The Domestication Process in Southeastern Turkey: The Evidence of Mezraa-Teleilat

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PREFACE

My interest in Archaeozoology developed over years of participating on excavations in the Near East and southeastern Anatolia, parts of the world where the neolithization process can best be understood through the archaeological record. Especially the Near East and the southeastern part of Anatolia played an important role in the neolithization process.

As a result, I wrote my Master's Thesis on selected faunal material from Çayönü with the support of the Prehistory Section of the University of Istanbul. Even though archaeozoology is among the concerns of prehistoric archaeology, there are no specialists in this field in any of the Turkish Institutions. The faunal analysis was therefore supervised outside of Turkey by Prof. R. H. Meadow (Harvard University, Peabody Museum) and by Dr. H. Hongo (Kyoto University).

In 1999 a rescue excavation was initiated at the Neolithic settlement Mezraa-Teleilat, near Urfa in southeastern Anatolia, under the direction of Prof. M. Özdoğan (University of Istanbul). Prof. Özdoğan gave me the opportunity of working with the faunal remains from the site. I would like to thank him here for his support in the project and for his guidance in stratigraphic issues.

Prof. H.-P. Uerpmann (University of Tübingen) made it possible for me to continue my studies with the financial support of the German Academic Exchange Service (DAAD) at the University of Tübingen. I am grateful to him and to Prof. Özdoğan for their help and for the many discussions. I was able to benefit from their experience, which made the work on this subject much easier.

For their support, their interest and for our many discussions, I would also like to thank Prof. U. Esin (University of Istanbul), Prof. M. O. Korfmann (University of Tübingen), Dr. H. Hongo (University of Kyoto), and Prof. R. H. Meadow (Harvard University).

Dr. N. Karul, E. Özdoğan and V. Gürdil (all from the University of Istanbul) shared their information about archaeological features, stratigraphy and excavation results with me.

For the identification of the shark tooth I thank A. Lehmkuhl (Staatliches Museum für Naturkunde, Museum Stuttgart). My thanks go to D. Kerns, Dr. G. Summers (Middle East Technical University, Ankara) for reviewing the English text.

And last but not least, this work would not have happened without the support of my family!

1. INTRODUCTION

In spite of an increased number of excavations having taken place and continuing to take place covering various phases of the Neolithic period, still a great number of unsolved problems remain to be solved. Moreover, as more data become available, even the basic concept of the Neolithic is beginning to be newly interpreted. Thus it is becoming necessary to revise all previous assumptions. In this respect, not only the primary questions of where, how and when animal domestication was initiated, but also its consequences need to be re-assessed; a better understanding of domestication will yield a complete and uninterrupted sequence of the Neolithic period, and the consequences of domestication will provide unique information into the later phases of the Neolithic.

The significance of animal domestication in the Neolithization process is self-evident. All previous assumptions have considered food-producing – as well as animal domestication – as a prerequisite of sedentarism. Nevertheless, recent evidence, not only from Çayönü, but also from the German excavations at Nevali Çori, Göbekli Tepe and Gürcütepe, has revealed a completely new picture, indicating that full domestication of animals occurred later than has been previously assumed, and that the establishment of permanent villages did not necessarily depend on domestication. However, it has become clear that the southeastern part of Anatolia did play a major role in animal domestication. Accordingly, new evidence from southeastern Turkey is of critical importance, not only in understanding this significant process, but more in comprehending its social and economic consequences.

In light of our changing views on what we call "the Neolithic", a re-assessment of the already existing data on animal domestication becomes a necessity. Nevertheless, in doing so, it is also obvious that new data should be embraced as well. The Neolithic settlement of Mezraa-Teleilat is located near the Euphrates and will soon become inundated by the construction of a major dam. Even though most of the site dates to the Pre-Pottery Neolithic Period (PPN)[1] such as found in Çayönü, excavations have revealed that the material from Mezraa-Teleilat will provide the missing link between the PPN and the Early Chalcolithic Period. The Pottery Neolithic (PN) layers of this site incorporate five cultural stages, all of which are poorly represented elsewhere in the Near East. Accordingly, the material evidence of Mezraa-Teleilat will help in solving a number of unresolved problems, such as the implications of developed farming economies - one of the least understood episodes of Near Eastern prehistory.

[1] For additional abbreviations as II/III, III/IV, IV/V and their chronological position see Tab. 5. "L" marks a "Late" and "M" a "Middle" phase, i. e., LPPNB is late PPNB, etc.

Moreover, it has become evident that the efficient exploitation of nearly domesticated forms began to take place only with the transition from the PPN to the PN.

The study described below deals with the zooarchaeological analysis of the faunal remains found at the southeastern Anatolian settlement of Mezraa-Teleilat. Within the framework of this study I have tried to cover the evidence on the potential domesticates of southeastern Turkey in a comparative matrix. Nevertheless, the main component of this assessment is the bone material from the site.

The faunal remains from Mezraa-Teleilat provide us with an opportunity to examine changes in human-animal relationships over the entire period of the PPN and into the PN. The following four topics define the scope of this work on the Mezraa-Teleilat material:

1) **Animal exploitation and how it changes over time.** The observation of differences between levels such as taxonomic abundance, sex ratios, skeletal part frequencies, bone modification, kill-off pattern, etc.
2) **Animal domestication.** Quantitatively and morphologically attesting for domesticates at Mezraa-Teleilat so as to determine which domestic animals were kept in the settlement, the date of domestication at the settlement, the beginnings of the use of domestic animals at the site and whether domestic animals were introduced or developed locally.
3) **Within-size variation.** Size index, comparative dimensions of the material with that material from other sites in western Asia.
4) **Intra-site variation.** Are there patterned differences in the nature of faunal remains recovered from different archaeological features at Mezraa-Teleilat? Is there any evidence for the development of specialization in animal husbandry, animal procurement, or carcass preparation? Are there functional differences of animal remains inside the buildings, differences in the animal exploitation between various archaeological features (buildings, pits, ovens etc.). Are there any animal remains signifying a special function or position at the settlement?
5) **Between-site comparison.** The Mezraa-Teleilat faunal material will be compared with material from contemporary sites in southeastern and south Central Anatolia, northern Syria, and the Levant.

2. THE NEOLITHIC PERIOD

2.1. Defining the Neolithic

The Neolithic was described until the last two decades as a period in which humans first started producing food.[2] Most scientists agree, that food production is the economic foundation upon which the state and modern civilization are built and maintained.[3]

This period, termed the "Neolithic Revolution" by G. Childe[4], cannot describe just a simple shift in the subsistence pattern from hunting-gathering to farming and domestication. Recent evidence indicates that very complex socio-cultural systems were involved, including monumental architecture, networks of trade, etc.

The concept of Neolithic was first used in prehistory by J. Lubbock in 1865. Later, at the end of the 1920s, G. Childe suggested that such a system simply reflects a technological development. The term itself cannot explain the social development and economic patterns involved. The significant element of the Neolithic concept should be the production of food.[5]

This new understanding of the term required data from archaeology and other allied fields such as zooarchaeology, archaeobotanic, etc., and, in a sense, brought them theoretically together. The "Oasis Theory", suggested by R. Pumpelly in 1908, was re-evaluated with the environmental interpretations by G. Childe and E. Huntington.[6]

Firstly, in 1948 R. J. Braidwood began testing ideas on food production with his excavation at Jarmo in Iraq. For the first time not only archaeologists but also zooarchaeologists, archaeobotanists, etc., took part in an excavation. From this time on, research has been carried out not only for the sake of chronology and description, but also done in the hope of understanding which conditions existed during the transition from hunting-gathering to food production.[7]

R. J. Braidwood introduced a new Neolithic terminology into the field of archaeology. He used the terms "*Natural Habitat Zone*" or "*Nuclear Zone*" to describe the regions which contain naturally domesticable plants and animals.[8]

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[2] Braidwood 1995:122-123.

[3] Wright 1971:109.

[4] Childe 1988; Huntington 1959; Özdoğan 1995a:269.

[5] Özdoğan 1995a:269.

[6] Özdoğan 1995a; Huntington 1959; Childe 1988.

[7] Wright 1971:118-119; Özdoğan 1995a:269.

[8] Wright 1971:119; Braidwood 1995:136-140; Redman 1978:95-97; Singh 1974:6-10.

His "*Natural Habitat Zone*" is closely related with Breasted's concept of the "*Fertile Crescent*", also known as the "*Hilly Flanks*", with both describing the most favorable environment for early agricultural societies.[9]

R. J. Braidwood focused his research after 1948 on clarifying the "*Food Producing Period*" – in opposition to G. Childe's technological system. He employed culturally based, socio-economic terms, and preferred using the term "*First Producing Societies*" for the Neolithic. According to this he divided the developing process into "*Incipient Food Producing*", "*Effective Food Producing Villages*", etc.[10]

R. J. Braidwood also supported the theory of a "*Slow and Continuously Evolution*" and disagreed with G. Childe's model of a "*Neolithic Revolution*".

Today Neolithic research has revealed that even the first stage of the Neolitihic period was developed by complex cultures with monumental buildings, planned and organized settlement structures, widespread trade, art objects and varied subsistence patterns.

Researchers over the last few decades have been searching for sources in earlier periods (Mesolithic or Proto-Neolithic) after evidence was uncovered revealing developed and splendid finds.[11] Especially since 1970, due to various reasons, they became interested in looking beyond the "*Natural Habitat Zone*". Some excavations in this region include Seng-i Çakmak, Ganj Dareh, Bus Mordeh, Tel İblis, El-Kown, Aswad, Umm Dabaghiyah, Bouqras, Nemrik, Qermezdere and Mureybit. The results of their work changed old ideas concerning the Neolithic. R. J. Braidwood and others extended the "*Natural Habitat Zone*".[12]

J. Oates suggested in 1973 that the distribution of Neolithic sites was not only limited to the "*Natural Habitat Zone*". According to her, Neolithic sites could also exist in a region which has very limited precipitation. Therefore she re-evaluated the data from arid regions in Iran, Iraq, Turkey and Syria.[13]

H. Nissen thought about these small eco-systems for the first time as containing varied environments. Also, some new concepts were developed with regard to demographic stress

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[9] Özdoğan 1995a:270; Özdoğan 1995b:44-45.

[10] Braidwood 1995; Özdoğan 1995a:270.

[11] Proto-Neolithic used for Mezolithic or Epipaleolithic cultures. Boudez and Bailloud suggest using this term for societies which were food producing but not yet benefiting from all the results of food producing (Özdoğan 1995a).

[12] Özdoğan 1997:8; Özdoğan 1995a:272.

[13] Özdoğan 1997:8; Oates 1973:147-181.

(the conditions causing stress, as a means for understanding the first food producing societies).[14]

The first period of new excavations saw intensified work in the "*Fertile Crescent*" and produced very interesting results. The "*Fertile Crescent*" has been accepted without any discussion as a "*Nuclear Zone* " for the Neolithization process. Due to more recent work, earlier stages, such as Proto-Neolithic and PPNA sites, were found in the Levantine region and old approaches had to be re-formulated again. The earliest level of the Neolithic period was encountered in the Levantine region, where the number of excavations carried out has remained high. On this basis O. Bar-Yosef, D. O'Henry, and J. Cauvin re-defined the "*Nuclear Zone*" again and described it as being located in the southern Levant. According to them, food producing began in this region and spread later (around 9.500 BP) to Syria and southeastern Anatolia. Neolithic sites outside of this zone, especially in Syria and Jordan's semi-arid regions, have been interpreted as resembling border cultures.[15]

J. Cauvin described such a distribution model as "*les premieres diffusions*" and dated it to the end of the PPNB. But he altered his model after excavations were carried out at the sites of Mureybet and Çayönü, which were described as coming from the PPNB.

O. Bar-Yosef developed another description for the "*Nuclear Zone*". He proposes that the diffusion of the first food-producing societies from Palestine to the north depended on climatic and environmental differences.[16] The argument behind this idea lies in the presumed poor environmental conditions: people had to migrate to the north because of better precipitation in this region.[17]

Another development in defining the Neolithic period is the dividing of the period into several phases. First of all the PPN was divided into two periods, A and B. This system was first used to describe the stratigraphy of Jericho and was later used for the whole Near Eastern PPN. Also a "Proto-Neolithic" and a "PPNC"[18] have been applied to this system and occurred in a process that includes four stages, i. e., Proto-Neolithic, PPNA, PPNB and PPNC.[19]

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[14] Wright 1971; Redman 1978:101-103.

[15] Bar-Yosef/Meadow 1995; Cauvin 1988:70; Cauvin/Cauvin 1993; Özdoğan 1995a:273.

[16] Cauvin 1989a:14; Bar-Yosef/Belfer-Cohen 1992:38

[17] Özdoğan 1995a:275; Bar-Yosef/Meadow 1995:39-40, 58-71.

[18] This period is marked by the general collapse of the cultural system. This trend was first observed in Ain Ghazal by G. O. Rollefson, who called it PPNC (Rollefson/Rollefson 1989; Köhler-Rollefson/Quintera/Rollefson 1993), or as final PPNB.

[19] Özdoğan 1995a:276.

In the last few decades the number of Neolithic excavations in Anatolia has increased. In southeastern and eastern Anatolia work has been conducted, for instance, at Cafer Höyük, Gritille, Nevalı Çori, Hayaz, Hallan Çemi, Mezraa-Teleilat, Akarçay Tepe and Göbekli Tepe; in Central Anatolia at Aşıklı Höyük, Musular, Suberde, Erbaba and Can Hasan III. Excavations and surveys in the Keban dam reservoir, or in the Ilısu-Kargamış Dam area, are still going on.

A contrast in traditional approaches seems at work here. Neolithic sites north of the Taurus (Cafer Höyük, Boytepe, Çınaz Höyük, with a strong possibility at Boytepe and Çınaz) are datable to the end of PPNB, and Cafer Höyük provided a long sequence of PPN.[20] The absence of PPNA sites in eastern Anatolia most likely is related to the lack of research in this region. The Hallan Çemi excavation in Batman provides us with finds that are antecedents of the "Çayönü Culture", dated to around 10.000–8.500 BC. The economy, determined through the finds at this excavation, was based on hunting-gathering. The architectural remains from the site were distinguished by their circular wattle and daub constructions. M. Rosenberg considers Hallan Çemi to have been a sedentary village. The lithic industry shows similarities to the finds from Nemrik and Qermezdere in the Zagros region.[21]

This settlement reflects the whole PPNA process and provides a view of the local development of the Neolithic cultures. These cultures developed within the region itself and not from outside, i. e., not through migration.[22]

The earlier levels at Çayönü have as yet to be well understood. The work carried out focused on the upper levels. But during more recent excavations earlier levels at the site have been reached and the existence of PPNA was evident. Çayönü appears to have possessed all stages of the Neolithic period. The monumental architecture is one of the best recognized and most highly developed in the Near East.[23]

The subsistence economy of Nevalı Çori was based on hunting and the primary stages of animal domestication occurred around 9.000 BC. The site seems to be a religious centre with small statues, big stone sculptures, "cult buildings" and houses. Sculptures from Nevalı Çori are life-size. They were found inside the "cult buildings" (8.610 – 8.330/7.460 – 7.070 BC).[24]

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[20] Cauvin 1989b; Cauvin/Aurence/Cauvin/Balkan-Atli 1999.

[21] Rosenberg 1994:130; Rosenberg/Nesbitt/Redding/Strasser 1995; Rosenberg 1999:29.

[22] Rosenberg 1994:130.

[23] Özdogan 1995a:277.

[24] Özdogan 1997:10; Hauptmann 1999:65. This date is taken from Bischoff 2004; OxA-8303, 8.280±55 BP, 8.610-8.330 cal. BC, human bone (level I); KIA-14759, 8.213±132 BP, 7.460-7.070 BC, bone (level III/IV).

Another important settlement is found at Göbekli Tepe, also located in Urfa Province. Monumental architecture is also observed here. The architectural character might indicate a religious centre.[25] After analyzing the lithic industry, the site has been dated to the first and middle stages of the PPN (9.130 – 8.790 cal. BC/7.590 – 7.390 cal. BC).[26]

The evidence from Hallan Çemi, Çayönü and Nevalı Çori, together with the assemblages from Biris Mezarlığı, reveal an unbroken sequence for southeastern Anatolia during the Neolithic period.[27] Güzir Höyük and Demirci Tepe, though, are as old as Hallan Çemi and have a PPNA character.[28]

According to this new evidence, J. Cauvin re-formulated his ideas on the diffuzion model, and accepted the existence of a different Neolithic formation in the north and called this formation "Taurus Neolithic" or "Mureybetian".[29]

The Neolithic cultures in southeastern Anatolia look as though they developed together with the Near Eastern ones.[30] But some local differences developed as well due to environmental variations. Çayönü, Cafer Höyük and Hallan Çemi are located at a altitude of ca. 800 m in contrast to Syrian and Levantine sites, which are situated in locations between 300 and 500 m. The Taurus Mountains contain rich raw material and biological resources. This might be a reason for the development of different features as determined by the environment. This trend is seen most significantly as influencing the selection of the settlement locations, the subsistence, the type of buildings and the lithic industries.[31]

The material/architectural picture of the PPN in Central Anatolia (Çatal Höyük, Can Hasan, Aşıklı) differs from those in southeastern Anatolia and in the Near East. The first recorded PPN seems to have developed in a very independent manner. M. Özdoğan suggested that antecedents of this culture should be sought in the Central Anatolian Paleolithic or Epi-Paleolithic periods.[32] During the PPN, extensive trade in obsidian has been observed as occurring from Central Anatolia into the Near East. But the trade did not play a role in

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[25] Schmidt 1996:3.

[26]This dates is taken from Bischoff 2004; Hd-20036, 9.559±53 BP, 9.130-8.790 cal BC (charcoal, Pistacia sp. Amygdalus sp.); UA-19561, 9.430±80 BP, 7.590-7.370 cal. BC (pedogenic carbonate coating). 14C dates are also published by Schmidt 1995:9; Kromer/Schmidt 1998; Peters/Schmidt 2004.

[27] Özdoğan 1995a:277; Özdoğan 1995c:53.

[28] Esin 1999:15.

[29] Özdoğan 1995a:275; Özdoğan 1995b:38; Özdoğan 1995c:52-53.

[30] Özdoğan 1995a:278; Özdoğan 1995b:53.

[31] Özdoğan 1995a:278.

[32] Özdoğan 1995a:278; Özdoğan 1995c:54.

creating cultural links between these two regions due to the different natural habitats in Central Anatolia.[33]

The Anatolian Neolithic in general – with the exception of some settlements in southeastern Anatolia – does not fit into the agricultural village subsistence model suggested from the 1960s. There is no evidence of food production at Hallan Çemi (a Proto-Neolithic site dating to ca. 9.000 BC[34]), while at Çayönü, hunting was the main source of the economy for a long period. This economy supported a very limited amount of crops. The situation at Aşıklı could be described in similar terms.[35]

The cultivation of crops has been understood as an essential component in describing a sedentary life in semi-arid and arid regions in the Near East. But Anatolia, with its more rich natural habitat, cannot be similarly described. In this respect, R. J. Braidwood's terminology of "*First Agricultural Societies*" cannot be employed in Anatolia. The Neolithic might be better explained as the adaptation of cultures, with their technologies, to changing environmental conditions.[36]

In PPN the cultivation of crops became more and more intensive, but hunting and gathering still played an important role in the subsistence. Because of this, PPNA and PPNB economies can best be defined as mixed or transitional economies. However, in the later PPNB domesticated animals appeared as well, and an agricultural economy became completely developed.[37]

2.2. The Neolithic in Turkey

For a very long time scholars assumed that Anatolia had no role to play in the formation of prehistoric cultures due to geographical difficulties. Many archaeologists chose to intensify their activities in the Near East, especially in the Levantine-Mesopotamia area. Anatolia was seen as a marginal area inhabited during later periods.[38] This notion did not change after Neolithic sites such as Hacılar, Çatal Höyük, Suberde and Aşıklı in Central Anatolia were

[33] Özdoğan 1995a:278; Özdoğan 1997:12.

[34] Beta-47252, 11.700±460 BP, 12.400-11.100 cal. BC (charcoal); Beta-66850, 9.510±200 BP, 9.200-8.600 cal. BC (charcoal), dates from Bischoff 2004.

[35] Özdoğan 1995a:278-279; Özdoğan 1995b:54; Özdoğan 1997:9.

[36] Özdoğan 1995a:279.

[37] Özdoğan 1997:13.

[38] Childe 1988; Özdoğan 1997:4.

investigated in the 1960s. Researchers assumed these locations to be subsidiary sites for trading obsidian or salt to the Levant. Only later did the complexity of Çatal Höyük become clear. The results from this site were then explained through diffusionist ideas.[39]

Only in recent years have some scholars working in Syro-Mesopotamia or in the southern Levant begun considering Anatolia within the formation zone of primary Neolithization.[40]

In southeastern Turkey the first clear evidence of Neolithic settlements was recovered in 1963 during a surface survey project by H. Çambel and R. J. Braidwood. Twelve PPN sites were detected as well as more than one hundred later prehistoric sites. During this survey Biris Mezarlığı, Söğüt Tarlası, Grikihaciyan and Çayönü were discovered and excavated. Çayönü became one of the key sites demonstrating the process of Neolithization. Later investigations followed in Central Anatolia at Can Hasan, Suberde and Erbaba, however all these excavations were not enough to change the accepted ideas concerning the Neolithic period, and the Anatolian evidence continued to be disregarded.

However, as a result of the work carried out at sites such as Nevalı Çori, Hallan Çemi, Göbekli Tepe and Aşıklı, the trend has changed, and Anatolia is now included among the regions exhibiting the primary Neolithic cultures.[41]

During the last few years archaeological activities have increased in Anatolia. But still, the number of excavated Neolithic sites in Turkey stands only at 36, while the number in Israel, Jordan, Lebanon, Syria and Iraq totals more than 400.[42]

There are still few sites known in northeastern Anatolia or in the littoral areas of the Aegean part of Turkey.

Archaeological activities in Anatolia were especially intensified in the Urfa-Diyarbakır Region, the Konya-Aksaray Region, the Lake District and in the Marmara Region.[43]

The Çayönü excavations continued until 1991. Similar to Çatalhöyük, Cayönü was accepted as a unique case on the route to the obsidian sources in a marginal region from the main zone of the Neolithic. Excavations at Cafer Hoyuk and Boytepe (both PPNB sites, on the northern side of the Taurus range), and other Neolithic sites such as Gritille, Hayaz, Nevalı Çori, Hallan Çemi and Çayönü, have all provided new information and thereby a new understanding into the Anatolian Neolithic period.[44]

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[39] See chapter 2.1.; Bar-Yosef/Belfer Cohen 1991:194; Cauvin 1988:77; Cauvin 1989a; Özdoğan 1999a:10.

[40] Bar-Yosef/Meadow 1995; Özdoğan 1997:5.

[41] Özdoğan 1999a:10.

[42] Harmankaya/Tanındı/Özbaşaran 1997; Esin 1999:17; Özdoğan 1995b:33.

[43] Özdoğan 1999b:11.

[44] Özdoğan 1995b:38.

Some scepticism still exists concerning the antiquity of Neolithic cultures in southeastern Turkey. Until a few years ago, a new series of hypothesis were formulated describing the "*Neolithisation secondaire*" and the "*Levantine Corridor*" and were based on the distribution of research in the Near East.

However, after Qermezdere and Nemrik, located in northern Iraq, the presence of the PPNA stage has been generally accepted for this region.[45]

2.2.1. Antecedents of the Anatolian Neolithic Cultures

Upper Paleolithic sites in Turkey are very rare while earlier and later periods are much better represented. Mediterranean Turkey is the most extensively examined region for the Paleolithic period.

Typical Aurignacian assemblages have been observed only on the Black Sea coast (Ağaçlı group). Final stages of the Upper Paleolithic were recovered in the cave sites of Antalya.

Mesolithic or Epi-Paleolithic sites are also very rare in Turkey. Baradız (dune site), Tekeköy, (rock shelters) Beldibi Biris Mezarlığı and Söğüt Tarlası (both open-air site) provide good samples for these time periods. Microlithic assemblages with some geometric components were recovered in all of them. But due to the insufficient non-artifactual assemblages, the lithic evidence remains unclear. Öküzini (Antalya) has provided more concrete evidence to fill the gap between the Upper Paleolithic and the early Neolithic. Only in the Antalya region does a long sequence exist from the Upper Paleolithic to the developed Neolithic. Natufian, Franchti and Romaneli elements have been observed in the microlithic assemblage at Öküzini and Beldibi (both near Antalya). We do not yet have enough information for this period in Central Anatolia (only limited data is available from Pınarbaşı, Baradız, Macunçay and Dervişin Hanı).

Coastal dune sites near the Black Sea on either sides of the Bosporus, called the Ağaçlı group, have also revealed microlithic industries. This assemblage is completely different from Öküzini and resembles a Gravettian tradition.

In conclusion, at least two distinctly different traditions were observed during the (Upper) Paleolithic/Mesolithic stage in Anatolia: Mediterranean and Pontic.[46]

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[45] Özdoğan 1995b:38.

[46] Özdoğan 1999b:226-227; Özdoğan 1997:17; Özdoğan 1995b:33-34.

2.2.2. The PPN in Turkey

Our knowledge of the early PPN stages in Anatolia is limited. PPNA levels were clearly observed at Çayönü and at Hallan Çemi in southeastern Anatolia. Both sites are fully sedentary villages and indicate a hunting and gathering society. The architecture is represented by simple round, hut-like structures. Socio-economic patterns of the inhabitants of Hallan Çemi indicate a "non-egalitarian" community. A "cult building" has been recovered in level I. Similar buildings were observed in later periods at Çayönü, Nevalı Çori and Göbekli Tepe. Obsidian makes up 58% of the lithic assemblage at Hallan Çemi.

The lithic industries at Biris Mezarlığı and Söğüt Tarlası contain microlithic tools. M. Özdoğan believed that these settlements (excavated in 1964 by B. Howe, in Urfa) might be contemporary to Hallan Çemi or probably earlier.

Roots of the southeastern Anatolian PPNB – from Hallan Çemi and Çayönü – extend back at least to the PPNA. They show similarities (architecture, burial practice, settlement patterns, etc.) to the Syrian-Levantine sites, though with some differences especially with regard to lithic artifacts.

It has been impossible until now to find the ancestors of the Aşıklı in Central Anatolia. The "Aşıklı Culture" is fully developed, even in the earliest layers. Therefore older stages should be occur in this region.

Two cultural regions were established by archaeologists for PPNB in Anatolia. The first region is southeastern Turkey. Here, the development took place parallel to what occurred in Syria, Mesopotamia and in the Levant. The cultural stages of the southern Levant are directly applicable to southeastern Anatolia. The second region is Central Anatolia, with a markedly different identity to that found in the southeast and in the Near East PPN.

The evidence from Central Anatolia (Aşıklı, Can Hasan, Suberde, Erbaba etc.) does not fit into the general system of the Near Eastern Neolithic. We can not use the PPNA- or PPNB-terminology for the Central Anatolian PPN.[47]

The southeastern Anatolian PPN architecture was characterized by free-standing structures surrounded by large spaces. In contrast, the Central Anatolian PPN architecture is significant with large, agglomerational buildings. There are only narrow passages between the houses. This tradition continued up through the PPN (Aşıklı) into the middle phase of the PN (Çatalhöyük).[48]

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[47] Özdoğan 1997:12-13; Özdoğan 1999b:227-229.

[48] Özdoğan 1999b:229.

Rigid planning was observed in southeastern Turkey during the PPNB. All structures were built on the same plan and with the same technique. Such pre-planned settlements started in this region as early as Hallan Çemi during the early PPNA and are also seen at the end of the PPNA in the so-called Grill Plan Sub-Phase period at Çayönü.

Other significant characteristics of the Southeast Anatolian PPNB are the "cult buildings", for example the "*Flagstone Building*", "*Skull Building*", "*Terrazzo Building*" at Çayönü[49], and a monumental building at Göbekli Tepe. They can be described as monumental and architecturally (plan, technique, material, size) different from domestic houses. This kind of building required a collaborative effort and has been used to indicate a social stratification in PPN societies of southeastern Anatolia.

In Central Anatolian PPNB settlements some shrines were also recovered, though they are architectually very similar to other buildings. They are distinguished simply by finds and some special features inside the constructions. These buildings are not so monumental as the southeastern Anatolian cult buildings mentioned above.

In this period there were, according to M. Özdoğan, two different cultural regions in Anatolia. The field work at Boytepe, Cafer Höyük and Çınaz have, though, altered this perception.

The final stage of the PPNB was characterized by advanced technological knowledge (burning lime, cultic buildings, etc.) in southeastern Anatolia and in Syrio-Levant, and by the end of this period many sites had been abandoned or diminished. This trend was first observed in Ain Ghazal by G. O. Rollefson, who described it as PPNC[50], otherwise, this phenomenon has been called the final PPNB.

Many scholars have explained this occurrence through climatic change, an over-exploitation of land or the spread of diseases introduced by domestic animals. M. Özdoğan suggests a kind of social turbulence as one possible reason.[51]

Çayönü and Mezraa-Teleilat are two of the few sites which survived in this period. Both of them diminished in size. "Cult buildings" disappear, burial customs were changed. While the PPN dead were buried within the settlements, in the PPNC (= final PPNB) no skeleton has been found inside the settlements. But this bias is valid only in southeastern Anatolia. Intramural burials continue in Central Anatolia approximately until the developed stage of the PN (Çatalhöyük, Köşkhöyük).[52]

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[49] For detail about special buildings at Çayönü, see Schirmer 1990.

[50] Rollefson/Rollefson 1989; Köhler-Rollefson/Quintero/Rollefson 1993.

[51] Özdoğan 1998a:35-36; Özdoğan 1997:13-14.

[52] Özdoğan 1999b:233.

2.2.3. The PN in Turkey

An aim of this part of my study is to provide a brief overview of the PN in Turkey. In the Pottery Neolithic period, the number of archaeological sites increased in Central Anatolia and in the Lake District. The first sedentary communities appeared in western Anatolia and in southeastern Europe.

The Bademağacı excavation revealed that the use of pottery in the Lake District may have appeared earlier than previously believed.[53]

There is no evidence for a Transitional Period (TP) from the PPN to PN for Central Anatolia and the Lake District. Also, for the first time traditional Anatolian architecture appeared in southeastern Anatolia with the PN at Çayönü. The structures were joined to one another with open courts around them and divided by streets. The pottery in these levels is similar to the Pre-Hassuna and Hassuna style. It suggests that the PN phase at Çayönü might have been earlier than the PN phases of the Amuq and the Cilician plains.[54]

The PN in Turkey originated within different cultures in different ecological regions. The settlements in the eastern part of Anatolia south of the Taurus reflect the PN which is known in northern Mesopotamia and northern Syria.

Çatalhöyük East, Can Hasan I, Hacılar, Erbaba, Kuruçay, Bademağacı and Köşkhöyük are the best-known PN sites from Central Anatolia and the Lake District.[55]

The main PN sites of the Marmara Regions are Yarımburgaz (cave), Fikirtepe, Pendik, Ilıpınar, Hoça Çeşme and Aşağı Pınar.[56] All of these sites contain different local characteristics and are different from each other. According to M. Özdoğan, the roots of the PN in the Marmara Region might be located in northwestern, inland Anatolia or in the Aegean coastal region. Settlements in the Marmara Region, especially in eastern Thrace, reveal relationships with southeastern Europe.[57] Cultural relations between eastern Thrace and the Balkans appeared initially during the PN period.[58]

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[53] Özdoğan 1999b:233.

[54] Özdoğan/Özdoğan 1990.

[55] Esin 1999:18.

[56] Özdoğan 1997:19-27; Özdoğan 1989.

[57] Özdoğan 1998b:71.

[58] Özdoğan 1998b; Esin 1999:19.

3. ANIMAL DOMESTICATION

3.1. Defining Animal Domestication

Domestication is a highly developed man-animal relationship. Many scholars have tired to define animal domestication, but the most accepted definition was created by S. Bökönyi: "The essence of domestication is the capture and taming by man of animals of a species with particular behavioral characteristics, their removal from their natural living area and breeding community, and their maintenance under controlled breeding conditions for mutual profit".[59]
H. M. Hecker and J. Clutton-Brock also described domestication. But their definition is very close to S. Bökönyi's.[60] Domestication appeared with the beginning of cereal production and was nearly completed in Neolithic times. It has been suggested that the cereals provided fodder for the caprovines. According to Bökönyi, specialized hunting was the basis of the first large scale move toward domestication.
P. Ducos's definition is slightly different: "domestication must be defined with reference to human society. Domestication can be said to exist when living animals are integrated as objects into the socio-economic organization of the human group, in the sense that, while living, those animals are objects for ownership, inheritance, exchange, trade, as are the other objects (or persons) with which human groups have something to do".[61]
Otherwise, domestication is a symbiosis and the animal itself plays an essential part in this process as well.[62] But P. Ducos does not agree. Domestication is not a symbiosis with two sides (animals and humans) both playing a major role. It is only a human idea, and humans engaged in such an enterprise because they wanted to. For domestication to occur, particular behavioral characteristics are important. Therefore, not all animals can be domesticated.[63]
Animal husbandry is the result of domestication, developed into two steps. The first is keeping animals without conscious selection; the second is developed animal breeding with conscious selection.[64] At first, domestic animals were exploited for their meat and secondary

[59] Bökönyi 1989:22-27; Bökönyi 1969:219.

[60] Hecker 1982:219; Clutton-Brock 1981.

[61] Ducos 1978a:54; Ducos 1989:28-30.

[62] Bökönyi 1989:22-27; Uerpmann 1996:227.

[63] Uerpmann 1996.

[64] Bökönyi 1989:26.

products, such as wool, milk, transport, etc., were procured from animals as early as in the Chalcolithic/Bronze Age (Anatolian terminology).[65]

3.2. Evidence for the Domestication Process in the Animal Bone Assemblages

There are two different forms of evidence for the domestication process: a biological form and a cultural form. All evidence for domestication are listed in two different group listed below:

(A) Cultural Evidence of Domestication:

- **A change in species abundance:** When the proportion of a species at an archaeological site or at different sites in the same region increases, this circumstance can be taken as evidence for domestication.
- **More young individuals in the assemblage:** When different proportions of age groups are observed in the assemblage than are normally found in a wild population. For example, more immature individuals.[66]
- **The introduction of a new species:** When one new species appeared at an archaeological site and this species did not live naturally in this region.
- **Sex structure:** The proportions of the sexes of a domesticable species are not the same as found normally in wild populations. The sex structure in domesticated herds is controlled by humans. More female bones in an adult herd are accepted as evidence of domestication.

Other criteria: Some artistic representations and artifacts can also be used in determining domestication[67], but this is more useful in much later time periods than for the first steps toward domestication in general.[68] Differences of age and sex groups are not sufficient pieces of evidence for evaluation. They can be related to selective hunting or seasonal exploitation.[69] Because of this, such a criterion should not be used alone in determining domestication.

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[65] Sherratt 1981:263 and 1983.

[66] Collier/White 1976:96-102; Herre 1969:257-271.

[67] Bökönyi 1969:219-229.

[68] Legge 1996:239; Olsen 1979:175-197; Berry 1969:207-217; Jarman/Wilkinson 1972:83-97; Grigson 1989:77-109.

[69] Meadow 1989:83; Uerpmann 1979; Jarman/Wilkinson 1972.

(B) Biological Evidence of Domestication: biological criteria take more time than cultural.

- **Morphological differences:** The morphological evidence cannot be used to evaluate the first stages of the animal domestication process. Morphological changes take more time to occur and can only be used in determining full domestication. S. Bökönyi suggested that the first morphological changes can be observed after approximately 30 generations.[70] Only two different morphological changes are visible in the first or second generation: pathological occurrences and dimunition in size. The latter is accepted by many scholars as the most confident criterion.[71] Domestic animals are smaller than their wild ancestors. But it need be mentioned that climatic conditions might also be a reason for dimunition in size, as this has been observed in wild populations. Bergmann's rule demonstrated larger wild mammalians occurred under cold climatic conditions.[72] This possibility should be taken into consideration when we discuss the domestication process and should be combined together with other criteria.[73] Other morphological differences include cross-sectional structures of horn cores (it takes more time than a dimunition in size or the appearance of pathologies) and, bone surface modification.[74] Horn cores are used for the determination of domestic animals (hornless females, etc.). But in using horn cores as evidence of domestication, variability of size and horn core forms in wild species should be known as well. A second problem here is the, at times, very difficult separation of sheep and goat. Many changes can appear also in the skull. Mostly the facial part of the skull can become shorter. Differences in hair and in some organs also may develop (in the pancreas, liver, etc). The brains of domestic animals become smaller. Some research has proved that domestic animals see and hear worse than their wild ancestors.[75]

After determining whether domestication has occurred, the existence of a local domestication at the settlement should then be discussed. Varying criteria are used by different scholars in discussing local domestication; the most important points are listed below:

- the existence of both wild and domesticated individuals;

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[70] Bökönyi 1989:25; Ducos 1978a:54; Ducos 1989:28-30; Uerpmann 1979; Meadow 1989:86

[71] See details about dimunition in size; cf. Uerpmann 1979. For the reason of the size reduction cf. Meadow 1989:86; Zeuner 1963.

[72] Bergman's rule; Tchernov/Horwitz 1991:54-75; Jarman/Wilkinson 1972:83-97; Ducos/Horwitz 1997:229-247.

[73] Meadow 1984:309-313.

[74] Daly/Perkins/Milling Drew 1973:157-161; Gilbert 1989:47-86; Fisher 1995; Olsen 1979:183.

[75] Herre/Röhrs 1973; Zeder 2006:109; Berry 1969:208.

- the existence of transitional forms: many transitional individuals apparent from the metrical analysis of animal bones, for example from sites with local domestication, and also transitional forms in shape;
- some differences in the proportion of age and sex groups in the wild population.[76]

3.3. Animal Domestication in the Near East

For the chronological situation at selected sites in the Near East see Figure 2. The map shows archaeological sites mentioned in the text (Fig. 1).

3.3.1. Anatolia

Material from the PPN in Anatolia is scarce and comes from the excavations at Çayönü, Cafer Höyük, Gritille, Hayaz, Aşıklı, Göbekli, Gürcütepe and Nevalı Çori.

3.3.1.1. Central Anatolia

Aşıklı lies at the western edge of the Taurus Mountain Range, near the escarpment of the Central Plateau, along the Melendiz River, ca. 25 km east of Aksaray. The site has been dated to the 8th millennium BC according to calibrated 14C dates.[77] In Aşıklı H. Buitenhuis continues to work on animal remains, and also Payne had worked on a small amount of Aşıklı animal bones found there.[78] Sheep and goat are the most dominant animals (70,6%). Wild cattle (20,5%) follow caprines. Wild boar, equids, cervids dogs, foxes, and hares seem to be of varying importance at the site. Some bird remains and very few fishes have also been recognized in the faunal material. The subsistence economy was mainly based on hunting of caprines and cattle. The sheep-goat ratio is 5:1. Caprines and cattle are the most available resources around Aşıklı. The proportion of the presented animals slightly shifts in different

[76] Bökönyi 1969:220-223.

[77] Esin 1995:75-76, Figs. 11-12.

[78] Payne 1985.

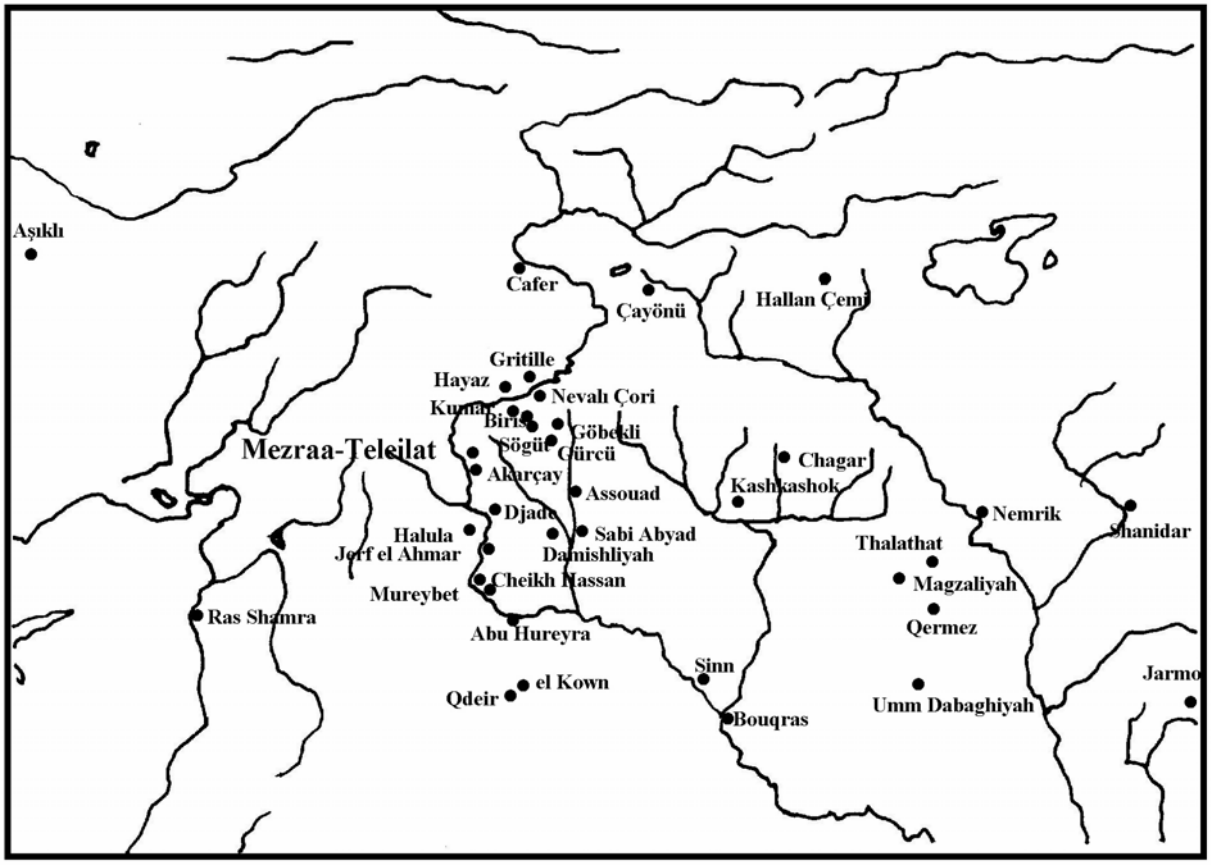

Fig. 1: Archaeological sites in the Near East mentioned in the text.

phases. Cattle remains increase in the latest period, when relative proportions between ovicaprid and cattle were found to be similar to earlier levels found at the site.

The ratio of female to male ovicaprids is roughly equal at the site, which H. Buitenhuis believes points to the killing of an equal amount of males and females, suggesting an unselective hunting strategy.

Based on fusion patterns, ca. 15% of the animals were killed in infancy (less than 8-12 weeks old), and that very few were killed in the juveniles and subadult stages. Most animals were killed between the ages of 30-48 months, while very few were killed at very advanced years. According to Buitenhuis, this tendency demonstrates selected hunting of animals by the people of Aşıklı.

He suggests an intensive management of the ovicaprids in the environment. No size diminution is observed for sheep and goat in the assemblage. Size index data shows that the

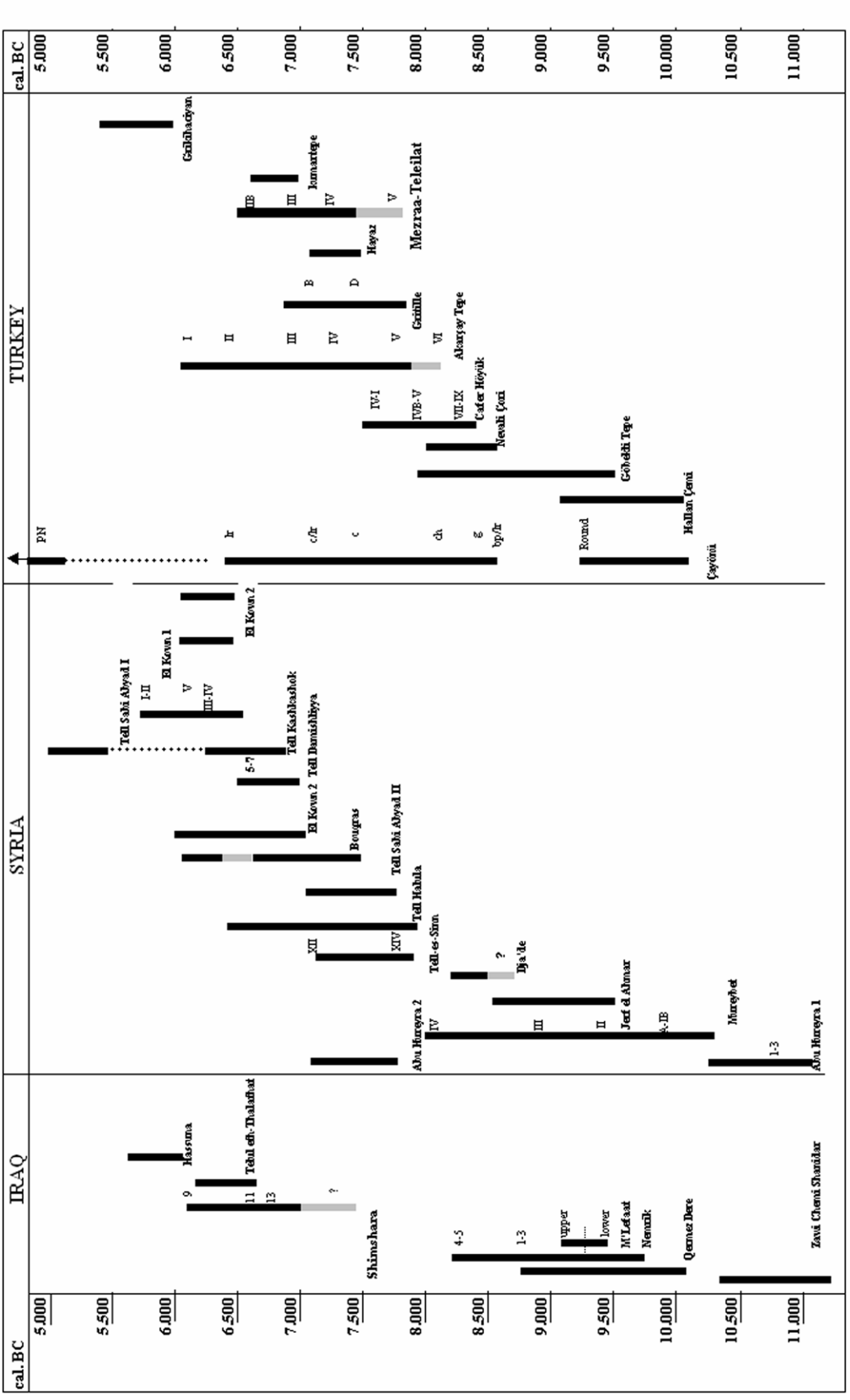

Fig. 2: Chronological table of the main Neolithic sites in the Near East, based on calibrated radiocarbon dates. Modified after D. Bischoff 2004.

sheep and goats at the site were the same or even larger than modern wild sheep and goats.[79] H. Buitenhuis maintained that "from the age and sex selection it is clear that some control over the major animal species was exercised. The age and sex patterns suggest a seasonality, which for a large population and a long period needed to depend on some form of control".[80]

3.3.1.2. Southeastern Anatolia

Hallan Çemi Tepesi is situated in the eastern Taurus. It is located on the western bank of Sason Çayı. Occupation began at the end of the Natufian period and continued until the beginning of the PPNA. Caprines (45%) were the most abundant species at Hallan Çemi, with the ratio of sheep to goats recorded at 18:1.[81] The kill-off pattern shows that 66% of the ovicaprids survived until an age of 42 months. The high adult survival rates indicated by the ovicaprid remains points to the sheep and goats being wild. Other important species include red deer (25%) and pigs (17%). Except for one aurochs (*Bos primigenius)* skull no wild cattle were found.[82] Other mammalian species represented in the faunal assemblage are fox, dog/jackal, bear, hare, fallow deer, stone marten, wild cat, beaver and European hedgehog, at less than 1% for each species. Non-mammalian species include two types of fish, lizards, tortoises and birds. Morphologically, sheep and goats are wild. A high proportion of immature pigs were observed at Hallan Çemi, and the kill-off pattern shows that 43% of the pigs were killed before the age of 12 months (10% even earlier than 6 months). The ratio of males to females is 19:9. Redding explains this pattern as being a result of selective hunting, favouring males. Some small pig teeth (two lower third molars and three upper second molars) were observed at the site. The sex ratio of pig demonstrate a strong male bias (11:4). This bias explained by Redding as some form of culling. The body part data indicate a higher percentage of pigs were butchered on or near the Hallan Çemi. R. W. Redding maintained that the kill-off pattern (high percentage of immature animals), sex ratio (bias toward males), body part frequency and some small-sized teeth indicate pig husbandry at the site.[83] But this notion has not been accepted by many scholars.[84]

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[79] Buitenhuis 2002:183-189; Buitenhuis 1997:655-662.

[80] Buitenhuis 1997:661; Esin 1998.

[81] Rosenberg/Nesbitt/Redding/Strasser 1995:5; Rosenberg/Nesbitt/Redding/Peasnall 1998.

[82] Rosenberg/Nesbitt/Redding/Peasnall 1998:28; Rosenberg 1999:25-33.

[83] Rosenberg/Nesbitt/Redding/Strasser 1995; Rosenberg/Nesbitt/Redding/Peasnall 1998; Rosenberg/Redding 1998.

Çayönü is located in the province of Diyarbakır, 7 km southwest of the town Ergani on the left side of the Boğazçay River, a tributary of the Tigris.[85] The site has been dated between 10.700–9.400 (round phase) and 6.640–6.260 cal. BC (large room).[86] A preliminary study of the Çayönü[87] material by B. Lawrence dates it to the beginning of the 8th millennium to the middle of the 7th millennium BC. This study demonstrates the occurrence of domestic sheep and goat.[88] B. Kuşatman worked on the pig bones for her doctoral thesis. R. H. Meadow also worked on the horse material.[89] According to their reports and new research, pigs are the most abundantly represented taxon through the "*Cell subphase*" (between 30%–40% in the different levels).[90] Cattle, sheep, goats, followed by pig, red deer, gazelle, roe deer, onager, bear, leopard, red fox, hare and a few other small mammal species, as well as some birds, tortoise, and a few fishes, are also represented in the assemblage. Through time prodomestic forms, especially ovicaprids (pig, sheep, goats and cattle), gradually increased (60% up to the *Cobble-paved* and approximately 90% in the *Large room subphase*).

Both the body size and the length of mandibular third molars of pigs from Çayönü indicate a gradual diminution over time.[91] However smaller pig lower third molar measurements (GL) increase in later subphases, and most of the pig mandibular third molars still fall into the size range of modern wild pigs.[92] Teeth smaller than the size range for modern wild pigs appear only in the PN, although a few wild pigs (large individuals) are still represented.

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[84] Detailed reasons of this see Peters/Helmer/von den Driesch/Saña Segui 1999.

[85] A. Özdoğan 1994:8.

[86] GrN-19482, 10.230±200, 10.700-9.400 cal. BC; GrN-10360, 9.300±140, 8.730-8.290 cal. BC (round building subphase); GrN-6243, 9.320±55 BP, 8.690-8.470 cal. BC; GrN-8821, 9.175±55 BP, 8.450-8.280 cal. BC (basal pits); GrN-14861, 9.090±50 BP, 8.420-8.230 cal. BC; GrN-16462, 9.040±65 BP, 8.410-8.020 cal. BC (grill building subphase); GrN-6241, 9.275±95 BP, 8.630-8.320 cal. BC; GrN-6244, 8.980±80 BP, 8.280-7,970 cal. BC (channelled building subphase); GrN-14862, 8.920±130 BP, 8.270-7.840 cal. BC; GrN-6242, 8.795±50 BP, 8.160-7.750 cal. BC (cobble-paved building subphase); GrN-8078, 8.355±50 BP, 7.530-7.340 cal. BC (cell building subphase); UCLA-1703C, 7.620±140 BP, 6.640-6.260 cal. BC (large room subphase), dates from Bischoff 2004.

[87] Çayönü material was initially interpreted by B. Lawrence in the 1960s, after Lawrence, Meadow and Hongo began again working on Çayönü material in 1995.

[88] Lawrence 1980 and 1982.

[89] Kuşatman 1991; Meadow 1986.

[90] Hongo/ Meadow, 1998 and 2000; Ervynck/Dobney/Hongo/Meadow 2001.

[91] Hongo/Meadow 2000, Figs. 1-2; Ervynck/Dobney/Hongo/Meadow 2001, Figs. 6-19.

[92] Hongo/Meadow 1998 and 2000.

Some smaller specimens of pigs began to appear as early as the *Grill subphase*. The diminution in the size of pigs progressed gradually until the *Cobble-paved subphase*,[93] with a shift in the range of size distribution towards smaller pigs becoming evident in the *Cell subphase*, progressing further in the *Large Room subphase*.[94] Some large specimens reveal that the hunting of wild pigs continued throughout the PPN. Small ovicaprids initially appear in the *Channelled Building subphase*. However, the osteometrical data for goats indicates a gradual decrease in animal size through the *Cobble-paved subphase*, but a clear shift toward smaller animals occurs in the *Cell subphase*. Some wild goats, as well as sheep continued to be hunted until the PN.

A few small cattle appeared as early as the *Channelled Building subphase*[95], but a clear shift in size distribution towards smaller cattle does not present until the *Large Room subphase*.[96]

In all subphases at Çayönü, a high percentage (about 50 to 65%) of juvenile pigs has survived in the assemblage.[97] The kill-off patterns for pigs show that progressively fewer individuals survived into adulthood in the later subphases at Çayönü.[98] The low survival curve rates for mature pigs in the later periods indicate that pigs were domesticated. An earlier kill-off in later subphases is also evident for cattle.[99] The shift towards an earlier kill-off for cattle began either in the *Channel* or *Cobble-paved subphases*.

The active hunting of wild pigs, wild cattle and wild caprines certainly continued throughout the PPN at Çayönü. Changes in body size and kill-off patterns are observed only for the pro-domestic taxa and not for the other frequently hunted artiodactyls (red deer).[100]

In conclusion, smaller sheep and goats, as well as smaller pigs and cattle, began to emerge as early as the Channelled subphase. Kill-off patterns for these species began to change possibly as early as in the Channelled subphase, but certainly during the Cobble-paved subphase.[101]

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[93] Hongo/Meadow 1998 and 2000.

[94] Hongo/Meadow/Öksüz/Ilgezdi 2002 and 2004.

[95] Öksüz 1998 and 2000.

[96] Hongo/Meadow/Öksüz/İlgezdi 2002: Fig. 8.

[97] Hongo/Meadow/Öksüz/İlgezdi 2002: Fig. 3.

[98] Hongo/Meadow 1998 and 2000; Hongo/Meadow/Öksüz/İlgezdi 2002; Envynck/Dobney/Hongo/Meadow 2001.

[99] Hongo/Meadow/Öksüz/İlgezdi 2002: Fig. 9; Öksüz 1999 and 2000.

[100] İlgezdi 1999 and 2000.

[101] Hongo/Meadow/Öksüz/İlgezdi 2004.

Göbekli Tepe[102], is located about 10 km northeast of Şanlıurfa. The site occupation started during the PPNA, and extends to the MPPNB. The available C14-dates range between 9.130–8.790 cal. BC and 7.590–7.370 cal. BC.[103]

According to the analysis of the PPNA assemblage, the most dominant animal is Gazelle (*Gazella subgutturosa*) at 40%. Wild cattle (20,1%), half ass (*Equus hemionus*, 10%) and wild boar (7,7%) follow. Only wild sheep have been found at the site. But around the hills of the site wild goat could have lived.[104] The environment, though, is more suited to sheep than goats. Fox (5%) and also hare (less than fox) are observed. Except for dog, all mammalians are wild. A total of 50% of the meat producers were wild cattle because of their large body weight. It has been theorized that the centre of Göbekli Tepe was used for hunting ceremonies.[105]

However, small samples of pelvis bones gathered for sex determination belong to wild sheep, and these bones mainly belong to male individuals. The distribution of bone measurements also supports the notion that male animals occurred more often than females. A large amount of young animal bones show hunting without control of sex or age. Hunters more likely focused on male animals due to their greater meat provision.

At Göbekli Tepe extremities (scapula, humerus, radius, ulna, pelvis, femur and tibia), which contain generally more meat, are usually observed while metapodials and phalanges have been found too, but in less frequency. On the other hand, far fewer skull fragments are seen in the Göbekli Tepe material. This tendency can be interpreted as an indication that hunters took mainly the bones with more meat, leaving heavier bones such as the skull of aurochs and male wild sheep (not containing so much meat) behind at the hunting place.[106]

Nevali Çori is situated in the foothills of the southern Taurus on a tributary of the Euphrates. It is likely that occupation in the Nevali Çori began at the end of the PPNA and continued during the EPPNB.[107] The faunal remains analyzed come from levels dated to the early (levels

[102] Of particular interest is the presence of cult buildings with T-shaped stone pillars (up to 3,5 m high) decorated with images of snakes, lions, foxes, wild cattle, and probably a crane (Schmidt 1995 and 1997).

[103]Bischoff 2004; Kromer/Schmidt 1999; Peters/Schmidt 2004.

[104] von den Driesch/Peters 1999 and 2001; Peters/Helmer/von den Driesch/Saña Segui 1999.

[105] von den Driesch/Peters 1999:23-27.

[106] von den Driesch/Peters 1999; von den Driesch/Peters 2001.

[107] OxA-8303, 9.280±55, 8.610-8.330 cal. BC; OxA-8236, 8.960±60, BP, 8.270-7.970 cal. BC (level I); OxA-8234, 8.930±60 BP, 8.240-7.970 cal. BC (level II); OxA-8302, 9.205±55 BP, 8.520-8,290 cal. BC; OxA-8247,

I/II) and later (level III) PPNB, with a smaller assemblage originating from a MPPNB context (level IV).[108]

At the settlement, while gazelle, rabbit and fox progressively lost their importance, sheep, goat, cattle and pig increased in number. The sheep/goat sample from Nevali Çori indicates a clear bias in favor of female animals. During the EPPNB a high proportion of immature sheep/goat (72%) were observed at Nevali Çori.[109] The cattle bones from Nevali Çori should belong to the wild cattle due to the lack in a significant difference observed in the cattle size. However, smaller individuals of sheep, goat and pig could be identified in the population. Sheep and perhaps goat were domestic in the EPPNB.[110]

Gürcütepe II is located east of Şanlıurfa in the northern Harran Plain. This site was inhabited during the LPPNB and final PPNB (PPNC). The most dominant animals are caprines at the site. However, the proportion of pig increases while cattle decreases during these periods. When we compare pig bones with Göbekli Tepe, a smaller but observable increase in pig bones were found at Gürcütepe II (18,8%). Fox and hare are represented in small amounts (both together less than 0,2%), while dog bones represent ca. 0,4% of the assemblage. At Gürcütepe II both sheep and goat are observed. The ratio between sheep and goat is 4:1.

Cattle, sheep and pigs are domesticated at Gürcütepe II. Their middle values are significantly smaller than the Göbekli Tepe material. This dimunition in size is more evident for sheep, less for pig and even less for cattle. But the cattle diminution in size indicates at least a “proto elevage” stage. A comparison of cattle bones from Gürcütepe II and Mureybet reveals their similarity in size. It is not clear whether sheep were locally domesticated or not. But cattle and

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8.610±90 BP, 7.750-7.540 cal. BC (level III); KIA-14756, 9.263±42 BP, 8.600-8.330 cal. BC; KIA-14759, 8.213±132 BP, 7.460-7.070 cal. BC (level III-V). Dates from Bischoff 2004.

[108] von den Driesch/Peters 2001.

[109] Peters/Helmer/von den Driesch/Saña Segui 1999:35; von den Driesch/Peter 2001.

[110] Peters/Helmer/von den Driesch/Saña Segui 1999.

Sites	*Level*	*Sheep*		*Goat*		*Pig*		*Cattle*	
		W.	*D.*	*W.*	*D.*	*W.*	*D.*	*W.*	*D.*
Halan Çemi	PPNA	+	-	+	-	+	? *	Only one skull	-
Aşıklı Höyük	PPNB	+	+/-	+	+/-	+	-	+	-
Göbekli Tepe	PPNA	+	-	-	-	+	-	+	-
Çayönü	r**	+	-	+	-	+	-	+	-
	g	+	-	+	-	+	-	+	-
	Ch	+	+	+	+	+	+	+	+
	Cp	+	+	+	+	+	+	+	+
	C	+	+	+	+	+	+	+	+
	Lr	+	+	+	+	+	+	+	+
	PN	+	+	+	+	+	+	+	+
Cafer Höyük	EPPNB, MPPNB	+	-	+	-	+	-	+	-
Gritille	LPPNB	+	+	+	+	+	?	+	?
Hayaz	LPPNB	+	+	+	+	+	?	+	?
Gürcütepe II	LPPMB	+	+	+	+	+	+	+	+
Nevali Çori	EPPNB, MPPNB	+	+	+	+	+	?	+	-
Mezraa-Teleilat	PN	+	+	+	+	+	+	+	+
	TP (LPPNC)	+	+	+	+	+	+	+	+
	LPPNB	+	+	+	+	+	+	+	+
	MPPNB	+	+	+	+	+	+	+	+
Akarçay Tepe	PN	+	+	+	+	+	+	+	+
	TP (LPPNC)	+	+	+	+	+	+	+	+
	LPPNB	+	+	+	+	+	+	+	+
	MPPNB	+	+	+	+	+	+	+	+

*. R. W. Redding suggested that domestic pig exist at the site but this idea is not accepted by many scholars

**r: round building subphase, g: grill building subphase, ch: channelled building subphase, cp: cobble-paved building subphase, c: cell building subphase, lr: large room building subphase

?: not clear

+/-: prodomestication (H. Buitenhuis 1997)

Tab. 1: Domesticates from different archaeological sites in Anatolia.

pigs were definitely domesticated at the site. Goats were most likely brought from another place as domesticated animals to the settlement. A similar tendency is also observed for sheep.[111]

At Gürcütepe II nearly the same proportion has been observed for both sexes (17 males, 19 females). This proportion is related to the circumstance that animals were seen as a "meat container" and not related to animal husbandry.

[111] von den Driesch/Peters 1999; von den Driesch/Peters 2001.

The kill-off pattern based on teeth suggests that young animals (under 2 years old) were killed at Gürcütepe. Most of the animals were killed when they were between one and two years old (ca. 25%, with 5% at Göbekli Tepe). In this age class, small ruminants reach their total weight. This bias is characteristic of a domesticated population.
The skeletal element distribution at Gürcütepe differs from Göbekli Tepe. Here, many skull fragments were found, belonging to sheep, goat and pigs. This is more evidence for the occurrence of domesticated animals that were then killed at the site. But the proportion of cattle skull fragments is nearly the same as at Göbekli Tepe. Such a bias indicates that large bovidae at Gürcütepe were free living and killed off of the site. Only selected skeletal parts were brought to the settlement.[112]

Cafer Höyük is situated about 40 km northeast of Malatya (in the Taurus Mountains) on the right bank of a tributary of the Euphrates. Cafer Höyük was investigated by J. Cauvin, the archaeozoological material by D. Helmer. Cafer Höyük was occupied from the EPPNB to the transition MPPNB/LPPNB (thirteen level).[113] The settlement dates to the beginning of the 7th millennium BC.[114] Goats make up approximately 42,9% of the assemblage, while other important species include pigs (24,8%), sheep (13,6%), cattle (12,6%) and deer (2,1%). The faunal list shows a variety of species which, in all probability, were hunted. According to Helmer, the size of cattle is similar to those of the wild cattle (in PPNA) at Mureybet. In the material of Cafer Höyük no diminution in size has been observed. The kill-off pattern suggests the ovicaprid, pig and cattle remains in the site are the result of the hunting of the wild population.[115]

The site of **Gritille is** located on the west bank of the Euphrate, about 8km north of Samsat. Gritille has been dated to between 8.450–7.700 cal. BC and 7.000–6.400 cal. BC.[116] It lies in

[112] von den Driesch/Peters 1999; von den Driesch/Peters 2001.

[113] Cauvin 1985.

[114] Ly-4436, 9.560±190 BP, 9.250-8.650 cal. BC; Ly-4437, 8.950±80 BP, 8.270-7.970 cal. BC (early phase, XIII-IX); Ly-3772, 8.480±140 BP, 7.680-7.320 cal. BC; Ly-3090, 8.920±160 BP, 8.280-7.810 cal. BC (middle phase; VIII-V); Ly-3091, 8.980±150 BP, 8.450-7.800 cal. BC; Ly-2181, 8.450±160 BP, 7.650-7.180 cal. BC (late phase; IV-I). Dates from Bischoff 2004.

[115] Helmer 1988:37-48; Peters/Helmer/von den Driesch/Saña Segui 1999.

