ANIMAL EXPLOITATION AT THE LATE PLEISTOCENE- HOLOCENE TRANSITION IN UPPER MESOPOTAMIA (10.900 – 7.700 CAL. BC) WITH A FOCUS ON A PROPOSED HUNTER-GATHERER CRISIS

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ABSTRACT

ANIMAL EXPLOITATION AT THE LATE PLEISTOCENE- HOLOCENE TRANSITION IN UPPER MESOPOTAMIA (10.900 – 7.700 CAL. BC) WITH A FOCUS ON A PROPOSED HUNTER-GATHERER CRISIS

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This study focuses on the archaeofaunal data from early prehistoric communities in Upper Mesopotamia (Euphrates, Tigris and Urfa regions) to understand whether the changing settlement pattern was interlinked with the changing climatic conditions. So far, many studies were undertaken on ecological data to understand the human subsistence strategies, but unfortunately, these studies focused on one settlement, one species of animals or one targeted question. In this study, environmental data on climate are reviewed to create a clear picture of the climatic conditions that prevailed during the transitions from Late Pleistocene to Early Holocene. Having reviewed prehistoric climate patterns, this study proceeds with the revaluation of 14C samples/dates from settlements aiming to clarify uncertainities in dating and understand the continuity/disruption of settlement patterns. Foremost, the main focus on this study is the review of published archaeofaunal data from selected Epipalaeolithic and Early Neolithic communities from Euphrates and Tigris. Here I use site-specific faunal data to understand which animals were consumed and to what proportions through time. It is expected that by examining together the faunal data and the recreated past climatic conditions within the time range derived from the 14C dates, we will reach a better understanding of a potential PPNA hunter-gatherer crisis in this region.

Keywords: Hunter-Gatherer, Climate, 14C, Fauna, Crisis, Neolithic.

ÖZ

YUKARI MEZOPOTAMYADA GEÇ PLEISTOSEN- HOLOSEN GEÇİŞİNDE AVCI TOPLAYICI KRİZİ OLARAK ÖNERİLMİŞ DÖNEMDE İNSANLAR VE HAYVANLAR ARASINDAKİ ETKİLEŞİMLER (10.900 – 7.700 CAL. BC)

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Bu çalışma, tarihöncesi toplulukların zaman içerisinde değişim gösteren yerleşim modellerinin, değişen çevre koşullarıyla bağlantılı olup olmadığını anlamak için esas olarak Yukarı Mezopotamyadaki (Fırat, Dicle ve Urfa bölgeleri) tarihöncesi topluluklardan şimdiye kadar elde edilmiş olan arkeofaunal verilere odaklanacaktır. Şimdiye kadar, tarihöncesi insanların geçim kaynaklarını anlamak için ekolojik veriler üzerine birçok çalışma yapılmıştır, ancak çoğu zaman bu çalışmalar bir yerleşim yeri, bir hayvan türü veya hedeflenen bir soru ile sınırlı kalmıştır. Bu çalışmada, Geç Pleistosenden Erken Holosene kadar olan iklim koşullarını net bir çerçevede sunabilmek için iklimle ilgili çevresel veriler gözden geçirilecektir. Bu inceleme sadece iklimin zamansal değişimini değil, aynı zamanda insan-iklim etkileşimini ve iklimin hayvan çeşitliliği üzerindeki etkisini anlamamıza yardımcı olacaktır. Tarihöncesi iklim modellerini yeniden yaratıldıktan sonra bu çalışma, yerleşim alanlarından alınan 14C örneklerinin / tarihlerinin yeniden değerlendirilmesiyle devam edecek ve yerleşim modellerinin sürekliliğini anlamak için bunları bir bağlama oturtacaktır. En önemlisi ve bu çalışmanın odak noktası Fırat, Dicle ve Urfa bölgelerinde yaşamış tarihöncesi topluluklardan seçilmiş olan arkeofaunal verilerin gözden geçirilmesi olacaktır. Arkeofaunal veriler toplandıktan sonra, 14C verilerine

dayalı zaman çizelgesi içerisinde yeniden yaratılan tarihöncesi koşullar, faunal verilerle birlikte değerlendirilecektir. Böylelikle bu araştırma, Fırat ve Dicle bölgelerindeki PPNA sonunda yerleşim yerlerinin kaybolmasında ve EPPNB de Urfa bölgesinde yerleşimlerin artmasında/yoğunlaşmasında çevresel unsurların oynamış olabilecekleri muhtemel rolleri daha iyi anlamamızı sağlayacaktır, kısaca PPNA Avcı-Toplayıcı krizine bir ışık tutmuş olacaktır.
Anahtar Kelimeler: Avcı-Toplayıcı, Kriz, İklim, 14C, Hayvan Kemikleri

To My Family

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LIST OF ABBREVIATIONS

Approx.	Approximately
BSR	Broad-Spectrum Revolution
BP	Before Present
calBC	calibrated Before Christ
EPPNB	Early Pre-Pottery Neolithic B
GISP	Greenland Ice Sheets Project
MPPNB	Middle Pre-Pottery Neolithic B
UNESCO	The United Nations Educational, Scientific and Cultural Organization
PPNA	Pre-Pottery Neolithic A
PPNB	Pre-Pottery Neolithic B
RCC	Rapid Climate Change
StdD	Standard Deviation

CHAPTER 1

INTRODUCTION

This thesis will consult archaeofaunal archives in order to shed light on animal exploitation in a crucial period of human history: the Neolithic transition (Late Pleistocene to Early Holocene). Comparisons of archaeofaunal data from numerous Epipalaeolithic and Early Neolithic settlements in Upper Mesopotamia will be used to highlight the role of animals in human subsistence between 10.900 – 7.700 calBC. These data will also be consulted against the background of cultural continuity and discontinuity in this transitional period.

The focus of this thesis lies on archaeofaunal records from Late Pleistocene and Early Holocene sites in Upper Mesopotamia, one of the core zones of Neolithisation (Özdoğan, 2008). Recent publications by scholars studying the emergence of Neolithic lifeways in this region have noted that this process took place over several millennia and was not as rapid as previously believed; in other words, it was not a quick *Neolithic Revolution* (Watkins, 2010). Between 11.000 and 7.500 calBC, a period of three and a half thousand years, there was a considerable environmental and cultural change (Özdoğan, 2014). Firstly, it witnessed the Younger Dryas, a cold, dry period which lasted over a thousand years, which was followed by warmer and wetter conditions in the Early Holocene; this climate change coincided with the end of the Palaeolithic and the appearance of the subsequent Early Neolithic in Southwest Asia (Bar-Yosef, 2011).

Notably, the climate and cultural developments of the Late Pleistocene and Early Holocene were not linear instead, there were climate fluctuations and discontinuities in the settlement sequence. The contribution of this thesis is to investigate the overall traditions of animal exploitation in this period with a focus on a phase of settlement discontinuity that has been referred to as the late PPNA/EPPNB

Hunter-Gatherer Crisis (Clare & Kinzel, 2020). As such, this investigation will be a contribution to our understanding of this phenomenon. This study of published faunal records from Epipalaeolithic and Early Neolithic settlements in Upper Mesopotamia will highlight human exploitation of wild animals (hunting strategies) as well as animal domestication, which happened in the 9th-millennium calBC. The research questions are as follows: will the archaeofaunal data also shed light on changes in animal exploitation strategies connected to the proposed hunter-gatherer crisis? For example, are there indications in the faunal data for periods of stress during these centuries, and if so, what can these signals tell us about possible causal mechanisms related to the crisis period, i.e. the transition from PPNA to EPPNB? What role did climate change play in this process? Was climate involved at all? Or were all the changes in this period related solely to cultural mechanisms?

This thesis is the first archaeofaunal study dedicated to the proposed late Hunter-Gatherer crisis, which is itself a new focus of study in the frame of the Göbekli Tepe research project. As such, the results from this thesis are a contribution to a new topic and will undoubtedly be consulted in future research.

There are several limitations to the investigations undertaken in the frame of this thesis. Firstly, it has not been possible to consult all aspects of the archeofaunal records, especially as the published data sets from the many sites are heterogeneous. A further limitation is connected to the availability of climate data (proxies) for the study region. Finally, the consulted radiocarbon data does not always provide a high enough resolution for studying short term changes in the archaeofaunal data.

1.1 Climate and Human Societies

The relationship between climate and human societies has long been recognised as having particular significance, even before academic studies focusing on this topic started to appear in the first half of the twentieth Century (Budja, 2015; Clare, 2016: 48-49). As early as the 1910s, there were studies examining climate culture interaction, such as those by the geographer E. Huntington, and Gordon Childe's Oasis Theory, and by the 1950s the interaction between nature and culture was already being seen as a driver of innovation (Budja, 2015: 171; Clare, 2016: 48). In the 1960s, the

New Archaeology approach saw the increased tendency to explain culture change with climate and environmental factors; this reflected the growing influence of the natural sciences in archaeological research (Clare, 2016: 48-49); notably, many of the interpretations at this time were still deterministic, i.e. they stated that cultural change was directly connected to climate and environmental changes (Budja, 2015: 172-173).

In the 1980s, a climatological study (Cooperative Holocene Mapping Project; COHMAP) focussing on long-term global climatic changes connected the climate amelioration of the Early Holocene with the Neolithic transition between 13.000 and 10.000 BP (Budja, 2015: 171). This was followed in the 1990s by the model of abrupt climate shifts (Bond *et al.* 1997) based on the results from deep core drillings in the Atlantic which showed accumulations of eight layers of ice-rafted lithic debris that had been transported there by iceberg discharges from the northern ice-shield. These discharges were linked to colder conditions in the North Atlantic on several occasions during the Holocene (Budja, 2015: 171-172). In the early 2000s, periods of climate fluctuation during the Holocene were also detected in the Eastern Mediterranean and linked to the increased frequency and intensity of high atmospheric pressure over Siberia which led to cold air being directed from there into the Eastern Mediterranean. These periods were later referred to by P.A. Mayewski (Mayewski, *et al.* 2004) as Rapid Climate Change events (Budja, 2015: 172; Clare, 2016: 34-35) and have since been linked to various changes in human societies (Clare, *et al.* 2008; Weninger et al. 2009; Weninger *et al.* 2014, Clare, 2016).

Meanwhile, the deterministic interpretations of studies from the early and middle twentieth century have been replaced by other interpretive approaches; Budja (Budja, 2015: 174-175) refers to a change in paradigms that has also been influenced by discussions related to the impacts of modern climate change on human societies. An important insight from these studies is the concept of adaptive cycles after Holling (Holling, 2001; Budja, 2015: 172; Clare, 2016: 51-52) that sees human social-ecological systems divided into four phases of a cycle (reorganisation-growth into action, rigidity and decline). According to this hypothesis, sudden and unpredicted events formed outside the cycle can lead to the collapse and disruption of the systems. Recently, adaptive cycles have been used in various studies focusing on climate-culture interaction in prehistory (e.g. Bradtmöller *et al.* 2012; Rosen & Rivera-Collazo, 2012; Clare, 2016).

1.2 Hunter-Gatherer Vs Agriculturalists: Why Domesticate?

What motivated our ancestors to change their millions of years' lifestyle of forager, hunter, gatherer to one of food production through the domestication of plants and animals? This topic has been debated for more than a century and not only by archaeologists. As early as Victorian times, Charles Darwin talked about the beginnings of agriculture, saying that this must be related to the onset of civilisation, *i.e.* the beginnings of agriculture would have required a sedentary population comprised of a union of families under a chief (Darwin, 1874; Richerson *et al.* 1999).

For Southwest Asia and Upper Mesopotamia, Robert Braidwood`s: "Hilly Flanks Hypothesis" from 1940s is of particular significance (Braidwood, 1948). According to Braidwood, plant and animal domestication must have started in the natural habitats where wild forms of later domesticated plants and animals were found, specifically along the hilly flanks of the Fertile Crescent (Zagros, Anatolia). Another important contribution to this topic was formulated by Lewis Binford in the 1960s. In his "Marginal Zone Theory" (Binford, 1968) he states that agriculture emerged as a response to population pressure in nuclear zones; as the nuclear zones did not have enough resources for the growing population, groups were forced to leave and move into the marginal zones where they experimented with plant and animal domestication.

A hypothesis that is more closely connected to the exploitation of animals at the transition to agriculture is the so-called Broad-Spectrum Revolution (BCR) proposed by K. Flannery (Flannery, 1968). The BSR is a term used to refer to the visible increase in the number of different species hunted in the Epipalaeolithic, potentially as a reaction to the negative change in climate conditions (cooler and drier) in the Younger Dryas. It has been argued that the BSR could have contributed to the emergence of Neolithic lifeways (domestication) in the Early Holocene (Munro, 2009A: 141-142).

In her book *The Economy of Cities* from 1969, Jane Jacobs argues that animals may have become domesticated as a result of being captured and stored "on the hoof" in the settlements (Jacobs, 1969). Based on this statement, Jacobs proposed that cities came first and domestication later. Barbara Bender (Bender, 1978), on the other hand, suggested that domestication was only possible when societies were organised (with alliances and exchange networks) and there was a control of surpluses. In the 1980s, David Rindos discussed the co-evolution of humans, plants and animals (Rindos, 1980&1984) and stressed the continuities rather than the contrasts between foraging and farming (evolutionary theory/selectivism).

Closer to our time, in the 1990s, Harlan wondered why anybody would abandon the enjoyable life of a hunter, replacing it with hard work under the hot sun, for a supply of food that was more fragile to adversity and even less nutritious (Harlan, 1992). Possible explanations to this question might be . Firstly, Brian Hayden envisioned the rise of agriculture as resulting from what he calls 'competitive feasting'. In other words, food was regarded as a source of social prestige; early domestication took place in order to create delicacies that were going to be shared in public feasts organized by families or individuals who wanted to improve their social status. S. Mithen instead explains the origins of agriculture as being linked to cognitive/evolutionary developments in the human brain. In Mithen's view, the origins of agriculture 10,000 years ago are best explained by a fundamental change in the way the human mind conceived nature (Mithen, 1996). Emphasis was put again on climatic changes as the push factor to take up farming with the work of Bar-Yosef and Belfer-Cohen (1991). They argued that the global climatic downturn, known as the Younger Dryas, decreased the yield of wild cereals and this motivated the Natufians communities of hunters and gatherers to turn to cultivation.

Finally, among the most recent insights into the origins of agriculture in the Near East is a 2011 contribution by Melinda A. Zeder (Zeder, 2011). In this publication, she stresses that there was a long period of intensive human management of animals and plants before any detectable morphological change (domestication) occurred. Further, she notes that agriculture most likely arose out of economic interest; Humans modified their local environments in order to "encourage" plant and animal resources. Lastly, it is now evident that the domestication process reaches back in time further than originally thought (at least to 9.500 calBC, *i.e.* we are dealing with a *longue durée*) (Zeder, 2011: S230). As seen from the above discussion, there is still no agreement as to what caused this dramatic change (domestication) in human history, though the climate is one of the reasons often mentioned. In the following, we will examine the possible contributions of climate change during the proposed hunter-gatherer crisis, which is roughly synchronous with the PPNA-EPPNB transition.

1.3 Study Aims and Methodology

In order to better understand whether the changing pattern of Epipalaeolithic and PPN settlements in Upper Mesopotamia (Euphrates and Tigris) was in any way connected with the changing environmental conditions, this study will take the following steps:

STEP 1: environmental data on climate will be reviewed to create a clear picture of the climatic conditions between Late Pleistocene to Early Holocene (10.900 and 7.700 calBC) in other words a time period covering Late Epipaleolithic, PPNA, EPPNB and MPPNB. This review not only helps us to understand the diachronic change of climate but also human-climate interaction, diversity of animal species and selective pattern of the settlements through regions.

STEP 2: Having recreated prehistoric climate patterns, this study will proceed with the revaluation of 14C samples/dates from settlements and put them into a context to understand the continuity and/or disruption of settlement patterns. So that, we are going to examine whether the prehistoric communities occupied the same sites continuously or are there hiatuses in settlement sequence through time.

STEP 3: The main focus on this study will be the review of published archaeofaunal data from selected Early Prehistoric communities from Euphrates, Tigris and Urfa regions. As we know, the hunt is a very crucial event for survival in prehistoric communities and similarly important were the animals. Following of herds, trapping and hunting them was constituting an essential part of a hunter’s daily life. What those people ate or didn't eat was always an important question for the researchers. Archaeofaunal data can be used to reconstruct past environmental elements like climate, subsistence and even ritual/belief systems. Here in this research, I will use site-specific faunal data to understand first which animals were consumed in what percentages in which settlement through time. According to the first evaluation, the sites in the same region will be compared with one another to see the differences or similarities in their subsistence patterns. Having completed the site-based evaluation, this research will proceed with the comparison of faunal data from Euphrates, Tigris and Urfa regions to reveal whether is there shared ‘’culture/values ‘’

shaping the consumption patterns of animals or is it nature itself. Finally, the diachronic development of human-animal interactions will be considered. Naturally, in this research, we will see the abandonment of many sites as well as flourishing others from Late Pleistocene to MPPNB (see figure 7-11).

CHAPTER 2

LITERATURE REVIEW

2.1 STUDY REGION

The study region of this thesis is frequently referred to as Upper Mesopotamia and is one of the core zones of Neolithisation (after Özdoğan, 2008: 142). Upper Mesopotamia, that covers parts of what is now northern Syria, Iraq and southeastern Turkey, witnessed the appearance of the Neolithic *modus vivendi* in the 10th and 9th millennia calBC. Neolithic lifeways remained intact in these regions for several millennia without any evident interference (Özdoğan, 2008: 142). Following the emergence of Neolithic lifeways in the core zones, these very gradually dispersed into adjacent regions. For example, before the 7th-millennium calBC, the Neolithic was absent in the *Interim Zones* of western Anatolia, the Marmara, the Aegean and most of the Balkans. In these regions, sites are comparatively rare and belong to the Epipalaeolithic or Mesolithic. However, after the 7th-millennia, typical features of the Neolithic (e.g., pottery, domesticated plants and animals etc.) appear here fully developed and without out any indications of local predecessors. Therefore, there are strong indications that the Neolithic lifeways were introduced to these regions from the east (Özdoğan, 2008: 140-145), eventually reaching western Europe in the 5th millennium calBC (see Figure 1).

In this thesis, the study region (Upper Mesopotamia) is divided into a western and an eastern subregion. This division is, as we shall see, based on slight geographical and climatic differences between the two. Generally speaking, both subregions feature a major river, the Euphrates in the west and the Tigris in the east. Between the two rivers there are areas of plateau and especially to the north there are the foothills of the eastern Taurus Mountains. In addition to the geographical and climatic differences, there are also differences relating to the archaeology of these subregions in the Neolithic transition period. For example, and most importantly, the T-pillar sites (e.g. Göbekli Tepe, Karahantepe, Nevali Çori, Sefer Tepe, Kurt Tepesi, Ayanlar Höyük, Harbetsuvan Tepesi, Hamzan Tepe, Yeni Mahalle and Taşlı Tepe), also referred to as

the Göbekli Tepe culture sites, are limited to the northern parts of the western subregion. Additionally, sites in the eastern subregion show closer connections (visible in the lithics and bone artefacts) to Epipalaeolithic/Zarzian traditions from further east, e.g. Iran (Rosenberg *et al.* 1998; Özkaya *et al.* 2018) while sites in the western subregion show connections to the south, i.e. the Natufian culture (Ibanez *et al.* 2007) (for more detail, see Chapter 2.6).

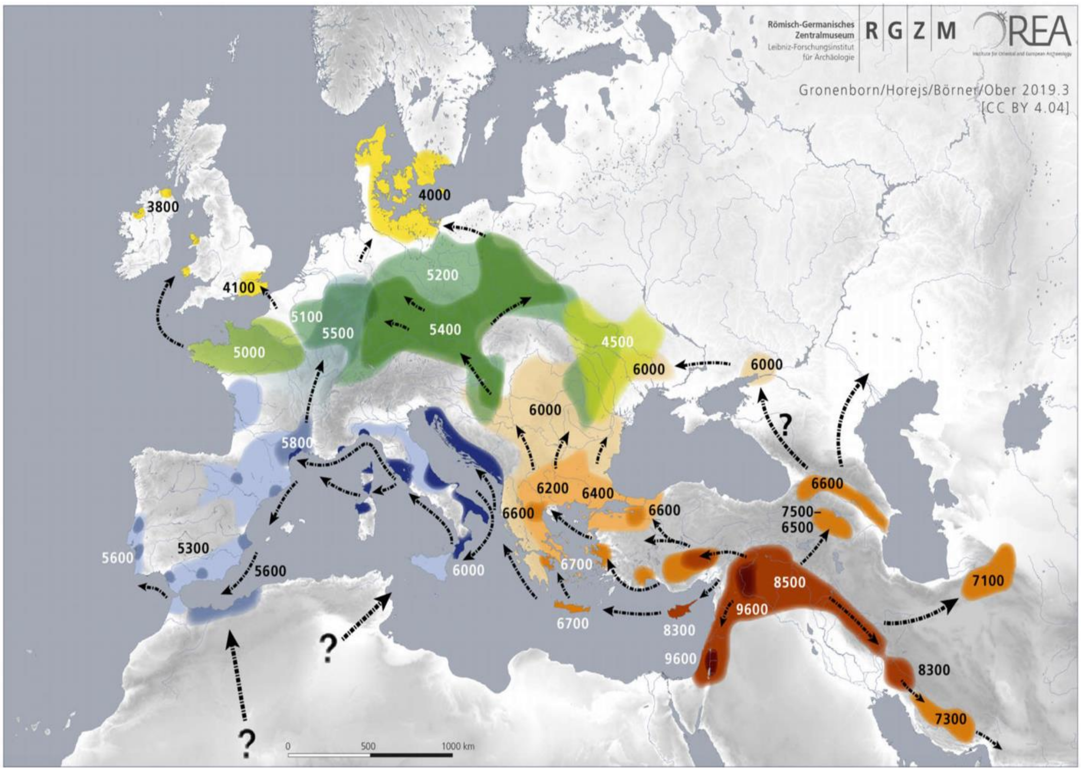


Figure 1: Map showing the diachronic dispersal of the Neolithic from its core areas into Europe after Gronenborn 2019.

2.1.1 Geography and Climate

According to Erol (1983), the modern Turkish Republic is comprised of seven different geographical regions: Marmara, Aegean, Mediterranean, Black Sea, Central Anatolia, East Anatolia and Southeast Anatolia. The focus of this study lies on Southeast Anatolia (or Upper Mesopotamia) which equates to the modern-day

Turkish-Syrian-Iraqi border region. Southeast Anatolia is divided into two sub-regions (west and east) based on geographical and ecological features. This chapter will first introduce the definition and the borders of sub-regions and will continue with the available literature on past climate data (from Late Pleistocene to Early Holocene).

2.1.2 Western Subregion

This subregion is bordered to the north by the foothills of the eastern Taurus Mountains and the south by the modern-day Turkish-Syrian border; it stretches from the hills bordering the Amik-Maras graben (fault line) in the west to the lava sheets of the Karacadag massif in the east. This westernmost subregion is still very much under the influence of western (maritime) climate, typical of the Eastern Mediterranean. It is characterised by limestone plateaus (see Figure 2).

The western subregion is further divided into a western and eastern part. In the west (see Figure 2, 711 after Erol), the inclination of the plateau decreases from the northwest to the southeast, while in the east (see Figure 2, 712 after Erol) lies an area referred to as the Urfa plateaus where the dominant landscape element is an almost horizontally lying limestone plate covered in the east by lava sheets of the Karacadag massif. The low level of fragmentation of the plateau enhances the character of the area. The climate is characterised by heat and drought in summer and cold, dry winters, which results in almost continuous steppe vegetation. Only in the area of the low thresholds dividing the plateau can scattered dry forest formations be found. The western subregion also extends to the south of the Turkish-Syrian border to include the Northern Syrian sites considered in this thesis. This region is very much a continuation, both physically and climatically, of the landscapes to the north. In this region, the Euphrates has created a fertile alluvial valley which cuts through the characteristic dry steppe (cf. Akkermans&Schwartz, 2009: 6)

2.1.3 Eastern Subregion

As in the western subregion, this subregion is bordered to the north by the foothills of the eastern Taurus Mountains and the south by the modern-day Turkish-Syrian-Iraqi border; it stretches from the lava sheets of the Karacadag massif in the west to the Hakkari Mountains in the east. Its landscape is formed by plateaus. In the lower-lying areas, there is steppe vegetation, while the areas surrounding them feature dry forest formations. The eastern subregion is further divided into a northern and southern part. In the north lies the Upper Tigris with its low-lying plateaus surrounded by hills (see Figure 2, 721 after Erol) and in the south the Mardin Esigi that is characterised by a large asymmetric anticlinal structure formed by Mesozoic and Old Tertiary formations (see Figure 2, 722 after Erol). The eastern subregion also extends to the south of the Turkish-Iraqi border to include the Northern Iraqi sites considered in this thesis.

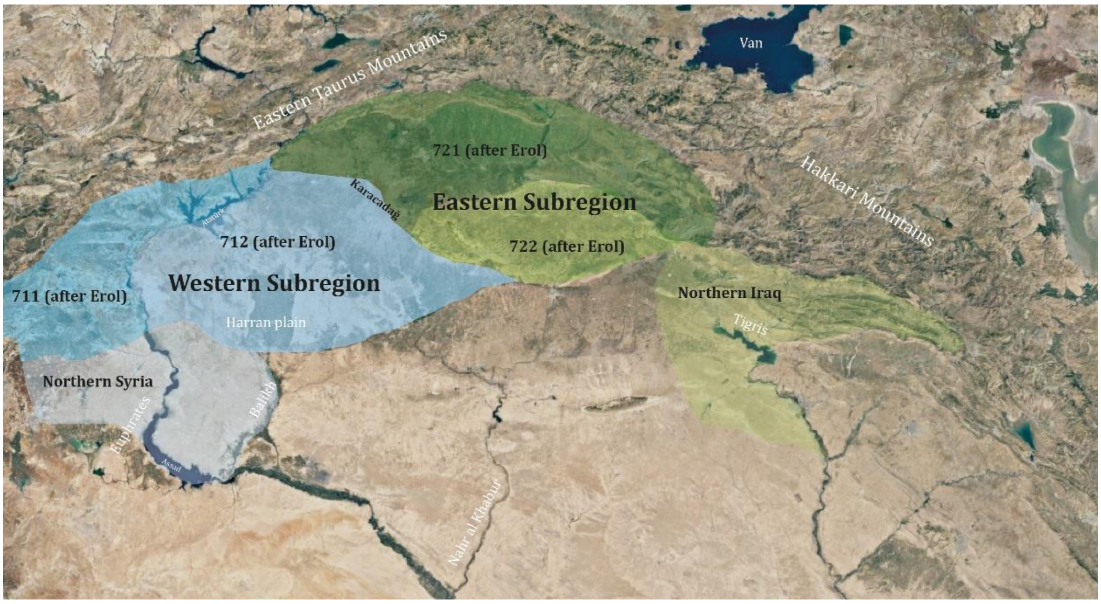


Figure 2: Map showing the defined regions in Turkey and with a focus on four Southeast regions of this study (after Erol 1983, amended).

2.2 Palaeoclimate

Having presented the modern climate of southeastern Turkey, we now move on to the palaeoclimate of this same region from the Younger Dryas to the Early Holocene. Unfortunately, for Upper Mesopotamia, there are still no high-resolution paleoclimate proxies from the Late Pleistocene and Early Holocene. Currently, most information relating to the palaeoclimate comes from archaeological studies undertaken at settlement sites which, however, relate a very local and limited picture of environmental conditions in their respective catchments. Notably, these data can also be biased as they also reflect the human agent in the selection of plant and animal species; therefore, the validity of these data for the reconstruction of more general palaeoclimate conditions is limited. Therefore, it is also helpful to consider proxies which tell us more about the larger scale (global, supra-regional) palaeoclimate and trends. For this purpose, different palaeoclimate records can be consulted which include Greenland ice sheets (GISP2 Potassium Smoothed, GRIP Delta-O18), marine (LC21) and lake sediment cores (Eski Acıgöl, Zenbar, Lake Van and Dead Sea) and speleothems (Soreq Cave).

Greenland Ice Sheets (GRIP, GISP1-2): the first Greenland Ice Sheet Project (GISP1) started in 1971 and continued as the follow-up project ‘’GISP2’’ in 1993.
The aim of this project was to supply information about climate change by drilling into the ice in Greenland and analysing various isotopic inclusions (e.g., Delta-O-18) in the trapped gases. A further project GRIP (Greenland Ice Core Project) successfully drilled down to 3053.44 metres; the components in the ice core have revealed a detailed climate change record of 100.000 years back in time (Mojtabavi *et al.* 2019). This study will consider high resolution GISP2 potassium ion records, a proxy for the intensity of Siberian high pressure over Eurasia in the winter months (Meeker&Mayewski, 2002; cf. Clare, 2016: 35-36).

Lacustrine Cores: These are cores drilled into the sediments of lakebeds. Various records can be studied from these sediments, including pollen, isotopes, *foraminifera* (plankton) etc. As such, lacustrine cores can provide environmental data, for example relating to changes in air temperature and the diversity of living organisms at different times in their chronological sequences. Among the lacustrine records known from Turkey and adjacent regions, the most important, which are considered in this chapter, include Lake Van (Van province, Turkey) (Wick *et al.* 2003), Eski Acigöl (Nevsehir province, Turkey) (Roberts *et al.* 2001), Lake Hazar (Elazig province, Turkey) (Ön *et al.* 2018), Nar Gölü (Nevsehir province, Turkey) (Dean *et al.* 2015) and Lake Zeribar (Iran) (Stevens *et al.* 2001).

Lake Water Level (Dead Sea): The Dead Sea is located in the Jordan Rift Valley in an area of tectonic depression. The Dead Sea is 43.000 km² and lies at 418 metres below sea level. Recent studies on sediments, which were taken from three different locations in the Dead Sea, show that the level of lake water fluctuated over the last 9.000 years; i.e., this is proxy for precipitation in the catchment of the Dead Sea basin (Migowski *et al.* 2006; Litt *et al.* 2012).

2.2.1 Younger Dryas

The Younger Dryas, which is a very good example of an abrupt climate change event, lasted about 1200 years and is recorded in terrestrial, marine and lacustrine archives and in ice cores. Generally speaking, the Younger Dryas was a cold and dry event in the Northern Hemisphere between 10.900 and 9.600 calBC. The term "younger" was given to this climate event because it was the last in a sequence of cold events which impacted at the end of the Pleistocene.

The palaeoclimate proxies with information relating to the Younger Dryas and mentioned above include the GISP2 potassium ion records, Lake Van, Eski Acigöl,

Lake Hazar, Nar Gölü and Lake Zeribar. According to the GISP2 potassium ion records, the Younger Dryas was chractrised by an intense Siberian High Pressure over Eurasia which is an indication for severe winters and a dry and cold climate in the study area (Clare, 2016: 35-36). At Lake Van, the available proxy data are also indicative of cold and dry climatic conditions, the lake level dropped dramatically and the vegetation turned to a semi-desert (Wick *et al.* 2003). Similar trends are also observable at the other Lake sites: at Eski Acigöl, pollen data indicate an *Artemisia*-chenopod steppe (Roberts *et al.* 2001); at Lake Hazar, the lake level dropped below today's level (Ön *et al.* 2018); at Nar Gölü, evaporation far exceeded precipitation (Dean *et al.* 2015); and at Lake Zeribar, there was a semi-desert vegetation with higly concentrated lake water (Stevens *et al.* 2001).

The effects of the Younger Dryas on human populations were probably extreme and may have contributed to the beginnings of agriculture around the Fertile Crescent (Bar-Yosef, 2002). In western Anatolia, the Younger Dryas vegetation is characterised by the change from forest to steppe; and in Eastern Anatolia, it saw the continuation of the Late Glacial steppe.

2.2.2 Early Holocene

This period can be considered a pluvial period. Compared to the proceeding Pleistocene, precipitation levels increased significantly and there were changes in vegetation cover and erosion processes. The Holocene can be divided into three main phases: Early Holocene (c.9.5-5.0 ka calBC), Middle Holocene (c.5.0-3.0 ka calBC) and Late Holocene (c. 3.0 ka calBC to the present).

According to the GISP2 potassium ion records, the intense Siberian High Pressure over Eurasia stopped in the Early Holocene (Clare, 2016: 35-36). At Lake Van, the available proxy data are indicative of Geochemical and isotopic records indicate a strong increase in moisture at the onset of the Holocene, and Artemisia-chenopod steppes were partly replaced by grass steppe and pistachio scrub (Wick *et al.* 2003). Similar trends are also observable at the other Lake sites: at Eski Acigöl, pollen data indicate that the *Artemisia*-chenopod steppe was replaced by grass-oak-terebinth parkland and there was a gradual increase in tree pollen (Roberts *et al.* 2001); at Lake Hazar, precipitation values were high and the temperature gradually increased (Ön *et al.* 2018); at Nar Gölü, conditions were much wetter (Dean *et al.* 2015); and at Lake Zeribar, the climate was wetter than in the Younger Dryas and the vegetation changed to a pistachio-oak-savanna (Stevens *et al.* 2001).

In summary, at the onset of the Early Holocene in the mid-10th millennium calBC there was a strong increase in rainfall; for this reason, this phase has been referred to as the *Levantine Moist Period* (c. 8.2- 6.6 ka calBC; for a summary, (Clare, 2016: 24-31). The increase in rainfall at this time is especially evident in the water level of the Dead Sea (see Figure 12). Finally, at 6.600 calBC, the Levatine Moist Period ended and there followed six centuries of climate change which are associated with 8.2 ka calBP event; after the 8.2 ka calBP event, wetter conditions returned in the late pluvial period (6-5 ka calBC) (Clare, 2016).

2.3 Chronology

Presently, there are several hundred 14C dates from 22 Late Pleistocene and Early Holocene sites in Southeast Turkey, northern Syria and northern Iraq (Clare, *et al.* 2020). Neolithic research has advanced in recent years: The Ilısu Dam project in the Tigris Basin has led to the discovery of new Neolithic sites, e.g. Körtik Tepe (starting from Younger Drayas to end of PPNA) (Coşkun *et* al. 2012), Gusir Höyük (Karul, 2011), Hasankeyf Höyük (Miyake *et* al. 2012), Boncuklu Tarla and Çemka Höyük (Kodaş, 2019). This new information adds to what was already known from earlier excavations, for example at Çayönü Tepesi (Erim – Özdoğan 2011), Demirköy (Rosenberg, 2011b), Hallan Çemi (Rosenberg, 2011a) along with Qermez Dere (Watkins, 1995) and Nemrik 9 (Kozlowski, 2002) in northern Iraq.

Tabqa and Tishrin Dam projects in northern parts of the Syrian Euphrates have also contributed the Neolithic research. Radicarbon dates from several sites, including Abu Hureyra and Mureybet (Tabqa Dam Project), and Jerf el Ahmar, Dja'de-el-Mughara and Tell 'Abr 3 (Tishrin Dam Project). Further to the north, there are further Neolithic settlements along the Turkish Euphrates which include Akarçay Tepe and Mezraa Teleilat; in the area of the modern Atatürk reservoir there is also the site of Nevali Çori which was flooded in mid- 1990s. Remarkably, only three other T-Shaped Pillar Sites have been excavated so far: the UNESCO World Heritage Site of Göbekli Tepe, and Harbetsuvan Tepesi and Karahan Tepe in Tektek Mountains. Numerous other T pillar sites are known from the region thanks to surface surveys undertaken by B. Çelik (Çelik, 2019). A further T-pillar site was probably located in the heart of the modern city of Şanlıurfa as suggested by evidence from Yenimahalle (Çelik, 2011).

Table 1: Overview of archaeological periods, chronology and climate for the sites considered in this study.

Period	Age (CalBC)	Climate
Epipalaeolithic (Late Natufian)	10.900-9.600 BC	Younger Dryas
Pre-Pottery Neolithic A (PPNA)	9.600-8-700 BC	Early Holocene
Early Pre-Pottery Neolithic B (EPPNB)	8.700-8.200 BC	
Middle Pre-Pottery Neolithic B (MPPNB)	8.200-7.500 BC	
Late Pre-Pottery Neolithic B (LPPNB)	7.500-7.000 BC	

The Epipalaeolithic is the final phase of the Palaeolithic period during which sedentary settlements began to appear and pre-domestication cultivation was practiced in the Fertile Crescent (Table 1); in the southern Levant this phase coincides with the Natufian culture (Grossman, 2013). Northernmost Natufian sites are known from northern parts of Syria. In contrast in the eastern sites of the study region (Tigris Basin) there is a much stronger Zarzian influence to be observed in lithic assemblages of this period. Already in the Epipalaeolithic, hunter gatherers practiced sedentary or semi-sedentary life before agriculture. In the Natufian phase of Abu Hureyra in northern Syria, there is evidence for the cultivation of cereals, particularly rye, and this shows that Epipalaeolithic hunter-gatherers did not just rely on hunting but also practiced pre-domestication cultivation. Epipalaeolithic architecture consisted of small semi-subterranean buildings (Grossman, 2013). This period is followed by the PPNA (Pre-Pottery Neolithic A) in the Levant and in Upper Mesopotamia (Fertile Crescent) between 9.600 – 8.700 calBC (Table 1). This time period is marked by small oval – round mudbrick dwellings, cultivation of crops and hunting and burials under the floor of the buildings (Mithen, 2006). PPNA is followed by the PPNB (Pre-Pottery Neolithic B) which spans a time period between 8.700 – c. 7.000 calBC (Table 1). In the PPNB people began to rely on domesticated animals and agriculture. Flint tool kits of this period are quite distinct and are characterised by naviform cores and Byblos points. Building become more and more rectangular and walls and floors were covered with clay-lime plaster (Chazan, 2017).

In this section there follows a review of the Epipalaeolithic, PPNA and PPNB sites in the study area (western-eastern subregions).

2.4 Archaeological Sites: Western Subregion

Surveys and excavations conducted in this subregion over the years have led to the discovery of very small number of Epi- Palaeolithic camp sites/settlements and a larger number of PPN sites. Epipalaeolithic Sites;

Hamami Mevkii: Located in Uğurcuk village in Birecik province of modern Turkish city, Şanlıurfa. Discovered in the frame of TÜBA survey project and finds collected from the site dated to Epi-Palaeolithic.

Kulabtar Kaya Altı Sığınakları: Located in Duyduk Village in Birecik District of modern Turkish province of Şanlıurfa, this site was discovered in 1999 and covers an area of 100 x 50 metres. Flint tools collected from the site assigned to Epi-Palaeolithic.

Uluk Mevkii: This site is situated on the southern bank of the Euphrates River in Şanlıurfa Province, about 23 km northwest of the Bozova, 1 km southwest of the Karababa Dam. and 2.5 km northeast of the Eskin (Sam) Village. According to M. Özdoğan, some of the flint assemblages collected from the site can be dated to the Epipalaeolithic (Özdoğan, 1977).

The following site has provided evidence for Epipalaeolithic and Pre-Pottery Neolithic A and B (PPNA and PPNB) activities:

Söğüt Tarlası: This Epipalaeolithic and PPN site is located 1 kilometre north of Biris Mezarlığı. It is a small mound of 2-3 metres in height and covers an area of 50 x 90 metres. The site was investigated by B. Howe in 1964. Excavations revealed a few pieces of obsidian. However, according to Hauptmann, the site can be assigned to the Epipalaeolithic, PPNA and PPNB periods (Hauptmann, 2011: 89).

The following site has provided evidence for Pre-Pottery Neolithic A and B (PPNA and PPNB) occupations:

Biris Mezarlığı: This PPNA and PPNB site is located to the southwest of Küçük Gölbaşı district in modern Turkish city of Şanlıurfa. It is small mound of at least 120 x 25 metres. Two trenches were opened by B. Howe in 1964. Although, no building remains were revealed, M. Özdoğan reports on 200 obsidian artefacts from this site. According to him (Özdoğan, 1994; 43) these indicate a connection between the site and the nearest obsidian source along the İncesu and then Şaşkan Samsat to the nearest obsidian source.

Eski Harabe: Located in Diktepe village in Birecik province of modern Turkish city, Şanlıurfa. Discovered in the frame of TÜBA survey project and finds collected from the site dated to PPNA.

Sınır Tepesi: Located in Arslanlı village in Birecik province of modern Turkish city, Şanlıurfa. Discovered in the frame of TÜBA survey project (2001) and researchers reported that there are possible flint tools can be dated to PPNA (Özdoğan & Karul, 2002).

Göbekli Tepe: Göbekli Tepe lies 15 km east-northeast of Şanlıurfa and 2.5 km east of Örencik Village in the Germus Mountains (37°13′22.81″ N; 38°55′20.51″ E). Göbekli Tepe overlooks the Harran Plain to the south, the modern city of Şanlıurfa and the Fatık Mountains to the west and south-west and the Tektek Mountains to the southeast. It is also possible to see (on days with good visibility) the eastern Taurus Mountains and the Karacadağ to the north and east (cf. Knitter *et* al. 2019). The site was originally discovered during the Southeast Anatolia Survey Project in 1963 along with many other sites, e.g. Çayönü Tepesi (Benedict, 1980). Göbekli Tepe was ‘’re-discovered ‘’ by Klaus Schmidt in 1994 (Schmidt, 2006). The prehistoric tell of Göbekli Tepe si comprised of a series of up to 15-metre-high knolls and lower-lying depressions; the highest point of the mound lies at 786 metres above sea level, making it the second highest peak in the Germuş Mountains.

Excavations since 1995 have revealed eight monumental structures which were previously unexpected for this period. These buildings were generally constructed according to a round-oval ground plan; at the centre of the buildings there are two T-shaped limestone pillars up to 5.50 metres in height. Smaller (up to a dozen) T-shaped monoliths (2.50-3.00 metres in height) are incorporated into the walls of the buildings. These smaller pillars were, therefore, never freestanding.

Some T-shaped pillars are (in some cases abundantly) decorated with animal depictions and other motifs in low and (less frequently) high relief. Since some pillars are decorated with human body parts like arms and hands it is understood that they are stylised representations of human beings. T-shaped pillars in the buildings are connected by stone benches that were constructed against the inner face of the walls; clay mortar served as an adhesive.

Monumental buildings became filled/sealed at the end of their use-lives. It is discussed whether the filling process is attributable to intentional or natural (erosion) events. Whatever the case, the large amounts of fill were crucial for the protection of the monolithic structures over the millennia until their discovery in the mid-1990s. T-shaped pillars and stone used in the construction of the buildings were quarried on the adjacent limestone plateau, as testified by the negatives of quarried blocks as well as unfinished (and still in-situ) carved elements in the quarries. Previously, it was suggested that Göbekli Tepe was solely a ritual centre and/or mountain sanctuary (Klaus, 2006). However, recent research at the site has revealed that the story is much more complex (Clare, 2020).

More recently, it has been recognised that the special buildings at Göbekli Tepe were in use for a much longer time (centuries) than previously thought (Clare, 2020). Architectural studies have demonstrated that buildings were modified and repaired over the course of their use-lives; in other words, architectural elements from different phases existed side by side. Contrary to previous stratigraphic studies, recent investigations have also showed that both vertical and horizontal stratigraphy are equally important at the site when discussing its development.

Another previous interpretation that is now being revised concerns the previously proposed ritual backfilling of the monumental structures in the course of feasts/ceremonies/rituals. For example, new studies are showing that the backfill of Building D could have resulted from the inundation of this building as the result of several (?) different slope-slide events which saw the surrounding slopes of the mound cascading into the lower-lying monumental building. This scenario also explains the origin of the material filling the buildings which is comprised of building rubble from the surrounding buildings and displaced archaeological deposits from the PPNA and EPPNB periods (Clare 2020; Kinzel and Clare 2020, 32).

It is likely that the special buildings at Göbekli Tepe were built directly on the natural rock surface of the plateau and were not cut into older settlement deposits. Instead, it is now postulated that the areas between the special buildings filled up with sediment after their construction. On the other hand, it cannot be ruled out that some later (?) structures were partially cut into slopes of the mound (Kinzel and Clare 2020, 32).

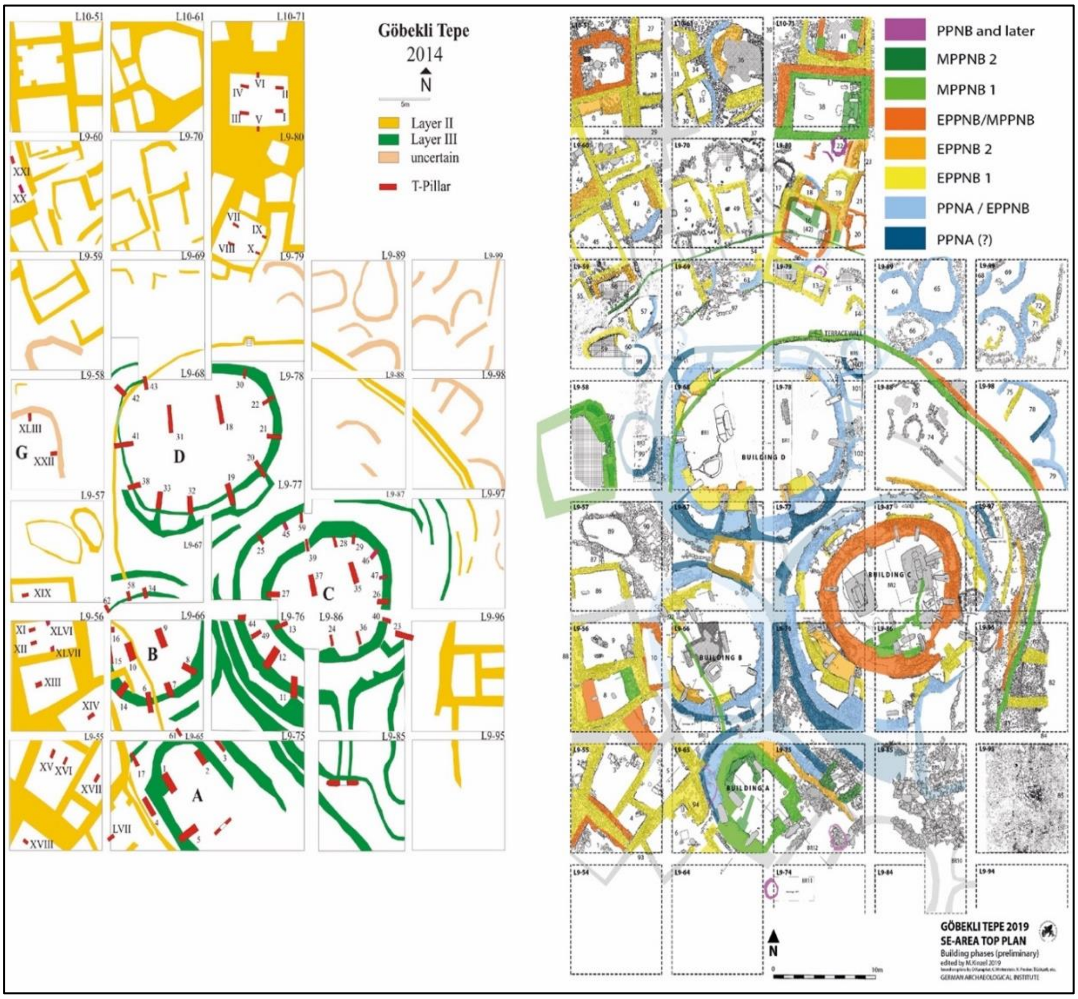


Figure 3: Göbekli Tepe: two schematic plans of the archaeological site showing the advances made in research since 2014. The left map is based on the chronological scheme suggested by K. Schmidt that features the Levels III (PPNA), and II (EPPNB); this chronological differentiation has since been abandoned. The map on the right shows the complexity of chronological phases (after Kinzel and Clare 2020 Figure: 3.2).

Phase 1 (PPNA?): The earliest phase of the settlement saw the first construction of buildings in the main excavation area/southeast hollow which included round-oval special/monumental buildings and round-oval domestic structures, two of which dabut Building D on its western and eastern sides (see Figure 3). Architectural elements assigned to Phase 1 are associated with occupations by a (semi?) sedentary community. Recently, in the north-west area (K10 – 13/23 see Figure 4) of the site and on the western flank of the mound (DR2) round-oval (domestic) structures have also been discovered (see Figure 4). Therefore, in this phase, the settlement area very likely already extended beyond the main excavation area/SE-hollow (Kinzel&Clare 2020, 32).

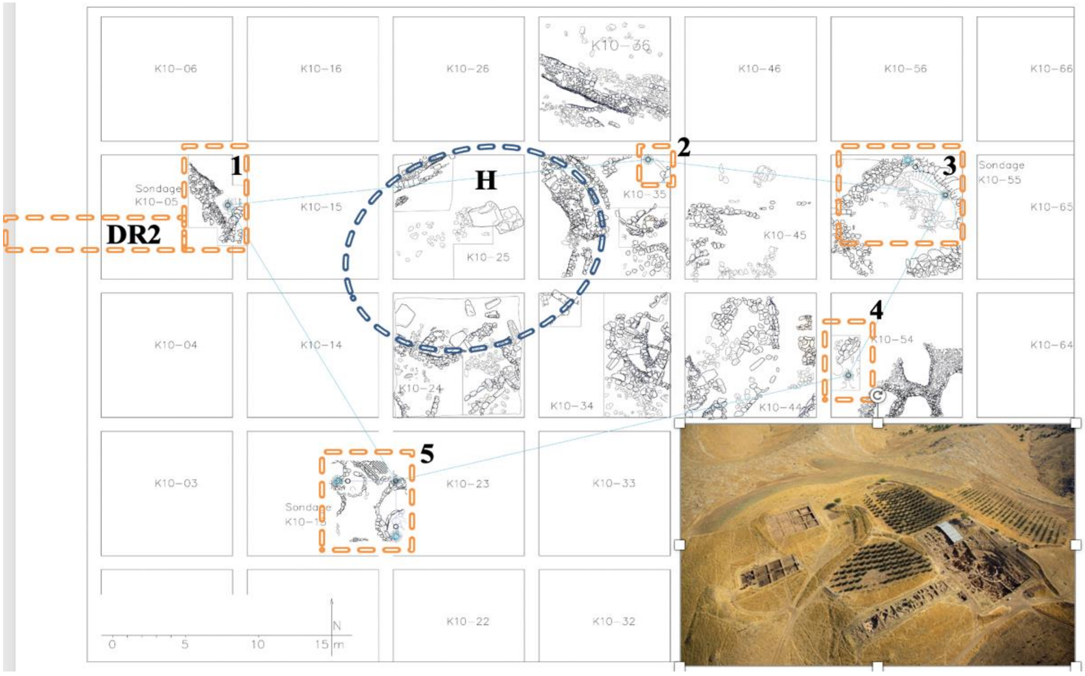


Figure 4: Plan showing the trenches and structures in the northwestern part of the site, including Building H and trench K10-13/23 and DR2, where the PPNA domestic structures were identified (cf. Clare 2020)

Figure 5: Photograph showing the PPNA domestic structures in trench K10-13/23 in the northwestern part of the site

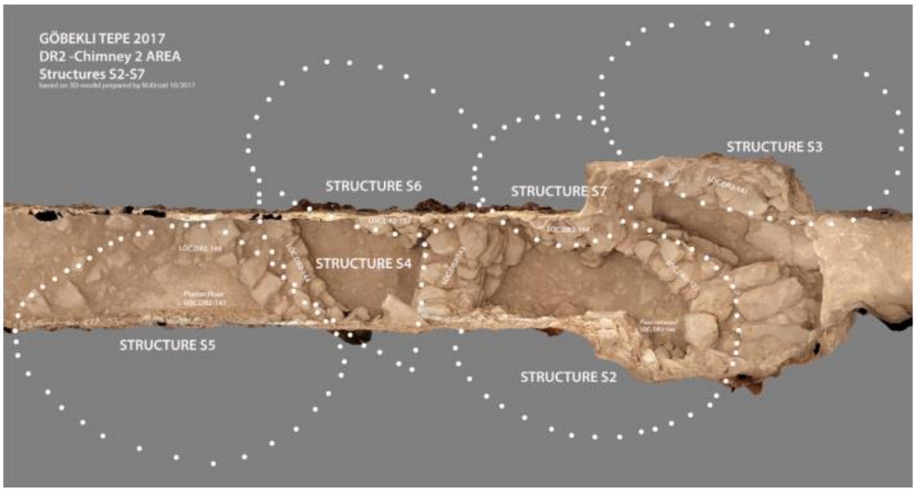


Figure 6: The domestic structures on the western flank of Göbekli Tepe (trench DR2).

Phase 2 (PPNA/EPPNB): This phase is associated with the first serious modification of the four special buildings (A-D) (Kinzel and Clare 2020, 32). This phase saw the construction of new walls inside the original (phase 1) buildings, thus reducing the internal diameter of these structures. In this phase, the T-shaped pillars appear to have been incorporated into the walls of the special buildings. The number of domestic structures also increased in this phase. While the ground-plan of the domestic structures remains round-oval, there is an increasing tendency towards a more rectangular shape. The expansion of structures in this phase remains uncertain due to later building activities and the significant replacement of PPNA/EPPNB transition buildings with rectangular structures in the following phase (Kinzel & Clare, 2020: 32).

Phase 3-5 (EPPNB 1; EPPNB 2; EPPNB/MPPNB): In this period, domestic buildings were constructed on the western and northern slope of the main excavation area/SE-Hollow. These rectangular structures are characterised by multiple construction phases; for example, it could be shown that stone benches with incorporated T-pillars were added to some of these buildings. Similar to the special buildings, the EPPNB rectangular structures show evidence for the addition of walls built against the internal faces of their original walls. During this phase, the special buildings also underwent further modification. This phase ended with a serious slope-slide event, as understood from the deposition of building rubble, middens and possibly even burials from collapsed PPNA and EPPNB structures which had originally stood on the surrounding slopes. The slope-slide event seriously damaged Building D which also saw repairs undertaken in this period. At this time, the final building works were also carried out at Building C and terrace walls were constructed on its eastern side in an attempt to stabilise the mound. However, these measures were insufficient, as testified by a second slope-slide which led to the final abandonment of Building D in the 9th millennium CalBC (Kinzel & Clare, 2020: 32-33).

Phase 6-7 (MPPNB 1, MPPNB 2): From the late 9th millennium to the early 8th millennium CalBC, settlement activity at Göbekli Tepe continued. The main excavation area (southeast hollow) experienced significant decline. This phase is related with the final building activities in and around Building A. The erection of Building G and the so-called Lion Pillar Building in these phases could be a response to the inundation of the special buildings B and D. Further, a terrace wall was constructed to the north of Building D (Phase 7); this wall can be considered as a last attempt to stabilise the slope and prevent it from slipping (Kinzel & Clare, 2020: 33).

Phase 8 (PPNB and later): At Göbekli Tepe there is evidence for a very final phase of occupation; so far architecture from this period is very scarce and is found in the very upper most deposits of the mound previously referred to as level one by K. Schmidt. So far, it is uncertain how old these remains are, but they could belong to a period from a late phase of the PPNB or later (Kinzel & Clare, 2020: 33).

T-Pillar Sites: So far, a total of five T-pillar sites have been the focus of archaeological excavations. T-pillar sites is a term used to refer to settlements where the architecture features the characteristic T-pillars of the Early Neolithic. The dispersal of T-pillar sites is limited to an area within the borders of the modern-day Turkish province of Şanlıurfa. The most prominent of the five excavated T- pillar settlements is the UNESCO World Heritage Site of Göbekli Tepe (Clare, et. al. 2019). Prior to excavations at Göbekli Tepe, which began in 1995, the first T-pillar site to be discovered was at Nevali Çori, which now lies submerged under the waters of the Atatürk reservoir. A third possible pillar site which only saw a small level of excavation, was discovered in the centre of Şanlıurfa city and it is referred to as Yeni Mahalle (Çelik, 2014). Two further T-pillar sites are currently being excavated in the Tektek Mountains to the East of the Harran Plain: Harbetsuvan Tepesi and Karahan Tepe. In addition to these five sites, six further (Sefer Tepe, Kocanizam Tepe, Ayanlar

Höyük, Hamzan Tepe, Tasli Tepe and Kurt Tepesi) sites are known from surface surveys by Bahattin Çelik. These sites are distributed within the borders of modern-day Şanlıurfa province. A final remark can be made to a small number of so-called desert kites (possible hunting traps) associated with the T-pillar sites.

Nevali Çori: Nevali Çori is the first T-pillar site discovered in Şanlıurfa region in the 1990s. It was excavated by Harald Hauptmann and covers an area of 90 x 40 metres (37°35′ N; 38°40′ E). The site dates to the EPPNB and features the so-called cult building in which limestone T shaped pillars were discovered in-situ within a rectangular structure. The site is now submerged beneath the Atatürk Reservoir (Hauptmann, 2011).

Gürcütepe: Excavations by the Şanlıurfa Museum and the Istanbul Department of the DAI were initiated in 1995. Gürcütepe is comprised of four mounds labelled with the Roman numerals I-IV. Excavations were carried out on the Gürcütepe I and II hills. At Gürcütepe II these investigations led to the discovery of PPNB architecture. So far, two building layers with a total of seven houses are known. Ceramic-Neolithic finds were observed on Gürcütepe I but they could not be connected to excavated building layers (Beile-Bohn *et al.* 1998).

Abu Hureyra: Discovered by Andrew Moore and excavated between 1972-1973, today the site is inundated by Lake Assad (reservoir of the Tabqa Dam) in the Euphrates valley,120 km east of Aleppo, Syria (35°52′06″ N; 38°23′36″ E). The site covers an area 11.5 ha. The site was occupied between 9.500-5000 Cal. B.C and consisted of two different settlements: Abu Hureyra 1 and 2 (Moore, 1992)

Abu Hureyra 1: This settlement belongs to Epipalaeolithic sedentary hunter-gatherers; architectural elements discovered at the site include roofed, small, and round subterranean dwellings (Hillman *et al.* 2001). The abandonment of the site has been linked to harsh conditions of the Younger Dryas; drought probably changed the route of the gazelle and other animals the amount and/or type of plant resources (Moore, *et al.* 2020).

Abu Hureyra 2A: (PPNB) This settlement belongs to a of PPNB farmers. Research has revealed that over a period of about 2000 years, Abu Hureyra grew into much bigger settlement of agricultures (Willcox, 2009).

Tell Qaramel: Tell Qaramel is located 25 kilometres north of Aleppo on the right bank of the River Quieq (36°22′40″ N; 37°16′30″ E). Excavations started in 1999 and ended in 2012. The site is situated on a limestone hill (443 metres from sea level) and covers an area of 190 x 160 metres. A total of five occupation levels have been identified. Based on results from 57 radiocarbon dates, the site shows an uninterrupted occupation from the Proto-Neolithic to the PPNA (Kanjou, *et al.* 2018).

Epipalaeolithic (16.890-10.980 calBC) (H0=Early Epi-Palaeolithic) contains a number of ovens and supporting poles for tents,

Proto-Neolithic (Proto Qaramelian) (10.890 – 9.670 calBC) H1 Levels = I-III contains few large round – oval houses, some of which are subterranean,

Early PPNA (Early Qaramelian): (10.670 – 9.250 calBC) H2 Levels=IV-VII occupation expands and includes many architectural elements.

Middle PPNA (Qaramalian Culture): 9820 - 8.710 calBC H3 Levels= VIII – XII

Late PPNA (Final stage of Qaramel): 9.310 – 8.780 calBC H4= Level XIII

The Proto–Neolithic phase of the site seems disorganised and was most likely an open camp. In the PPNA many architectural elements are observed, including, round–oval domestic buildings in small clusters, the Bucrania House and communal/shrine houses (Kanjou, *et al.* 2018).