[116] GrN-15254, 8.960±230 BP, 8.450-7.700 cal. BC; GrN-15253, 8.600±150 BP, 7.940-7.480 cal. BC (level E); GrN-15246, 8.700±150 BP, 8.200-7.550 cal. BC; GrN-15249, 8.190±140 BP, 7.460-7.050 cal. BC (level D); Beta-13216, 8.610±90 BP, 7.750-7.540 cal. BC; GrN-15247, 8.075±40 BP, 7.140-6.860 cal. BC (level C); GrN-

the transitional zone between the eastern Taurus and the lowland steppe. G. Stein studied the animal bones. Ovicaprids (71%) are the most dominant animals in the LPPNB. Pig (16,5%) and cattle (3,2%) are other important animals found at Gritille. In small numbers, dog/wolf, gazelle, roe deer, fallow deer and hare are also present. The ratio of sheep and goat is nearly 3:1. The kill-off pattern shows that 65% of the caprines were killed before an age of 3 years. Therefore, sheep and goat are considered to have been domesticated. The domestication status of cattle and pig, similar to what we find at Hayaz (see below), is not clear because of the small number of measurable bones. Upon this basis, G. Stein suggests cattle domestication, while pigs could be considered in an early stage of domestication.[117]

Hayaz lies on the right bank of the Euphrates near the Kalburçu confluence (province of Adıyaman) and has been dated to the second part of the 7th millennium BC (PPN).[118] The faunal remains have been studied by H. Buitenhuis. Hayaz is a flint workshop, and unlike other settlements described here. Only a small area was occupied. The majority of the finds belong to ovicaprids, with far fewer amounts of cattle (11%) and pig (20%). The ratio of sheep and goat is 1:1. The domestic status of sheep and goat was established by size changes and the sex to age ratios. At both sites, Hayaz and Gritille, the domestication status of cattle and pig is uncertain.[119]

Akarçay Tepe, situated in the Birecik region (in province of Şanlıurfa), is very near Mezraa-Teleilat. The site has been dated to between 7.950–7.680 cal. BC/6.220–6.070 cal. BC.[120] M. Saña Segui has been studying the animal remains.[121] Generally sheep outnumber goat (especially in phase V and II). Cattle and pig follow. However, pig saw a relative increase in phase III, while cattle remained stable.[122] Additionally, M. Saña Segui analyzed the animal

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15255, 8.000±50 BP, 7.060-6.820 cal. BC; Beta-8240, 7.770±150 BP, 7.000-6.400 cal. BC (level B). Dates from Bischoff 2004.

[117] Stein 1986a-c and 1989.

[118] GrN-12510, 8.300±60 BP, 7.520-7.190 cal. BC (basal layer); GrN-12512, 8.040±170 BP, 7.300-6.650 cal. BC (second layer). Dates from Bischoff 2004.

[119] Buitenhuis 1985:62-74; Peters/Helmer/von den Driesch/Saña Segui 1999.

[120] Beta-138584, 8.750±40 BP, 7.950-7.680 cal. BC (phase V); Beta-138583, 8.390±110 BP, 7.580-7.320 cal. BC (phase IV); Beta-138586, 7.970±120 BP, 7.060-6.690 cal. BC (phase III); Beta-138582, 7.470±80 BP, 6.410-6.240 cal. BC (phase II); Beta-138585, 7.280±50 BP, 6.220-6.070 cal. BC (phase I). Dates from Bischoff 2004.

[121] Special thanks go to M. Saña Segui for allowing me to use the unpublished datas from Akarçay Tepe.

[122] Balkan-Atlı et al. 2002:295-297; Saña Segui unpublished data.

bones from Akarçay in three different areas: west sector, east sector and trench 20. The biometrical variation of the ovicaprids indicates that from phase V to I a a gradual decrease occurred and a majority of ovicaprids were domestic. M. Saña Segui also observed very large animals in phase V as well as in the MPPNB of Halula. Though biometrical data for pig from the later periods (phases III to I) indicate a slight increase, in general the numbers remain relatively stable. All animal species represented here are in the same variation range as in the LPPNB at Tell Halula. Pigs are smaller than the pigs from the MPPNB at Tell Halula. This indicates the presence of domestic individuals in phase V. The same tendency is also valid for cattle. Akarçay Tepe's cattle are smaller than Tell Halula's from the MPPNB and LPPNB. This shift toward smaller animals is evidence for the existence of domestic cattle up to phase V at Akarçay Tepe. Animal husbandry at Akarçay has been observed as beginning in phase V. However, while sheep, goat, pig and cattle were domesticated at the site, hunting also continued until the PN. The variation of the hunted species decreases in later periods. In phase V hunting depended on different animal species such as equus, cervus, gazelle, hare, leon and canidae, but focused on gazelle as of phase IV. Pig husbandry and the hunting of gazelle comprise the animal products supplying strategy practiced during these initial occupations.[123] For a general summary of animal domestication in Anatolia see table 1.

3.3.2. Northern Syria

Tell Mureybet[124] is located on the left bank of the Euphrates. D. Ducos analyzed the faunal material from the excavations of van Loon (Phases II and III – Khiamian and PPNA) and J. Cauvin (Phase IV – EPPNB and MPPNB).[125] No domestic animals are observed. Hunting focused on larger species. In the Khiamian and PPNA the hunting of cattle concentrated on young animals and adult males. A high proportion of the adult individuals are observed in the EPPNB and MPPNB at Mureybet. Female and male animals are represented in nearly equal

[123] Unpublished data from M. M. Saña Segui; Balkan- Atlı/Borell/Buxo/Duru/Ibanez /Maede/Molist/Özbaşaran/Piquet/Saña/Wattez 2002:295-297.

[124] Phases II and III-Khiamian and PPNA excavated by van Loon and Phase IV-EPPNB and MPPNB excavated by J. Cauvin.

[125] MC-675: 10.350±150 BP, 10.700-9.800 cal. BC; MC-733: 10.030±150 BP, 9.950-9.250 cal. BC (Natufian); Lv-607: 10.590±140 BP, 10.950-10.350 cal. BC; P-1224: 9.492±122, 9.509±122 BP, 9.130-8.620 cal. BC (PPNA); MC-861: 9.600±150 BP, 9.220-8.790 cal. BC; MC-737: 8.910±150 BP, 8.270-7.820 cal. BC (PPNB). Dates from Bischoff 2004.

numbers in the assemblage. Ducos explained this tendency as "proto-élevage". The later excavation material was analyzed by D. Helmer, who established that there had been no domestication of animals until the EPPNB at Mureybet. Gazelle, equus and cattle are the most dominant animals. Non- mammalian species include fisch and birds, which are relatively abundant in the Khiamian and PPNA but become extremely rare in the later periods. However, some smaller cattle bones were observed from MPPNB, though it is unclear whether they belong to female wild cattle or to large domestic cattle.[126]

Tell Abu Hureyra is located on the right bank of the Euphrates near Meskene. Animal bones originate from the Late Natufian, the MPPNB, LPPNB and PN.[127] T. Legge analyzed the bone material. The subsistence economy was based on gazelles in the Natufian period with equids and caprines following in numbers. Similar results have been also found for the MPPNB. In the LPPNB caprines (70,5%) increased in number and gazelles (18,6%) lose their importance. A similar pattern is observed during the PN (gazelles 21,6%, caprines 68,7%). Cervus, cattle and pigs are represented in a low percentage at the site. However, caprines were exploited all year round, gazelles though only in special seasons.[128]
New research reveals that goat is absent during the late Natufian period and first appeared in domesticated form in the MPPNB.[129] The change in the gazelle/caprine ratio in the LPPNB is related to increasing caprine husbandry and a decrease in gazelle hunting at the site.

Jerf el Ahmar is lies on the left bank of the Euphrates ca. 70 km north of Mureybet, where excavations have revealed that occupation began in the PPNA and probably continued throughout the EPPNB.[130] The most hunted animals were equus, gazelle and cattle at site. Only dogs were domesticated at Jerf el Ahmar.[131]

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[126] Ducos 1978b; Ducos/Helmer 1980; Peters/Helmer/von den Driesch/Saña Segui 1999:30.

[127] OxA-4660: 8.180±200 BP, 7.550-6.800 cal. BC (trench A); BM-1122: 9.374±72 BP, 8.750-8.480 cal. BC; OxA-1232: 7.310±120 BP, 6.340-6.020 cal. BC (trench B); BM-1423: 8.676±72 BP, 7.790-7.590 cal. BC; BM-1425: 8.393±72 BP, 7.550-7.350 cal. BC (trench C); BM-1721R: 8.490±110 BP, 7.650-7.350 cal. BC; OxA-881: 8.870±100 BP, 8.210-7.830 cal. BC (trench D); BM-1120: 8.666±66 BP, 7.760-7590 cal. BC; OxA-2168: 8.330±100 BP, 7.530-7.190 cal. BC (trench E); OxA-1228: 9.680±90 BP, 9.250-8.830 cal. BC; OxA-1227: 8.320±80 BP, 7.520-7.190 cal. BC (trench G). Dates from Bischoff 2004.

[128] Legge/Rowley-Conwy 2000.

[129] Legge 1996:256.

[130] Ly-10651: 9.965±55 BP, 9.610-9.280 cal. BC (V, east); Ly-10648: 9.855±70 BP, 9.390-9220 cal. BC (III, east); Ly-10647: 9.395±55 BP, 8.750-8.550 cal. BC (I, east, transition); Ly-10649: 9.445±75 BP, 9.110-8.600 cal. BC (II, west). Dates from Bischoff 2004.

Another PPNA and EPPNB site is **Tell Cheikh Hassan,** situated north of Tell Mureybet. Except for dogs, no domestic animals are observed at Tell Cheikh Hassan, making it similar to Jerf el Ahmar. Evidence of a large number of equus, gazelle and cattle from the PPNA was found at the site. Although the animal spectrum in the EPPNB is similar to that of the PPNA, more gazelle have been observed from the EPPNB.[132]

Tell Halula lies on the north bank of the Wadi Kalkal. The occupation of Tell Halula occurred from the MPPNB to the Halaf period.[133] The subsistence economy was based on hunting of wild cattle (10,5% to 21,8%), gazelle (13,1% to 26%), pigs (4,2% to 15,7%), cervids (3,6% to 14,4%) and equids (0,3% to 3,2%) in the EPPNB. Goats are the most dominant animal (26,3% to 39,5%). At this time only 0,1% sheep bones were found. Saña Segui suggests that goat husbandry began in the MPPNB at the site. At the end of MPPNB domestic sheep started to appear at the site. But caprine husbandry is more clearly evident in the beginning of the LPPNB. In this period domestic cattle occur. Saña Segui suggested cattle domestication should have started in the MPPNB. Based on a log size index, Peters, von den Driesch, Helmer and Sana Segui maintained that cattle remains from the MPPNB level in Tell Halula were smaller than those of other southeastern Anatolian assemblages (Göbekli Tepe-PPNA, Nevali Çori-EPPNB and Gürcü Tepe-LPPNB).
The domestication of pig at Tell Halula is not clear due to the small number of bone material. M. Sana Segui suggests that domestic pigs appeared in the LPPNB at the site, but were only domesticated at the end of the MPPNB. The proportion of sheep increased with the introduction of domestic pig and cattle in the same period. at the site. Their importance was more significant than that of goats.[134]

Bouqras is situated near the junction of the Habur and Euprates rivers, south of Abu Hureyra. The site can be dated to the LPPNB and PN (approx. 7.530–7.350 cal. BC/6.390–6.250 cal.

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[131] Peters/Helmer/von den Driesch/ Saña Segui 1999:30.

[132] Peters/Helmer/von den Driesch/Saña Segui 1999.

[133] UBAR-396: 8.800±1890 BP, 10.700-6.000 cal. BC; Beta-58928: 8.700±60 BP, 7.790-7.600 cal. BC (MPPNB); UBAR-384: 8.860±410 BP, 8.600-7.500 cal. BC; UBAR-290: 7.930±310 BP, 7.300-6.450 cal. BC (LPPNB); Beta-58925: 7.880±120 BP, 7.040-6.590 cal. BC; Ly-649: 7.710±70 BP, 6.600-6.460 cal. BC (pre-Halaf). Dates from Bischoff 2004.

[134] Saña Segui 1999 and 2000; Helmer/Sana 1996; Peters/Helmer/von den Driesch/Saña Segui 1999.

BC).[135] A. T. Clason and H. Buitenhuis have studied the Bouqras material. Caprines are the most common animal group at the site, with sheep outnumbering goats. Cattle were another important animal at Bouqras, where both wild and domestic cattle were observed in the assemblage. Clason and Buitenhuis believe that it is likely that some domestic pigs were present at Bouqras. Hunting focused on gazelles and seems to have been less important than domestication.[136]

Tell es Sinn is located on the north side of the Euphrates. The site is dated to the LPPNB.[137] Caprines are the most dominant animal group. Cattle, gazelle and pigs follow in number. Sheep outnumbered goat. Both wild and domestic sheep, goat and cattle were observed at the site.[138]

Tell Assouad is situated on the left bank of Nahr el Turkman, a tributary of the Balikh (7.940–7.570 cal. BC/7.600–7.330 cal. BC).[139] During the LPPNB occupation of the site, caprines were dominant and more goats were available than sheep. Osteometrically, cattle bones are large in size and indicate that the animals were probably wild. Some small pig bones were observed. According to the osteometrical data D. Helmer suggests that pig probably represented an initial stage of domestication. But due to the small sample size, the presence of domestic pig is doubtful.[140] D. Helmer proposes that domestication could be established only for goats and sheep.

Ras Shamra is situated on the Mediterranean coast. The site was inhabited from the LPPNB to the Early Bronze Age. Research has shown the presence of caprines, domestic cattle and pigs in the LPPNB. During all the occupation periods, cattle and pigs are far more common than caprines.[141]

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[135] Akkermans/Boerma/Clason/Hill/Lohof/Meiklejohn/Miere/Molgat/Roodenberg/Waterbolk-van Rooyen/van Zeist 1983. 14C dates from Bischoff 2004.

[136] Clason 1980:35-53; Buitenhuis 1988.

[137] GrN-9833: 8.650±50 BP, 7.740-7.590 cal. BC; GrN-9832: 8.280±40 BP, 7.460-7.190 cal. BC (level XIV); GrN-9831: 8.170±100 BP, 7.330-7.050 cal. BC (level XIII). Dates from Bischoff 2004.

[138] Clason 1980:35-53.

[139] MC-864: 8.450±120 BP, 7.600-7.330 cal. BC (level VIII); MC-865: 8.650±120 BP, 7.940-7.570 cal. BC (level III). Dates from Bischoff 2004.

[140] Helmer 1985.

[141] Helmer 1989.

Tell Sabi Abyad II is a small LPPNB site, situated in Balikh valley. Three phases were recognized, and were dated between ca. 7.550 BC to 6.850 BC.[142]

More than 90% of the identified animal bones belong to domestic species. Caprines (85% – 90%) are predominant at the site. Other animal species represented in the faunal assemblage are foxes, badgers and a small quantity of birds. A study of the animal bones provided evidence of ovicaprid husbandry in the PPNB. The osteometric data indicate the presence of incipient domestication of cattle and pigs. Hunting focused on gazelle and played a less important role in the subsistence economy. The proportion of cattle, pigs and wild animals changed in the other phases, and increased in phase 1.[143]

Tell Sabi Abyad I, located in the northern part of the Balikh Valley, has been dated to 6.390–6.250/5.890–5.720 cal. BC.[144] Material from the site was analyzed by C. Cavallo. Ovicaprids (70%) are the largest group represented in the assemblage. Cattle, pigs, equids, gazelle, deer sp., dogs, hyena, foxes, bear, hare, rodents, birds, reptiles and fishes are also present at site. The ratio of sheep and goat is nearly the same in the first two phases, while goats are dominant in the later ones. C. Cavallo explains this tendency with a change in the herding economy toward more exploitation of milk.[145] Some large ovicaprid measurements are observed. They probably belong to wild individuals.

The kill-off pattern data from the pre-Halaf phase may be interpreted as a pattern of meat exploitation in which the animals were killed mainly at the moment of maximum meat weight and reproductivity (age between 3 and 4 years). In the transitional phase from Pre- to early Halaf and in the early Halaf phases, more juvenile ovicaprids were killed. This phenomenon

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[142] Verhoeven 1994, 1997, 2004. GrN-21319: 8.530±60 BP, 7.600-7.535 cal. BC (lowest level 8); GrN-22273: 8.190±60 BP, 7.310-7.080 cal. BC (middle level 5); Utc-4907: 7.950±50 BP, 7.040-6.700 cal. BC (upper level 3A).

[143] van Wijngaarden-Bakker/Maliepaard 2000; Cavallo 2000.

[144] GrN-16805: 7.145±30 BP, 6.060-5.920 cal. BC; UtC-1009: 7.080±80 BP, 6.020-5.840 cal. BC (level 8); GrN-19368: 7.100±60 BP, 6.020-5.890 cal. BC; GrN-19367: 7.075±25 BP, 5.990-5.890 cal. BC (level 6); GrN-16803: 7.075±25 BP, 5.990-5.890 cal. BC; UtC-1008: 6.930±80 BP, 5.890-5.720 cal. BC (level 4); GrN-16801: 7.465±35 BP, 6.390-6.250 cal. BC; GrN-16802: 7.065±30 BP, 5.990-5.890 cal. BC (level 3); GrN-16800: 7.005±30 BP, 5.970-5.810 cal. BC (level 2); GrN-16804: 6.975±30 BP, 5.890-5.790 cal. BC (level 1); GrN-16806: 7.225±30 BP, 6.160-6.020 cal. BC; UtC-1010: 6.670±100 BP, 5.670-5.480 cal. BC (Halaf), Dates from Bischoff 2004.

[145] Cavalo 2000; 1995; 1996.

Sites	*Level*	*Sheep*		*Goat*		*Pig*		*Cattle*	
		W.	***D.***	***W.***	***D.***	***W.***	***D.***	***W.***	***D.***
Shams ed-Din	Late Halaf	+	+	+	+	+	+	?	+
Tell Sabi Abyad I	Early Halaf	+	+	+	+	+	+	+	+
	Transitional	+	+	+	+	+	+	+	+
	Pre-Halaf	+	+	+	+	+	+	+	+
Bouqras	PN	+	+	+	+	+	+	+	-
	LPPNB	+	+	+	+	+	?	+	+
Tell Abu Hueryra	2C	+	+	+	+	+	+	+	+
	2B	+	+	+	+	+	+	+	+
	2A	+	+	+	+	+	-	+	-
Tell Assouad	LPPNB	+	+	+	+	+	?	+	-
Tell Sabi Abyad II	LPPNB	+	+	+	+	+	+	+	+
Tell es Sinn	LPPNB	+	+	+	+	+	+	+	+
Tell Halula	LPPNB	+	+	+	+	+	+	+	+
	MPPNB	+	?	+	?	+	?	+	?
Mureybet	MPPNB	+	-	+	-	+	-	+	?
	EPPNB	+	-	+	-	+	-	+	-
	PPNA	+	-	+	-	+	-	+	-
Jerf el Ahmar	EPPNB	+	-	+	-	+	-	+	-

?: not clear

Tab. 2: Domesticates from different archaeological sites in the northern Syria.

indicates the importance of secondary products such as milk. The sheep were slaughtered at an older age in the transitional phase than was observed in earlier periods. Cavallo suggests that this tendency may reflect that sheep continued to be used for meat (and probably for wool) while goats were used more for milk than meat.

However, mainly osteometric data of cattle bones, in the range of the domestic cattle, and also some specimens observed from Sabi Abyad, fall within the range of *Bos primigenius* measurements of the Near East. The proportion of wild to domestic cattle decreases in time, 5,9% in the pre-Halaf period, 2,9% in the TP and 1,2% in early Halaf.

In the Pre-Halaf period, more than 50% of cattle survived to a subadult and adult age. Only 10% of the cattle killed were of a juvenile age in the same period. In the transitional phase more young animals were slaughtered than in the Pre-Halaf period. Based on the kill-off pattern, Cavallo mentioned that cattle were probably exploited mainly for their meat at Sabi Abyad I.

Pigs represent about 9% of the total faunal assemblage at the site. The Most of the pig bones belong to the domestic pig. The importance of pigs increases from 4,6% in the Pre-Halaf phase to 7,7% in the transitional and to 16% in the early Halaf phase. Extremely young pigs were killed in all phases.[146]

Shams ed-Din dates to the end of the Halaf period. The site lies on the left bank of the Middle Euphrates. H.-P. Uerpmann worked on animal remains from the site. The percentage of domestic animals is low (46% of the total identified remains). Sheep and goats are the dominant domestic species, followed by cattle and pigs. Due to the many young individuals, the size of the cattle can not evaluated.

Ovicaprids were more often kept until an older age (48 months old). This kill-off pattern demonstrates that ovicaprids were exploited mainly for their meat.

A high percentage of the identified bones (54%) came from such wild animal species as onager, gazelle, fallow deer, red deer and wild boar. However, some large cattle specimens have been identified in the assemblage, while the presence of aurochs is doubtful. Remains of water buffalo (*Bubalus* sp.) were also recognized.[147]

Domestication status for the PPN and PN sites in northern Syria is presented in Table 2.

3.3.3. The Zagros Region

D. Perkins suggested that domestic sheep existed at **Zawi Chemi Shanidar**[148], with C14-dates available at around 9.000 BC.[149] More sheep than goat have been observed, although goats were dominant in the earlier levels. Perkins argued that the environment of these sites was more suitable for goats than sheep, and the high proportion of sheep does not point to the local wild sheep species. He thus interprets these findings as an increase of sheep, and therefore as a presence of managed sheep at the site. Another piece of evidence is the high proportion of immature sheep metapodials in the upper levels of Shanidar Cave and at Zawi

[146] Cavallo 1995; 1996; 2000.

[147] Uerpmann 1982.

[148] Perkins 1964. Shanidar Cave and the open-air site Zawi Chemi Shanidar are located in the highlands of Iraq, stratigraphically dated from the Mousterian up through to the Proto-Neolithic (ca. 11.000 BP). M. Evins evaluated the Mousterian levels at Shanidar Cave for her Master's thesis. D. Perkins published the results of animal bones in 1964.

[149] W-681: 10.870±300 BP, 10.800±300 BP, 11.250-10.350 cal. BC (layer B). Dates from Bischoff 2004.

Chemi. D. Perkins considered this as an argument that the Zawi Chemi sheep were managed livestock, while the goats were wild.[150]

Due to the small sample of remains, his argument concerning sheep domestication has not been widely accepted. Some researchers did not find the ratio of species and age distribution in the assemblages dependable[151], and others suggest an emphasis on young animals alone without verifiable sex distribution data might reflect selective hunting.[152] The natural occurrence of wild sheep in the Greater Zab River valley is also deemed problematic.[153]

Karim Shahir is an open-air encampment. The site lying about 850 m above sea level was excavated by B. Howe in the 1950s[154] ant the site material was examined by F. Barth and C. Reed. According to an analysis of the material, domesticable species of sheep, goats, cattle and pigs made up ca. 50% of the assemblage.[155] H.-R. Stampfli worked also on animal remains from Karim Shahir. The size of ovicaprids and also a morphology of the sheep horn cores indicate wild caprines. No evidence of the domestication of animals was found at the site.[156]

Another important site in this region is **Jarmo**.[157] C. Reed and H.-R. Stampfli evaluated the material.[158] They agree that horn cores of the goats revealed some modification from the wild type, which is thought to indicate the early stages of domestication. H.-R. Stampfli also argues that, because of the shape of the horn cores, sheep were also domesticated. However C. Reed is doubtful about the domestication of the sheep at Jarmo.[159] Some reduction of sheep and goats was also observed by H.-R. Stampfli at the site.[160] R.-H. Meadow mentioned that the size of the sheep from Jarmo was very similar to the older level of Çayönü (9th millennium

[150] Perkins 1973:279.

[151] Bökönyi 1977; Uerpmann 1978a; Bar-Yosef/Meadow 1995; Reed 1983.

[152] Meadow 1989.

[153] Reed 1983; Bar-Yosef/Meadow 1995.

[154] Howe 1983.

[155] Braidwood 1960; Stampfli 1983:451; Zeder 1999.

[156] Stampfli 1983.

[157] Jarmo was excavated by R. J. Braidwood in the 1950s and 1960s. Dates are: W-657: 11.240±300 BP, 11.850-10.950 cal. BC; UCLA-1723: 6.180±300 BP, 5.500-4.750 cal. BC. Other dates occur between this range. Dates from Bischoff 2004.

[158] Reed 1959, 1960 and 1983; Stampfli 1983.

[159] Reed 1960:135; Stampfli 1983:455.

[160] Stampfli 1983.

BP). H.-P. Uerpmann observed a "considerable size" reduction for goats in the later levels at Jarmo[161], and believes they represent domesticated animals.[162] According to K. Flannery, domestic pigs were found in the upper pottery levels at Jarmo,an interpretation that has been widely accepted.[163]

Asiab is located in the Kermanshah Valley in northwestern Iran. S. Bökönyi worked on the Asiab material.[164] The settlement was dated by R. J. Braidwood and B. Howe to about 11.000 BP (i. e., contemporary with Karim Shahir, Shanidar B1, and Zawi Chemi Shanidar). But according to F. Hole, the settlement should be given a later date, around 9.000 BP.[165] Caprines, and mostly goat, are the dominant animal species at Asiab. The ratio of goats to sheep is 2:1. There are indications of the hunting of red deer, wild boar and wild cattle.[166] Just three horn cores indicate transitional characteristics between the wild and domestic phenotypes. The majority of the goat horn cores belong to wild individuals. S. Bökönyi maintained that the high number of large adult male sheep at Asiab could be interpreted as a transitional culling pattern on the way to actual herd management.[167] Selective hunting or transitional domestication of sheep occurred at the site, indicated by the size of the material. But this interpretation is not accepted by researchers more recently. They have concluded that ovicaprids were wild at Asiab.

Tepe Sarab is dated to the PN by R. J. Braidwood (around 7.700 BP). S. Bökönyi has worked with the animal bones. He observed the following from the material:

a) some morphological changes on many of the goat horn cores,
b) the existence of some hornless female sheep,
c) evidence of size reduction in sheep and goats and,
d) kill-off pattern emphasis on young animals.[168]

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[161] Bar-Yosef/Meadow 1995:87; Zeder 1999.

[162] Bar-Yosef/Meadow 1995:89; Uerpmann 1979.

[163] Flannery 1983.

[164] Braidwood/Howe/Reed 1961; Bökönyi 1977.

[165] Howe 1983:117; Hole 1987:363; Hole/Flannery 1967.

[166] Bökönyi 1977.

[167] Bökönyi 1969:224-225 and 1977:20.

[168] Bökönyi 1977.

All of these patterns (a-d) are accepted as evidence for the developed stages of caprine domestication. Moreover, S. Bökönyi observed also evidence for pig domestication at Tepe Sarab.[169]

Ganj Dareh was excavated by P. Smith. Four AMS dating and thirteen bone colagen samples, recently obtained by M. Zeder and spanning all five levels (A-E), confirm that the site was only briefly occupied at around 8.900 BP (ca. 7.900 cal. BC).[170] B. Hesse analyzed the large assemblage of animal remains.[171] According to this study, little evidence for a change in the morphology of horn cores of goats was found. No size diminition was observed among goats in the early levels. According to Hesse this tendency reflects more selective hunting strategies. In contrast, Hesse maintained that, based on survivorship and sex ratio data, the goat remains from Ganj Dareh are from domestic animals in later levels. A high percentage of the young males (between 1 and 2 years old) were slaughtered, while the females survived until after their prime breeding years. Also a size reduction of goat bones was observed, indicating that goats might have been domestic. H.-P. Uerpmann, R. H. Meadow, D. Helmer and T. Legge have all mentioned a diminution in the size of the goats from Ganj Dareh.[172] Most researchers accept Ganj Dareh as one of the earliest sites for goat domestication in the Near East. Generally it is accepted that the goats of this site were domesticated due to their size. M. Zeder re-analyzed animal remains from Ganj Dareh, and maintained that no reduction in size was observed among the goats at the site[173], stating that reduction in size mentioned by several researchers was related with the ratio between sexes.[174] M. Zeder refers to the kill-off patterns. The male kill-off began early, but a few males were slaughtered later. Female kill-off was, relative to male kill-off, delayed. At Ganj Dareh young males were more often slaughtered and adult females and grown males were preserved as breeding stock.[175] The evidence for the domestication of sheep is not clear. No size reduction was observed in the sheep measurements. Kill-off patterns indicate older, adult animals, which is a tendency more consistently found in hunting.[176]

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[169] Flannery 1983:176.

[170] For new 14C dates see Zeder 2005:131-132.

[171] Hesse 1982 and 1984.

[172] Uerpmann 1979; Helmer 1989; 1992; Bar-Yosef/Meadow 1995; Legge 1996:249-252.

[173] Zeder 2005:130-133; Zeder 2001:69; Zeder 2003:129.

[174] Zeder 2001:76.

[175] Zeder 1999:11-25; Zeder/Hesse 2000:2257; Zeder 2001.

[176] Zeder 1999:22.

Tepe Guran[177] is located in the Hulailan Valley in northern Luristan with pre-pottery and PN occupations. This spans a period from about 8.500 to 7.700 BP.[178] K. Flannery analyzed the bone material. Caprines are the most common animal species in the assemblage. Gazelle also occurs. The ratio of goats to sheep is about 2:1. Based on horn core morphology and high adult survival rates indicated by the sheep remains, it looks as though the sheep were wild. However, mainly sheep bones were found in the PN at the site, while goats were common at all levels. Transitional domestic forms of goat horn cores (more almond cross section) are found even in the lowest levels. Horn cores from upper levels reveal a later domesticated form (concave medial surface and slight helical twist). Age distribution indicates a heavy emphasis on young goats[179], from which K. Flannery has deduced that the goats represent the managed domestication of animals at Guran. In the upper levels at the site the exploitation of wild sheep was increased while, in the same period, the hunting of wild animals became important. In this period the architecture changed from wooden structures to mud brick houses.[180]

Ali Kosh is located in the Deh Luran Valley of southwestern Iran.[181] The occupation of the site is divided into three phases: Bus Mordeh/Ali Kosh Phases (both from the PPN) and the final Mohammed Jaffar Phase (early PN). Some dating problems have occurred here. The site was dated by archaeologists to around 9.500–7.600 BP. M. Zeder dated some bones from the Bus Mordeh levels to 8.500 BP (ca. 7.500 cal. BC) and the Mohammed Jaffar phase to ca. 8.000 BP (ca. 7.000 cal. BC).[182]

Gazelle and equid were recovered more in the Ali Kosh and Mohammad Jaffar phases than in the Bus Mordeh phase. K. Flannery suggested that investigations based on morphological change, zoogeography and herd demography indicates domesticated caprines.

The gradual transformation in the form of the goat horn cores present at site. When wild form of the goat horn cores dominate in the lower levels, the number of more almond shape cores increased in the middle Ali Kosh phase. In the PN Mohammed Jaffar levels at Ali Kosh, some early domestication forms of horn cores were found, as well as forms similar to

[177] Tepe Guran was excavated by P. Mortensen in 1963 and has both aceramic and PN occupations, thought to span from about 8.500 to 7.700 BP.

[178] Hole 1987.

[179] Hole/Flannery/Neely 1969:285.

[180] Zeder 1999:16.

[181] Hole/Flannery/Neely 1969.

[182] Zeder 2005.

Sites	*Date/Level*	*Sheep*		*Goat*		*Pig*		*Cattle*	
		W.	*D.*	*W.*	*D.*	*W.*	*D.*	*W.*	*D.*
Zawi Chemi Shanidar	9.000 BC	+	?	+	-	+	-	+	-
Nemrik	8.250-7.950 BC	+	-	+	-	+	-	+	-
	7.850-7.750 BC	+	+	+	+	+	-	+	-
	7.650-7.150 BC	+	+	+	+	+	+	+	-
	7.100-7.050 BC	+	+	+	+	+	+	+	+
	Ca. 6.500 BC	+	+	+	+	+	+	+	+
Ganj Dareh	7.900 BC	+	-	+	+	+	-	+	-
Tepe Sarab	PN	+	+	+	+	+	+	+	?
Asiab	9.000 BP	+	-	+	-	+	-	+	-
Kharim Shahir	ca. 9.000 BC	+	-	+	-	+	-	+	-
Ali Kosh	PN	+	+	+	+	+	+	+	+
	PPN	+	-	+	+	+	-	+	-
Tepe Guran	8.500-7.700 BP	+	-	+	+	+	-	+	-
Jarmo	ca. 8.700 BP	+	+	+	+	+	+	+	+

?: not clear

Tab. 3: Domesticates from different archaeological sites in the Zagros Region.

developed domesticated goat horn cores. K. Flannery based his argument for early goat domestication on zoogeographical grounds.[183]

The strongest argument for caprine domestication is based on the kill-off pattern of caprines. Tooth eruption and long bone epiphyseal fusion demonstrate that mostly young animals (between 12-36 months old) slaughtered in the earliest Bus Mordeh phase indicating the controlled exploitation of young males in a managed herd.

Sheep domestication at Ali Kosh is more problematic. K. Flannery observed the skull of a hornless female sheep at the lowest levels at the site, surmising that this pointed to the early domestication of sheep at Ali Kosh. But due to the existence of hornless wild female sheep, sheep domestication at the site appears doubtful from the Bus Mordeh phase.

[183] Zeder 1999:17.

No size distribution observed for sheep at site. Kill-off pattern focused also on adult sheep. The size of sheep, and also their kill-off pattern lean more towards the hunting of wild animals.[184]
There was no evidence of domestic pig or cattle at the site.[185]

The **Nemrik** material has been analyzed by A. Lasota-Moskalewska.[186] Gazelle bones are the largest group among the identified small ruminant remains. The second largest category was found to be domestic caprines. Pigs were almost as important as sheep and goat. The last significant group of small ruminants were wild sheep and goat, whose numbers increased in the successive phases at the Nemrik settlement as well. The proportion of large ruminants is 41,6%. Their presence increases sharply over time. The bulk of large ruminant remains came from aurochs (40,1%) and from domestic cattle (42%). The subsistence economy was based on wild animals (61,8%). The most frequently hunted large ruminant was aurochs, but the interest in this animal became significant only after 7.100 BC. Before then, the principal large ruminant game was antelope. The largest category of domestic animals was found to be cattle (49,4%), while the exploitation of domestic cattle began in the middle phase (7.100–7.050 BC). No domesticated animals were recovered in the first phase (8.250–7.950 BC) of Nemrik. In phase 2 (7.850–7.750 BC) remains of domestic sheep and goat occur, while domestic pig appear in phase 3 (7.650–7.150 BC) . Domestic cattle remains are observed in the middle phase (7.100–7.050 BC), together with dog. The presence of domestic pig in Nemrik's third phase is also fairly obvious. The pigs were either very small or very large in size. Many transitional forms are also observed in this period.[187]
For a brief summary of the domestication status at the PPN and PN sites in Iran and Iraq, see Table 3.

3.4. The Levant

Hunting is observed as the prime element in the subsistence economy during the Proto-Neolithic and the PPNA at **Jericho**. The hunting strategy focused on gazelle. However, in the

[184] Zeder 1999.

[185] Hole/Flannery/Neely 1969:311-356.

[186] Lasota-Moskalewska 1994.

[187] Lasota-Moskalewska 1994.

Sites	*Level*	*Sheep*		*Goat*		*Pig*		*Cattle*	
		W.	*D.*	*W.*	*D.*	*W.*	*D.*	*W.*	*D.*
Jericho	PPNB	+	?	+	?	+	+	+	?
	PPNA	+	+	+	+	+	+	+	+
Ain Ghazal	Yarmoukian	+	++	+	+	+	+	+	+
	PPNC	+	+	+	+	+	+	+	+
	LPPNB	+	+	+	+	+	+	+	+
	MPPNB	+		+		+		+	
Beidha	LPPNB	-	++					+	+

++: not local domestication ?: not clear

Tab. 4: Domesticates from a few archaeological sites in the Levant.

early phases, the proportion of ovicaprid (both sheep and goats) remains are rare in contrast to those found in the PPNB. Both of them increase in number in the PPNB. The size of the goat bones and horn cores indicates that goat was still present in a wild form at the site.[188]

But an initial stage of goat domestication probably exists here. They were captured but their morphology had not yet changed at the site. Also cattle bones are quite large and similar in size to wild cattle. But as seen with the goat, the initial stages of taming and control of cattle could be understood as occurring here.

Pig measurements reveal a slight size reduction when we compare these measurements to those from earlier periods. This could indicate that pigs were more likely domesticated in the PPNB.

A total of fourteen sheep bones were identified at Jericho in from the PPNA and PPNB together. In spite of the lack of evidence for the domestication of sheep at the site, J. Clutton-Brock and H.-P. Uerpmann believe that the appearance of domestic sheep in the PPNB at Jericho does not come as a surprise.[189]

Ain Ghazal is one of the rare sites providing a continuous occupation from the MPPNB through to the earliest PN, the so-called Yarmoukian Culture. This phase, still aceramic, is

[188] Clutton-Brock 1971:50; Clutton-Brock 1979 and 1983.

[189] Clutton-Brock/Uerpmann 1974:261-274.

called the PPNC.[190] I. Köhler-Rollefson, and then later A. von den Driesch and U. Wodtke, evaluated the animal bones collected in 1993–1995.[191] Ovicaprids are the most dominant animal during all the periods at the site, followed by gazelle, pig and cattle However, in the earlier periods goats outnumber sheep, sheep bones increased gradually at the site. The age distribution shows that the percentage of young animals is extremely high. Based on kill-off pattern, a high proportion of goats (64,2% to 83%) were killed when they were under the age of 2,5 years. von den Driesch and Wodtke maintained that kill-off pattern for ovicaprids reflect the keeping of sheep and goats under human care. They believe that efforts at goat domestication were begun in the earliest phase of the site. Domestic sheep were brought from outside to Ain Ghazal in the transitional period from the MPPNB to LPPNB. Wild cattle and pigs were probably kept in captivity. Sheep/goat husbandry is an important element in the subsistence economy at the site.
In the Yarmoukian period an increase in gazelle and equid hunting is observed due to increasing aridity. Subsistence economy based on caprine husbandry and also probably cattle husbandry during Yarmoukian phase at Ain Ghazal.[192]

The faunal assemblage from **Basta** is dominated by ovicaprid remains. C. Becker evaluated this material. She found small- and large-sized cattle bones together. Because of this, she assumed that domestic cattle occurred in the LPPNB.[193] Sheep do not appear to be local, but were brought to the settlement fully domesticated in the LPPNB, probably from the Damascene Basin or from the Taurus-Zagros Region.[194] C. Becker determined that fully domesticated animals were kept and slaughtered at Basta.[195]
For a brief summary of the domestication status for the PPN and PN sites, see Table 4.

[190] Rollefson/Simmons 1986 and 1987.

[191] Rollefson/Köhler-Rollefson 1989; Köhler-Rollefson/Rollefson 1990; Köhler-Rollefson/Gillespie/Metzger 1988; Köhler-Rollefson/Rollefson 1990; Köhler-Rollefson/Quintero/Rollefson 1993; von den Driesch/Wodtke 1987.

[192] von den Driesch/Wodtke 1997.

[193] Becker 1998:67.

[194] Ducos 1993.

[195] Becker 2000:200.

Fig. 3: Aerial view of Mezraa-Teleilat. Excavation archives.

4. MEZRAA-TELEILAT: An Overview

4.1. Natural Setting

4.1.1. Location

The site of Mezraa-Teleilat is located in the province of Şanlıurfa. The settlement lies 5 km south of the town of Birecik on the left side of the Euphrates and within the Mezraa Village (Figs. 3–4).

The village began to grow very quickly and spread as much as ca. 2 km above the Euphrates due to the construction of dams in this region. The old nucleus of the Mezraa Village covers

the northern part of the site, but a large part is still protected, lying between two districts in the village.[196]

4.1.2. Geomorphology of the Region

Birecik is situated in the Middle Euphrates region of Southeast Anatolia along the river. The town of Birecik is bordered in the east by the Arat and Baba mountains, in the southeast by the Beko Mountains and in the northwest by the Kalazan Mountain.[197]

G. Algaze conducted a survey in this region between 1989–1991, during which time the geomorphology of the Euphrates was studied in an area from Halfeti to 3 km downstream. The Euphrates cuts into a horizontal and gently folded level of Eocene to Miocene limestones and mudstones. Quaternary terraces and alluvial deposits reveal a complex history of entrenchment, followed by valley fill, then renewed downcutting. The Euphrates has a straight to locally-meandering pattern and is confined in a narrow gorge (300 m deep), which is entrenched in a limestone plateau to the south of Halfeti. The valley bottom widens south of the gorge from about 0,5 km to 2 km at Birecik, and is entrenched by only 60–180 m. Four geomorphological zones were identified outside of the river flood plain during G. Algaze's survey in this region. They are as follows:

a- upland plateaus,
b- pediments,
c- high river terraces of Pleistocene, and
d- lower terraces of Late Pleistocene to Holocene.[198]

a- **<u>Upland Plateaus:</u>** These plateaus rise in the Euphrates Canyon south of Halfeti at elevations between 600 m – 750 m and are structurally controlled by resistant limestone beds of Eocene, Oligocene and Miocene.

In the south (downstream) of the deep Euphrates Canyon, two lower plateaus were recorded: The Birecik Plateau (east of the river) and the Nizip Plateau (west of it). These lower plateaus are formed by limestone and calcareous mudstone (400 m – 500 m). Substantial areas of arable deep soil are found here, but a large part of the this

[196] Özdoğan 2002a and b.

[197] Başgelen 2002:107; Bengisu 1986.

[198] Algaze/Breuninger/Knudstad 1994:46-47; Algaze 1992; Algaze/Breuninger/Lightfoot/Rosenberg 1991.

Fig. 4: Location of Mezraa-Teleilat (modified after Schmidt 1997:158, Fig. 5).

region is not densely settled because of the lack of well-developed surface drainageways, while permeable limestone bedrock has resulted in a deep water table.

b- **<u>Pediments:</u>** In this region, some spoon-shaped erosional surfaces were recovered. The most important are located about 10 km northwest of Birecik on the eastern side of the river. Except for in the central part, these pediments have few perennial streams and shallow ground water.

c- **<u>High terraces:</u>** P. Sanlaville noticed that the slope break level in the pediments north of Birecik corresponds closely to the top of a high terrace on the opposite (west,

locally south) bank of the river at a roughly similar elevation (400 m – 405 m).[199] This high terrace is formed by a thick (35 m – 45 m) alluvial and colluvial sequence. This sequence begins with the entrenchment of the Euphrates and extends to an elevation of about 360 m. The deposition of river gravel and colluvial deposits with several well-developed palaeosoils is filling the valley up to a height of ca. 400 m – 405 m. The present valley has been excavated down to its present elevation of about 340 m by renewed downcutting.

d- **Low terraces:** The Euphrates has formed a complex series of flood plain steps and low straith-terraces, below the pediments and high terraces. The lower steps are all within 6 m or so of the low (autumn) level of the river. Pistachio trees, and other dryland and irrigated crops are the typical crops of the higher flood plain steps and terraces. Low terraces lie between ca. 6 m and 18 m above the low river level. Small alluvial fans of the valley margin mantle many of the terraces, while small local tributaries of the Euphrates have engraved narrow gulches across the terraces. Sections of the terrace deposits reveal a complex series of river channel gravels, flood plain silt, sand and clay beds, and paleosoils. The lower terraces flanking the river are probably Holocene and Late Pleistocene in age. The lower Euphrates terraces, due to the local-capping alluvial fans are arable and irrigable lands. Algaze et al. State: "Because of this, most of the archaeological sites are located in this region. Bedrock entrenchment of the river channel several meters below the base of many terrace deposits has laterally confined the channel along many reaches, leaving the terraces largely protected from undercutting and destruction".[200]

Mountains and rocks covered much less area in the Birecik region, with mountains situated in a north-south direction, losing altitude in the south. The most important characteristic of these mountains is their average altitude, making them suitable for pistachio and olive cultivation. They can be raised in the foothills and on the sides of the mountains.

The Arat Mountain (888 m) is the highest peak in the Birecik area. From Syria it looks as if it is merely a continuation of the plain, but from Birecik it appears quite high. The Babahat Mountain is found to the east and the Bello Mountain to the southeast, near the Syrian border, while the Kalazan Mountain appears in the northwest. Undulating lands are situated between

[199] Sanlaville 1987:55-56.

[200] Algaze/Breuninger/Knudstad 1994.

the mountains, and many wide plains can be observed here as well. This wide plain, watered by the Euphrates and its tributaries, constitutes the Birecik Plain.[201]

Except for the Euphrates, Birecik is not rich in rivers. Many smaller ones do not have a continual flow due to low precipitation and high temperatures (high evaporation). Many streams begin near Kehriz, Caber, Zeytin, Birecik and Koymat. They flow to the Euphrates, but are no longer active today. Moreover, some small water sources also exist, such as Tatayn Çayı, Tiso, Ayran and Çoğan.[202]

Soils: Red Mediterranean soil is widespread in the limestones of the Gaziantep Plateau. Vertisoils cover a wide area on clayish-lime soft sediments, occurring in the Altınbaşak and Şanlıurfa plains. Another characteristic of the soil in this region is the existence of pebble levels under the soil near to the Euphrates plains in Şanlıurfa. Around Birecik the soil was formed with pebbles. In these areas, soils buried under pebble layers are typical examples of palaeosoils.

There are grey-coloured soils on clayish-lime areas between Gaziantep-Şanlıurfa. They reflect the character of the main ground. These soils do not present a normal profile due to erosion.[203]

The palaeosoil on the plateau of Gaziantep extends between 500 m – 700 m. It is composed of limey and sandy limestone of the Eocene. The plateau was dissected as deep as some 50 m by the Euphrates and its main tributaries. In Birecik, buried palaeosoils are found at an altitude of 450 m on the west bank of the Euphrates River.[204]

4.1.3. Modern Vegetation

In southeastern Anatolia ten different wild types of wheats (*Triticum*) can be observed. Half of these occur in the Karacadağ region. Gum-tragacanth plants (*Astragalus*) are the most dominant plants in this region. They are widespread in the steppe, and gum-tragacanth plants are represented by approximately 400 different types in Turkey. Most of them live in this region, while six of them are endemic (*Astragalus aintibicus*, *Astragalus gaziantebicus*, etc.).

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[201] Sözer 1984:12.

[202] Başgelen 2002:5.

[203] Atalay/Mortan 1997:268-269.

[204] Atalay 1994.

However, some species of chickpea (*Cicer sp.*), lentil (*Lens sp.*), vetch (*Lathyrus*), fig (*Vicia*), pea (*Pisum sp.*), trefoil (*Onobrychis sp.*), bird's foot trefoil (*Lotus sp.*), clover (*Medicago sp.*) and spices (*Trigonella sp.*) are found in southeastern Anatolia. Some of them are endemic to this region.

Cereals (*Gramineae*) are the natural vegetation of the steppes in Turkey. Four species of cereals grow in southeastern Anatolia (*Triticum baeoticum*, *Triticum dicoccoioes*, *Triticum durum*, *Triticum aestivum*).[205]

Generally speaking, Şanlıurfa has poor vegetation except around Halfeti and Birecik due to their situation in the Euphrates Valley. Here there is a variety of plant species. In the parts of Birecik located outside of the Euphrates Valley a steppe-like vegetation dominates. Especially in areas along the Euphrates and its radius all kinds of plants can be cultivated. Groups of trees also become dense in this area. In the valley, endemic species can observed. "Euphrates poplar (*salix Alba*)" is a type of willow tree.

West of the steppe, and west of the Euphrates, the vegetation changes. Here limestone plateaus (500 m – 600 m) are covered with olive and pistachio (*Pistacia vera*) trees. Pistachio nut plantations are found especially on the plateau between Gaziantep – Şanlıurfa. Beginning around Gaziantep, and passing to the west, is the Mediterranean forest region. Here, red pine (*Pinus brutia*), Qermez oak (*Quercus coccifera*), and nettle trees (*Celtis australis*), or makis, are found among wild pistachio nut (*Pictacia terebinthus*) trees. Many places with red pines have been destroyed. Beginning from the east (Kilis), the desert-like steppe begins again.

The dominant bush species seen in this region are *Amygdalus arabica* (almond), *Cerasus microcarpa*, *Cercvis siliquastrum* (judas tree), *Ficus caria* (wild fig), *Acer monspessulanum* (white birch), *Cerasus mahalep* (mahalep), *Crataegus aronica* (Mediterranean medlar), *Pyrus syriaca*, *Celtis tournefortii* (nettle tree), *Pistacia khinjuk* (Pistachio) and *Pistacia vera* (Pistachio).[206]

4.1.4. Climate

Today the type of climate dominating Birecik can be described as a continental Mediterranean climate. It is characterized by hot, arid summers and relatively humid winters. Birecik is situated at a point where continental and Mediterranean climates come together. Because of

[205] Atalay/Mortan 1997:271.

[206] Atalay/Mortan 1997:272.

this, in higher areas, behind the mountains and generally in the interiors, the continental climate is dominant, while central, open areas to the south and west have generally a Mediterranean climate.

What makes the climate different from that of a Mediterranean climate is less humidity and fluctuations in temperatures between night and day. Also, precipitation is in the form of rain.[207]

Precipitation:

Annual precipitation is between 400 mm – 1.200 mm. The driest part of this region is around Ceylanpınar. Here, the annual precipitation average is approximately 400 mm. In Gaziantep-Şanlıurfa, on the plateaus and in the Diyarbakır Basin, the annual precipitation is between 400 mm – 600 mm. The distribution of precipitation over several years does indicate differences. The annual average precipitation in Şanlıurfa changes from between 200 mm – 800 mm.[208]

Precipitation occurs in the winter and spring in Birecik. It is very low in June, July, August and September, with precipitation mostly falling in December (70,5 mm). The annual average of days with snow cover is very low (3,1). The humidity in this region is very low as well. Annual average of relative humidity is around 50%. In summers it decreases to 30%, and on some summer days may even be under 1%.[209]

Temperature:

The annual average temperature is 17,6 °C, the highest temperature 45,2 °C, the lowest –10,3 °C. The average relative humidity was measured at 56%.[210]

4.1.5. Botanical Samples from Mezraa-Teleilat

R. Neef is analyzing the plant remains from Teleilat-Mezraa[211] as well as the soil samples from the PN and PPN levels. A simple water flotation technique was used for separating carbonized plant remains from the soil. He has observed almost the complete spectrum of

[207] Atalay/Mortan 1997:265.

[208] Atalay/Mortan 1997:265; Sözer 1984:16-20.

[209] Sözer 1984:18.

[210] Sözer 1984:18.

[211] I would like to thank Dr. R. Neef (DAI Berlin) for allowing me to use his unpublished results from Mezraa-Teleilat.

early domesticated crop plants at Mezraa-Teleilat. Emmer (*Triticum dicoccum*) and barley (*Hordeum sp.*), einkorn (*Triticum monococcum*) and naked wheat (*Triticum aestivum/durum*) are the most frequently found plant remains. Numerous spikelet forks of emmer were especially found at our site.

The barley grains retrieved at Mezraa-Teleilat are hulled barley. R. Neef suggests that the growing of pulses such as bitter vetch (*Vicia ervilia*) Flax (*Linum usitatissimum*) and lentil (*Lens culinaris*). must have been important at the site. Investigation of plant remains indicate, that pistachios (Pistacia atlantica?), almonds (Prunus sp.) and figs (Ficus sp.) were collected by the people of Mezraa-Teleilat.

A charcoal analysis shows that the most frequently found woody is wild pistachio (*Pistacia cf. atlantica*). Another identified wood species are pomaceous fruit tree and deciduous oak (*Quercus cf. brantii*). This species are tolerant of relatively marginal conditions. They are considered drought-resistant vegetation. Neef mentioned that these forests are mainly found in the transition zone between the oak forests and the steppe. Nowadays nothing is left of the steppe forest area on the plateau near Mezraa-Teleilat. In conclusion, the results from the analysis of the botanical samples indicate a xeric woodland with oak, almond and pistachio tree species in the around of the Mezraa-Teleilat. R. Neef suggests that dense forest vegetation around Mezraa-Teleilat would have been similar to the riparian forests along the Euphrates.[212]

4.2. Mezraa-Teleilat: The Archaeology

4.2.1. Excavation History

The site was originally discovered by G. Algaze in 1989 during a survey which took place in the Euphrates River Basin.[213] Research at the site began with a surface survey in 1998 as part of the METU – TAÇDAM Carchemish Dam Project. The investigations were conducted by the Directorate of the Şanlıurfa Museum and under the scientific direction of Prof. Dr. M. Özdoğan (İstanbul University). After surface survey had been completed, excavations began in 1999 at the site and continued until 2004.

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[212] Neef, unpublished data.

[213] Algaze/Breuninger/Knudstad 1994:46-47, site no. 48; Algaze 1992; Algaze/Breuninger/Lightfoot/Rosenberg 1991:201.

Phase	Abbreviation	Period		Description
I		***Iron Age***		
	IA			Persian-Achaemenian Period
	IB			Neo-Assyrian Period
	IC			Late Bronze Age – Early Iron Age Transition
II		***PN***		
	IIA1		**Late PN**	Halafian Period
	IIA2			Proto-Halafian painted pottery
	IIB1		**Middle PN**	Red slipped pottery and early painted pottery
	IIB2			Impressed decorated pottery
	IIB3			Hassuna and early impressed decoration
	IIC1		**Early PN**	Plain light colored wares
	IIC2			Claff tempered coarse pottery
III		***Transitional Period PN/PPN***		
	IIIA			Round or circular light structures, random appearance of Dark Fased Burnished Ware (small amount)
	IIIB			Ashy deposits without any pottery
IV		***PPN***		LPPNB
V				MPPNB

Tab. 5: Stratigraphy of Mezraa-Teleilat.

4.2.2. Stratigraphy and Dating

According to information from the excavations, the main fill of the mound dates to the Neolithic period, covering at least the so-called PPNB, PPNC and PN stages. Another period uncovered at the site is the Iron Age. There is a gap between the PN and Iron Age. But no gap seems to appear in the Neolithic sequence. Because of this, the developments occurring in the

Neolithic period can be well observed (Tab. 5). A description of the stratigraphic situation at Mezraa-Teleilat follows below.

Late Bronze and Iron Age:

Phase I is represented by a large building complex, dated to the end of the Iron Age. It was uncovered immediately beneath the topsoil. At least three building phases have been observed. Relying on information from the pottery, M. Özdogan believes that the earliest of these phases can be dated to the end of the Late Bronze Age, and the latest phase to the Hellenistic period.[214] The Iron Age levels at Mezraa-Teleilat have proven to be extremely rich in material. The existence of horse/cavalier figurines an a bullae indicates that the site was an important centre during the Iron Age. M. Özdoğan maintained that the Neo-Assyrian monumental building of Level IB is, without doubt, a palace. This palace is the first excavated Neo-Assyrian palace in Anatolia. The type of plan is similar to the Neo-Assyrian palace structures found in northern Syria. There is no surrounding settlement. M. Özdoğan mentioned that "its situation near the Euphrates may be considered as a deliberately placed control station or a harbor".[215]

PN:

The PN fill was found almost everywhere beneath the Iron Age level. However, there is a chronological gap of more than four thousand years between the top of the Neolithic fill and the beginning of the Iron Age levels, but no sterile sediment observed between PN and Iron age at Mezraa-Teleilat. Probably, upper part of the PN fill was penetrated by the Iron Age construction.[216] The PN levels of Mezraa-Teleilat are extremely rich in material for the periods between the PPN and the beginning of the Chalcolithic, i. e., the Halafian period. The time between the PPN and the beginning of the Halafian period is not well understood for northern Syria, Mesopotamia and for southeast Anatolia. This lack of understanding is a result of the abandonment of the PPNB sites and the limited number of stratigraphically superimposed PPN and PN occupation levels. A general cultural collapse or shift occurring all over the region is a possibility. Most of the PN sites are short-term, simple settlements. A few larger PN settlements excavated such as Sabi Abyad and Tell Kerkh in northern Syria, but the

[214] Karul/Ayhan/Özdoğan 2001:136-138.

[215] Karul/Ayhan/Özdoğan 2004:93-94.

[216] Karul/Ayhan/Özdoğan 2001:139.

data collected from limited areas do not provide enough information to fill the gaps in our knowledge or to answer the questions presented here.

Mezraa-Teleilat is also very informative for the PN of the Near East. At Mezraa-Teleilat, phase II has three well-preserved sub-phases, which are denoted as A, B and C. PN period at Mezraa-Teleilat covers an era between the earliest examples of pottery production and the Halafian period.[217]

The TP from the PPN to PN:

The Transitional period from the PPNB to PN, named the PPNC by some, or the final PPNB by other scholars, is not very well defined in Near Eastern archaeology. This period is observed mainly in Trenches 21 E and 21 F at the site (see Plate 6). The fill of this level is remarkably different from those of the upper levels. The lithic industry contrasts sharply from the industries of the PPN and PN. Phase III has a completely different architecture, settlement structure and finds as compared to both phases of PPNB and to PN as well. Interestingly, the large stone structures of earlier phase of the PN (IIC) reveal similarities with the other sites in Southeast Anatolia, which are contemporary with Mezraa-Teleilat PPNB levels. In the transitional period, completely different architecture which contain wattle and daub architecture without large mudbrick blocks appeared at the site. No comparisons exist for the wooden structures of Mezraa-Teleilat in existing literature, but archaeological data points towards at least three or more building phases. The earliest levels of the so-called transition period (IIIB) contain no pottery. In the uppermost level (IIIA), excavators collected a small number of pottery fragments. An interesting circumstance related to phase III is that certain pottery sherds are rarely found towards the end of the phase; however, the pottery in this level is not the very primitive coarse ware (with straw temper) found in the early PN at Mezraa-Teleilat, but belongs to the dark-faced burnished ware, which is made with an advanced technology, not known in this part of the Euphrates. According to M. Özdoğan, the earliest pottery was produced outside of Mezraa-Teleilat and imported to the Mezraa-Teleilat. This fact indicates that the beginning of the PN was not the same everywhere. M. Özdoğan mentioned that in the western region of the site, the end of PPN began earlier than in the Euphrates Valley.[218]

[217] Karul/Ayhan/Özdoğan 2004:92; Özdoğan 2002a:83-84.

[218] Karul/Ayhan/ Özdoğan 2002:110-112.

MEZRAA–TELEİLAT (36° 58` N, 37° 59` E)					
Lab. No	**Date BP**	**Cal. BC**	**Material**	**Level**	**Provenance**
AA-49102	9324±59	8720-8470	Seeds	IIIB2	Trench 21E, feature 38, sample 233
AA-49103	8021±55	7070-6820	*Aegilops*	IIIB2	Trench 21E, feature 38, sample 233
AA-49107	8001±55	7060-6820	*Gramineae*	IIIB2	Trench 21E, feature 62, sample 223
AA-49106	7993±58	7060-6820	Seeds	IIIB2	Trench 21E, feature 62, sample 223
AA-49104	7977±54	7050-6770	*Triticum sp.*	IIIB2	Trench 21E, feature 38, sample 233
AA-49105	7973±62	7050-6770	*Gramineae*	IIIB2	Trench 21E, feature 38, sample 233
AA-49108	7926±69	7030-6680	*Triticum sp.*	IIIB2	Trench 21E, feature 62, sample 223
AA-49101	7806±61	6690-6500	Seeds	IIB	Trench 21F, feature 100, sample 224
AA-49100	7746±61	6640-6480	Seeds	IIB	Trench 21F, feature 100, sample 224
AA-49099	7849±61	6980-6590	Seeds	nd	Soundage, trench 14K, feature 16, sample 214

Tab. 6: Modified from CANeW 14C databases (after Bischoff 2004).

None of the excavated sites have exposed either descriptive architecture or significant finds for this period. Many of the PPNB sites were abandoned in the beginning of the transitional period. Excavations reveal a collapse of PPNB cultures or reduction in settlement size.This period probably a short-term cultural horizon at Mezraa-Teleilat. If this theory is correct, the excavations at Mezraa-Teleilat provide important new information on the Neolithic of the Near East.[219]

PPN:

The PPN could only be investigated in a limited area at site. The PPN at Mezraa-Teleilat has been described as phase IV and V. This level represents the developed PPNB, which we know from several excavations in the Near East. This period, though, has four building phases, while underneath it is a phase V, which we can date to the middle PPNB. The most important find from this period is a fortification wall, which is similar to those walls found at Magzalya. The wall at Mezraa-Teleilat is the fifth example of such a structure in the PPNB period. In front of the wall, a fill was observed with large amounts of animal bones. It belongs without

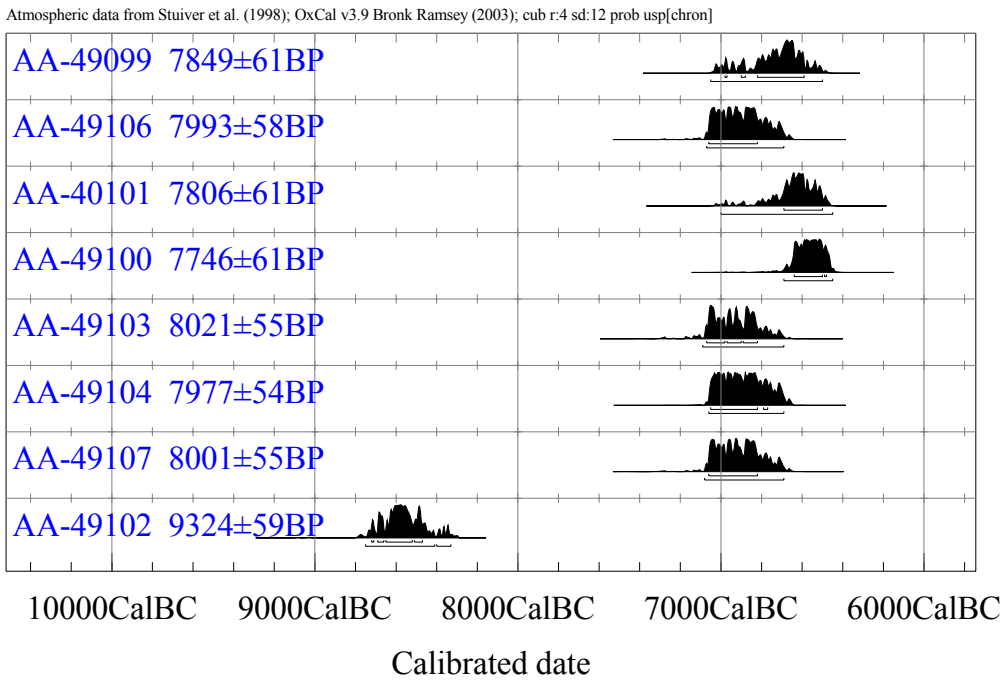

Fig. 5: Calibrated 14C dates from Mezraa-Teleilat. Calibrated with OxCal v. 3.9.

doubt to a ditch.[220]

Table 6 and Figure 5 provide Mezraa-Teleilat's 14C-dates. Seven samples are available for TP, two for PN, with one sample from a sounding. Except for one date, all are compatible with the stratigraphy of Mezraa-Teleilat. Four dates belong to feature 38 from a floor level of a building dated to the TP. The oldest date (8.720–8.470 BC) is especially noteworthy. Feature 62 provided three samples for the TP. These samples were taken from an oven, which extends down to the house floor. Two samples belong to the PN (from an open area; Feature 100) and do not contain any architectural remains. According to the 14C dates, we can date the transitional levels to the time between 7.070–6.680 BC (oldest date not evaluated), and the PN levels to the time between 6.690–6.480 BC.[221]

[219] Özdoğan/Ayhan/Demirtaş 1999:2-3; Özdoğan 2002:82.

[220] 2002, unpublished excavation report.

[221] 2002, unpublished excavation report.

4.2.3. The Architecture of Mezraa-Teleilat

4.2.3.1. The PN

Some information is provided below concerning the well-preserved buildings. Two buildings are especially of interest and important for this study due to some animal skeletons found there.

BH Building: The BH building has a similar architectural plan as the AL building (see below), and lies under the AL building, only 1 m to the northeast. This building has a rectangular plan with a stone foundation and mudbrick walls. The house contains four cell plan rooms in equal size. Burnt mudbrick rubble was found inside, which indicates destruction by a large fire. Below this burnt fill, a large amount of grain, especially inside of the northwestern cell, and one well made, unfinished stone pot with three feet were found in the southwestern cell. The building belongs probably to phase IIB2.[222]

BG Building: The BG building has the same plan as building AP (see below; Fig. 6).[223]

AY Building: This building is oriented northeast-southwest and consists of a space measuring 5,5 m x 2,3 m, with walls of two rows of stones, surviving to three courses. The southwest part is disturbed. Although the northern wall had been destroyed by a pit, traces of a wall were still observed, showing the continuation of the building in this direction. Another wall section was running parallel to this room, about 1 m to north. Burned mudbrick and floor pieces were observed in the room, indicating destruction by fire. The burned floor pieces do not belong to the excavated area; they collapsed onto the area from an upper floor. M. Özdoğan believes that the excavated area was used as a basement. Under this burned floor, the remains of five burnt pig skeletons were found within very crushed mudbrick pieces and ashy building fill (Fig. 6).[224]

AS Building: This building is located to the south of the BB building (see below). Only a part of the structure, measuring 2 m x 2 m, was preserved. The construction is

[222] 2002, unpublished excavation report.

[223] 2002, unpublished excavation report.

[224] For detailed information see chapter 9.1. Karul/Ayhan/Özdoğan 2004:98.