Tell Mureybet: Tell Mureybet is located in northern Syria, 86 km west of Aleppo (36°04′06″ N; 38°05′26″ E). The site situated on the left bank of the Euphrates. Jacques Cauvin started first excavations in the 1970s but today the site is submerged under the reservoir of Tabqa Dam (Cauvin, 1977). The site was occupied from the Late Natufian to MPPNB. The Natufian phase features cooking pits and hearths but no buildings were found. The phases IB, IIA and IIB are characterised by small round – oval buildings; however, during the subsequent phases (IIIA and IIIB) architectural elements also include rectangular and multi-cellular structures (Stordeur, *et al.* 2009).

Jerf-el Ahmar: The site is composed of two knolls (36°23′30″ N; 38°12′30″ E). Research has revealed that the east knoll was occupied first; it has nine layers. The first four layers featured only round – oval shaped structures, while the subsequent three layers produced rectangular buildings with large curving angles. The final occupation level at the east knoll is assigned to the PPNA-PPNB transition. Occupation of the west mound probably coincides with layer II of the east mound. The plan of the site is very similar to those of other sites along the Syrian Euphrates, with communal buildings (with stone slabs and decoration and multi-cellular buildings) surrounded by round – oval shaped, rectangular or semi-rectangular buildings (Stordeur, 2000).

Level –I/E: PPNA/PPNB transition phase.

Level 0/E: First rectangular architectures

Levels II/E and I/E: Architectures with straight walls and rounded angles.

Levels VII/E to III/E: Circular architectures.

Tell Abr'3: The village of Tell 'Abr is located on the left bank of the Euphrates about 15 kilometres from the Turkish border (36°40′55″ N; 38°05′11″ E). The tell was formerly known to have and Obeid occupation. Prospection and excavations carried out in 2001, 2003 and 2004 by a Syrian team confirmed the presence of a village dating from the Final PPNA, parallel to the end of occupation at Jerf el Ahmar and at Mureybet (phase III). Tell 'Abr 3 is currently the closest Syrian PPNA site to Turkey. This position makes it an important milestone between the sites of the Syrian Euphrates (Mureybet, Jerf el Ahmar and Cheikh Hassan) and sites in south-eastern Turkey (Yartah, 2005).

Nine levels could be recognized in all excavation areas: five levels in the southern sector and along the Euphrates and four in the northern sector. Circular detached houses, semi-subterranean, and buried community buildings have been spotted in all of these levels. The PPNA / PPNB transition phase is marked in this region by the emergence of large circular multicellular constructions with multifunctional character (storage, meetings, rituals). Examples of such structures are known from Jerf el Ahmar (Stordeur *et* al. 2000). This development has been linked to clear desire to have a larger space that was more open and conducive to meetings (Stordeur and Abbès 2002). The community buildings in this phase are therefore always circular and subterranean and larger than earlier round/oval PPNA buildings (Yartah, 2005).

Tell Dja'de el Mughara: Located on the western bank of the Euphrates, Dja'de el Mughara is one of the early Neolithic sites that was excavated as part of the rescue program for archaeological sites located in the area of the Tishrin Dam in northen Syria (36°38′35″ N; 38°12′28″ E). Excavations revealed architecture and small finds from to the transitional phase of the PPNA to the EPPNB, continuing until the transition to MPPNB (Cocueugniot, 1999).

Tell Sheik Hassan: Located on left bank on Euphrates River, ca. 100 km east of Aleppo, Syria. The site is now inundated by Tabqa reservoir. The stratigraphy of the site reflects an occupation period dated to the PPNA/EPPNB (Müller-Neuhof, 2006).

2.5 Archaeological Sites: Eastern Subregion

Compare to the western subregion in the eastern subregion there are more sites with Epipalaeolithic occupations with continuity into the Pre-Pottery Neolithic.

Following sites have provided evidence for Epipalaeolithic and Pre-Pottery Neolithic A activities:

Körtik Tepe: Körtik Tepe (37°48′51.90″N; 40°59′02.02″E) is located at the junction of the Batman streamlet and Tigris river. To the north, east and south directions, the area is enclosed by mountain chains. The Environment grants access to attractive resources such as fish, animals and plant (Özkaya & Coşkun 2011; Benz, et al. 2015). In the Neolithic, the settlement Körtik Tepe was closer to the rivers than it is today. The accumulation of displaced artefacts and pebbles under the Early Holocene buildings indicates a flooding event at the end of the Younger DrayaS (Benz, et al. 2015). Excavations revealed different occupation levels: which are assigned to Younger Dryas and Early Holocene. The remains of many buildings and more than 800 burials have been discovered. Why the site was abandoned remains unclear. A total of five possible Epipalaeolithic structures have been identified at the site but due to later disturbances by PPNA builders these earliest structures are not well preserved. The oldest (Epipalaeolithic) phase of the site can be dated to 10.400/10.200 CalBC. Younger Dryas occupation phase continued until the Early Holocene. The Early Holocene occupation of Körtik Tepe comprised round – oval shaped buildings which can be classified as small sized storage, medium sized dwellings and large sized buildings. Burials are found under the floors of these structures (Özkaya & Coşkun 2011).

Qermez Dere: Located in northern Iraq, northwest of Tell Affar village (36°23′ N; 42°26′ E), the site covers an area of about 100 x 60 metres and is 1.75 metres high. Qermez Dere is located in the foothills of the Jebel Sinjar and modestly above the Je zirah plain. As such, the site is located at the junction of two quite different ecological areas. The architectural structures revealed at the site are subterranean and have round – oval plans (Watkins, 1989). Based on calibrated radiocarbon dates Qermez Dere was occupied from the Younger Dryas to the Early Holocene 10.050-8840 CalBC. Observations relating to the stratigraphy and building techniques of the structures suggest that the site must be comprised of two different occupation layers (Watkins, et *al.* 1995).

- Qermez Dere Phase 1 (topsoil)
- Qermez Dere Phase 2 (RAA house phase)
- Qermez Dere Phase 2.5 (RAD house phase)
- Qermez Dere Phase 3(RAB house phase)
- Qermez Dere Phase 4 (midden)
- Qermez Dere Phase 5 (midden)
- Qermez Dere Phase 6 (midden)
- Qermez Dere Phase 7 (basal soil)

Shanid**ar Cave:** This site was discovered during the archaeological survey project in north-eastern Iraq in 1951 (Solecki, 1971). Cave Shanidar is located 640 km north of Baghdad and 640 metres above sea level in the Zagros Mountains of Iraqi Kurdistan (36°50′ N; 44°20′ E). The cave lies at a junction of the Great Zab and Rowanduz rivers. Total of 14 metres deposits and four levels of occupation was identified in the course of excavations. Layer A Neolithic, Layer B Proto-Neolithic/Mesolithic and Layer C Upper Palaeolithic. Beneath these layers there is also a Middle Palaeolithic layer (Layer D). Layer B is divided two sub-layers B1 and B2. Layer B1 and B2 are associated with Epipaleolithic or Mesolithic ‘’ Zarzian’’ industry (c. 12.000- 10.500 BP), while Layer A is younger and is assigned to the Early Holocene (c.7.000-Present) (Solecki, 1971: Renolds *et al.* 2018)

Following sites have provided evidence for Epipalaeolithic to Pre-Pottery Neolithic Sites activities:

Boncuklu Tarla: In recent years, excavations along the Upper Tigris have been carried out in the run-up to flooding of this area by the Ilısu Dam. Boncuklu Tarla is another site discovered through rescue excavations in this region. Excavations commenced in 2012 and again in 2017. According to recently published results

(Kodaş, 2019) the earliest occupation level of this settlement was in the Palaeolithic (Younger Dryas). Notably, it is one of three sites (together with Körtik Tepe and Çemka) in the Tigris region with an occupation that continues from Younger Dryas into the Early Holocene. While the Younger Dryas occupation is found in Level 6, this is followed by PPNA in Level 5, by a transitional PPNA-B in Level 4, by EPPNB in Level 3, by MPPNB in Level 2, and by LPPNB in Level 1. As such, this an important site as it covers theentire sequence from the Epipalaeolithicto the Late PPNB, some 3.000 years.

Çemka Höyük: Çemka Höyük is located in Ilısu hamlet in modern Turkish province of Mardin. 420 metres above sea level, and covers an area of 65 x 135 metres (37°31′22.27″ N; 41°50′26.23″ E). Eight different building levels have been identified from Epipalaeolithict to PPNA. The examination of buildings from these periods showrec the sequence of development the structures from small simple huts to large rectangular buildings (Kodaş et *al.* 2020).

Following sites have provided evidence for Pre-Pottery Neolithic A activities:

Demirköy: The site is located in the eastern part of the hill known as Demircitepe, near Demirkuyu village in Diyarbakır Silvan district (37°53′ N; 41°05′ E), the prehistoric settlement is placed on the western side of the Batman Stream, one of the tributaries of the Tigris River. The site covers an area of 75m2.

The settlement was discovered in 1989 during surveys conducted by a team under the leadership of Guillermo Algaze (The Tigris – Euphrates Archaeological Reconnaissance Project) (Algaze, et al. 1991) to determine the archaeological settlements to be inundated by the waters collecting in the catchments of the Birecik, Kargamış, Dicle and Batman Dams.

This Pre-Pottery Neolithic settlement has been dated using the chipped stone assemblages; it is thought to be later than Hallan Çemi, and the round houses layer of Çayönü (PPNA) (see table 2 number 35).

Gusir Höyük: Located in the Turkish city of Siirt and situated next to the Gusir Lake, 2 km west of Ormanardı hamlet, this site was first discovered in 1989 during the surveys conducted by a team under the leadership of Guillermo Algaze (The Tigris – Euphrates Archaeological Reconnaissance Project) (Algaze, et *al.* 1991). The site covers an area of approx. 150 metres in diameter and lies at 535 metres above sea level. 14C dates indicate that the site was occupied in the PPNA. Architectural remains from the site show that there was a round – oval building tradition, the site also features one possible larger ‘’communal ‘’ rectangular building with rounded corners (see table 2 number 34).

Hallan Çemi Tepesi: Located in approx. 50 km north of modern-day Turkish city of Batman and discovered during the survey for endangered sites related to Dam Project construction in 1990 (38°14′ N; 41°15′ E), Hallan Çemi was located on a small watercourse at the junction of numerous environmental zones. During the course of excavations, Rosenberg encountered three building levels (Peasnall, 2000; Rosenberg & Davis, 1992; Rosenberg & Redding, 2000). The size and numbers of the buildings increased over time. Compared to other buildings, two large buildings (A and B) appear in building level 1; notable was the discovery of an aurochs bucranium in Building A. These large buildings may have fulfilled communal functions. AMS dates have revealed that the site was occupied for about 300 years (approx. 9.700 to 9.400 CalBC) (Starkovich and Stiner, 2009). Abandonment processes at the site remain unclear, though there is some evidence indicating that the inhabitants of Hallan Çemi relocated to nearby Demirköy Höyük.

Hasankeyf Höyük: This site is situated on left bank of Tigris River, approximately 2 km east of the medieval settlement of Hasankeyf in Batman province (37°42′51″N 41°24′47″E). Excavations were initiated in 2009 by Prof. Abdülsellam Uluçam from Batman University and continued until 2011. Research was then taken over by Japanese Team from Tsukuba University. The site covers an area of 150 metres in diameter and it is eight metres high. With the exception of the short-lived occupations in Hellenistic and Iron ages, all the archaeological deposits are from 10^{th} millennium CalBC. Buildings are semi-subterranean feature stone walls and have semi – rectangular and round-oval ground plans (Miyake &Yutaka, et *al.* 2012).

Following sites have provided evidence for Pre-Pottery Neolithic A to B Sites:

Çayönü Tepesi: Located 40 km north of the modern Turkish city of Diyarbakır (38°12′59″N 39°43′35″E), this site lies at the foot of the Taurus Mountains and next to the Boğazçay, at tributary of Tigris River. Excavations at the site were initiated by Robert John Braidwood and Halet Çambel, later passed on to Mehmet Özdoğan and

Aslı Erim Özdoğan (Özdoğan, 2011). The stratigraphy of Çayönü Tepesi is divided into subgroups according to architectural traditions:

- Round-Oval (PPNA)
- Grill (PPNA)
- Channeled (EPPNB)
- Cobble paved (MPPNB)
- Cell (LPPNB)
- Large Room (FPPNB)

Nemrik'9: Discovered between 1985-1987 during survey project by Warsaw University. Excavations were initiated by S.K Kozlowski. Nemrik`9 is is situated on the third terrace of the Tigris River (340-345 metres above sea level) and covers an area of 1,8 ha. (36°43′ N; 42°51′ E). The site is comprising of three levels. The oldest occupation phase is dated to the 9th millennium BC, the middle phase is dated to 8th millennium and the youngest phase begins at the end of 8th millennium and lasts until at the end of 8th millennium. The oldest phase of the site is characterised by round – oval structures with four metres in diameter. The middle phase of the site features round houses but with greater diameters (around 6-8 m). Finally, the buildings of youngest phase of the site differ only due to the replacement of wooden supports with pillars made using pise (Kozlowski 1989; 26). (see, Table 2; 32)

Zawi Chemi Shanidar: Located in northern Iraq, Zawi Chemi Shanidar has two occupation layers: Upper Layer A dated to the post-Christian layer and B dated to the Early Neolithic. Early Neolithic buildings are round-oval building (3 metres in diameters), and are paved with river pebble (Solecki & Rubin, 1958). (see, Table 2; 37)

Table 2 gives an overview of the archaeological sites and settlements which have been introduced in this chapter. The sites are arranged according to region (western subregion with northern Syria and eastern subregion with northern Iraq) and in rough chronological order. The chronology of the sites in this table is based on the respective publications by the excavators, references for which can be found in the above site descriptions. Additionally, in the final colum of the table, the presence of studied archeofaunal assemblages is indicated for the respective sites.

In the Western Subregion with Northern Syria there is a total of 27 sites (eight of which [29.63%] have published archaeofaunal assemblages), while in the eastern subregion with northern Iraq there are 12 (nine of which [66.66%] have published archeofaunal assemblages). In both subregions there is evidence for Epipalaeolithic occupations, and especially in the western subregion, there are numerous sites with continuity in settlement occupation for the duration of the Pre-Pottery Neolithic. This result reflects the site distribution in the study areas as presented in Figures 7,8,9 and 11. A more detailed consideration of the available radiocarbon data from the respective sites will be presented in Chapter 3.1.

Table 2: Tabular overview of the sites introduced in this chapter, their rough chrono-cultural affiliation and the availability of archeafaunal assemblages.

ID	Site	Sub-region	Epi-Pal.	PPNA	PPNA/ EPPNB	EPPNB	MPPNB	Faunal Remains
	WESTERN SUBREGION NORTHERN SYRIA							
1	Biris Mezarlığı	712						
2	Uluk Mevkii	712						
3	Kulabtar Kaya Altı Sığınakları	712						
4	Hamam Mevkii	712						
5	Abu Hureyra	Syria					Phase 2A?	X
6	Söğüt Tarlası	712		?	?			
7	Tell Qaramel	Syria						X
8	Tell Mureybet	Syria						X
9	Eski Harabe	712						
10	Sınır Tepesi	712						
11	Jerf-el Ahmar	Syria						X
12	Tell Abr'3	Syria						
13	Göbekli Tepe	712						X
14	Karahan Tepe	712		?			?	
15	Ayanlar Höyük	712		?			?	
16	Hamzan Tepe	712		?			?	
17	Yeni Mahalle	712		?			?	
18	Harbetsuvan Tepesi	712		?			?	
19	Kocanizam Tepe	712		?			?	
20	Sefer Tepe	712		?			?	
21	Kurt Tepesi	712		?			?	
22	Taşlı Tepe	712		?			?	
23	Tell Dja'de el Mughara	Syria						
24	Tell Sheik Hassan	Syria						
25	Nevali Çori	712			?		?	X
26	Gürcütepe	712					?	X
27	Mezra-Teleilat	712						X
	EASTERN SUBREGION							
28	Boncuklu Tarla	722						X
29	Çemka Höyük	722						
30	Körtik Tepe	721						X
31	Qermez Dere	Iraq						X
32	Shanidar Cave	Iraq						X
33	Nemrik'9	Iraq						
34	Gusir Höyük	721						X
35	Demirköy	721						
36	Hallan Çemi	721						X
37	Hasankeyf Höyük	721						X
38	Zawi Chemi Shanidar	Iraq						X
39	Çayönü Tepesi	721						X

2.6 Diachronic Trends in Settlement Dispersal (Epipalaeolithic-PPNA-EPPNB-MPPNB)

The maps in this chapter (Figures 7, 8, 9, 10 and 11) show the spatial dispersal of Younger Dryas and Early Holocene sites in the study region. While the left side of the maps belong to the western subregion, the right side of the maps equates to the eastern subregion; the Euphrates and Tigris Rivers, around which these subregions are focused, are clearly visible.

Figure 7 shows the dispersal of known and possible sites in the study region during the Younger Dryas. Western and eastern subregion, there are small number of sites, which include Abu Hureyra, Tell Qaramel and Tell Mureybet along the River Euphrates, and Qermez Dere, Boncuklu Tarla, Körtik Tepe and Shanidar Cave in the catchment of the River Tigris. Whereas the sites of the western subregion are more strongly connected to the Natufian tradition of Southern Levant, the eastern subregion sites are more closely related to the Epipalaeolithic Zarzian tradition further east (Iran) (Rosenberg *et al.* 1998; Özkaya *et al.* 2018) (Ibanez *et al.* 2007) (See Chapter 2 Study Region). This period coincides with the cold and dry conditions of the Younger Dryas with its characteristic grasslands (See Chapter 2.2)

Figure 7: Late Pleistocene (Younger Dryas) sites in the study areas (10.900 - 9.600 calBC) (after L. Clare).

At the beginning of the Early Holocene (PPNA; Figure 8), there is a considerable increase in the number of sites in the western and eastern subregion. This increase in settlement density coincides with the climate improvements following the cold and dry Younger Dryas. According to the available climate proxies, the Early Holocene was charactrised by wetter and warmer conditions and by the gradual return of trees and woodland. Based on the increase in the number of the sites, this environment appears to have been advantageus for the sedentary hunter-gatherer way of life. The two subregions shared numerous cultural chracteristics, including some architectural traditions, a similar material culture (small finds) and even in their symbolism (Schmidt, 2006).

Figure 8: Early Holocene (PPNA) sites in the study areas (9.600 - 8.700 calBC after) (L. Clare).

Figure 9: Early Holocene (EPPNB) sites in the study areas (8.700 - 8.200 calBC) (after L. Clare).

Following the PPNA, there is an apperant break in settlement contuniuty in the eastern subregion. The number of sites along the Tigris River drops to just one or two settlements (Boncuklu Tarla and Cayönü Tepesi). Additionally, the number of sites in the western subregion also decreases with settlement focused on just a few sites, including Dja`de el Mughara and Tell Mureybet. In the northern part of the western subregion (Sanliurfa) there is an explosion in the number of settlement sites; in other words, this period sees the climax of the so-called *Göbekli Tepe Culture* with T-pillar sites (Figure 9). Recently, this period has also been referred to as *Late Hunter-Gatherer Crisis.* Based on the settlement dispersal, the crisis affected the different subregions of the study area (Upper Mesopotamia) in different ways (Figure 10). Notably, this period also coincides with first morphologically domesticated plants and animals (Peters *et. al.* 2017).

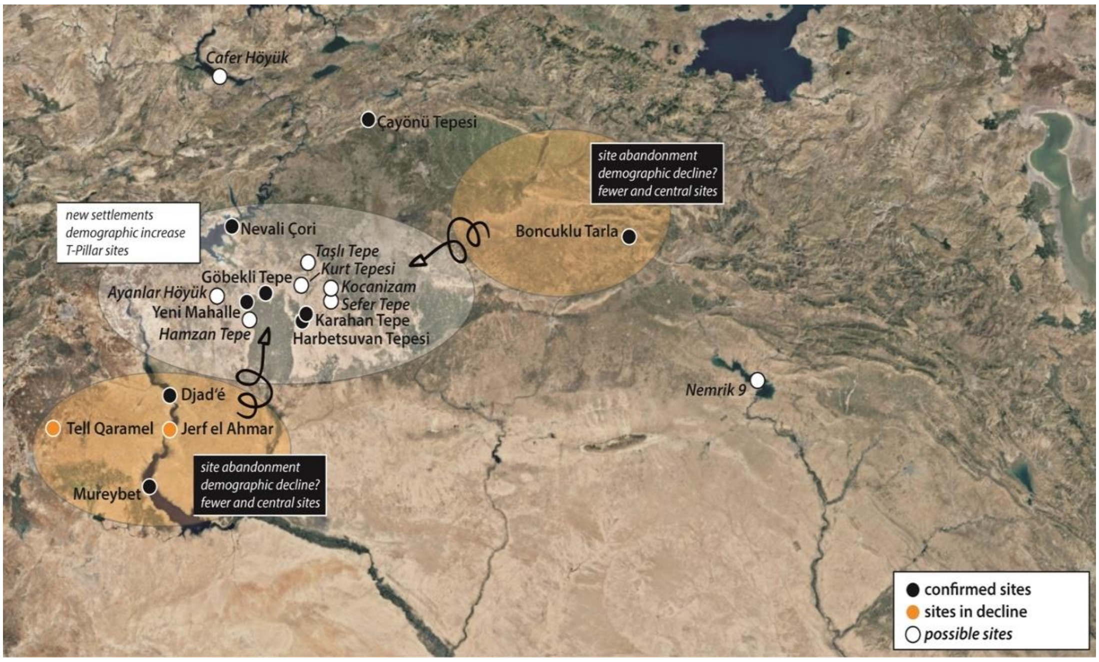


Figure 10: Map of EPPNB (8.700-8.200 calBC) settlements (as in figure 9) with an additional summary of developments associated with the Late Hunter-Gather crisis (approx. 8.900 - 8.600 calBC) (after L. Clare).

The MPPNB (Figure 11) was a period which saw the increase in the dependency of sedentary communities on domesticated animal and plant species. Significantly, the onset of the MPPNB (at around 8.200 calBC) coincides with a further increase in rainfall as documented in the water level of the Dead Sea (See Chapter 2.2). A causal relationship between this climate event and the increase in domesticated species was recently proposed (Weninger, 2017). There is very little change in settlement patterns compared to EPPNB.

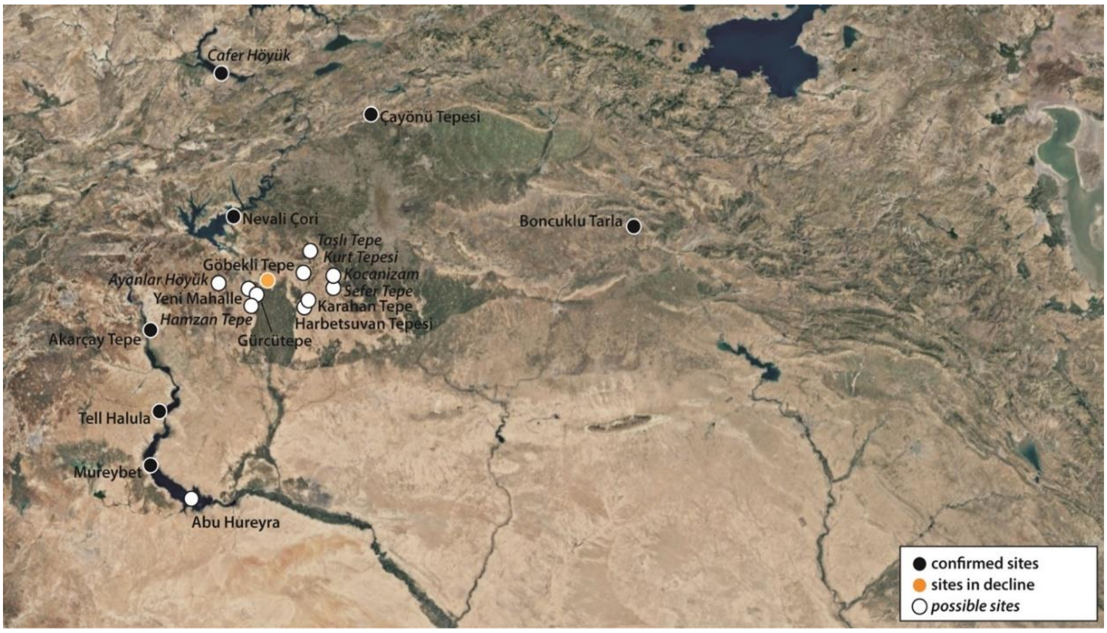


Figure 11: Early Holocene (MPPNB) sites in the study areas (8.200 - 7.700 calBC) (after L. Clare).

CHAPTER 3

DATA & ANALYSIS

In this section, available absolute (14C) chronological and faunal data gathered from the literature will be presented. The chapter begins with a review of the radiocarbon dates (3.1) and is followed by the presentation of the faunal data from each of the settlement sites (3.2). We then move on to comparisons of this data from a diachronic and regional perspective (3.3). In a first step, the focus of these latter investigations will lie on the frequency/ratios of large and medium sized mammal species, while in a second part, we will turn our attention to the overall diversity of animal species represented at the settlements. This assessment will not only help us to understand the similarities or differences in subsistence strategies of hunter-gatherer communities in time and space, but it might also show us how they responded to ecological changes or potential "crises". The insights obtained here will be discussed further in Chapter 4.

3.1 Radiocarbon Ages and Palaeoclimate

Figure 12 shows the barcode calibration of unfiltered 14C-dates from Epipalaeolithic and PPN sites in the study region (amended after Clare&Kinzel 2020, Figure 7.1) in relation to important paleoclimate proxies discussed in this study and by Clare&Kinzel (2020). This figure shows that the Epipalaeolithic coincides with the Younger Dryas. The GISP2 potassium (non-sea-salt) is a proxy for the intensity of high pressure over Siberia which was linked to cooler and drier conditions, also in the study region. The Late PPNA crisis which was proposed by Clare and Kinzel (2020) also coincides with a peak in the same climate proxy curve; however, it is unclear whether the impact of this short-lived event was in any way causally linked to the proposed crisis. A further peak in this curve can be seen at around 8.200 calBC, which coincided with the appearance of morphologically domesticated animals and plants in

Upper Mesopotamia. It is followed by a rapid and major increase in the water level of the Dead Sea which is indicative of increased levels of rainfall in Southwest Asia.
Radiocarbon data have been used for a number of decades to date archaeological sites and to study cultural-chronological squences.
The radiocarbon method has been especially important for our understanding of the chronology of the Neolithic transition in Upper Mesopotamia. Over the years, the technology and methodology of radiocarbon dating has been improved, making indivual dates and chronologies more and more accurate and reliable. However, any consideration of radiocarbon dates in archaeological studies must be undertaken very carefully, especially when old data (processed in the early decades of radiocarbon dating) are included. For example, these data are very often characterised by high standard deviations which makes them less precise. Additionally, care must be given to the context of dated organic samples, for example, especially when data do not correspond

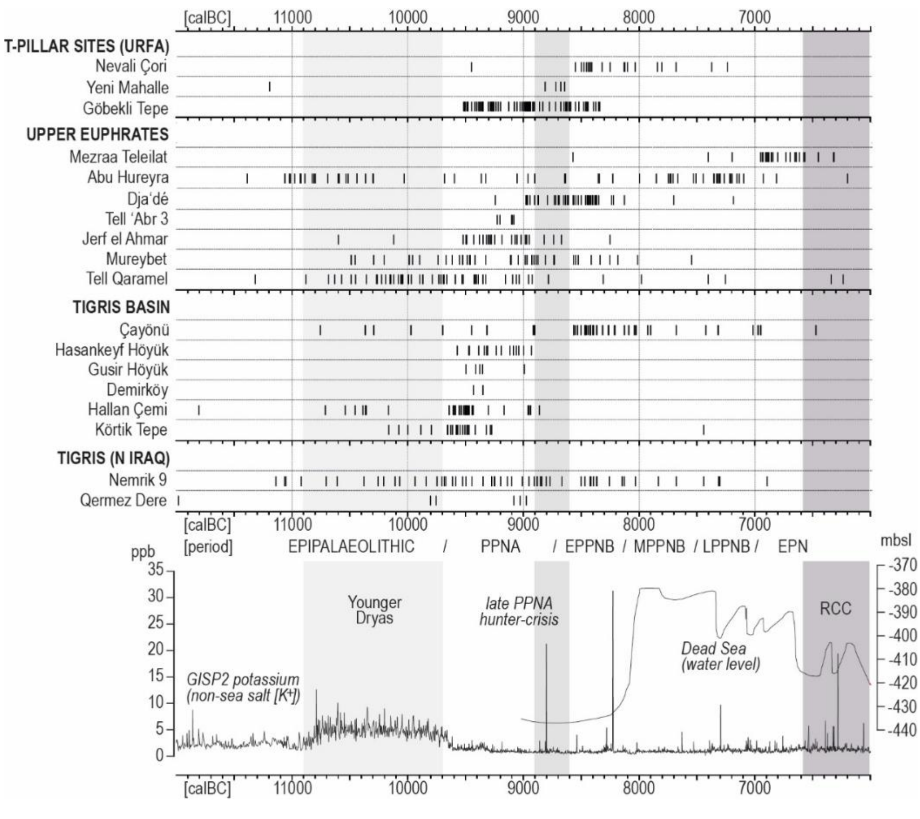


Figure 12: Barcode calibration of 14C dates from Epipalaeolithic and PPN sites in the study region (amended after Clare&Kinzel 2020, Figure 7.1). This graph also shows the 14C data in relation to important paleoclimatice proxies discussed in this study and by Clare&Kinzel (2020).

to stratigraphic sequences at the archaeological sites. For this reason, the published radiocarbon data for the for the Epipalaeolithic and Neolithic settlements was reconsidered in the frame of this thesis. In other words, the data were filtered, leading to the exclusion of all radiocarbon dates with a standard deviation of more than 100 14C-years (Appendix A). The remaining radiocarbon data were calibrated using the CalPal software package (Weninger & Jöris 2008) and the INTCAL20 dataset (Remier *et al*. 2020).

Chronology of the Western Subregion

The earliest radiocarbon data about the fauna we examined, come from the lowermost settlement phase at Abu Hureyra (1A-1C) which is associated with the Late Epipalaeolithic. Abu Hureyra (1A-1C) is dated to between 11.110 and 10.600 calBC based on the group calibration of three 14C measurements (BM-1121, OxA-8718, OxA-8719) at 68% probability The second oldest faunal assemblage comes from Tell Qaramel (PPNA); this settlement phase is dated to between 10.290 and 9030 calBC based on the group calibration of 23 14C measurements (Gd-11673, Gd-11741, Gd-12503, Gd-12506, Gd-12510, Gd-12515, Gd-12639, Gd-12649, Gd-12651, Gd-30017, Gd-12816, Gd-12817, Gd-12820, GdS-358, GdS-360, GdS-362, GdS-363, Gd-11627, Gd-12652, Gd-30005, Gd-30062, GdS-359, GdS-364) at 68% probability.

There follows a sequence of nine different occupation phases from two sites: Tell Mureybet and Jerf el Ahmar. This sequence includes five phases from Tell Mureybet which span from the Epipalaeolithic/ final Natufian (level IA) to the MPPNB (level IVB), and four occupation phases from Jerf el Ahmar which coincide with the duration of the PPNA (levels VII/E-III/E) until the late PPNA-EPPNB transition (level -I/E). The available radiocarbon dates upon which this chronological sequence is based are as follows; in each case the time spans are given at 68% probability of the group calibration:

- Tell Mureybet (level IA – Natufian final phase): one 14C data (Ly-11623) (9580-9320 calBC);
- Jerf el Ahmar (levels VII/E-III/E – early to middle PPNA): eight 14C data (Ly-10648, Ly-10651, Ly-275, Ly-7489, Lyon-2334, Lyon-2335, Lyon-2599, Lyon-2809) (9660-9290 calBC);

- Tell Mureybet (levels IB, IIA, IIB – Khiamian phase): one 14C data (Ly-11787) (9530-9300 calBC);
- Jerf el Ahmar (levels II/E and I/E – middle PPNA): one 14C data (Lyon-2333);
- Jerf el Ahmar (level 0/E – late PPNA): six 14C data (Ly-10649, Ly-10650, Ly-1579, Lyon-2336, Lyon-2598, Lyon-2601) (9330-9240 calBC);
- Tell Mureybet (levels IIIA, IIIB – Mureybetian phases): four 14C data (Ly-11625, Ly-11628, Ly-11626, Ly-11630) (9010-8580 calBC);
- Jerf el Ahmar (level -I/E – late PPNA-EPPNB transition): four 14C data (Ly-10647, Ly-10653, Lyon-1578, Lyon-2332) (9050-8690 calBC);
- Tell Mureybet (level IVA and IVB – EPPNB to MPPNB): two 14C data (GrA-20636, LyonOxA-2158) (8590-8340 calBC).

The last data come from the three different settlement phases at Nevali Çori which are associated with the EPPNB to MPPNB and dated to between 8530 and 7670 calBC based on the group calibration of six 14C measurements from Layer I-II (Hd-16782-351, Hd-16783-769, OxA-8234, OxA-8235, OxA-8236, OxA-8303), six 14C measurements from Layer III (KIA-14756, KIA-14757, KIA-14758, KIA-14760, KIA-14761, KIA-14762) and four 14C measurements from Layer IV (OxA-8247, OxA-8302, OxA-8381, OxA-8382).

Chronology of the Eastern Subregion

The earliest faunal data in the region come from the lower most settlement phase at Çayönü Tepesi which is associated with the PPNA. Çayönü Tepesi Oval Building Phase is dated to between 10.510 and 8390 calBC based on the group calibration of two 14C measurements (GrN-10358, GrN-8103) at 68% probability (see Graphs 17 and 18)

The five radiocarbon dates from PPNA levels at Qermez Dere (OxA-3752, OxA-3754, OxA-3755, OxA-3756, OxA-3757) place the entire Qermez Dere PPNA sequence to between 9840 and 8910 calBC at 68% probability. This is followed by the PPNA settlement phase at Körtik Tepe which is dated to between 9720 and 9380 CalBC based on the group calibration of 14 14C measurements (Beta-178242, ETH-38848, ETH-38849, ETH-38850, ETH-38851, ETH-38852, ETH-38853, ETH-38854,

ETH-38855, ETH-39509, ETH-39510, ETH-39511, ETH-39512, KIA-44863) at 68% probability.

The next oldest faunal assemblage comes from Hallan Çemi and includes the faunal remains from 4 PPNA building levels at this site; according to the 24 available 14C data the deposits from which the faunal material was collected can be dated to between 9680 and 9340 calBC based on 68% probability (Beta-55049, Beta-55050, Beta-66855, Beta-67463, Beta-67464, OxA-12298, OxA-12299, OxA-12328, OxA-12329, OxA-12330, OxA-12331, OxA-12332, OxA-12333, OxA-12334, OxA-12335, OxA-12336, OxA-12337, OxA-12338, OxA-12339, OxA-12340 OxA-12341, OxA-12769, OxA-12878, OxA-12879).

The Hallan Çemi faunal assemblages are followed by material from Gusir Höyük which is dated to between 9510 and 8980 calBC based on group calibration of four radiocarbon ages at 68% probability (KIA-44176, KIA-44177, KIA-44178, KIA-44179, KIA-44180).

The PPNA faunal records from Hasankeyf Höyük are slightly younger but are statistically contemporaneous with Gusir Höyük; the group calibration of 15 radiocarbon ages places the PPNA at Hasankeyf Höyük to between 9470 and 8920 CalBC at 68% probability (MTC-16066, MTC-16067, MTC-16068, MTC-16069, MTC-16070, MTC-16071, MTC-16072, MTC-16073, MTC-16074, MTC-16075, MTC-16076, MTC-16077, MTC-16078, MTC-16079, MTC-16080).

The five youngest faunal assemblages from Eastern subregion come again from Çayönü Tepesi and include the transitional PPNA/EPPNB (Grill) phase and the EPPNB (Channeled) phases of the site, followed by MPPNB (Cobble Paved), LPPNB (Cell) and FPPNB (Large Room) phases. The two radiocarbon ages (GrN-14861, GrN-4459) for the transitional PPNA/EPPNB phase are statistically contemporaneous with the six 14C ages (GrN-13947, GrN-13949, GrN-14857, GrN-14860 GrN-6241, GrN-6244) from the EPPNB (channeled phase); whereas the transitional PPNA/EPPNB phase is dated to 8500 to 8290 calBC, the EPPNB (Channeled) phase lies between 8530 and 8250 CalBC at 68% probability. The MPPNB (Cobble Paved) phase at Çayönü Tepesi is dated to between 8160 and 7830 calBC based on the group calibration of three radiocarbon ages at 68% probability (GrN-13948, GrN-6242, GrN-8820); finally, this is followed by the LPPNB (Cell) and the FPPNB (Large Room) phases which have been dated to between 7390 and 6850 based on four 14C data (GrN-16463. GrN-5954, GrN-8078, GrN-8819) also at 68% probability.

3.2 Faunal Data

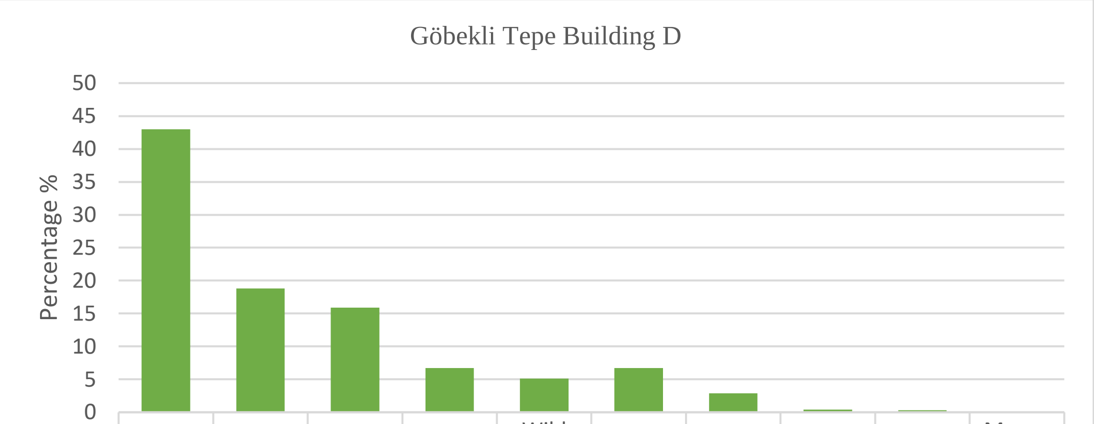
Published faunal data from 16 sites are examined here with the aim to understand how the exploitation of animal developed through time. Some criteria are put forward to described and characterise these developments. The criteria are as follows:

- When exploitation is dominated by hunting only one or two species at a range of 60-80% and with a small contribution from other various species, we consider this as "Specialised Hunting".
- If there is a third or even fourth species, with rather minor but still important contribution we call this exploitation "wide hunting strategies on large-medium mammals".
- Related to the small game and other minor contributors, such as small mammals, fish, birds, molluscs, 2 parameters were checked, after combining them in the broad category "others". First, what proportion of the total percentage these "others" take. If it was in the range of 10-20%, we call it "Minor exploitation of small game". If it was higher than 20% we call it "Broad spectrum". The second criterium was the species diversity. If only 2-3 minor species were exploited this looked as if it might be a secondary specialisation of hunting. We still categorised it under "Minor exploitation of small game". If the species diversity was wide (and especially if it included both mammals and birds and fishes and molluscs), we call it broad spectrum.

3.3 Detailed Distribution of Animal Species of Each Settlement

Göbekli Tepe: As already presented in Chapter 2, new results from research at Göbekli Tepe have shown that the subdivision of the site into three phases is no longer possible; this is related to newly available radiocarbon data, which show that the monumental buildings were much longer lived than previously realised, combined with the realisation that the fill of the buildings, from which much of the faunal assemblage was retrieved, stems from settlement deposits which had accumulated on slopes of the Tell and slipped down into the monumental structures some time in the PPNB. Notably, before this realisation, the fill of the special buildings had been assigned to the former Level III (PPNA); meanwhile, we know that this fill is comprised of mixed PPNA and PPNB deposits (which also includes the animal bones). For this reason, it is a further aim of this thesis to evaluate the faunal assemblage from Göbekli Tepe by referring to the data from sites of the same age. Table below shows the ratios of different mammals from the faunal assemblage taken from fill of Building D (Pöllath 2018). As previously stated, this assemblage must be considered mixed, it being comprised of mixed PPNA and PPNB deposits taken from the fill of monumental Building D. The faunal assemblages were mostly hand-picked with only some dry screening applied in the course of the excavation. As can be seen from the available data from Building D, the PPN hunters from Göbekli Tepe were specialists in the hunting od gazelle which would have roamed the lower lying plains to the south of the site.

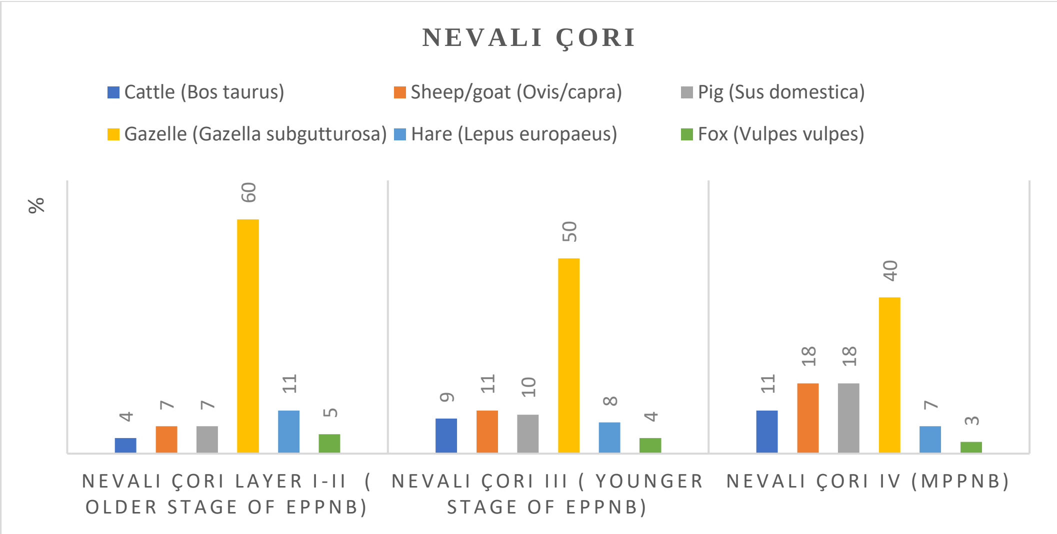
Graph 1: showing the ratios of different mammals from the faunal assemblage taken from fill of Building D (after Pöllath 2018).



	Gazelle	Wild ass	Aurochs	Wild boar	Wild sheep/goat	Fox	Deer	Hare	Polecat	Mouse (Indian Gerbil)
%	43	18.8	15.9	6.7	5.1	6.7	2.9	0.4	0.3	0.1

Nevali Çori: Based on the available faunal data from Nevali Çori there is a diachronic decrease in the consumption of gazelle from EPPNB to MPPNB. This decrease in the number of gazelles goes hand in hand with the parallel increase in the number of domesticated species, including sheep/goat, pig and cattle.

Graph 2: Diachronic distribution of most frequent species in Nevali Çori.



Notably, other hunted species, which include hare and fox, also show a decrease in frequency in the faunal record from this site between EPPNB and MPPNB. The number of identified bones/species (NISP) from this site was not provided in the secondary literature (Peters, et *al.* 1999). The collection methods of faunal remains at the excavations are also not mentioned.

Gürcü Tepe II: The two graphs below show the different species and (for three species) their ratios in faunal records from Gürcü Tepe II. The first graph (Graph 2) suggests that the subsistence strategy at Gürcü Tepe II was based mainly on three domesticated species, including cattle, goat and pig; however, the remains of wild species at the site certainly indicate that hunting was still an important subsistence strategy (Table 3).

Graph 3: Distribution of most frequent species in Gürcü Tepe II.

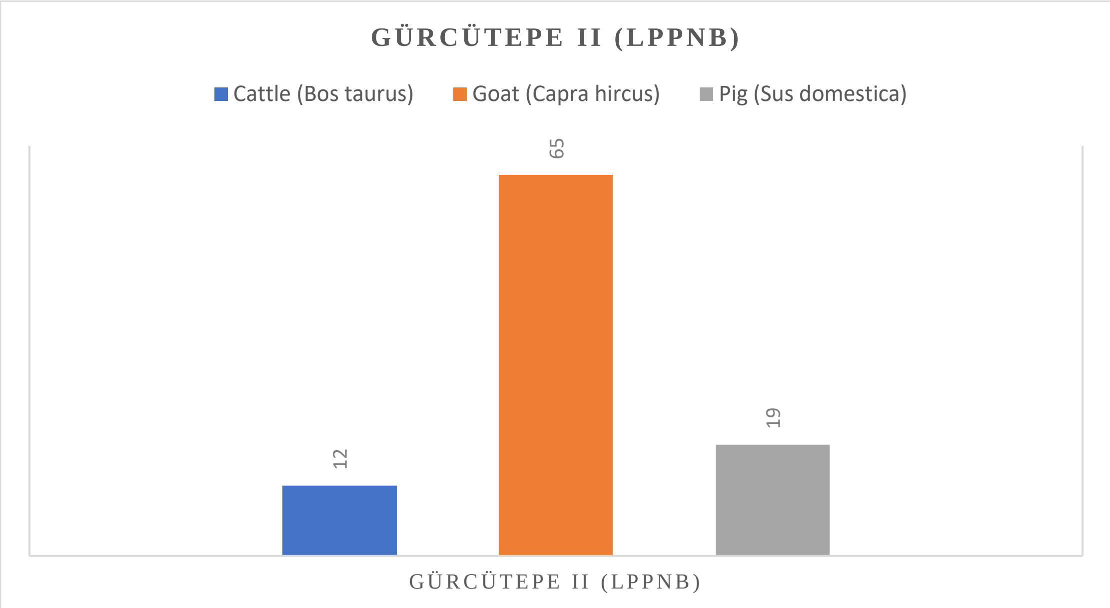


Table 3: Presence of wild animal remains found in Gürcü Tepe II.

Species	Gürcütepe II (LPPNB)
Fallow deer (Dama)	Present
Gazelle (Gazella subgutturosa)	Present
Equid (Equus sp.)	Present
Hare (Lepus europaeus)	Present
Fox (Vulpes vulpes)	Present

Nevertheless, no further information as NISP or % was published about the wild species. (Peters, et *al.* 1999). The collection methods of faunal remains at the excavations are also not mentioned.

Körtik Tepe: Only three species could be identified from the Epipalaeolithic layers of Körtik Tepe settlement (see Table###). Identified animal remains gathered from PPNA layers also remains insufficient. However, table## giving some idea about the species that are eaten by the prehistoric community. From this limited information we have about the important site of Körtik tepe, it appears that there is a preference for medium sized animals and especially sheep. Wild sheep counts for 3.3% Wild goats make up another 1%. All together the sheep and goat remains come up to 7.5%". The next peak in percentages is in the category deer with 4.9%. Since the species is not given we cannot know if these "deer" comes from the large red deer or the medium sized fallow deer. Nevertheless, fallow deer bones were identified in the assemblage in a small number (less than 1%) whilst no red deer was found. This is an indication that the rest of the bones may also belong to fallow deer. Wild goats make up another 1%. Aurochs make up for a 2.8% of the assemblage.

Graph 4: Distribution of most frequent species in Körtik Tepe

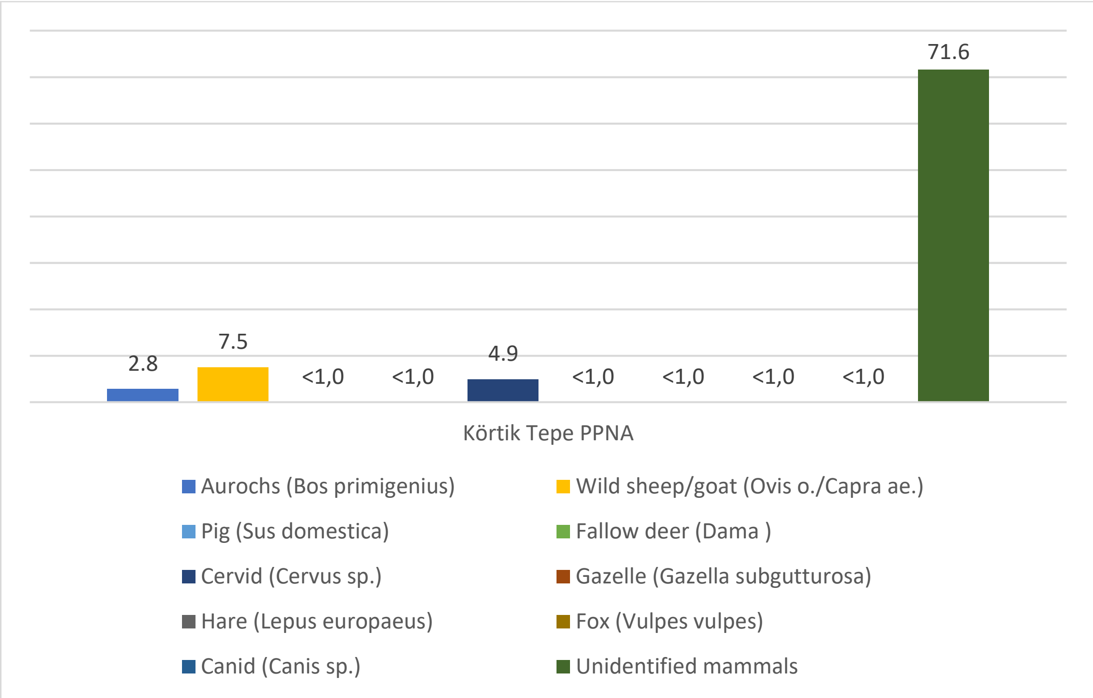


Table 4: Presence of some animal remains found in Körtik Tepe

Species	Körtik Tepe Epi-Palaeolithic
Tortoise	Present
Small Birds	Present
Fish (General)	Present

This quantity is not small. It is about half of the deer and more than 1/3 of the sheep. Given the difficulty of hunting this big animal and the big amount of meat aurochs have, it would not be unreasonable to propose that aurochs also play an important role in this economy. Pig and gazelle have been found in very low proportions. Gazelle may have not been abundant in the area around Körtik Tepe but pig should have been.

Small pray such as hare is also hunted and fox is also present but in very small proportions. Since most of the bones recovered from the excavation remain unidentified, it is hard to know whether these trends are true and they will persist after the final identification of the bones. With the current information we could say that the economy of Körtik tepe is mostly directed towards sheep and deer with a good contribution of aurochs.

All other animals are of minor importance (Arbuckle & Özkaya, 2006). At this site, screening was not used; this means that smaller bones and bones of smaller species are likely underrepresented (Arbuckle & Özkaya, 2006: 116). The identified number of bones/species (NISP) at this site is 1169. Fish, birds and tortoise remains have been reported (Table 4) but no further information as NISP or % was given.

Gusir Höyük: According to publications written on faunal remains of Gusir Höyük so far give a little information. As we can understand from the publications wild sheep is consumed in Gusir höyük in considerable percentages. It is also known that the people in Gusir Höyük consumed fish freshwater mussels, wild boar, beaver and birds beside wild sheep, nevertheless no detailed information as NISP or % about these species was published (Table 5) (Kabukçu, 2021). The collection methods of faunal remains at the excavations are also not mentioned.

Table 5: Presence of various animals found in Gusir Höyük

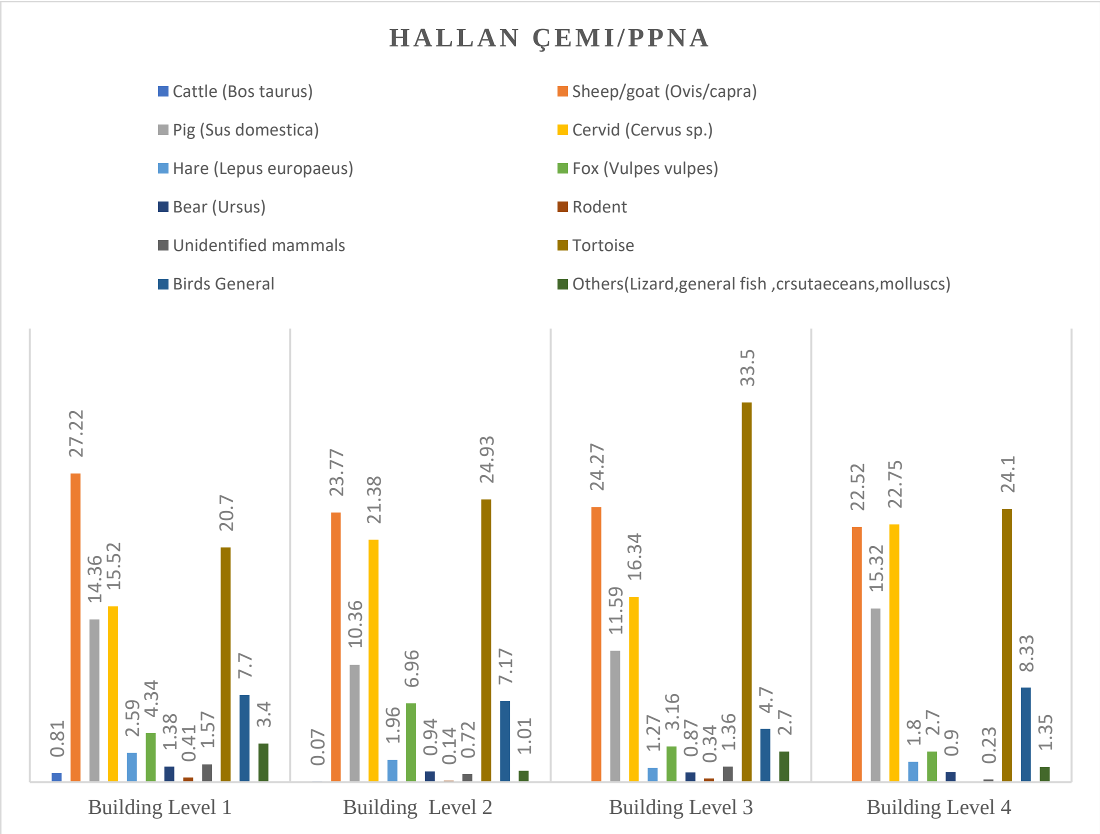
Species	**Gusir Höyük PPNA**
Wild boar	Present
Beaver	Present
Small Birds	Present
Fish (General)	Present
Fresh water mussels shells	Present

Hallan Çemi: The faunal records from Hallan Çemi show clearly the presence of three dominant mammal species: the wild sheep, wild pig and deer, of which the sheep is the most numerous. This high ratio of sheep is a trend which continues through all building levels of the site; only in Building Level 4 is the ratio of deer slightly higher than the sheep. Remarkably, decreases in the ratio of sheep appear to correlate with increases in the ratio of deer, e.g., in Building Level 2 and 4; therefore, it appears that sheep and deer substituted one another. The ratio of pig shows a slight decrease in

Building Levels 2 and 3, apparently recovering to its highest percentage (15.32%) in Building Level 4.

Other important trends visible in the faunal data from Hallan Çemi concern the near absence of wild cattle and the extremely high ratios of tortoise. Additionally, the faunal repertoire includes fox, hare, rodents, reptiles, fish, birds, bear and others. This reflects broad-spectrum hunting strategies which are characteristic for Late Palaeolithic hunter gatherer groups which continued into the PPNA. The high number of tortoises could reflect either the natural abundance of this animal in the local environment and/or the cultural significance (ritual) of this species for the prehistoric community at Hallan Çemi. The identified number of bones/species (NISP) at this site is 17.545. At this site, dry screening was and hand picking used (Zeder, 2016).

Graph 5: Distribution of most frequent species according to building levels in Hallan Çemi.



Hasankeyf Höyük: Published results on the fauna from Hasankeyf give only a very general picture of animal exploitation at this site on the banks of the Tigris. We have quantified information only for wild pig, red deer and fox (total number of identified bones from three species 20. For the rest of the species attested, that is wild sheep, gazelle, wild goat, badger, tortoise and carp we only know that they are present at the site but no NISP nor % was mentioned. Notably, as at Hallan Çemi there is also an absence of wild cattle. According to the publication, wild sheep are present throughout the occupation but increase from lower to upper levels; this development is parallel to a decrease in ratio of goat over the same period. Gazelle, badger and tortoises occur in all occupation levels. Large numbers of carp were found in structure 1 (Itahashi, 2017). The collection methods of faunal remains at the excavations are also not mentioned.

Graph 6: NISP of 3 species identified in Hasankeyf Höyük.

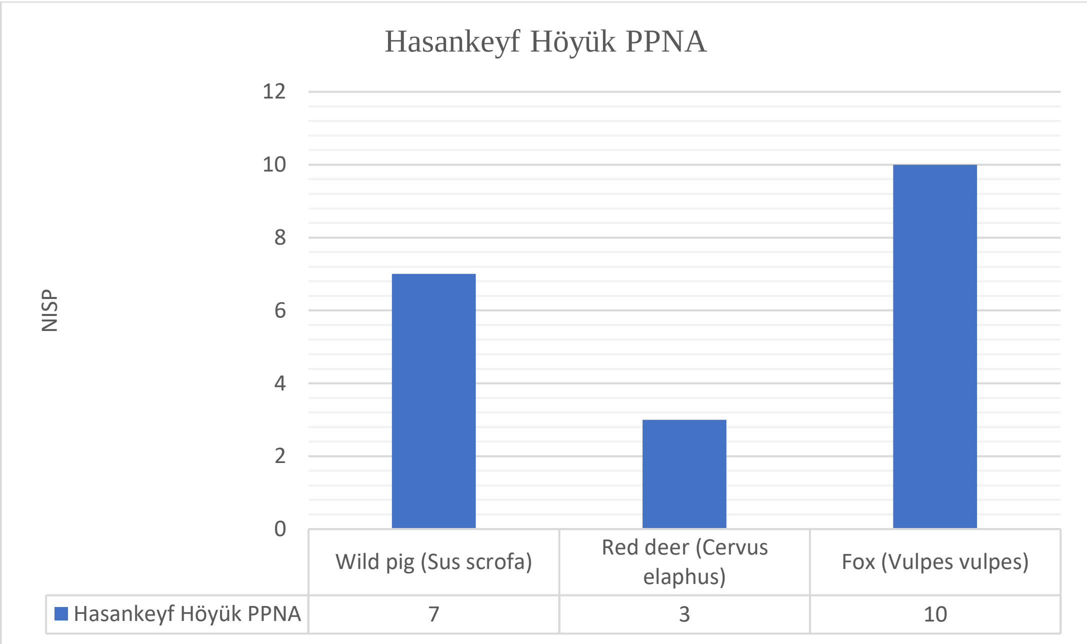
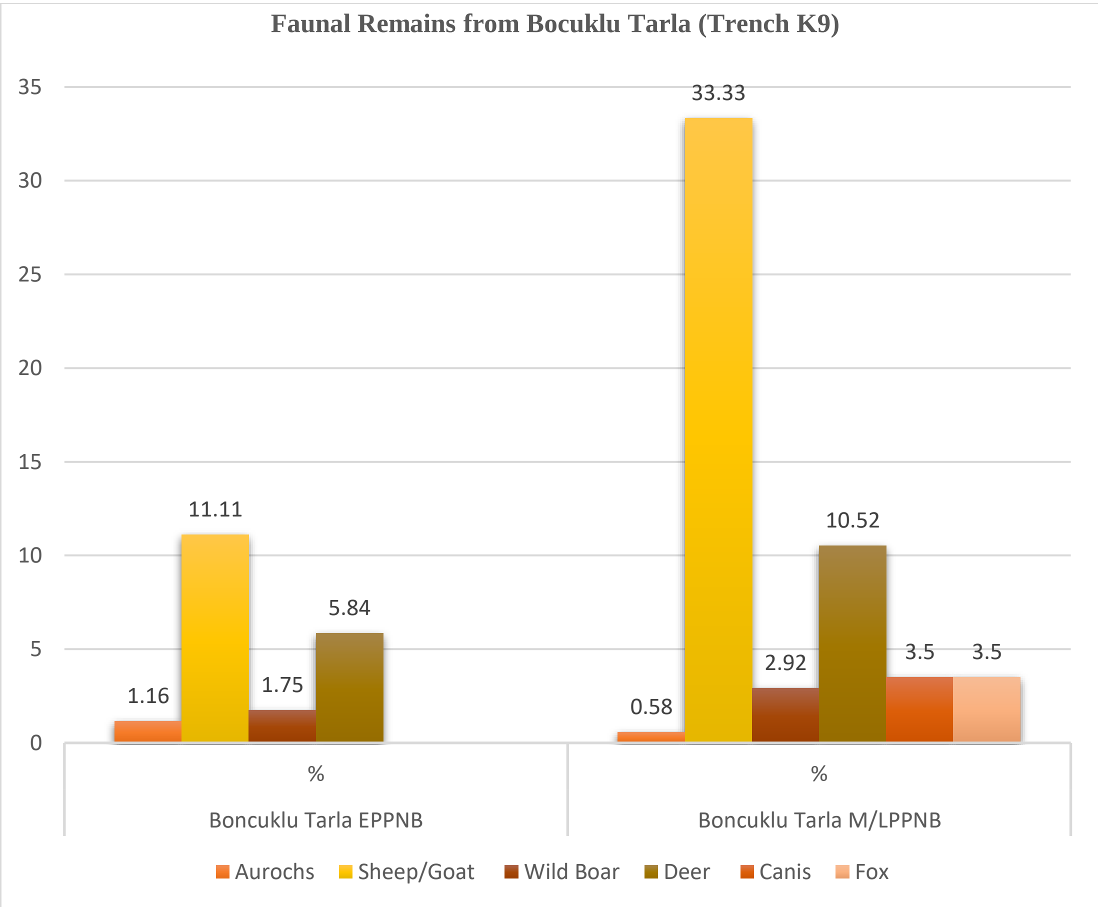


Table 6: Identified species in Hasankeyf Höyük but neither NISP nor % couldn't found.