Fig. 6: AG-AP-BG-AR buildings at Mezraa-Teleilat (excavation archives).

rectangular, with walls of medium- and small-sized stones standing to a height of ca. 50 cm. The walls are too fragile to support a heavy roof. It seems that the architectural remains were an independent storage unit in the courtyard north of building AY. Building AS belongs to phase IIB2.[225]

AA Building: The upper part of the south wall was destroyed by building BB. It also has a cover with a fill containing small stones also found in buildings from the same period.[226]

BB Building: This building is similar to building AG, It had mudbrick walls covering an area of ca. 4 m x 3 m. The internal cells measure around 1 m x 1,2 m.[227]

AV Building: The building has a plan similar to AB. It is a large building, the size about 15 m x 8 m. Its long axis is oriented southeast-northwest orientation, its superstructure is formed by long, narrow, parallel corridors. At the lowest level of the foundation, these corridors have the appearance of a cell-plan foundation, formed from the connecting walls. The walls are ca. 1 m thick and preserved to a height of 60 cm. An associated wall was uncovered

[225] Karul/Ayhan/Özdoğan 2004:99.

[226] 2002, unpublished excavation report.

running parallel to the west of the building, that also bounds the west side of building AM to the north, suggesting a corridor between the two structures. When the building was abandoned, it was covered with stones.[228]

AM Building: This construction here is similar to building AV. This building was destroyed by numerous pits. It extends over the trenches 19 E/F and 18 E. A part of the building, measuring 10 m x 5 m. Its long axis has a southeast-northwest orientation. The walls at the foundation level were built using large stones (worked faces), while smaller fieldstones were used for the construction of the upper levels. The walls are 1 m thick, and stand to a height of ca. 60 – 70 cm. The plan of the AM consists of a wide central corridor, flanked on either side by a narrower parallel corridors. The corridor walls at the level of the lowest row of stones are connected each other and form a cell plan of rooms. The building was destroyed by fire, and probably belongs to phase IIB2 or IIB3.[229]

AL Building: This building appeared under Iron Age deposits. It is a burnt cell building with stone foundations. A part of the AL, 5 m x 4 m, could uncovered. Six cells with the same dimensions were excavated The outer walls of the AL building were destroyed by fire. The construction techniques of the stone walls indicate wooden beams in the upper part. The building probably belongs to phase IIB1 or IIB2.

AH Building: This building was discovered immediately beneath the topsoil. AH building consist of a single room (6 m x 3 m) and a corridor (1,5 m) that surrounded the room to the south and west. The building probably belongs to phase IIA2 or IIB1.[230]

AG Building: AG is a large building with a complex plan. It was recognized in the burnt accumulation lying below building AH. The plan of the AG building consist of a long corridor in the center and two long narrow rooms. The dimensions of the building is approximately 14 m x 6 m. In the northwest corner of the building an oven was found. The plan of the building show long and narrow

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[227] Karul/Ayhan/Özdoğan 2004:98.

[228] Karul/Ayhan/Özdoğan 2004:99; 2002, unpublished excavation report.

[229] Karul/Ayhan/Özdoğan 2004:99; 2002, unpublished excavation report.

[230] Karul/Ayhan/Özdoğan 2004:96.

rooms, forming the central axis of the building, and also small square rooms to the north and south of the central axis.

A oven was uncovered in the east of the building built adjacent to the square plan room. Thus, the oven was located in an open space in a corner outside of the AG building with its opening face looking to the outside of the building. The traces near the floor of the oven indicate that the oven was domed. Its floor, measuring 1,5 m x 1 m, has been renovated several times. The eastern part of the building is formed again by square rooms with stone foundations. A second oven was located adjoining the most easterly of these rooms. The oven located here is also in the outer corner of the building. Larger flat stones were used for the outer walls and for some of the walls on the central axis The thickness of the walls is 1 m at foundation elevation and progressively thinner toward the upper part of the wall (50 cm – 60 cm). On top of the foundations a mould-made mudbrick has been preserved with a thickness up to 30 cm. At least three goat skeletons were recovered to the east of the oven, in the northwest room.[231] One human skeleton was found in the middle of the corridor. The burnt level probably belongs to phase IIB2 or IIB3 (Fig. 6).[232]

AR Building: This building, rectangular in plan, extends beneath the eastern bulk of the trench. Its northern part is damaged. To the west, the remains of the structure cut into the eastern wall of the building. The house covers an area of 15 m x 3 m (Fig. 6).[233]

AP Building: This building are placed in trench 23 H, extending east from the northwest corner of the trench. The building is formed from small adjoining square rooms (1,5 m x 1 m). The walls were built from mould-made mudbrick on stone foundations. The dimensions of building is ca. 5 m x 2,5 m. This building probably belongs to phase IIB2 or IIB3 (Fig. 6).[234]

BB Building: This building sits directly on the AA building and belongs to phase IIB3.

[231] For detailed informations see chapter 9.2.

[232] Karul/Ayhan/Özdoğan 2004:96-97.

[233] Karul/Ayhan/Özdoğan 2004:97.

[234] Karul/Ayhan/Özdoğan 2004:97; 2002, unpublished excavation report.

4.2.3.2. The TP from the PPN to PN

A total of five structures were exposed: two well- and three partly-preserved from the TP. An ashy dark grey-coloured filling suggests wooden constructions, an assumption supported by the existence of several pits and post holes. Additionally, three burned areas were found in this area with sunken floors, which may be traces of hearths. These are oval-shaped pits with rounded corners, measuring 60 cm – 70 cm x 30 cm. The pit filling and river pebble covering are noteworthy. Both the traces of fire on the stones and the ashy fill indicate some kind of fire pits, quite close to each other, although not arranged in a regular row. They are surrounded by platforms made of flat stones. A pavement was observed here in this very ashy area with its accumulation of small stones. No distinct architectural plan is discernible. In the southeast corner of the trench, a square section of a clay floor was found, immediately in front of it observed a half circle shaped fireplace. Its edges (20 cm high) and floor had been plastered.[235]

4.2.3.3. The PPN Level

Building remains of the PPNB were observed in the western part of the site. A slope destroyed the western part of the BD building. Only the foundations of the eastern and southern wall were preserved. The eastern wall along the north-south direction was built with big, flat stones. Small projecting parts have been observed along the wall. Under this building another building was uncovered in the northern part of the trench, named building BE. It was burnt, and the wall was built with thin, flat mudbrick blocks. Under the southern wall traces of floor are visible, and made of small stones. A large part of this building projects down to the northern profile of the site. The western part of the building was destroyed by a slope. Building BE could have been built in a rectangular plan and separated into cells. They have hard floors, covered with mudbricks.[236]

[235] Karul/Ayhan/Özdoğan 2004:68.

[236] 2002, unpublished excavation report.

4.2.4. A Short Description of the Pottery from Mezraa-Teleilat

Late PN – Early Halaf Transitional ware:

Halaf pottery is represented by one decorated sherd at Mezraa-Teleilat. Some ceramics of an orange-coloured clay with shiny red-painted decorations were observed also in this group. This type of pottery sherds resembles early Halaf examples and supports the existence of an Halaf transitional period, or the Halaf period, at Mezraa-Teleilat.[237]

Late PN – Red-painted decoration:

The pottery in this group consists of bowls, either carinated or with a slight S-profile. Jars with straight necks and spherical bodies observed also in the assemblage. A thick red slip is common on the inner part of the open forms. The decoration on the outer surfaces consists of broken lines and geometrical shapes (filled or combed triangles). Panels with twisting or wavy lines occur as well, but more rare than others. Along with the red-slipped ware, a well-made, light yellowish-coloured ware with sand temper and gut burnished dark coloured sherds were found. Also found within this phase were husking tray vessels, characteristic of the Hassuna Culture, with rough, grater-like interior surfaces, as well as sherds with Hassuna-type incised decoration.[238]

Late PN – Smeared red-slipped ware:

The form and surface treatment of the pots from this group are similar to the red-painted decoration ware (described above). The red clay slip is smeared on the surface, giving it a wavy appearance. Distinguishing examples of decoration are rare. Some dark faced, good burnished ware and Hassuna-like sherds are also found in this phase at site. More common among the undecorated sherds are samples of a light colour, smeared or very lightly burnished and with finely cut plant temper.[239]

Late PN – Plain ware with impresso and red-slip decoration:

The pottery indicate a transition between the group with impressed decoration and with red slip. This group is strictly confined to light coloured wares with fine plant tempering. However, the surfaces are unburnished. A small number of well-made, fine-rimmed sherds

[237] Karul/Ayhan/Özdoğan 2001:139.

[238] Karul/Ayhan/Özdoğan 2001:141.

[239] Karul/Ayhan/Özdoğan 2001:140.

with highly burnished surfaces have been recovered at this level. Some of the well-made pottery contain well burnished thick red slips around the rim. This treatment is seen particularly on the bowls with straight rims or those that are slightly necked.
There are also jars with very long necks, with red slip and an untreated body. Notched, comb-impressed or incised decoration can be observed on the bodies of some of the vessels with red slipped rims. Semi-globular bowls and globular jars with short necks are very common. In these levels coarse wares appear as well. Also, large, chaff-tempered coarse vessels begin to appear with rough surfaces and thick rims.[240]

Late PN – Combed and impressed ware:
The pottery in this group is unburnished and made from a light-coloured fabric. A very few dark coloured sherds were also found at site, the most dominant type being vessels with finely cut plant temper. The most common forms are jar with spherical body and small bowls. Most of the pottery is decorated by multi-toothed comb-like instrument. This decoration technique known as "impresso". Other interesting types of decorations include broken lines, rectangles, triangles and rocker (mixed arrangements of motifs made by dragging a comb-like instrument across the surface). There are also some sherds decorated with wavy lines and impresso: Incised motifs, such as notches and impressed dots, as well as finely applied red-painted thick bands or lines applied to sherds as decoration. In this phase a number of fine wares have also been observed. This pottery has been well-fired and tempered with grit. The dominant surface colours of fine wares are a dirty yellowish-white and a pinkish dirty-white. Decoration in this group is very rare, but the most common types are tiny crescents, small knobs or raised wavy lines. The pottery of fine wares have been created on a spherical body.[241]

Late PN – Plain, light coloured wares and Chaff-tempered coarse pottery:
Coarse wares constitute the earliest pottery found at Mezraa-Teleilat. A large amount of chaff was used as temper. Generally coarsely-shaped, the ware is light in colour, ranging from pale-yellowish to pinkish-white. The pottery in this group comprises narrow-mouthed, low-bellied vessels. The only decorative features are raised bands or relief decorations below the rim. Also found were a small number of very coarse thick lugs.[242]

[240] Karul/Ayhan/Özdoğan 2001:140-141.

[241] Karul/Ayhan/Özdoğan 2001:141.

[242] Karul/Ayhan/Özdoğan 2001:141; 2002 unpublished excavation report.

TP:

A small number of pottery fragments were found from the uppermost level. The most interesting aspect of these finds is that they are completely different from those of the later phase. The pottery of the earliest PN level (phase IIC) is composed of very simple coarse ware, made of clay with straw temper. The surfaces are lightly buff-coloured and unburnished. The wares of phase III, however, are made of clay with mineral temper, are well burnished and brown coloured. M. Özdoğan mentioned that the earliest pottery was produced elsewhere and imported during the transition phase of the Mezraa-Teleilat. The earliest phase of the so-called transition phase contain no pottery.[243]

4.2.5. Lithic Artifacts

The lithic analysis of finds from the site is still in progress. The industry is represented mainly by flint. The quality of the raw material is better in the PPN levels. The imported obsidian is not found as often as flint.[244] According to G. Coskunsu the main part of the material is composed of cortical flakes and flake fragments. Unidentifiable fractures and very small pieces are also numerous. Of the flints, 74,77% of the finds are debitage, while 25,16% of the artifacts are retouched, i. e., tools. The common artifacts found at Mezraa-Teleilat are arrow heads (2,41%) and spearheads (0,68%). The Mezraa-Teleilat points can be categorized into two types: Byblos and Amuq points. There are also different types of points. The number of scrapers[245] (5,67%) increases in the PN levels. Endscrapers are the most frequently found scrapers (4,14%; some including handles), with sidescrapers (0,80%), round scrapers (0,49%) and core scrapers (0,24%) also included in the assemblage. The second most dominant artifact form is the glossy artifact (12,37%) in the Neolithic period. This type can be divided into three categories: simple flakes or blades, truncated on point or edge and crescents. Crescent-shaped sickle blades first appeared in the transitional levels. Three different perforator (3,58%) types are observed: drills on long and thick blades (2,66%), polished cylindrical borers (0,8%) and micro-perforators on bladelets (0,12%). Especially the last two types are found less and less frequently in the PPN levels. Micro-drills are the most specialized tools in

[243] Karul/Ayhan/Özdoğan 2002:111; Karul/Ayhan/Özdoğan 2004:104.

[244] The most frequent is transparent and homogenous green. The other kind of obsidian is black and lustrous, but non-transparent. Coskunsu 2001:175; Coskunsu 2002:143.

the lithic industry of Mezraa-Teleilat. G. Coskunsu reported that these kinds of micro-drills are known from the sites of Tell el Kerkh, Kumartepe, and from Çayönü Tepesi. Most of the burins (1,42%) are made from unretouched flakes and blades, but also points. The highest ratio among these tools are those (56,62%) that generally exhibit slight wear.[246]

Although obsidian is found in both the PPN and PN, it decreases in the upper levels. The rare occurrence of waste fragments suggests that they were brought to the site as finished tools. According to G. Coşkunsu, a few cores and fragments indicate that limited knapping activities also took place in the settlement. Debitage makes up 60% of the obsidian assemblage. Bladelets are the most frequently found (50%) tools, followed by blade fragments at 20,2%, while complete tools are rare. Flakes compose 2,05% of the material, undefined pieces 20.1%, core revival pieces 1,43%. Waste products make up 6,37% of the material, while 40% of the artifacts are on obsidian. Those exhibiting edge wear (61%) and the truncated pieces (15%) are the second dominant artifact form. The most typical obsidian tool is turuncated pieces. They are all made on blades and bladelets. Among the retouched tools, a few scrapers (3,9%), retouched pieces (5,1%) and notched tools (3,3%) have been recovered.[247]

4.2.6. Figurines

Twenty-one animal figurines have been found from the PN period. Six of the figurines were recovered in building AY. All of them are made of clay. Two different type of figurine were found from the TP:

a) Human figurines: In transitional period (IIIC), a large number of human statues were found. All figurines found in the IIIC phase of site. They were made of soft limestone. The workmanship exhibited on the figurines in general is rather poor, in most cases the surfaces have not been properly treated, indicated by the carving marks left untreated. Nevertheless, there are a few examples, especially of the seated male figures, on which the surfaces have been well smoothed, with at least two of them revealing traces of red

[245] Most of the scrapers are on flakes, rarely on blades, made on chocolate flint with fine texture. The cortex can be seen on most of the artefacts.

[246] Coskunsu 2001:176; Coskunsu 2002:144-145.

[247] Coskunsu 2001:175-178; Coskunsu 2002:143-148.

coating still preserved. The human figurines can be divided to three categories: seated figures, standing figures and phallic symbols.[248]

b) Animal Figurines: Seventeen animal figurines were found. One of them was made of bone and the others of clay. Also fifteen animal figurines were recovered from the TP or LPPNB. They were found in features that are not clearly dated.

Twelve figurines originate from the LPPNB and only three from the MPPNB. Two animal figurines were found in features that are dated to the LPPNB/MPPNB. More details about animal figurines are available in Chapter 10.1.

[248] Özdoğan 2003:515.

5. METHODS OF RECORDING THE ANIMAL BONES FROM MEZRAA-TELEİLAT

5.1. Collecting

Faunal remains were collected during the six field seasons at Mezraa-Teleilat from 1999 to 2004. All excavation units were carefully dug by hand and some were dry sieved. The material is currently stored at the excavation house in Birecik and also at the University of İstanbul. The bones are still in their original field sample packages, labeled as to trench, level, feature and date collected.

5.2. Identification and Recording

Specimens which provide demographic, metrical, or taxonomic information, or which have butchering marks or other traces of modification, were recorded individually, for each specimen, feature of excavation, skeletal part, taxon fragmentation, symmetry, age, sex, weight, and type of modification, tooth eruption and wear. Measurements were recorded using a protocol based on existing systems.[249]

Bones that were collected between the 1999 and 2001 excavation seasons were brought to Tübingen at the end of 2001 and were identified to the taxa and skeletal part using the comparative collection of the Institute of Archaeobiology at the University of Tübingen. Most animal bones were analyzed during the 2002 and 2003 excavation seasons. During the analysis of the animal bone material in the excavation house, animal bone atlases and several articles were used to aid in the identification process due to the absence of a comparison collection at the excavation house (Birecik/Urfa).[250] Specimens that could not be identified during the excavations were brought to Tübingen and identified at the Institute of Archaeobiology. In 2004 the author worked on Mezraa-Teleilat material at the Prehistory

[249] Meadow 1978; Uerpmann 1978b; von den Driesch 1976. In this work, cattle, sheep, goat and pig are discussed by species with no distinction being made between wild and domestic animals, although they are distinguished in the figures and tables while percentages are described in chapter 8.2. Discussion of the differences between the bones of wild and domestic animals is reserved for a future publication.

[250] Prummel 1987a-b and 1988; Prummel/Frisch 1986; Boessneck 1969; Hillson 1986 and 1992; E. Schmid 1972.

Laboratory at the University of İstanbul and used comparative material from the Prehistory Department to aid in the identification of finds.

Group of unidentified Bones	**Description**
Very small animals	Rodent etc.
Small animals	Small dogs, cats, hares etc.
Medium animals	Smaller ruminants (sheep,goat etc.), wolves, dogs etc.
Large animals	Cattle, horse, large deer etc.

Tab. 7: Classification of unidentified bones.

Shaft fragments, vertebrae, ribs, skull fragments, and other small fragments were also identified as to body part, grouped according to animal size categories, counted and weighed. The classification of unidentified bones according to animal size can be found in Table 7.[251] Analyzed results were directly recorded into the computer. The new version of the KNOCOD program, developed by Prof. Uerpmann, was used.[252] This new version of the KNOCOD program is based on windows and is still a prototype. The graphics and tables included here were made in Microsoft Excel, 1997 version.

5.2.1. Ageing

Determining the age of the animal bones indicates population structure and demonstrates the reason for the exploitation of animals at the site for products such as meat, milk, wool, etc. Age structure from an archaeological site can be used to determine domestication, though the kill-off pattern can not be used alone.

[251] Uerpmann 1973:309.

[252] Uerpmann 1978a.

The analysis of kill-off patterns is based on documenting epiphyseal fusion, tooth eruption and wear.[253]

Epiphyseal fusion can sometimes be misleading. When epiphysis and diaphysis are fused together, separating the mature and senile individuals becomes nearly impossible, while teeth usually permit a clear distinction between prime and senile adults. Thus, tooth eruption and wear provide a more specific age. Epiphyseal fusion, tooth eruption and wear together are then safer means in determining age when used together. Due to the small number of jaws in the assemblage, single molars were also used for estimation of age at Mezraa-Teleilat. In Chapter 8 survival curve graphics are presented for domesticates (sheep, goat, cattle, pig) and also for gazelle. Which bones were used for which age class (age is given in months) is presented in the same chapter. Vertebrae are not used for evaluating epiphyseal fusion because of the problems associated with their use in identification. The formula given below was used for evaluating survival rates of animals.

$$\frac{Fu+EF}{UF(FU+EF)} \times 100 = \%X \text{ for evaluating survival rates of animals.}$$

Fu: Fused, EF: Epiphyseal fusion, UF: Unfused

The survival curve graphs demonstrate the relative distribution of each age group within the population represented in the assemblage.

5.2.2. Sexing

Determining sex of the animal bones (as age) is also used to indicate population structure, exploitation pattern, and the like. Pig jaws are the easiest to identify since the development of the canine is sexually determined. Horn cores, pelvic bones and metapodia can be used in determining the sex of ruminants. The sex of sheep and goats is clearly reflected in either the horn cores or the frontal bones of hornless individuals. Pelvic bones are a better basis for the

[253] Silver 1969; Bökönyi 1972; Payne 1973; Habermehl 1975; Deniz/Payne 1982; Grant 1982; Watson 1978.

sex determination of ruminants. J. Boessneck, H.-M. Müller and F. M. Teichert[254] have described the criteria for sheep and goat bones.[255] The other possibility for sex determination is evaluating the metapodials. Measurements are another means in estimating sex ratios for animals that are sexually dimorphic, for example, by evaluating the metapodials. But it is extremely difficult to determine the sex of animals on the basis of the metapodial alone.
In this study, morphological differences in the pelvis, and canine morphology for pigs, were used for determining sex. Because of the absence of good samples of horn cores, they could not be used for determining sex.

5.2.3. Osteometry

The analysis of bone measurements has been a particularly productive means for investigating the domestication of some animals. In this study, the measurement criteria provided by Von den Driesch are used.[256] Some additional measurements that were developed for the KNOCOD-programm by H.-P. Uerpmann are also used for several bones. The appropriate abbreviations of these measurements can be found in Appendix 1.
For the most part, bones of adult animals were measured: unfused bones were also at times measured for evaluating the domestication process, but these bones were clearly recovered unfused. Intensively burnt bones were not measured due to the loss of weight and size.[257] Also, pathological bones were not measured. All measurements were in millimeters. Two different digital calipers, 150 mm and 300 mm, were used.
Sheep, goat, cattle, pig and gazelle measurements from each stratigraphic component of Mezraa-Teleilat will be compared with those from earlier and later components. This was done directly, dimension by dimension, for several elements and in groups using the log ratio technique from R. H. Meadow[258] and the size index technique from H.-P. Uerpmann.[259] For the calculation of LSI, the following formula was used:

[254] Boessneck/Müller/Teichert 1964:78; Boessneck 1969.

[255] Uerpmann 1973:313.

[256] von den Driesch 1976.

[257] von den Driesch 1976:10.

[258] Meadow 1981 and 1999.

[259] Uerpmann 1979.

LSI = log m (Mezraa-Teleilat measurements) - log x (standard measurements)

Unfortunately, because of the absence of a complete cattle skeleton from the Near East, cattle measurements were used from Ullerslev, Denmark[260] as the standard. For sheep and goat, individuals were used as standards published by H.-P. Uerpmann in 1979. Female sheep (*Ovis orientalis*) from Iran, housed in the Oriental Institute of Chicago, specimen number 57951, were used as the standard for comparison, while samples from the Natural History Museum of London, BMNH 653 M and 653 L2, were used for goat (*Capra aegagrus*), for the average of the male and female individuals.

The measurements of a female wild boar from Elazığ, Turkey, were used as the standard. This individual is in the Museum of Comparative Zoology, Harvard University. Standard Measurements for pig (female wild boar from near Elazığ, Turkey; Museum of Comparative Zoology, Harvard University, specimen number 51621) were published by H. Hongo.[261]

For gazelle, a female *Gazella subgutturosa* skeleton from Ceylanpınar (*Gazella subgutturosa* production area), Urfa, was used. This individual was prepared by the author and B. Öksüz for the comparative collection at Istanbul University. All measurements of this specimen that are used here as standard are available in Appendix 2 of this work.

The particular value of the Çayönü material lies in the long sequence that—at least for sheep, goat, and cattle—stretches back to a time before domestication of these animals. I compared Mezraa-Teleilat caprines, cattle and pig measurements with the Çayönü material.

5.2.4. Quantification

The number of identified specimens per taxon (NISP) is frequently used as a measure for the abundance of taxa represented within vertebrate archaeofaunas.[262]

Several different methods have been developed by archaeozoologists. Number of Identified Species (NISP) and WISP (Weight of Identified Species) were used in this work. Individuals were considered and were not added when evaluating the NISP.

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[260] Degerbøl 1970.

[261] Hongo/Meadow 2000.

[262] Ducos 1968 and 1975; Hesse/Perkins 1974. For studies that either use NISP directly more use measures based upon NISP elsewhere see Grayson 1978; 1984.

6. RESULTS FROM THE MATERIAL ANALYSES

The analysis of the animal bone material from Mezraa-Teleilat began in 2002 (January). Animal bones from the TP that were collected in 1999–2002 were analyzed in the Archaeobiology laboratory at the University of Tübingen. All information derived from the material was put into the computer directly in a prototype version of the "KNOCOD Program" based on Windows. A second step in the analysis began in mid-September 2002 in the excavation house in Birecik (Şanlı Urfa) and also after the excavation season in the Laboratory of the Prehistory Department at İstanbul University. Mostly measurable bones were brought to the Archaeobiology Laboratory of Tübingen.

The third working season took place in 2003, again in Birecik during the excavation season for approximately two months. The intensively studied material came from a PPNB context. After the excavation, work on the material continued in İstanbul, mainly on those finds from the PN layers. The 2004 excavation turned out to be a brief field season. The bone material of the late PPNB to PN was studied and fully analyzed in October 2004 in İstanbul. Most of the material came from the TP, followed by the PN. Only 5% of the analyzed animal bones came from the Middle PPNB period. These proportions correspond directly with the excavated area belonging to these periods (Fig. 7).

From 2002 to 2004, more than 34,900 animal bones were recovered from the Neolithic levels; 10.930 of the bones were identified to taxon and element (Tab. 8). A total of 165,21 kg of bones were analyzed for this study. After the 2004 excavation, work at Mezraa-Teleilat has been stopped.

For this study, only material from primary deposits were analyzed. Bones which have been redeposited or which came from surface or mixed features have not been included here.

6.1. Relative Proportion of Taxa

Figure 8 summarizes the relative abundance of identified animal taxa by the number of identified specimens. Pig, sheep, goat and cattle are the most common animals at the site and make up all together about 96% of the identified faunal remains up to the PN (Tab. 11, 12). Over time the proportions of the taxa do not vary. The most dominant animals are sheep and goat in all the periods. Of the Ovicaprids, 61,86% were recovered from the earliest

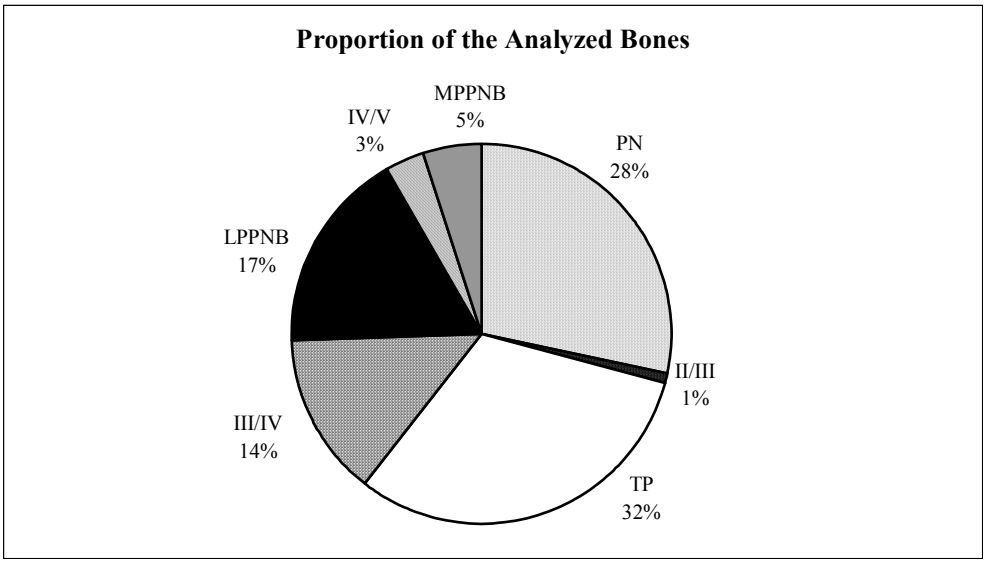

Fig. 7: Proportion of the analyzed bones from Mezraa-Teleilat.

Quantity of Analyzed Specimens				
Periods	**N analyzed***	**W analyzed* (kg)**	**NISP (%)****	**WISP (kg, %)**
PN	9.896	39,05	2.231 (23,45)	17,844 (21,02)
II/III	318	1,35	119 (1,25)	0,47 (0,55)
TP	10.927	43,87	2.605 (27,37)	29,601 (34,88)
III/IV	4.885	21,95	1.571 (16,98)	10,704 (12,61)
LPPNB	5.971	35,04	1.806 (18,97)	15,4484 (18,20)
IV/V	1.192	7,79	465 (4,88)	2,685 (3,16)
MPPNB	1.752	16,16	682 (7,16)	8,1116 (9,55)
Total	**34.941**	**165,21**	**9.479 (100,06)**	**84,8996 (99,97)**

*individuals were included

** individuals were seperated

Tab. 8: Mezraa-Teleilat. Quantity of specimens analyzed.

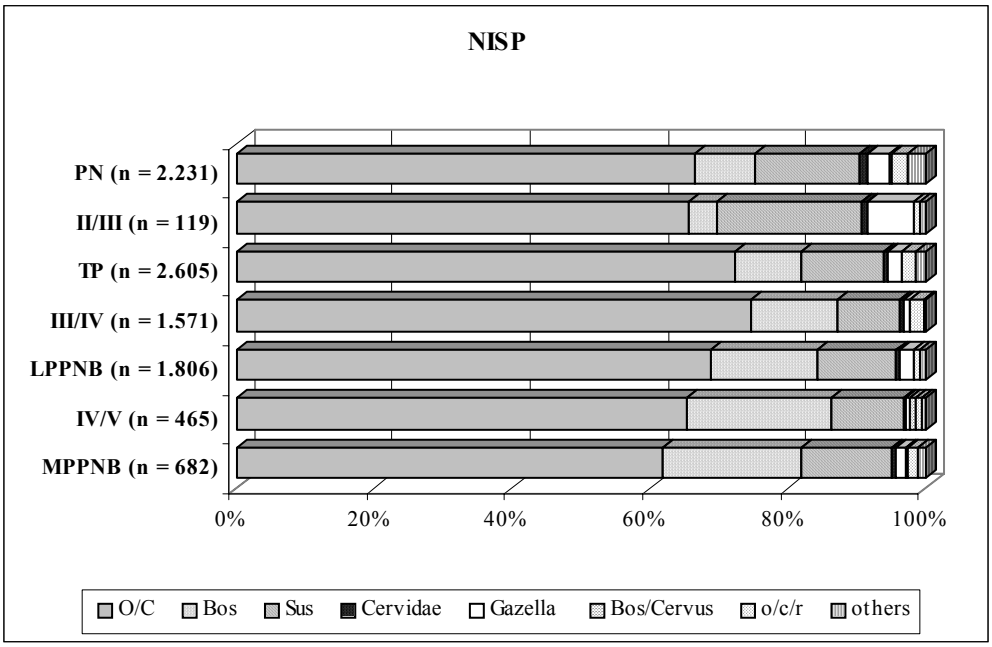

Fig. 8: Mezraa-Teleilat. Proportion of the number of identified species.

level (MPPNB) and 68,8% in the LPPNB level, while 72,15% were recovered from the TP and 66,38% from the PN at Mezraa-Teleilat.

Cattle is the second most common species in the MPPNB (19,94%) and the LPPNB (15,22%), while in later periods pigs increase and cattle decrease considerably (TP: 9,63%; PN: 8,6%). In later periods, pigs are the second dominant taxa (PN: 15,27%; TP: 12,09%). Cattle follows pig in numbers (cf. Fig. 2). Tables 11 and 12 show that the spectrum of animal species is not so wide at Mezraa-Teleilat (Fig. 8).

A detailed proportion of the unidentified animal bones is recorded in Tables 9 and 10. A total of 24.025 animal bones were recorded as unidentified. Most of these animal bones belong to middle-sized mammals such as ovicaprids, small deer, etc. (Plates 1, 2).

Wild/domestic animals are the dominant animal group in the assemblage, making up more than 90% of the remains in all levels. Most of the bones from this group belong to domestic animals. For details see Chapter 8. Wild animals follow the domestic animals in numbers (Plate 3).

	PN		II/III		TP		III/IV		LPPNB		IV/V		MPPNB	
Taxa	**N**	**N%**	**N**	**N%**	**N**	**N%**	**N**	**N%**	**N**	**N%**	**N**	**N%**	**N**	**N%**
Unidentified, very small	1	0,02	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified, small	4	0,06	4	2	14	0,2	3	0,1	3	0,1	-	-	2	0,2
Unidentified, small/middle	4	0,06	-	-	13	0,2	2	0,1	10	0,2	-	-	6	0,6
Unidentified, middle	5.877	92,7	183	92,0	7.124	86,8	2.937	88,6	3.501	84,1	608	83,6	880	82,2
Unidentified, middle/large	2	0,03	-	-	19	0,2	2	0,1	-	-	1	0,1	1	0,1
Unidentified, large	452	7,1	12	6	1.042	12,7	370	11,2	651	15,6	118	16,2	181	16,9
Unidentified, very large	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified, total	**6.340**	**99,9**	**199**	**99,9**	**8.212**	**100,1**	**3.314**	**100,0**	**4.165**	**100,0**	**727**	**99,9**	**1.070**	**100,0**

Tab. 9: Mezraa-Teleilat. Proportion of unidentified animal bones.

	PN		II/III		TP		III/IV		LPPNB		IV/V		MPPNB	
Taxa	**W**	**W%**	**W**	**W%**	**W**	**W%**	**W**	**W%**	**W**	**W%**	**W**	**W%**	**W**	**W%**
Unidentified, very small	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified, small	0,2	> 0,1	1,6	0,3	21,2	0,1	3,5	> 0,1	4	> 0,1	-	-	2,7	> 0,01
Unidentified, small/middle	3,8	> 0,1	-	-	7	> 0,1	5,0	> 0,1	14,1	0,1	-	-	5,3	> 0,01
Unidentified, middle	12.340	69,2	387,9	82,5	12.703	68,0	7.106	66,7	7.685	73,6	1.411	52,6	2.993	52,2
Unidentified, middle/large	41,6	0,2	80,9	17,2	97,2	0,5	11,2	0,1	4,7	> 0,1	12,4	0,5	4,7	> 0,01
Unidentified, large	5.455	30,6	-	-	5.864	31,4	3.525	33,1	2.732	26,2	1.262	47	2.732	47,6
Unidentified, very large	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified, total	**17.840**	**100,0**	**470,4**	**100,0**	**18.692**	**100,0**	**10.651**	**99,9**	**10.440**	**99,9**	**2.685**	**100,1**	**5.738**	**100,0**

Tab. 10: Mezraa-Teleilat. Weight of unidentified animal bones.

6.2. Distribution of Animal Bones According to the Trenches

A total of 36 trenches, all dating to the Neolithic period, were opened at Mezraa-Teleilat. Animal bones from the PN were collected from 30 different trenches (Plates 4, 5). Trenches 18H (10,39%), 21F (13,13%), 21H (14,96%), 23H (9,26%) proved especially rich in animal bones.

In this period excavations were conducted more intensively at the centre and also in the western part of the site. The areas with the least amount of animal bones for the PN were trench 33P (just one specimen) and 35S (only two) (Tab. 13).

	PN		II/III		TP		III/IV		LPPNB		IV/V		MPPNB	
Taxa	**N**	**%**	**N**	**%**	**N**	**%**	**N**	%	N	%	N	%	N	%
Dog, C*ANIS*	3	0,1	-	-	1	> 0,1	2	0,1	2	0,1	-	-	4	0,6
Domestic animal, Total	**3**	**0,1**	**-**	**-**	**1**	**> 0,1**	**2**	**0,1**	**2**	**0,1**	**-**	**-**	**4**	**0,6**
W/d Cattle, *BOS*	192	8,6	5	4,2	251	9,6	196	12,5	275	15,2	97	20,9	136	20,0
Cattle or Red deer	5	0,2	-	-	1	> 0,1	2	0,1	2	0,1	4	0,9	2	0,3
W/d Sheep, *OVIS*	241	10,8	5	4,2	359	13,8	208	13,2	277	15,3	50	10,8	83	12,2
W/d Goat, *CAPRA*	104	4,7	6	5,0	63	2,4	45	2,9	50	2,8	14	3,0	18	2,6
W/d Sheep/goat, *OVIS/CAPRA*	1.137	51,0	67	56,3	1.458	56,0	918	58,4	916	50,7	240	51,6	321	47,1
Sheep/goat/roe deer	52	2,3	1	0,8	53	2,0	29	1,8	17	0,9	4	0,9	9	1,3
W/d Pig, *SUS*	341	15,3	25	21,0	315	12,1	144	9,2	210	11,6	49	10,5	90	13,2
Wild or Domestic animal, Total	**2.072**	**92,9**	**109**	**91,5**	**2.500**	**96,0**	**1.542**	**98,2**	**1.747**	**96,7**	**458**	**98,5**	**659**	**96,6**
Hare, *Lepus capensis/europaeus*	4	0,2	-	-	9	0,3	1	0,1	2	0,1	1	0,2	2	0,3
Fox, *Vulpes vulpes*	4	0,2	-	-	4	0,2	4	0,3	5	0,3	1	0,2	2	0,3
Badger, *Meles meles*	-		-	-	2	0,1	-	-	1	0,1	-	-	-	-
Donkey, *Equus cf.* Hemionus	35	1,6	-	-	2	0,1	-	-	-	-	-	-	-	-
Fallow deer, *Dama mesopotamica*	11	0,5	-	-	5	0,2	3	0,2	1	0,1	-	-	1	0,1
Red deer, *Cervus elaphus*	13	0,6	1	0,8	7	0,3	5	0,3	6	0,3	1	0,2	2	0,3
Gazelle, *Gazella subgutturosa*	74	3,3	8	6,7	50	1,9	14	0,9	36	2	3	0,6	11	1,6
Iltis, *Mustela putorius*	-		-	-	-	-	-	-	-	-	-	-	1	0,1
Wild mammalian, Total	**141**	**6,3**	**9**	**7,6**	**79**	**3,0**	**27**	**1,7**	**51**	**2,8**	**6**	**1,3**	**19**	**2,8**
Fish, *Pisces spec.*	9	0,4	-	-	18	0,7	-	-	3	0,2	-	-	-	-
Fish, Total	**9**	**0,4**		**-**	**18**	**0,7**	**-**	**-**	**3**	**0,2**	**-**	**-**	**-**	**-**
Turtle, *Testudinae spec.*	-	-	-	-	2	0,1	-	-	-	-	1	0,2	-	-
Reptile and Amphibian, Total	**-**	**-**	**-**	**-**	**2**	**0,1**	**-**	**-**	**-**	**-**	**1**	**0,2**	**-**	**-**
Birds, *Aves spec*.	6	0,3	1	0,8	5	0,2	-	-	3	0,2	-	-	-	-
Wild birds, Total	**6**	**0,3**	**1**	**0, 8**	**5**	**0,2**	**-**	**-**	**3**	**0,2**	**-**	**-**	**-**	**-**
Identified animal bones, Total	**2.231**	**100,1**	**119**	**99.8**	**2.605**	**100,1**	**1.571**	**100,1**	**1.806**	**100,0**	**465**	**100,0**	**682**	**100,0**

Tab. 11: Mezraa-Teleilat. List of identified species and quantities per phase (individuals were separated). W/d: Wild/domestic

Taxa	PN W	%	II/III W	%	TP W	%	III/IV W	%	LPPNB W	%	IV/V W	%	V W	%
Dog, C*ANIS*	14,7	0,1	-	-	-	-	4,1	> 0,,1	10,9	0,1	-	-	19,3	0,2
Domestic animal, Total	**14,7**	**0,1**	**-**	**-**	**-**	**-**	**4,1**	**> 0,1**	**10,9**	**0,1**	**-**	**-**	**19,3**	**0,2**
W/d Cattle, *BOS*	4.990,1	23,5	334	37,7	5.070	35,5	4.779	42,5	10.737	54,8	3325	65,0	4.793	59,5
Cattle or Red deer	100,2	0,5	-	-	4,8	> 0,1	63,4	0,6	24,9	0,1	11,2	0,2	111,4	1,4
W/d Sheep, *OVIS*	2.289,2	10,8	32	3,6	1.986	13,9	1.330,5	11,8	2.132	10,9	298,4	5,8	666,9	8,3
W/d Goat, *CAPRA*	1.474,5	7,0	18,7	2,1	441,7	3,1	326,9	2,9	458,3	2,4	82,5	1,6	174,5	2,2
W/d Sheep/goat, *OVIS/CAPRA*	3.967,1	18,7	150	16,9	3.600	25,2	2.980	26,5	3.471,2	17,7	947,9	18,5	1.192	14,8
Sheep/goat/roe deer	187,6	0,9	0,5	0,1	144,7	1,0	63,4	0,6	67,3	0,3	11,2	0,2	80,6	1,0
W/d Pig, *SUS*	6.067	28,6	280	31,6	2.427	17,0	1.337,2	11,9	2.214,3	11,3	366,9	7,2	1.009	12,5
Wild or Domestic animal, Total	**19.076**	**90,0**	**815**	**92,0**	**13.674**	**95,8**	**10.880,4**	**96,7**	**19.105**	**97,57**	**5.043**	**98,7**	**8.028**	**99,7**
Hare, *Lepus capensis/europaeus*	4,4	> 0,1	-	-	13	0,1	0,6	> 0,1	3	> 0,1	1,5	> 0,1	2,9	> 0,1
Fox, *Vulpes vulpes*	6,5	> 0,1	-	-	7,7	0,1	144,4	1,3	12,1	0,1	3,2	> 0,1	3,9	> 0,1
Badger, *Meles meles*	-	-	-	-	8,2	0,1	-	-	3,9	> 0,1	-	-	-	-
Donkey, *Equus cf.* Hemionus	1.215,3	5,7	-	-	56,8	0,4	-	-	-	-	-	-	-	-
Fallow deer, *Dama mesopotamica*	63,2	0,3	-	-	22,7	0,2	23,8	0,21	6,4	> 0,1	-	-	-	-
Red deer, *Cervus elaphus*	297,9	1,4	14,8	1,7	169	1,2	53,7	0,5	62,7	0,3	10,3	0,2	-	-
Gazelle, *Gazella subgutturosa*	522,4	2,5	55,1	6,2	298,7	2,1	144,4	1,3	383,9	2	50	1,0	-	-
Iltis, *Mustela putorius*	-	-	-	-	-	-	-	-	-	-	-	-	1,8	> 0,1
Wild mammalian, Total	**2.109,7**	**9,9**	**69,9**	**7,9**	**576,1**	**4,0**	**366,9**	**3,3**	**472**	**2,4**	**65**	**1,3**	**8,6**	**0,1**
Fish, *Pisces spec.*	7,3	> 0,1	-	-	21,5	0,2	-	-	3	> 0,1	-	-	-	-
Fish, Total	**7,3**	**> 0,1**	**-**	**-**	**21,5**	**0,2**	**-**	**-**	**3**	**> 0,1**	**-**	**-**	**-**	**-**
Turtle, *Testudinae spec.*	-	-	-	-	2,2	> 0,1	-	-	-	-	3,5	> 0,1	-	-
Reptiles and Amphibian, Total	**-**	**-**	**-**	**-**	**2,2**	**> 0,1**	**-**	**-**	**-**	**-**	**3,5**	**> 0,1**	**-**	**-**
Birds, *Aves spec.*	6,4	> 0,1	0,9	0,1	4,5	> 0,1	-	-	3,6	> 0,1	-	-	-	-
Wild birds, Total	**6,4**	**> 0,1**	**0,9**	**-**	**4,5**	**> 0,1**	**-**	**-**	**3,6**	**> 0,1**	**-**	**-**	**-**	**-**
WISP, Total	**21.214**	**100,1**	**885,6**	**100,0**	**14278,3**	**100,1**	**11.251,4**	**100,1**	**19.594,5**	**100,1**	**5111,6**	**99,99**	**8055,3**	**100,0**

Tab. 12: Mezraa-Teleilat. Weight of the identified animal bones. W/d: Wild/domestic (individuals were separated).

Similar to the earlier period, most of the animal bones in the TP came from the centre and western part of the site. As for the TP (from the PPNB to PN), animal bones were collected in

only 19 of the trenches. A greater number of bones are available from trenches 21D (21%), 21E (34,2%), 21F (24,2%) and 23G (7,76%) (Fig. 13; Plates 6–7).

The PPNB was separated into two different periods at the site, late and middle. The material was collected in eleven different trenches from the late PPNB.

Most of the material came from trenches 20D (27,7%), 20C (14%) and 21E (33,8%) (Tab. 13; Plates 8–9). In five trenches animal bones from the MPPNB were recovered. Nearly all of this material was collected from trenches 20D and 21E. Unfortunately, a larger area could not be opened from this period. Excavations of this period were conducted intensively only in the last three excavation seasons (2002–2004). For the MPPNB, excavation work became more intensive in the western part of the site (Plate 10). For a detailed distribution of the animal bones, see Plates 6–10.

6.3. Distribution of Animal Bones from the Buildings

Few animal bones were found inside the houses at Mezraa-Teleilat. Most of the animal bones were recovered from PN houses due to the fact that this period was examined in a much larger area at the site (Fig. 9). Five pig individuals were found in building AY in a small room. The pigs are dated to the PN. Also, three different goat individuals were recovered in building AG. For details see Chapter 9. Two reasons can be given to explain the results. Firstly, the PN covers a large area at the site and many of the buildings belong to this period, i. e., the construction activity during this period was more intensive. Secondly, the results reflect different household activities (Plate 12). Animal bones were recovered from a total of 16 different buildings: houses AG (241 bones), AY (1.252), AC (69), AP and AU (56).

The TP is the second richest period for animal bones inside the excavated houses (Plates 13–14). Animal bones were found in seven buildings belonging to this period. While buildings AV (84 bones), BE (10 bones), and AN (51) contain a great deal of material, no building was found from the LPPNB, nor was any building uncovered which dates to the MPPNB period (Plate 15).

Most of the animal bones from buildings could not be identified to taxa due to their intensive fragmentation. They can be identified, though, as belonging mainly to middle-sized mammalians (Plate 11). Other animal species, which have been identified inside of the houses, are sheep/goat, cattle and pig. A detailed list for the distribution of animal species from the buildings is presented in Table 14 and Plate 11.

	PN		II/III		TP		III/IV		LPPNB		IV/V		MPPNB	
Trenches	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
14L	70	0,7	-	-	-	-	-	-	-	-	-	-	-	-
18E	1	> 0,1	-	-	-	-	-	-	-	-	-	-	-	-
18F	84	0,8	-	-	-	-	-	-	-	-	-	-	-	-
18G	291	2,9	-	-	-	-	-	-	-	-	-	-	-	-
18H	1.029	10,4	-	-	-	-	-	-	-	-	-	-	-	-
19D	193	2,0	-	-	-	-	6	0,1	-	-	-	-	-	-
19E	51	0,5	-	-	118	1,1	497	10,2	9	0,2	-	-	-	-
19F	51	0,5	-	-	64	0,6	44	0,9	121	2,0	-	-	-	-
19G	276	2,8	-	-	-	-	-	-	-	-	-	-	-	-
20C	-	-	-	-	-	-	142	2,9	835	14,0	-	-	-	-
20D	177	1,8	-	-	401	3,7	918	18,8	1.653	27,7	488	41,0	677	38,6
20E	27	0,3	-	-	138	1,3	106	2,2	350	5,9	-	-	-	-
20F	478	4,8	63	19,8	345	3,2	-	-	-	-	-	-	-	-
20G	579	5,9	-	-	7	0,1	-	-	-	-	-	-	-	-
20H	17	0,2	-	-	1	> 0,1	-	-	-	-	-	-	-	-
20I	8	0,1	-	-	-	-	-	-	-	-	-	-	-	-
21C	-	-	-	-	-	-	-	-	-	-	4	0,3	-	-
21D	7	0,1	-	-	2.291	21,0	1.271	26,0	821	13,7	-	-	110	6,3
21E	39	0,4	-	-	3.732	34,2	1.711	35,0	2.021	33,8	691	58,0	965	55,1
21F	1.300	13,1	127	39,9	2.642	24,2	46	0,9	67	1,1	1	0,1	-	-
21G	136	1,4	-	-	203	1,9	19	0,4	94	1,6	-	-	-	-
21H	1.481	15,0	-	-	-	-	-	-	-	-	-	-	-	-
21I	37	0,4	-	-	-	-	35	0,7	-	-	-	-	-	-
22G	460	4,6	-	-	-	-	-	-	-	-	-	-	-	-
22H	548	5,5	-	-	21	0,2	78	1,6	-	-	-	-	-	-
22I	282	2,8	-	-	4	> 0,1	-	-	-	-	-	-	-	-
22V	-	-	-	-	14	0,1	-	-	-	-	-	-	-	-
23F	-	-	-	-	40	0,4	-	-	-	-	-	-	-	-
23G	852	8,6	128	40,3	848	7,8	-	-	-	-	-	-	-	-
23H	917	9,3	-	-	-	-	-	-	-	-	-	-	-	-
23I	469	4,7	-	-	-	-	-	-	-	-	-	-	-	-
28H	32	0,3	-	-	-	-	-	-	-	-	-	-	-	-
33P	1	> 0,1	-	-	-	-	-	-	-	-	-	-	-	-
34R	-	-	-	-	36	0,3	-	-	-	-	8	0,7		-
35R	-	-	-	-	-	-	12	0,2	-	-	-	-	-	-
35S	2	> 0,1	-	-	-	-	-	-	-	-	-	-	-	-
Total	**9.895**	**99,9**	**318**	**100,0**	**10.905**	**100,1**	**4.885**	**99,9**	**5.971**	**100,0**	**1.192**	**100,1**	**1.752**	**100,0**

Tab. 13: Distribution of animal bones in Trenches.

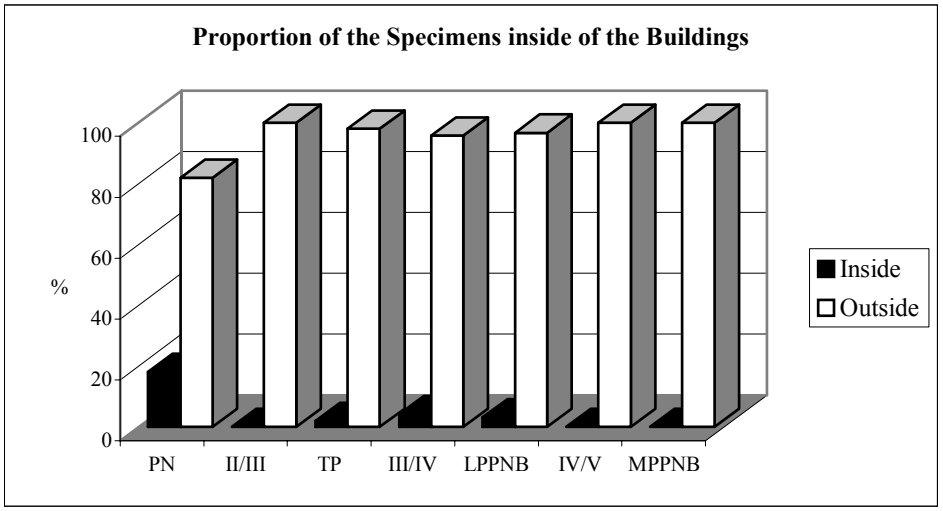

Fig. 9: Proportion of the specimens inside and outside of the buildings.

6.4. The Relation between Animal Bones and Archaeological Features

Most of the animal bones came from collecting units, followed by pits. Interestingly, houses are the second richest feature in the PN. Other archaeological features containing animal bones are ovens, hearths, courtyards, ashy fills or trash areas. Most of the material from the PPNB was discovered in pebble stone fillings lying outside of the large, so-called “city-wall”. Plates 16–18 present a detailed list of the relationship between animal bones and archaeological features from different levels.

	PN		II/III		TP		III/IV		LPPNB		IV/V		MPPNB	
Buildings	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
AB	7	0,4	-	-	-	-	-	-	-	-	-	-	-	-
AC	69	3,9	-	-	-	-	-	-	-	-	-	-	-	-
AE	23	1,3	-	-	-	-	-	-	-	-	-	-	-	-
AG	241	13,5	-	-	-	-	-	-	-	-	-	-	-	-
AH	6	0,3	-	-	-	-	-	-	-	-	-	-	-	-
AK	9	0,5	-	-	-	-	-	-	-	-	-	-	-	-
AL	9	0,5	-	-	4	2,6	-	-	-	-	-	-	-	-
AM	-	-	-	-	51	32,9	-	-	-	-	-	-	-	-
AN	7	0,4	-	-	4	2,6	-	-	-	-	-	-	-	-
AP	56	3,1	-	-	-	-	6	2,9	-	-	-	-	-	-
AR	22	1,2	-	-	2	1,3	-	-	-	-	-	-	-	-
AS	5	0,3	-	-	-	-	-	-	-	-	-	-	-	-
AU	56	3,1	-	-	-	-	-	-	-	-	-	-	-	-
AV	-	-	-	-	84	54,2	20	9,5	84	42,9	-	-	-	-
AY	1.252	70,0	-	-	-	-	-	-	-	-	-	-	-	-
BA	-	-	-	-	-	-	165	78,6	-	-	-	-	-	-
BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BE	-	-	-	-	10	6,5	19	9	112	57,1	-	-	-	-
BG	13	0,7	-	-	-	-	-	-	-	-	-	-	-	-
BH	13	0,7	-	-	-	-	-	-	-	-	-	-	-	
Total	**1.788**	**99,9**	**-**		**155**	**100,1**	**210**	**100**	**196**	**100**	**-**		**-**	

Tab. 14: Number of specimens from the buildings (individuals were seperated).

7. TAPHONOMY

7.1. Degree of Identification and Fragmentation

Generally, the material is in a poor state of preservation. Most bones are broken and heavily fragmented. The colour of the burnt bones varies from brown to white and gray. Because of the fragmentation, there is a high percentage of unidentifiable bones in the assemblage (Plates 19–22).

The percentage of identified bones varies from about 39% in the lowest levels to ca. 36% in the upper levels (Plate 1). All of the unidentifiable fragments could be ascribed to the categories of medium or large mammals. The ratio, category medium, is more highly represented in all levels. The high degree of fragmentation is probably a result of butchery, trampling, weathering, etc. The majority of completely preserved specimens consists of phalanges and carpal/tarsal bones.

Teeth are generally less well preserved than the other bone fragments. Loose teeth form a high percentage of the remains in all the levels. As shown in Plates 19–22, the pattern of fragmentation of sheep/goat, pig and cattle bones is more or less equal throughout the levels (Plates 19–22). The group of completely preserved teeth is more common among the ovicaprids than among the finds from cattle and pig.

7.2. Pre-depositional Factors

The varying degrees of preservation for the various species and their overall high degree of fragmentation can only be partly explained by the taphonomic factors (Plates 23–34).

The butchering marks mainly consist of short, fine and repeated cutmarks located in the articular zones of the bones (Plates 38–45). Chopmarks were seldom observed. A slightly higher percentage of butchering marks is present in the upper levels, i. e., in the PN and TP. Among the three main domestic species, Ovicaprids form a higher proportion of butchered bones, followed by cattle and pig (Plates 35–37). Apart from these three main domestic species, gazelle, badger, rabbit, and horse species occur with a low percentage of cut marks.

	PN	II/III	TP	III/IV	LPPNB	IV/V	MPPNB
ARTEFACTS:							
Worked bones	128	14	98	36	40	5	9
CUTMARKS:							
not deep cutmark	18	-	27	9	17	3	12
deep cutmark	29	-	35	24	31	4	17
GNAWED:							
gnawed, not identified	41	-	28	29	13	2	2
gnawed, carnivorous	29	1	6	25	13	-	7
gnawed, rodent (also rabbit etc.)		-	2	-	2	-	-
BURNT:							
partly white burnt	-	-	2	-	-	-	-
totally white burnt	-	-	-	1	-	-	-
Braun burnt	10	-	10	22	24	2	1
totally braun burnt	-	-	2	1	8	-	2
mostly braun, partly grau burnt	-	-	-	-	-	-	-
Mostly braun, partly black burnt	-	-	-	1	2	-	1
mostly braun burnt	7	-	32	35	47	4	-
Mostly braun, partly white burnt	14	-	-	-	-	-	-
grau/blue burnt	1.390	2	8	19	21	3	-
mostly grau, partly braun burnt	-	-	1	-	-	-	-
totally grau burnt	-	-	2	1	1	-	-
mostly grau, partly black burnt	-	-	-	-	-	-	-
mostly grau burnt	135	2	10	7	10	1	1
mostly grau, partly white burnt	-	-	-	-	-	-	-
Black burnt	216	8	919	692	470	24	19
Mostly black, partly braun burnt	-	-	3	1	-	-	-
Mostly black, partly grau burnt	-	-	1	-	-	-	-
totally black burnt	1	-	1	-	-	-	-
mostly black burnt	-	-	-	-	-	-	-
mostly black, partly white burnt	-	-	-	-	-	-	-
small part white burnt	2	-	8	-	-	-	-
small part grau burnt	-	-	3	1	2	-	-
small part black burnt	16	-	14	14	33	4	4
small part braun burnt	-	-	-	10	6	-	5
White burnt	48	-	1	-	-	-	-
mostly white, partly braun burnt	-	-	-	-	-	-	-
mostly white, partly grau burnt	-	-	-	-	-	-	-
mostly white, partly black burnt	-	-	-	-	-	-	-
largerly white burnt	7	-	2	-	1	-	-
totally white burnt	-	-	-	2	-	-	-
PATHOLOGICAL:							
not identified	-	-	-	3	6	1	1
TOTAL:	**2.091**	**27**	**1.215**	**933**	**747**	**53**	**81**

Tab. 15: Mezraa-Teleilat. Taphonomy list.

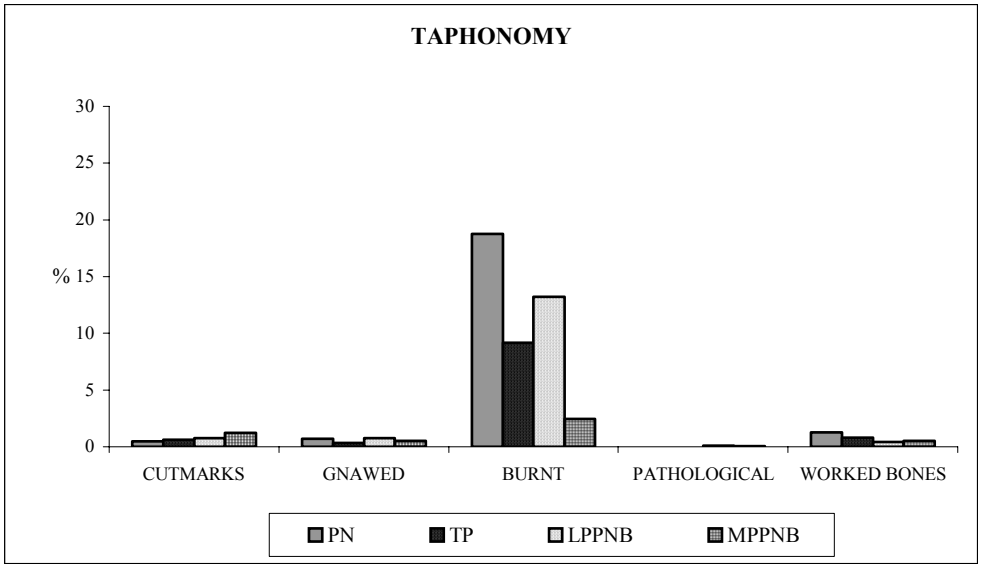

Fig. 10: Proportion of the modifications at Mezraa-Teleilat.

As shown in Table 15, bones with traces of carnivore gnawing are much more abundant in the upper levels. Among the three main domestic species, the highest proportion of gnawed bones was observed in Ovicaprids, followed by pig and cattle (Plates 40B, 45). Dogs are not found in high numbers at the settlement.

The upper levels, i. e., the PN, TP and also LPPNB, contain the highest percentage (18,65%) of burnt animal remains, a factor correlated to house activities. M. Özdoğan suggests that in the PN humans burnt their houses for a religious reason and then built houses in the places where the old houses stood.[263] In the MPPNB burnt bones amount to only ca. 1,88% of the total bones (Tab. 15 and Fig. 10). Among the identifiable bones, most burnt bones belong to ovicaprids. This contrasts with the finds from the PN, where pig predominates, with five burnt pig individuals. Other burnt bones belong to cattle, Gazelle, as well as to some small mammals.

[263] Özdoğan/Özdoğan 1989.

7.3. Post-depositional Factors

The faunal assemblage may have been affected by different post-depositional variables, such as the activity of micro-organisms, which exist in high numbers in hot regions and which can easily destroy the organic feature of the bones. Great fluctuations in temperature between night and day and between the seasons are another variable, creating a mechanical impact on the bones. In addition, indications of acidic activity of plant roots were occasionally observed. On the surface of some bones root etchings were found (Plates 39A, 40B).

8. DETAILED RESULTS OF THE RESEARCH

8.1. Domestic Mammals

8.1.1. Dog (*Canis familiaris*)

The dog is the oldest domesticated animal. Approximately 150 different species are known from around the world. Its ancestor is the Wolf (*Canis lupus Linnè, 1758*). Wolves can live in the tundra, in areas 2.500 m high, in forest regions, steppe and semidesert climates. A wolf smaller than those found in the Middle East is the Indian Wolf (*Canis lupus pallipes*). The natural habitat for this species ranges from Anatolia to North Arabia, from southern Iran and Baluchistan to India.[264] The oldest domesticated dogs were found in Europe and date to the late Pleistocene/early Holocene, a timespan between 13.000 and 7.000 BC. However, the domestication of wolf began earlier. It might have started in the Middle or Late Palaeolithic (ca. 25.000 – 18.000 BC). The oldest evidence of domesticated dogs comes from Palegawra Cave (Iraq) in the Middle East and has been dated to approximately 10.000 BC. For the Near East, a slightly earlier date also seems possible. There are some animal bones from Natufian sites, which could belong to dogs, but they can not be clearly assigned to either wolf or dog.[265]

8.1.1.1. Number of Dog Bones

Twelve dog bones in total can be identified in the material from Mezraa-Teleilat. Four specimens of dog bones came from the earliest levels (MPPNB). Nearly all levels contain a few examples of dog bones. Low percentages of dog bones (between 0,03% to 0,56%) indicate that dogs did not play an important role in the economy at Mezraa-Teleilat. Because of the small size of the bones, the dogs could have been domestic individuals. Indirect evidence for the presence of dogs would be the gnawing marks of carnivores on the bones. Animal bones with gnawing marks are found nearly in all levels in a lower percentage. There is no evidence that dogs were eaten at the site. It is possible that dogs were kept on the settlement for herding practices (Tab. 11 and Plates 47-48).

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[264] Benecke 1994:208-209.

[265] Benecke 1994:214.

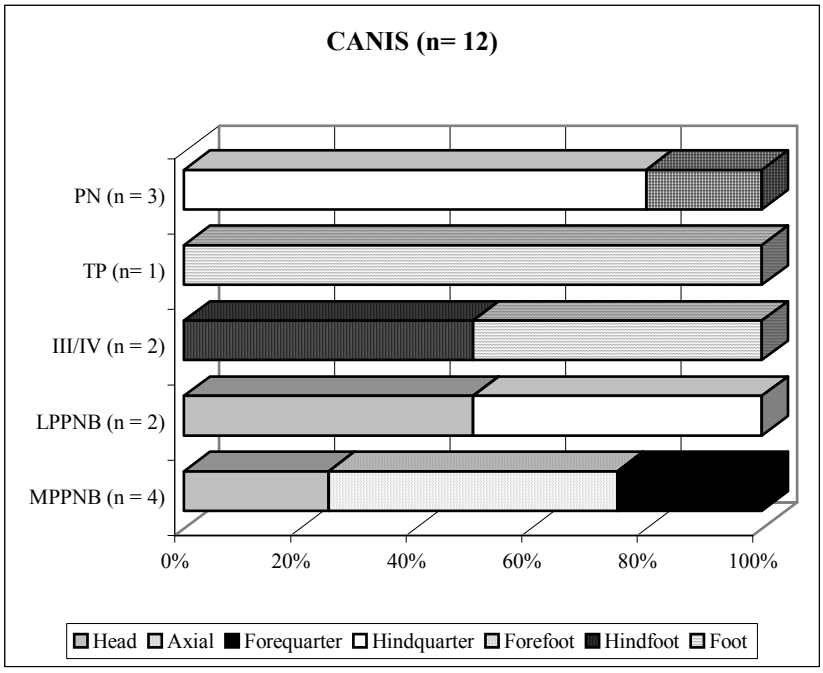

Fig. 11: Proportion of the skeletal part of dogs in different levels at Mezraa-Teleilat.

8.1.1.2. Element Distributions

Different element parts belonging to dogs have been observed. The remains consist of a mandible, a first upper molar, some post-cranial fragments of the forelimb (one radius), one scapula and hindlimb (one femur), one metatarsal, one calcaneum, one astragalus, two phalanges and one specimen of an atlas and axis. Plate 46 presents a detailed list of the element distribution in Mezraa-Teleilat for different levels (Fig. 11;Plate 46).

8.1.1.3. Sexing

Because of the small number of preserved dog bones in the settlement, it is impossible to interpret the proportion of males and females.

8.1.1.4. Size

Except for one slightly worn maxillare first molar, other skeletal parts of dogs indicate that they all belonged to adult individuals. All post-cranial bones are fused and are relatively smaller than those of wolves. Therefore, they could belong to domestic dogs. Unfortunately, we cannot compare the measurements of our material to other samples. For this kind of comparison we generally use skull measurements and lower teeth. Mandibular teeth are mainly used for the evaluation of size, but just one upper molar tooth is available.

8.1.1.5. Kill-off Pattern for Dog

Fused long bones and one sample of an upper molar tooth can be used to determine ageing at the settlement. While all long bones are fused, one upper first molar is slightly worn. These bones and also the tooth probably belong to subadult or adult dogs.