Species	Hasankeyf Höyük PPNA
Wild sheep (Ovis orientalis)	Present
Gazelle (Gazella subgutturosa)	Present
Goat (Capra aegagrus)	Present
Badger (Meles Meles)	Present
Tortoise	Present
Carp (Cyprinidae)	Present

Bocuklu Tarla: Published results on the fauna from Boncuklu Tarla settlement gives only a very general picture of animal exploitation at this site, specifically from Trench K9. Quantified information is only available for ovis/capra (58.47%), deer (23.96%) wild boar (8.76%), fox (3.5%), canis (3.5%) and aurochs (1.74%). The total number of identified bones from the seven species is 171 (Aydin, 2019: 62-72). The collection methods of faunal remains at the excavations are not mentioned; however, it is visible from the graph (7) that the most consumed species was sheep/goat (58.47%), followed by deer (23.96%) and than other species in smaller percetanges (wild boar 8.76%, fox 3.5% and canis 3.5%) (Aydin, 2019). However, since the information from this site is limited, i.e. from just one trench (as at Göbekli Tepe), the information derived from the settlement may not reflect the complete picture of animal exploitation. Therefore, this site is not included in the regional comparative analysis.

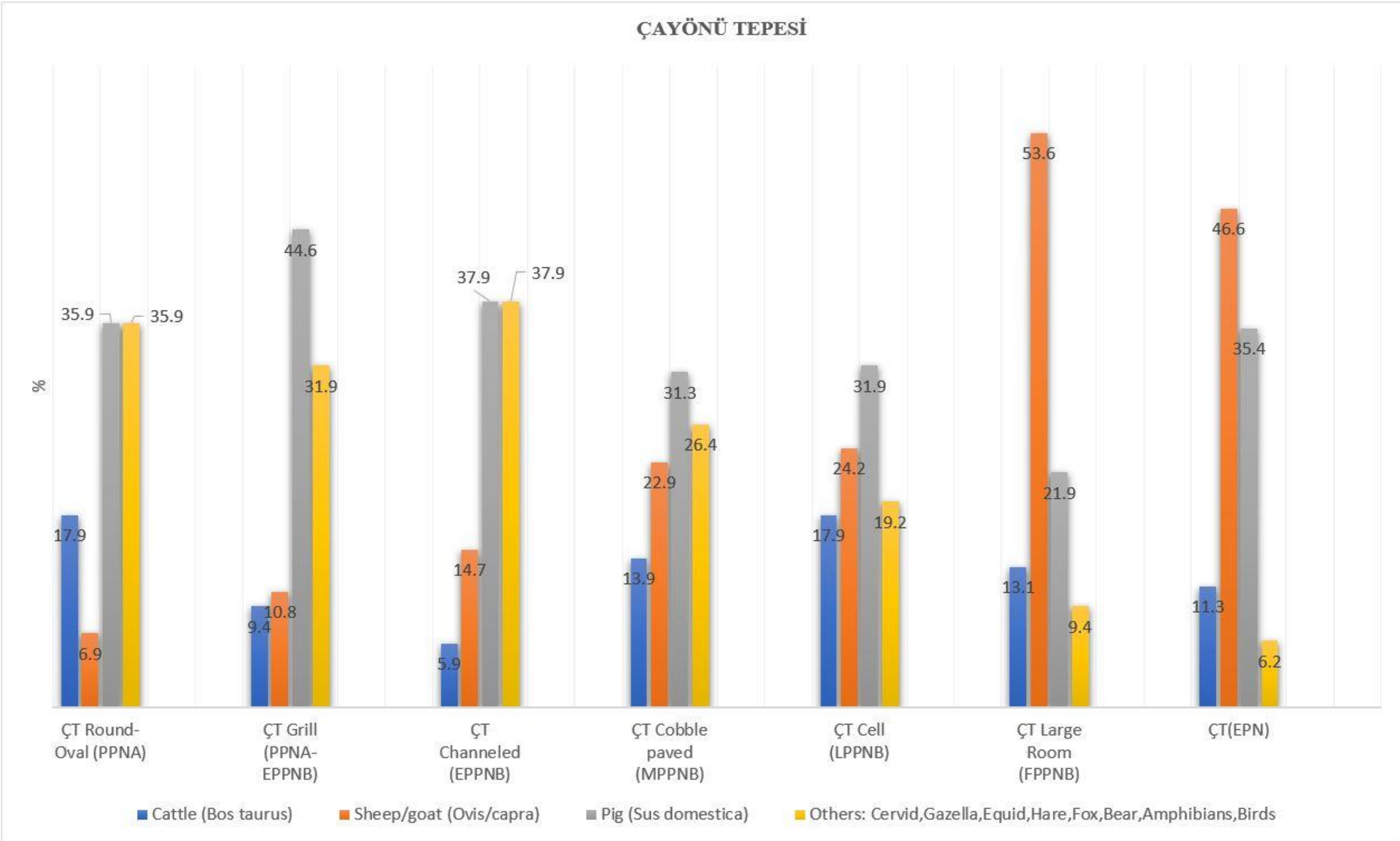
Graph 7: Faunal Remains from Bocuklu Tarla (Trench K9) after Aydin, 2019.



Mezraa-Teleilat: Graph 8 shows the results of the fauna from Mezraa-Teleilat MPPNB layers. According to this data the most frequent species is sheep/goat (61.86%), followed by cattle/aurochs (19.94%), pig (10%) and others (8%). Faunal remains collected during the excavation by hand-picking and dry screening. Percentages in the table given based on NISP (Ilgezdi, 2008).

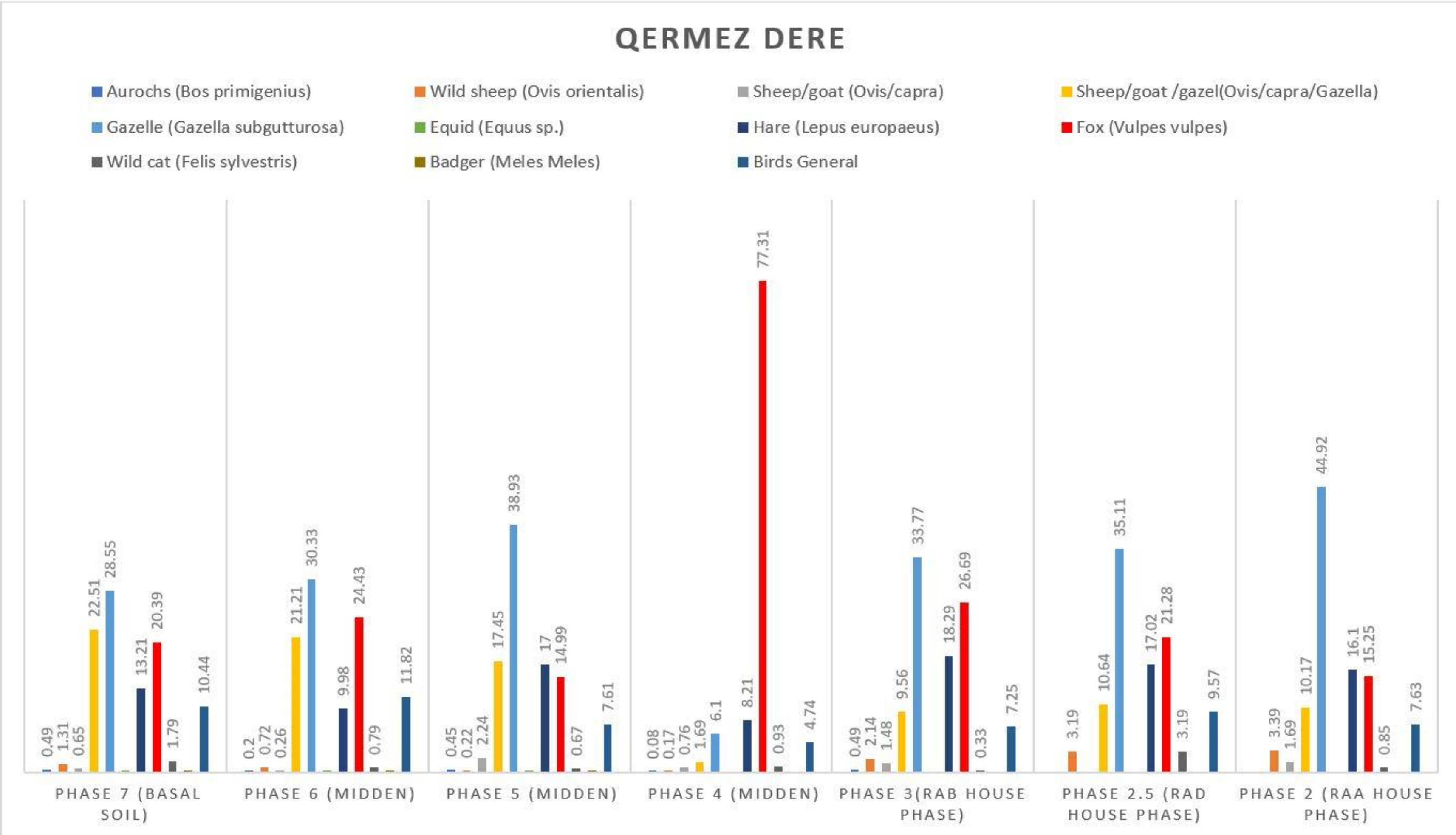
Graph 8: Distrubution ratios of mammals from Mezra-Teleilat

Çayönü Tepesi: At Çayönü Tepesi, the pig was a mainstay in all settlement periods of the site. Indeed, in the PPNA-EPPNB transitional (Grill) period, the total number of pigs is nearly equal to the number of all other hunted species, including cervid, gazelle, equid, hare, fox, bear, amphibians and birds. Notably, there is evidence that pig husbandry may have been practiced at Çayönü Tepesi in the EPPNB (cf. Peters et al. 2017: 251). Even though the ratio of pig dropped in the following periods (MPPNB and LPPNB), when ther was a certain increase in other species like cattle and sheep/goat, the pig was still the most consumed animal. In the FPPNB and EPN, pig consumption declined in favour of sheep/goat, though pig remained the second most numerous species. However, it certainly appears that the continuouss increase of sheep/goat was related to the decrease of pig (Hungo et al. 2009). Percentages are based on NISP, though the exact numbers are not given in the consulted literature. The collection methods of faunal remains at the excavations are also not mentioned.



Graph 9: Diachronic distribution of most frequent species in Çayönü Tepesi.

Qermez Dere: The faunal records from the different phases at Qermez Dere point to broad spectrum hunting strategies characteristic for pre-farming societies. The only exception are the faunal data from Phase 4 when there is an obvious peak in the number of foxes; notably, the studied faunal remains from this period stem from a midden context and should probably be considered an outlier. However, the exploitation of foxes is not unknown at other settlements; however, the question remains whether the increase in foxes is related to ritual events or the exploitation of a species not usually hunted, for example, at a time of (ecological) crisis. Finally, gazelle hunting also appears to have played a major role at Qermez Dere, as demonstrated by the dominace of this species in every phase (except Phase 4) (Dibney et al. 1999). Total number of identified animal bone remains is 4304. The collection methods of faunal remains at the excavations are also not mentioned.



Graph 10: Distribution of most frequent species based on layers in Qermez Dere

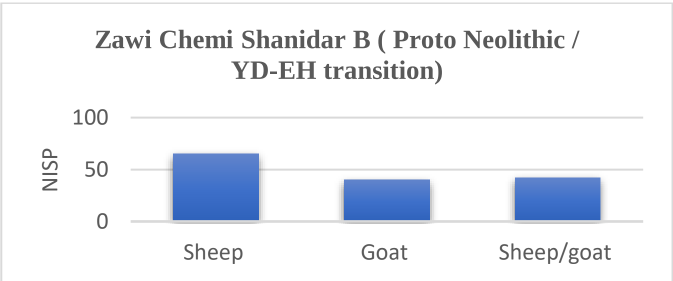
Shanidar Cave: All the information obtained so far is shown in the table above and no further information has been found. We have quantitative information only about wild sheep and wild goat which make the bulk of the faunal materials at 79 number of animal bones (NISP). However, as can be seen from the table above, a large animal collection has been identified in Shanidar Cave's B1 and B2 Layers which is very wide in line with other hunter gatherer sites showing evidence for broad-spectrum animal exploitation (Melinda, Zeder 2008; Perkins, 1964). The collection methods of faunal remains at the excavations are also not mentioned.

Table 7: Identified species in Shanidar Cave in Layer B2 and B1.

Species	**Shanidar Cave Layer B2 (Epi-Pal/Zarzian)**	**Shanidar Cave Layer B1 (Proto *Neolithic / YD-EH transition*)**
Cattle (Bos taurus)		Present
Wild sheep (Ovis orientalis)	17 (NISP)	
Wild goat (Capra aegagrus)	30 (NISP)	
Sheep/goat (Ovis/capra)	32 (NISP)	
Wild pig (Sus scrofa)		Present
Red deer (Cervus elaphus)		Present
Fallow deer (Dama)		Present
Fox (Vulpes vulpes)		Present
Canid (Canis sp.)		Present
Bear (Ursus)		Present
Beaver (Castor fiber)		Present
Rodent		Present
Tortoise		Present
Birds General		Present
Fish (general)		Present
Molluscs		Present

Zawi Chemi Shanidar: All the information obtained so far is shown in the table above and no further information has been found. However, as can be seen from the table above based on NISP, only sheep and goat remains so far identified in this settlement. The collection methods of faunal remains at the excavations are also not mentioned.

Graph 11: NISP of 3 species identified in Zawi Chemi Shanidar.



Abu Hureyra: As can be seen from the table above, the most commonly hunted animal is gazelle followed by small quantities of equids and hare. Cattle, wild sheep, wild pig, fallow deer and fox are also hunted. It is clear that the food economy is centred around gazelle hunting and supplemented by other animals (Moore et *al.* 2000). The collection methods of faunal remains at the excavations are also not mentioned.

Graph 12: Distribution of most frequent species in Abu Hureyra 1.

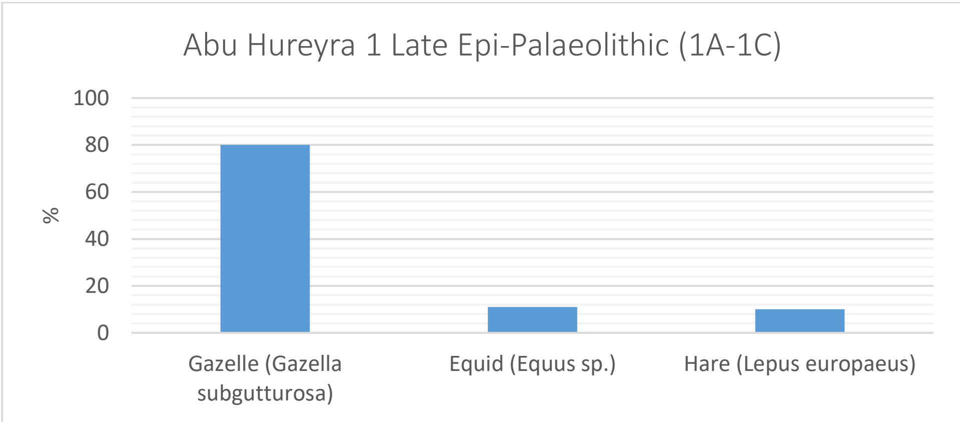
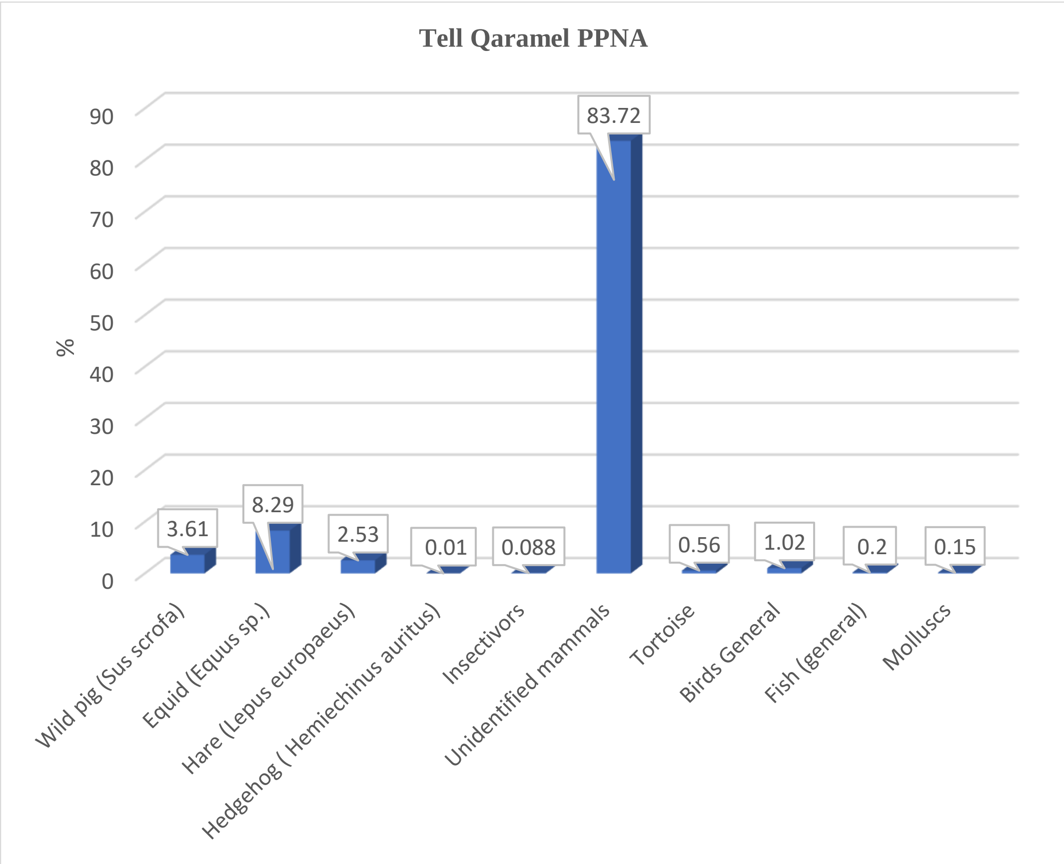


Table 8: Identified species in Abu Hureyra 1.

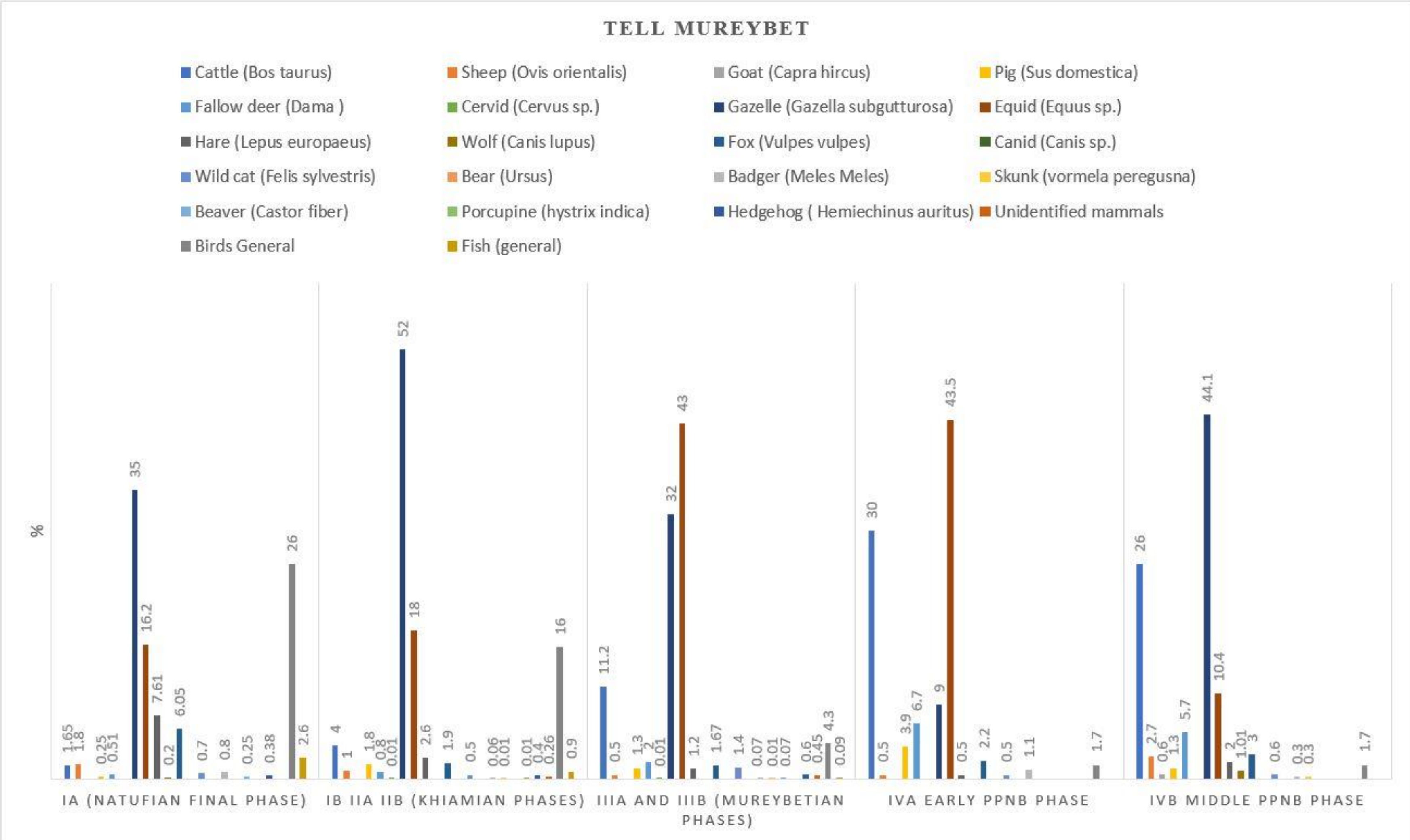
Species	Abu Hureyra 1 Late Epipalaeolithic(1A-1C)
Aurochs	Present
Sheep (Ovis orientalis)	Present
Wild pig (Sus scrofa)	Present
Fallow deer (Dama)	Present
Fox (Vulpes vulpes)	Present

Tell Qaramel: Tell Qaramel does not draw a very different picture from the contemporaneous settlements in terms of animal diversity. However, the details relating to the ratios of exploited animals are unclear due to the high percentage of unidentified mammals in the faunal remains. A number of species, namely, hedgehog, insectivores and tortoise are present in very small quantities. Because of the scarcity of their bones it is doubtful whether or not they did have any role in the diet of people as these animals can be found in archaeological deposits because they borrow in the soil. When died naturally their remains are incorporated in the sediment. Some bones of fish, bird and some molluscs are also found rarely. The bulk of hunting seem to have been directed towards equids followed by wild pig and hare. Total number of identified animal bones 13.184 (Kanjou et *al.* 2018). The collection methods of faunal remains at the excavations are also not mentioned.

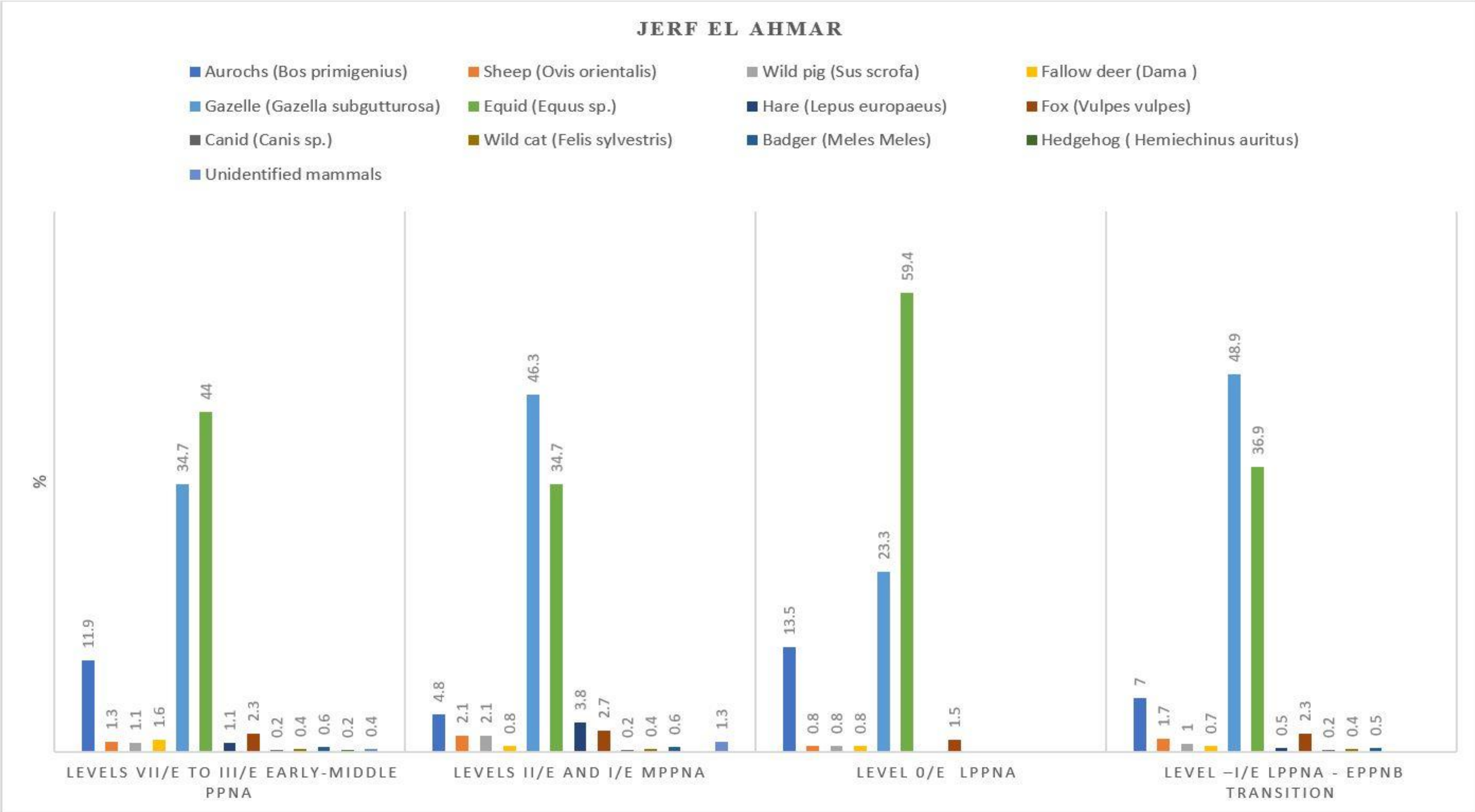
Graph 13: Distribution of most frequent species in Tell Qaramel.



Tell Mureybet: The most frequent animals in levels IA, IB, IIA and IIB are gazelle, equids, hare, fox and bird species; ratios of these species differ across the different phases. For example, in the Natufian phase gazelle makes up 35% of the assemblage while equids make up less than half this number (16.2%); notably, birds are also more common than equids (26%). In levels IB, IIA and IIB (Khaimian phase), there is a significant increase in gazelle ratio and equids are about equal to birds. However, the proportion of animals such as fox, rabbit and bird decreased in IIIA and B, and there is the first visible increase in cattle. A significant development in this period is that equids for the first time exceed the number of gazelles. Moving on to level IVA, there is a notable decrease in the number of gazelles with a parallel increase in the number of cattle; equids are roughly stable resembling the previous phase. In the IVB period, there was a renewed increase in the number of gazelles and a decrease in equids is evident, but cattle remained abundant and there was an increase in the number of pigs, which was not seen much in other periods. The consumption of small species such as hare, fox, and fish seem to have completely disappeared during IVA and IVB phase of Tell Mureybet (Gourichon, 2012). Number of identified animal bone remains 13.970 (NISP). The collection methods of faunal remains at the excavations are also not mentioned.



Graph 14: Diachronic distribution of most frequent species in Tell Mureybet



Graph 15: Diachronic distribution of most frequent species in Jerf el Ahmar

The faunal record for Jerf el Ahmar shows that the subsistence economy of this settlement was based on two main species: equids and gazelle. A third important but less numerous species is the aurochs. In the first two phases of the site, the faunal record is indicative a broad-spectrum hunting strategy, a trend that disappears in the final settlement phases of the site (0 / E to -1/E). There is continuous fluctuation in the ratios of gazelle to equid; remarkably, whenever equid is high, the ratio of aurochs is also high, while when gazelle is most numerous the ratio of aurochs decreases (Gourichon, 2012). Number of identified animal bone remains 2.673 (NISP). The collection methods of faunal remains at the excavations are also not mentioned.

3.4 Regional Analysis of Faunal Assemblages

In the first part of this chapter, all the published faunal data from Epipalaeolithic, PPNA and PPNB settlements in the study region was collected – whenever possible – according to individual occupation phases and subsequently presented in graphs and presence/absence tables. During the data collection process, it became clear that the faunal remains from many settlements are poorly documented, thus making intra-site and intra-regional comparisons of these assemblages potentially problematic. A further difficulty is related to the absolute (radiocarbon-dated) chronologies of the settlement layers; many of these are not always dated, the available data are unreliable or the resolution of the data is far too poor.

In the following part of this chapter, two graphs are presented for each of the two subregions. While the first of the two graphs consider the ratios of larger species, the second focuses on smaller animals, also including fish and molluscs.

In the graphs, the faunal data from the different occupation levels of the sites are presented in chronological sequence from old to young, i.e. from the left of the graphs to their right. Notably, in many cases there is considerable chronological overlap of settlement layers from different sites. Slightly problematic are stratigraphically younger occupation layers with radiocarbon ages which show them to be older than stratigraphically earlier layers at the same site; in these cases, sequences in the graphs are oriented according to the stratigraphic relations (and not the absolute dates). Finally, the data presented in this chapter will be discussed in greater detail in Chapter 4 (Discussion).

3.4.1 Western Subregion and Northern Syrian Sites

Table Western subregion and Syrian sites show the percentages of Large and medium mammals from a total of five sites located along the Euphrates river valley within the borders of modern-day Turkey and Northern Syria. These are data differentiated according to settlement layer/level and spans the period Late Epipalaeolithic to the end of MPPNB. The data from the different levels are arranged in the graphs from oldest (left hand side) to youngest (right hand side) based on available radiocarbon data and, at sites where these are unavailable or unreliable, on stratigraphic relations; for this reason, the chronological sequence of occupation layers with faunal data sometimes appears out of order: In other words, the stratigraphy has priority over the radiocarbon data.

Faunal Assemblages of Large and Medium Mammals: According to data Graph 15, there are only very limited identifiable diachronic trends in the western subregion from the Epipalaeolithic to the end of the PPNB. On the other hand, the data show clear local and site-specific trends.

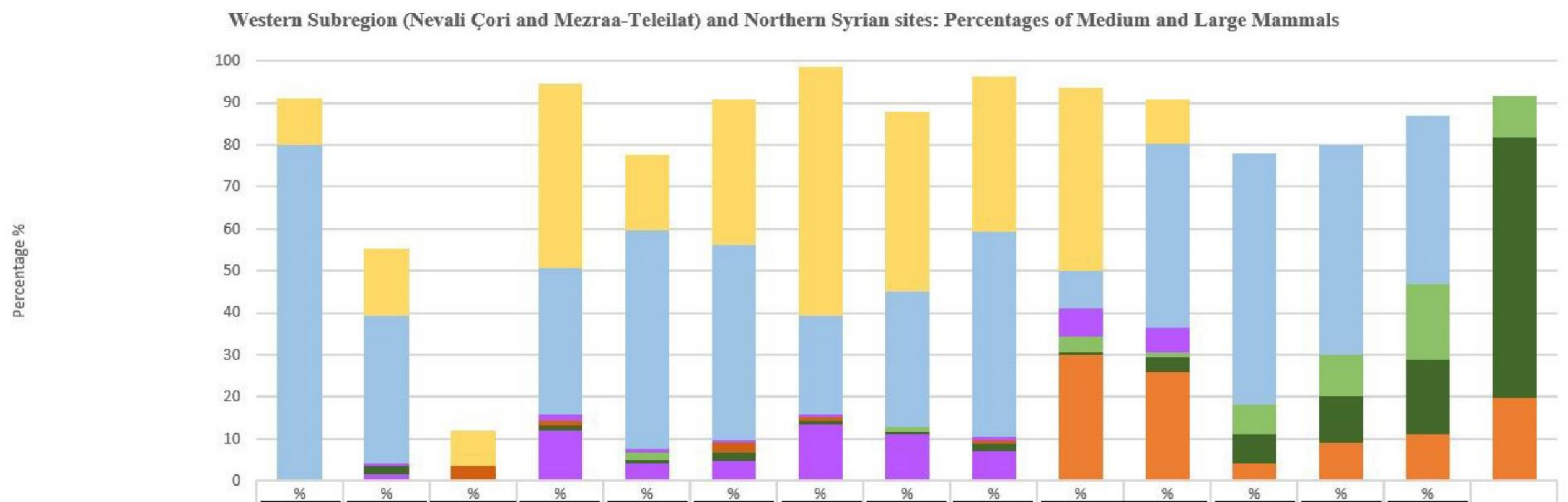
The oldest data sets from the Epipalaeolithic layers at Abu Hureyra and Tell Mureybet share a dominance of gazelle with equid constituting the second most frequent game animal. The main difference between the two is the presence, in Tell Mureybet, although in very small numbers, of four further species: Fallow deer, pig, sheep and cattle. This lack of minor species at Abu Hureyra is probably related to the poorly studied faunal remains at this site. On the other hand, at Mureybet there is evidence for a diversification of hunted species and perhaps even broad-spectrum hunting; all large game makes up about 55% and the rest (45%) belongs to small game species.

In the early part of the PPNA (approx. 9600-9-300 CalBC) available faunal data from Mureybet (Khamian Phase) show no differences to the aforementioned Epipaleolithic at this site; in other words, gazelle and equids are the most important hunted animals. At contemporary Jerf el Ahmar (Level VII-E/III-E), similar trends are also found with high percentages of equids (44%) and gazelle (34.7%); however, here at this site there is a considerable number of aurochs (11.9%) which is otherwise absent at Tell Mureybet and Tell Qaramel. The very few data from Tell Qaramel show that the population from PPNA period from this site hunted equid and wild pig.

The middle and late PPNA layers at Jerf el Ahmar show a continuation of trends from its early to middle phase, i.e. there is a reliance on gazelle and equid. The same can also be said for the late PPNA (Mureybetian Phases) at Tell Mureybet, though here there is a visible increase in cattle compared to the Khiamian phase at this site. Overall the hunters from these two sites in these periods appeared to have been specialised hunters who targeted gazelle and equids. However, there is an important change at Mureybet which is the increase in the number of aurochs. This trend might be indicative of an increasingly wetter climate in the PPNA and a more forested environment. This observation would be in line with the palaeoclimate data with the Early Holocene.

The PPNB transitional period is also documented at the two sites Jerf el Ahmar and Tell Mureybet. Once again, the aforementioned trend and ratios continue, though at Tell Mureybet there is again a considerable increase in cattle (30%) at the expanse of gazelle, which falls to just 9% compared to 32% in the proceeding phase. However, in the PPNB at this site, gazelle again increases to 44.1% with a slight decrease in cattle (28%) and a considerable decrease in equid (10.4%). Therefore, these three species (equid, gazelle and cattle) were the main staples of the meat diet at this site, though their ratios fluctuated in relation to one another over the course of time. Most importantly, this trend at Tell Mureybet is related to the introduction of domesticated cattle at this time. In other words, the community at the site relied on animal husbandary as well as hunting; they were practicing a mixed economy.

The final (youngest) faunal assemblages considered here come from the EPPNB and MPPNB occupation levels at Nevali Çori. This site clearly specialised in the hunting of gazelle with smaller ratios of pig, sheep and cattle, which as we shall see in chapter 4 were already showing signs of human control (domestication). The proportion of domesticates increases gradually but the hunting of gazelle never stops. Mezraa-Teleilat on the other hand as a village which is practising animal husbandry in full.

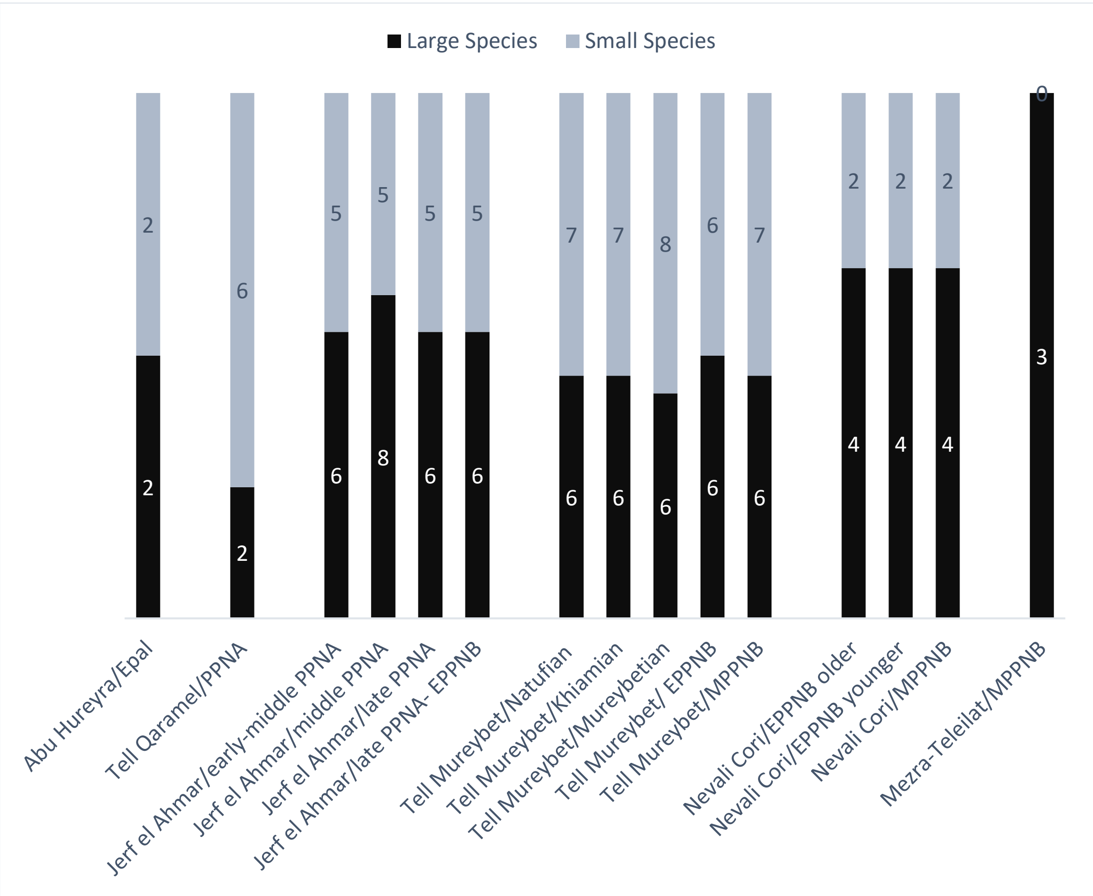


	% 11110-10600 calBC	% 9580-9320 calBC	% 10290-9030 calBC	% 9660-9290 calBC	% 9530-9300 calBC	% 9330-9240 calBC	% 9090-8800 calBC	% 9010-8580 calBC	% 9050-8690 calBC	% 8590-8340 calBC	%	% 8530-8080 calBC	% 8420-7670 calBC	% 8470-7840 calBC	
	Abu Hureyra 1 Late Epi-Palaeolithic (1A-1C)	Tell Mureybet IA (Natufian Final Phase)	Tell Qaramel PPNA	Jerf el Ahmar Levels VII/E to III/E Early-Middle PPNA	Tell Mureybet IB IIA IIB (Khiamian Phase)	Jerf el Ahmar Levels II/E and I/E MPPNA	Jerf el Ahmar Level 0/E LPPNA	Tell Mureybet IIIA and IIIB (Mureybetian Phases)	Jerf el Ahmar Level –I/E LPPNA - EPPNB transition	Tell Mureybet IVA Early PPNB phase	Tell Mureybet IVB Middle PPNB phase	Nevali Çori Layer I-II (older stage of EPPNB)	Nevali Çori III (younger stage of EPPNB)	Nevali Çori IV (MPPNB)	Mezraa-Teleilat MPPNB
Equid (Equus sp.)	11	16.2	8.29	44	18	34.7	59.4	43	36.9	43.5	10.4				
Gazelle (Gazella subgutturosa)	80	35		34.7	52	46.3	23.3	32	48.9	9	44.1	60	50	40	
Fallow deer (Dama)		0.51		1.6	0.81	0.8	0.8	0	0.7	6.7	5.7				
Wild pig (Sus scrofa)			3.61	1.1		2.1	0.8		1						
Pig (Sus domestica)		0.25			1.8			1.3		3.9	1.3	7	10	18	10
Sheep/goat (Ovis/capra)		1.8		1.3	1	2.1	0.8	0.5	1.7	0.5	3.3	7	11	18	61.86
Aurochs (Bos primigenius)		1.65		11.9	4	4.8	13.5	11.2	7						
Cattle (Bos taurus)										30	26	4	9	11	19.94

Graph 16: Western Subregion (Nevali Çori and Mezraa-Teleilat) and Northern Syrian sites: Percentages of Medium and Large Mammals

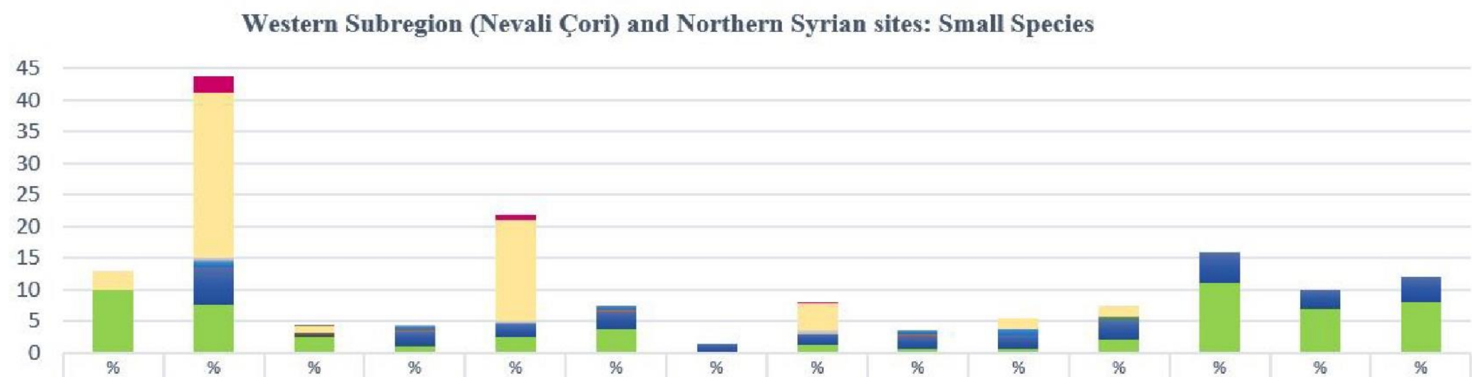
Faunal Assemblages of Small Species: compared to the large and medium species, the small species make up comparatively small amounts of the faunal assemblages of the Epipalaeolithic and PPN settlement occupations in the study region (Graph 16). These small numbers make it relatively difficult to identify whether the animals were hunted for their meat, their fur, or whether they should be classified as vermin which were attracted to the human settlements and died while borrowing and perhaps hibernating there. Certainly, in the case of such animals as the fox and the hare, as well as birds, it appears feasible these were hunted species. Considering the proximity of many of these sites to Euphrates River, it is surprising that only very small amounts of fish are recorded at just two of the sites (Tell Mureybet, Tell Qaramel); indeed, this small ratio of fish and molluscs (only identified at PPNA Qaramel) could reflect sampling strategies at the excavations.

Graph 17: Overview of species diversity based on the number of identified large and small animal species in the different occupation levels at the study sites



Inspite of the drawbacks of the data mentioned above, there are some trends relating to species diversity if we consider the relationship between large and small animal species according to site, region and chronology (see Graph 17 and 18). While the Northern Syrian sites (Abu Hureyra, Jerf el Ahmar and Tell Mureybet) show more or less equal ratios of small and large animal species, sites in Southeastern Turkey (Nevali Çori and Mezraa-Teleilat) have smaller numbers of (or no) small species; in the case of Mezraa-Teleilat, there are no records of small mammals (Ilgezdi, 2008; 85-86) which definetly must reflect sampling strategies at the excavation.

The percentages of small species at the sites in the western subregion differ from site to site, though there are also observable trends in the data. Notably the highest percentages among the small species include birds at Tell Mureybet, fox at Tell Mureybet, Jerf el Ahmar and Nevali Çori, and hare at Abu Hureyra, Tell Mureybet, Jerf el Ahmar and Nevali Çori. The percentages of each of the small species can be seen in graph 18. At the sites in the Western Subregion, the small species make up between 1.5% of the faunal assemblages at Jerf el Ahmar (Level 0/E; late PPNA) and 43.69% at Tell Mureybet (IA; Natufian Phase) (Graph 16).



	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	11110-10600 calBC	9580-9320 calBC	10290-9030 calBC	9660-9290 calBC	9530-9300 calBC	9330-9240 calBC	9090-8800 calBC	9010-8580 calBC	9050-8690 calBC	8590-8340 calBC		8530-8080 calBC	8470-7840 calBC	8420-7670 calBC
	Abu Hureyra 1 Late Epi-Palaeolithic (1A-1C)	Tell Mureybet IA (Natufian Final Phase)	Tell Qaramel PPNA	Jerf el Ahmar Levels VII/E to III/E Early-Middle PPNA	Tell Mureybet IB IIA IIB (Khiamian Phases)	Jerf el Ahmar Levels II/E and I/E MPPNA	Jerf el Ahmar Level 0/E LPPNA	Tell Mureybet IIIA and IIIB (Mureybetian Phases)	Jerf el Ahmar Level –I/E LPPNA - EPPNB transition	Tell Mureybet IVA Early PPNB phase	Tell Mureybet IVB Middle PPNB phase	Nevali Çori Layer I-II (older stage of EPPNB)	Nevali Çori IV (MPPNB)	Nevali Çori III (younger stage of EPPNB)
Molluscs			0.15											
Fish (general)		2.6	0.02		0.9			0.09		0	0			
Birds General	3	26	1.02		16			4.3		1.7	1.7			
Tortoise			0.56											
Hedgehog (Hemiechinus auritus)		0.38	0	0.2	0.4	0	0	0.6	0	0	0			
Beaver (Castor fiber)		0.25						0.07						
Skunk (vormela peregusna)					0.01			0.01			0.3			
Badger (Meles Meles)		0.8		0.6	0.06	0.6	0	0.07	0.5	1.1	0.3			
Canid (Canis sp.)				0.2		0.2	0		0.2					
Fox (Vulpes vulpes)		6.05		2.3	1.9	2.7	1.5	1.67	2.3	2.2	3	5	3	4
Hare (Lepus europaeus)	10	7.61	2.53	1.1	2.6	3.8	0	1.2	0.5	0.5	2	11	7	8

Graph 18: Western Subregion (Nevali Çori) and Northern Syrian sites: Small Species

3.4.2 Eastern Subregion and Northern Iraq

Table eastern subregion shows the percentages of identified animal species from a total of five sites located along the Tigris river valley within the borders of modern-day Turkey as well as the only available faunal data from a northern Iraqi site at Qermez Dere. This data also differentiated according to settlement layer/level and spans the period PPNA to the end of the PPNB. The data from the different levels are arranged in the graphs from oldest (left hand side) to youngest (right hand side) based on available radiocarbon data and, at sites where these are unavailable or unreliable, on stratigraphic relations; for this reason, the chronological sequence of occupation layers with faunal data sometimes appears out of order: In other words, the stratigraphy has priority over the radiocarbon data.

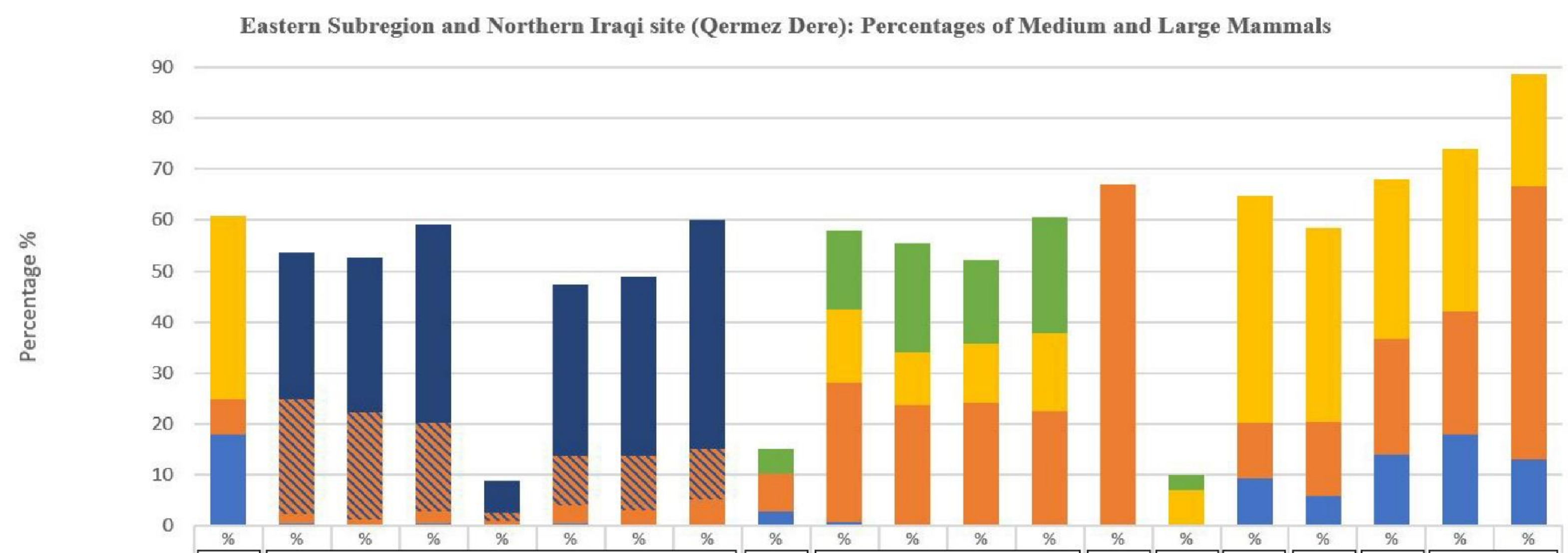
Faunal Assemblages of Large and Medium Species: According to data Graph 17, there are only very limited identifiable diachronic trends in the eastern subregion from the PPNA to the end of the PPNB. On the other hand, the data do show clear site-specific trends. For example, the earliest level at Çayönü Tepesi (Oval Phase) shows clear similarities to the later (PPNB) phases at this same site on the right-hand side of graph. At Qermez Dere and Hallan Çemi, PPNA layers also appear extremely homogeneous. At the former site (Qermez Dere) the most important game animals were gazelle followed by sheep/goat, while at Hallan Çemi, pig and cervid were the most important species.

At Körtik Tepe, excavations in the PPNA occupation level have revealed a faunal assemblage that is comparable to Hallan Çemi (Level 1,2,3 and 4) with a dominance of sheep/goat, but with the practical absence of pig (<1%). In addition, at Körtik Tepe, aurochs are hunted, while they are very rare at Hallan Çemi. Notably notably both Körtik Tepe PPNA and Hallan Çemi (Level 1,2,3 and 4) are synchronous (approx. 9.700-9.300 CalBC). Gusir PPNA is only slightly younger but the medium and large mammals found at this site are dominated by sheep/goat (67%). The faunal assemblage from Hasankeyf Höyük is statistically the same age as Gusir Höyük PPNA, but here the available faunal remains show a preference for pig (7%) and cervid (3%), though the available faunal data is extremely limited. All these data point to adaptations of subsistence strategies to very local environments.

Finally, the PPNB levels from Çayönü Tepesi are not dissimilar to the ratios found in the PPNA (Oval) level of the site. Pig remains extremely important throughout the PPNB. Though with a slight decrease from the transitional PPNA to

EPPNB (Grill) phase (44.8%). A radical change is observed in the FPPNB (Large Room) phase when the pig falls to 21.9%. Notably, this decrease in pig is accompanied by a substantial increase in the number of sheep/goat which is clearly associated with the appearance of domesticated animals in the course of the PPNB. The site of Çayönü then transforms from a hunters' village to one entering the process of Neolithisation, reminiscent of Mureybet. In short, we see three sites with three different animal exploitation strategies which are indicative of adaptations to the local environments.

Another important characteristic of this group is that aurochs/cattle are absent from most of the sites except for a little bit in Körtik Tepe (in its wild form) and a lot in Çayönü (in its wild and domesticated form). At Çayönü Tepesi the relationship of humans and cattle changed gradually across the occupation of the site of Çayönü Tepesi with the appearance of domesticated cattle at approx. 8300-8200 calBC, i.e. in the late EPPNB.



	ÇT Oval (PPNA)	QD Phase 7 (basal soil)	QD Phase 6 (midden)	QD Phase 5 (midden)	QD Phase 4 (midden)	QD Phase 3(RAB house phase)	QD Phase 2.5 (RAD house phase)	QD Phase 2 (RAA house phase)	KT PPNA	HÇ Building Level 1 PPNA	HÇ Building Level 2 PPNA	HÇ Building Level 3 PPNA	HÇ Building Level 4 PPNA	GH PPNA	HKH PPNA	ÇT Grill (PPNA-EPPNB)	ÇT Channeled (EPPNB)	ÇT Cobble paved (MPPNB)	ÇT Cell (LPPNB)	ÇT Large Room FPPNB
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	10510-8390 calBC	9840-8910 calBC							9720-9380 calBC	9680-9340 calBC				9510-8980 calBC	9470-8920 calBC	8500-8290 calBC	8300-8250 calBC	8160-8250 calBC	7390-6850 calBC	
Gazelle		28.55	30.33	38.93	6.1	33.77	35.11	44.92	0											
Cervid									4.9	15.52	21.38	16.34	22.75		3					
Pig	35.9								0	14.36	10.36	11.59	15.32		7	44.6	37.9	31.3	31.9	21.9
Sheep/Goat /Gazel		22.51	21.21	17.45	1.69	9.56	10.64	10.17												
Sheep/Goat	6.9	1.96	0.98	2.46	0.93	3.62	3.19	5.08	7.5	27.22	23.77	24.27	22.52	67		10.8	14.7	22.9	24.2	53.6
Aurochs/Cattle	17.9	0.49	0.2	0.45	0.08	0.49			2.8	0.81	0.07					9.4	5.9	13.9	17.9	13.1

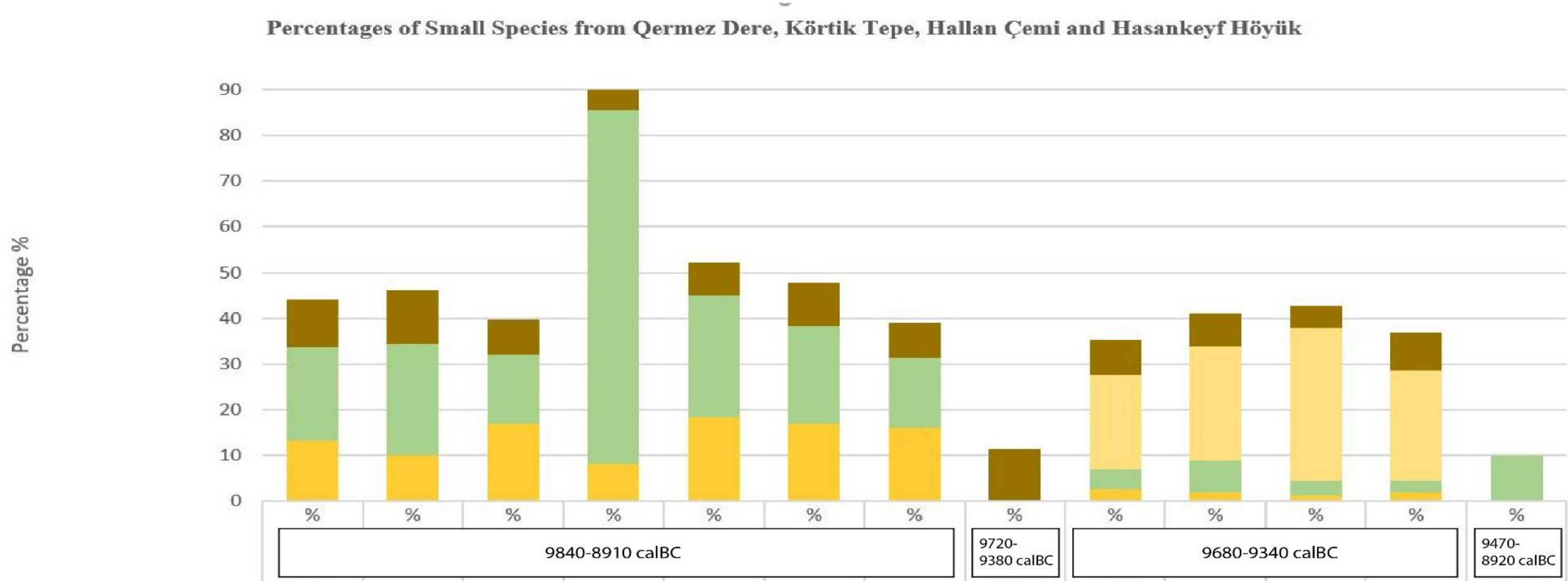
Graph 19: Eastern Subregion and Northern Iraqi site (Qermez Dere): Percentages of Medium and Large Mammals

Faunal Assemblages of Small Species: When compared with the Western subregion and Syrian sites, the sites from the Eastern subregion and Northern Iraq feature a very limited number (between 1 and 4) of small species, though at much greater percentages compared to the large species (Graph 18). Certainly, this is most likely a reflection of the current state of publication of the faunal remains from these sites. However, the available data, which include birds, tortoise, fox and hare, do show that there were trends in the exploitation of these species at the sites of Qermez Dere, Körtik Tepe, Hallan Çemi and Hasankeyf Höyük. The percentages of each of the small species in each of the occupation levels of the sites can be seen in graph 20. At the sites in the Eastern Subregion, the small species make up between 10% of the faunal assemblage at Hasankeyf Höyük (PPNA) and 90.26% at Qermez Dere (layer 4, midden).