8.2. Domestic or Wild Mammals

8.2.1. Cattle (*Bos primigineus/Bos taurus*)

The aurochs is the ancestor of domestic cattle (*Bos primigenius Bojanus*, 1827). This wild species is now extinct.[266] The oldest domestic cattle to date is from the PPN site of Argissa Magula in Thessalia and dated to 7.000–6.000 BC. But northern Greece is not a primary development area for animal breeding. Morphologically, these cattle bones show one developed phase of domestication. Benecke suggests that cattle domestication most likely would have occurred in the fertile crescent. For the Near East, this would be difficult because different forms of cattle are observed in the assemblage. It is very difficult to separate wild from domesticated cattle.[267]

[266] Benecke 1994:261.

[267] Benecke 1994:264; Boessneck 1983:13-14.

Benecke expect the beginning of cattle domestication in the Middle East to have taken place in the second half of the 8th millennium BC.[268] The cattle sub-family of the bovids is one of the most difficult groups for the palaeozoologist to evaluate.

Two species of wild cattle have been identified in the Middle East: the aurochs, *Bos primigenius*, and the wisent, *Bison bison*. Remains of a buffalo, *Bubalus spec.*, have also been identified but have not been completely confirmed.[269]

Aurochs remains have often been assigned to Upper Pleistocene and Early Holocene sites in a broad range of environments.[270] According to Uerpmann, aurochs from the Anatolian and western Iranian highlands slightly larger than those of Mesopotamia and the Levant.

Bos primigenius seems to have expanded their terrain from the Levant into Africa during the Upper Pleistocene. Uerpmann suggests that aurochs could tolerate fairly dry conditions, due to the a amount of aurochs bones in archaeological sites from the arid region.

The aurochs was a browsing and grazing ruminant that inhabited forests but could also have flourished in environments with open scrub.[271]

8.2.1.1. Number of Cattle Bones

A total of 1.152 cattle bones were identified in Mezraa-Teleilat. Cattle was the second most important animal, especially in the earlier periods (from the MPPNB until to the III/IV). As of the TP, pigs began to increase and cattle to decrease to third amongst identified animals (Fig. 12, Tab. 11, Plates 49–56).

8.2.1.2. Element Distributions

The most common skeletal part is the head in all levels. Fragmented teeth, horn and skulls make up a large proportion of the assemblage. The axial category is poorly represented for cattle at the site. Due to fragmentation, most of the vertebrae and ribs could not be identified to taxa and then separated, as was the case for the large-sized mammals. Other skeletal parts

[268] Benecke 1994:266.

[269] Uerpmann 1987:71.

[270] Uerpmann 1987:71.

[271] Uerpmann 1987:63.

(except head and axial) occurred in similar proportions in all levels at the site (Fig. 13, Plates 57–58).

8.2.1.3. Sexing

Unfortunately, sex determination cannot be evaluated for cattle, due to the absence of the pelvic bones. All pelvic bones are fragmented, with the more distinctive bones not being preserved.

8.2.1.4. Size

Measurements of the Mezraa-Teleilat cattle specimens were compared to the corresponding dimensions of a standard animal using the "difference of logs" method. Two different standards were used for LSI. Firstly, the measurements of a wild cow from the Danish site of Ullerslev were used as the standard[272], while a second graphic (Fig. 15) was produced using one female wild Bos from Germany. This specimen is stored in the Archaeobiology Laboratory at the University of Tübingen, under the number 43. Measurements belonging to both standard specimens are available in Appendix 2. Unfortunately, no wild Bos measurements are available from the Middle East or Anatolia.

Figure 14 shows the size index that is used as the standard from Ullerslev. On the basis of cattle bone dimensions, we found larger animals in the MPPNB and LPPNB levels. However, the smallest specimens occur especially in the LPPNB period. Only 10% of the bones from the PN period are from larger animal, while no larger specimen was recorded in the assemblage from the TP. Because of the small sample size, it is difficult to evaluate the size data of cattle from the TP. Relatively smaller animals appear in the earliest level (MPPNB).

[272] Degerbøl 1970; Grigson 1989.

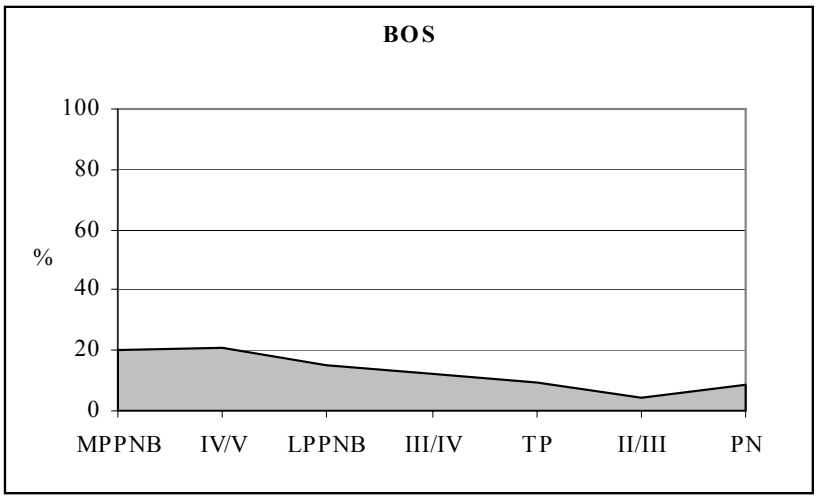

Fig. 12: Proportion of Bos in the number of identified animals in Mezraa-Teleilat.

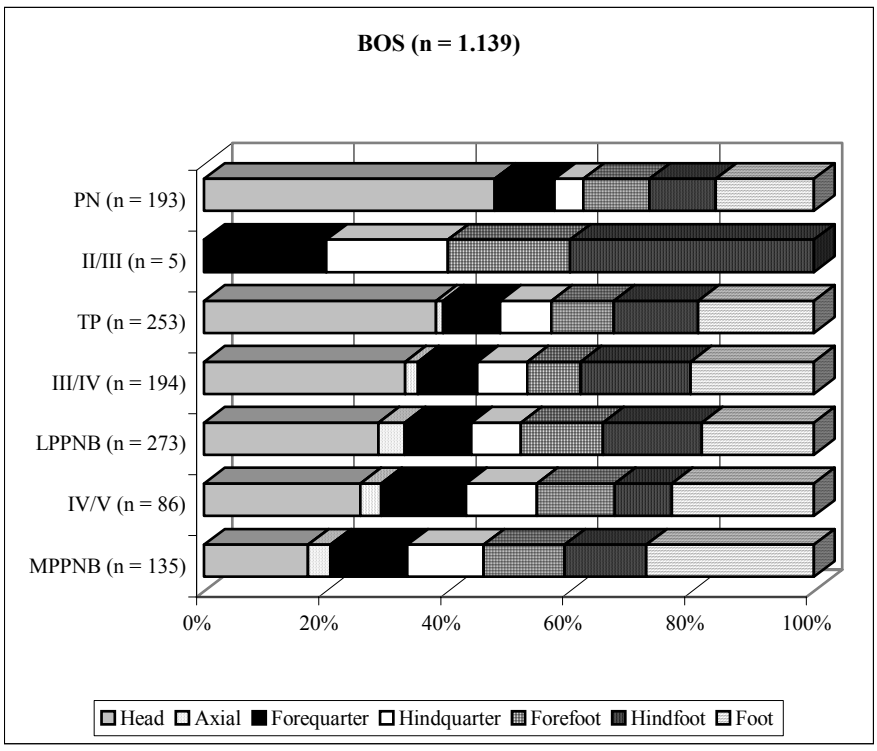

Fig. 13: Proportion of the skeletal part of cattle in different levels at Mezraa-Teleilat.

A clearly smaller animal is observed in the LPPNB level. Although smaller cattle begin appearing as early as in the MPPNB level, a clear difference begins to take place only by the LPPNB level. Cattle probably were being kept under control in the MPPNB period samples from the LPPNB levels indicate domesticated animals. However, bones from large animals still occur, suggesting that the hunting of wild cattle continued into the PN. It is important to point out that Ullerslev aurochs tend to be larger than Anatolian aurochs. Because of this another individual for the LSI has been used. Figure 15 shows the size index that was used as a standard specimen, number BOS 43 from Germany. This individual is smaller than the Ullerslev specimens. Median values are larger than standard until the TP (except for the MPPNB) at site. Some bones from the IV-V[273] period were evaluated together with the MPPNB specimens. Although some smaller specimens were observed during the MPPNB, they do not represent a large enough sample to allow us to claim with certainty that cattle was domestic until the MPPNB at site. I believe that, up to the MPPNB, the Teleilat people began bringing cattle under control, though real domestication started as early as the LPPNB due to the range of the smaller samples.

Figure 16 compares GL and Bd measurements of cattle astragalus from different levels of Mezraa-Teleilat. Only astragalus measurements from three different levels could be used. This figure demonstrates that astragalus measurements from the LPPNB are clearly larger than in the MPPNB and the PN.

Figure 17 compares Lph and SD measurements of cattle Ph 1ant/post from different levels of Mezraa-Teleilat. The smallest measurements come from the TP. Three shorter and thicker ph 1 bones are observed at the site, and their measurements are also compared with *Bos bubalus* coming from Shams ed-Din (Halaf Period, Syria) in this chart.[274] But their SD measurements

[273] This archaeological features dated MPPNB or LPPNB.

[274] Uerpmann 1982.

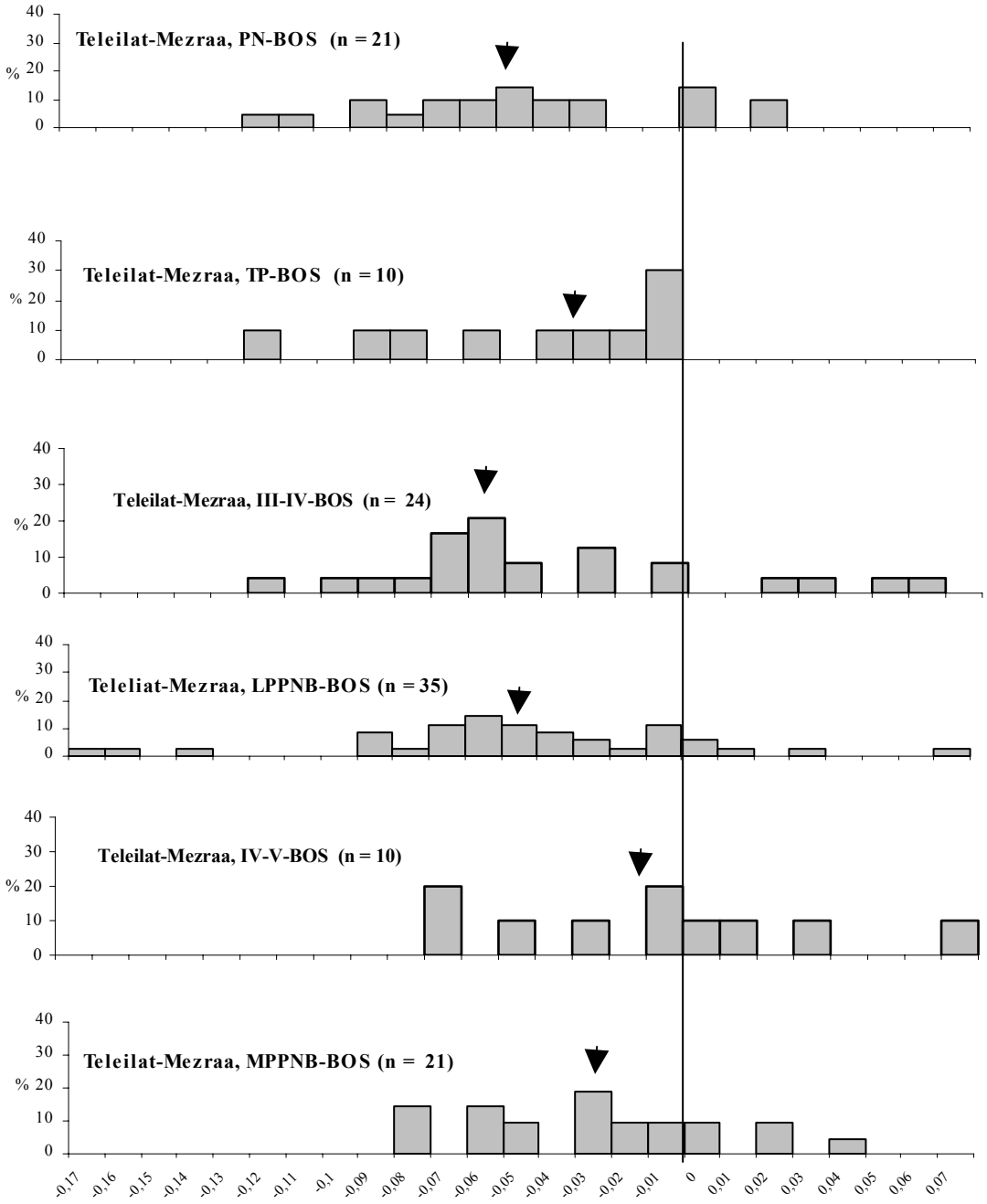

Fig. 14: Size index distributions for cattle from Mezraa-Teleilat. The median value for each level is indicated by the arrow. The measurements of a wild cow from the Danish site of Ullerslev are used as the standard (Degerbøl 1970; Grigson 1989).

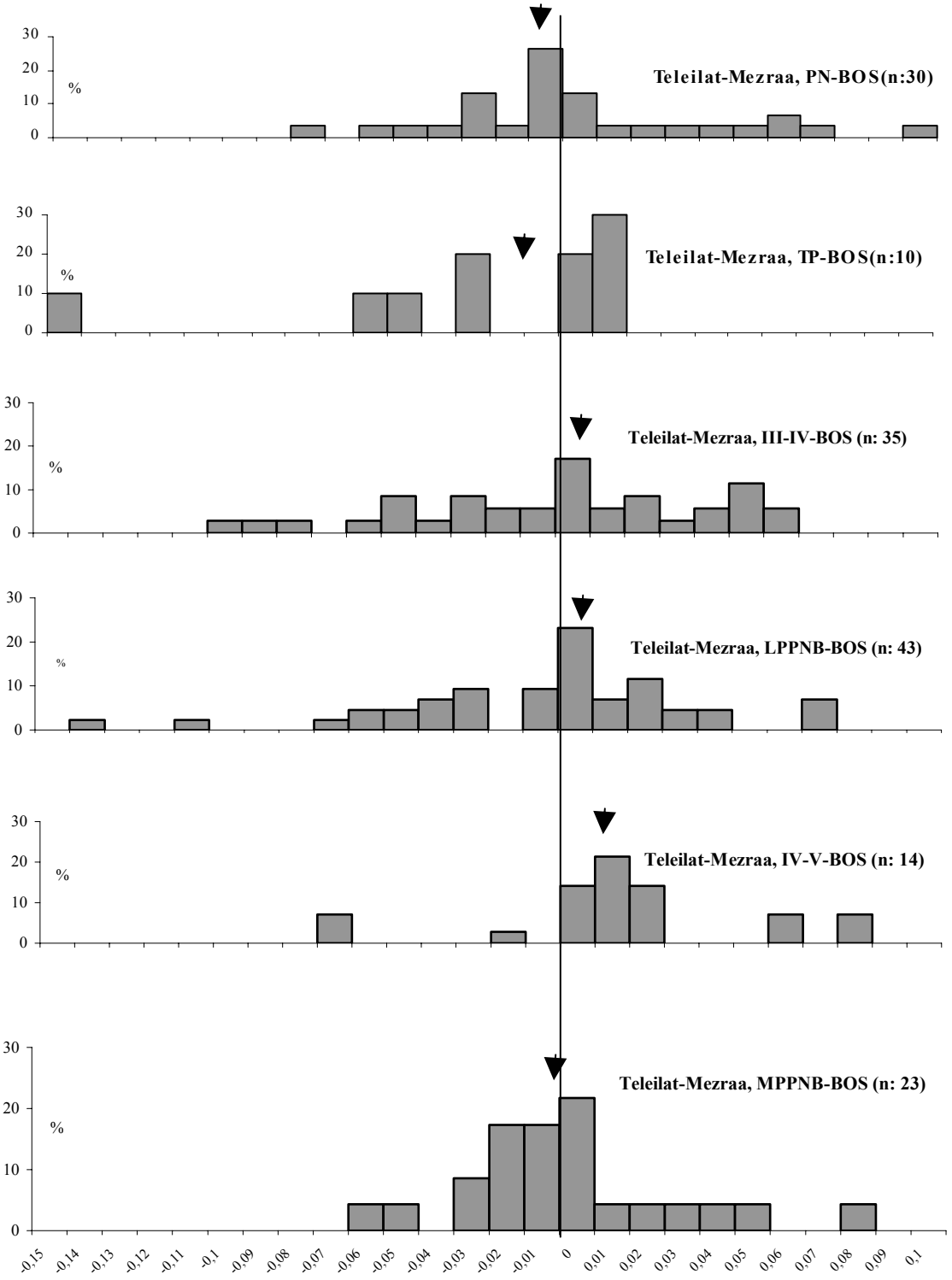

Fig. 15: Size index distributions of cattle from Mezraa-Teleilat. The median value for each subphase is indicated by the arrow. The measurements of a wild cow from Germany (individual number is BOS 43) are used as the standard. Measurements of this cow are available in Appendix 2.

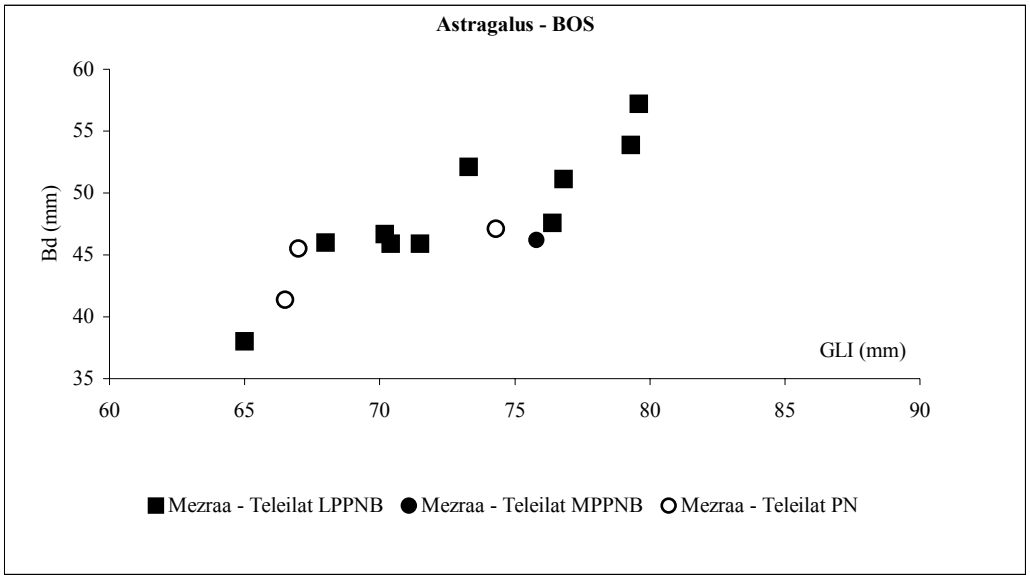

Fig. 16: Greatest length (GL) and breadth of depth (Bd) measurements of cattle Astragalus from different periods of Mezraa-Teleilat.

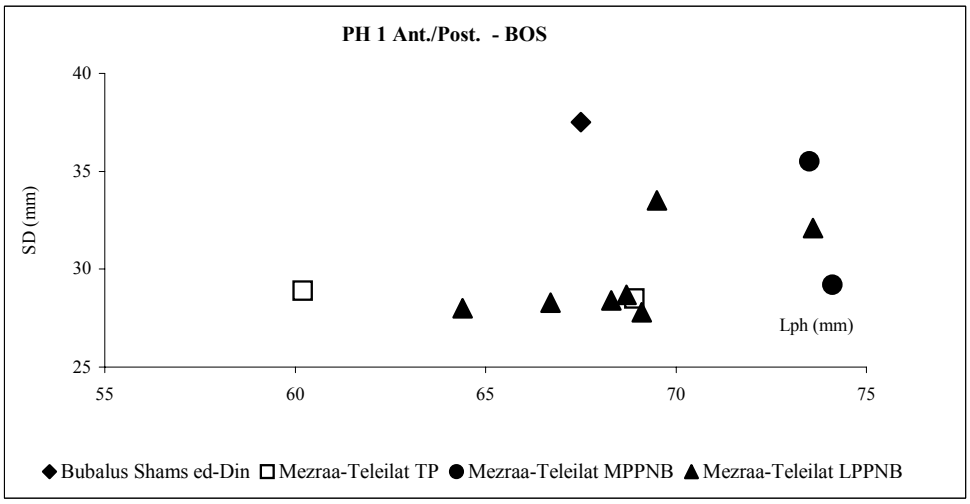

Fig. 17: Length (Lph) and smallest depth of the Ph1 of cattle from different levels of Mezraa-Teleilat.

Stage I (6-12 months)	Stage II (12-18 months)	Stage III (24-42 months)	Stage IV (42-48 months)
Distal Scapula	Distal Humerus	Distal Metapodials	Proximal Humerus
Proximal Radius	Proximal Phalanx 1	Distal Tibia	Distal Radius
Pelvis:Acetabulum	Proximal Phalanx 2	Proximal Calcaneum	Proximal Ulna
			Proximal and Distal Femur
			Proximal Tibia

Tab. 16: Skeletal parts used for each age stage based on the sequence of epiphyseal fusion for cattle (after Silver 1969; Habermehl 1975; Bökönyi 1972).

are smaller (thinner) than *Bos bubalus* values. Because of this, these ph1 bones do not belong to the *Bos bubalus*.

8.2.1.5. Kill-off Pattern for Cattle

Kill-off patterns are investigated based on the state of epiphyseal fusion of long bones. Table 16 above lists the stages of epiphyseal fusion and the estimated age of fusion for cattle.[275]

The survival rates for Mezraa-Teleilat cattle through the infantile and juvenile age stages were found to be high. In all levels at Mezraa-Teleilat, about 65% to 100% of the cattle in the assemblage survived the juvenile age stage. The trend of an earlier kill-off is also evident for cattle in Mezraa-Teleilat. In the PN and MPPNB levels only about 40% of the cattle survived beyond the adult age stage, while 22,2% to 12,5% survived the same age stage in the TP and LPPNB (Plate 59).

Kill-off patterns for cattle at Mezraa-Teleilat, however, indicate a trend in which progressively fewer individuals survived into adulthood in all levels, especially in the LPPNB and the TP.

Such low survival rates into adulthood are comparable to those for a domestic cattle population (Fig. 18).

[275] After Silver 1969; Habermehl 1975; Bökönyi 1972.

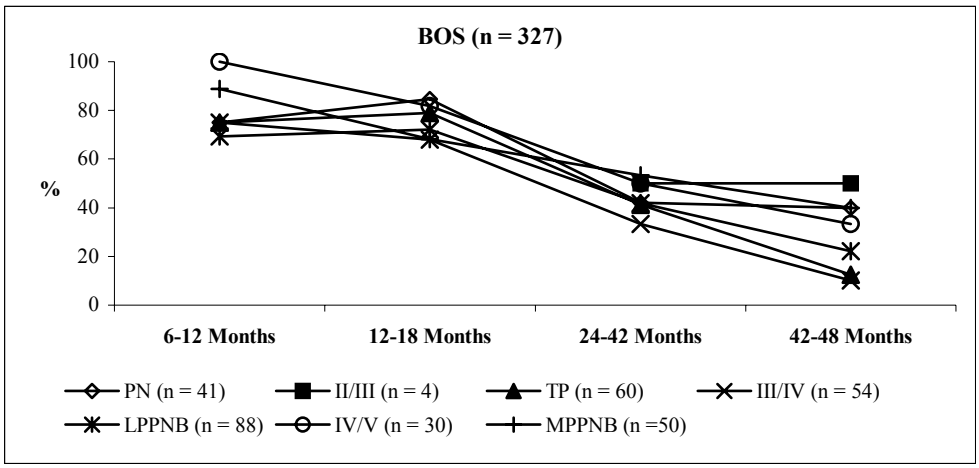

Fig. 18: Mezraa-Teleilat. Survival curves for cattle.

Teeth Age		PN		TP		III/IV		LPPNB		IV/V		MPPNB	
		n	%	n	%	n	%	n	%	n	%	n	%
dp4, dp4+, dp4++, M1-/+, M2-/+	< 1 year	2	16,66	5	24,0	-	-	9	25	-	-	2	50
dp4+++, M1, M1+, P-/+, I 1-/+	1 - 2 year	-	-	4	19,04	8	47,05	6	16,7	-	-	-	-
p4, p4+, M1++, M2, M3-/+	2 - 3 year	6	50	3	14,3	3	17,64	6	16,7	1	100	1	25
p4++, M3+, M2+	3 - 4 year	-	-	4	19,04	3	17,64	7	19,4	-	-	1	25
p4+++, M3++, M1+++, M2++, M2+++, M3+++	> 4 year	4	33,33	5	23,80	3	17,64	8	22,2			-	-
Total		**12**	**99,9**	**21**	**100**	**17**	100	**36**	**100**		100	**4**	100

-/+ erupting + slight worn ++ moderate worn +++ heavy worn

Tab. 17: Mandibular wear and eruption data for cattle

Tooth wear and eruption were also used for evaluating cattle exploitation at the site. Except for the MPPNB period, all other levels contain older cattle (>4 years). The earliest level at Mezraa-Teleilat also reveals a younger kill-off pattern (<1 years). In the PN, more animals

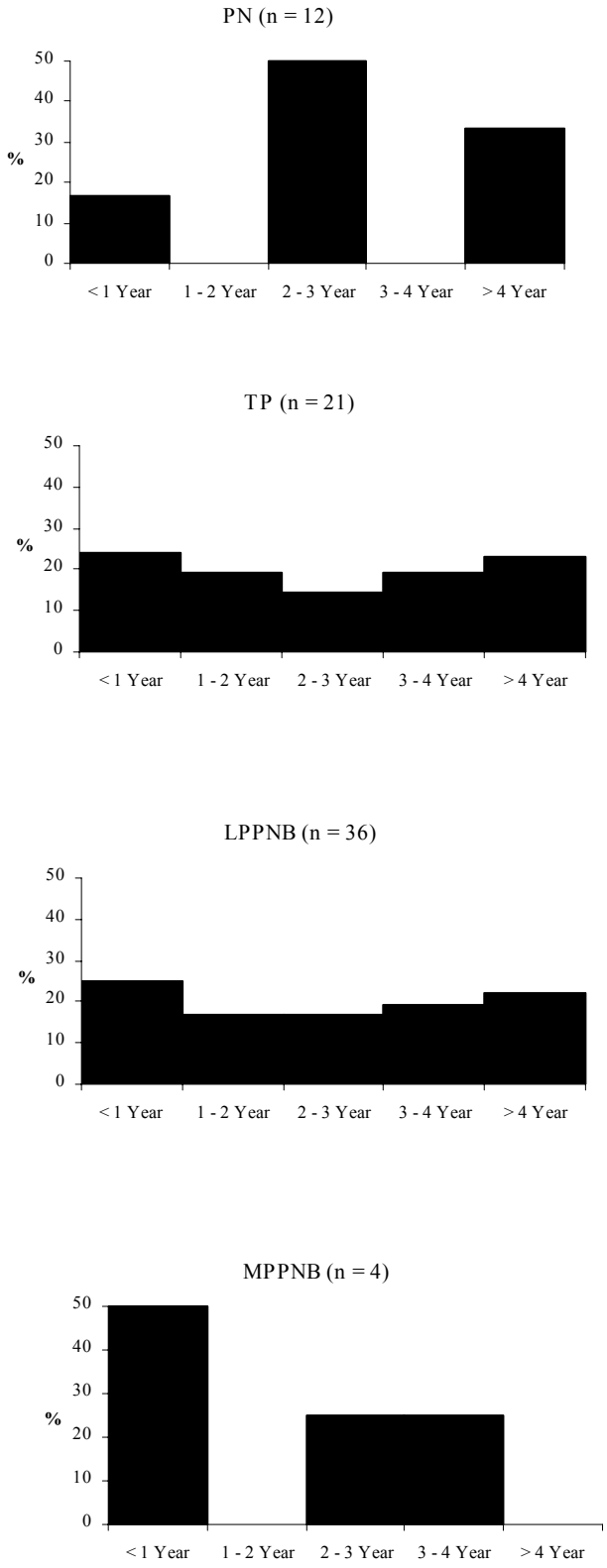

Fig. 19: Kill-off pattern for cattle from the four main levels based on tooth eruption and wear at Mezraa-Teleilat.

were slaughtered in the subadult age stage (2–3 years) after they had reached their full weight. Because of similar proportions in which animals were slaughtered at different ages, an exploitation pattern cannot be established in the TP and LPPNB periods. This might have to do with using the isolated teeth in analysis (Tab. 17, Fig. 19, Plate 59).

8.2.2. Sheep or Goat (*Ovis orientalis*/*Ovis anatolica* or *Capra aegagrus*/*Capra hircus*)

Ovicaprids are economically important animals for humans. Sheep habitats are hilly regions and the foothills of mountains. Sheep/goat were domesticated in the mountain regions of Southwest Asia at the end of the 10th millennium BC (around 9.000 BC). *Ovis orientalis*, the Asiatic mouflon, was probably the ancestor of all domestic sheep. In earlier times, ovicaprids were used simply for meat. The use of milk and wool, i. e., the so-called second products, was first established in much later periods.[276] According to Benecke, sheep were domesticated initially in the mountainous areas of the Middle East.[277] The oldest domesticated sheep bones were recovered from Zawi Chemi-Shanidar (northern Iraq), and dated to ca. 10.000 BC.[278]

The wild sheep (*Ovis orientalis*) lives today in South Central Anatolia and in the mountains of Armenia and Azerbeidjan down to the southeastern end of the Zagros.

Due to their biology, wild sheep are not so selective about their habitats as goats. Unlike goats, wild sheep are not as developed for climbing. They prefer semidesert, steppe or brush vegetation.[279]

Goats are extremely adaptable to hot weather and arid climates. Reductions in size of goat bones appeared for the first time around 9.000 BC in the Fertile Crescent. Wild goats occurred over the entire Fertile Crescent at the time when they were first domesticated in the late 8th millennium BC. As with sheep, goats were exploited in earlier times only for meat.[280]

Uerpmann mentions that wild goats live in a limited area in the Middle East (from Aegean to the Caucasus, Afghanistan and Pakistan).

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[276] Benecke 1994:228-229; Sheratt 1981 and 1983.

[277] Benecke 1994:230.

[278] For details, please see chapter 3.3.3.

[279] Uerpmann 1987:124-127; Uerpmann 1981:102.

[280] Benecke 1994:241.

8.2.2.1. Number of Sheep/Goat Bones

Ovicaprids are the most dominant animals at Mezraa-Teleilat. A total number of 6.580 bone fragments were identified as belonging to these animals, making up ca. 61,86% of the bone remains in the earlier levels and 72,15% in the TP. Figure 20 summarizes the proportion of ovicaprids at our site.

To distinguish between sheep and goat bones, the criteria established by Boessneck et al. were used.[281] Due to the large percentage of finds exhibiting heavy fragmentation, mostly on teeth, skull, axial bones and some post-cranial bones, ovicaprids could not be identified by species, and were simply termed sheep/goat. A total of 5.057 Ovis/Capra bones were recovered in all levels.

A total of 1.223 bones were identified as Ovis and 300 as Capra. Whereas the overall proportion of ovicaprid remains is fairly constant through time, the importance of goat remains seem to increase slightly in the upper levels (II/III and PN). The ratio of Ovis versus Capra is ca. 4,6:1 in the MPPNB, 5,6:1 in the LPPNB and in TP, but 2,1:1 in the PN levels at Mezraa-Teleilat. In other levels the ratios of ovicaprid bones are between these two values. Sheep are the most frequently found goat in all levels of the site (Tab. 11, 18; Figs. 20–22).

The territory around Mezraa-Teleilat was suited to sheep. They prefer flat grassy plains and hot summer temperatures. However, due to the lack of a high rocky area around the site, which would be suitable for goats, we do not expect to identify many goat from Mezraa-Teleilat. Goat increased more than sheep especially in the PN. This trend could be related to domestication.

Two interesting situations are observed for ovicaprids at the site. One is the recovery of two nearly complete ovicaprid foetus skeletons from a TP context. The skeletons were found together, unfortunately from a collecting unit. No adult animal remains were found nearby. An explanation for this might be that the mother of these two foeteses had been hunted. After the mother had been slaughtered, the foeteses were thrown away. Another possibility is that

[281] Boessneck/Müller/Teichert 1964.

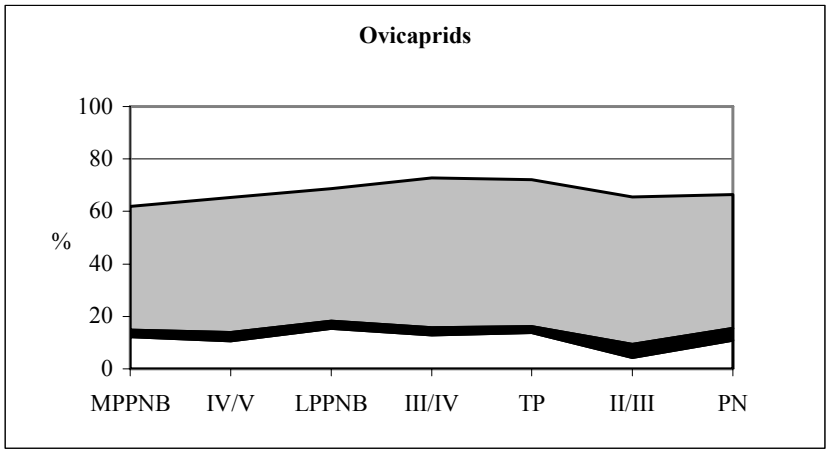

Fig. 20: Proportion of the Ovis/Capra in the number of identified animals in Mezraa-Teleilat. White: Ovis; Black: Capra; Grey: Ovis/Capra.

Level	Ovis	Capra	O:C
PN	241	104	2,3:1
II/III	5	6	0,8:1
TP	359	63	5,7:1
III/IV	208	45	4,6:1
LPPNB	277	50	5,5:1
IV/V	50	14	3,6:1
MPPNB	83	18	4,6:1

Tab. 18: Ratio between Ovis and Capra at Mezraa-Teleilat. O – Ovis; C – Capra.

the domestic mother had perhaps died from illness.[282] Neither skeleton could be identified to species and were recorded as Sheep/goat.

Another interesting bone assemblage was uncovered from building AG. Here, three separate, blue-grayish burnt goat skeletons were found inside a house (Plates 60, 61). These finds provide information about the function of the buildings at Mezraa-Teleilat.[283]

[282] Pregnant animals are generally not slaughtered.

8.2.2.2. Element Distributions

At a site where domestic animals were raised, slaughtered and consumed, we would expect to see nearly all parts of the body represented in approximately the same levels of frequency. Because of certain taphonomic processes and carnivore activities, some skeletal parts can be excepted to be absent from the material. Moreover, a very high fragmentation of skulls (including mandibula and teeth), vertebrae and ribs could not be identified to taxon. They were identified as medium mammalian in the unidentified animal bone list. As illustrated in Plates 62–67, nearly all skeletal elements from ovicaprids were recovered from the site. This means, in general, ovicaprids were slaughtered at the settlement or nearby.

However, some small bones such as carpals, tarsals and phalanges exist in small percentages in our material, so that we can say that all skeletal parts are represented for ovicaprids. This emphasizes the point made above about slaughtering on site. It is clearly visible in Plates 62–64 that sheep/goat teeth are represented in a high percentage due to fragmentation. The various skeletal elements were found in more or less similar proportions in the four main periods of occupation of the site. Loose teeth occur most frequently.[284] This high value is probably related to the fragmentation of teeth. Plates 62–64 present a detailed distribution of elements. Here we divided the body into seven parts in order to summarize available skeletal parts of ovicaprids. The head category includes only skulls, mandible fragments and teeth; vertebrae and ribs form a separate axial category; the forequarter includes the scapula, humerus, ulna, and radius; the hindquarter, the innominate, sacrum, femur, patella, and tibia; the forefoot consists of carpal and metacarpal elements; the hindfoot includes tarsal, calcaneum, astragalus and metatarsal elements; only the foot consists of elements identified only as metapodial elements and phalanges. Figure 23 summarizes the frequency levels of skeletal parts and demonstrates their similar occurrences in all levels.

The high fragmentation of bones exaggerated the percentages included under the category of head. The category of axial is poorly represented due to fragmentation levels which make a concrete identification difficult. The axial bones can be found in the medium mammalian category. The second, least preserved body part is the forefoot, which is probably due to fragmentation levels.

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[283] For detailed informations cf. Chapter 9.2.

[284] They compose 35,54% of the faunal assemblage in the MPPNB, 36,28% in LPPNB, 40% in TP and 41,13% in the PN.

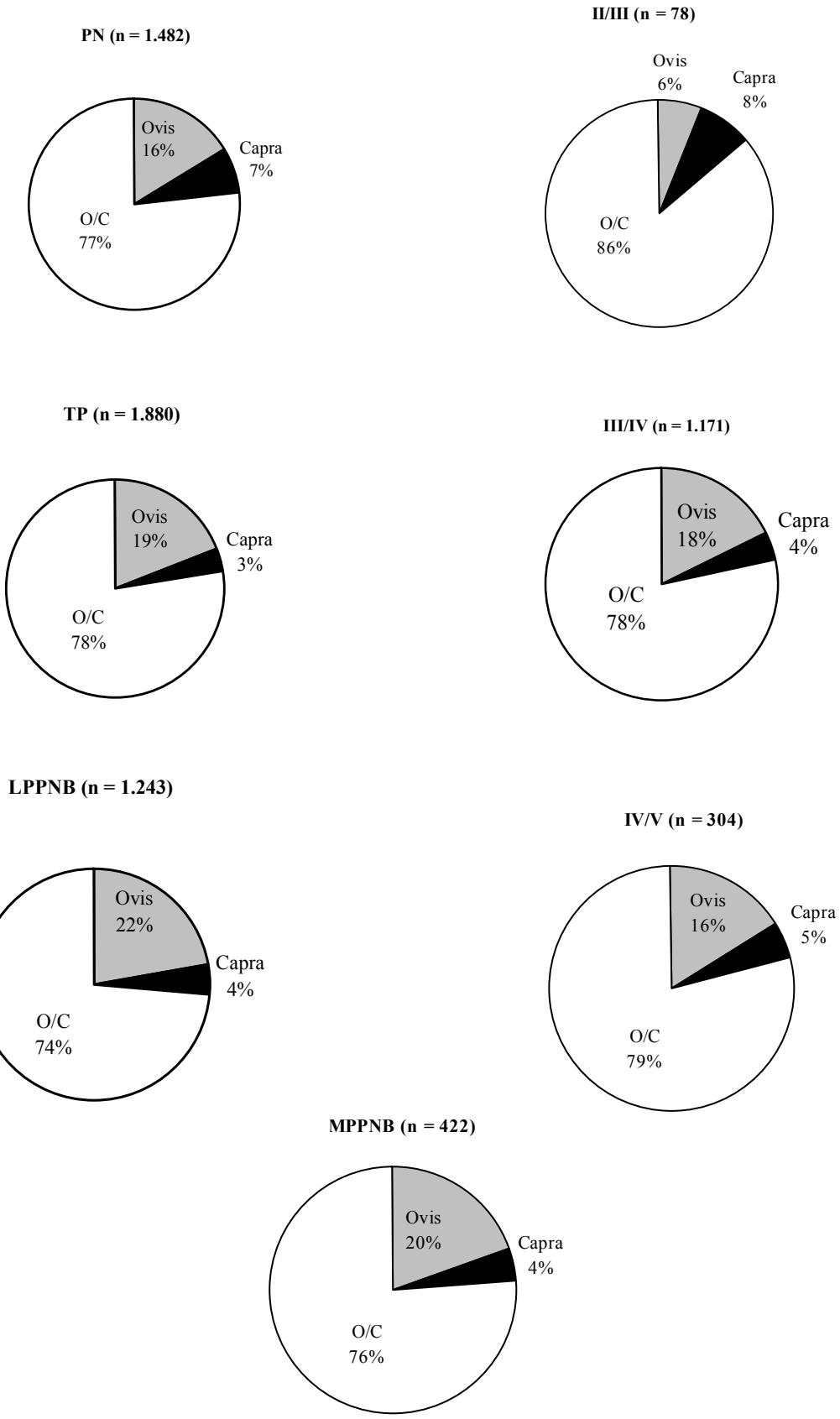


Fig. 21: Mezraa-Teleilat. Proportion of ovicaprids in different levels. O/C – Ovis/Capra.

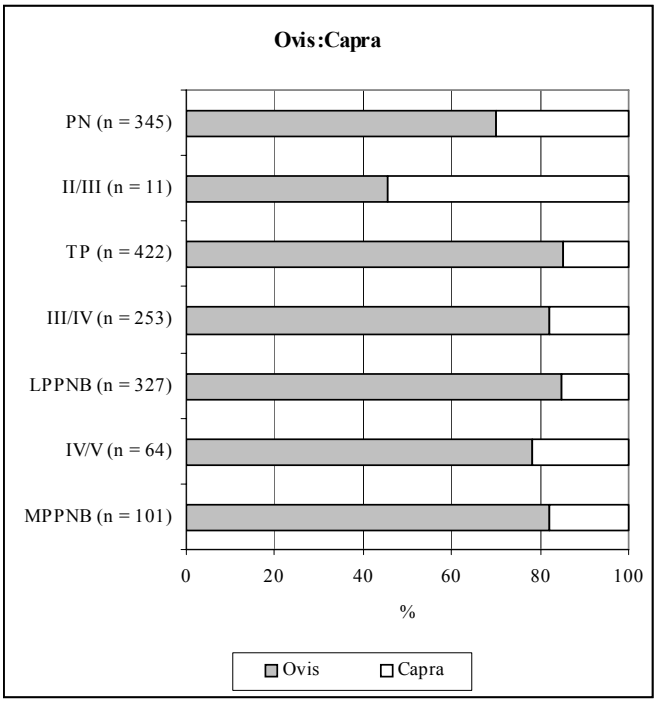


Fig. 22: Mezraa-Teleilat. Ratio of Ovis and Capra bones.

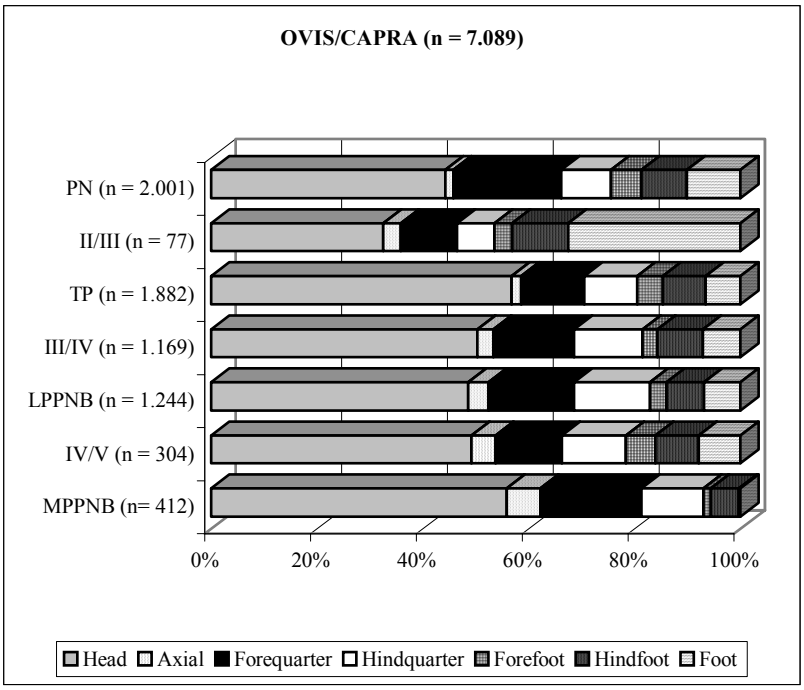


Fig. 23: Proportion of the skeletal part of ovicaprids in different levels at Mezraa-Teleilat (individuals are included).

Female:				
Element	**Level**	**Ovis**	**Capra**	**O/C**
Pelvis	PN	3		4
	II/III	1	-	-
	TP	4	3	5
	III/IV	1	1	7
	LPPNB	6	1	6
	IV/V	-	-	-
	MPPNB	-	-	3
	Total:	**15**	**5**	**26**
Male:				
Pelvis	PN	-	-	-
	II/III	-	-	-
	TP	2	-	1
	III/IV	1	-	2
	LPPNB	-	-	8
	IV/V	1	-	4
	MPPNB	-	-	1
	Total:	**4**	**-**	**16**

Tab. 19: Numbers of sexed bones of Ovis and Capra. O/C – Ovis/Capra, indifferent.

8.2.2.3. Sexing

Because of the lack of well-preserved horn and skull bones, a sex determination of ovicaprids is based only on pelvis bones. The sex ratios are presented in Table 19. In total, 66 bones could be sexed from all levels. Excluding levels IV/V (for sheep and sheep/goat) and the LPPNB (for sheep/goat), males dominate the assemblage. In the other levels, females outnumber males.

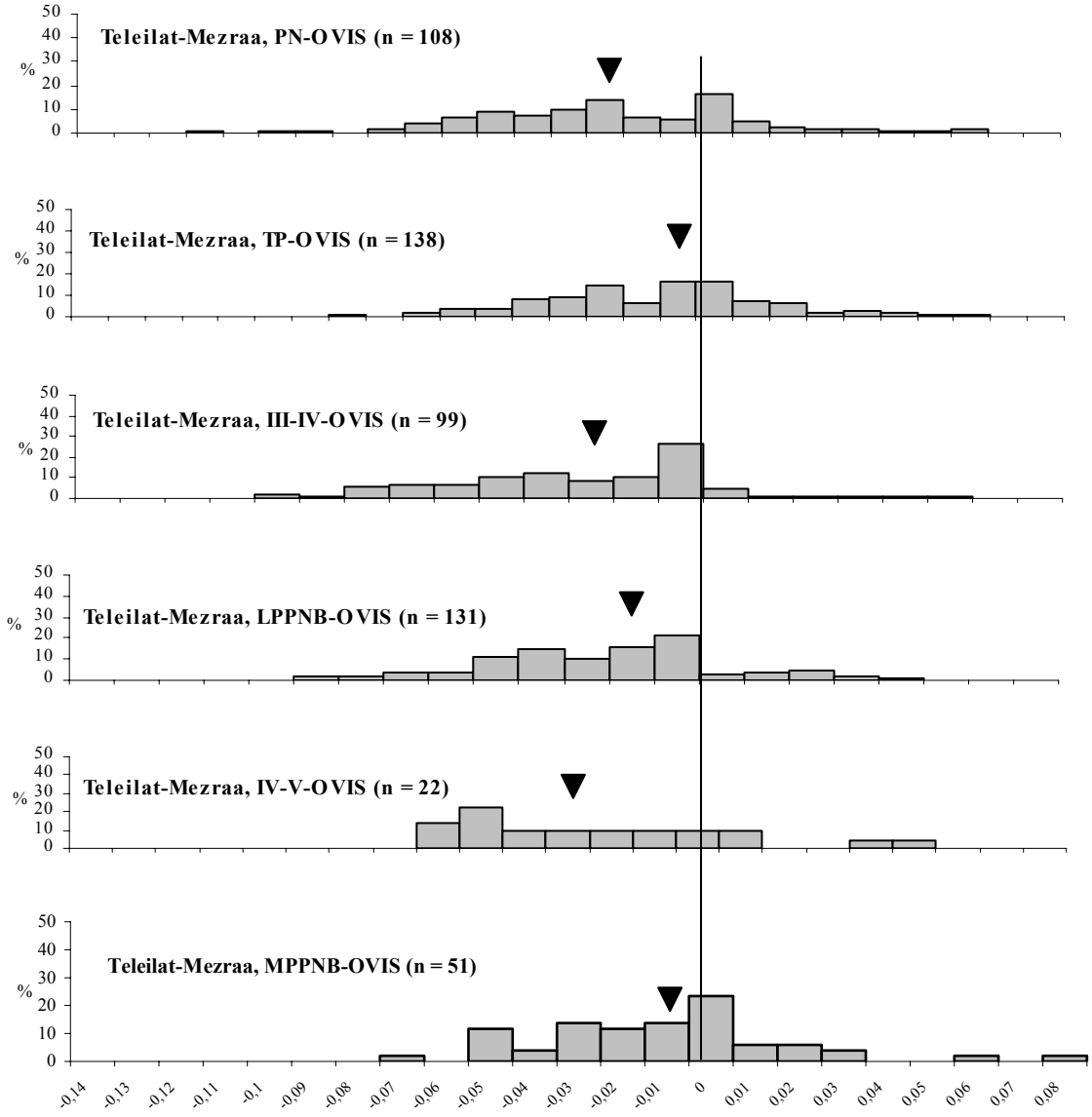


Fig. 24A: Size index distribution for sheep from Mezraa-Teleilat. The median value for each level is indicated by arrow at chart. See attachment part for the standard measurement.

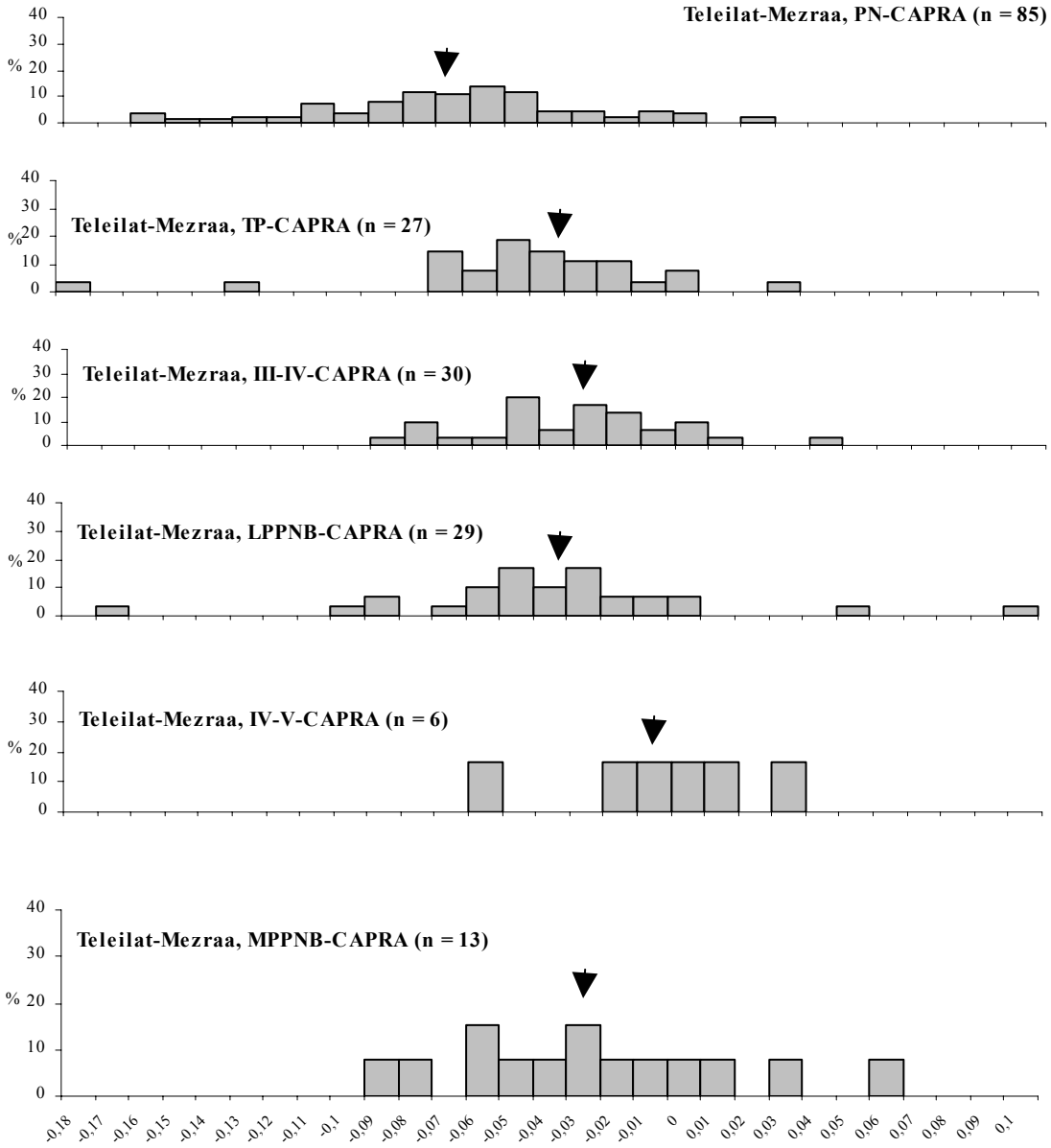


Fig. 24B: Size index distribution for goat from Mezraa-Teleilat. The median value for each level is indicated by arrow at chart. See attachment part for the standard measurements.

8.2.2.4. Size

Measurements for sheep and goat specimens were compared to the corresponding dimensions of a standard animal, using the "difference of logs"-method. The measurements of a wild sheep and a goat were taken from H.-P. Uerpmann (1979).[285] Figures 24A and B show size index distribution for goat and sheep from Mezraa-Teleilat. The median value for each level is indicated by the arrow on the chart.

A reduction in body size is one of the characteristics that can be used to provide evidence on the domestic or wild status of an animal. The comparison of post-cranial measurements of ovicaprids from different subphases indicates that the size diminution began appearing as early as in the MPPNB. The size index distributions for sheep indicate a similar pattern for goats. Down through to the earliest levels smaller animals have been recovered. Because of this we think that sheep and goats were domesticated.

There are still some larger specimens in all levels at our site. Although some wild sheep and goats continued to be hunted, the size distribution for sheep and goats in this level is comparable to those of a domesticated population (Figs. 24A and 24B).

The analysis of the remains of sheep and goat suggests that they originate mostly from domesticated animals. Figure 25 presents a plot of the sheep astragalus sizes from different levels of Mezraa-Teleilat. Astragalus measurements are for the most part similar. The largest sheep astralgalus measurements belong to the PN and TP. Specimens from earlier levels (MPPNB and LPPNB) are smaller than those from the younger levels (TP and PN).

8.2.2.5. Kill-off Pattern for Sheep/Goat

The kill-off patterns for sheep/goat in each subphase were initially investigated based on the epiphyseal fusion of long bones. In general, Stage I corresponds to infantile (6–12 months), Stage II to juvenile (12–30 months), Stage III to subadult (30–36 months) and Stage IV (36–42 months) to adult animals. Table 20 presents the skeletal parts used for each stage.

In order to evaluate the kill-off patterns for ovicaprids we used 1.648 specimens from the material. In all levels a very high percentage of sheep and goats survived in the infantile stages: approximately 72% survived in the TP to 92,7% in the Late PPNB. For the juvenile

[285] Measurements of the standard animals are available in appendices of this work.

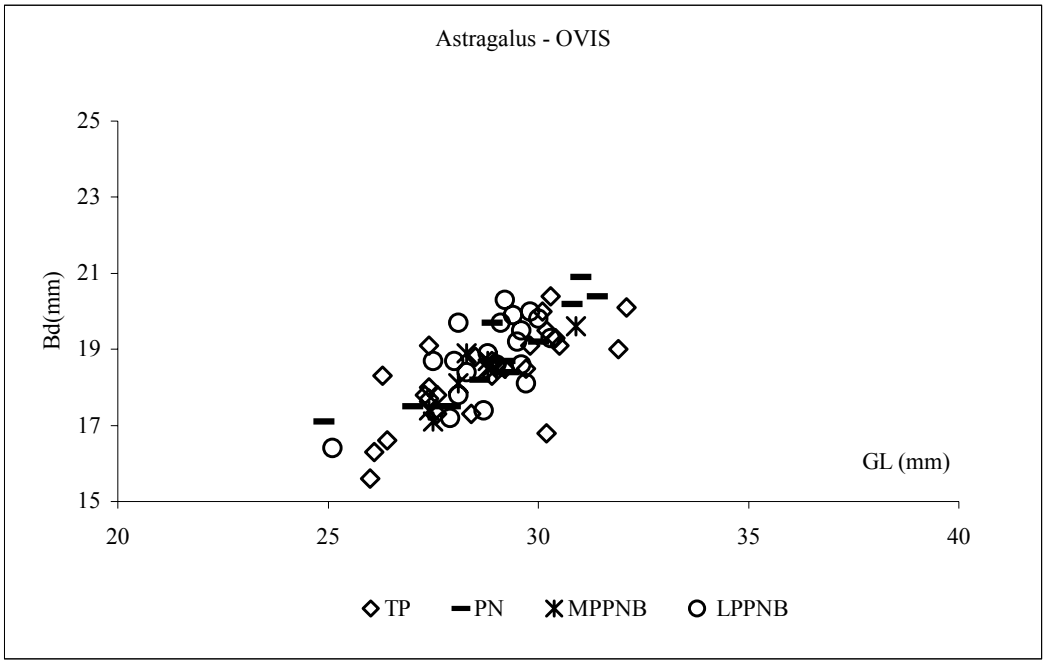
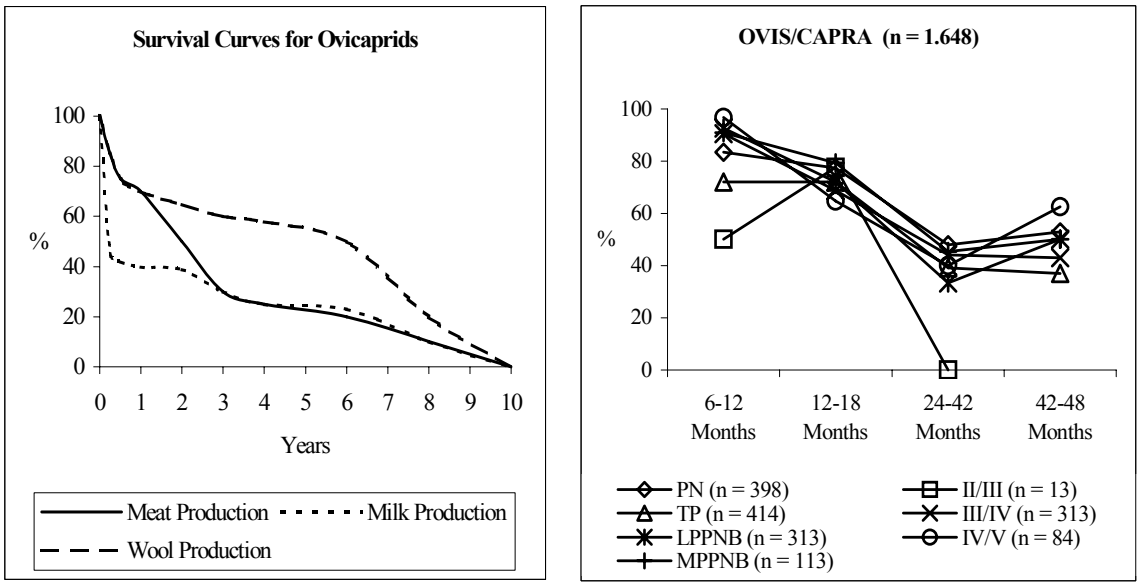


Fig. 25: Greatest length (GL) and breadth of distal (Bd) sheep astragalus measurements from different levels at Mezraa-Teleilat.

Stage I (6-12 months)	**Stage II (12-28 months)**	**Stage III (30-36 months)**	**Stage IV (36-42 months)**
Distal Scapula	Proximal Phalanx 1	Proximal Ulna	Proximal Humerus
Distal Humerus	Proximal Phalanx 2	Proximal Femur	Distal Radius
Proximal Radius	Distal Metapodials	Proximal Calcaneum	Distal Femur
Pelvis:Acetabulum	Distal Tibia		Proximal Tibia

Tab. 20: Stages of epiphyseal fusion and estimated age of fusion for sheep/goat (after Silver 1969; Habermehl 1975; Bökönyi 1972).



A **B**

Fig. 26A-B: A - Models for meat, milk and wool production – a possible kill-off pattern (after Payne 1973).
B - Survival curves for ovicaprids at Mezraa-Teleilat.

Tooth Age		PN		II/III		TP		III/IV		LPPNB		IV/V		MPPNB	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
dp4, dp4+, dp4++, M1-/+, M2-/+	< 1 year	1	7,14	-	-	16	14,3	1	1,31	17	16,5	2	9,5	6	12,8
dp4+++, M1, M1+	1-2 years	10	71,4	2	33	35	31,3	14	18,42	30	29,12	6	28,6	10	21,3
p4, p4+, M1++, M2, M3-/+	2-3 years	2	14,3	3	50	34	30,4	16	21,05	45	43,68	6	28,6	7	14,9
p4++, M3+, M2+	3-4 years	-	-	1	17	3	2,67	4	5,26	5	4,85	2	9,5	4	8,51
p4+++, M3++, M1+++, M2++, M2+++, M3+++	> 4 years	1	7,14	-	-	24	21,4	41	53,94	6	5,82	5	23,8	20	42,5
Total		**14**	**99,9**	**6**	**100**	**112**	**100,1**	**76**	**100**	**103**	**100**	**21**	**100**	**47**	**100**

-/+ erupting + slight worn ++ moderate worn +++ heavy worn

Tab. 21: Mandibular wear and eruption data for ovicaprids.

stage, we counted between 72,1% to 79,4% from ovicaprids, in the subadult stage significantly less (between 33,3% to the 48%).

In the TP, only 36,9% of the ovicaprids survived until full adulthood. In stage IV of the LPPNB level, 50% of the animals survived in Stage IV and in the PN, 53%, although there is a „rebound“ caused primarily by large numbers of fused distal radius and distal femur bones (Fig. 26B). The kill-off pattern for ovicaprids in all the levels at Mezraa-Teleilat, however, indicates a trend in which progressively fewer individuals survived into adulthood in all the levels (Fig. 26B; Plate 68).

The kill-off pattern for ovicaprids has also been compared with the models presented by S. Payne for meat, milk and wool production (Fig. 26A). Most animals had been killed when they reached their total weight. This trend corresponds with S. Payne's meat production model.

The kill-off pattern has also been calculated according to tooth wear . Unfortunately, because of fragmentation, we do not have many teeth which would fall in the mandibula range. An isolated tooth has been evaluated and included in the calculation of ageing. Table 21 presents a list of all ovicaprine teeth found at Mezraa-Teleilat in relation to age groups. The mandibular data suggest that about 33% to 78% of the animals were killed before the end of their second year, ca. 14% to 43% between the ages of two and three, whereas the remaining 5% to 42% of the animals survived into their fourth year (Tab. 20; Fig. 27). Excluding the PN here, ovicaprids were generally killed before they were two years old. Most animals had been killed between two and three years in the LPPNB. The high percentage of surviving ovicaprids (42%) in the MPPNB is very interesting. This situation could be explained by way of hunting strategies. The same percentages continue especially in the earliest phases but do not remain so high as in the later periods.

As mentioned earlier, a high incidence of young animals, particularly those under about three years, is an indication of a domesticated animal population.

8.2.3. Pigs (*Sus scrofa*/*Sus domesticus*)

Wild boar was more widespread in the Middle East in prehistoric times than they are today. Today pigs are found all over Anatolia and in northern and western Iran, as well as in high densities in the forested areas along the coasts of the Black and Caspian Seas.[286] However

[286] Uerpmann 1987:41; Benecke 1994:250; Turan 1988:71; Turan 1984:66.

wild pigs are highly adaptive to many different biotopes, but they do not live in arid deserts. They are present also along the Euphrates Valley. The domestication of pigs began independently in different areas of the world. Their nutrition consists of plant-like roots, oak, beechnut and tuber. There is evidence for pig domestication in Çayönü (Turkey), dated to the first half of the 8th millennium BC. Benecke suggests that pig breeding did not play as important a role due to their rather low value in human nutrition in the Middle East.[287] Domestic pigs have descended from one species. Wild boar (*Sus scrofa*) is still a relatively common wild animal found in many regions.[288] Wild pigs prefer to live in leafy mixed woodlands, reed beds, dense bushy and marshy places, near lakes or rivers as well as in pastures with densely covered bush.[289]

8.2.3.1. Number of Pig Bones

A total of 1.174 animal bones were identified as pig from our site. Plates 69–73 present several pig bones. However, the percentage of pig changes in different levels, from between 8,95% (LPPNB) and 15,27% (PN).

Pig was not the most important animal in the economy of Mezraa-Teleilat, but it was an important meat source (Fig. 28). Their importance increased especially in the PN, and they were kept in the houses. We do not know exactly when they began to be kept at the settlement but we have evidence at least for the PN. Five different individual animals were observed in a small room in building AY. Detailed information about these skeletons is given in Chapter 9.1.

8.2.3.2. Element Distributions

Nearly all skeletal parts of pigs are observed at Mezraa-Teleilat. We have more axial bones from the PN, a proportion similar to that of pig skeletons found in building AG. This indicates that pigs were mostly slaughtered at the site. Only ribs, vertebrae and some small bones such as carpals, tarsals and metapodials, as well as some phalanges, are absent in some phases or

[287] Benecke 1994:250.

[288] Clutton-Brock 1981:71.

[289] Clutton-Brock 1981:71-72; Turan 1984:66.