Although the high percentage of small species from Qermez Dere (layer 4, midden) is most certainly related to the special significance of the midden from which the faunal remains were excavated, the sites from the eastern subregion generally feature higher percentages of small species than the sites in the western subregion (event though the diversity of small species is far lower).

At Hasankeyf Höyük only foxes are reported (10% of the faunal assemblage), while at Körtik Tepe there are only data relating to birds (11.4% of the entire assemblage). In contrast, three small species are especially significant at Qermez Dere; remarkably, the most numerous species at this site is (as at Hasankeyf Höyük) the fox (15-27% in the different PPNA occupation levels), followed by hare (10-18% in the different PPNA occupation levels) and birds (8-12% in the different PPNA occupation levels).

At Hallan Çemi, the most important small animal is the tortoise (21-34% in the different PPNA occupation levels), followed by bird (5-8% in the different PPNA occupation levels), fox (4-7% in the different PPNA occupation levels) and hare (1-3% in the different PPNA occupation levels). Whereas the fox could have been eaten, its symbolic value should also not be overlooked, for example its high frequency among the reliefs found adorning the T-Pillars at Göbekli Tepe (Schmidt, 2006). Additionally, the symbolic value of the tortoise should also be considered especially given its presence in so-called shaman burial at the 12,000-year-old Natufian cave site, Hilazon Tachtit in Israel (Grossman et al. 2008).



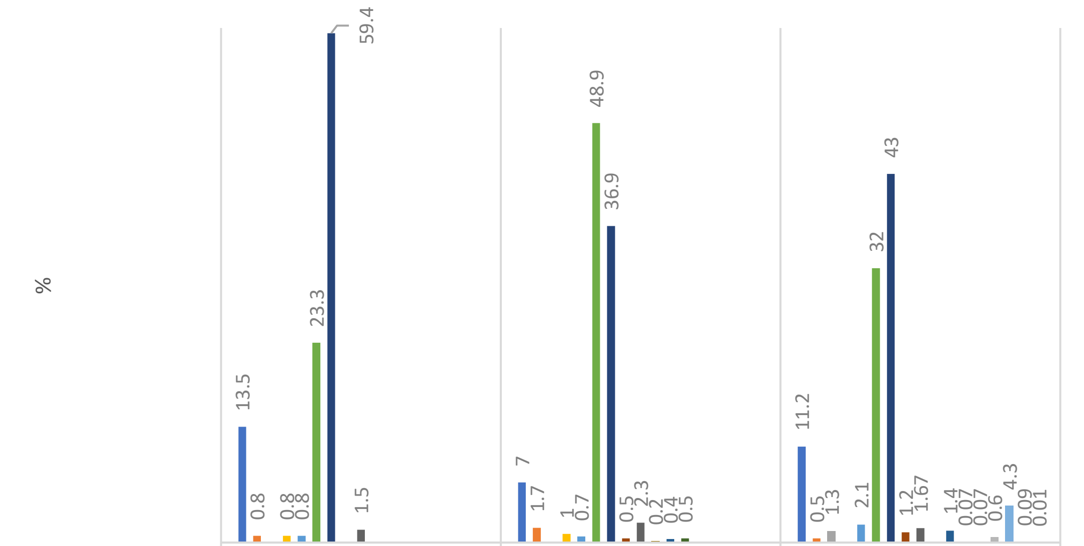
	QD Phase 7 (basal soil) %	QD Phase 6 (midden) %	QD Phase 5 (midden) %	QD Phase 4 (midden) %	QD Phase 3(RAB house phase) %	QD Phase 2.5 (RAD house phase) %	QD Phase 2 (RAA house phase) %	KT PPNA %	HÇ Building Level 1 PPNA %	HÇ Building Level 2 PPNA %	HÇ Building Level 3 PPNA %	HÇ Building Level 4 PPNA %	HKH PPNA %
Birds General	10.44	11.82	7.61	4.74	7.25	9.57	7.63	11.4	7.7	7.17	4.7	8.33	
Tortoise									20.7	24.93	33.5	24.1	
Fox (Vulpes vulpes)	20.39	24.43	14.99	77.31	26.69	21.28	15.25	0	4.34	6.96	3.16	2.7	10
Hare (Lepus europaeus)	13.21	9.98	17	8.21	18.29	17.02	16.1	0	2.59	1.96	1.27	1.8	

Graph 20: Percentages of Small Species from Qermez Dere, Körtik Tepe, Hallan Çemi and Hasankeyf Höyük

3.5 The Crisis and Post-Crisis Periods

As the focus of this thesis lies on a proposed hunter-gatherer crisis at the transition from PPNA to the EPPNB (8900-8600 calBC) and whether or not this crisis is visible in the archaeofaunal data, we will now look more closely at faunal assemblages from occupation layers which, based on their radiocarbon ages, are synchronous with the crisis period.

Graph 21: Faunal data from three settlement phases at two sites (Jerf el Ahmar and Tell Mureybet) which are synchronous with the crisis period



	Jerf el Ahmar Level 0/E LPPNA	Jerf el Ahmar Level –I/E LPPNA - EPPNB transition	Tell Mureybet IIIA and IIIB (Mureybetian Phases)
Aurochs/Cattle	13.5	7	11.2
Wild Sheep	0.8	1.7	0.5
Pig			1.3
Wild pig	0.8	1	
Fallow deer	0.8	0.7	2.1
Gazelle	23.3	48.9	32
Equid	59.4	36.9	43
Hare		0.5	1.2
Fox	1.5	2.3	1.67
Canid		0.2	
Wild cat		0.4	1.4
Badger		0.5	0.07
Beaver			0.07
Hedgehog			0.6
Birds			4.3
Fish			0.09
Skunk			0.01

Graph 21 shows the faunal data from three settlement phases at two sites which are synchronous with the crisis period. Both these sites (Jerf el Ahmar and Tell Mureybet) are located in the western subregion; in contrast, in the eastern subregion there are no published archaeofaunal assembalges which date to period in question. Whereas Level 0/E and Level -1/E at Jerf el Ahmar are assigned by the excavators to the late PPNA and the late PPNA/EPPNB transition (respectively), the Mureybetian phase at Tell Mureybet IIIA/B also corresponds to a late PPNA occupation. According to the filtered radiocarbon data from these settlement layers (see chapter 3.1) the three settlement phases in graph 21 are dated as follows:

- Jerf el Ahmar Level 0/E: 9090-8800 calBC
- Jerf el Ahmar Level -1/E: 9050-8690 calBC
- Tell Mureybet IIIA/B: 9010-8580 calBC

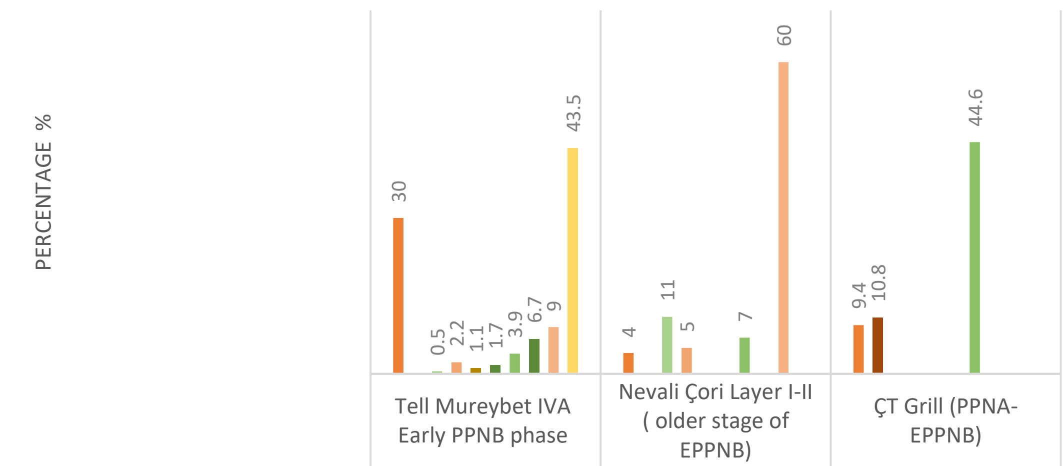
A closer look at the faunal assemblages from the three occupation phases just mentioned shows that the animal exploitation strategies highly resemble those of earlier phases at these sites, i.e. with a clear focus on the hunting of two species (equid and gazelle). Addditionally, the small animal species in these phases suggest that we are dealing with specialised hunting and wide hunting strategies. The percentages of the different species in the assemblages, and their potential significance for reconstructing human behaviour during the crisis period will be discussed in chapter 4.3.3.

Remarkably, the biggest changes become visible at settlements which (based on the available radiocarbon data) can be assigned to the post-crisis period. There are three post hunter-gatherer crisis occupations (for radiocarbon dates see chapter 3.1):

- Tell Mureybet IVA: 8590- 8340 calBC
- Nevali Cori I-II: 8530-8080 calBC
- Cayönü Grill Plan: 8500-8290 calBC

Compared to the animal exploitation strategies at the Crisis-Period occupations (see Graph 21) where the hunters focused on two main species (equid and gazelle), in the post crisis period (see Graph 22) the communities relied on a mixture of hunting and animal husbandary. For example, the cattle at Tell Mureybet IV/A are described as a domestic-wild mix (Gourichon, 2012). Although at Nevali Cori (Layer I-II), hunting still played the most dominant role in animal exploitation strategies, as testified by high percentage of gazelle (60%) and hare (11%), there are also clear signs from archaeofauna that the pigs and caprines from this site were also already under human control (Peters et *al.* 2017: 250-254). Similar animal exploitation strategies are also indicated by the available data from Çayönü Grill Plan phase where pig and sheep goat followed by aurochs make up the bulk of the animal remains.

Graph 22: Faunal data from three settlement phases at three sites (Tell Mureybet, Nevali Çori and Çayönü Tepesi) which post-date to crisis period



	Tell Mureybet IVA Early PPNB phase	Nevali Çori Layer I-II (older stage of EPPNB)	ÇT Grill (PPNA-EPPNB)
Cattle (Bos taurus)	30	4	9.4
Wild sheep (Ovis orientalis)			10.8
Hare (Lepus europaeus)	0.5	11	
Fox (Vulpes vulpes)	2.2	5	
Badger (Meles Meles)	1.1		
Birds General	1.7		
Pig (Sus domestica)	3.9	7	44.6
Fallow deer (Dama)	6.7		
Gazelle (Gazella subgutturosa)	9	60	
Equid (Equus sp.)	43.5		

3.6 Summary

In this section we have consulted available absolute (14C) chronological, paleaoclimate and faunal data gathered from the literature. The chapter began with a review of the radiocarbon dates and palaeoclimate and was followed by the presentation of the faunal data from each of the settlement sites. We then moved on to comparisons of this data from a diachronic and regional perspective.

The review of the available radiocarbon and paleoclimate data has shown that the Epipalaeolithic and Pre-Pottery Neolithic settlements covered a time period which was charactrised by considerable climate change. Most notably, the Epipalaeolithic coincides with the cool and dry conditions of the Younger Dryas, and the PPN was contemproneus with climate improvement of the Early Holocene when there was reforestation following the decrease of trees in the Younger Dryas. The late PPNA hunter crisis was shown to corresponded with a possible abrupt climate event chractrised by cold and dry conditions, though this remains to be confirmed (pers. comm. L. Clare).

The faunal data available from the Epipalaeolithic and Early Neolithic sites were presented. Although the amount of available data varies from site to site, it was possible to obtain ratios of the different mammals from a total of ten sites. A review of these data showed that the prehistoric communities exploited a large number of different animals, sometimes with a clear specilasation on one or two particular species. These data according to chronology and the animal exploitation strategies behind these data will be discussed in Chapter 4.

CHAPTER 4

DISCUSSION

The data available and discussed in this thesis are limited to results from published reports reflecting the different ratios of animal species found at different archaeological sites in the study region (Upper Mesopotamia) from the Epipalaeolithic and the Pre-Pottery Neolithic. These data do not include results from, for example, more detailed analyses of the bone material, e.g. fragmentation rate, age and sex profiles etc., which are frequently used to gain more explicit insights into prehistoric animal exploitation. Nevertheless, the data (ratios) that have been presented in Chapter 3 are still sufficient to provide a bigger picture about the emerging trends in animal exploitation at a crucial time (Neolithic transition) in Upper Mesopotamia. Additionally, it will allow us to put this geographic area into context with other developments (environmental and cultural) in this region at this time.

The approach to the following discussion will be diachronic. Starting with the Younger Dryas and the Epipalaeolithic data, we will move through the 10th, 9th and 8th millennia calBC to take a look at changing trends in animal exploitation through the Pre-Pottery Neolithic. As outlined in the introduction into this thesis, this overview of animal exploitation will consider whether the faunal data shows any indication of a hunter crisis which has been proposed for the transition from PPNA to EPPNB, i.e. the early centuries of 9th millennium calBC (Clare & Kinzel 2020). Additionally, this synthesis will take into consideration the different hypotheses and models relating to hunting and animal exploitation, including the Broad-Spectrum Revolution of the Epipalaeolithic and the subsequent period characterised by hunting specialisation.

4.1 Quality of Data

There are considerable differences in the quality of the available archaeofaunal data from the different sites considered in this thesis various. These differences reflect the excavation strategies employed in the various projects (screening, hand picking etc.)

and also the state of publication. As this thesis is focusing solely on the percentages of the different species in the assemblages, the available data are perhaps less problematic than if the focus had been on more specilisied investigations, such as osteometrics. However, even here, there are differences in the quality of the data from site to site. For four sites, only presence/absence information for the different species was available in the consulted literature: Gusir Höyük, Hasankeyf Höyük, Shanidar Cave, Zawi Chemi Shanidar. A combination of presence/absence data and percentages was available in the literature for three sites: Gürcü Tepe, Körtik Tepe and Abu Hureyra. Among the best studied sites, i.e. with most extensive funal data, are Göbekli Tepe, Nevali Çori, Hallan Cemi, Bocuklu Tarla, Mezraa-Teleilat, Çayönü Tepesi, Qermez Dere, Tell Mureybet, Tell Qaramel and Jerf el Ahmar. For all these prehistoric settlements, the percentages of documented species are available in more detail.

Concerning the radiocarbon data, these were filtered, leading to the exclusion of all radiocarbon dates with a standard deviation of more than 100 14C-years (Appendix A). The remaining radiocarbon data were calibrated using the CalPal software package (Weninger & Jöris 2008) and the INTCAL20 dataset (Remier *et al*. 2020) (See Chapter 3.19).

4.2 General Tendencies in Animal Exploitation

Regarding general tendencies in animal exploitation at Epipalaeolithic and PPN sites in the study region, it is possible to discern different trends; these include a) a clear focus on one or two specific species; b) the role of secondary species; c) trends in regional animal exploitation strategies; c) trends in the exploitation patterns of small species; and d) the hunting of what might be termed unusual animals.

a) The following sites have provided evidence for the focus on one or two specific species; in the western subregion these include, Abu Hureyra (gazelle), Tell Mureybet (gazelle and equid), Jerf el Ahmar (gazelle and equid) and Nevali Cori (gazelle). In the eastern subregion these include; Çayönü Tepesi (pig and sheep/goat), Qermez Dere (gazelle and sheep/goat) and Hallan Çemi (sheep/goat and cervid).

b) In the two subregions there are also different dominant secondary species. In the western subregion, these are birds and cattle at Tell Mureybet and Jerf el

Ahmar. In the eastern subregion, the dominant secondary species are sheep/goat (at Qermez Dere) and pig (at Hallan Çemi). Finally, at EPPNB and MPPNB sites in both subregions, domesticated species (pig, sheep/goat and cattle) can be also be considered dominant secondary species.

c) Regional exploitation strategies appear to be related with the environmental conditions in the two subregions. A dominance of gazelle and equids in the west contrasts with a dominance of sheep/goat and pig in the east. The only exception here is Qermez Dere which follows the gazelle pattern even though it is located in the eastern subregion. This could mean that the diet was a cultural decision and not one based on environmental limitations.

d) Some sites specialize in very unusual animals. Whereas Hallan Çemi (western subregion) has large numbers of tortoise, at Qermez Dere (eastern subregion), there is a high percentage of fox. Neither of these animals would have provided much meat. One explanatation could be that these communities were relying more heavly on plants for their subsistence; alternatively, it is not unusal for societies coping with stress situtations, for example, in periods of drought and/or famine to turn to unusual animals (Clare, 2016; 63-64).

4.3 Diachronic Change in Animal Exploitation

This chapter will proceed with a consideration of archaeofaunal assembalges from a diachronic perspective. Beginning with the Epipalaeolithic, which as we have seen coincides with the cold dry conditions with Younger Dryas, hunting strategies and animal exploitation is different to subsequent Pre-Pottery Neolithic A. In the western subregion, there are two Epipalaeolithic archaeofaunal assmblages (Abu Hureyra I and Tell Mureybet IA) which show evidence for wide hunting and broad-spectrum hunting strategies after the criteria stated in Chapter 3.2. In the eastern subregion, there so far, no available archaefaunal assemblages. Wide hunting and broad-spectrum hunting strategies will be looked at in more detail in chapter 4.3.1.

In the PPNA, the arcaheofaunal assemblages in the western subregion fulfil the criteria for the presence of more specialised hunters, i.e. there are one or two dominant hunted species (equid and gazelle). In the eastern subregion, there are also dominant secondary species, especially sheep and goat at Qermez Dere, pig at Hallan Çemi, and aurochs at Çayönü Tepesi. Additonally, there are numerous small species with lower percentages in both subregions which could indicate the contuniation of broad-spectrum hunting strategies from the Epipalaeolithic, especially at Tell Mureybet Layers IB-IIA-IIB (Khiamian) where small species make up 43.69% of the archaeofaunal assemblage. However, in other PPNA occupations the percentage of small species lies between 1.5% and 8.1% of the respective assemblages. Trends in animal exploitation at the Holocene transition and in the PPNA are looked at in Chapter 4.3.2.

From the EPPNB, there is increasing evidence for presence of animal control, domestication and animal husbandry. The addition of domesticated animals impacts on the hunting strategies, which is indicated by a decrase in the percanteges of wild animal species. As we shall see chapter 4.3.5, domesticated species include pig, sheep/goat and cattle.

4.3.1 Epipalaeolithic: Intensification of Hunter-Gatherer Subsistence Strategies in the Younger Dryas and Broad-Spectrum Strategies

The Epipalaeolothic is a key period for understanding the gradual transition from hunter-gathering to agriculture, especially against the background of the so-called Broad-Spectrum Revolution (BCR) proposed by K. Flannery (Flannery, 1968). The BSR is a term used to refer to the visible increase in the number of different species hunted/exploited in the Epipalaeolithic, potentially as a reaction to the negative change in climate conditions (cooler and drier) in the Younger Dryas. Combined with the factor human demographic growth, it has been argued that the BSR could have contributed to the emergence of Neolithic lifeways in the Early Holocene (Munro, 2009A: 141-142).

Since its formulation in the late 1960s, K. Flannery`s theory of Broad-Spectrum Revolution (BSR) has featured in numerous studies looking at the subsistence strategies of Epipalaeolithic communities, especially in the context of the Natufian culture and the transition to the Early Pre-Pottery Neolithic in the southern Levant. The term is used to describe the exploitation of an increased number of small game species and the related changes in the human diet (for a general summary of the BSR, see, e.g Munro 2009). As such, a clear sign of Broad-Spectrum hunting is an increase in the variability of different species in the faunal assemblages from archaeological sites. It is frequently stated that Broad-Spectrum strategies are triggered by the "*imbalances between human populations and resources*" (Munro 2009A: 141). As such, the Broad-Spectrum hypothesis is closely related to other models (e.g. population pressure; cf. Bowles & Choi, 2019) which have been used to explain the transition from hunter-gathering to agriculture (Neolithisation) in the Fertile Crescent.

There is some evidence from the study region that Broad-Spectrum hunting was practiced in Upper Mesopotamia. Currently, there are only four Epipalaeolithic sites with published archaeofaunal assemblages in the study region (Shanidar Cave, Körtik Tepe, Tell Mureybet and Abu Hureyra): Shanidar Cave (Layer B2) is in Iraq, Körtik Tepe lies on the Tigris River in Turkey, and Abu Hureyra (Level 1A-1C) and Tell Mureybet (Level IA) are located on the Euphrates River in northern Syria; of these four sites, only two have relevant faunal data which have been included in this study: Tell Mureybet (Level IA) and Abu Hureyra (Level 1A-1C).

The publications consulted for the Abu Hureyra site only provide percentages for four species during its Late Epipalaeolithic occupation; these data appear to be indicative of wide hunting strategies. In contrast, the data from Tell Mureybet are perfectly in line with what might be expected in a broad-spectrum strategy. The fauna from Mureybet IA (Natufian Final Phase) features a total of 13 different species, which may or may not have all been hunted and eaten; the small percentages of some animals might imply that they were attracted to the human settlement and died there (vermin). The most numerous animal species were gazelles, birds and equids, which make up a total of 77.2% of the studied assemblage. In the subsequent Early Holocene, the ratio of gazelle at the site increases and the number of birds decreases; however, the total percentage of equids, gazelle and birds increase compared to the Epipalaeolithic, therefore indicating that the broad-spectrum strategy was gradually being replaced by the specialisation on a limited number of species. This trend is also supported by the decrease in the percentages of the other species in the PPNA (Khiamian) assemblage at the site.

Importantly, the different strategies of diversification (Broad Spectrum) and specialization also provide an insight into the diet of the prehistoric groups. While the reliance on multiple animal species (diversification) is indicative of a diverse diet, specialisation is instead related with a narrower dietary breadth (Munro 2009B). According to Munro (2009B), the most important changes in Epipalaeolithic animal exploitation in the region of modern Israel occurred on a regional scale and probably reflect changing availability of prey due to over-hunting or impacts of climate change. Climate might also explain the change in the faunal assemblage from Tell Mureybet where improved Early Holocene conditions probably led to an increase in the number of gazelles in the vicinity of the site and subsequently to a focus of hunting on this species.

4.3.2 Holocene Transition / PPNA

The onset of climate improvements in the Early Holocene coincides with a comparative explosion of settlement sites belonging to sedentary hunter-gatherer (PPNA) communities (see chapter 1, Figure 3). This increase in the number of archaeological sites is also reflected in the higher number of available faunal assemblages in this study. As a result, a lot more can be said about animal exploitation in the Early Holocene than in the Younger Dryas. Notably, the term "Pre-Pottery Neolithic A", which might suggest substantial changes in subsistence strategies, is clearly misleading, especially as the faunal data from this period are more indicative of a continuation (and intensification) of specialised hunting and wide hunting strategies known from the Epipalaeolithic.

Wide hunting strategies were practiced by PPNA hunter gatherer groups in the entire research area (western and eastern subregion). For example, the PPNA faunal assemblage from Jerf el Ahmar (Euphrates) stems from three different phases and features 17 species, including fish, birds, hedgehog, beaver, skunk, badger, canid, fox, hare, equid, gazelle, cervid, fallow deer, wild pig, sheep and aurochs/cattle; at Hallan Çemi (Tigris), where there are four different PPNA phases, there are eight different species, including birds, tortoise, rodents, fox, hare, cervid, pig, sheep/goat and aurochs/cattle; finally, the assemblage from Qermez Dere (northern Iraq) stems from seven different phases and features nine different species, including birds, badger, fox, hare, equid, gazelle, sheep/goat and aurochs/cattle. All these assemblages clearly show that the communities from these sites were still hunting a wide range of animals in the PPNA. This trend is also visible at the other documented sites from the study area (Tell

Mureybet and Göbekli Tepe in the western subregion, and Körtik Tepe, Hasankeyf Höyük and Çayönü Tepesi in the eastern subregion) where several different species were also hunted.

Although, wide hunting strategies were practiced at all of these sites, their assemblages, i.e. the different species, indicate that they were adapted to the local environment and the animals available in their catchments. In the case of Qermez Dere, the most numerous species is gazelle, which fits well with the local landscape around the site, overlooking the Je Zirah plain from the foothills of the Jebel Sinjar. Turning to Hallan Çemi, the most numerous species are tortoise and sheep/goat which also fit well with the location of this site in the foothills of the eastern Taurus Mountains with rocky outcrops covered by a lightly wooded oak/pistachio forest and close to the tributary of Batman River (Zeder et *al.* 2016: 145). Finally, at Jerf el Ahmar, the most numerous species are equids and gazelle, which fit with the location of this site on the left bank of the Euphrates, close to several different environments at the interface between alluvial valleys and the steppe (Stordeur, 2015: 23).

In addition to the wide hunting strategies, some sites also show evidence for the sprecialisation in hunting particular game animals: In the western subregion, these animals included gazelle and equid, and in the eastern subregion, gazelle, cervid, sheep/goat, pig and cattle. These specialisations varied from site to site and reflect the local environments in the catchments of the respective sites. In this context, it is of interest to consider results from a recent study at Gusir Höyük. According to Kabukçu *et al.* (2021), the PPNA hunter-gatherers living at this site hunted various birds and mammals, the most numerous being wild sheep and goat. However, and most importantly, despite the dominant riverine environment in the catchment of the settlement, the hunters preferred to exploit dryland habitats: For example, 99.1% of all bird bones from this period belongs to partridges, which prefer open and dry grassland habitats in rocky hills; at the same time aquatic birds a virtually absent. Additionally, sheep/goat are also found in dry habitats away from the river. Therefore, Kabukçu et *al.* (2021) conclude that the exploitation strategies at this site must reflect the distinctive identities and culinary choices of the group rather than the local environment. In other words, human communities at this time were making conscious choices about their diet which were not dictated by the available resources in the site catchment.

4.3.3 The Hunter-Gatherer Crisis (8.900-8.600 calBC)

In the late PPNA there is a change in settlement dispersal in the study area which includes the abandonment of many PPNA settlements in the Tigris region, followed by a similar development in the valley of the Euphrates River in northern Syria; around the same time (first half 9th millennium calBC), there is a significant increase in the number of sites in the Şanlıurfa region. An earlier publication has referred to this phase of apparent upheaval as the late PPNA hunter-gatherer crisis (Clare & Kinzel, 2020). The exact chronology of site abandonment in the eastern subregion (Tigris) still requires further study; however, the available radiocarbon ages from the sites in this region show that the abandonment process was not a sudden event but was very probably a process which took place over the course of some centruies.

By 8.900 calBC, very few sites (Çayönü Tepesi, Boncuklu Tarla, Çemka Höyük and Gusir Höyü) in the eastern subregion remained occupied; even the available radiocarbon data from Çayönü Tepesi might suggest a break in contunuity, though this is not visible in its stratigraphic sequence. The abandonment process in the western subregion was delayed in comparison to the eastern subregion; here, however, there was an explosion of sites around Şanliurfa related to the T-pillar tradition (Göbekli Tepe Culture) seen at sites such as Nevali Çori, Göbekli Tepe, Harbetsuvan Tepesi and Karahantepe (Clare & Kinzel, 2020; 64-65).

As set out in the introduction to this thesis, the available archaeofaunal assemblages from contemporaneous sites have been assessed in order to investigate whether the crisis period is reflected in animal exploitation trends. For example, were there changes in the percentages of the different species? If so, are these changes indicative of climate/environmental change? Alternatively, could the changes reflect coping strategies, which included changes to human diet, associated with climate instability? Remarkably, there is some tentative evidence for an abrupt and short-lived period of climate instability or Rapid Climate Change (RCC) at around 8800 calBC, as suggested by a peak in the GISP2 potassium record, a proxy for strong Siberian High pressure over Eurasia. RCC conditions are characterised by climate instability (e.g. severe winters, aridity and drought, excessive rainfall etc.) comparable to the impacts of the Little Ice Age (AD1400-1900) (Clare 2016: 20-47). In the following, we return to two assemblages from the sites of Jerf el Ahmar and Tell Mureybet which, based on the available radiocarbon data, can be assigned to the hunter-gatherer crisis period (see chapter 3.5).

The three archaeofaunal assemblages from the study region show an observable trend relating to changes in the percentages of hunted species during the crisis period. At Tell Mureybet IIIA and IIIB (Mureybetian) and at Jerf el Ahmar, Level 0/E (late PPNA), there is a clear decrease in the percentages of gazelle with an increase in equid, and there are changes in the ratio of small species, compared to the preceeding settlement phases;

- At Jerf el Ahmar, the percentage of gazelle decrases from 36.3% (pre-crisis; level IIE and IE) to 23.3%; at Tell Mureybet the same species decreases from 52% (pre-crisis; level IB, IIA and IIB) to 32%.
- At the same time, at Jerf el Ahmar, the percentage of equid increases from 34.7% (pre-crisis; level IIE and IE) to 59.4%; at Tell Mureybet the same species increases from 16% (pre-crisis; level IB, IIA and IIB) to 43%.
- At Tell Mureybet, there is a decrease in the percentage of birds; while birds made up 16% of the assemblage before the crisis (level IB, IIA and IIB), this dropped to 4.3% in the crisis period. This resulted in the percentages of small species at this site from 21.87% to 8.1%.
- At Jerf el Ahmar the percentage of small species also decreases in the crisis period, from 7.3% (level IIE and IE) to 1.5%.

At the present time, explanations for the changes in the faunal assemblages in the crisis period can only be suggested. In other words, there are numerous possible explanations which may or may not be related to climate and environmental change; alternative explanations can also be found in the socio/cultural sphere.