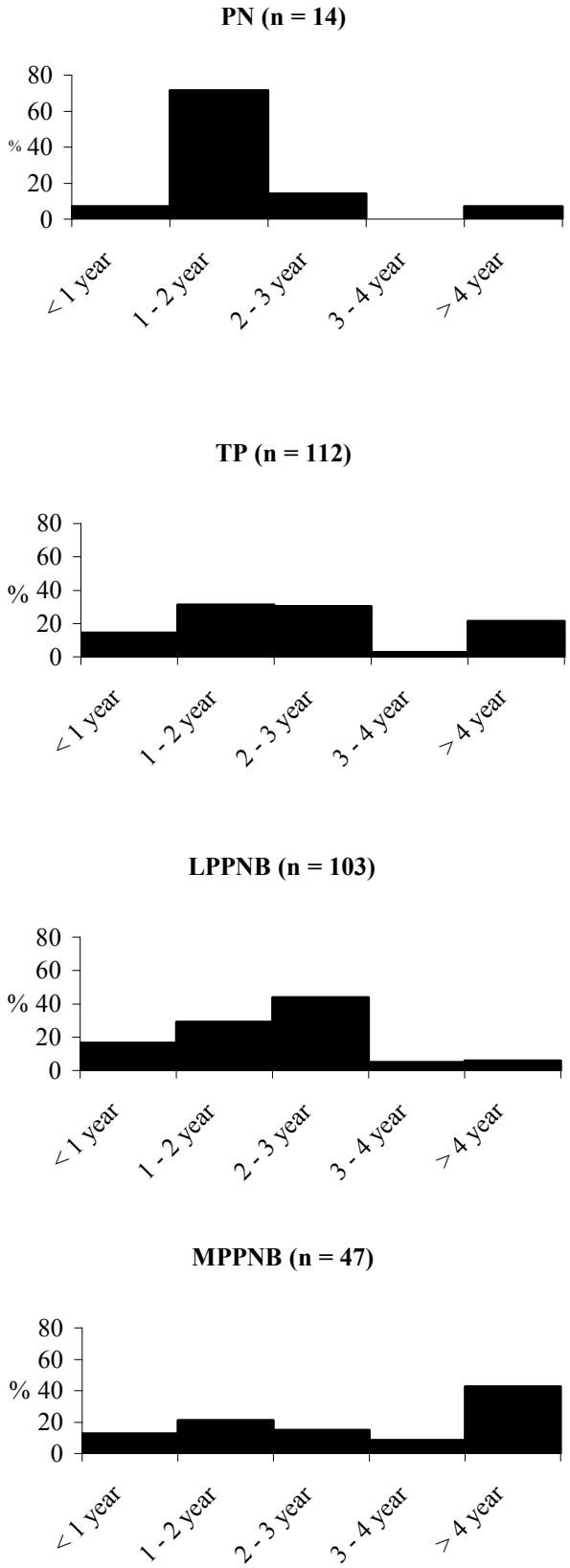


Fig. 27: Kill-off pattern for sheep/goat from four main levels based on tooth eruption and wear at Mezraa-Teleilat.

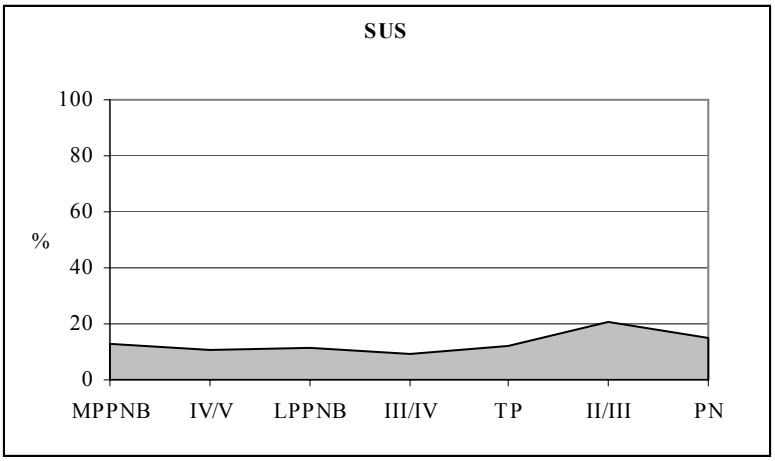


Fig. 28: Proportion of pig in the number of identified animals in Mezraa-Teleilat.

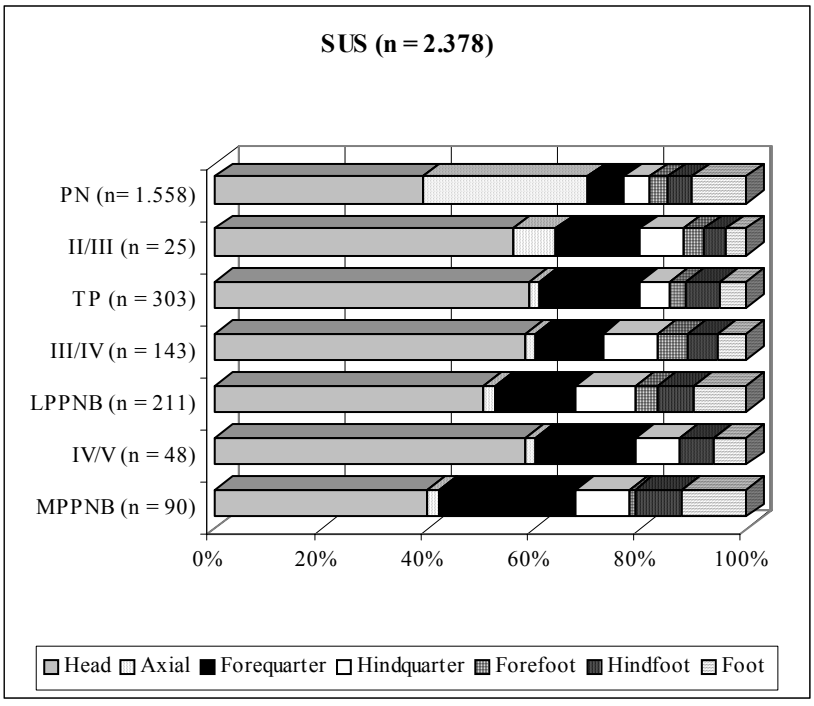


Fig. 29: Proportion of the skeletal part of pig in different levels at Mezraa-Teleilat.

occur only rarely. But this seems related to fragmentation, leading to difficulties in identification. These bones are evaluated in the medium animal category. Skull fragments are evaluated more often than other types. Pig skulls are stronger than other animal skulls and are better preserved, therefore they can be identified more easily. Another available category found more frequently is the forequarter category: it includes the scapula, humerus, ulna and radius. The forefoot (carpals and metacarpal) are less represented in all periods at the settlement (Plates 75; Fig. 29).

8.2.3.3. Sexing

Canines are used to determine the sex of pigs, but canines are extremely rare in our material. All of the canines are badly fragmented, and therefore do not provide detailed information. Only four canines could be used to determine sex of the remains. They all belong to female animals. However, there are not enough samples to conclude that females outnumbered male pigs at the site.

8.2.3.4. Size

Measurements of the pig remains from Mezraa-Teleilat were compared to those of "standard animals", using the "log size index" method developed by Richard Meadow.[290] The measurements of a female wild boar from Elazığ (Turkey) have been used as the standard. This individual is kept in the Museum of Comparative Zoology at Harvard University for the standard measurements of Sus (specimen number 51621). The measurements are available in the catalogue. Measurements from 118 bones are used for the Log Size Index.

Diminution in size began as early as the MPPNB. However, we only have a small sample size from the MPPNB. Our sample quantity is much less, with only 13 bones available for size index distribution in the MPPNB. The size distributions for pigs are similar in the LPPNB and in the PN. The median value is smaller than in other levels representing a domestic population. But we can still see some larger specimens in the main four phases (MPPNB,

[290] Meadow 1983.

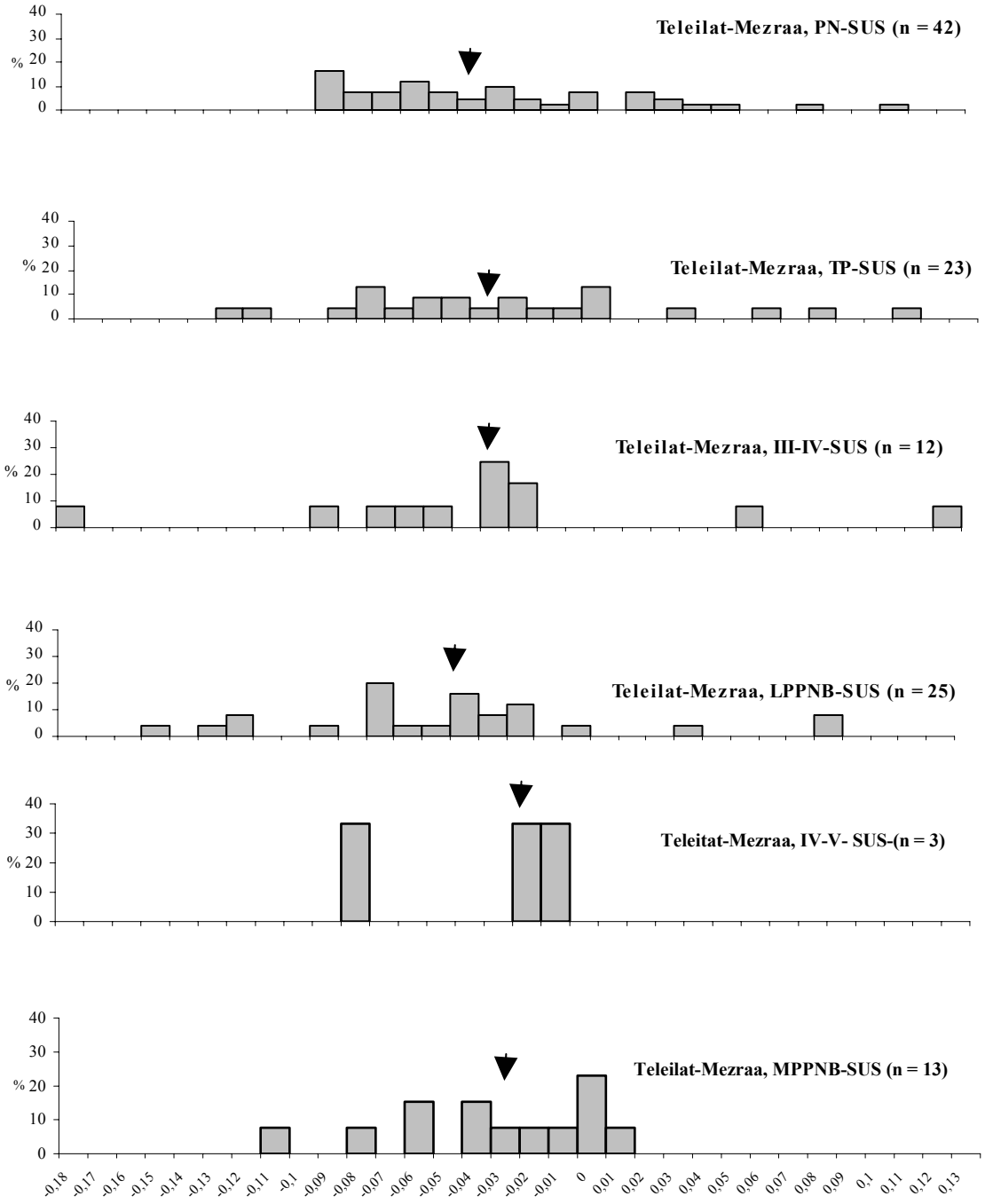


Fig. 30: Size index distributions for pig from Mezraa-Teleilat. The median value for each level is indicated by arrows. The measurements of a wild pig from Elazig are used as the standard (Hongo/Meadow 1998 and 2000). See for the standard measurements Appendix 2.

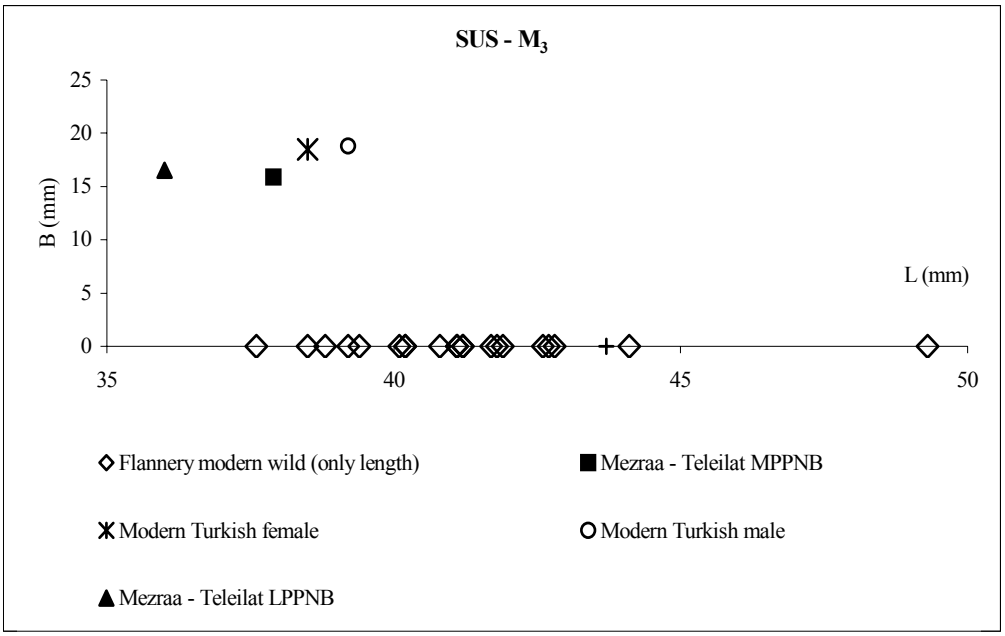


Fig. 31: Length and greatest breadth of Sus mandibular/third molar from Mezraa-Teleilat, from a modern, male wild pig from Anatolia (collection H. Hongo) as well as a female (specimen number 51621, Mammal Department, Museum of Comparative Zoology, Harvard University), and from modern wild specimens reported by Flannery (1983).

LPPNB, TP and PN). The smallest specimen occurs in phase III/IV. During the PPN and PN, the hunting of wild pigs continued at Mezraa-Teleilat (Fig. 30).

The size reduction of teeth is one of the characteristics used for identifying the presence of domestic pigs at a site.[291] Lengths and greatest breadths of lower third molars from Mezraa-Teleilat are plotted in Figure 31. The measurements of two modern wild pigs (male and female) from Turkey are shown in the same figure. The measurements of the length of the third mandibular molar of modern wild pigs was established by K. Flannery (1983) in the Middle East. Flannery's samples are shown at the bottom of the chart.

Unfortunately, we have only two third mandibular molar measurements from Mezraa-Teleilat. One LPPNB specimen is smaller than Flannery's minimum value for wild pig in the Middle East and also for modern Turkish female and male pigs. The other sample, dated to the MPPNB, is slightly larger than K. Flannery's minimum value but smaller than the modern Turkish female and male pigs.

In Figure 32 the length and greatest breadth of upper M3 measurements of Mezraa-Teleilat corresponded with K. Flannery's wild pig measurements. Only one upper third molar was

Stage I (before 12 months)	Stage II (12-30 months)	Stage III (36-42 months)
Pelvis: Acetabulum area	Distal Metapodials	Distal Radius
Distal Humerus	Distal Tibia	Proximal and Distal Ulna
Proximal Radius	Distal Fibula	Proximal and Distal Femur
Proximal Phalanx 2	Calcaneum	Proximal Tibia
		Proximal Fibula

Tab. 22: Skeletal parts used for each age stage based on the sequence of epiphyseal fusion for pig (after Silver 1969; Habermehl 1975; Bökönyi 1972).

observed from the LPPNB. The minimum, mean and maximum measurements of modern wild specimens measured by K. Flannery (1983) are also included in this Figure. According to this information, the Mezraa-Teleilat specimen is larger than K. Flannery's minimum value for modern wild pig.

The lengths and greatest breadths of upper second molars from Mezraa-Teleilat are plotted in Figure 33. Only one upper second molar was observed from the MPPNB. The minimum, mean and maximum measurements of modern wild specimens measured by K. Flannery are also included in this figure. According to the data, the Mezraa-Teleilat specimens are smaller than K. Flannery's minimum value for modern wild pig.

8.2.3.5. Kill-off Pattern for Pig

Kill-off patterns are investigated based on the state of epiphyseal fusion of long bones, tooth eruption and wear. Table 22 describes the skeletal parts used for each stage. In general the Stage I epiphyses fused during infantile and juvenile stages (before 12 months), Stage II epiphyses during the subadult stage (between 24 and 30 months), and Stage III epiphyses fused when the animals reached full adulthood (between 36 and 42 months).

An early kill-off is observed for pigs in the later levels: 64,2% of pigs survived Stage I in the MPPNB and 47,6% survived in the LPPNB. But only 41,1% of the pigs survived in the TP and only 37,6% in the PN. In the TP and LPPNB levels only ca. 39,1% to 57,1% survived

[291] Flannery 1983; Stampfli 1983.

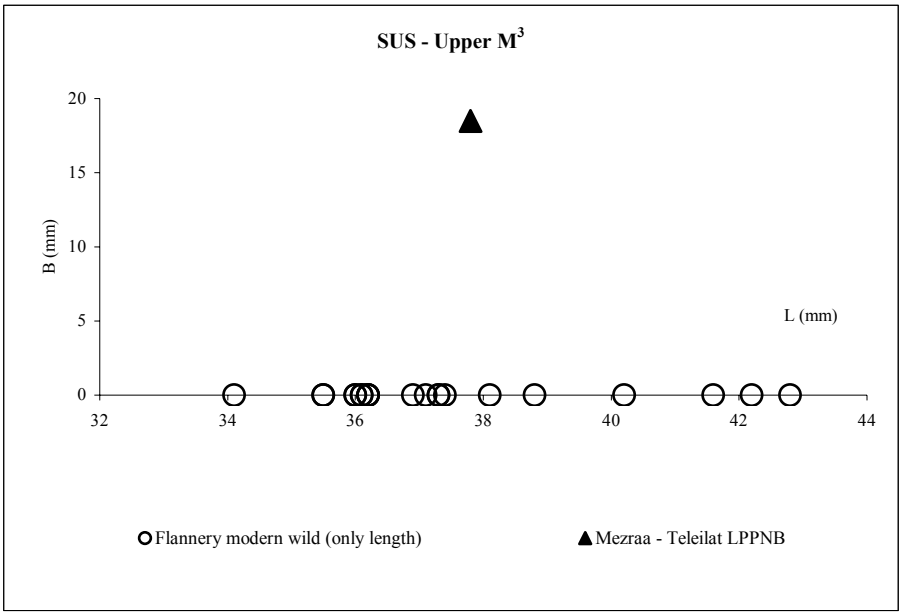


Fig. 32: Length and greatest breadth of Sus maxillare/third molar from Mezraa-Teleilat, from modern wild specimens reported by Flannery (1983).

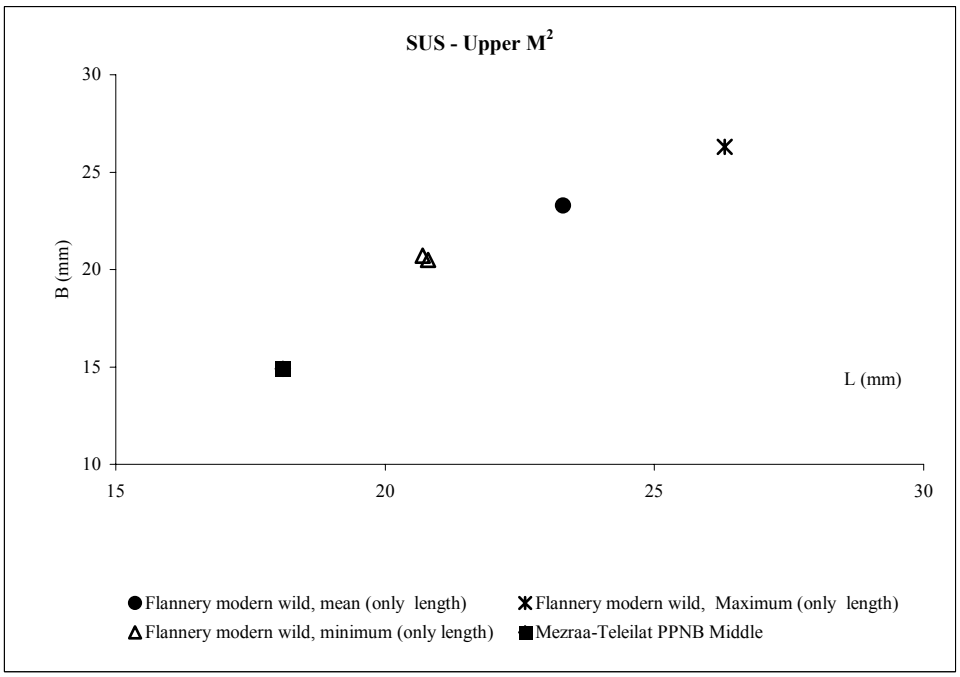


Fig. 33: Length and greatest breadth of Sus maxillare second molars from Mezraa-Teleilat, from modern wild specimens reported by Flannery (1983) from different archaeological sites in the Near East.

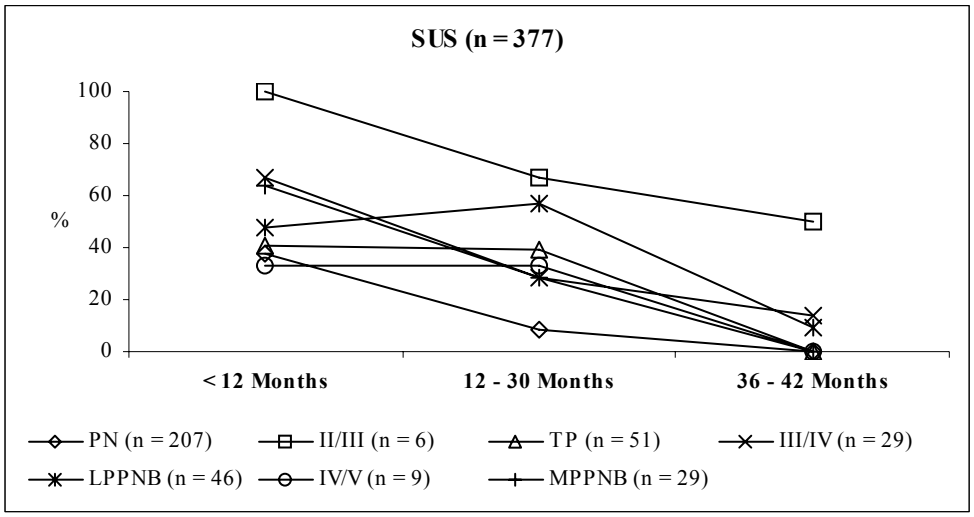


Fig. 34: Survival curves for pig at Mezraa-Teleilat.

Age Stage	MPPNB		LPPNB		TP		PN	
	N	%	n	%	n	%	n	%
newborn					1	4,54	1	3,12
up to ca. 6 months	1	9,09			4	18,2	7	21,8
ca. 6 – 12 months.	3	27,3	6	26,08	9	40,9	11	34,3
ca. 12 - 18 months	3	27,3	5	21,73	5	22,7	7	21,8
ca. 18 - 24 months	2	18,2	6	26,08	2	9,09	3	9,37
Over 24 months	2	18,2	6	26,08	1	4,54	3	9,37
Over 36 months								
Total:	**11**	**100**	**23**	**100**	**22**	**100**	**32**	**99,8**

Tab. 23: Mandibular wear and eruption data for pig. See Plate 77 for explanation on age stages.

beyond the subadult age, while 28,5% to 8,5% survived the same stage in the MPPNB and PN levels. A rebound occurred during the subadult age for the LPPNB and the TP. This is caused primarily by the large number of fused metapodials and distal tibiae in the assemblage. There are, progressively over time, fewer animals which appear to have survived adulthood. In the MPPNB, the TP and PN of Mezraa-Teleilat none of animals survived in the full adult stage.

In the LPPNB only 9% of the pigs survived Stage III. Such low survival rates into adulthood are comparable to those for a domestic pig population (Fig. 34). When we evaluate only the four main levels[292], the situation is not so clear in the LPPNB and in the transitional levels due to rebound. This trend of younger kill-offs seems to progress into the MPPNB level (only 28.5% survived in stage II and none survived stage III; cf. Plate 76 and Fig. 34).

Another way to investigate slaughter patterns is through the analysis of tooth eruption and wear data. Loose teeth were classified into age stages based on wear patterns defined by A. Grant[293] and G. Bull/S. Payne.[294] The first stages represent infantile and juvenile animals (up to ca. 12 months), stage II subadults (ca. 12–24 months) and Stage III full adults (ca. 24 to 36 months).

Stages IV and V include old animals (over ca. 36 months). Although we are aware of the problem of small sample sizes, we can make the following observations (Tab. 23 and Plate 77).

In the MPPNB only about 36,36% of the animals were killed during the earliest three age stages. Pigs were mainly killed when in the subadult years. A similar pattern is observed in the LPPNB. About 26,08% of the animals and 47,81% of the subadult animals were killed during infantile and juvenile stages. Kill-off is indicated relatively early in our material for the TP and the PN—more than half of the teeth represent the earliest three age stages (Fig. 35).

The pattern observed in the TP and in the PN resembles the type of kill-off that might be expected in a domestic population, with few very young animals and few very old animals. However, in the MPPNB and LPPNB levels it looks as if animals mainly survive into later stages, which also corresponds with the above-mentioned pattern. In these two periods animals were mainly killed during the subadult stages.

[292] The other three levels can belong to two different levels.

[293] Grant 1982.

[294] Bull/Paine 1988:Tab. 6.

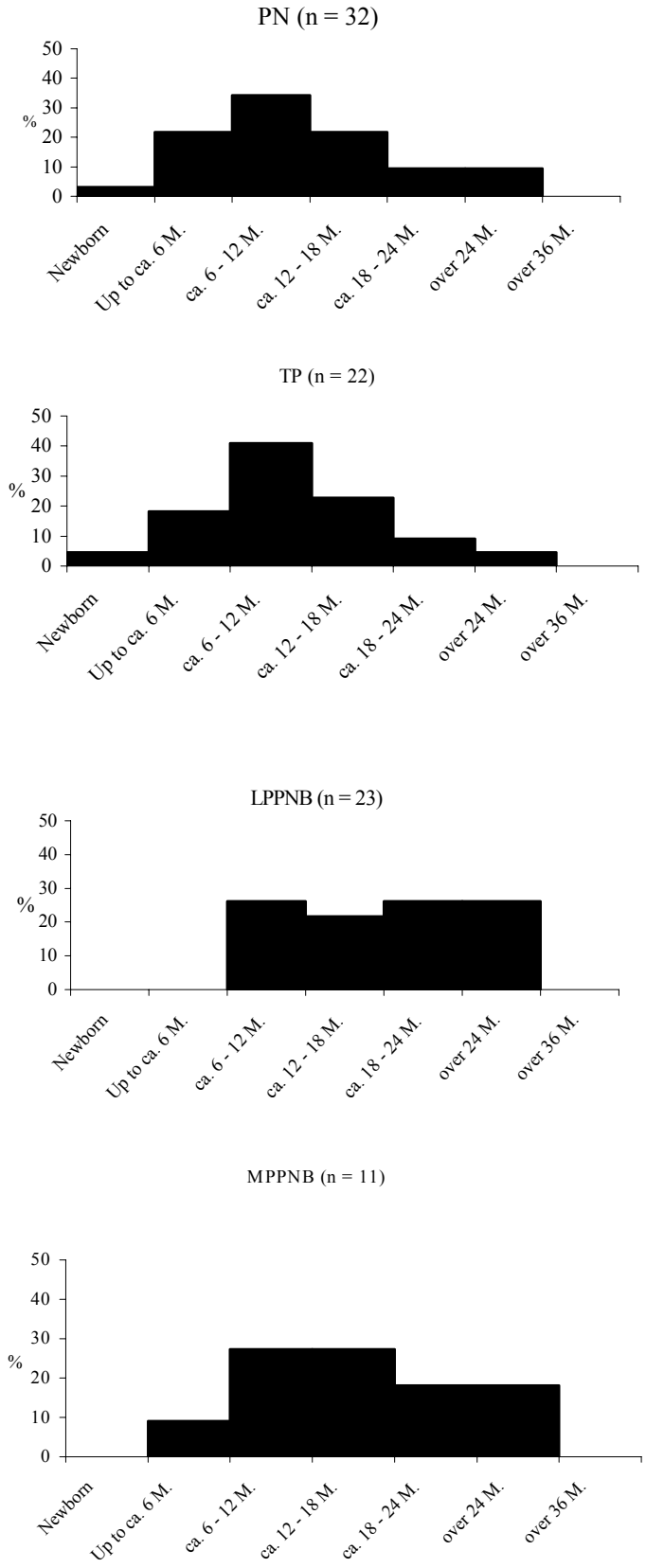


Fig. 35: Kill-off pattern for pig from four main levels based on tooth eruption and wear at Mezraa-Teleilat.

8.3. Middle- and Large-Sized Wild Mammals

8.3.1. Gazelle (*Gazella subgutturosa*)

According to the biogeography, only the goitered gazelle (*Gazella subgutturosa*) was present in the region around Mezraa-Teleilat. The distribution ranges from Persia (west and north) to the southern part of Central Asia, as well as to the lowlands and foothills in the north and eastern part of the Tigris, including Mesopotamia.[295]

While the goitered gazelles inhabit the semi-desert steppe of Persia and Mesopotamia, they live in Arabia mainly on the sand and gravel plains of the Arabian Plateau.[296] Gazelles in the northern part of their distribution area (Euphrates Valley) are smaller than those from the south (e. g., Ain Mallaha).[297]

Their habitat ranges from steppe to semi-desert areas. Gazelle remains are very common in the Upper Palaeolithic, in the Natufian and in the PPNA.[298] They are distributed in the southeastern part of Anatolia, open areas and steppes near the modern Syrian border. In Anatolia they appear from Çukurova to Cizre, but in the last 40 years they live only in protected areas, in the so-called "Ceylanpınar Gazelle Production Area".[299] They prefer milder steppe landscapes, sandy and low hilly areas, and places with widely spaced trees, without wadis and river banks.[300]

8.3.1.1. Number of Gazelle Bones

A total of 196 bones have been identified as *Gazella subgutturosa*. In the earlier periods they make up between 0,64% and 1,99% and increase later up to 6,72% in level II/III (TP and/or PN), to 3,31% in the PN. The result is very similar to the percentage of goats in the PN. More gazelle bones are observed in the PN than in earlier levels, but they do not play a significant part in the economy at Mezraa-Teleilat. This is an interesting point, as normally more

[295] Uerpmann 1987:98.

[296] Uerpmann 1987:98.

[297] Ducos 1968; Uerpmann 1987:100.

[298] Clutton-Brock 1981:170.

[299] Turan 1984:65; Turan 1988:70.

[300] Turan 1984:64.

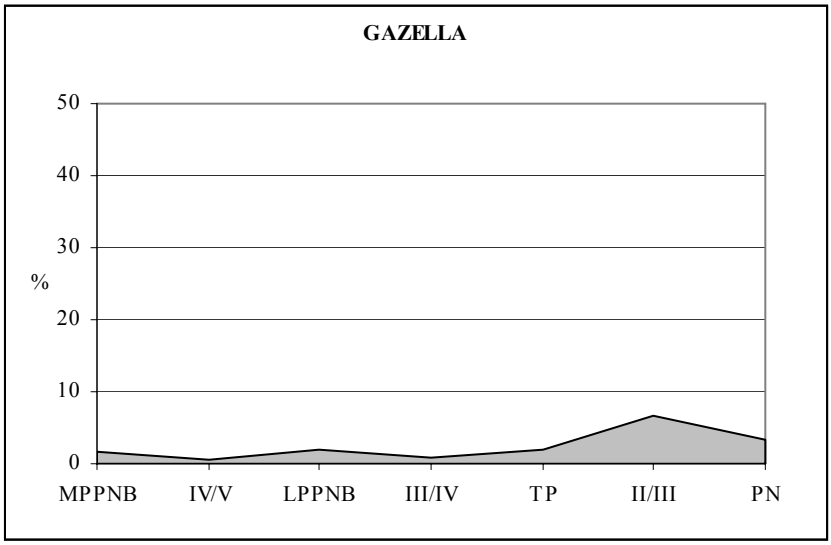


Fig. 36: Proportion of the gazelle in the number of identified animals in Mezraa-Teleilat.

gazelle bones were observed in earlier periods in the Near East. It seems they lost their importance in the time of animal domestication (Fig. 36; Plates 78–82).

8.3.1.2. Element Distributions

The gazelle remains consist mainly of the distal part of the scapula, humerus, tibia, calcaneus and phalanges. This is probably due to several factors; on the one hand, these elements are relatively easy to attribute either to gazelle or to any of the other small herbivores. On the other hand, these elements fuse earlier and have therefore a better chance of being preserved. The underrepresentation of the axial elements seems to be a result of the extreme difficulty in distinguishing vertebrae and costae between the various small herbivore species. The presence of almost all kinds of skeletal elements (especially in the PN), including the cranial elements, suggests that the gazelle carcasses were brought to the site intact, where they were further processed (Plates 83–84).

Head, forequarter (except ulna), hindfoot and foot remains are found in the assemblage, with far less examples of hindquarter (except tibia) and forefoot. Except for one axis, no other vertabra were identified from the LPPNB (for an explanation, see above; Fig. 37; Plates 83–84).

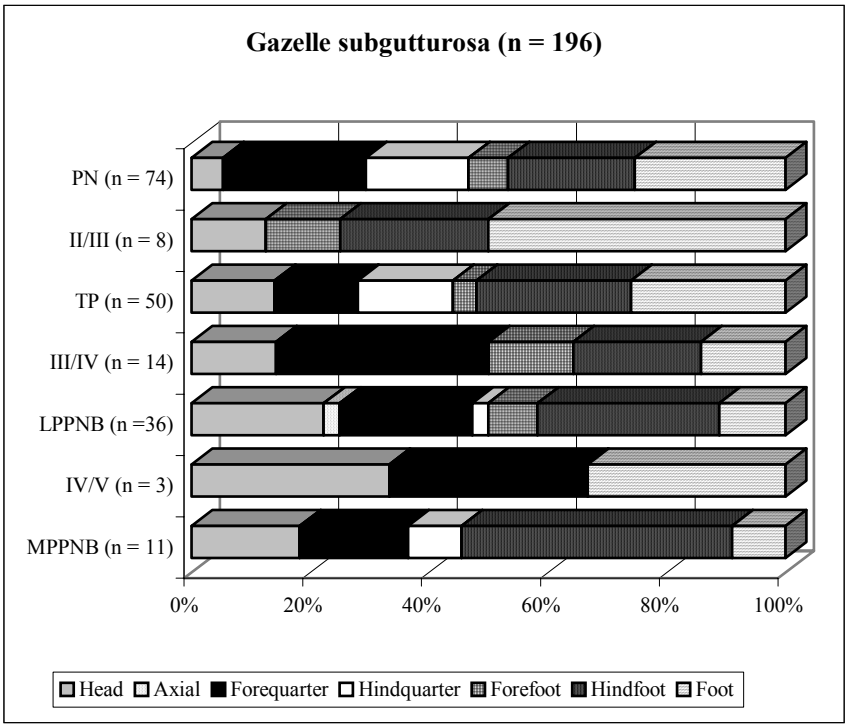


Fig. 37: Proportion of the skeletal parts of gazelle in different levels at Mezraa-Teleilat.

8.3.1.3. Sexing

In total, 15 horn fragments were identified, and none of them are complete. Only male *Gazelle subgutturosa* carry horns. Due to fragmentation, however, it is not possible to say how many individuals they represent, and what the ratios are to female specimens.

8.3.1.4. Size

The measurements of the gazelle remains from Mezraa-Teleilat were compared to a "standard animal" using the "log size index" method developed by R. Meadow and H.-P. Uerpmann[301], the measurements of a female *Gazelle subgutturosa* from Urfa in Southeast Turkey were used as the standard. This individual has been taken from the above-mentioned "Ceylanpınar

[301] Meadow 1983; Uerpmann 1978a-b and 1979.

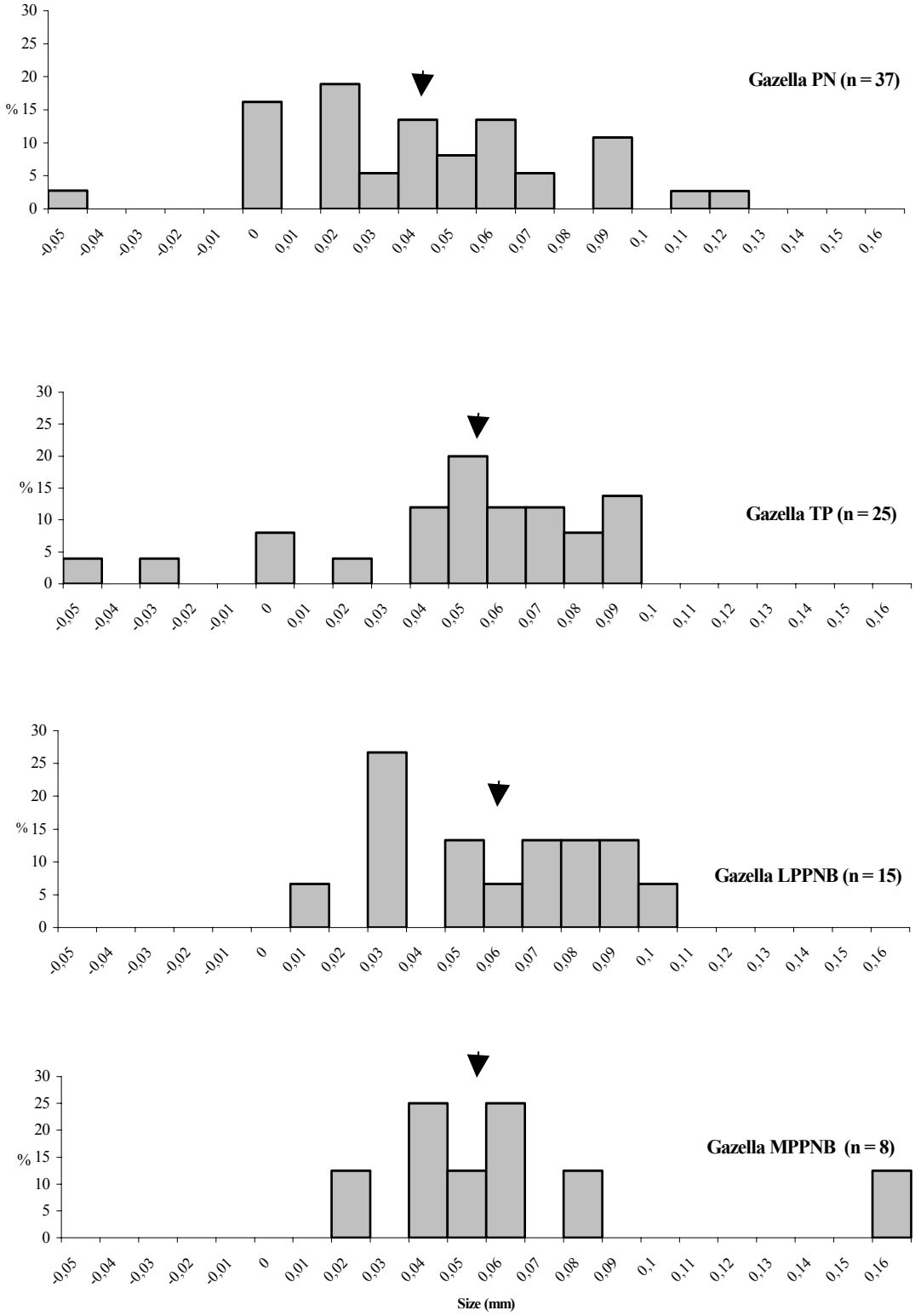


Fig. 38: Size index distribution for gazelle from Mezraa-Teleilat. The median value for each level is indicated by the arrow on the chart. The measurements of a gazelle from the Ceylanpinar-Şanlıurfa are used as the standard. Standard measurements are available in Appendix 2.

Production area for *Gazella subgutturosa*" and was prepared by the author.[302] The results are available in Appendix 2. Measurements from 85 bones are used for the log size index.

Nearly all specimens from Mezraa-Teleilat are larger than the female *Gazelle subgutturosa* used as the standard. Only two bones (distal metacarpal and calcaneum), both dated to the TP, are smaller. One of them is a distal metacarpal. The epiphyseal are not completely fused, indicating that it belongs to a juvenile individual. Another bone is an astragalus without signs of fusion. One more specimen, recovered from the PN levels, is smaller than the standard. This is a fused, anterior first phalange (Fig. 38). It seems, that a high percentage of male gazelles were hunted.

The breadth of the distal and of the trochea of the gazelle humerus is plotted in Figure 39. The modern female gazelle specimen number 2 from Urfa and the distal humeri from Tell Halula, Tell Sabi Abyad, Tell Sabi Abyad II, Mureybet and Shams ed-Din are also included in the figure. Generally, all measurements in this figure are similar and prove larger than those of a modern female gazelle.

As with the distal humerus, our astragalus measurements are larger than those of the modern female gazelles. Nine measurements from Mezraa-Teleilat are illustrated in Figure 40. The largest specimens belong to the LPPNB and to Tell Halula (PPNB). The smallest measurement comes from Tell Halula (PPNB). All of the specimens are larger than the modern sample and indicate similar ranges between the sites (Fig. 40).

The breadth of the proximal and the greatest length of the peripheral side of the Ph 1 from Mezraa-Teleilat are illustrated in Figure 41.

One specimen from Mezraa-Teleilat (PN) is smaller than our modern female gazelle. It is probably from a female. The largest measurements come from Tell Halula (PPNB) and from Mezraa-Teleilat (LPPNB). Most ph 1 bones are larger than the standard and quite similar to each other. Except for one measurement from Mezraa-Teleilat and another from Tell Halula, all probably belong to male specimens.

8.3.1.5. Kill-off Pattern for Gazelle

It was possible to study the age of death with specimens of five isolated teeth. The majority of animals were killed as adults. It is important to remember that the unfused elements are

[302] The bones are kept in the Prehistory Laboratory of İstanbul University, specimen number 2 (subadult or adult).

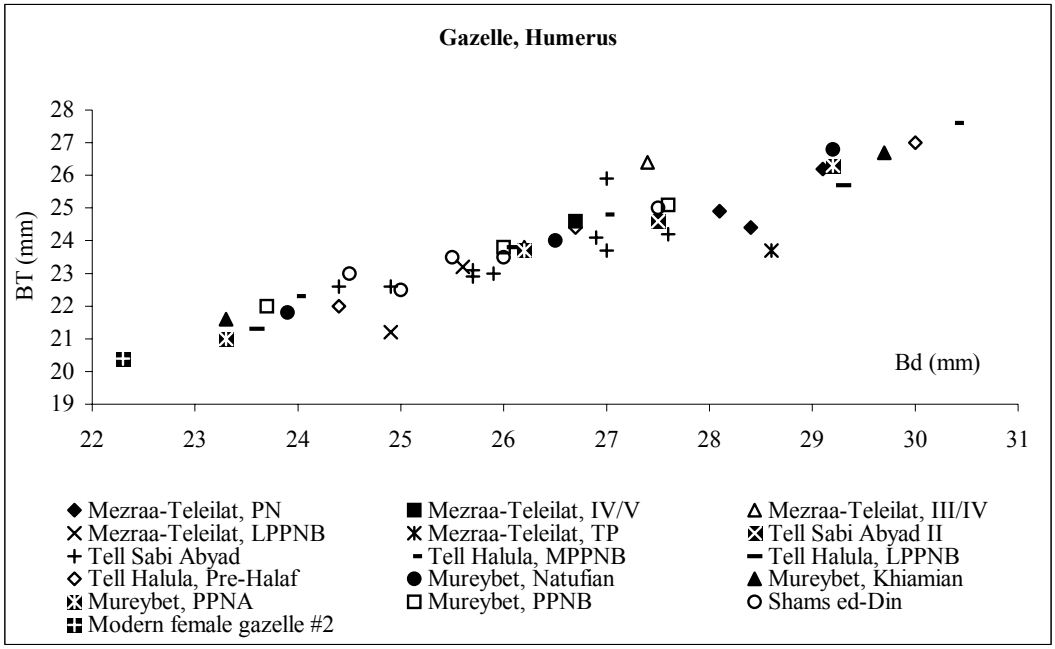


Fig. 39: Breadth of distal and breadth of trochea of gazelle humeri (BD-BT) from Mezraa-Teleilat, from a modern female (İstanbul University collection, specimen number 2) and Tell Halula (Saña Segui 1999), Mureybet (Ducos 1978b), Tell Sabi Abyad II (Cavallo 1996 and 2000), Shams ed-Din (Uerpmann 1982).

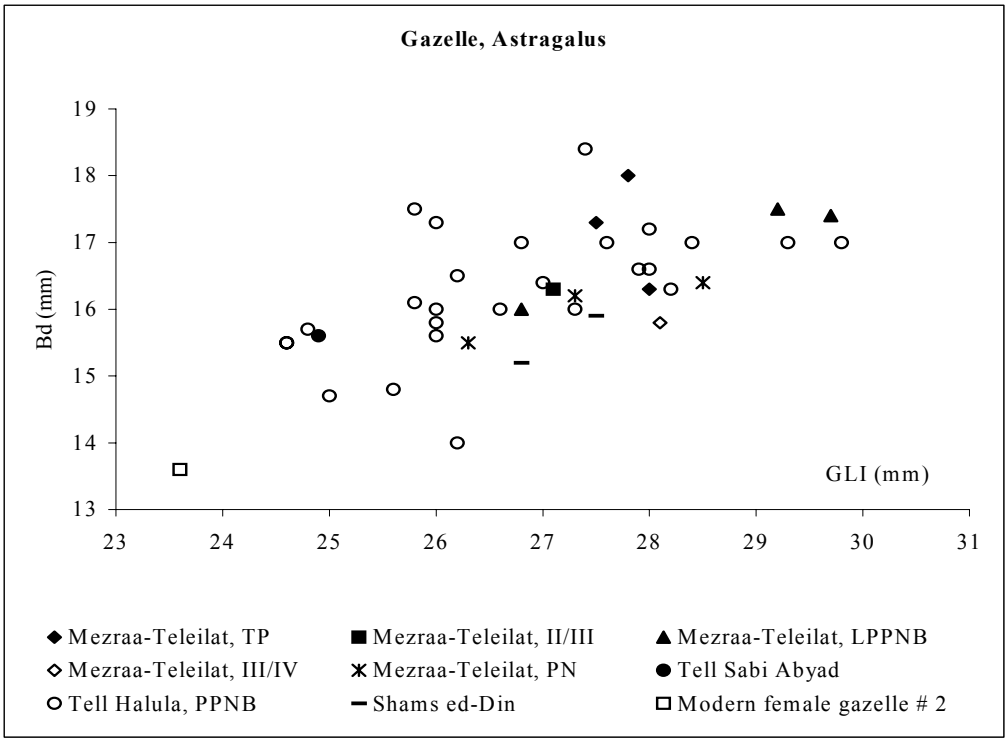


Fig. 40: Greatest length of lateral and breadth of depth of gazelle astragali (GLI-BD) from Mezraa-Teleilat, from a modern female gazelle (specimen number 2, Istanbul University collection) and from Tell Halula (Saña Segui 1999), Shams ed-Din (Uerpmann 1982), Tell Sabi Abyad (Cavallo 1996 and 2000).

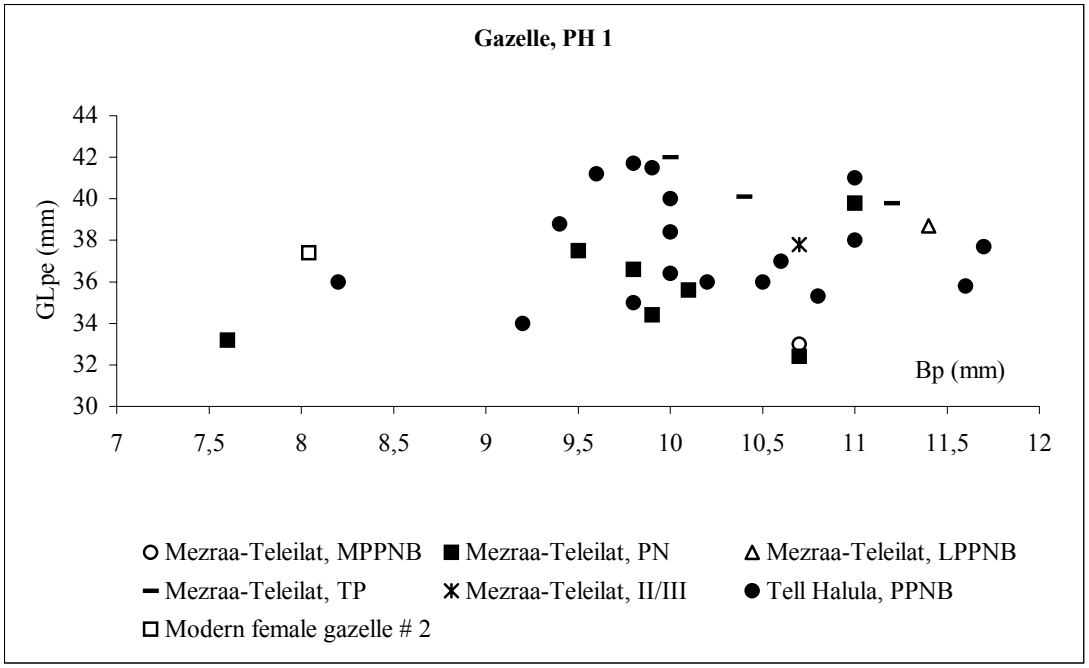


Fig. 41: Breadth of proximal and greatest length of peripheral of gazelle-ph 1 (Bp-Glpe) from Mezraa-Teleilat, a modern female gazelle (specimen number 2; İstanbul University collection) and from Tell Halula (Saña Segui 1999).

Level	Teeth
III/IV	- a maxillare dp4; heavy worn: Juvenile - a mandibular M3; moderate worn: Adult
LPPNB	- a maxillare M2; moderate worn: sub-adult - a mandibular PM; moderate worn: sub-adult - a mandibular M1; moderate worn: sub-adult

Tab. 24: Tooth wear of gazelle at Mezraa-Teleilat.

probably underrepresented because of a taphonomic loss or sampling bias.[303] Only five unfused bones were found: four distal metapodial and one distal femur. No proximal tibia or ulna, which fuse late, were observed. The data for the epiphyseal fusion are confirmed by the

[303] Unfused epiphysis has not been found and diaphysis can not be assigned to species.

data from the samples showing eruption. Furthermore we have only five isolated teeth. Three of them came from LPPNB and two from levels III/IV. Most of the isolated teeth belong to subadult individuals, with one from an adult and one from a juvenile individual (Tab. 24; Plate 85).

8.3.2. Red Deer (*Cervus elaphus*)

Red Deer (*Cervus elaphus*), living in the Middle East, has been identified as the Caucasian Red Deer, which is larger than the European subspecies. The distribution of the red deer in prehistoric times was much wider than today. They have been recovered from many excavations in Turkey, western and northern Iran, and in the eastern Taurus and in the western Zagros area. This species prefers mixed forests and forests with leafy trees as well as forests with open areas and meadows. They go up in to the highlands as far as the tree line during the summers. The nearest red deer habitats to Mezraa-Teleilat are the forests of the Binboğa Mountains in Kahramanmaraş.[304]

8.3.2.1. Number of Red Deer Bones

A total of 35 red deer bones have been identified among the material from our site. The percentage of red deer from the entire faunal assemblage lies between 0,21% to 0,84%, an important meat supply for the settlement.

They probably inhabited the Taurus forest. The human population of Mezraa-Teleilat would have had to walk a long way in order to hunt them. As with gazelle, red deer increases in the PN. This trend most likely is an indicator of which more often existed in the PN than in earlier periods.

There are also 16 specimens identified as Bos/*Cervus elaphus*. This group can be classified as belonging to red deer (Tab. 11).

[304] Turan 1984:50; Turan 1988:63.

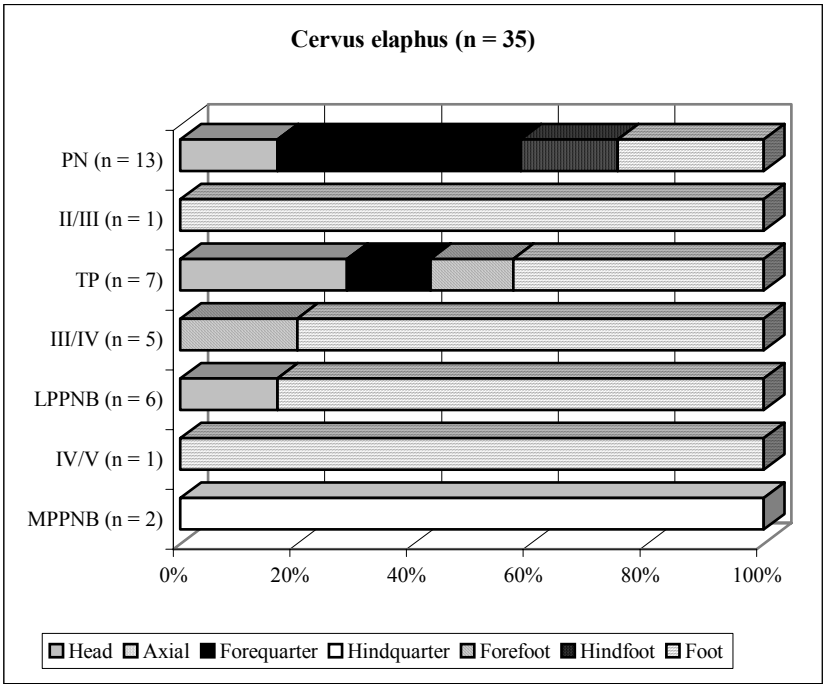


Fig. 42: Proportion of the skeletal parts of red deer in different levels at Mezraa-Teleilat.

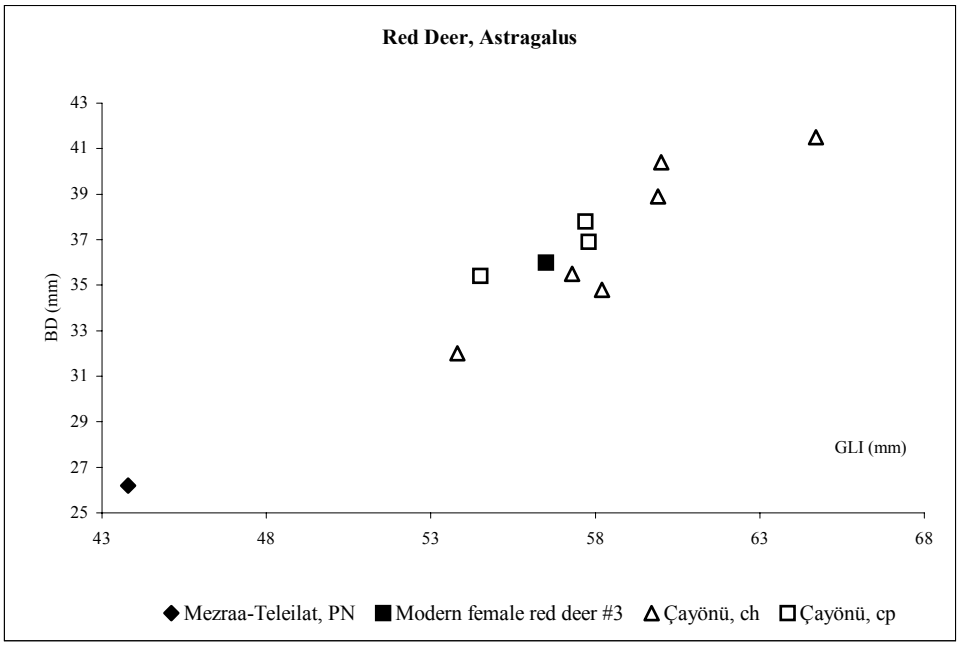


Fig. 43: Comparisons of greatest length and breadth of distal astragalus (red deer; GLI - BD): Mezraa-Teleilat, a modern female red deer (from İstanbul, red deer production area; specimen number 2 at the İstanbul University collection) and a sample from Çayönü (Ilgezdi 1999 and 2000).

8.3.2.2. Element Distributions

Foot bones are the most common remains. No axial bones were identified. Only six bones were found for the head category. Two of them belong to antler, one piece of antler and one large shed antler. In the category More phalanges and forequarters were found in the category Bos/red deer (Plate 86; Fig. 42).

8.3.2.3. Sexing

It is impossible to determine sex from the red deer remains. We have only two antler, one of a shed antler, the other a fragment.

8.3.2.4. Size

Twenty-seven red deer bones were measured. Most of them are phalanges. The results from Mezraa-Teleilat were compared to a modern female red deer from Anatolia (specimen number 1 in the collection of the İstanbul University, Prehistory Department Laboratory). Due to the small number we could not use the log size index method.

The greatest length of the lateral side and the breadth of a distal astragalus (GLI - BD) from Mezraa-Teleilat (Fig. 43) were compared to a modern female red deer (from the İstanbul red deer production area; specimen number 2 at the İstanbul University collection) and to remains from Çayönü. Only one specimen in this chart (from Mezraa-Teleilat, PN) is smaller than the modern female red deer. This specimen probably belongs to a subadult individual. The largest measurements come from Çayönü (channelled building subphase). Mostly the astragalus bones are generally larger than the standard, while some measurements are very near to it and just a few are smaller than the standard.

8.3.2.5. Kill-off Pattern for Red Deer

Since red deer teeth are rarely encountered in the faunal assemblage from Mezraa-Teleilat, the kill-off patterns are investigated based on the state of epiphyseal fusion of long bones. It is

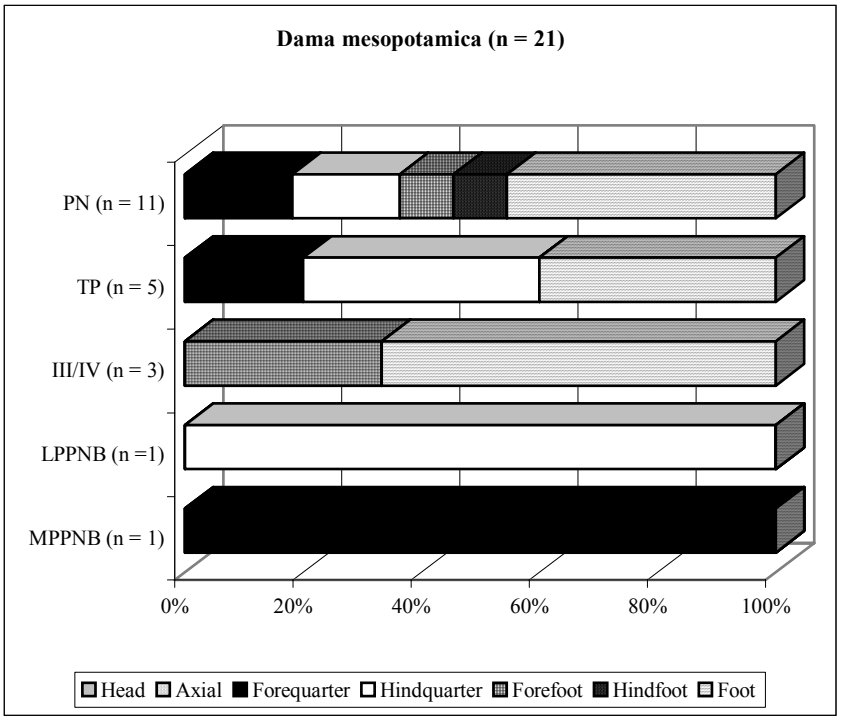


Fig. 44: Proportion of the skeletal part of fallow deer in different levels at Mezraa-Teleilat.

remarkable that the number of samples are very small in all levels. Only eight specimen could be used for evaluating the kill-off patterns for red deer. However, all bones are fused, though we should note here that these bones fused as early as the subadult age. There is only one specimen that fused in the adult stage. Because of this we assume that subadult or adult red deers were more often hunted at the site.

Only three isolated teeth were recovered. Their wear patterns are listed below:

From the LPPNB: a maxilare M1: moderate worn

From the PN: a maxilare dp4: heavy worn

a maxilare M1: moderate worn

These isolated teeth indicate juvenile and subadult individuals. The result of tooth wear stages also is compatible to the fusion of the epiphyseal of the long bones.

8.3.3. Fallow Deer (*Dama mesopotamica*)

Two species of fallow deer live in the Near East. One is the European fallow deer (*Dama dama*), widespread in Central and Western Europe and in the Mediterranean countries. *Dama dama* found also in the western and southern Anatolia. Prof. Uerpmann mentioned that the Taurus is the northeastern border of the *Dama dama*.[305]

The second species is the Mesopotamian fallow deer (*Dama mesopotomica*): it is larger than the *Dama dama*, but what distinguishes it from the Dama dama is the shape of the antlers. The antlers of *Dama mesopotomica* are not palmate distally, but are flattened in their basal part and have a smaller brow tine.[306]

According to Uerpmann, The Taurus and the Zagros mountains were the northern limits for *Dama mesopotamica*. The southern boundary of the earlier distribution of *Dama mesopotamica* was the Euphrates Valley.[307] Today, *Dama dama* lives in the Antalya Düzlerçamı region in a special protective area (southern Turkey).[308] We have, due to biogeographical reasons, only *Dama mesopotamica* at Mezraa-Teleilat.

8.3.3.1. Number of Fallow Deer Bones

A total of 21 bones were identified as *Dama mesopotamica* at Mezraa-Teleilat. Again, as with other wild animals, the number of *Dama mesopotamica* bones increased among the PN specimens. We think that this trend is related to the increasing number of identified animals in the PN. But dama was not a relevant part of the subsistence economy of the site. Their percentage within the assemblage is under 1% at the settlement even in the PN (Tab. 11).

8.3.3.2. Element Distributions

Tibia, scapula, ulna, metapodial, phalanges were all recovered. Scapula and tibia have an especially high meat value as opposed to metapodial and phalanges. No examples of antler,

[305] Uerpmann 1987:58.

[306] Uerpmann 1987:58.

[307] Uerpmann 1987:63.

[308] Turan 1983:53; Turan 1988:66.

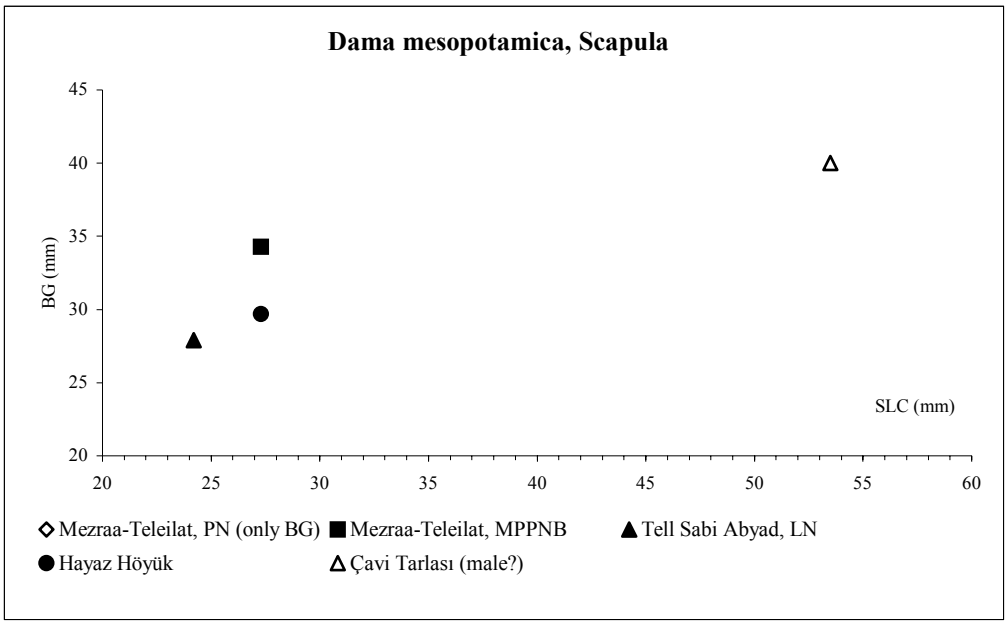


Fig. 45: Smallest length of the column and breadth of glenoid of the Mesopotamian fallow deer scapula (SLC-BG) from Mezraa-Teleilat, from Tell Sabi Abyad (LN; Cavallo 1996 and 2000), Hayaz Höyük and Çavi Tarlası (Cavallo 1996).

skull and axial part of the body are available. This is probably an indication that the hunted animals were butchered at the kill sites, away from the settlement area. Only the parts of the body with rich meat content were brought back to the settlement (Plate 87; Fig. 44). Phalanges and metapodials could be left attached to the body part when carrying the meat back to the site ("Schlepp effect").

8.3.3.3. Sexing

We have no evidence for a sex determination of *Dama mesopotamica*.

8.3.3.4. Size

Nineteen bones of *Dama mesopotamica* could be used for measurements. The smallest length of the column and the breadth of the glenoid of a scapula from Mezraa-Teleilat are plotted in

Figure 45. The scapula measurements from Tell Sabi Abyad (LN), Hayaz Höyük and Çavi Tarlası are also plotted in the same figure and compared to each other.
Except for one specimen from Çavi Tarlası, all measurements in the figure are quite similar. Only one specimen from Çavi Tarlası is larger than the other specimens, probably indicating that it comes from a male animal.

8.3.3.5. Kill-off Pattern for Fallow Deer

Seventeen bones could be used to determine the kill-off pattern for *Dama mesopotamica* at the site. Only two unfused proximal ulna (from the TP and PN) and first proximal phalange that are not completely fused (epiphseal lines) were observed in the PN. All remaining fallow deer bones were fused and belong to adult specimens. A kill-off pattern based on the epiphyseal stage of long bones demonstrates that adult fallow deer were mainly killed by the Teleilat people.

8.3.4. Half Ass (*Equus hemionus*)

Two different equus species exist in this region. The most common species is the wild half ass *Equus hemiones*. The second is *Equus africanus* with a distribution stretching into northern Syria, but not into the Birecik region. The Syrian onager is now extinct. It was the smallest of the hemiones and inhabited the Near East from the Levant to Iraq.[309] *Equus hemionus* is a larger subspecies. According to Uerpmann, hemiones were the most important wild equids in the Euphrates Valley and in areas north of the Euphrates.[310] Hemiones prefer steppe landscapes and deserts, but not stony areas. Mureybit and Shams ed-Din (both in Syria) contain a high quantity of hemiones bones. Due to biogeographical reasons and also due to the size of the equid bones, we think that we have only hemiones at Mezraa-Teleilat. Generally, equid species can be distinguished from each other on the basis of the size and the enamel patterns of the cheekteeth.[311] We have a total of eight isolated teeth. Four of these are measurable, others fragmented (Plate 88A).

[309] Clutton-Brock 1981:93-94.

[310] Uerpmann 1987:22.

[311] Uerpmann 1987:19.

HALF ASS, *Equus hemionus*				
	TP		PN	
Element	**N**	**%**	**N**	**%**
Teeth	-	-	9	25,7
other vertebrae			1	2,9
Scapula	-	-	1	2,9
Metacarpal			4	11,4
ph 2 ant.	-	-	1	2,9
Pelvis	-	-	1	2,9
Femur	-	-	1	2,9
Tibia	1	50	3	8,6
Metatarsal			1	2,9
unident. Metapodial	-	-	2	5,7
ph 1 ant./post.			8	22,9
ph 2 ant./post.			1	2,9
ph 3	1	50	2	5,7
Total	**2**	**100**	**35**	**100,1**

Tab. 25: Element distribution for *Equus hemionus* from Mezraa-Teleilat.

8.3.4.1. Number of Half Ass Bones

A total of 37 bones have been identified as *Equus hemionus.* Half ass was observed only in the later periods (TP and mostly in the PN; Plates 88–89).

Most of the samples were collected from pits and collecting units. No *Equus spec.* has been found inside of the buildings.

8.3.4.2. Element Distributions

All teeth and phalanges (35 specimens) were collected in the PN. Only one prx. tibia and a nearly complete ph3 were observed in the TP (2 specimens; Fig. 46; Tab. 25). In addition, one completely fused cervical vertebra was also identified as *Equus spec.*

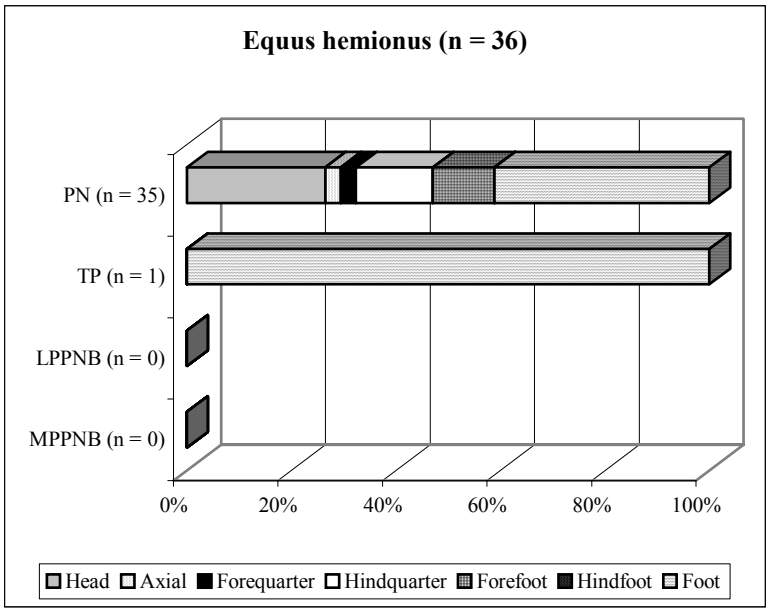


Fig. 46: Proportion of the skeletal parts of half ass in the different levels at Mezraa-Teleilat.

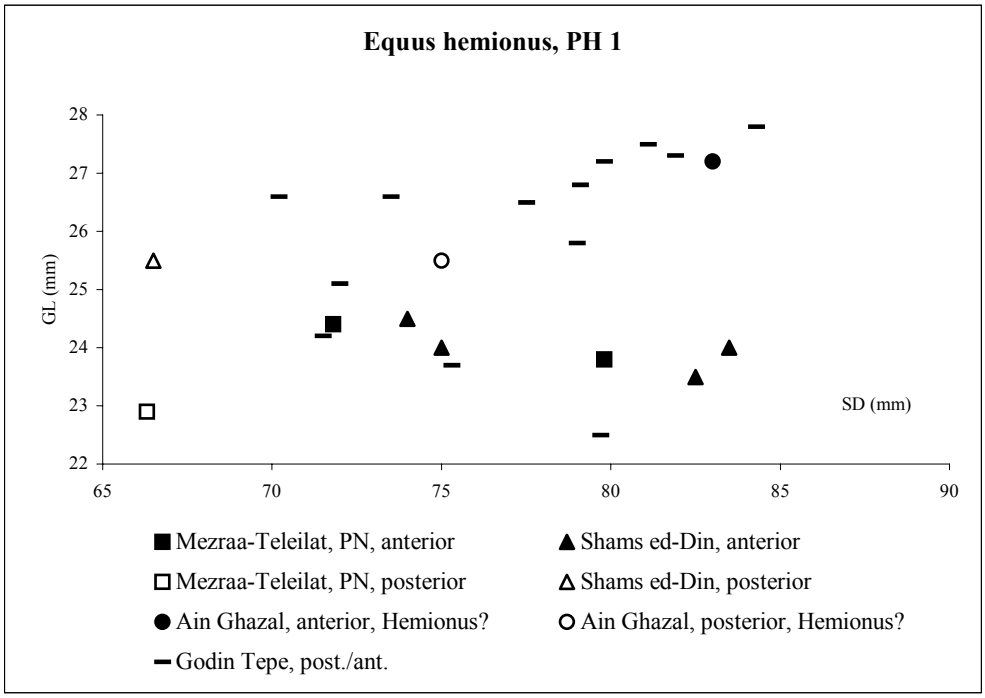


Fig. 47: Scatter diagram of shaft width (SD) versus greatest length (GL) of the first phalanges of the equids from Mezraa-Teleilat, Shams ed-Din (Uerpmann 1982), Ain Ghazal (von den Driesch/Wodtke 1997) and Godin Tepe (Gilbert 1991).

Element	Measurement	N	Mean	Max.	Min.
Metacarpus	Bp	2	-	43,1	42,8
Tibia	Bd	3	55,2	58,4	42,6
Metatarsal	Bp	1	41,2	-	-
Metapodial	Bd	1	38,1	-	-
Phalange I	SD	5	22,9	24,4	21,4
Phalange II	Bp	1	39,3	-	-
M^1	L	4	28,2	33	22,3
M_1	L	1	24,2	-	-

Tab. 26: Summary of the *Equus hemionus* measurements from Mezraa-Teleilat.

8.3.4.3. Sexing

There is no evidence available for determining sex.

8.3.4.4. Size

A total of 23 *Equus hemionus* bones have been measured. The greatest length and the smallest depth of ph 1 have been compared to Shams ed-Din, Ain Ghazal and Godin Tepe (see Fig. 47, Tab. 26). The smallest specimens came from Mezraa-Teleilat (PN level) and Shams ed-Din. The largest specimen belongs to Godin Tepe. Mezraa specimens are quite similar to those from the other sites.

8.3.4.5. Kill-off Pattern for Half Ass

Only eight bones could be used to determine age. Although only one unfused proximal second phalange exists from the PN, other specimens found in the PN belong to adult individuals. The kill-off pattern for half ass focused on adult animals at the site.

8.4. Small-Sized Wild Mammals

8.4.1. Fox (*Vulpes vulpes*)

Vulpes vulpes can live in various habitats. Generally they prefer arid areas with trees as well as land covered with heath and meadows, as well as steppe, highlands and wide agricultural areas (up to 2.500 m high). Foxes are distributed widely throughout Turkey.[312]

8.4.1.1. Number of Fox Bones

A total of twenty fox bones have been identified. Between 0,15% to 0,27% Foxes were observed in different periods at Mezraa-Teleilat (most fox bones came from the LPPNB). They do not play an important role in the subsistence economy of the site (Tab. 11; Plate 90, A and D).

8.4.1.2. Element Distributions

No forefoot, hindfoot and foot bones were found. Only five vertebrae (III/IV and PN), as well as a sacrum (PN), four frequarter, five hindquarter, a skull fragment, two mandibula and two teeth were identified as fox (Fig. 48; Plate 91).

8.4.1.3. Sexing

Unfortunately, no information was uncovered to determine the sex of the remains.

8.4.1.4. Size

In total, four fox bones could be measured (scapula, distal tibia, distal humerus and two distal femur). Distal humerus measurements of fox were compared to finds from Ain Ghazal,

[312] Turan 1984:88-89.

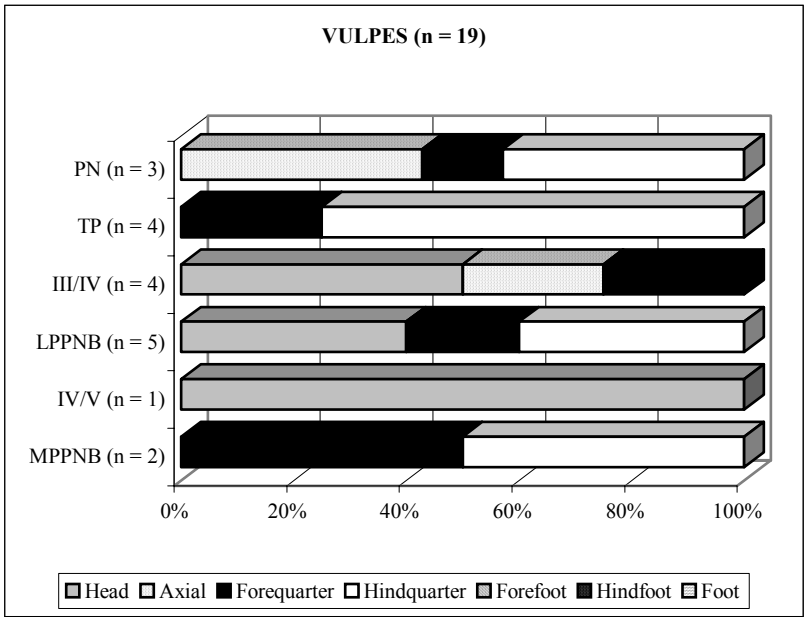


Fig. 48: Proportion of the skeletal part of fox in different levels at Mezraa-Teleilat.

Tell Halula and Tell Sabi Abyad. Only one specimen (from the MPPNB period; only Bd) from Mezraa-Teleilat was plotted to in Figure 49. This specimen is slightly larger than the others (Table 27 and Fig. 49). In Table 27 several tibia, scapula and femur measurements were compared to Mezraa-Teleilat, Tell Halula, and Tell Sabi Abyad. A scapula measurement from Mezraa-Teleilat (III/IV) and a humerus are slightly larger than the samples from Tell Halula (Tab. 27).

8.4.1.5. Kill-off Pattern for Fox

Eight bones could be evaluated for ageing:

- Caninus: Moderate worn
- three distal femur: Fused
- a distal humerus: Fused
- a distal tibia: Fused
- two prox. femur Fused
- a cervical vertebra: Unfused

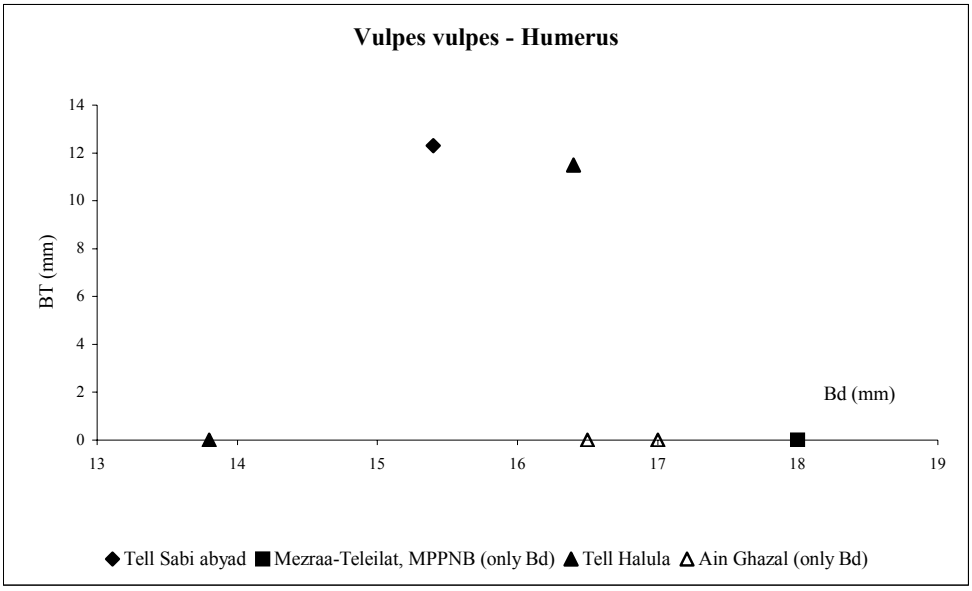


Fig. 49: Breadth of distal and breadth of throclea of fox humeri (Bd-BT) from Mezraa-Teleilat, Tell Sabi Abyad (Cavallo 1996 and 2000), Ain Ghazal (von den Driesch/Wodtke 1997) and Tell Halula (Saña Segui 1999).

The list above illustrates that all specimens belonged to adult individuals. Vertebrae are unfused, but they fuse very late in age.

8.4.2. Hare (*Lepus capensis europeus*)

Hare is widely distributed throughout the world. Their habitat is varied, but they show a preference for flat areas and terrain near cultivated land; rarely do they live in coniferous woodlands.[313] Hare can live in steppes and near to marshy areas.[314]

[313] Boitani/Bartoli 1983:137.

[314] Turan 1984:108.

Settlements	*Measurements*			
	Humerus			
	Bd	**BT**		
Tell Sabi Abyad	15,4	12,3		
Mezraa-Telelat, MPPNB	18,0	-		
Tell Halula	13,8	-		
	16,4	11,5		
	Tibia			
	Bd	**Dd**		
Mezraa-Teleilat, LPPNB	12,3	8,5		
Tell Halula	12,0	7,8		
	12,8	9,2		
	Scapula			
	SLC	**GLP**	**LG**	**BG**
Mezraa-Teleilat, III/IV	14,5	16,1	13,9	8,8
Tell Halula	13,2	14,8	12,8	8,9
	Femur			
	Bd	**BTP**		
Mezraa-Teleilat, TP	17,4	5,6		
Mezraa-Teleilat, TP	-	6,4		
Tell Halula	17,2			

Tab. 27: Fox bone measurements from Mezraa-Teleilat and from other settlements.

8.4.2.1. Number of Hare Bones

Nineteen fragments of *Lepus capensis* were identified, with most of them dated to the TP. Hare, like foxes, are not common animals at Mezraa-Teleilat (Tab. 11; Plate 90B and C; Plate 93C).

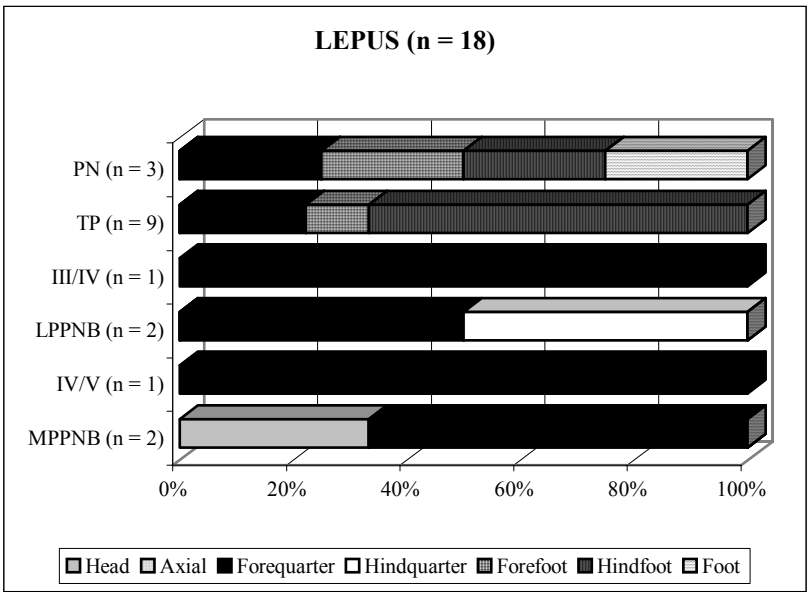


Fig. 50: Proportion of the skeletal parts of hare in different levels at Mezraa-Teleilat.

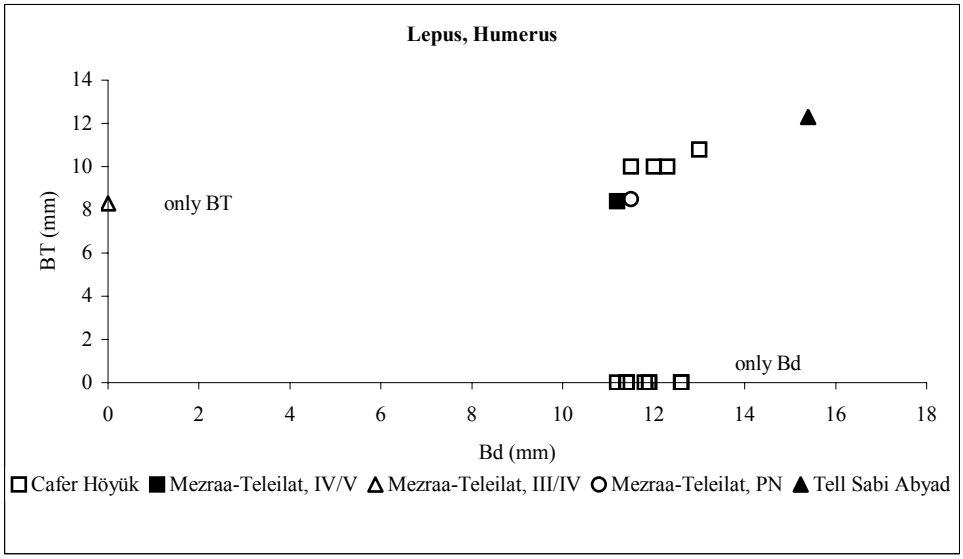


Fig. 51: Breadth of distal and breadth of trochlea of rabbit humeri (Bd-BT) from Mezraa-Teleilat, Tell Sabi Abyad (Cavallo 1996 and 2000) and Cafer Höyük (unpublished measurements).

BADGER, *Meles meles*	LPPNB		TP	
Element	**N**	**%**	**N**	**%**
Mandibula	1	100,0	-	-
Humerus	-	-	1	50,0
Ulna	-	-	1	50,0
Total	**1**	**100**	**2**	**100**

Tab. 28: Element distribution for badger.

Ulna	DPA
Mezraa-Teleilat, TP	19,2
Tell Halula	16,6

Tab. 29: Ulna measurements from *Meles meles*.

8.4.2.2. Element Distributions

Metapodial, ulna, humerus, scapula, and pelvis were observed at Mezraa-Teleilat (Fig. 50; Plate 91). The most common skeletal part is the metapodial (10 specimens).

8.4.2.3. Sexing

Unfortunately we lack the proper finds for determining the sex of the animal remains.

8.4.2.4. Size

Only twelve rabbit bones were measurable. All measurements are available in Appendix 1. In Figure 51 Breadth of distal and breadth of trochlea of hare humeri (Bd-BT) from Mezraa-Teleilat are compared to Tell Sabi Abyad[315] and Cafer Höyük (unpublished measurements).

[315] Cavallo 1996 and 2000.

Although one specimen from Tell Sabi Abyad is larger, the Cafer Höyük and Mezraa-Teleilat specimens are similar in their size.

8.4.2.5. Kill-off Pattern for Hare

All bones are fused and only one mandibular first molar is highly worn. These results indicate adult hares.

8.4.3. Badger (*Meles meles*)

Badgers are carnivores that belong to the Mustelidae family. Their distribution stretches over Eurasia except for the northernmost regions of Asia and areas bordering India. Badgers prefer woodlands, rocky areas, sometimes high altitudes (up to 2.000 m), areas near to fields and meadows, steppes or half steppes, and mountain areas.[316]

8.4.3.1. Number of Badger Bones

Only three badger bones were identified. They came only from the LPPNB and TP (Tab. 11; Plate 92).

8.4.3.2. Element Distributions

A mandibular fragment, a distal fused humerus and also one prx. ulna are included (Tab. 28) in the assemblage.

8.4.3.3. Sexing

We lack the finds for determining the sex of the badger remains.

[316] Boitani/Bartoli 1982:281; Turan 1984:90.

8.4.3.4. Size

Two hare bones have been measured. The DPA measurement of the ulna from the TP is compared to Tell Halula in Table 29. Our specimen is larger than that from Tell Halula (Tab. 29).

8.4.3.5. Kill-off Pattern for Badger

A distal humerus and a proximal ulna are fused. Also, a second mandibular molar is slightly worn. However, the distal humerus fused in early stages and the ulna slightly later. All specimens probably belonged to adult animals.

8.5. Very Small-Sized Wild Animals

8.5.1. Iltis (*Mustela putorius*)

Only one skull fragment could be identified. It belongs to the MPPNB (Tab. 11).

8.5.2. Birds

Only four different bird species were observed.

***Mergus merganser*.** These birds are winter visitors (in small numbers) to Turkey, Iran and Iraq. They are vagrants in Cyprus, Israel, and northeastern Africa. They prefer to live near large rivers, lakes, and reservoirs.[317]

***Corvus frugilegus*.** They are mainly resident birds. They pass through Turkey during the winter, traveling up to southwestern Iran and southern Iraq, Syria, occasionally Cyprus and

[317] Hollom/Porter/Christensen/Willis 1988:47; Kiziroğlu 1989:37.

BIRDS, Aves spec.						
	LPPNB		**TP**		**PN**	
Element	**N**	**%**	**N**	**%**	**N**	**%**
Humerus	-	-	-	-	1	16.66
Ulna	1	16,7	1	20	-	-
metacarpal	1	16,7	-	-	-	-
Femur	1	16,7	-	-	-	-
metatarsal	1	16,7	-	-	1	16.66
unidentified	2	33,3	4	80	2	33.33
Coracoid	-	-	-	-	2	33.33
Total	**6**	**100,1**	**5**	**100**	**6**	**100**

Tab. 30: Element distribution for birds in Mezraa-Teleilat.

Israel. They are in Egypt and vagrants in Algeria and Kuwait. They inhabit agricultural land with trees. Their nests and roosts are in colonies of threes.[318]

***Corvus corone* (Hooded crow)**. They are mainly resident, with a wide range of habitats, notably open country with scattered trees, edges of woods, parks and towns. Their nests are in trees, sometimes on cliffs.[319]

***Gypaetus barbatus* or *Gyps fulvus*, *Griffon vulture*.** Their size range is between 68.4 cm – 73.5 cm (male) and 69 cm – 75 cm (female). Their life expectancy is ca. 34–37 years, but one specimen reached 117 years. As scavengers[320], they come in the summer for breeding near the Birecik area. Generally they prefer rocky and mountainous areas. Their nests are in rocks and in colonies. The species decreased in number by poisoned meat left for wolves. These birds are local in the Taurus region, and in the East Black Sea mountain areas.[321]

8.5.2.1. Number of Bird Bones

A total of 27 bird bones have been identified at the site, 75% of them are just small long bone bones and could not be more precisely determined. More corvus species (six bones) have been

[318] Hollom/Porter/Christensen/Willis 1988:227; Heinzel/Fitter/Parslow 1995:324.

[319] Hollom/Porter/Christensen/Willis 1988:227; Kiziroğlu 1989:63; Heinzel/Fitter/Parslow 1995:324.

[320] Kiziroğlu 1989:38.

[321] Heinzel/Fitter/Parslow 1995:88.

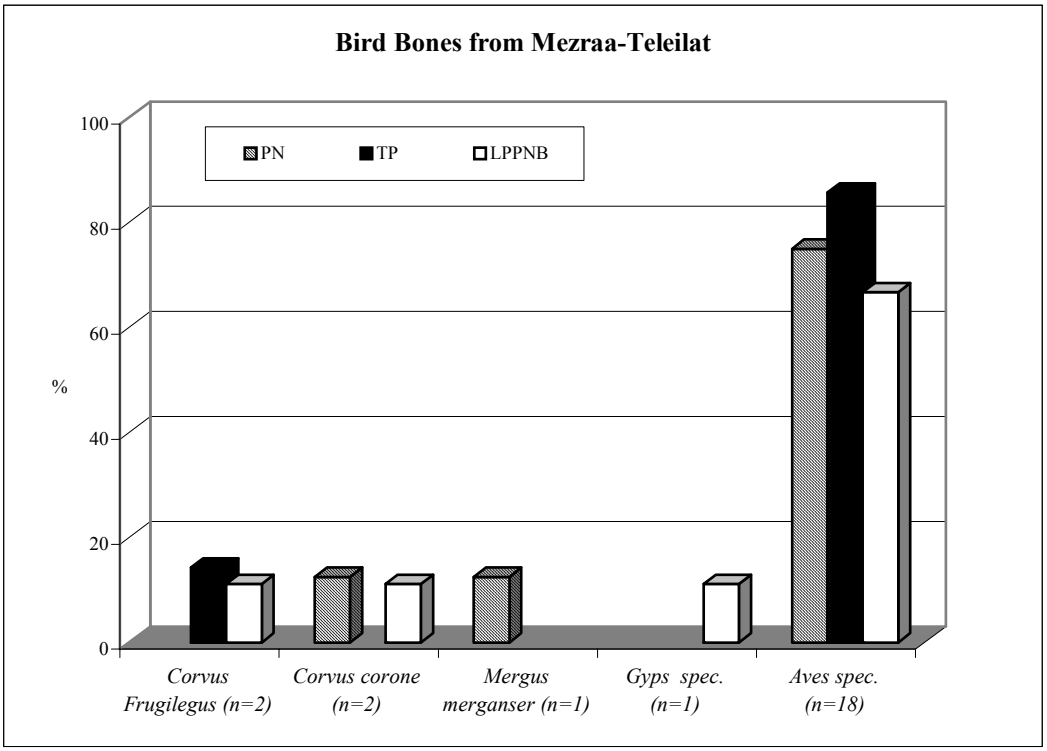


Fig. 52: Distribution of bird species in different levels at Mezraa-Teleilat.

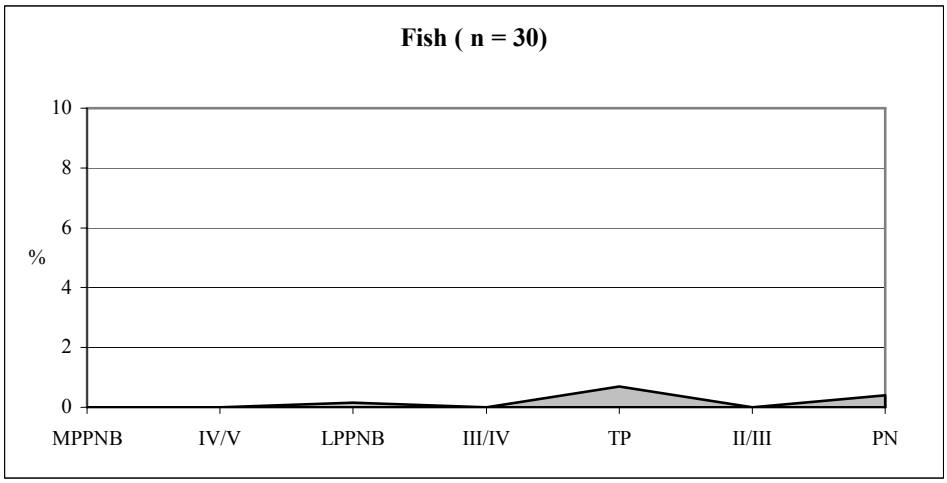


Fig. 53: Proportion of the fish bones in the number of identified animals in Mezraa-Teleilat.

recovered and one bone from a duck. The most interesting bird bone is a metapodial of a gyps species. Bird bones were collected from three different levels. Nine bones could be identified: a crocoid of a duck (*Mergus merganser*), a metatarsal and a metacarpal from crow (*Corvus corone*), two ulna of a crow (*Corvus frugilegus*) and a metatarsal of a gyps (*Gyps species*). The surface of the gyps bone is polished (there are some lines on it), which suggests that this bone was used as a tool. Also a bone of *Corvus frugilegus* is burnt black (Tab. 11; Fig. 52; Plate 93,B).

8.5.2.2. Element Distributions

Eight bird bones could not be attributed specifically to skeletal part. Coracoid, humerus, ulna, metapodial and femur (Tab. 30) were observed at the site.

8.5.2.3. Kill-off Pattern for Birds

All bird bones are fused, therefore originating from adult individuals.

8.6. Fish Bones

A total of thirty fish bones were recovered, though none could be identified to species (Tab. 11; Plate 94).

The soil was sieved during excavation, and also a large amount of soil was sieved from different levels for botanical samples with wet flotation. But no micro-animal remains and also no fish bones were found by dry or wet sieving. It seems that fishing was not so important, maybe they had enough domestic animals (Fig. 53).

Fish bones could not be identified to species. But we know that *Glyptathorax kurdistanicus*, *Glyptathorax armeniacus*, *Barbus capito pectoralis*, *Barbus subquincinsynatus*, *Salmo trutta macrostigma*, *Salmo trutta*, *Cypinus carpio*, *Alburnoides bipuuctatus*, *Leiciscus cephalus*, *Parasilurus triotegus*, *Turcine macheilus kosswigi* and 32 other species live still today in the Euphrates region.[322]

[322] Banister 1980.

FISH, *Pisces spec.*								
	PN		TP		LPPNB		MPPNB	
Element	**N**	**%**	***N***	**%**	**N**	**%**	**N**	**%**
other vertebrae	9	100	18	100	3	-	-	-
Total	**9**		**18**		**3**			

Tab. 31: Element distribution for fish.

TURTLE, *Testuninae spec.*										
	PN		TP		LPPNB		MPPNB		IV/V	
Element	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Humerus	-	-	2	100	-	-	-	-	1	100
Total	**-**	**-**	**2**	**100**	**-**	**-**	**-**	**-**	**1**	**100**

Tab. 32: Element distribution for turtle.

All the fish bones are vertebrae with a radius between 1,0 cm – 1,5 cm (Table 31).

8.7. Reptile Bones

Only tree turtle humeri are part of the assemblage (from the TP and PN). All are fused. This subspecies is probably *T. graeca ibera*, which is common in Turkey today (Tab. 32).

9. ANIMAL SKELETONS AND THE BUILDINGS

Some animal skeletons have been found *in situ* inside of the buildings. They are clear evidence that animals were kept at the site. In this chapter we will look in more detail at these skeletons and their orientation.

9.1. Pig Skeletons

Five pig individuals were found inside of building AY in Trench 21H (Plate 95). This building has a northeast-southwest orientation and consists of a space measuring 5,5 m x 2,3 m with walls of two rows of stones. The southwest part of the building is disturbed. Although the north wall had been destroyed by a pit, traces of a wall were observed that show the continuation of the building in south-west direction. In the nort another part of wall was noted running parallel to this room. Small stones covering the room.

Most of the bones were unfused and all were burnt entirely gray. Because of this, the bones are very fragile. Also, the unfused and burnt bones could not be measured.

Skulls of subadult individuals (ca. 2 years and ca. 1 year old) show morphologically a wild pig character. But as mentioned earlier, morphological transpire takes over a long period of time. Therefore, the pig individuals were probably domesticated. Some bones – generally very small bones such as carpals, etc. – are absent. This circumstance is related to their fragile conditions (Plate 96).

M. Özdoğan believes that this house was a dwelling. Building AY consists of only one room lying in a northeast-southwest direction. It was completely burnt; the inner part is full of burnt mudbrick and floor pieces. He suggests that the floor pieces do not belong to this room, but to the upper floor and later fell down into the room from above. This dwelling room was probably used as a cellar. Pig skeletons were found under the floor pieces, dusty mudbrick and ashy filling.

Burnt bones are in a very poor state of preservation. The skeletons belong to a subadult, two juvenile and two infantile individuals. Due to the position of the finds, we think that they were penned in this small room, which collapsed due to a fire. Another possibility could be that they were killed at an earlier point and then left on the floor of the building, possibly for cultic reasons. Then they burnt them accidentally or consciously together with the building. The first suggestion seems more plausible. Such intentional burning is observed several times in the

IIC period of the PN at Mezraa-Teleilat. The presence of some animal skeletons inside of the houses (pig and three goat skeletons) has led M. Özdoğan to conclude that we are looking at a "building cult" tradition. Such a tradition is known in the PPN in this region and could continue into the PN (Plates 97–101).[323]

9.2. Goat Skeletons

Other animal skeletons were discovered in building AG (22G) in the PN layer (Plate 102). They are also burnt completely blue. The house is a large building with a complex plan. The length of the buildig is 14 m from east to west and 6 m from north to south. The plan of the building consist of a long corridor in the center and two long narrow rooms. The northwest part of the building observed another rectangular rooms and a large oven. The oven was placed in an open space in a corner outside the building. The east part of the building was formed from square rooms with stone foundations.

Different sizes stone were used in the foundations of buildings AG. Outer walls, and some of the walls on the central axis were constructed from larger flat stones.

Three goat skeletons were discovered (two mature and one young) east of the oven in one of the small square rooms in the northwest of the building. The finds indicate that this room functioned as a kind of shed where animals were kept. A study of the animal bones shows that no complete animal is present, suggesting that this room was used for butchering (Plates 103–105). The animals were crushed during the fire beneath the debris of the collapsed ceiling (Plate 102). The eastern part of the corridor leading to the long narrow room, is also full of bones of different species mixed with the debris of the roof. The burnt level probably belongs to phase IIB2 or IIB3.

9.3. Sheep/Goat Skeletons

Two foetal sheep/goat skeletons were found during analysis at the excavation house (Plate 106). They originate from the collecting units in trench 23G, dated to the TP, from the PPN to the PN (Plate 107). This feature contains only these two individuals. However, they were not found in any relation to architectural remains. Building AG, containing the goat skeletons, in

[323] Personal communication; Özdoğan/Özdoğan 1989.

trench 22G is closely located to the two foetal skeletons. The two foetals are positive evidence of the penning of animals at the site. The mutter certainly died at the site. Only the long bones, vertebrae, ribs and skull fragments were recovered, but no small bones such as phalanges, carpals and tarsals were found (Plates 108–109). These bones could not be collected probably due to of their size.

Fig. 54: Several animal figurines at Mezraa-Teleilat.

10. OTHER FINDS

10.1. Animal Figurines

The figurines can be interpreted as an indicator of the importance of animals at the site. A total of 49 animal figurines were recovered, but only from the Neolithic. The majority were made of clay, two made of stone, with one being a terracotta figurine and another made of bone (Tab. 33; Fig. 55). A detailed investigation of the figurines has not yet begun. According to the style, sheep/goat, pig, and cattle are mainly represented. But in general, ovicaprids and cattle dominate. Four figurines belong to the inner part of building AY (PN). Figure 54 shows a group of animal figurines.

Phase	*Number of Figurines*
PN	18
II/III	-
TP	14
III/IV	6
LPPNB	8
IV/V	1
MPPNB	2
Total	**49**

Tab. 33: Number of animal figurines from different levels at Mezraa-Teleilat.

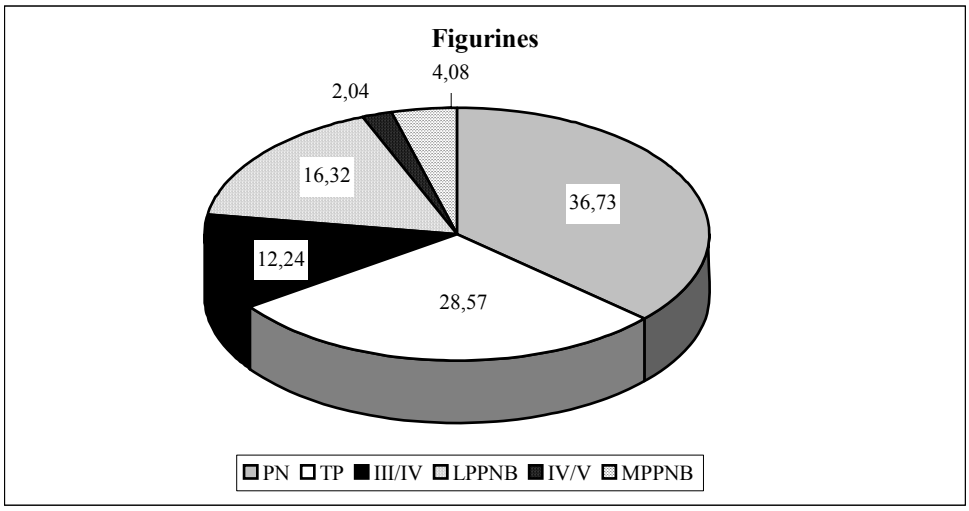


Fig. 55: Proportion of animal figurines in different levels at Mezraa-Teleilat.

Phase	*Number of Worked Bones*
PN	128
PN/TP	14
TP; PN/PPN	98
TP/LPPNB	36
LPPNB	40
MPPNB/LPPNB	5
MPPNB	9
Total	***330***

Tab. 34: Number of worked animal bones from different levels at Mezraa-Teleilat.

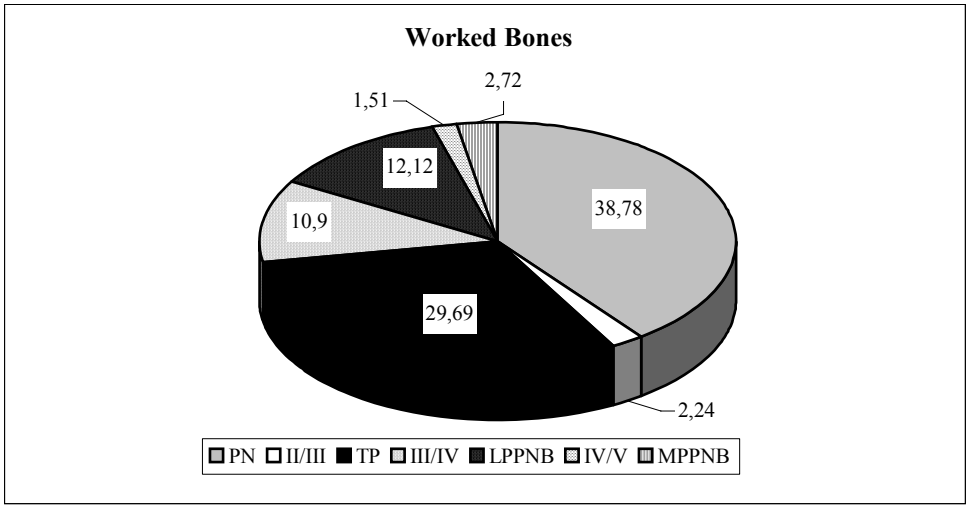


Fig. 56: Proportion of the worked bones from different phases at Mezraa-Teleilat.

Fig. 57: Fossil shark tooth from the Pre-Pottery level at Mezraa-Teleilat (photo without scale; size approx. Length: 48 mm, Breadth: 27 mm).

10.2. Worked Animal Bones

In total 330 worked bones were recorded, mostly from the PN (Table 34; Fig. 56), with mainly awls, needles, beads, bracelets, belt, drill, etc., being included. A detailed analysis on the animal bone artifacts be completed in the near future. The focus here is on the identification of the animal specimens, not their function. The majority of the finds are made on small ruminant bones, sheep/goat, and gazelle. Other bones do not include a diagnostic part and can be described as medium mammal bones.

10.3. Miscellaneous

Another interesting find is a fossilized shark tooth found in the PPN level. After the initial investigations were completed, this shark tooth was dated to the Tertiary period and belongs to *Carcharodon sp.*[324] Some traces of use are recognized on it. The root of the tooth was cut, probably in order to attach a handle (Fig. 57).

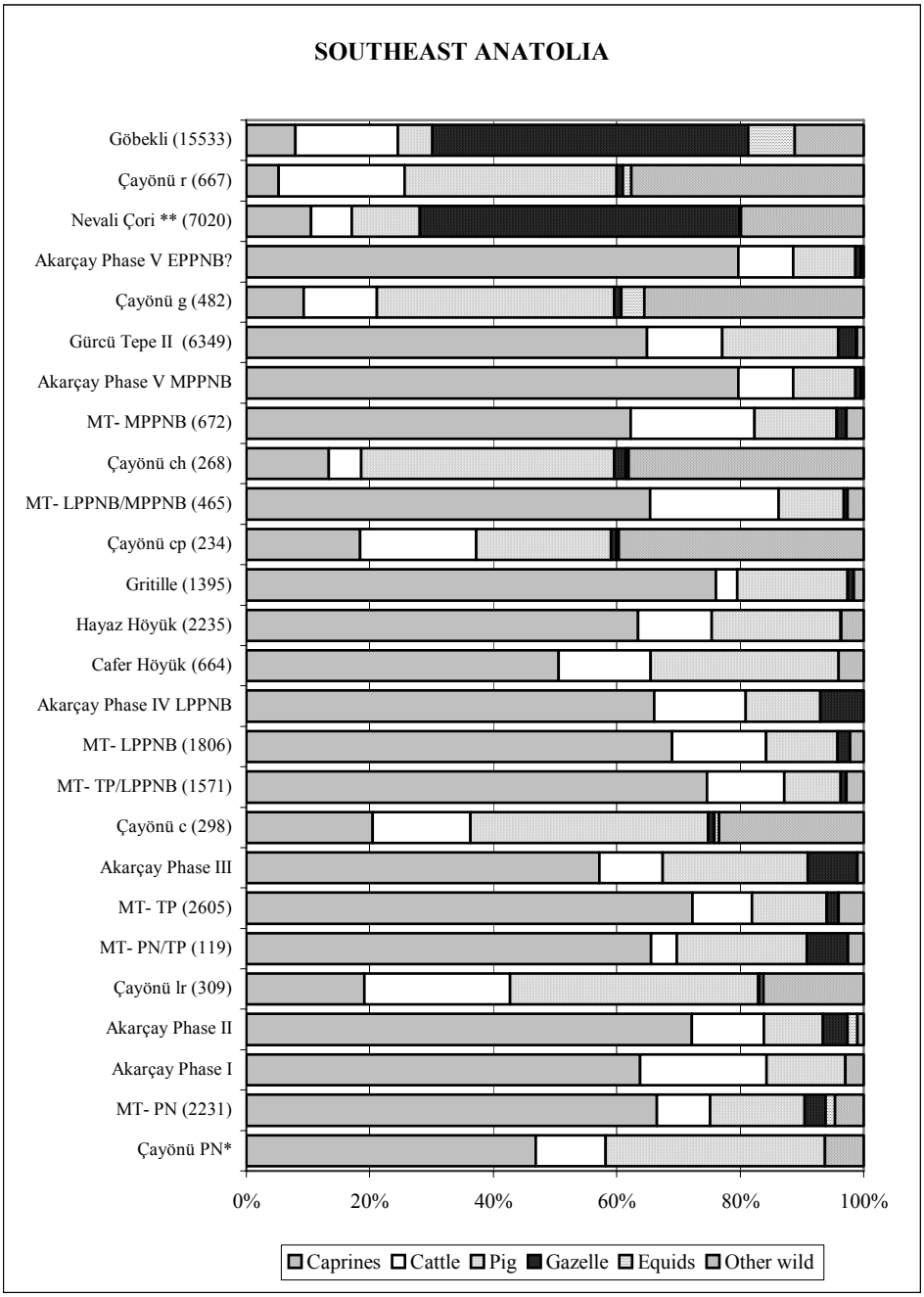
11. COMPARISONS

11.1. Proportion of the Prodomesticates

The proportions of sheep and goat remains gradually increased over time at PPN sites in southeastern Turkey (Fig. 58). This tendency occurred also in the Near East. However, 25% of the ovicaprids were recovered from the Cell Building subphase, Sheep and goats increased to make up 50% of the total during the Large Building subphase at Cayönü. A high percentage of sheep and goat bones (between 60% and 70%) were also observed at other Late or Final PPNB sites in southeastern Anatolia (Gritille, Hayaz Höyük and Gürcütepe II). Faunal remains from Hallan Çemi and Cafer Höyük reflect a different subsistence economy in this region, and both settlements contain evidence of a high number of wild sheep and goats in their assemblage. Both archaeological settlements unique in southeastern Anatolia. At Mezraa-Teleilat ovicaprids were always the dominant animal group in the NISP, even in the earliest level of the MPPNB (domestic). But the Çayönü ovicaprids were increasing in the later period (before Sus was the predominate species). The proportion of ovicaprids was never so high as at Mezraa-Teleilat even in the later periods (PPNC), at Çayönü. According to the H. Hongo, up until the end of the MPPNB, each settlement in southeastern Anatolia specialized in the exploitation of one particular animal species, which was probably the taxon most prevalent around the site. For example, wild pigs were most abundant at Çayönü. At Hallan Cemi wild sheep dominated the faunal assemblages, at Göbekli Tepe and Nevali Çori gazelle were dominate. Wild goats were most available animals at Cafer Höyük (located on the northern side of the Taurus Mountains, no domestic animal was observed). At Mezraa-Teleilat, sheep and goats were frequently exploited (high percentage domestic).[325] The hunting of different animals also continued in accordance with the most accessible species, during this period. H. Hongo explaines this subsistence economy as a broad-spectrum strategy combined with the intensive exploitation of one dominant taxon. After the beginning of the domestication process hunting continued, in different proportions, in nearly all the settlements. But wild animals were never more important than domesticated animals. Shams ed-Din is a special

[324] For the identification of the species I would like to thank A. Lehmkuhl (Staatliches Museum für Naturkunde, Stuttgart).

[325] Hongo/Meadow/Öksüz/Ilgezdi 2004.



MT: Mezaa-Teleilat.

Fig. 58: Proportion of the animals from different archaeological sites in southeastern Anatolia.

case due to the fact that in a later period (Halaf) hunting began again to play an important role in the subsistence economy (see Fig. 60).

In the LPPNB, subsistence economy based on sheep and goats (mainly on sheep)

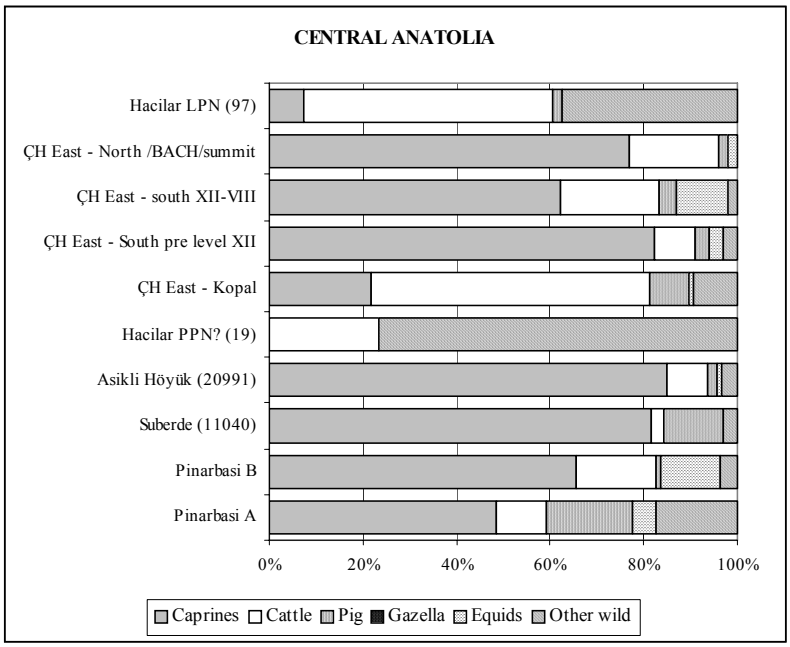


Fig. 59: Proportion of animals from different archaeological sites in Central Anatolia.

at Çayönü, the proportion of wild taxa steadily decreased from the Cobble-Paved subphase, to the PN. At Gürcü Tepe II, Çayönü, Hayaz, Gritille, Akarçay and Mezraa-Teleilat domesticated caprines are the most common animals, with pigs second, and cattle third as the most frequent among the identified faunal remains. At these sites clear evidence exists for hunting as a secondary subsistence activity. Domesticated and wild forms of sheep, goat, cattle and pig occur at different archaeological sites, such as Mezraa-Teleilat in the Middle East.

A different tendency is observed for the NISP in the faunal assemblage in Central Anatolia, with another tendency developing at Aşikli. Here, even in the earlier levels, ovicaprids were predominate, but there is no positive evidence for the existence of domestic forms.[326] The same trend also observed at the early Neolithic sites Hallan Çemi and Cafer Höyük in Southeastern Turkey (see above; should be ovicaprids were abundant in the vicinity of these sites). We have a similar situation at Suberde and Pınarbaşı. The Late PN and the PPN[327] at Hacılar provide us with a different picture (Fig. 59)

[326] H. Buitenhuis thinks prodomesticates may exist.

[327] Some scholars do not accept the presence of a Pre-Pottery level at Hacılar. This period is observed at a settlement in only one sounding.

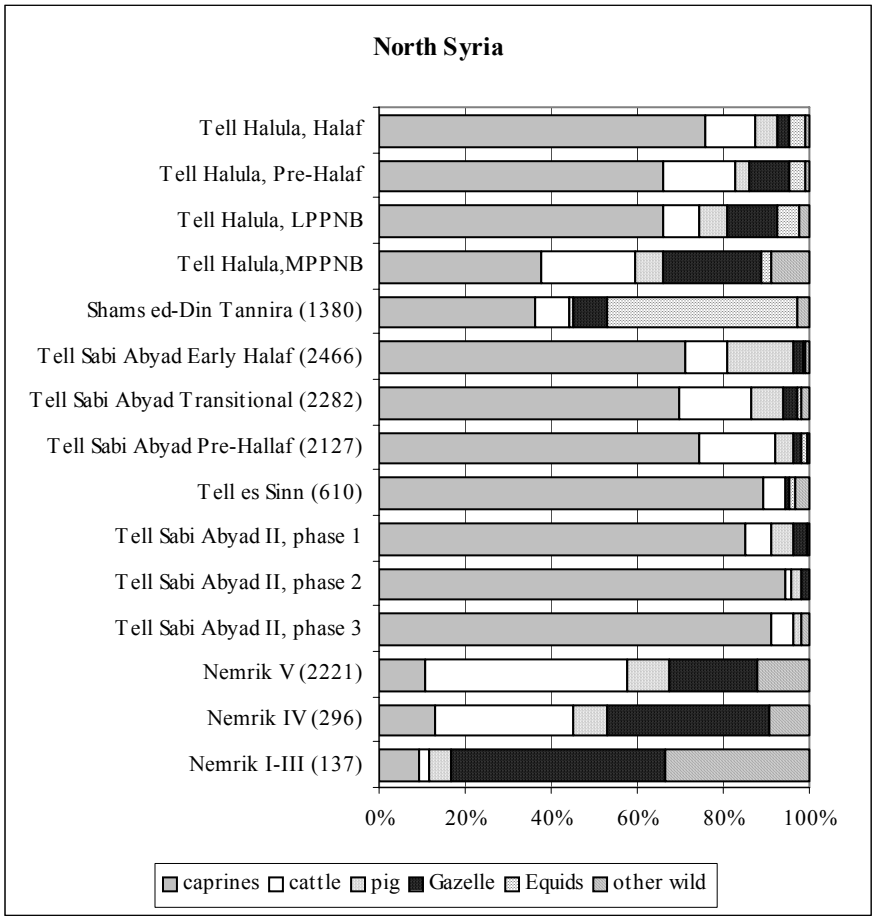


Fig. 60: Proportion of animals from different archaeological sites in northern Syria.

Both levels hold a much smaller proportion of ovicaprids, though this phenomenon might be related to the small number of samples from this settlement. The high proportion of ovicaprids in the earlier periods in Central Anatolia is not related to the domestication process in the same way as in southeastern Anatolia. This tendency might be related to the fact that the ovicaprids were probably the most accessible taxon in the vicinity. In the PPN period no domesticated animals were observed in this region.[328]

In Syria, except Nemrik, ovicaprids predominate. The subsistence economy relied primarily on wild animals at Nemrik. The largest category of domestic animals is cattle, followed by domestic ovicaprids. There is a smaller proportion of ovicaprids during the MPPNB period at Tell Halula than in later periods.

[328] H. Buitenhuis suggested that ovcaprids at Aşıklı were probably prodomesticates.

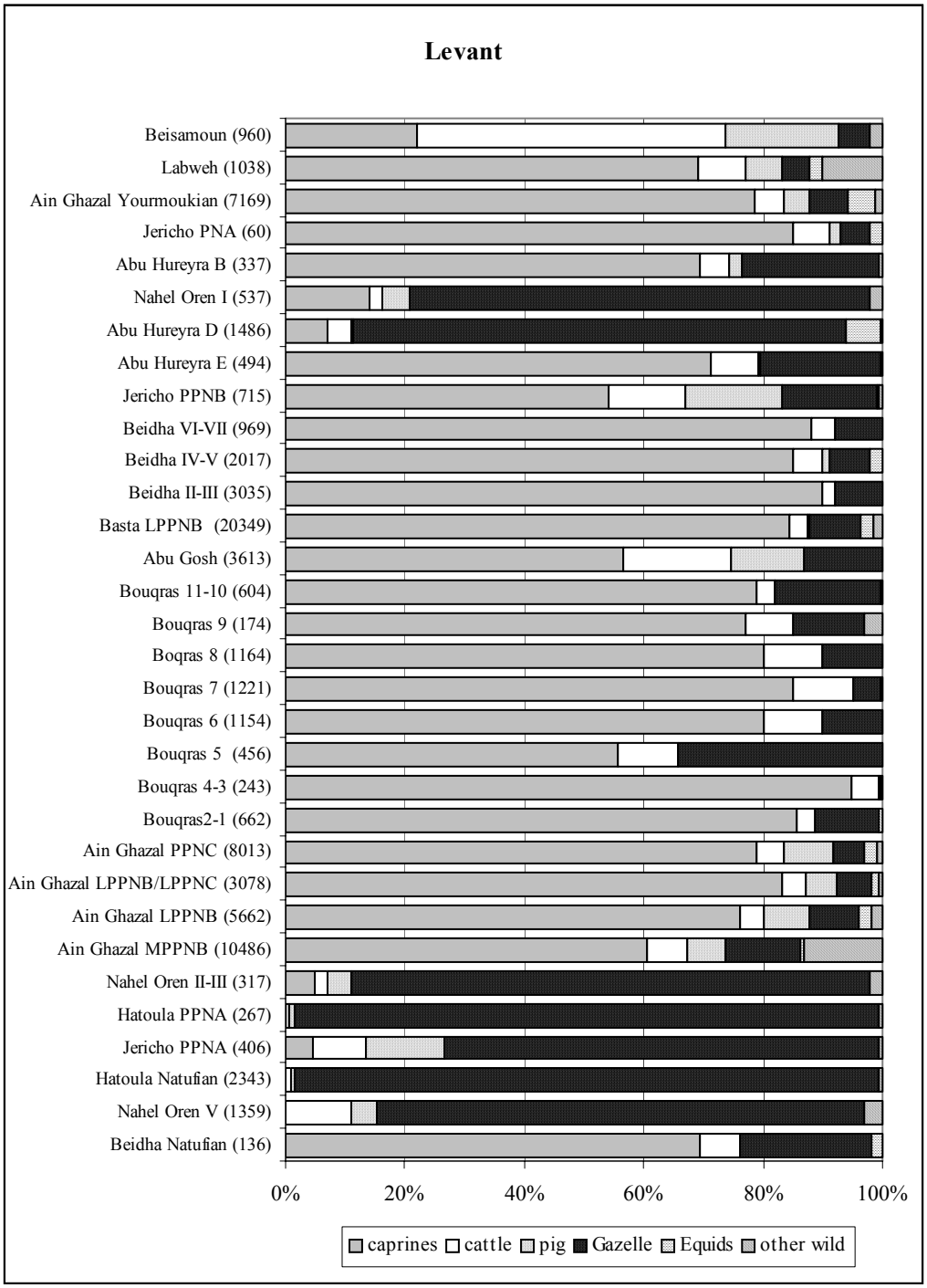


Fig. 61: Proportion of animals from different archaeological sites in the Levant.

In the Levant, a high proportion of domesticated ovicaprids is also observed. In earlier periods (Natufian, PPNA) gazelle was the predominate animal in this region (Fig. 61).

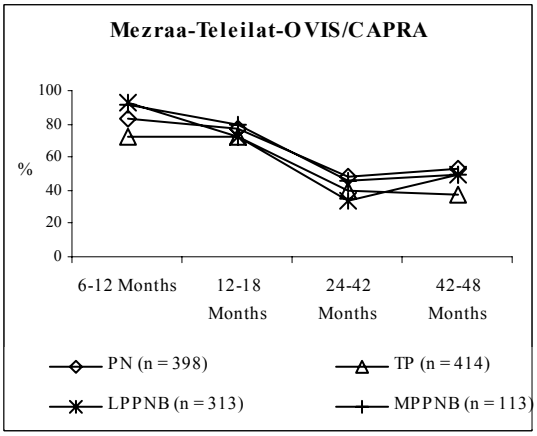
11.2. Kill-off Patterns

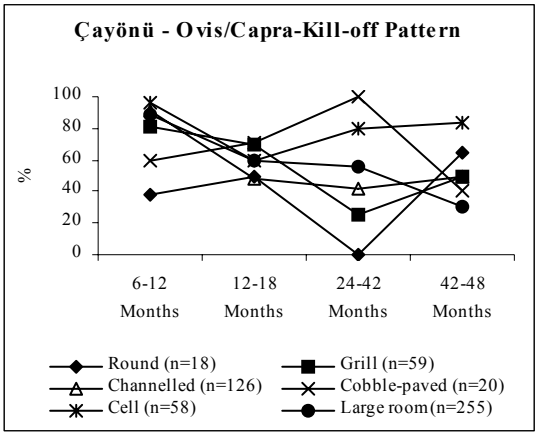
The presence of young individuals in an assemblage can be interpreted as evidence for domestication. However, some settlements have a very high proportion of young animals, but they do not have domesticated animals. A bias towards slaughtering young animals can also be related to selective hunting, e.g., the very high proportion of young pigs at Hallan Çemi.
Figure 62 combines the kill-off pattern of Ovicaprids, pigs and cattle from Mezraa-Teleilat, Çayönü, Gürcü Tepe and Göbekli Tepe. It seems that at Mezraa-Teleilat progressively fewer animals survived in later stages. This tendency is valid for all four species and indicates domesticated animals. The kill-off pattern at Mezraa-Teleilat and Çayönü demonstrates that animals were exploited for their meat. At both Göbekli Tepe, but especially at the Gürcü Tepe II, sites many animals were slaughtered when they were younger than 2 years old. At Göbekli Tepe a high survival rate of adult sheep and goats are observed. This pattern reflected on the animals being hunted. The majority of pigs survived until their subadult age (1–2 years old) while very few adult individuals are observed. An early kill-off pattern also exists at Gritille. When we compare the kill-off patterns for Ovicaprids, cattle and pig at Çayönü and Mezraa-Teleilat, an earlier kill-off pattern for all species can be surmised from our site.

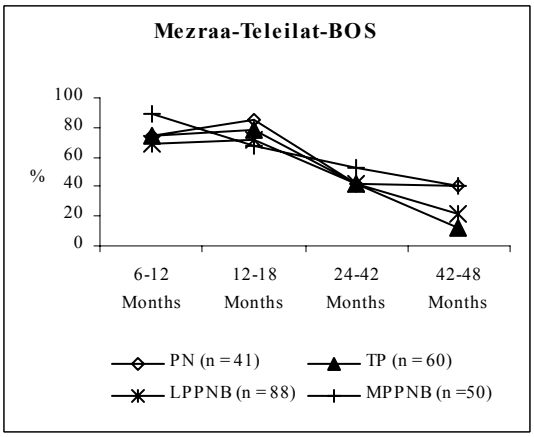
11.3. Biometry and State of Domestication

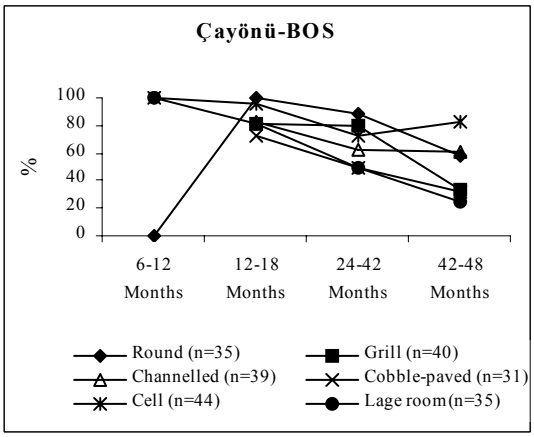
Size reduction is accepted as the most useful evidence of domestication. We can see some bone size reduction on Ovicaprids, pigs and cattle bones from different archaeological sites when we look at bone assemblages in the Near East.
H. Hongo mentioned that "The measurements of post-cranial bones of pigs, sheep, goats, and cattle at Çayönü are largely conform with the measurement data from contemporary sites in southeastern Turkey and in northern Syria".[329] She claims that in the earlier levels (Round and Grill subphases) in çayönü, the post-cranial measurements of pigs, sheep and cattle display similar distributions with Göbekli Tepe and goats with Cafer Höyük. During the Channelled subphase at Çayönü some smaller cattle, sheep and pig specimens can be found, but the size distribution of these animals are generally similar to the early PPNB at Nevali Çori.

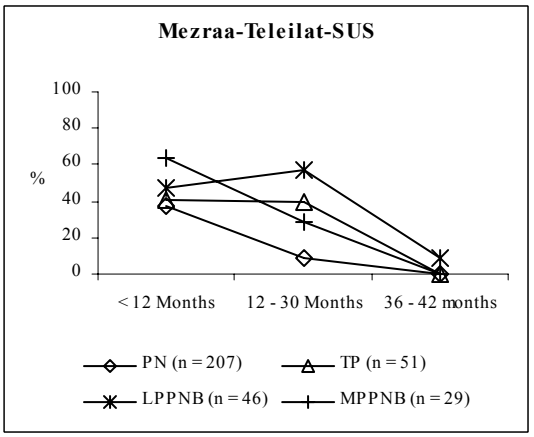
[329] Peters/Helmer/von den Driesch/Sana Segui:Figs. 7-10.

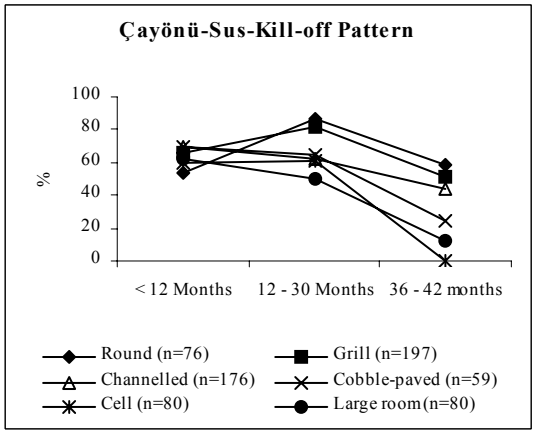

Mezraa-Teleilat-OVIS/CAPRA
100
80
60
40
20
0
%
6-12 Months
12-18 Months
24-42 Months
42-48 Months
PN (n = 398)
TP (n = 414)
LPPNB (n = 313)
MPPNB (n = 113)

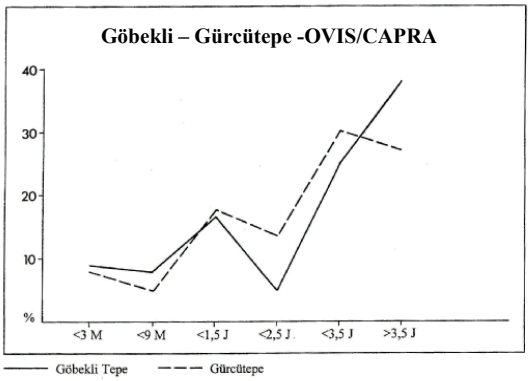

Çayönü - Ovis/Capra-Kill-off Pattern
100
80
60
40
20
0
%
6-12 Months
12-18 Months
24-42 Months
42-48 Months
Round (n=18)
Grill (n=59)
Channelled (n=126)
Cobble-paved (n=20)
Cell (n=58)
Large room(n=255)

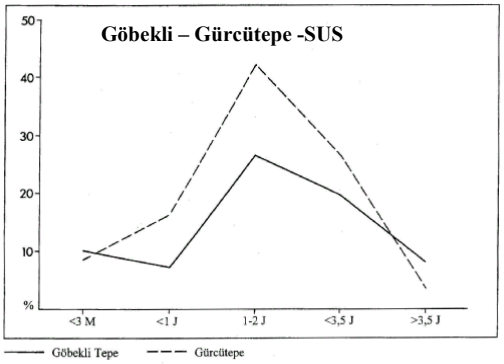

Mezraa-Teleilat-BOS
100
80
60
40
20
0
%
6-12 Months
12-18 Months
24-42 Months
42-48 Months
PN (n = 41)
TP (n = 60)
LPPNB (n = 88)
MPPNB (n =50)


Çayönü-BOS
100
80
60
40
20
0
%
6-12 Months
12-18 Months
24-42 Months
42-48 Months
Round (n=35)
Grill (n=40)
Channelled (n=39)
Cobble-paved (n=31)
Cell (n=44)
Lage room(n=35)


Mezraa-Teleilat-SUS
100
80
60
40
20
0
%
< 12 Months
12 - 30 Months
36 - 42 months
PN (n = 207)
TP (n = 51)
LPPNB (n = 46)
MPPNB (n = 29)


Çayönü-Sus-Kill-off Pattern
100
80
60
40
20
0
%
< 12 Months
12 - 30 Months
36 - 42 months
Round (n=76)
Grill (n=197)
Channelled (n=176)
Cobble-paved (n=59)
Cell (n=80)
Large room(n=80)


Göbekli – Gürcütepe -OVIS/CAPRA
40
30
20
10
%
<3 M
<9 M
<1,5 J
<2,5 J
<3,5 J
>3,5 J
Göbekli Tepe
Gürcütepe


Göbekli – Gürcütepe -SUS
50
40
30
20
10
%
<3 M
<1 J
1-2 J
<3,5 J
>3,5 J
Göbekli Tepe
Gürcütepe

Page before:

Fig. 62: Kill-off pattern of Ovicaprids, Bos and Sus from Mezraa-Teleilat, Çayönü, Göbekli Tepe and Gürcü Tepe II (von den Driesch/Peters 1999, Fig. 4 and 5).

The size distributions of sheep/goat, cattle in the Cell subphase at Çayönü are similar to the LPPNB at Gürcütepe II. H. Hongo mentioned that "The range of the size distribution for pigs in the Cell subphase at Çayönü shows more variability than that at Gürcütepe II, although the peak of the size distribution is similar at the two sites. Further size diminution occurred for all four taxa at Çayönü in the following Large Room subphase".[330]

Comparing the size of ovicaprids from that region with the finds from Mezraa-Teleilat reveals that the capra from EPPNB of Nevali Çori were smaller in size than the wild goats from Cafer Höyük. J. Peters, A. von den Driesch, D. Helmer and M. Saña mention that some goat measurements from Nevali Çori indicate that the animals were similar in size to the those deduced from the smallest goat bones found at Tell Halula. but believes that rather then being related to domestication, concur with Bergmans's rule adding that more female specimens were evident in the faunal assemblage of Nevali Çori. Goat measurements from PPN Mezraa-Teleilat demonstrate also a similar size as those at Tell Halula. However it should be mentioned here that a high percentage of goats at the site were domestic.

Goat bones from Assouad indicate an advanced state of domestication, but the status of the sheep has yet to be defined.[331]

According to the domestic population of Sabi Abyad II (PPN; 6.700–6.500 BC), the ovicaprids from Sabi Abyad are smaller and less varied, and are even smaller than those from Tell Bouqras (ca. second half of the 7th millennium and the beginning of the 6th millennium BC, with a mixed wild-domestic population).[332]

However, the size diminution for sheep and also for goats may have occurred during the Cobble-paved subphase, but there is a clear shift towards smaller animals in the Large Room subphase. The post-cranial measurements of goats indicates a gradual decrease in animal size at Cayönü.

[330] Hongo/Meadow/Öksüz/Ilgezdi 2004:113.

[331] Helmer 1985b.

[332] Buitenhuis 1988; Uerpmann 1982.

The Mezraa-Teleilat size index data have been compared with data from Çayönü.[333] The Ovicaprids are relatively smaller than those from Çayönü (cf. Fig. 63A-B), especially in the LPPNB (Cell Building subphase in Çayönü). H. Hongo suggests that some small sheep and goats began to appear in the Channelled subphase. She presumes that smaller goats appeared earlier than sheep in the Cobble-Paved or Cell subphase, but observed that a marked shift in the size distribution of sheep towards smaller animals appeared in the Large Room subphase, which is contemporary to the TP at Mezraa-Teleilat.

Domestic sheep and goat are known from around 7.850–7.750 BC. At Nemrik domestic sheep and goat appeared in the first half of the 8th millennium BC (ca. 8.000–7.500 BC). Similar dates are given by D. Helmer for domestic caprines.[334] At nearly all Near Eastern PPNB sites the two species, goat in particular, predominate numerically. Goat is found in Jericho[335], Jarmo[336], 'Ain Ghazal[337], Bouqras[338] and in Beidha[339], where the initial stage of goat domestication ("herds under control") is apparent.

At Gürcütepe II and also at Mezraa-Teleilat the size diminution for sheep and goat are more evident than for pig and cattle. Most of the sheep and goats from Gritille, Hayaz Höyük and Gürcütepe II were domesticated based on bone size and on kill-off patterns.[340] It is likely that cattle and pigs were domesticated locally at Gürcütepe II, as was the case with Mezraa-Teleilat.

At many sites in the Near East, sheep and goats, do not seem to have been domesticated locally, but rather sheep and especially goats came into the settlement already

[333] I would like to thank Dr. H. Hongo for permission to use the Çayönü measurements in this work.

[334] Helmer 1989.

[335] Clutton-Brock 1979.

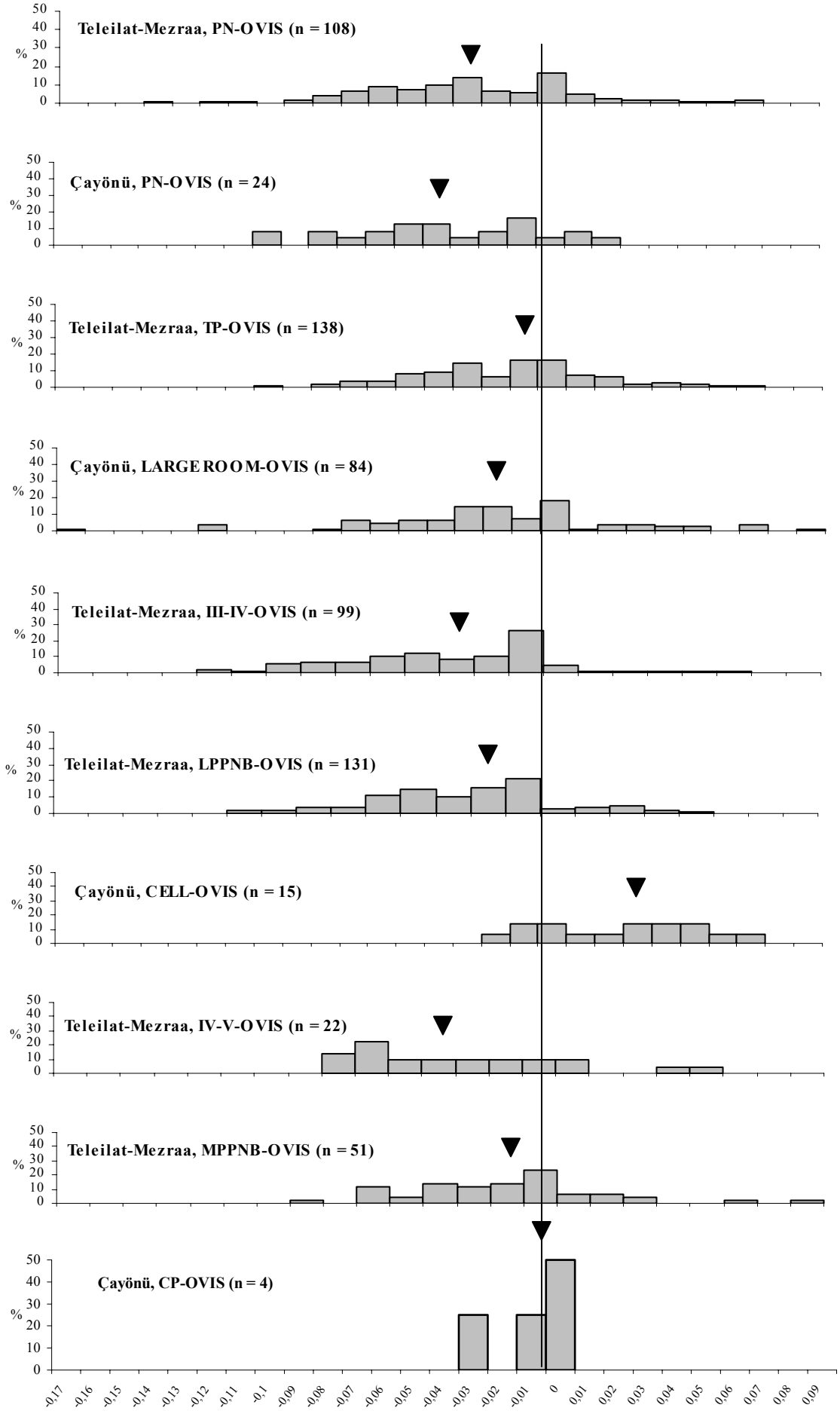
[336] Stampfli 1983.

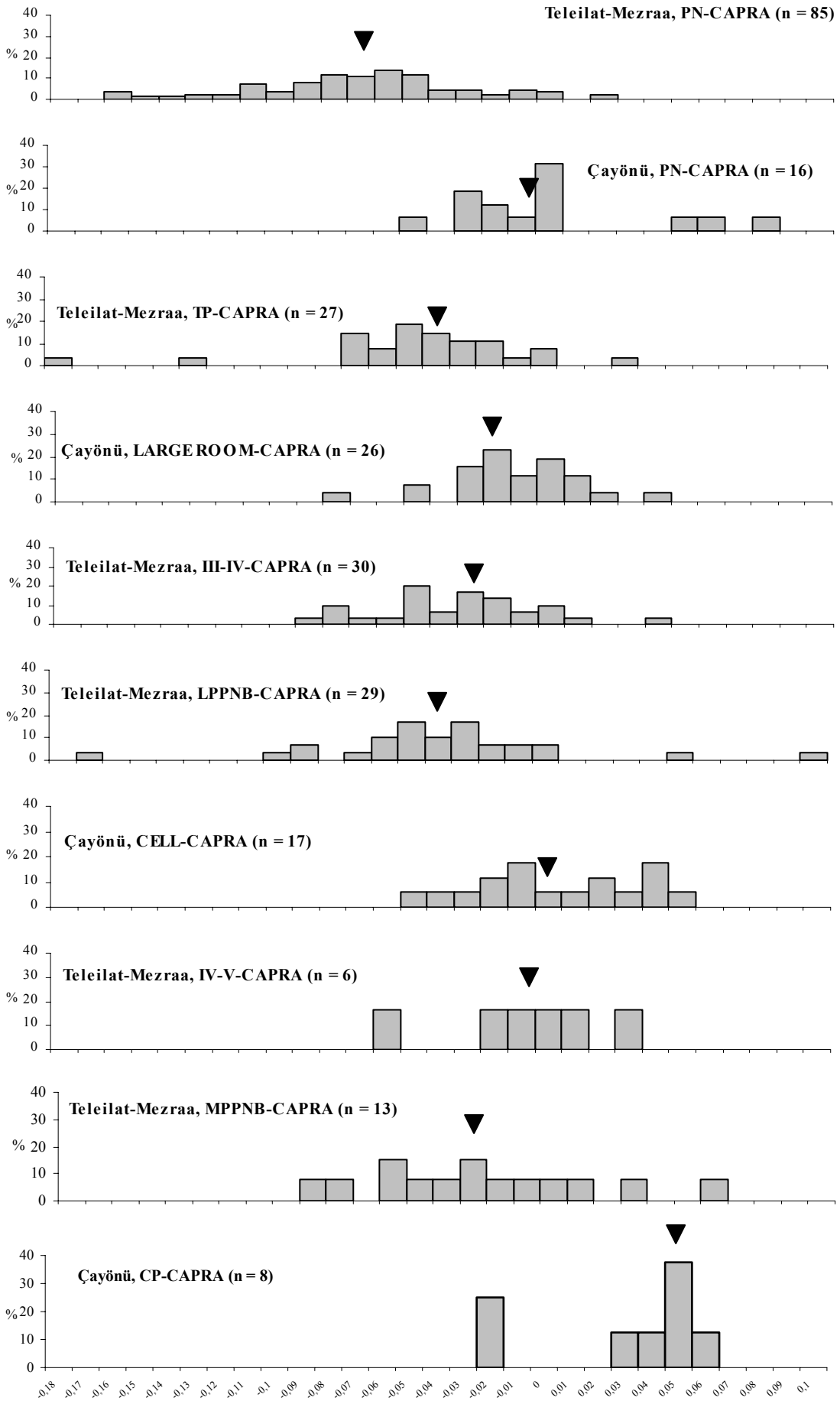
[337] Köhler-Rollefson 1989.

[338] Clason 1980.

[339] Hecker 1982.

[340] Stein 1986a; 1986b; 1989; Buitenhuis 1985; Driesch/Peters 1999; Peters/Helmer/von den Driesch/Saña Segui 1999.


Teleilat-Mezraa, PN-OVIS (n = 108)
Çayönü, PN-OVIS (n = 24)
Teleilat-Mezraa, TP-OVIS (n = 138)
Çayönü, LARGE ROOM-OVIS (n = 84)
Teleilat-Mezraa, III-IV-OVIS (n = 99)
Teleilat-Mezraa, LPPNB-OVIS (n = 131)
Çayönü, CELL-OVIS (n = 15)
Teleilat-Mezraa, IV-V-OVIS (n = 22)
Teleilat-Mezraa, MPPNB-OVIS (n = 51)
Çayönü, CP-OVIS (n = 4)
%
0
10
20
30
40
50
-0,17
-0,16
-0,15
-0,14
-0,13
-0,12
-0,11
-0,1
-0,09
-0,08
-0,07
-0,06
-0,05
-0,04
-0,03
-0,02
-0,01
0
0,01
0,02
0,03
0,04
0,05
0,06
0,07
0,08
0,09


Teleilat-Mezraa, PN-CAPRA (n = 85)
Çayönü, PN-CAPRA (n = 16)
Teleilat-Mezraa, TP-CAPRA (n = 27)
Çayönü, LARGEROOM-CAPRA (n = 26)
Teleilat-Mezraa, III-IV-CAPRA (n = 30)
Teleilat-Mezraa, LPPNB-CAPRA (n = 29)
Çayönü, CELL-CAPRA (n = 17)
Teleilat-Mezraa, IV-V-CAPRA (n = 6)
Teleilat-Mezraa, MPPNB-CAPRA (n = 13)
Çayönü, CP-CAPRA (n = 8)
%
40
30
20
10
0
-0,18 -0,17 -0,16 -0,15 -0,14 -0,13 -0,12 -0,11 -0,1 -0,09 -0,08 -0,07 -0,06 -0,05 -0,04 -0,03 -0,02 -0,01 0 0,01 0,02 0,03 0,04 0,05 0,06 0,07 0,08 0,09 0,1

Pages before:

Fig. 63A-B: Size index distribution for ovis and capra from Mezraa-Teleilat and Çayönü. The median value for each level is indicated by the arrow on the chart. See also the Appendices for the standard measurement.

domesticated. This tendency is observed as well at Mezraa-Teleilat. Sheep and goat at Mezraa-Teleilat, at Gürcütepe II and sheep at ‘Ain Ghazal were not locally domesticated. The analysis of the remains of sheep and goat suggests that they belong mostly to domesticated animals.

Figure 64 illustrates the plotted sizes of sheep astragalus from different levels of Mezraa-Teleilat, as compared to those from other sites in Anatolia and in the Middle East. Specimens from our settlement are similar in range to Tell Sabi Abyad II. The mean value of Cafer and Tell Halula corresponds also with Tell Sabi Abyad (Late Neolithic). Specimens from earlier levels (MPPNB and LPPNB) are smaller than the younger levels (TP and PN).

Figure 65 presents a comparison of sheep humerus (Bd and BT) measurements from Mezraa-Teleilat and other settlements in the Near East. The largest specimen came from Mezraa-Teleilat (TP). However, another larger specimen dates to the pre-Halaf period at Tell Halula, while the smallest specimen is from the same period. Other specimens from Mezraa-Teleilat are similar in range to other Near Eastern settlements. Humerus measurements from the earliest (MPPNB) level are smaller than those from the later period at Mezraa-Teleilat.

The greatest length (GLI) and breadth of distal (Bd) measurements of Capra astragalus from Mezraa-Teleilat, Tell Halula and Tell Sabi Abyad I are compared in Figure 66. The specimens from MPPNB at Tell Halula are larger than those of our settlement. The smallest astragalus measurements come from the latest period of Mezraa-Teleilat (PN). Specimens from the MPPNB are larger than in later periods.

Figure 67 presents the breadth of distal (Bd) humerus and the breadth of trochlea (BT) humerus measurements of Capra from Mezraa-Teleilat, Tell Halula and Tell Sabi Abyad I.

The largest specimen came from the MPPNB period at Mezraa-Teleilat. The second largest specimens belong to the MPPNB period of Tell Halula, but these are smaller than a specimen from MPPNB Teleilat-Mezraa. The smallest specimen belongs to the pre-Halaf level of Tell Halula. Other measurements from different settlements are of similar size.

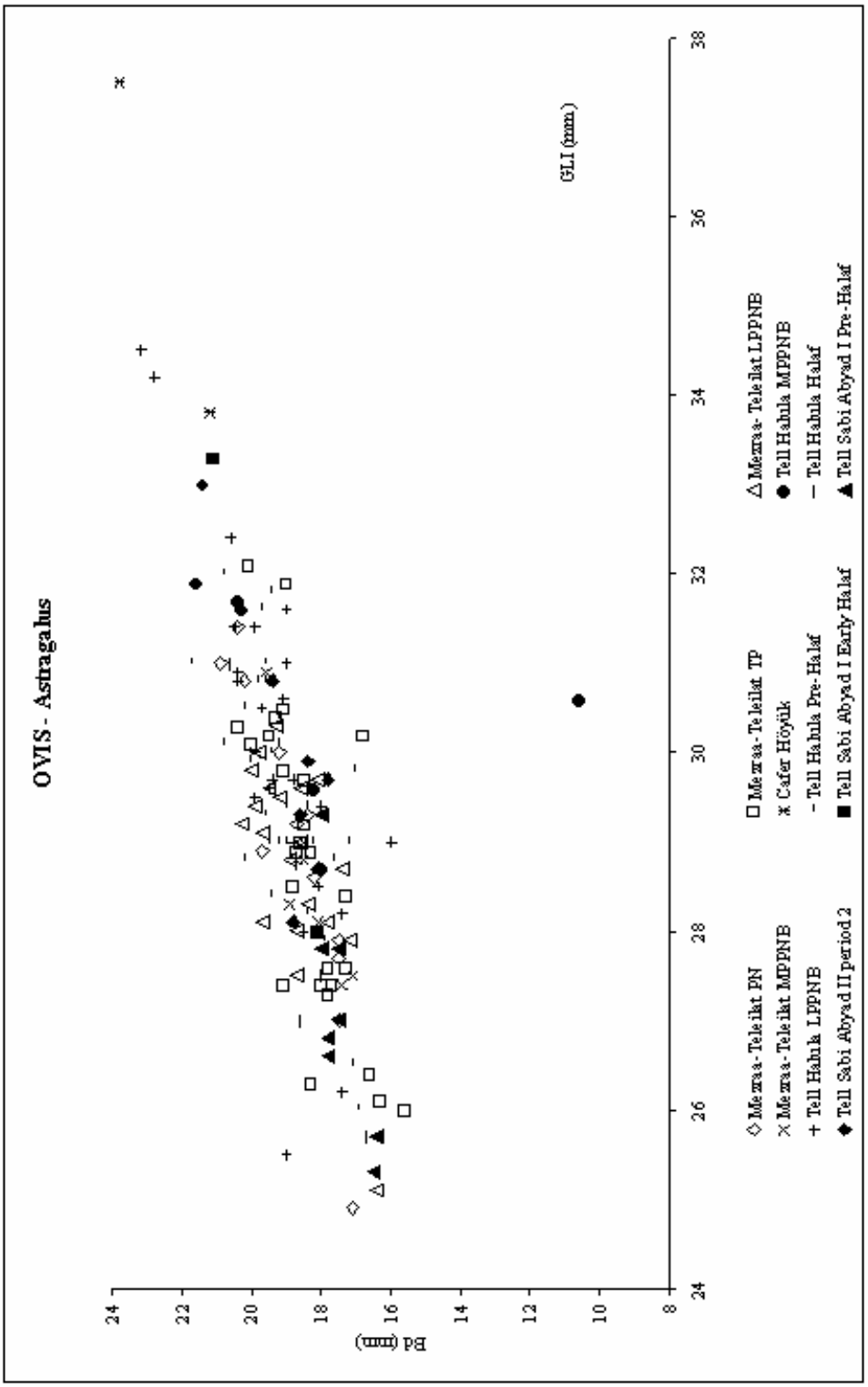


Fig. 64: Greatest length (GLI) and breadth of distal (Bd) astragalus of Ovis from Mezraa-Teleilat, Tell Halula (Saña Segui 1999), Tell Sabi Abyad II (Van Wijngaarden-Bakker/Maliepaard 2000), Tell Sabi Abyad I (Cavallo 1999), Cafer Höyük (Helmer 1988).

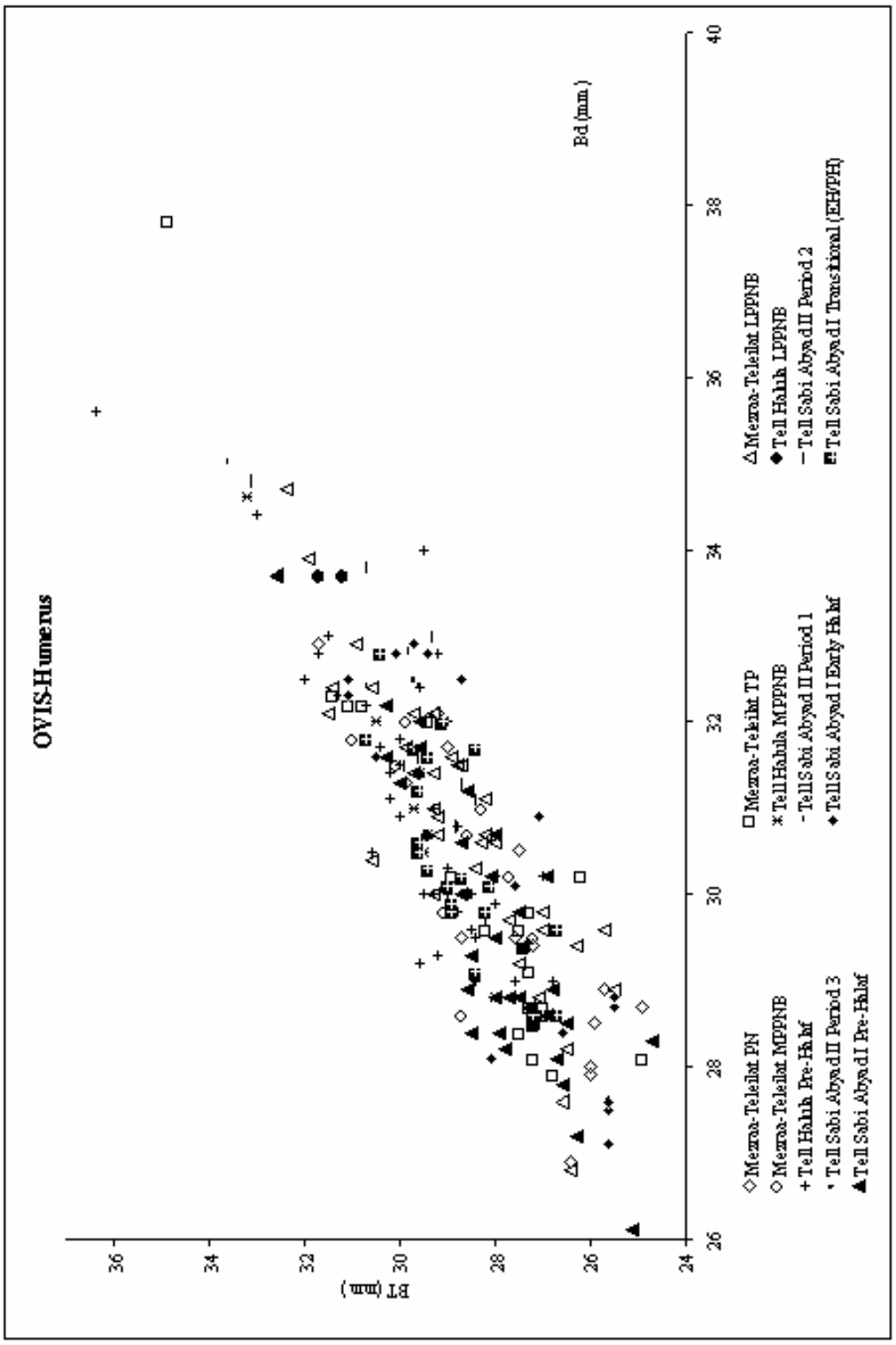


Fig. 65: Breadth of the distal (Bd) and breadth of the trochlea (BT) of Ovis. Humerus from Mezraa-Teleilat, Tell Halula (Saña Segui 1999), Tell Sabi Abyad II (Van Wijngaarden-Bakker/ Maliepaard 2000), and Tell Sabi Abyad I (Cavalllo 2000).

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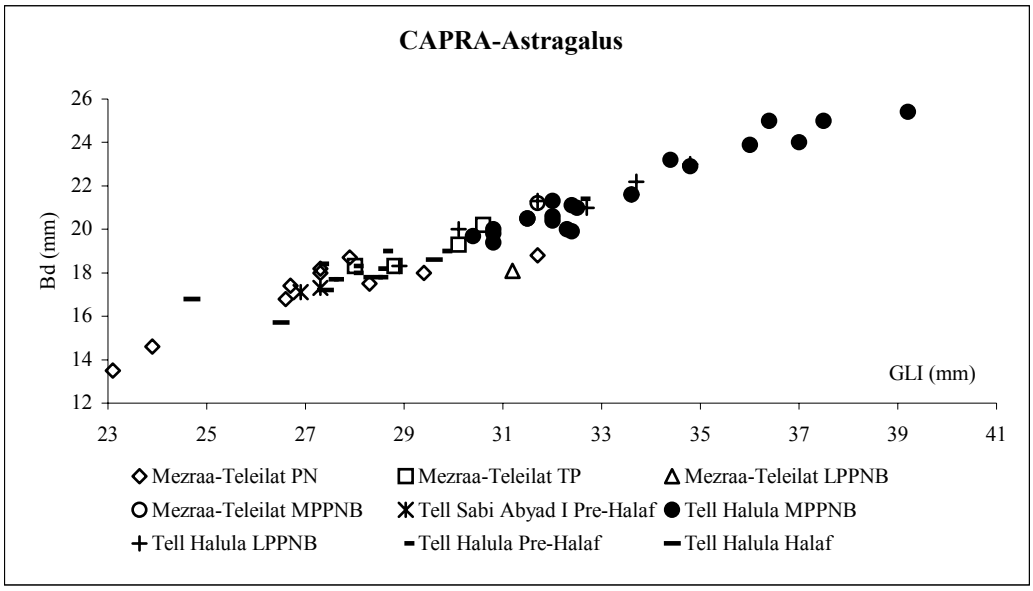

Fig. 66: Greatest length (GLI) and breadth of distal (Bd) measurements of Capra astragalus from Mezraa-Teleilat, Tell Halula (Saña Segui 1999), Tell Sabi Abyad I (Cavallo 1999).

The cattle remains from Sabi Abyad I reflect their domestic status. According to Cavallo an analysis of the metrical data demonstrates that most of the measurements from Sabi Abyad I are similar to the smallest values at Mureybit (*Bos primigenius*). The cattle measurements from the late Halafian sites point to a similarity with the small cattle from Sabi Abyad I; but they are often even smaller. The cattle samples from Sabi Abyad indicate a reduction in size from the pre-Halaf to the early Halaf Period.[341]

Peters, Helmer, von den Driesch and Saña Segui compare the LSI (log size index) of cattle bone remains from the PPNA of Göbekli Tepe and the EPPNB of Nevali Çori with remains from the MPPNB of Tell Halula and the LPPNB of Gürcütepe[342], and find that the MPPNB cattle from Tell Halula were significantly smaller than those from earlier periods. M. Saña Segui interpreted this phenomenon as evidence of the keeping in captivity and breeding of the cattle population.[343]

[341] Cavallo 1996 and 2000.

[342] Peters/Helmer/von den Driesch/Saña Segui 1999:Fig. 7.

[343] Saña Segui 1999; Peters/Helmer/von den Driesch/Saña Segui 1999.

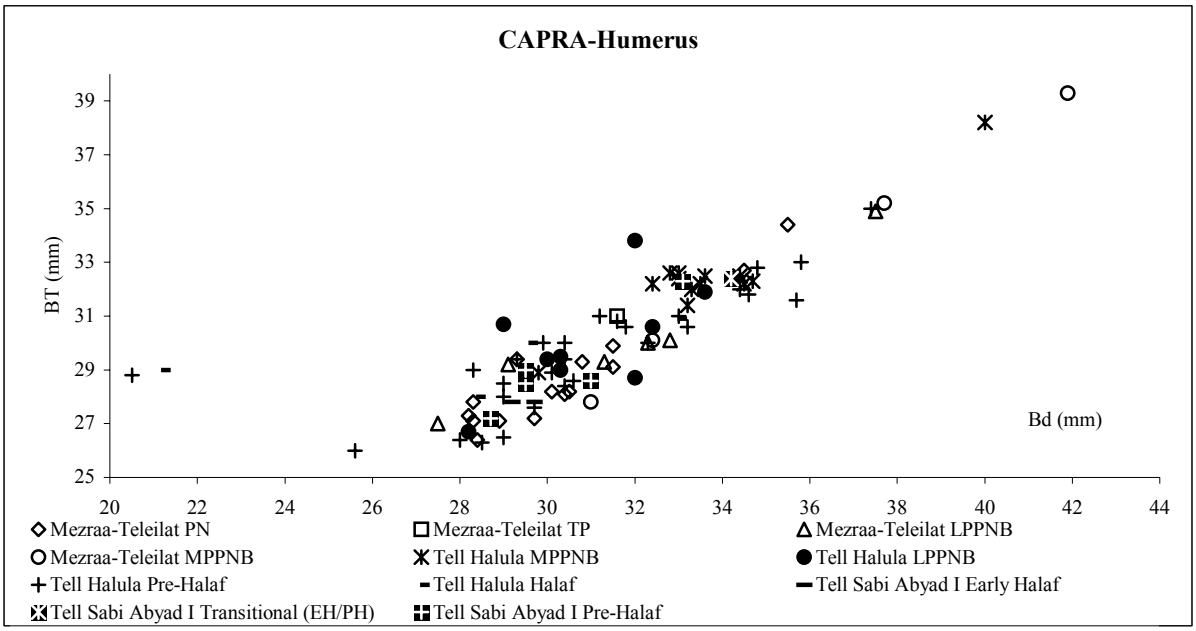

Fig. 67: Breadth of distal (Bd) and breadth of trochlea (BT) measurements of Capra humeri from Mezraa-Teleilat, Tell Halula (Saña Segui 1999), Tell Sabi Abyad I (Cavallo 2000) and from different archaeological sites.

Other early finds of domestic cattle are recorded from Bouqras and Tell es-Sinn in Syria[344], as well as from Umm Dabaghiyah[345] in Iraq. The cattle remains from the PPN layers at Jericho are of the same size as those found in the PN layers.[346] Evidence of cattle and pig domestication is not clear at Hayaz and Gritille due to the small number of measurable bones, but based on the available samples, H. Buitenhuis and G. Stein suggested that both were domesticated.[347]

In Figure 68 the LSI of Bos from Mezraa-Teleilat is compared with the LSI from Çayönü. At Çayönü a size diminution is initially observed in the Channelled period. H. Hongo believes that Bos domestication should have begun essentially during the Cobble-Paved level.[348] We observe a size diminution at Mezraa-Teleilat as early as in the MPPNB. During this time the median value is slightly larger than what we find at Çayönü, but there are more specimens

[344] Clason 1980; Peters/Helmer/von den Driesch/Saña Segui 1999.

[345] Bökönyi 1973 and 1978.

[346] Clutton-Brock 1971:46.

[347] Buitenhuis 1985 and 1988; Stein 1986a-c and 1989.

[348] Öksüz 1988 and 2000; Hongo/Meadow/Öksüz/Ilgezdi 2002 and 2004.

evaluated at Mezraa-Teleilat than at Çayönü (with just six specimens). However, in the LPPNB period a smaller median value exists at Mezraa-Teleilat, which is similar to that in the TP. Yet Çayönü has larger specimens. For the PN period, the Çayönü median value is smaller than at Mezraa-Teleilat.

In Figure 69 the greatest length lateral (GLI) of astragalus and breadth of distal (Bd) astragalus are presented for Bos from Mezraa-Teleilat, Çayönü, Aşıklı, Cafer Höyük, Tell Halula, Çatalhöyük and Tell Sabi Abyad I. The largest astragalus measurements belong to the pre-Halaf period of Tell Halula. One specimen from Çayönü (Cobble-Paved subphase) and one specimen from Tell Sabi Abyad I and from the LPPNB period at Mezraa-Teleilat are similar in size. Most measurements from the PN period at Mezraa-Teleilat are smaller than in other levels at the site.

The breadth of distal (Bd) and the breadth of trochlea of Bos humeri from Mezraa-Teleilat, Çayönü, Tell Sabi Abyad I, Cafer Höyük, Tell Halula are illustrated in Figure 70. The specimens from Tell Halula (pre-Halaf levels) and also from Tell Sabi Abyad I (pre-Halaf levels) are larger than samples from other sites. Only two Bos humerus measurements from Mezraa-Teleilat could be plotted on the figure.

One specimen from the MPPNB and from the LPPNB are presented. Two group measurements are provided in Figure 70. A specimen from the MPPNB period together with some measurements from Tell Halula and the pre-Halaf period of Tell Sabi Abyad form a larger group. More measurements are provided from the LPPNB period, together with Çayönü Cell and Large Room subphases, Tell Halula, Tell Sabi Abyad and a smaller group from Cafer Höyük.

Length of ph1 and smallest depth of Bos ph1 measurements from Mezraa-Teleilat, Jericho, Çayönü are compared in Figure 71. Some thick and short bos ph1 bones are observed at the Mezraa-Teleilat. Because of this *Bos bubalus* measurements from Shams ed-Din are also plotted here. All specimens from Mezraa-Teleilat are thinner (SD) than *Bos bubalus*. Just one specimen from MPPNB is thicker but longer than the specimens of *Bos bubalus*. One specimen from the TP period at Mezraa-Teleilat and also a specimen from the PN level at Çayönü are smaller than the other specimens.

Figure 72 shows the smallest diaphysis (SD) of ph2 and the greatest length (GL) of ph 2 ant./post. of Bos from different sites. The smallest specimen belongs to Mezraa-Teleilat TP. Two specimens from the Large Room subphases at Çayönü are longer and thicker. The MPPNB samples from Tell Halula are mostly larger than our specimens.

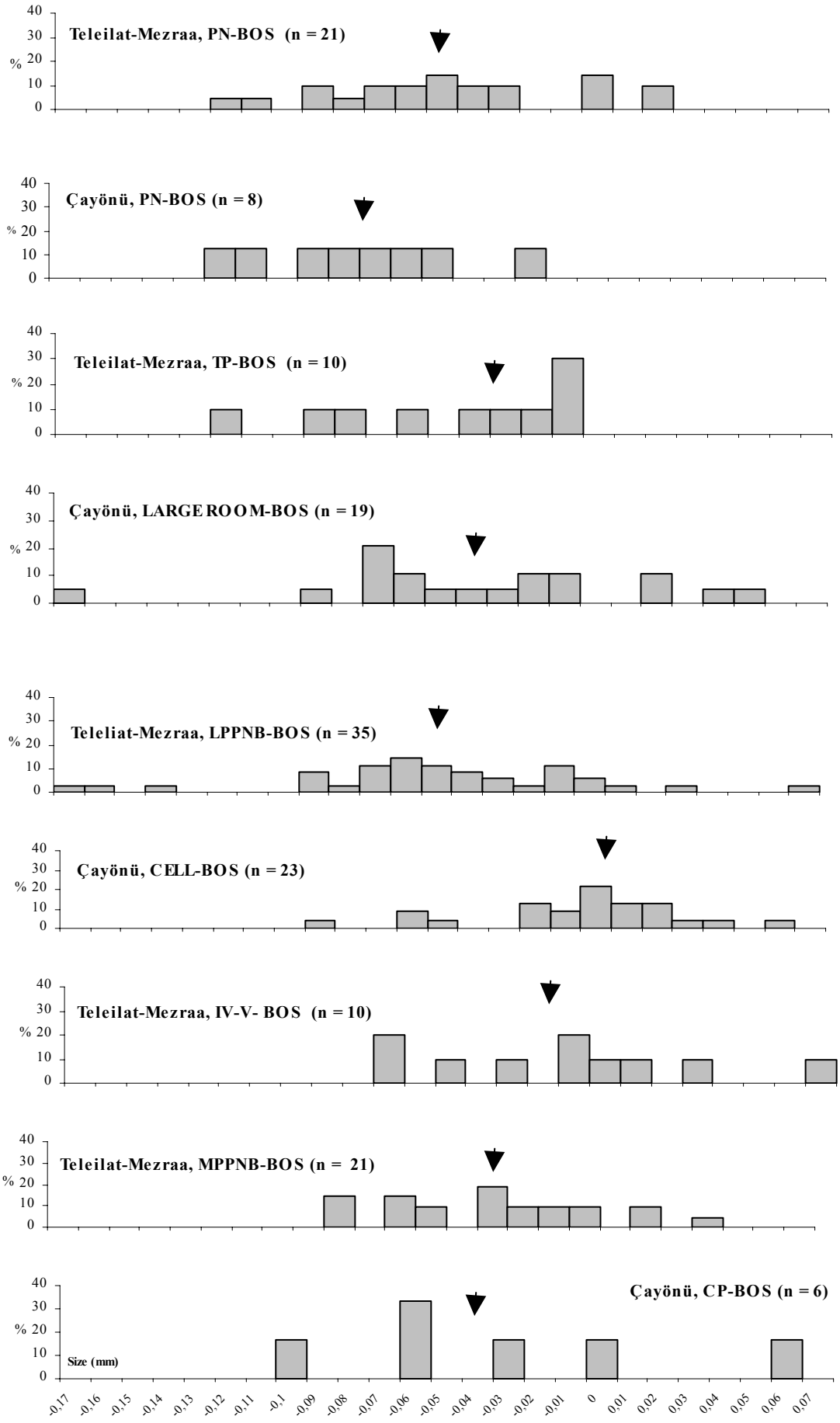
Teleilat-Mezraa, PN-BOS (n = 21)
Çayönü, PN-BOS (n = 8)
Teleilat-Mezraa, TP-BOS (n = 10)
Çayönü, LARGEROOM-BOS (n = 19)
Teleliat-Mezraa, LPPNB-BOS (n = 35)
Çayönü, CELL-BOS (n = 23)
Teleilat-Mezraa, IV-V- BOS (n = 10)
Teleilat-Mezraa, MPPNB-BOS (n = 21)
Çayönü, CP-BOS (n = 6)
%
Size (mm)
0 10 20 30 40
-0,17 -0,16 -0,15 -0,14 -0,13 -0,12 -0,11 -0,1 -0,09 -0,08 -0,07 -0,06 -0,05 -0,04 -0,03 -0,02 -0,01 0 0,01 0,02 0,03 0,04 0,05 0,06 0,07

Fig. 68 (page before):

Size index distributions for cattle from Mezraa-Teleilat and Çayönü. The median value for each level is indicated by the arrow. The measurements of a wild cow from the Danish site of Ullerslev are used as the standard (Degerbøl 1970; Grigson 1989).

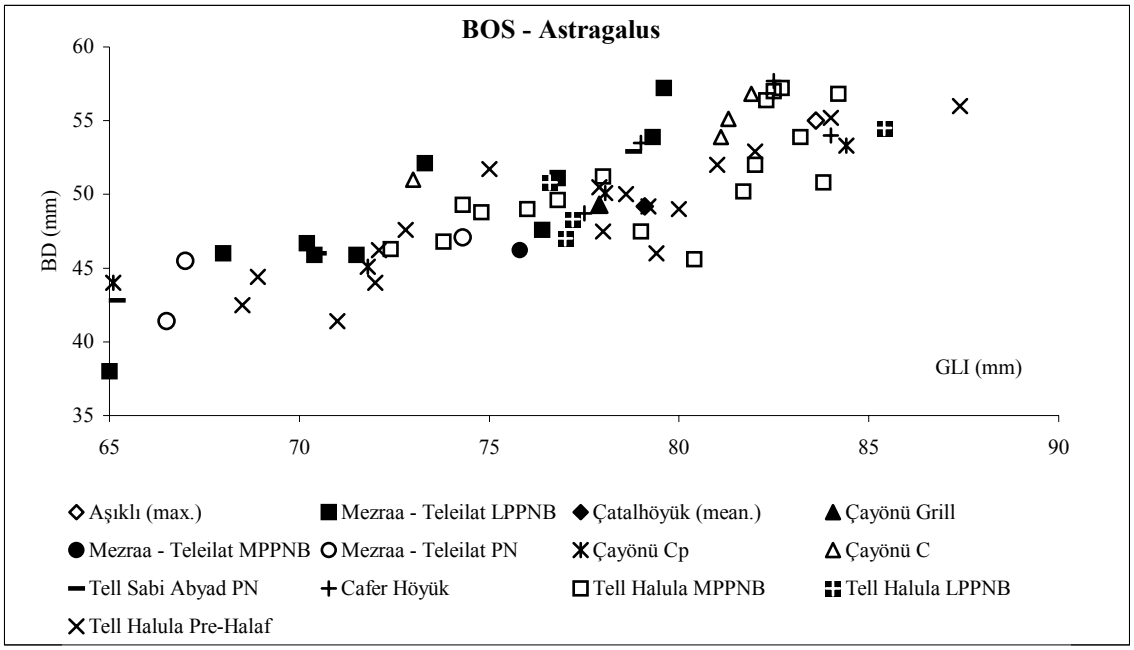

Fig. 69: Greatest length (GLI) and breadth of distal (Bd) Bos astragalus from Mezraa-Teleilat, Çayönü (Öksüz 1998 and 2000), Aşıklı (Payne 1985), Cafer Höyük (Helmer 1988), Tell Halula (Saña Segui 1999), Çatalhöyük (Payne 1985; Ducos 1978), Tell Sabi Abyad I (Cavallo 2000).

The following figure (Fig. 73) presents the log size index for pig bones from Çayönü and Mezraa-Teleilat. The log size index for pig bones from Çayönü, using the same standard animal, is shown in Figure 30. There are marked differences between Çayönü (PPN and PN) and the assemblages from Mezraa-Teleilat. Except in the PN, all levels of the site have smaller median values than Çayönü.

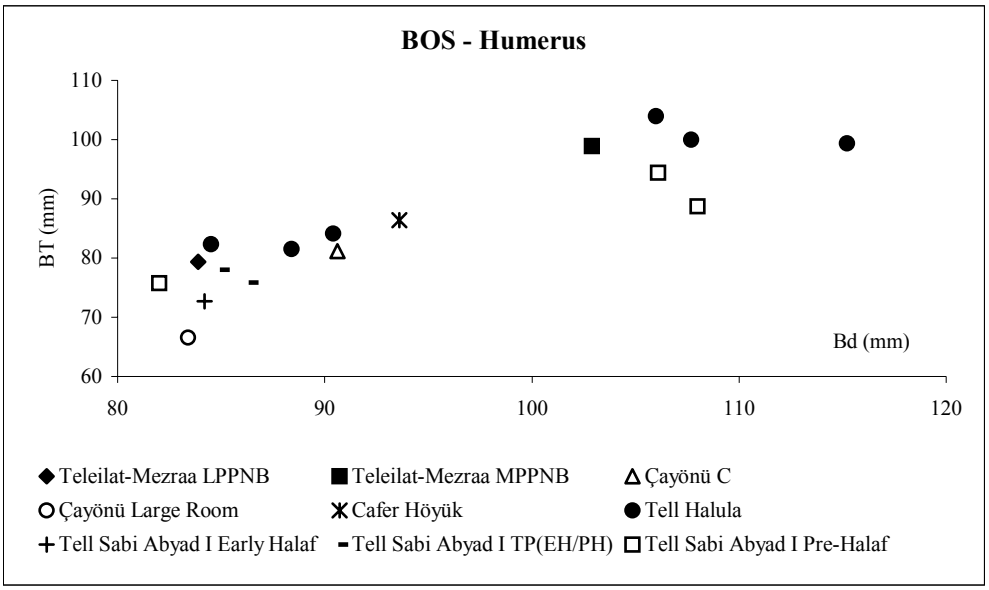

Fig. 70: Breadth of distal (Bd) and breadth of trochlea of Bos humerus from Mezraa-Teleilat, Çayönü (Öksüz 1998 and 2000; Hongo et al. 2002 and 2004), Tell Sabi Abyad I (Cavallo 2000), Cafer Höyük (Helmer 1988), Tell Halula (Saña Segui 1999).

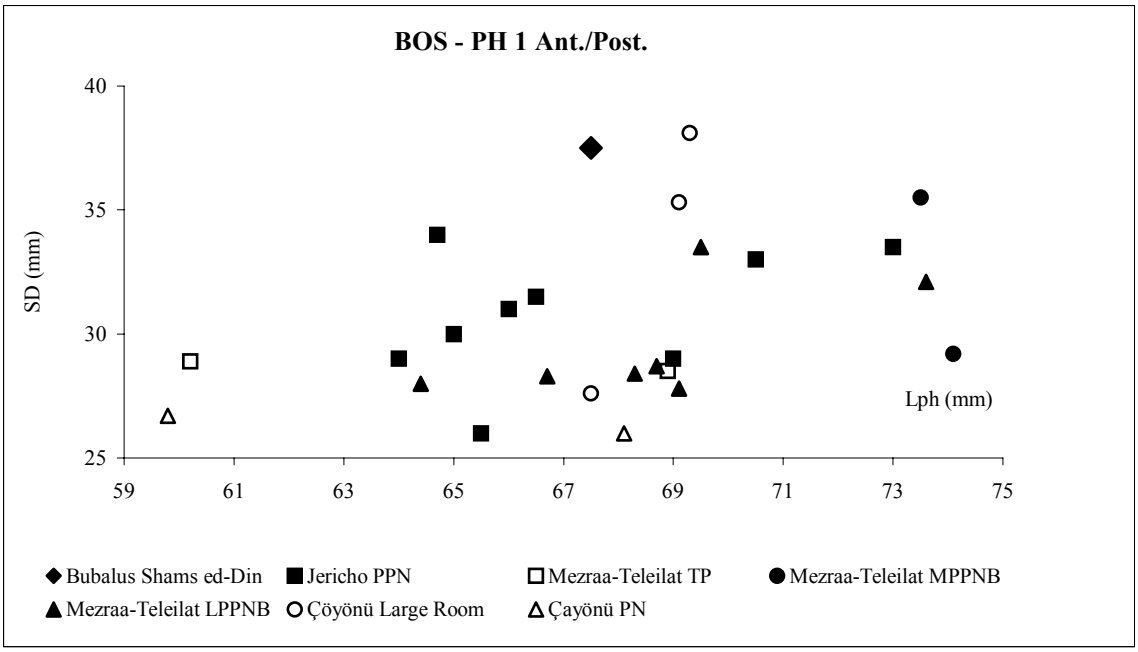

Fig. 71: Length and smallest depth measurements of the Bos ph 1 from Mezraa-Teleilat, Jericho (Clutton-Brock 1983), Çayönü (Öksüz 1988 and 2000; Hongo et al. 2002 and 2004), with *Bos bubalus* measurements from Shams ed-Din given as well (Uerpmann 1982).

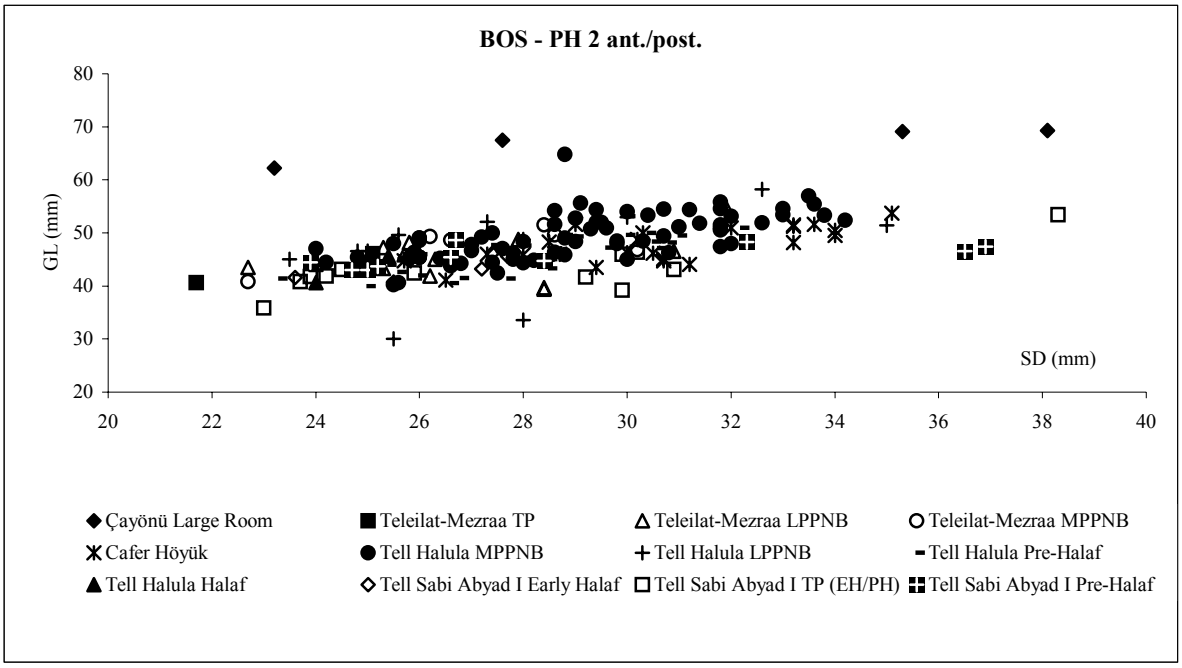

Fig. 72: Smallest diaphysis (SD) and greatest length (GL) of Bos Ph 2 ant./post. from Mezraa-Teleilat, Çayönü (Öksüz 1998 and 2000; Hongo et al. 2002 and 2004), Cafer Höyük (Helmer 1998), Tell Halula (Saña Segui 1999) and Tell Sabi Abyad I (Cavallo 2000).

The process of domestication for cattle and pig began at Mezraa-Teleilat in the MPPNB period. All four animals are certainly domesticated as early as in the LPPNB period.

The measurements of the length of the third mandibular molar of modern wild pigs were established by K. Flannery[349] in the Middle East. These wild pig mandibular third molar measurements are compared with Mezraa-Teleilat, Hallan Çemi, Jericho and Çayönü in Figure 74. K. Flannery's wild pig measurements are presented at the bottom of the chart because only length measurements are available.[350] Unfortunately, we have only two third mandibular molar measurements from Mezraa-Teleilat. One LPPNB specimen is smaller than K. Flannery's minimum value for wild pig in the Middle East. It is nearly the same length as a specimen from the Cayönü Cobble-Paved subphase.[351]

[349] Flannery 1983.

[350] Flannery 1983.

[351] cf. Flannery 1983.

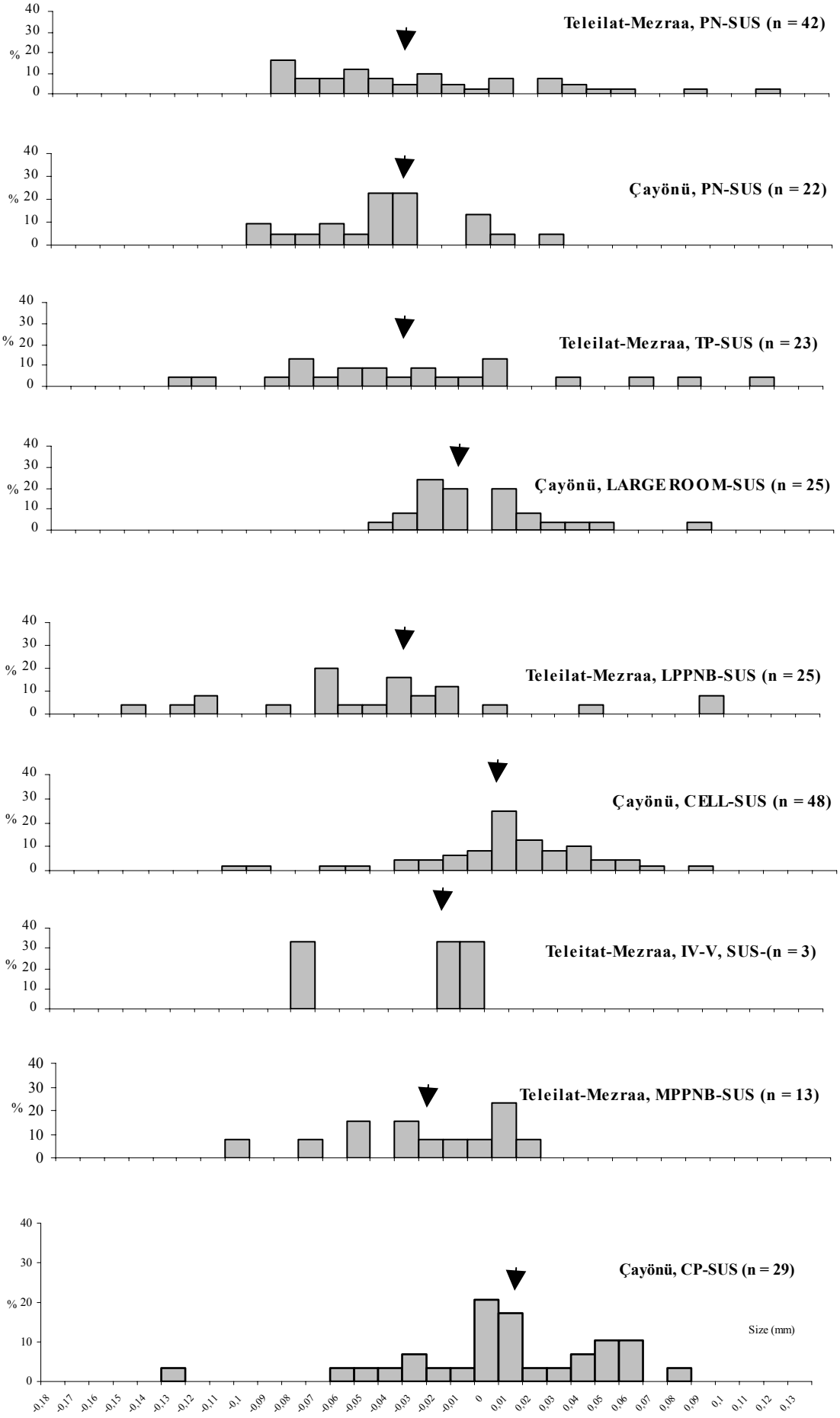
Teleilat-Mezraa, PN-SUS (n = 42)
Çayönü, PN-SUS (n = 22)
Teleilat-Mezraa, TP-SUS (n = 23)
Çayönü, LARGE ROOM-SUS (n = 25)
Teleilat-Mezraa, LPPNB-SUS (n = 25)
Çayönü, CELL-SUS (n = 48)
Teleitat-Mezraa, IV-V, SUS-(n = 3)
Teleilat-Mezraa, MPPNB-SUS (n = 13)
Çayönü, CP-SUS (n = 29)
%
Size (mm)

Fig. 73 (page before):

Comparison of size index distributions for pig from Mezraa-Teleilat and Çayönü. The median value for each level is indicated by arrows. The measurements of a wild pig from Elazığ are used as the standard (Hongo/Meadow 1998 and 2000). See for the standard measurements Appendix 2.

The other sample, dated to the MPPNB, is slightly larger than K. Flannery's minimum value, as is the case for a specimen from Çayönü (Cobble-Paved subphase; PPNB).[352] Both measurements available from our site are smaller than the measurements of specimens from Hallan Çemi and Jericho (PPNA).

The greatest length (L) and breadth (B) of a Sus upper third molar from several places are compared with K. Flannery's[353] modern wild pig, though only length measurements are available in Figure 75. Only one measurement from Mezraa-Teleilat is available (LPPNB). This specimen is larger than the above-mentioned minimum.[354] Only some of K. Flannery's wild specimens and Tell Halula's measurements are larger than the Mezraa-Teleilat specimen.[355] All samples from Tell Sabi Abyad and also one specimen from Gritille are smaller than our upper molar.

The length and greatest breadth of the upper second molar from Mezraa-Teleilat are plotted in Figure 76. Only one upper second molar was observed from our settlement. The minimum, mean and maximum measurements of modern wild specimens measured by K. Flannery are included in the same figure, as well as the upper second molar measurements from Gritille and Tell Halula. According to the data, our specimen is smaller than even K. Flannery's minimum value for modern wild pig and smaller than the sample from Gritille. Just one specimen from Tell Halula is smaller than our specimen (MPPNB).

[352] cf. Flannery 1983.

[353] Flannery 1983.

[354] Flannery 1983.

[355] Flannery 1983.

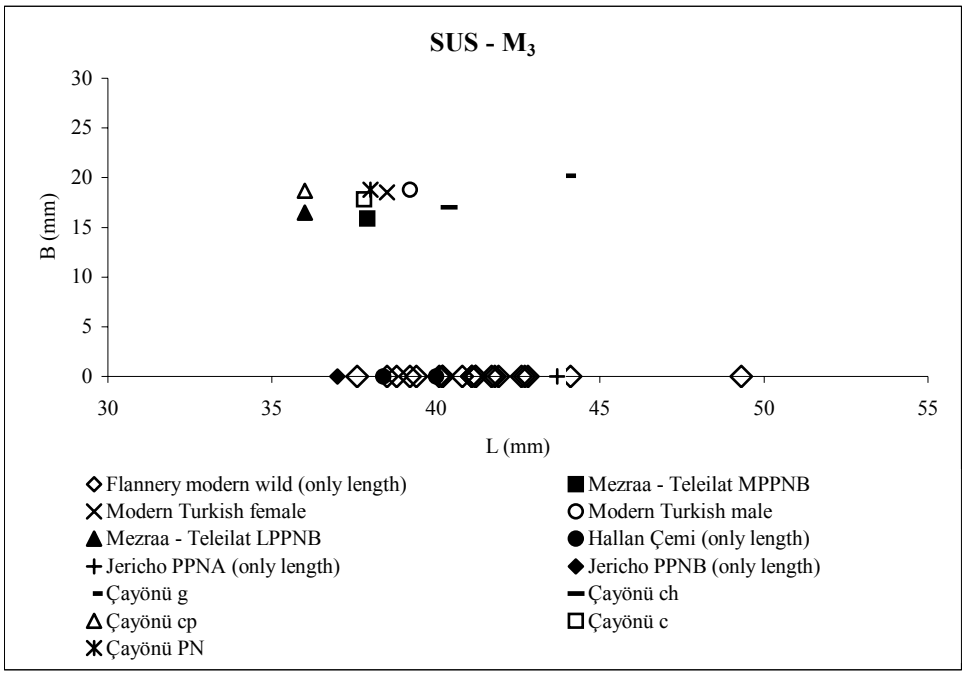

Fig. 74: Comparison of greatest length (L) and breadth (B) of Sus mandibular third molar from Mezraa-Teleilat, Jericho (Clutton-Brock 1983), Çayönü (Hongo et al. 1998 and 2000), Hallan Çemi (Rosenberg/Redding 1998) to modern Turkish female and male pigs (female, from the Elazığ region; Harvard University, specimen number 51621 and a male from the H. Hongo collection) and Flannery's modern wild pig.

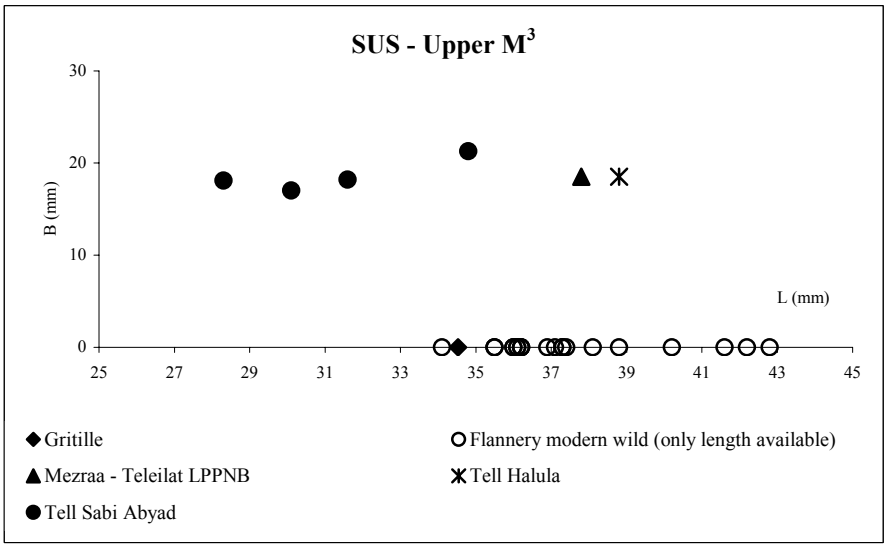

Fig. 75: Comparison of greatest length (L) and breadth (B) of a Sus upper third molar from Mezraa-Teleilat, Gritille (Stein 1986a and 1989), Tell Sabi Abyad (Cavalli 2000), Tell Halula (Saña Segui 1999) to Flannery's modern wild pig (Flannery 1983; only length measurements are available).

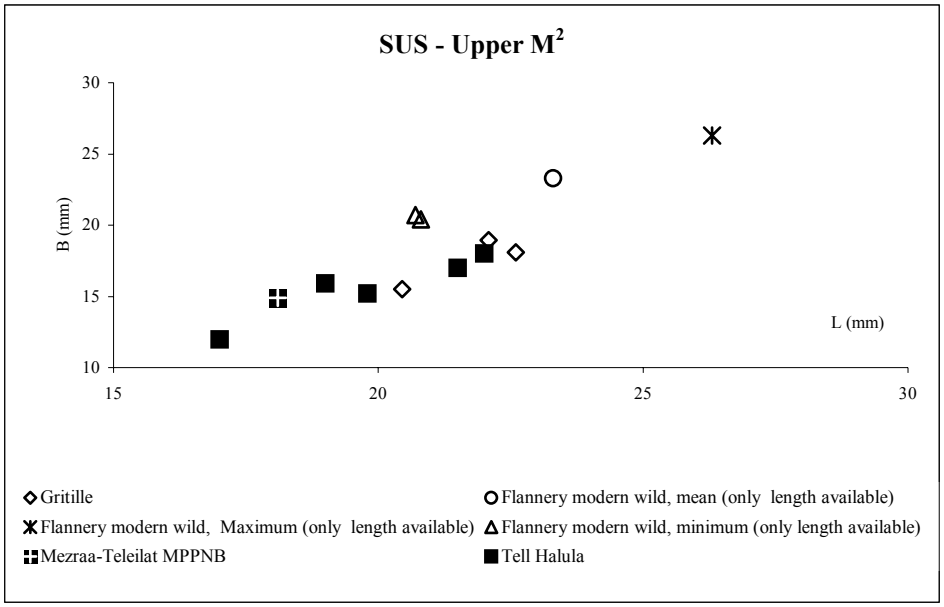

Fig. 76: Comparison of greatest length (L) and breadth (B) of Sus upper second molar from Mezraa-Teleilat, Gritille (Stein 1986a and 1989), Tell Halula (Saña Segui 1999) with K. Flannery's modern wild pig. Only length measurements are available.

Figure 77 presents measurements for the breadth of distal (Bd) and breadth of trochlea (BT) of Sus humerus measurements from different sites. The largest specimen came from Tell Sabi Abyad (Pre-Halaf level), the smallest specimen from our settlement (PN).

The breadth of distal (Bd) and greatest length of lateral (GLI) Sus astragalus from Mezraa-Teleilat, Çayönü and Tell Halula are compared in Figure 78. The smallest specimens came from Mezraa-Teleilat (LPPNB and PN), the largest specimen belongs to the Çayönü Cell subphase. Measurements from the MPPNB are larger than those of later periods.

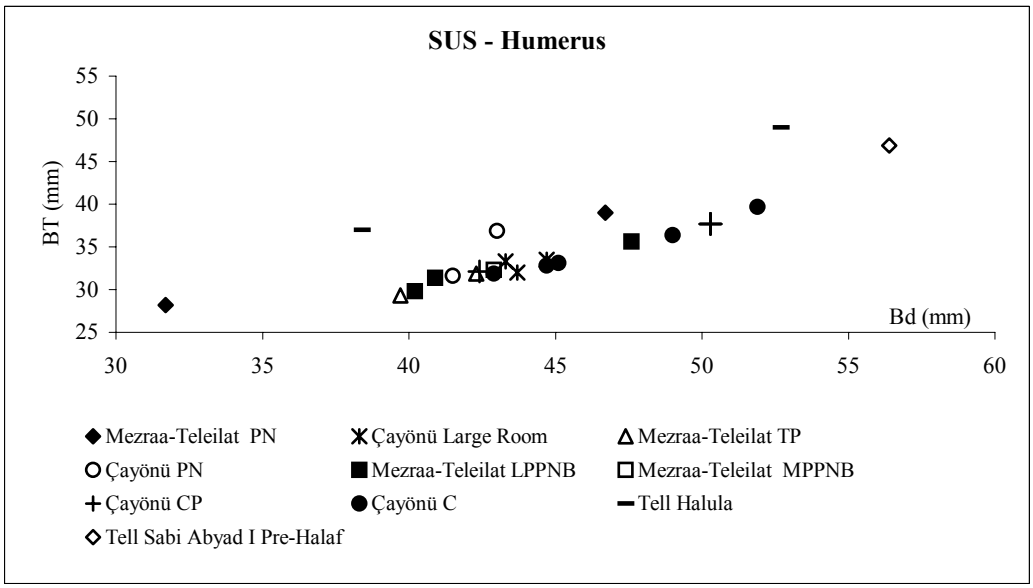

Fig. 77: Breadth of distal (Bd) and breadth of trochlea (BT) of Sus humerus from Mezraa-Teleilat Çayönü (Hongo et al. 1998 and 2000), Tell Sabi Abyad I (Cavallo 2000), Tell Halula (Saña Segui 1999).

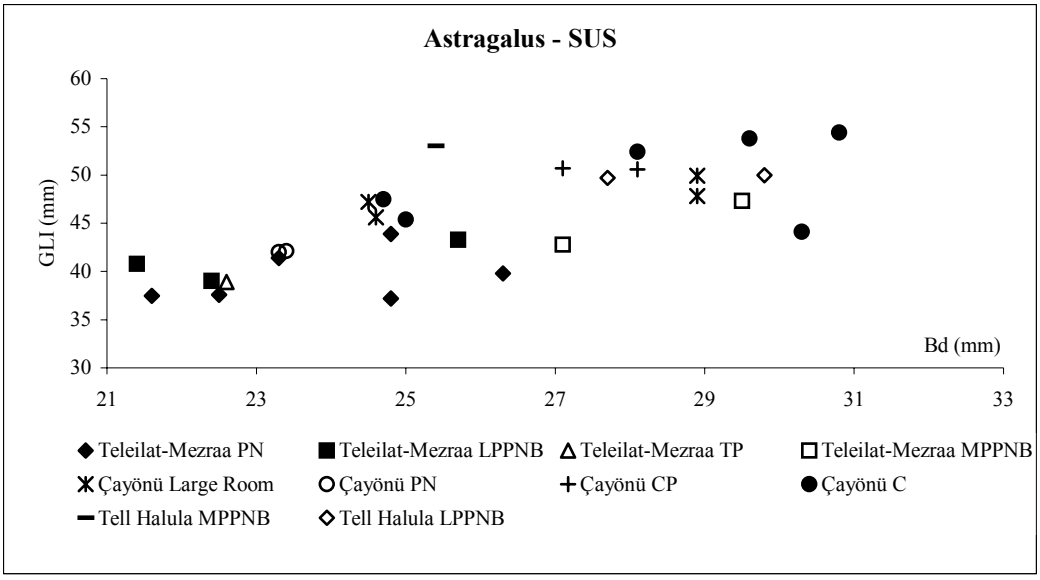

Fig. 78: Breadth of distal (Bd) and greatest length of lateral (GLI) of Sus astragalus from Mezraa-Teleilat, comparing with Çayönü (Hongo et al. 1998 and 2000) and Tell Halula (Saña Segui 1999).

12. CONCLUSION

Mezraa-Teleilat is the one of the most important sites in southeastern Anatolia, where faunal assemblages have been recovered from the entire span of the PPN and the PN periods. At the present state of analysis, sheep appear to have been the dominant animal species at Mezraa-Teleilat. Ovicaprids are the most dominant animal during all the periods at the site, followed by pigs and cattle. Among the identified caprine specimens sheep dominates; the ratio of sheep to capra is 4,6:1 in the MPPNB, 5,5:1 in the LPPNB, 5,7:1 in the TP and 2,3:1 in the PN. In the earlier levels (MPPNB and LPPNB) cattle were the second most abundant taxa, but from the TP the ratio of pig increased, becoming the second important taxa at the site.

The size diminution of animal bones and the survival curves based on epiphyseal fusion indicate a high percentage of sheep, goat, pig and cattle, probably all domesticated. The vast majority of log size indices are smaller than the standards, although a few larger ovicaprids are also represented. Both the kill-off patterns (most ovicaprids were killed between 12-18 months) and the size of the ovicaprids point to a fully domesticated population. Domestic sheep and goat played an increasingly important role in the economy of the site. There is a strong possibility that both sheep and goat were not locally domesticated but were introduced to the site already domesticated. Even in the earliest period (MPPNB) the size diminution can be observed and the proportion of the smaller individuals are high. This tendency is also apparent at Gürcütepe, another Pre-Pottery settlement in the Şanlıurfa region. The earliest excavated period at Mezraa-Teleilat is the MPPNB, but levels of the PPN still continue some meters deep. If earlier material were available, the description of the settlement presented above might change somewhat. In contrast to sheep/goat, cattle and pig were probably domesticated locally. In the MPPNB period small and large individuals can be observed and a more gradual size diminution is visible. However, some tooth eruption and wear analyses indicate older individuals. This kill-off pattern indicates that these animals were used for their meat rather than for secondary products such as milk, etc. The kill-off pattern of older individuals could be related to hunting. The hunting of wild animals continued throughout the PN levels but did not play an important role in the subsistence economy at Mezraa-Teleilat. Gazelle was the prime focus of hunting, though a few *Equus hemionus* were hunted as well. Interestingly, in earlier periods, *Equus hemionus* was not found in the assemblage; they appear for the first time in the TP.

The presence of a few specimens from small pigs and cattle and a slightly earlier kill-off in the LPPNB level might be significant. At least some pigs and cattle were being kept in the site

perhaps as early as in the MPPNB level, and most certainly in the LPPNB level. Analysis of the material from the oldest levels will have to wait until further excavations are resumed. Work in these levels is of critical importance in helping us to understand whether the patterns of animal exploitation were different in the earlier levels at Mezraa-Teleilat. Future work will also examine the domestication process at the site as well as in southeastern Anatolia.

The pig skeletons found in the PN provide evidence that they were kept in the settlement. These skeletons might possibly be related with a cult building discovered in the PPN period, but in all likelihood they are related to animal penning. Three goat individuals were found inside building AG. In addition to these animal skeletons two foetal sheep/goat skeletons were recovered from the TP period. These skeletons, however, belong to an excavation unit near building AG in which the goat skeletons mentioned above were discovered. This is further evidence of animal penning at the site as early as the TP. Other archaeological finds support the animal bone analysis. Many animal figurines have been found from different levels. They are generally made of clay, but a few sample were made of bone. A detailed study of these figurines has not yet been undertaken, but on a preliminary basis it is clear that they represent mostly ovicaprids and cattle (including aurochs, according to stylistic criteria). These figurines might indicate a very close relationship between the animals and the site.

The absence of the half ass *(Equus hemionus*) in the PPN levels of Mezraa-Teleilat is interesting. They appeared first in the TP and increased in the PN. This tendency is known from Sabi Abyad II (PPN) and Sabi Abyad (PN). Onagers are typical animals of the steppe regions that feed on grasses/shrubs. The settlement of Mezraa-Teleilat is situated very near to the Euphrates, while the steppe area lies a little further away. But people did not have to go to the steppic region. R. Neef suggested that agricultural plants exist even in the earliest phase (MPPNB) of the site. The present evidence suggests that agriculture and domestic animals were sufficient to feed the population of Mezraa-Teleilat, and that the human population did not have to hunt gazelle on a regular basis because gazelle herds came to the river valley, due to birth seasons, etc.

Mezraa-Teleilat's subsistence economy was very similar to that at Akarçay Tepe. Akarçay Tepe lies some kilometers from Mezraa-Teleilat and reveals a similar animal exploitation pattern to that at Mezraa-Teleilat. At Akarçay Tepe, animal husbandry already occurred as early as the MPPNB period. It is certain that Ovicaprids were domesticated by the beginning of the MPPNB, and that pig and cattle were also domesticated as well.

13. SUMMARY

Mezraa-Teleilat, located in the province of Şanlı Urfa (5 km south of Birecik), is a settlement in southeastern Anatolia with a sequence without interruption from the PPN to the PN (excavations were under the direction of Prof. Dr. M. Özdoğan, İstanbul University). The site was excavated between 1999–2004. The faunal remains were analyzed for the work described above. More than 34,900 (165.21 kg bones) animal bones were recovered from the Neolithic levels. A total of 10,930 of them have been identified to taxon and element. Sheep/goat, pig and cattle predominate. They represent all together about 96% of the identified faunal remains. Over time the proportions of the taxa indicate few differences. The size diminution of the animal bones and the survival curves based on epiphyseal fusion indicate that sheep, goat, pig and cattle were probably domesticated at high percentage rates. Domestic sheep and goat played an increasingly important role in the economy of the site. There is a strong possibility that sheep and goat were not domesticated locally but were brought to the site as domesticated animals. In contrast to the ovicaprids, cattle and pig appeared to have been domesticated locally. The hunting of wild animals (with a focus on Gazelle, but also on Fallow deer and *Equus hemionus*) continued throughout the PN, but did not play an important role in the subsistence economy at Mezraa-Teleilat. Pig skeletons were found in the PN levels, providing evidence that these animals were kept in the settlement.

14. ZUSAMMENFASSUNG

Die Siedlung Mezraa-Teleilat liegt in der Provinz Şanlı Urfa, 5 km südlich von Birecik in Südostanatolien. Die Ausgrabungen erbrachten eine Sequenz vom akeramischen bis zum keramischen Neolithikum (Ausgrabungen unter der Leitung von Prof. Dr. M. Özdoğan, Universität İstanbul). Die Feldarbeiten fanden von 1999 bis 2004 statt.

Für die vorliegende Doktorarbeit wurden die Tierknochen ausgewertet. Mehr als 34.900 (165,21 kg) Knochen aus den neolithischen Schichten wurden analysiert. 10.930 von ihnen konnten tierartlich bestimmt werden. Demnach dominieren Schaf/Ziege, Schwein und Rind. Sie haben einen Anteil von ca. 96%. Im Laufe der Besiedlungszeit am Fundplatz ändern sich die Anteile der Tierarten geringfügig. Sie deuten darauf hin, dass Schaf, Ziege, Schwein und Rind in einem hohen Anteil wohl domestiziert waren. Domestizierte Schafe und Ziegen spielten eine bedeutende Rolle für die Fleischversorgung. Mit großer Wahrscheinlichkeit sind

Schaf und Ziege nicht lokal domestiziert und von außerhalb eingeführt worden. Im Gegensatz dazu sind Rinder und Schweine vermutlich lokal domestiziert. Die Jagd auf Wildtiere (hauptsächlich Gazelle, auch Hirsch und *Equus hemionus*) erfolgte weiterhin, bis in das keramische Neolithikum. Sie spielte aber keine wichtige Rolle für die Subsistenz von Mezraa-Teleilat. Schweineskelette wurden in Schichten des keramischen Neolithikums gefunden. Sie geben einen Hinweis darauf, dass die Tiere innerhalb der Siedlungen gehalten wurden.

15. REFERENCES

Akkermans, P. A., J. A. K. Boerma, A. T. Clason, S. G. Hill, E. Lohof, C. Meiklejohn, M. le Mière, G. M. F. Molgat, J. J. Roodenberg, W. Waterbolk-van Rooyen, W. van Zeist 1983

Bouqras Revisited: Preliminary Report on a Project in Eastern Syria. *Proceedings of the Prehistoric Society 49*:335-372.

Algaze, G. 1992

The Cultural Aspects of the Güneydoğu Anadolu Projesi/Güneydoğu Projesinin Kültürel Yanları. *Arkeoloji ve Sanat 56/57*:3-15.

Algaze, G., R. Breuninger, C. Lightfoot and M. Rosenberg 1991

The Tigris-Euphrates Archaeological Reconnaissance Project, 1989-90. *Anatolica XVII*:175-240.

Algaze G., R. Breuninger, J. Knudstad 1994

The Tigris-Euphrates Archaeological Reconnaissance Project : Final Report of the Birecik and Carchemish Dam Survey Areas. *Anatolica XX*:1-71.

Atalay İ. 1994

Türkiye Coğrafyası. Ege Üniversitesi Yayınevi. İzmir.

Atalay, İ., K. Mortan 1997

Türkiye Bölgesel Coğrafyası. İnkilap Yayınevi. İstanbul.

Balkan-Atlı, N., F. Borell, R. Buxo, G. Duru, J. J. Ibanez, O. Maede, M. Molist, M. Özbaşaran, R. Piquet, M. Saña, J. Wattez 2002

Akarçay Tepe 2000. In: N. Tuna, J. Velibeyoğlu (eds.). *Ilısu ve Karkamış Baraj Gölleri Altında Kalacak Arkeolojik ve Kültür Varlıklarını Kurtarma Projesi 2000 Yılı Çalışmaları (Salvage Project of the Archaeological Heritage of the Ilısu and Carchemish Dam Reservoirs Activities in 2000).* Centre for Research and Assessment of the Historic Environment (TAÇDAM). Middle East Technical University. Ankara:287-308.

Banister, K. E. 1980

The Fishes of the Tigris and Euphrates Rivers. In: J. Rzoska, J. F. Talling, F. R. S. K. E. Banister (eds.). *Euphrates & Tigris, Mesopotamian Ecology and Destiny*. Dr. W. Junk Publishers. Monographiae Biologicae 38. The Hague. Boston:95-108.

Bar-Yosef, O., A. Belfer Cohen 1991

From Sedentary Hunter-Gatherers to Territorial Farmers in the Levant. In: S.A. Gregg (ed.). *Between Bands and States*. Occasional Paper No. 9. Center for Archaeological Investigations. Carbondale:181-202.

Bar-Yosef, O., A. Belfer Cohen 1992

From Foraging to Farming in the Mediterranean Levant. In: A.B. Grebauer, T. D. Price (eds.). *Transitions to Agriculture in Prehistory*. Prehistory Press. Wisconsin:21-48.

Bar-Yosef, O., R. H. Meadow 1995

The Origins of Agriculture in the Near East. In: T. Douglas, P. Gebauer, A. Gebauer (eds.). *Last Hunters, First Farmers: New Perspectives on the Prehistoric Transition to Agriculture*. School of American Research Press. Santa Fe:39-94.

Başgelen, N. 2002

Birecik-Suruç, Türkiye Kültür Envanteri Pilot Bölge Çalışmaları. T. C. Kültür Bakanlığı. Türkiye Bilimler Akademisi. Ankara.

Becker, C. 1998

The Role of Hunting in Pre-Pottery Neolithic Pastoralism and Its Ecological Implications: The Basta Example (Jordan). *Anthropozoologica 27*:67-78.

Becker, C. 2000

Bone and Species Distribution in Late PPNB Basta (Jordan) – Rethinking the Anthropogenic Factor. In: H. Buitenhuis, M. Mashkour, A. L. Choyke (eds.). *Archaeozoology of the Near East IVA.* ARC-Publications. Groningen:196-207.

Benecke, N. 1994

Der Mensch und seine Haustiere. Die Geschichte einer jahrtausendealten Beziehung. Theiss. Stuttgart.

Bengisu, M. 1986

Urfa İlinin Coğrafyası. Urfa.

Berry, R. J. 1969

The Genetical Implications of Domestication in Animals. In: P. J. Ucko, G. W. Dimbleby (eds.). *The Domestication and Exploitation of Plants and Animals*. Gerald Duckworth&Co Ltd. London:207-217.

Bischoff, D. 2004

Canew 14C database. In: F. Gerard, L. Thissen (eds.). *The Neolithic of Central Anatolia, Internal Developments and External Relations During the 9th – 6th Millennia*

Cal. BC. Preceedings of the International CANeW Table Ronde İstanbul. 23-24 November 2001. Central Anatolian Neolithic e-Workshop. Ege Yayınları.

Boessneck, J. 1969

Osteological Differences Between Sheep (*Ovis aries* Linné) and Goat (*Capra hircus* Linné). In: D. Brothwell, E. Higgs, G. Clark (eds.). *Science in Archaeology*. Thames and Hudson. Bristol:331-358.

Boessneck, J. 1983

Die Domestikation und Ihre Folgen. In: H. Müller-Karpe (ed.). Zur Frühen Mensch-Tier-Symbiose. Kolloquien zur Allgemeinen und Vergleichenden Archaologie Band 4. DAI Berlin:5-23.

Boessneck, J., H. H. Müller, F. M. Teichert 1964

Osteologische Unterscheidungsmerkmale zwischen Schaf (*Ovis aries* Linné) und Ziege (*Capra hircus* Linné). *Kühn-Archiv. 78*:1-129.

Boitani, L., S. Bartoli 1983

Simon & Schuster's Guide to Mammals. S. Anderson (U.S. ed.). A Fireside Book. Published by Simon&Schuster Inc. New York.

Bökönyi, S. 1969

Archaeological Problems and Methods of Recognizing Animal Domestication. In: P.J. Ucko and G. Dimbleby (eds.). *The Domestication and Exploitation of Plants and Animals*. Duckworth. London:219-229.

Bökönyi, S. 1972

Zoological Evidence for Seasonal or Permanent Occupation of Prehistoric Settlements. In: P. J. Ucko, R. Tringham, G. W. Dimbleby (eds.). *Man, Settlement and Urbanism*. Duckworth. London:121-126.

Bökönyi, S. 1977

Animal Remains from the Kermanshah Valley, Iran. BAR International Series Number 34. Oxford.

Bökönyi, S. 1989

Definition of Animal Domestication. In: J. Clutton-Brock (ed.). *The Walking Larder, Patterns of domestication, pastoralism and predation*. Unwin Hyman. London:22-27.

Braidwood, R. J. 1960

Prehistoric Investigations in Iraqi Kurdistan. The Oriental Institute of the University of Chicago Studies in Ancient Oriental Civilization 31. Chicago:University of Chicago Press. Chicago.

Braidwood, R. J. 1995

Tarihöncesi İnsan. (Translation of Prehistoric Men. published in 1975. Scott Freeman and Co. Glenview Illinois.). Arkeoloji ve Sanat Yayınları. İstanbul.

Braidwood, R. J., B. Howe, C. A. Reed 1961

The Iranian Prehistoric Project. *Science 133*:2008-2010.

Buitenhuis, H. 1985

Preliminary Report on the Faunal Remains of Hayaz Höyük from the 1979-1983 Seasons. *Anatolica XII*:62-74.

Buitenhuis, H. 1988

Archeozoölogisch Onderzoek Langs de midden-Eufraat. Onderzoek van het faunamateriaal uit zes nederzettingen in Zuidoost-Turkije en Noord-Syrië daterend van ca. 10.000 BP tot 1400 AD. Unpublished Ph.d. Rijksuniversiteit Groningen. Amsterdam.

Buitenhuis, H. 1997

Aşıklı Höyük: A'Prododomestication' Site. In: M. Kokabi and J. Wahl (eds.). Proceedings of the 7th ICAZ Conference Actes du 7e Colloque International d'Archeozoologie. Beitrage des 7. ICAZ-Kongress (Konstanz, 26/09/1994-01/10/1994). L'Homme et I'Animal. Societe de Recherche Interdisciplinaire. *Anthropozoologica 25-26*:655-662.

Buitenhuis, H. 2002

The Transition from Foraging to Farming: The Archaeozoological Perspective in Anatolia. In: R. T. J. Cappers and S. Bottema (eds.). *The Dawn of Farming in the Near East. Studies in Early Near Eastern Production. Subsistence and Environment 6*. Ex Oriente. Berlin:183-189.

Bull G., S. Payne 1988

Components of Variation in Measurements of Pig Bones and Teeth, and the Use of Measurements to Distinguish Wild from Domestic Pig Remains. *Archaeozoologia II/1,2*:27-66.

Cauvin, J. 1985

Le Néolithique de Cafer Höyük (Turquie). Bilan provisoire après quatre campagnes (1979-1983). *Cahiers de I'Euphrate 4*:123-133.

Cauvin, J. 1988

La Néolithisation de la Turquie du Sud-Est dans son contexte proche-oriental. *Anatolica XV*:70-80.

Cauvin, J. 1989a

La néolithisation au Levant et sa première diffusion. In: O. Aurenche, J. Cauvin (eds.). *Néolithisations.* B.A.R International Series Number 516. Oxford.

Cauvin, J. 1989b

La stratigraphie de Cafer Höyük-Est (Turquie) et les origines du PPNB du Taurus, *Paléorient 15/1*:75-85.

Cauvin, J., O. Aurenche, M.-C. Cauvin, N. Balkan-Atlı 1999

The Pre-Pottery Site of Cafer Höyük. In: M. Özdoğan, N. Başgelen (eds.). Neolithic in Turkey. Arkeoloji ve Sanat Yayınları. İstanbul:87-103.

Cauvin, M.-C. L., J. Cauvin, 1993

La sequence neolithique PPNB au Levant nord. *Paleorient 19/1*:23-28.

Cavallo, C. 1995

Some Observations on the Animal Remans from the Pre-Halaf Levels of Tell Sabi Abyad, Northern Syria. In: H. Buitenhuis, H.-P. Uerpmann (eds.). *Archaeozoology of the Near East II*. Backhuys publihers. Leiden:45-51.

Cavallo, C. 1996

The Animal Remains-A Preliminary Account. In: P .M. M. G. Akkermans (ed.). *Tell Sabi Abyad. The Late Neolithic Settlement. Report on the Excavations of the University of Amsterdam (1988) and the National Museum of Antiquities Leiden (1991-1993) in Syria II*. Nederlands Historisch-Archaeologisch Instituut te İstanbul:475-566.

Cavallo, C. 2000

Animals in the Steppe. A Zooarchaeological Analysis of Later Neolithic Tell Sabi Abyad Syria. B. A. R. International Series Number 891.

Childe, G. 1988

Kendini Yaratan İnsan. (Translation of Man Make Himself. Filiz Ofluoğlu, translator). Varlık Yayınları. Reprint. İstanbul.

Clason, A. T. 1980

The Animal Remains from Tell es Sinn Compared with those from Bouqras. *Anatolica VII*:35-53.

Clutton-Brock, J. 1971

The Primary Food Animals of the Jericho Tell from the Proto-Neolithic to the Byzantine period. *Levant III*:41-55.

Clutton- Brock, J. 1979

The Mammalian Remains from the Jericho Tell. *Proceedings of the Prehistoric Society 45*:135-157.

Clutton-Brock, J. 1981

Domesticated Animals from Early Times. Heinemann&British Museum (Natural History). London.

Clutton-Brock, J. 1983

Appendix L: The Animal Remains: A Summary. In: K. M. Kenyon, T. A. Holland (eds.). *Excavations at Jericho V. The Pottery Phases of the Tell and Other Finds*. Britisch School of Archaeology in Jerusalem. London:802-803.

Clutton-Brock J., H.-P. Uerpmann 1974

The Sheep of Early Jericho. *Journal of Archaeological Science 1*:261-274.

Collier, S., J. P. White 1976

Get them Young? Age and Sex Inferences on Animal Domestication in Archaeology. *American Antiquity 41/1*:96-102.

Coskunsu, G. 2001

Mezraa-Teleilat Yontmataş Buluntu Topluluğu. In: N. Tuna, J. Öztürk, J. Velibeyoğlu (eds.). *Ilısu ve Karkamış Baraj Gölleri Altında Kalacak Arkeoloji ve Kültür Varlıklarını Kurtarma Projesi 1999 Yılı Çalışmaları / Salvage Project of the Archaeological Heritage of the Ilısu ve Karkamış Dam Reservoirs Activities in 1999*. Centre for Research and Assessment of the Historic Environment (TAÇDAM). Middle East Technical University. Ankara:175-178.

Coskunsu, G. 2002

Mezraa-Teleilat Yontmataş Endüstrisi/Mezraa-Teleilat Chipped Stone Industry. In: N. Tuna, J. Velibeyoğlu (eds.). *Ilısu ve Karkamış Baraj Gölleri Altında Kalacak Arkeoloji ve Kültür Varlıklarını Kurtarma Projesi 2000 Yılı Çalışmaları / Salvage Project of the Archaeological Heritage of the Ilısu ve Karkamış Dam Reservoirs Activities in 2000*. Centre for Research and Assessment of the Historic Environment (TAÇDAM). Middle East Technical University. Ankara:143-158.

Daly, P., D. Perkins, I. Milling Drew 1973

The Effects of Domestication on the Structure of Animal Bone. In: J. Matolcsi (ed.). *Domestikationsforschung und Geschichte der Haustiere*. Internationales symposion in Budapest. Akadémiai Kiadó. Budapest:157-161.

Degerbøl, M. 1970

Zoological Part. In: M. Degerbøl and B. Fredskild (eds.). The Urus *(Bos primigenius bojanus)* and Neolithic Domesticated Cattle *(Bos taurus domesticus Linné) in Denmark*. Det Kongelige Dankse Videnskabernes Selskab. *Biologiske Skrifter 17(1)*. Kobenhavn. Munskgaard:5-78.

Deniz E., S. Payne 1982

Eruption and Wear in the Mandibular Dentition as a Guide to Ageing Turkish Angora Goats. In: B. Wilson, C. Grigson, S. Payne (eds.). *Ageing and Sexing Animal Bones from Archaeological Sites*. B. A. R. International Series Number 109. Oxford:155-205.

Ducos, P. 1968

L'Origine des Animaux domestiques en Palestine. Publications de I'Institute de Préhistoire de I'Universite de Bordeàux. Mémoire 6.

Ducos, P. 1975

Analyse statistique des collections d'ossements d'animaux, In: A. T. Clason (ed.). *Archaeozoological Studies*. American Elsevier:35-44.

Ducos, P. 1978a

'Domestication' Defined and Methodological Approaches to Its Recognition in Faunal Assemblages. In: R. H. Meadow and M. Zeder (eds.). *Approaches to Faunal Analysis in the Middle East*. Harvard University: Peabody Museum Bulletin 2. Cambridge:53-56.

Ducos, P. 1978b

Tell-Mureybet (Syrie, Ix^{o}-VII^{o} millènaires) ètude archéozoolgique et problémes d'écologie humaine 1. Editions du CNRS. Paris.

Ducos, P. 1989

Defining Domestication: a Clarification. In: J. Clutton-Brock (ed.). *The Walking Larder, Patterns of Domestication, Pastoralism and Predation*. Unwin Hyman. London:28-30.

Ducos, P. 1993

Proto-élevage et élevage au Levant Sud au VII^{e} millénaire B.C. Les données de la Damascène. *Paléorient 19/1*:153-173.

Ducos, P., D. Helmer 1980

Le point actuel sur I'apparition de la domestication dans le Levant. In: *Préhistoire du Levant*. colloques internationaux du CNRS n^{o} 568. Paris:523-528.

Ducos, P., L. R. K. Horwitz 1997

The Influence of Climate on Artiodactyl Size During the Late Pleistocene-Early Holocene of the Southern Levant. *Paleorient 23/2*:229-247.

Ervynck, A., K. Dobney, H. Hongo, R. H. Meadow 2001

Born Free? New Evidence for the Status of Sus scrofa at Neolithic Çayönü Tepesi (Southeastern Anatolia, Turkey). *Paléorient 27/2*:47-73.

Esin, U. 1995

Early Copper Metallurgy in the Pre-Pottery Site of Aşıklı. In*: Reading in Prehistory. Studies Presented to Halet Çambel*. Graphis. İstanbul: 61-77.

Esin U. 1998

Hunted Animals at Aşıklı and the Environment. In: P. Anreiter, L. Bartosiewicz, E. Jerem, W. Meid (eds.). *Man and the Animal World. Studies in Archaeozoology, Archaeology, Anthropology and Paleolinguistics in memoriam Sándor Bökönyi*. Archaeolingua. Budapest.

Esin, U. 1999

Introduction, The Neolithic in Turkey: A General Review. In: M. Özdoğan, N. Başgelen (eds.). *Neolithic in Turkey. The Cradle of Civizilaziton*. Arkeoloji ve Sanat Yayınları. İstanbul:13-23.

Fisher, J. W. 1995

Bone Surface Moditifications in Zooarchaeology. *Journal of Archaeological Method and Theory 2/1*: 7-68.

Flannery, K. V. 1983

Early Pig Domestication in the Fertile Crescent: A Retrospective Look. In: T. C. Young, Jr., P. E. I. Smith, P. Mortensen (eds.). *The Hilly Flanks and Beyond: Essays on the Prehistory of Southwestern Asia*. Studies in Ancient Oriental Civilization 36. The Oriental Institute of the University of Chicago. Chicago:163-188.

Gilbert, A. S. 1989

Microscopic Bone Structure in Wild and Domestic Animals: a Reappraisal. In: P. J. Crabtree, D. Campana, K. Ryan (eds.). The Museum Applied Science Center for Archaeology (MASCA). Research Papers in Science and Archaeology. Special Supplement to Volume 6. *Early Animal Domestication and its Cultural Context*. The University Museum of Archaeology and Anthropology University of Pennsylvania. Philadelphia:47-86.

Gilbert, A. S. 1991

Equid Remains from Godin Tepe, Western Iran: an Interim Summary and Interpretation, with Notes on the Introduction of the Horse into Southwest Asia. In: R. H. Meadow and H.-P. Uerpmann (eds.). *Equids in the Ancient World II*. Beihefte zum Tübinger Atlas des Vorderen Orients. Reihe A (Naturwissenchaften) 19/2. Dr. Ludwig Reichert Verlag. Wiesbaden:75-123.

Grant, A. 1982

The Use of Tooth Wear as a Guide to the Age of Domestic Ungulates. In: B. Wilson, C. Grigson, S. Payne (eds.). *Ageing and Sexing Animal Bones from Archaeological Sites*. B.A.R. International Series Number 109. Oxford:91-107.

Grayson, D. 1978

Minimum Numbers and Sample Size in Vertebrae Faunal Analysis. *American Antiquity 43*:53-65.

Grayson, D. 1984

Quantitative Zooarchaeology. Topics in the Analysis of Archaeological Faunas. Studies in Archaeological Science. Academic Press. Harcourt Brace Jovanovich Publishers. Orlando.

Grigson, C. 1989

Size an Sex: Evidence for the Domestication of Cattle in the Near East. In: A. Milles, D. Williams, N. Gardner (eds.). *The Beginnings of Agriculture*. B. A. R. International Series Number 496. Oxford:77-109.

Habermehl, K.-H. 1975

Die Altersbestimmung bei Haus- und Labortieren. Verlag Paul Parey. Berlin und Hamburg.

Harmankaya, S., O. Tanındı, M. Özbaşaran 1997

TAY-Türkiye Arkeolojik Yerleşmeleri 2: Neolitik. Ege Yayınları. İstanbul.

Hauptmann, H. 1999

The Urfa Region. In: M. Özdoğan, N. Başgelen (eds.). *Neolithic in Turkey, The Cradle of Civilization. New Discoveries*. Arkeoloji ve Sanat Yayınları. İstanbul:65-86.

Hecker, H. M. 1982

Domestication Revisited: Its Implication for Faunal Analysis. *Journal of Field Archaeology 9*:217-236.

Heinzel, H., R. Fitter, J. Parslow 1995

Türkiye ve Avrupa'nın Kuşları. Kuzey Afrika ve Ortadoğu Dahil. Doğal Hayatı Koruma Derneği. Pocket Guide to Birds of Britain&Europe with North Africa& the Middle East. Harper Collins Publishers. Rotolito Lombarda. İtalya.

Helmer, D. 1985

Étude de la faune de Tell Assouad (Djezireh-Syrie), Sondage J. Cauvin. In: M.-C. Cauvin and O. Aurenche (eds.). *Cahiers de I'Euphrate 4*. Paris. ERC:275-285.

Helmer, D. 1988

Les animaux de Cafer et des sites précéramiques due Sud-Est de la Turquie: Essai de Synthèse. *Anatolica XV*:37-48.

Helmer, D., 1989

Le développement de la domestication au Proche-Orient de 9500 a 7500 BP: les nouvelles données d'El Kown et de Ras Shamra, In: O. Aurenche, M.-C. Cauvin, P. Sanlaville (eds.). *Préhistoire du Levant. Processus des changements culturels, Paléorient 15,1*:111-121.

Helmer, D., M. Saña Segui 1996

Análisis Arqueozoológico de los restos faunísticos recuperados: dinámica del proceso de domesticación animal a lo largo de la secuencia tell. In: M. Molist Montaña (ed.). *Tell Halula (Siria) un yacimiento neolítico del valle medio del Éufrates campañas de 1991 y 1992*. Ministerio de educacion y cultura, Instituto del Patrimonio Histórico Español:143-149.

Herre, W. 1969

The Science and History of Domestic Animals. In: D. Brothwell, E. Higgs, G. Clark (eds.), *Science in Archaeology, A Survey of Progress and Research*. Thames and Hudson. Bristol:257-271.

Herre, W., M. Röhrs 1973

Haustiere zoologisch gesehen. Gustav Fischer Verlag, Stuttgart.

Hesse, B. 1982

Slaughter Patterns and Domestication:The Beginnings of Pastoralism in Western Iran. *Man 17*:403-417.

Hesse, B. 1984

These are Our Goats: The Origins of Herding in West Central Iran. In: J. Clutton-Brock, C. Grigson (eds.). *Animals and Archaeology: 3. Early Herders and their Flocks*. B.A.R. International Series Number 202. Oxford:243-264.

Hesse, B., D. Perkins 1974

Faunal Remains from Karataş-Semayük in Southeast Anatolia: An Interim Report. *Journal of Field Archaeology 1*:149-160.

Hillson, S. 1986

Teeth, Cambridge Manuals in Archaeology. Cambridge University Press. Cambridge.

Hillson, S. 1992

Mammal Bones and Teeth: an Introductory Guide to Methods of Identification. Institute of Archaeology, University College London. London.

Hole, F. A. 1987

Chronologies in the Iranian Neolithic. In: O. Aurenche, J. Evin, F. Hours (eds.). *Chronologies in the Near East*. B.A.R. International Series Number 379. Oxford:353-379.

Hole, F. A., K. V. Flannery 1967

The Prehistory of Southwestern Iran: A Preliminary Report. Proceedings of the *Prehistoric Society XXXIII*:147-207.

Hole, F. A., K. V. Flannery, J. A. Neely 1969

Prehistory and Human Ecology on the Deh Luran Plain. Memoirs of the Museum of Anthropology 1. The University of Michigan Press. Ann Arbor.

Hollom, P. A. D., R. F. Porter, S. Christensen, I. Willis 1988

Birds of the Middle East and North Africa. A Companion Guide. Town Head House. Calton.

Hongo, H., R. H. Meadow 1998

Pig Exploitation at Neolithic Çayönü Tepesi (Southeastern Anatolia). In: S. M. Nelson (ed.). *Ancestors for the Pigs: Pigs in Prehistory*. The Museum Applied Science Center for Archaeology (MASCA). Research Papers in Science and Archaeology 15. MASCA at the University of Pennsylvania Museum. Philadelphia:77-98.

Hongo, H., R. H. Meadow 2000

Faunal Remains from Prepottery Neolithic Levels at Çayönü, Southeastern Turkey: A Preliminary Report Focusing on Pigs (Sus sp.). In: H. Buitenhuis, M. Mashkour, A. L. Choyke (eds.). *Archaeozoology of the Near East IVA*. ARC-Publications. Groningen: 121-140.

Hongo, H., R. H. Meadow, B. Öksüz, G. İlgezdi 2002

The Process of Ungulate Domestication in Prepottery Neolithic Çayönü, Southeastern Turkey. In: A. H. Al-Shiyab, A. M. Choyke, H. Buitenhuis (eds.). *Archaeozoology of*

the Near East V. ARC-Publication. Groningen:153-165.

Hongo, H., R. H. Meadow, B. Öksüz, G. İlgezdi 2004

Animal Exploitation at Çayönü Tepesi, Southeastern Anatolia. *TÜBA-AR VII*:107-119.

Howe, B. 1983

Karim Shahir. In: L. Braidwood, R. J. Braidwood, B. Howe, C. A. Reed, P. J Watson (eds.). *Prehistoric Archaeology along the Zagros Flanks*. Oriental Institute Publications 105. The Oriental Institute. Chicago:23-154.

Huntigton, E. 1959

Main Springs of Civilization. Mentor Books. New York.

İlgezdi, G. 1999

Çayönü Çanak Çömleksiz Neolitik Yerleşmesinde Kızıl Geyik (*Cervus elaphus*) Kemiklerinin İncelenmesi (Analysis of Red Deer Bones from the Prepottery Neolithic Settlement at Çayönü). Institute of Social Sciences, University of Istanbul. Unpublished M.A.-Thesis. İstanbul.

İlgezdi, G. 2000

Zooarchaeology at Çayönü: A Preliminary Assessment of the Red Deer Bones. In: H. Buitenhuis, M. Mashkour, A. L. Choyke (eds.). *Archaeozoology of the Near East IVA*. ARC-Publications. Groningen:141-153.

Jarman, M. R., P. F. Wilkinson 1972

Criteria of Animal Domestication. In: E. S. Higgs (ed.). *Papers in Economic Prehistory*. Studies by Members and Ussosiates of the British Academy Major Research Project in the Early History of Agriculture. Cambridge University Press:83-97.

Karul, N., A. Ayhan, M. Özdoğan 2001

1999 Yılı Mezraa-Teleilat Kazısı/1999 Excavations at Mezraa-Teleilat. In: N. Tuna, J. Öztürk, J. Velibeyoğlu (eds.). *Ilısu ve Karkamış Baraj Gölleri Altında Kalacak Arkeoloji ve Kültür Varlıklarını Kurtarma Projesi 1999 Yılı Çalışmaları / Salvage Project of the Archaeological Heritage of the Ilısu ve Karkamış Dam Reservoirs Activities in 1999*. Centre for Research and Assessment of the Historic Environment (TAÇDAM). Middle East Technical University. Ankara:133-161.

Karul, N., A. Ayhan, M. Özdoğan 2002

2000 Yılı Mezraa-Teleilat Kazısı/2000 Excavations at Mezaa-Teleilat. In: N. Tuna, J. Velibeyoğlu (eds.). *Ilısu ve Karkamış Baraj Gölleri Altında Kalacak Arkeoloji ve Kültür Varlıklarını Kurtarma Projesi 2000 Yılı Çalışmaları / Salvage Project of the*

Archaeological Heritage of the Ilısu ve Karkamış Dam Reservoirs Activities in 2000. Centre for Research and Assessment of the Historic Environment (TAÇDAM). Middle East Technical University. Ankara:101-142.

Karul, N., A. Ayhan, M. Özdoğan 2004

2001 Yılı Mezraa-Teleilat Kazıları/2001 Excavations at Mezraa-Teleilat. In: N. Tuna, J. Greenhalg, J. Velibeyoğlu (eds.). *Ilısu ve Karkamış Baraj Gölleri Altında Kalacak Arkeoloji ve Kültür Varlıklarını Kurtarma Projesi 2001 Yılı Çalışmaları / Salvage Project of the Archaeological Heritage of the Ilısu ve Karkamış Dam Reservoirs Activities in 2001*. Centre for Research and Assessment of the Historic Environment (TAÇDAM). Middle East Technical University. Ankara:57-106.

Kiziroğlu, İ. 1989

Türkiye Kuşları (Kırmızı Listede Olanlar ve Bulundukları Bölgeler). The Birds of Turkey (Species list, in red data book). Ankara.

Köhler-Rollefson, I., G. O. Rollefson 1990

The Impact of Neolithic Subsistence Strategies on the Environment: The Case of 'Ain Ghazal, Jordan. In: S. Bottema, Entjes-Nieborg, W. van Zeist (eds.). *Man's Role in the Shaping of the Eastern Mediterranean Lanscape*. Balkema. Rotterdam:3-14.

Köhler-Rollefson, I., L. Quintero, G. O. Rollefson 1993

A Brief Note on the Fauna from Neolithic 'Ain Ghazal. *Paléorient 19/2*:95-97.

Köhler-Rollefson, I., W. Gillespie, M. Metzger 1988

The Fauna from Neolithic 'Ain Ghazal. In: A. N. Garrard, H. G. Gebel (eds.). *The Prehistory of Jordan. The State of Research in 1986, Part II*. B.A.R. International Series Number 396 (II). Oxford:423-431.

Kromer, B., K. Schmidt 1998

Two Radiocarbon Dates from Göbekli Tepe South Eastern Turkey. *Neo-Lithics 3/98*: 8-9.

Kuşatman, B. 1991

The Origins of Pig Domestication with Particular Reference to the Near East. Ph.D. Thesis. Institute of Archaeology. University College London.

Lasota-Moskalewska, A. 1994

Animal Remains from Nemrik, A Pre-Pottery Neolithic Site in Iraq. In: S. K. Kozlowski (ed.). *Nemrik 9. Pre-Pottery Neolithic Site in Iraq 4: Animal Remains.* In: A. Lasota-Moskalewska (ed.), Wydawnictwa Uniwersytetu Warszawskiego. Warszawa:5-52.

Lawrence, B. 1980

Evidence of Animal Domestication at Çayönü. In: H. Çambel, R. J. Braidwood (eds.). *İstanbul ve Chicago Üniversiteleri Karma Projesi Güneydoğu Anadolu Tarihöncesi Araştırmaları (The Joint Istanbul-Chicago Universities Prehistoric Research in Southeastern Anatolia)*. İstanbul Üniversitesi, Edebiyat Fakültesi Basımevi. İstanbul:285-308.

Lawrence, B. 1982

Principal Food Animals at Çayönü. Prehistoric Village Archaeology in South-Eastern Turkey. In: L. S. Braidwood, R. J. Braidwood (eds*.). Prehistoric Village Archaeology in South-Eastern Turkey*. B. A. R. International Series Number 138. British Archaeological Reports. Oxford:175-199.

Legge, A. J. 1996

The Beginning of Caprine Domestication in Southwest Asia. In: D. R. Harris (ed.). *The Origins and Spread of Agriculture and Pastoralism in Eurasia*. Institute of Archaeology. University College London. UCL Press Limited. London:238-261.

Legge, A. J., R. A. Rowley-Conwy 2000

The Exploitation of Animals. In: A. M. T. Moore, G. C. Hillman, A. J. Legge (eds.). *Village on the Euphrates*. Oxford University Press. Oxford:423-471.

Meadow, R. H. 1978

Effects of Context on the Interpretation of Faunal Remains: a Case study. In: R. H. Meadow, M. Zeder (eds.). *Approaches to Faunal Analysis in the Middle East*. Peabody Museum Bulletin 2. Peabody Museum of Archaeology and Ethnology. Harvard University. Cambridge:15-21.

Meadow, R. H. 1981

Early Animal Domestication in South Asia: a First Report of the Faunal Remains from Mehrgarh, Pakistan. In: H. Härtel (ed.). *South Asian Archaeology 1979*. Dietrich Reimer Verlag. Berlin:143-179.

Meadow, R. H. 1983

The Vertebrate Faunal Remains from Hasanlu period X at Hajji Firuz. Appendix G. In: M. M. Voigt (ed.). *Hajji Firuz Tepe, Iran: The Neolithic Settlement (Hasanlu Excavation Reports I)*. The University Museum of University of Pennsylvania. Philadelphia:369-422.

Meadow, R. H. 1984

Animal Domestication in the Middle East: A View from the Eastern Margin. In: J. Clutton-Brock, C. Grigson (eds.). *Animals and Archaeology 3. Early Herders and their Flocks*. B. A. R. International Series Number 202. Oxford:309-337.

Meadow, R. H. 1986

Some Equid Remains from Çayönü, Southeastern Turkey. In: R. H. Meadow, H.-P. Uerpmann (eds.). *Equids in the Ancient World*.I. Dr. Ludwig Reichert Verlag. Wiesbaden:266-301.

Meadow, R. H. 1989

Osteological Evidence for the Process of Animal Domestication. In: J. Clutton-Brock (ed.). *The Walking Larder: Patterns of Domestication, Pastoralism and Predation*. Unwin Hyman. London:80-90.

Meadow, R. H. 1999

The Use of Size Index Scaling Techniques for Research on Archaeozoological Collections from the Middle East. In: C. Becker, H. Manhart, J. Peters, J. Schibler (eds.). *Historia Animalium ex Ossibus: Beiträge aur Paläoanatomie, Archäologie, Ägyptologie, Ethnologie und Geschichte der Tiermedizin*. Verlag Marie Leidorf. Rahden/Westf.: 285-300.

Oates, J. 1973

The Background and Development of Early Farming Communities in Mesopotamia and the Zagros. *Proceedings of the Prehistoric Society 39*:147-181.

Olsen, S. J. 1979

Archaeologically, What Constitutes an Early Domestic Animal?. *Advances in Archaeological Method and Theory 2*. Academic Press:175-195.

Öksüz, B. 1998

Çayönü Çanak Çömleksiz Neolitik Yerleşmesinde Yabani Sığır Kemiklerinin İncelenmesi (Analysis of the cattle bones of the Prepottery Neolithic settlement of Çayönü). University of Istanbul, Institute of Social Sciences. Unpublished M.A.-Thesis. İstanbul.

Öksüz, B. 2000

Analysis of the Cattle Bones of the Prepottery Neolithic Settlement of Çayönü. In: H. Buitenhuis, M. Mashkour, A. L. Choyke (eds.). *Archaeozoology of the Near East IVA*. ARC-Publications. Groningen:154-163.

Özdoğan, A. 1994

Çayönü Yerleşmesinin Çanak Çömleksiz Neolitikteki Yeri (Küçük Buluntuların Yardımıyla). Unpublished Ph.D.-Thesis. University of İstanbul. İstanbul.

Özdoğan, M., 1989

Neolithic Cultures of Northwestern Turkey, A General Appraisal of the Evidence and Some Considerations. In: S. Bökönyi (ed.). *Neolithic of Southeastern Europe and Its Near Eastern Connections.* Varia Archaeologica Hungarica II. Budapest:201-215.

Özdoğan, M. 1995a

Yakındoğu Neolitiği ve Güneydoğu Anadolu Eleştirisel Bir Değerlendirme. In: A. Erkanal, H. Erkanal, H. Hüryılmaz, A. T. Ökse, N. Çınardalı, S. Günel, H. Tekin, B. Uysal, D. Yalcıklı (eds.). *Eski Yakın Doğu Kültürleri Üzerine İncelemeler*. Memoriam İ. Metin, B. Devam Anı Kitabı. Arkeoloji ve Sanat Yayınları. İstanbul:267-280.

Özdoğan, M. 1995b

Neolithization of Europe: A View from Anatolia Part 1: The Problem and the Evidence of East Anatolia. *Poročilo o raziskovanju paleolitika, neolitika in eneolitika v Sloveniji XXII*. Ljubljana:25-61.

Özdoğan, M. 1995c

Neolithic in Turkey, The Status of Research. In: *Halet Çambel için, Prehistorya Yazıları*, Graphis Yayınları. İstanbul:41-59.

Özdoğan, M. 1997

The Beginning of Neolithic Economies in Southeastern Europe: An Anatolian Perspective. *Journal of European Archaeology 5/2*:1-33.

Özdoğan, M. 1998a

Anatolia from the Last Glacial Maximum to the Holocene Climatic Optimum: Cultural Formations and the Impact of the Environmental Setting. *Paléorient 23/2*:25-38.

Özdoğan, M. 1998b

Tarihöncesi Dönemlerde Anadolu ile Balkanlar Arasındaki Kültür İlişkileri ve Tarakya'da Yapılan Yeni Kazı Çalışmaları. *TÜBA-AR 1*:63-93.

Özdoğan, M. 1999a

Preface. In: M. Özdoğan, N. Başgeln (eds.). Neolithic in Turkey. Arkeoloji ve Sanat Yayınları. İstanbul:9-12.

Özdoğan, M. 1999b

Concluding Remarks. In: M. Özdoğan, N. Başgelen (eds.). *Neolithic in Turkey*. Arkeoloji ve Sanat Yayınları. İstanbul:225-236.

Özdoğan, M. 2002a

Mezraa-Teleilat Yeni Yaşamın Öncüsü. *Atlas 107*:70-85.

Özdoğan, M. 2002b

Redefining the Neolithic of Anatolia. A Critical Overview. In: R. T. J. Cappers, S. Bottema (eds.). The Dawn of Farming in the Near East. Studies in Early Near Eastern Production, Subsistence, and Environment 6. Ex Oriente. Berlin:153-158.

Özdoğan, M. 2003

A Group of Neolithic Stone Figurines from Mezraa-Teleilat. In: M. Özdoğan, H. Hauptmann, N. Başgelen (eds.). *From Villages to Towns. Studies Presented to Ufuk Esin*. Arkeoloji ve Sanat Publications. İstanbul:511-523.

Özdoğan, M., A. Ayhan, A. Demirtaş 1999

Mezraa-Teleilat: Bir Neolitik Çağ Yerleşmesinin Tanıtımı. In: N. Tuna, J. Öztürk (eds.). *Ilısu ve Karkamış Baraj Gölleri Altında Kalacak Arkeoloji ve Kültür Varlıklarını Kurtarma Projesi 1998 Yılı Çalışmaları / Salvage Project of the Archaeological Heritage of the Ilısu ve Karkamış Dam Reservoirs Activities in 1998*. Centre for Research and Assessment of the Historic Environment (TAÇDAM). Middle East Technical University. Ankara:1-10.

Özdoğan, M., A. Özdoğan 1989

Building of Cult and the Cult of Building. In: G. Arsebük, M. J. Mellink, W. Schirmer (eds.). Light on Top of the Black Hill. Studies Presented to Halet Çambel. Ege Yayınları, İstanbul:581-601.

Özdoğan, M., A. Özdoğan 1990

Çayönü - A Conspectus of Recent Work. In: O. Aurenche, M. C. Cauvin (eds.). *Prehistoire de Levant II*. Lyon:387-396.

Payne, S. 1973

Kill-off Patterns in Sheep and Goats: The Mandibles from Aşvan Kale. *Anatolian Studies XXII*:281-303.

Payne, S. 1985

Animal Bones from Aşıklı Hüyük. Anatolian Studies XXXV:109-122.

Perkins, D. 1964

Prehistoric Fauna from Shanidar, Iraq. *Science 144*:1565-1566.

Perkins, D. 1973

Chorologies in Old World Archaeology, Archaeological Seminar at Columbia University 1971-1972. American Journal of Archaeology 77, Number 3:279-282.

Peters J., D. Helmer, A. von den Driesch, M. Sana Segui 1999

Early Animal Husbandry in the Northern Levant. *Paléorient 25/2*:27-47.

Peters, J., K. Schmidt 2004

Animals in the Symbolic World of Pre-Pottery Neolithic Göbekli Tepe, South-Eastern Turkey: a Preliminary Assessment. *Anthropozoologica 39/1*:179-218.

Prummel, W. 1987a

Atlas for Identification of Foetal Skeletal Elements of Cattle, Horse, Sheep and Pig. Part 1. *Archaeozoologia I (1)*:23-30.

Prummel, W. 1987b

Atlas for Identification of Foetal Skeletal Elements of Cattle, Horse, Sheep and Pig. Part. 2. *Archaeozoologia I (2)*:11-42.

Prummel, W. 1988

Atlas for Identification of Foetal Skeletal Elements of Cattle, Horse, Sheep and Pig. Part. 3. *Archaeozoologia II (1-2)*:13-26.

Prummel, W., H.-J. Frisch 1986

A Guide for the Distinction of Species, Sex and Body Side in Bones of Sheep and Goat. *Journal of Archaeological Science 13*:567-577.

Redman, C. 1978

The Rise of Civilization; from Early Farmers to Urban Society in the Ancient Near East. W. H. Freeman and Company. San Fransisco.

Reed, C. A. 1959

Animal Domestication in the Prehistoric Near East. *Science 130*:1629-1639.

Reed, C. A. 1960

A Review of the Osteological Evidence on Animal Domestication in the Prehistoric Near East. In: R. J. Braidwood, B. Howe (eds.). *Prehistoric Investigations in Iraqi Kurdistan*. Studies in Ancient Oriental Civilization 31. University of Chicago Press, the Oriental Institute. Chicago:119-145.

Reed, C. A. 1983

Archaeozoological Studies in the Near East: A Short History (1960-1980). In: L. Braidwood, R. J. Braidwood, B. Howe, C. A. Reed, P. J. Watson (eds.). *Prehistoric Archaeology along the Zagros Flanks*. Oriental Institute Publications 105. The Oriental Institute: Chicago:511-536.

Rollefson, G., A. Simmons 1986

The Neolithic Village of ‘Ain Ghazal, Jordan: Preliminary Report on the 1984 Season. *Bulletin of the American Schools of Oriental Research, Supplement 24*:147-164.

Rollefson, G., A. Simmons 1987

The Neolithic Vilage of ‘Ain Ghazal, Jordan: Preliminary Report on the 1985 Season. *Bulletin of the American Schools of Oriental Research, Supplement 25*:93-106.

Rollefson, G. O., I. Köhler-Rollefson 1989

The Collapse of Early Neolithic Settlements in the Southern Levant. In: I. Hershkovitz (ed.). *People and Culture in Change*. B. A. R. International Series Number 508. Oxford:73-89.

Rosenberg, M. 1994

Hallan Çemi Tepesi: Some Further Observations Concerning Stratigraphy and Material Culture. *Anatolica XX*:121-140.

Rosenberg, M. 1999

Hallan Çemi. In: M. Özdoğan, N. Başgelen (eds.). *Neolithic in Turkey*. Arkeoloji ve Sanat Yayınları. İstanbul:25-33.

Rosenberg, M., R. M. A. Nesbitt, R. W. Redding, B. L. Peasnall 1998a

Hallan Çemi Pig Husbandry, and Post-Pleistocene Adaptations along the Taurus-Zagros arc (Turkey). *Paléorient 24/1*:25-41.

Rosenberg, M., R. M. A. Nesbitt, R. W. Redding, T. F. Strasser 1995

Hallan Çemi Tepesi: Some Preliminary Observations Concerning Early Neolithic Subsistence Behaviors in Eastern Anatolia. *Anatolica XXI*:1-12.

Rosenberg, M., R. W. Redding 1998

Early Pig Husbandry in Southwestern Asia and Its Implications for Modeling the Origins of Food Production. In: S. M. Nelson (ed.). *Ancestors for the Pigs: Pigs in Prehistory*. The Museum Applied Science Center for Archaeology (MASCA). Research Papers in Science and Archaeology 15. MASCA at the University of Pennsylvania Museum. Philadelphia:55-64.

Saña Seguí, M. 1999

Arqueologia de la domesticación animal. La gestión de los recursos animales en Tell Halula (Valle del Èufrates-Siria) del 8,800 al 7,000 BP. Treballs d’Arqueologia del Pròxim Orient 1. Barcelona. Universitat Autònoma de Barcelona.

Saña Seguí, M. 2000

Animal Resource Management and the Process of Animal Domestication at Tell Halula (Euphrates Valley-Syria) from 8800 BP to 7800 BP. In: H. Buitenhuis, M. Mashkour, A. L. Choyke, H. Buitenhuis, F. Poplin (eds.). *Archaeozoolgy of the Near East IVB*. ARC-Publications. Groningen:242-256.

Sanlaville, P. 1987

Etude géomorphologique de la région du Nizip. In: A. Minzoni-Déroche (ed.) *Le Paleolithique du Bassin de Nizip*. French Archeological Institute. İstanbul:34-70.

Schirmer, W. 1990

Some Aspects of Buildings at the "Aceramic-Neolithic" Settlement of Cayönü Tepesi. *World Archaeology 21:3*:363-387.

Schmid, E. 1972

Atlas of Animal Bones, for Prehistorians, Archaeologists and Quaternary Geologists. Elsevier Publishing Company. Amsterdam.

Schmidt, K. 1995

Investigation in the Upper Mesopotamian Early Neolithic: Göbekli Tepe and Gürcütepe. *Neo-Lithics 2/95*:9-10.

Schmidt, K. 1996

The Urfa Project 1996. *Neo-Lithics 2/96*:2-3.

Schmidt, K. 1997

'Stier, Fuchs und Kranich'. Der Göbekli Tepe bei Şanlıurfa und die Bilderwelt des obermesopotamischen Frühneolithikums. *Nürnberger Blätter zur Archäologie 14*:155-170.

Sherratt, A. 1981

Plough and Pastoralism: Aspeckts of the Secondary Products Revolution. In: J. Hodder, G. Isaac, N. Hammond (eds.). *Pattern of the Past: Studies in Honour of David Clarke*. Cambridge University Press. Cambridge:261-305.

Sherratt, A. 1983

The Secondary Exploitation of Animals in the Old World. *World Archaeology 15*:90-104.

Silver, I. A. 1969

The Ageing of Domestic Animals. In: D. Brothwell, E. Higgs (eds.). *Science in Archaeology*:283-302.

Singh, P. 1974

Neolithic Cultures of Western Asia. Seminar Press.

Sözer, A. N. 1984

Güneydoğu Anadolu'nun Doğal Çevre Şartlarına Coğrafi Bir Bakış. *Ege Coğrafya Dergisi Ocak 1984*:8-29.

Stampfli, H.-R. 1983

The Fauna of Jarmo With Notes on Animal Bones from Matarrah, the 'Amuq, and Karim Shahir. In: L. S. Braidwood, R. J. Braidwood, B. Howe, C. A. Reed, P. J. Watson (eds.). *Prehistoric Archaeology along the Zagros Flanks*. Oriental Institute Publications 105. The Oriental Institute of the University of Chicago. Chicago:431-483.

Stein, G. J. 1986a

Village Level Pastoral Production:Faunal Remains from Gritille Höyük, Southeast Turkey. *The Museum Applied Science Center for Archaeology (MASCA) Journal 4/1*:2-11.

Stein, G. J. 1986b

The Use of Animal Bones Remains to Reconstruct Ancient Economic Systems. *Expedition 28/2*:35-42.

Stein, G. J. 1986c

Herding Strategies at Neolithic Gritille. *Expedition 28-2*:35-42.

Stein, G. J. 1989

Strategies of Risk Reduction in Herding and Hunting Systems of Neolitihc Southeast Anatolia. In: P. J. Crabtree, D. Campana, K. Ryan (eds.). *Early Animal Domestication and its Cultural Context. The Museum Applied Science Center for Archaeology (MASCA) Journal 6*:87-97.

Tchernov, E., L. K. Horwitz 1991

Body Size Diminution under Domestication:Unconscious Selection in Primeval Domesticates. *Journal of Anthropological Archaeology 10*:54-75.

Turan, N. 1984

Türkiye'nin AV ve Yaban Hayvanları, Memeliler, Ongun Kardeşler Matbaacılık Sanayii. Ankara.

Turan, N. 1988

Türkiye'nin Büyük Av Hayvanları ve Sorunları. Türkiye ve Balkan Ülkelerinde Yaban Hayatı Uluslararası Sempozyum. Orman Müdürlüğü. İstanbul:61-82.

Uerpmann, H.-P. 1973

Animal Bone Finds and Economic Archaeology: A Critical Study of Osteo-Archaeological Method. *World Archaeology 4/3*:307-322.

Uerpmann, H.-P. 1978a

Metrical Analysis of Faunal Remains from the Middle East. In: R. H. Meadow, M. A. Zeder (eds.). *Approaches to Faunal Analysis in the Middle East*. Peabody Museum Bulletins 2. Peabody Museum. Harvard University. Cambridge:41-44.

Uerpmann, H.-P. 1978b

The "Knocod" System for Processing Data on Animal Bones from Archaeological Sites. In: R. H. Meadow, M.A. Zeder (eds.). Approaches to Faunal Analysis in the Middle East. Peabody Museum Bulletins 2. Peabody Museum Harvard University. Cambridge:149-167.

Uerpmann, H.-P. 1979

Probleme der Neolithisierung des Mittelmeerraums. Tübinger Atlas des Vorderen Orients, Reihe B, Nr. 28. Wiesbaden. Dr. Ludwig Reichert Verlag.

Uerpmann, H.-P. 1981

The Major Faunal Areas of the Middle East During the Late Pleistocene and Early Holocene. In: J. Cauvin and P. Sanlaville (eds.). *Prehistoire du Levant*. Maison de l'Orient Lyon. Paris:99-106.

Uerpmann, H.-P. 1982

Faunal Remains from Shams ed-Din Tannira, A Halafian Site in Northern Syria. *Berytus, Archaeological Studies XXX*. The Facultly of Arts and Sciences, The American University of Beirut:3-52.

Uerpmann, H.-P. 1987

The Ancient Distribution of Ungulate Mammals in the Middle East, Fauna and Archaeological Sites in Soutwest Asia and Northeast Africa. Dr. Ludwig Reichert Verlag. Wiesbaden.

Uerpmann, H.-P. 1996

Animal Domestication-Accident or Intention?. In: D. Harris (ed.). The Origins and Spread of Agriculture and Pastoralism in Eurasia. :UCL. Press Limited University College London. London:227-237.

Van Wijngaarden-Bakker, R. Maliepaard 2000

The Animal Remains. In: M. Vorhoeven, P. M. M. G. Akkermans (eds.). *Tell Sabi Abyad II. The Pre-Pottery Neolithic B Settlement. Report on the Excavations of the*

National Museum of Antiquities Leiden in the Balikh valley, Syria. Nederlands Historisch-Archaeologisch Instituut. İstanbul:147-171.

Verhoeven, M. 1994

Excavation at Tell Sabi Abyad, a Later Pre-Pottery Neolithic B Village in the Balikh Valley, Northern Syria. *Orient Express 1*:9-12.

Verhoeven, M. 1997

The 1996 Excavations at Tell Sabi Abyad II, A Later PPNB Site in the Balikh Valley, N-Syria. *Neo-Lithics 1/97*:1-3.

Verhoeven, M. 2004

A Tale of Two Tells Comparing Neolithic Lifestyles at Tell Sabi Abyad II and Tell Sabi Abyad I, Northern Syria. In: O. Aurenche, M. Le Miére, P. Sanlaville (eds.). *From the River to the Sea - The Paleolithic and Neolithic on the Euphrates and in the Northern Levant*. B. A .R. International Series 1263:367-382.

Vigne, J.-D., G. Dollfus, J. Peters 2000

Editorial Note. The Beginning of Herding in the Near East: New Data and New Ideas. *Paléorient 25/2 (1999):*9-10.

von den Driesch, A. 1976

A Guide to the Measurement of Animal Bones from Archaeological Sites. Peabody Museum Bulletin 1. Peabody Museum of Archaeology and Ethnology. Harvard University. Cambridge.

von den Driesch, A., J. Peters 1999

Vorläufiger Bericht über die archäozoologischen Untersuchungen am Göbekli Tepe und am Gürcütepe bei Urfa, Türkei. *Istanbuler Mitteilungen 49*:23-39.

von den Driesch, A., J. Peters 2001

Früheste Haustierhaltung in der Südosttürkei. In: R. M. Boehmer, J. Maran (eds.). *Lux Orientis. Archaologie zwischen Asien und Europa. Festschrift für Harald Hauptmann zum 65. Geburtstag*. Verlag Marie Leidorf. Rahden/Westf.:113-120.

von den Driesch, A., U. Wodtke 1997

The Fauna of ‘Ain Ghazal a Major PPN and Early PN Settlement in Central Jordan. In: H. G. K. Gebel, Z. Kafafi, G. O. Rollefson (eds.). *The Prehistory of Jordan II. Perspectives from 1997. Studies in Early Near Eastern Production, Subsistence, and Environment 4*. Ex oriente. Berlin:511-556.

Watson, J. P. N. 1978

The Interpretation of Epiphyseal Fusion Data. In: D. R. Brothwell, K. D. Thomas, J.

Clutton-Brock (eds.). *Research Problems in Zooarchaeology*. University of London. Institute of Archaeology, Occasional Publication 3:97-101.

Wright, G. 1971

Origins of Food Production in Southwestern Asia: A Survey of Ideas. *Current Anthropology 12/4-5*:109-139.

Zeder, M. A. 1999

Animal Domestication in the Zagros: A Review of Past and Current Research. *Paléorient 25/2*:11-25.

Zeder, M. A. 2003

Hiding in Plain Sight: The Value of Museum Collections in the Study of the Origins of Animal Domestication. In: G. Gruppe and J. Peters (eds.). Documenta Archaeobiologiaw 1: Deciphering Ancient Bones. The Research Potential of Bioarchaeological Collections, Yearbook of the State Collection of Palaeoanatomy. Rahden/Westf: Verlag M. Leidorf GmbH. München. 125-138.

Zeder, M. A., B. Hesse 2000

The Initial Domestication of Goats (*Capra hircus*) in the Zagros Mountains 10,000 Years Ago. Science 287:2254-2257.

Zeder, M. A. 2001

A Metrical Analysis of a Collection of Modern Goats (*Capra hircus aegargus and C. h. hircus*) from Iran and Iraq: Implications for the Study of Caprine Domestication. Journal of Archaeological Science 28:61-79.

Zeder, M. A. 2006

Central Questions in the Domestication of Plants and Animals. Evolutionary Anthropology 15:105-117.

Zeder, M. A. 2005

A View from the Zagros: New Perspectives on Livestock Domestication in the Fertile Crescent. In: J.-D. Vigne, J. Peters, D. Helmer (eds.). First Steps of Animal Domestication, New Archaeozoological Approaches. Proceedings of the 9th Conference of the International Council of Archaeozoology, Durham, August 2002, Oxbow Books, London:125-146.

Zeuner, F. S. 1963

A History of Domesticated Animals. London. Hutchinson.