Concerning the increase in the percentage of equid, this could indicate more arid conditions in the western subregion. Equids, in this case probably the asiatic wild ass, are dry-land and steppe animals; for this reason, they can survive periods of climate detoriation better than, for example, aurcohs and pig. However, the same observation also applies to gazelle which deacrased during the crisis period. Therefore, climate may not have been responsible for this development. One explanation could be that the gazelle numbers decrased due to over-hunting, perhaps connected to more effective hunting strategies, as reflected in the numerous hunting traps (desert kites) in the western subregion, or it was due to the antrpogenic change in the landscape.

The decrease in the number of small species and the parallel increase in the percentage of equids suggests that the hunters became more speciliased during the crisis. Specialisation and a decrase in small species are, however, not what might be expected during a period of climate stress. In times of drought and related food shortages, people usually exploit a wider range of different resources (animals and plants) (Clare, 2016; 63-65). Another buffering strategy at times of drought includes increased mobility; perhaps the decrease in the number of sites in both the western and eastern subregions is linked to higher levels of mobility due to climate stress. Therefore, there are arguments for and against climate triggered distrubtion during the crisis period.

Finally, we turn to the increase in the number of sites in the western subregion, around Sanliurfa, in the crisis and post-crisis periods. This trend is the opposite of what we see in the eastern (Tigris) subregion and in northern Syria. All the sites around Sanliurfa have in common that they are characterised by the monolithic T-shaped pillars known from excavations at Nevali Cori, Göbekli Tepe, Harbetsuvan Tepesi and Karahan Tepe. Remarkably, at Göbekli Tepe there are so far no finds of domesticated animals, and it has been argued by Clare & Kinzel (2020) that this absence could indicate a more conservative (Epipalaeolithic) exploitation compared to other contemporaneous (EPPNB) sites (e.g. Tell Mureybet, Nevali Cori and Cayönü Tepesi) where domesticated species (cattle, pigs, sheep/goat) are already known (see chapters 4.3.4 and 4.3.5).

In summary, details about the phase referred to by Clare & Kinzel (2020) as the hunter-gatherer crisis are still very limited. Although the GISP 2 potassium record from the Greenland ice might suggest an RCC event at around 8.800 calBC, there are no local paleaoclimate datasets confirm this. The percentages of hunted species suggest that the animal exploitation trends changed at this time, though it is still unclear whether these indicate buffering strategies related to climate deterioration.

Perhaps a better explanation for the crisis comes from the disappearance of hunter-gatherer communities and/or their attempts to preserve their Epipalaeolithic traditions at a time when Neolithic lifeways were emerging and becoming more and more dominant.

4.3.4 Post-Crisis Period / EPPNB

Four assemblages from three different EPPNB sites, one of which is located in northern Syria (Tell Mureybet/IVA), one on the Euphrates in modern day Turkey (Nevali Çori Layer I-II and III) and one from the Tigris basin (Çayönü/Channel Building Phase), testify to a decrease in wide hunting strategies and an increase in hunting specialisation and animal husbandry in the the post-crisis period. When compared with the available faunal data from the preceding PPNA phase, the spectrum of different species has substantially decreased. Only at Tell Mureybet does the faunal assemblage include several different species, characteristic of wide hunting strategies, though even here there is a clear specialisation on hunting on equids, which make up 43.5% of the faunal assemblage. In contrast, at Nevali Çori and Çayönü Tepesi there are fewer documented species and with a specialisation on the hunting of gazelle and pig, respectively. In the context of hunting specialisation, particular note should be made of so-called desert kites or hunting traps which have been found in the catchments of EPPNB T-Pillar settlements in the Şanlıurfa region. Up to present, many of such traps have been identified by B. Çelik (2019), though none of these so far been subject to archaeological excavation and their EPPNB age remains unconfirmed.

The post-crisis period also coincides with an important transition from hunting to animal husbandry, it being marked by earliest evidence for morphologically domesticated animals in the study region, most likely the culmination of many decades, if not centuries, of experimentation with wild progenitor species (Peters et *al.* 2017).

4.3.5 Animal Domestication Processes

Pig Domestication: Notably as already mentioned above, the EPPNB coincides with the appearance of domesticated animals at Neolithic sites. In the case of Nevali Çori, the pig bones from the EPNNB layers are indicative of human control, as suggested by the presence of individual animals that are smaller in size than those found in modern Near Eastern wild boar (Peters et *al.* 2017: 250-251). It is a well-known characteristic of domesticated animals that they are smaller than their wild cousins. Additionally, evidence has been presented that pig husbandry was also practiced at Çayönü in the EPPNB (Hongo et al. 2009; cf. Peters et *al.* 2017: 251). Remarkably pig husbandary spread only very gradually into other parts of Anatolia, for example, it was not introduced to the rest of the Zagros region until the Chalcolithic (Price & Arbuckle, 2013: 251)

Caprine Domestication: At EPPNB Nevali Çori there are also first signs of osteometric (bone size) and dietary changes thought to be associated with management and husbandry of sheep and goat; however, there is no evidence for selective kill-off patterns which would also be an indication of caprine management at this time (Peters et *al.* 2017: 252-254).

Cattle Domestication: Finally, the earliest faunal evidence for domestication of cattle also stands from the study area. For example, at Çayönü Tepesi there is trend towards a higher proportion of females in the EPNNB faunal assemblage which can be interpreted as evidence for a "*a developing relationship between humans and cattle*" (Peters et *al.* 2017: 254). Additionally, Hongo et *al.* (2009) state that relationship of humans and cattle changed gradually across the occupation of the site of Çayönü Tepesi with the appearance of domesticated cattle at approx. 8300-8200 calBC, i.e. in the late EPPNB.

4.3.6 Middle and Late PPNB

The MPPNB and LPPNB phases span a time period of some 1.200 years, between 8.200 and 7.000 calBC. Following the first appearance of early stock keeping in the EPPNB, the MPPNB and LPPNB periods coincide with the full transition to a farming economy. In other words, all the important species are now available in their domesticated forms (pig, sheep/goat, cattle). Certainly, the growing dependency on domesticated animals was also accompanied by the increasing reliance on domesticated plants. Naturally the hunting of wild species continued to play an important part in the subsistence strategies of late PPN communities. Graph 22 in Chapter 3.2.3 shows that these trends are clearly visible in the available data from five different archaeological settlements (Nevali Çori / Level IV, Çayönü Tepesi / Cell, Cobble Paved and Large Room Building phases, Tell Mureybet / IVB, Mezraa-Teleilat MPPNB, Gürcü Tepe / LPPNB). The faunal assemblages, especially those from Nevali Çori, Çayönü Tepesi, Mezraa-Teleilat and Gürcü Tepe show clear dependencies on the domesticated species (pig, sheep/goat and cattle). However, especially at Nevali Çori, gazelle remain an important quarry and component of the meat diet.

4.4 Faunal Data from Göbekli Tepe in Context

Most recently published faunal data from Göbekli Tepe come from the excavated fill of special building D (Pöllath et. al. 2018; Graph 1). As explained in Chapter 1 and at the beginning of chapter 3 recent results from Göbekli Tepe have completely changed the valid cultural-stratigraphic sequence of the site. Whereas previously the fill of the special buildings was assigned to the PPNA, we now know that we are dealing here with a mixed PPNA and PPNB assemblage. For this reason, it is not possible to give an exact picture of the diachronic trends at Göbekli Tepe for the duration of its occupation (PPNA-MPPNB); rather, in the case of the fauna from Building D, we are dealing very much with what could be referred to as a palimpsest of the nearly the entire PPN occupation at the site.

The assemblage from Building D shows a clear dominance of gazelle, which was the main quarry at Göbekli Tepe followed by equid, aurochs and wild boar. The high number of foxes is also quite remarkable; only comparison to this high frequency is to be found at Qermez Dere. Naturally, at Göbekli Tepe that fox have special role in the iconography of the T-Pillars, therefore making this animal a potential candidate for ritual hunting, much like the aurochs which is also present in iconography of Göbekli Tepe and in the frequent finds of bucrania at other sites, e.g. Hallan Çemi (Rosenberg & Redding 2002: 49).

In spite of the issues connected with the archeafaunal data from Bulding D at Göbekli Tepe, the mixed PPNA/PPNB assemblage does not contradict the overall picture presented by the faunal data from the other PPNA and PPNB sites. Specifically, however, the large number of gazelles is a clear indication of specialised hunting, as already observed at other PPNB sites in the study area. Additionally, the presence of wild boar, sheep, deer, hare and a large avifaunal (birds) assemblage points to the practice of Broad-Spectrum hunting strategies, a tradition known since the Epipalaeolithic.

Finally, it must be emphasised that evidence of morphologically domesticated animal species is still lacking at Göbekli Tepe. This absence of domesticated animals (and also plants) in the PPNB phase of the site is quite unusual, especially given the indications for animal management at the contemporaneous sites of Nevali Çori and Çayönü Tepesi. Although the reasons for the absence of domesticated species at Göbekli Tepe are still unclear, it has been put forward that this trend could be related to possible taboos at the site in connection with attempts made to preserve the hunter gatherer way of life in the phase of the emerging Neolithic (Clare&Kinzel 2020).

CHAPTER 5

CONCLUSION

In the conclusions to this thesis, we return once again to the aims specified at the beginning of this study. As we shall see, the questions raised in these aims have not always been sufficiently answered. Nevertheless, there are some important insights relating to human-animal-environment interactions which can be demonstrated by the collected environmental, chronological, settlement and faunal data.

Beginning with Step 1 (see Chapter 1), the aim was stated to provide a clear picture of the climatic conditions between Late Pleistocene to Early Holocene (10.900 and 7.700 CalBC), in other words, a period covering Late Epipaleolithic, PPNA, EPPNB and MPPNB. As could be demonstrated, the entire study area, including the western and eastern subregion, has a distinct absence of paleoclimatice archives. For this reason, many of our insights into the Late Pleistocene (Younger Dryas) and Early Holocene environmental conditions stem from data collected during archaeological excavations, e.g. archaeobotanical and faunal assemblages. Additionally, data and insights from paleoclimatice archives in neighbouring regions, and as far away as the ice cores of Greenland, can help us to better understand the environmental conditions in Upper Mesopotamia in the 11^{th} to 8^{th} millennium calBC.

According to available paleoenvironmental data, the Upper Mesopotamian region experienced considerable climate and environmental change between the Epipalaeolithic and the Late Pre-Pottery Neolithic. In the Younger Dryas (10.900-9.600 CalBC), Upper Mesopotamia was characterised by a drier and colder climate than today; these colder and drier conditions saw the reduction in woodland environments and an increase in steppe vegetation. These conditions appear to have been well-suited to hunter-gatherers who, for the first time, began to build sedentary hamlets and villages: In the western subregion, evidence for these first villagers comes from Biris Mezarlığı, Uluk Mevkii, Kulabtar Kaya Altı Sığınakları, Hamam Mevkii, Sögüt Tarlasi, Abu Hureyra, Tell Qaramel and Tell Mureybet. In the Eastern Subregion, Epipalaeolithic hunter-gatherer groups are known from; Körtik Tepe, Boncuklu Tarla, Çemka Höyük, Qermez Dere, Shanidar Cave and Nemrik`9.

The transition to the Early Holocene at around 9.600 CalBC correlates with an improvement of climate and environmental conditions. The climate became increasingly wetter and warmer compared to the Younger Dryas. Gradually, reforestation occurred, though the grasslands of the steppes remained; these were an important resource for local hunter-gatherer groups who were already practicing pre-domestication cultivation of wild wheats. At his time, there is also a dramatic increase in the number of hunter-gatherer settlements, which are now assigned to the Pre-Pottery Neolithic of a total of 34 sites, 22 are from the western and 12 from the eastern subregion (.

The aim of step two (see chapter 1) was an evaluation of available radiocarbon data to provide a chronological sequence for settlements and settlement phases with archaeofaunal data. This evaluation involved the consideration of several hundred 14C dates (N=653) from 22 Late Pleistocene and Early Holocene sites in Southeast Turkey, Northern Syria and Iraq. Although, this evaluation was successful in that the chronological sequence of sites and the occupation levels could be considered, it was quickly evident that the data was insufficient to provide the study with a high-resolution sequence which would have permitted more detailed insights into diachronic animal-human interaction trends. The biggest problem that was encountered was the frequently high standard deviation of many older 14C measurements that were made prior to the AMS–dating method.

Finally, we turn to step three (see chapter 1) with the aim of comparing faunal data from the two subregions to reveal whether there were shared ‘’culture/values ‘’ which shaped human-animal interactions over the 4.000-year period under study.

Beginning with the Epipalaeolithic (Younger Dryas), archaeological investigations of sites are far fewer compared to (later) Neolithic (PPN) sites. The best information regarding animal exploitation in this period comes from a small number of sites at which there is frequently continuity from the Epipalaeolithic to the Neolithic; these sites include Abu Hureyra and Tell Mureybet (western subregion) and Körtik Tepe and Shanidar Cave (eastern subregion). As we saw in chapters 3 and 4, the Epipalaeolithic hunters practiced some very characteristic strategies for this period which are also known from other regions, e.g. the southern Levant. These hunting strategies are referred to as “Broad Spectrum”. In other words, these hunters were extremely well adapted to the Younger Dryas environment. Their animal exploitation strategies included the hunting of a large number of different species; in this way the Epipalaeolithic groups were using as many different resources as possible and exploiting the environment to maximum effect. Finally, the available faunal data from the Epipalaeolithic show quite clearly that the Epipalaeolithic groups were also very well adjusted very specific environment in the catchment of their individual settlements, as particularly well demonstrated in the different ratios of the medium and large mammals (gazelle, goat, sheep, pig, cattle/aurochs).

Things changed in the Early Holocene when the climate amelioration led to changes in the environment, also including the faunal resources in the region. In both subregions there is evidence that hunters very gradually moved away from the broad-spectrum strategies of the Younger Dryas and began to specialise in the hunting of particular animals; for example, in the western subregion, particularly around modern Şanlıurfa, hunters began to trap gazelle, as suggested by the presence of so-called desert kites. Additionally, from the EPPNB, there is also the growing amount of evidence for animal control, which by the MPPNB, led to the increased appearance of domesticated animal species.

Table 9: Overview of results from this thesis showing the number of sites in the western and eastern subregions, the archaeological periods, their calendric ages and with notes on the prevailing palaeoclimate, environmental conditions and animal exploitation strategies.

Age (calBC)	Period	West subregion	East subregion	Animal Exploitation	Palaeoclimate	Environment
10.900-9.600	Epi-palaeolithic	Number of sites: 8	Number of sites: 6		Younger Dryas Dry and Cool	Decrease in woodland; increased steppe vegetation
		Abu Hureyra		Wide hunting strategies		
		Tell Mureybet		Specialised hunting, Broad spectrum		
9.600-8.700	Pre-Pottery Neolithic A (PPNA)	Number of sites: 7 and 10 possible	Number of sites: 12		Early Holocene Climate Improvement (Warmer and Wetter)	Decrease in steppe vegetation and increase in woodland
		Tell Qaramel		Speciliased hunting		
		Tell Mureybet		Specialised hunting, wide hunting strategies		
		Jerf el Ahmar				
		Göbekli Tepe				
			Körtik Tepe	Wide hunting strategies		
			Qermez Dere	Specialised hunting, wide hunting strategies		
			Gusir Höyük	Specialised hunting (?)		
			Hallan Cemi	Specialised hunting and wide hunting strategies		
			Hasankeyf Höyük	Wide hunting strategies		
			Cayönü Tepesi	Specialised hunting, wide hunting strategies		
8.900-8.600	Hunter Gatherer Crisis	Number of Sites 16 and 2 possible	Number of Sites 4		Peak in GISP 2 potassium might indicate short Rapid Climate Change (RCC) event	?
		Tell Mureybet		Specialised hunting and wide hunting strategies		
		Jerf el Ahmar				
8.700-8.200	Early Pre-Pottery Neolithic B (EPPNB)	Number of sites: 14	Number of sites: 4		Early Holocene Climate Improvement (Warmer and Wetter)	Continued decrease in steppe vegetation and increase in woodland
		Tell Mureybet		Specialised hunting and animal husbandry		
		Göbekli Tepe		Specialised hunting and wide hunting strategies		
		Nevali Cori		Specialised hunting and animal husbandry		
			Boncuklu Tarla	Specialised hunting and animal husbandry (?)		
			Cayönü Tepesi	Specialised hunting and animal husbandry		
8.200-7.500	MPPNB	Number of sites: 3 and 12 possible	Number of sites: 4		Levantine Moist Period	Increase in anthropogenic influence.
		Tell Mureybet		Specialised hunting and animal husbandry		
		Nevali Cori		Specialised hunting and animal husbandry		
		Mezraa-Teleilat		Animal husbandry		
			Boncuklu Tarla	Specialised hunting and animal husbandry		
			Cayönü Tepesi	Specialised hunting and animal husbandry		

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APPENDIX A

Uncalibrated Radiocarbon (14c) Data from Different Archaeological Sites considered in this Thesis

SITE	LAB-NUMBER	14C-AGE	StdD	SOURCE
Abu Hureyra	BM-1121	10792	82	Moore 2000: Moore, A.M.T., Hillman, G.C., Legge, A.J (eds.) (2000) Village on the Euphrates: From Foraging to Farming at Abu Hureyra. Oxford University Press.
Abu Hureyra	OxA-8718	11140	100	
Abu Hureyra	OxA-8719	10610	100	

SITE	LAB-NUMBER	14C-AGE	StdD	SOURCE
Çayönü	GrN-10358	9180	80	Benz 2014: Benz, M. (2014) PPND - the Platform for Neolithic Radiocarbon Dates https://www.exoriente.org/associated_projects/ppnd.php
Çayönü	GrN-13947	9240	90	
Çayönü	GrN-13948	8910	50	
Çayönü	GrN-13949	9205	45	
Çayönü	GrN-14857	9155	35	
Çayönü	GrN-14860	9040	35	
Çayönü	GrN-14861	9090	50	
Çayönü	GrN-16463	8040	60	
Çayönü	GrN-4459	9200	60	
Çayönü	GrN-5954	8055	75	
Çayönü	GrN-6241	9275	95	
Çayönü	GrN-6242	8795	50	
Çayönü	GrN-6244	8980	80	
Çayönü	GrN-8078	8355	50	
Çayönü	GrN-8103	10430	80	
Çayönü	GrN-8820	8865	45	

SITE	LAB-NUMBER	14C-AGE	StdD	SOURCE
Gusir Höyük	KIA-44177	9900	40	Karul, N. (2011) Gusir Höyük. In: Özdogan, M., Basgelen, N, Kuniholm, P. (eds.) (2011) The Neolithic in Turkey, Vol. 1, The Tigris Basin. Istanbul, Archaeology & Art Publications: 1-17-
Gusir Höyük	KIA-44178	9975	50	
Gusir Höyük	KIA-44179	9935	40	
Gusir Höyük	KIA-44180	9590	45	

SITE	LAB-NUMBER	14C-AGE	StdD	SOURCE
Hallan Çemi	Beta-55049	10050	80	Benz 2014: Benz, M. (2014) PPND - the Platform for Neolithic Radiocarbon Dates https://www.exoriente.org/associated_projects/ppnd.php
Hallan Çemi	Beta-55050	9840	50	
Hallan Çemi	Beta-66855	10060	90	
Hallan Çemi	Beta-67463	9890	90	
Hallan Çemi	Beta-67464	10000	80	

Hallan Çemi	OxA-12298	9980	60	Higham, T.F.G., Bronk-Ramsey, C., Brock, F, Baker, D., Ditchfield, P. (2007) Radiocarbon Dates from the Oxford AMS System: Archaeometry Datelist 32. Archaeometry 49, 1, 2007: 1-60.
Hallan Çemi	OxA-12299	10020	45	
Hallan Çemi	OxA-12328	9960	45	
Hallan Çemi	OxA-12329	10085	45	
Hallan Çemi	OxA-12330	9980	45	
Hallan Çemi	OxA-12331	9975	45	
Hallan Çemi	OxA-12332	9935	45	
Hallan Çemi	OxA-12333	10050	45	
Hallan Çemi	OxA-12334	9970	45	
Hallan Çemi	OxA-12335	9995	40	
Hallan Çemi	OxA-12336	10020	40	
Hallan Çemi	OxA-12337	9965	40	
Hallan Çemi	OxA-12338	9970	40	
Hallan Çemi	OxA-12339	9955	40	
Hallan Çemi	OxA-12340	9980	40	
Hallan Çemi	OxA-12341	10045	45	Benz 2014: Benz, M. (2014) PPND - the Platform for Neolithic Radiocarbon Dates https://www.exoriente.org/associated_projects/ppnd.php
Hallan Çemi	OxA-12769	10010	40	
Hallan Çemi	OxA-12878	9535	75	
Hallan Çemi	OxA-12879	9560	100	
SITE	**LAB-NUMBER**	**14C-AGE**	**StdD**	**SOURCE**
Hasankeyf Höyük	MTC-16066	9860	82	Miyake, Y., Maeda, O., Tanno, K., Hongo, H., Gündem, C.Y. (2012) New Excavations at Hasankeyf Höyük: A 10th, millenium calBC site on the Upper Tigris, Southeast Anatolia. Neo-Lithics 2/12: 3-7.
Hasankeyf Höyük	MTC-16067	9827	69	
Hasankeyf Höyük	MTC-16068	9920	83	
Hasankeyf Höyük	MTC-16069	9652	77	
Hasankeyf Höyük	MTC-16070	10006	83	
Hasankeyf Höyük	MTC-16071	9597	66	
Hasankeyf Höyük	MTC-16072	9828	76	
Hasankeyf Höyük	MTC-16073	9674	72	
Hasankeyf Höyük	MTC-16074	9527	71	
Hasankeyf Höyük	MTC-16075	9708	77	
Hasankeyf Höyük	MTC-16076	9778	69	
Hasankeyf Höyük	MTC-16077	9916	82	
Hasankeyf Höyük	MTC-16078	9831	90	
Hasankeyf Höyük	MTC-16079	9784	95	
Hasankeyf Höyük	MTC-16080	9733	68	
SITE	**LAB-NUMBER**	**14C-AGE**	**StdD**	**SOURCE**
Jerf el Ahmar	Ly-10647	9395	55	Benz 2014: Benz, M. (2014) PPND - the Platform for Neolithic Radiocarbon Dates https://www.exoriente.org/associated_projects/ppnd.php
Jerf el Ahmar	Ly-10648	9855	70	
Jerf el Ahmar	Ly-10649	9445	75	
Jerf el Ahmar	Ly-10650	9065	95	
Jerf el Ahmar	Ly-10651	9965	55	

Jerf el Ahmar	Ly-10653	9810	55	
Jerf el Ahmar	Ly-1578	9440	60	
Jerf el Ahmar	Ly-1579	9620	60	
Jerf el Ahmar	Ly-2332	9570	70	
Jerf el Ahmar	Ly-2334	9980	70	
Jerf el Ahmar	Ly-2335	10280	70	
Jerf el Ahmar	Ly-2336	9545	70	
Jerf el Ahmar	Ly-2598	9715	65	
Jerf el Ahmar	Ly-2599	9890	60	
Jerf el Ahmar	Ly-275	9790	80	
Jerf el Ahmar	Ly-2809	9835	55	
Jerf el Ahmar	Ly-7489	9680	90	
SITE	**LAB-NUMBER**	**14C-AGE**	**StdD**	**SOURCE**
Körtik Tepe	Beta-178241	8370	40	Özkaya, V., Coşkun, A. 2007. Körtik Tepe Kazilari: Erken Neolithik Dönemde Bölgesel Kükturel Ilişkiler Üzerine Bazi Gözlemler. In: B. Can and M. Işikli (eds.) Doğudan Yükselen Işik. Arkeologji Yazilari, Atatürk Üniversitesi 50. Kuruluş Yildönümü Arkeoloji Bölümü Armağani (2008) 85-98. Istanbul, Graphis Matbaa.
Körtik Tepe	Beta-178242	9870	40	
Körtik Tepe	ETH-38848	9985	40	Benz, M., A. Coşkun, I. Hajdas, K. Deckers, S. Riehl, K.W. Alt, B. Weninger & V. Özkaya, (2012) Methodological Implications of New Radiocarbon Dates from the Early Holocene Site of Körtik Tepe, Southeast Anatolia, Radiocarbon 54(3–4), 291–304.
Körtik Tepe	ETH-38849	10065	40	
Körtik Tepe	ETH-38850	10035	40	
Körtik Tepe	ETH-38851	10075	40	
Körtik Tepe	ETH-38852	9965	45	
Körtik Tepe	ETH-38853	10015	45	
Körtik Tepe	ETH-38854	10000	40	
Körtik Tepe	ETH-38855	10040	40	
Körtik Tepe	ETH-39509	9960	60	
Körtik Tepe	ETH-39510	9925	45	
Körtik Tepe	ETH-39511	10100	60	
Körtik Tepe	ETH-39512	9955	45	
Körtik Tepe	KIA-44863	9815	45	
SITE	**LAB-NUMBER**	**14C-AGE**	**StdD**	**SOURCE**
Mureybet	GrA-20636 (Lyon-1928)	9300	70	Benz 2014: Benz, M. (2014) PPND - the Platform for Neolithic Radiocarbon Dates https://www.exoriente.org/associated_projects/ppnd.php
Mureybet	Ly-11623	9940	50	
Mureybet	Ly-11625	9435	90	
Mureybet	Ly-11626	9455	45	
Mureybet	Ly-11628	9320	50	
Mureybet	Ly-11630	9505	50	
Mureybet	Ly-11787	9905	60	
SITE	**LAB-NUMBER**	**14C-AGE**	**StdD**	**SOURCE**
Nevalı Çori	Hd-16782-351	9243	55	

Nevalı Çori	Hd-16783-769	9212	76	Benz 2014: Benz, M. (2014) PPND - the Platform for Neolithic Radiocarbon Dates https://www.exoriente.org/associated_projects/ppnd.php
Nevalı Çori	KIA-14756	9265	40	
Nevalı Çori	KIA-14757	9020	40	
Nevalı Çori	KIA-14758	8865	50	
Nevalı Çori	KIA-14760	9100	45	
Nevalı Çori	KIA-14761	8780	45	
Nevalı Çori	KIA-14762	9205	45	
Nevalı Çori	OxA-8234	8930	60	
Nevalı Çori	OxA-8235	9180	60	
Nevalı Çori	OxA-8236	8960	60	
Nevalı Çori	OxA-8247	8610	90	
Nevalı Çori	OxA-8302	9205	55	
Nevalı Çori	OxA-8303	9280	55	
Nevalı Çori	OxA-8382	8990	90	
SITE	**LAB-NUMBER**	**14C-AGE**	**StdD**	**SOURCE**
Qermez Dere	OxA-3752	10145	90	Benz 2014: Benz, M. (2014) PPND - the Platform for Neolithic Radiocarbon Dates https://www.exoriente.org/associated_projects/ppnd.php
Qermez Dere	OxA-3754	9580	95	
Qermez Dere	OxA-3755	9710	85	
Qermez Dere	OxA-3756	10115	95	
Qermez Dere	OxA-3757	9640	85	

APPENDIX B TÜRKCE ÖZET

Kuzey Suriye, Irak ve Türkiye'nin güneydoğusunu kapsayan Yukarı Mezopotamya, Neolitik yaşam tarzının (M. Özdoğan 2008) ilk defa ortaya çıkıp kendini oluşturduğu ve geliştirdiği çekirdek bölgedir. Bu gelişmenin ardından, Neolitik hayat tarzı Anadolu'nun sınır bölgelerine ve ötesine yayıldı (ayrıca bkz. Clare, 2020: 81). Neolitik hayat tarzının yayılması ve gelişimi ilk olarak yukarıda da bahsettiğim bölgeleri kapsayan çekirdek alan olan Yukarı Mezopotamya da başlamış ve birkaç bin yıl boyunca herhangi bir belirgin müdahale olmaksızın bozulmadan kalmıştır (Özdoğan, 2008: 142).

Neolitik hayat tarzının ilk ortaya çıktığı ve çekirdek bölge olarak niteleyebileceğimiz Yukarı Mezopotamya'dan bu gelişme, yavaş yavaş yakınında bulunan bölgelere yayılmıştır. Örneğin, yedinci binyıldan önce Neolitik, Batı Anadolu, Marmara, Ege ve Balkanların çoğunu kapsayan diğer ara bölgeler olarak adlandırabileceğimiz bölgelerde yoktu. Bu bölgelerde, yerleşimler çok yoktur ve Neolitiğin ilk ortaya çıktığı daha doğudaki Çekirdek Bölge ile ilgisi olmayan tipik Mezolitik veya Epi-Paleolitik gelenekleri yansıttığı bilinen yerlerdir. Bununla birlikte, bahsi geçen ara bölgelerde yedinci bin yıldan sonra, Neolitik dönemin tipik özellikleri (örneğin, çanak çömlek, evcil bitkiler ve hayvanlar, vb.), yerel öncüllerine dair herhangi bir belirti / kalıntı olmaksızın tamamen gelişmiş olarak ortaya çıktığı anlaşılmıştır. Bu nedenle, Neolitik hayat tarzının bu bölgelere sonradan tanıtıldığına (Özdoğan, 2008: 140-145) ve sonunda örneğin MÖ beşinci bin yılda Batı Avrupa'ya ulaştığına dair güçlü göstergeler vardır (bkz. Figür 1, Gronenborn 2019).

Bu tezin odak noktası, Mehmet Özdoğan'ın (2008) bahsettiği çekirdek bölgeden ele geçen Geç Pleistosen ve Erken Holosen yerleşimlerinden (yayınlanmış) arkeofaunal kayıtlara dayanmaktadır. Son ve önceki çalışmaların ışığında (Clare, 2020; Kinzel ve Clare 2020; Clare ve Kinzel 2020; Peters et. Al 2019; Clare et. al 2019) Göbekli Tepe arkeolojik alanı özel olarak değerlendirilecektir. Klaus Schmidt'in çalışmaları, yeni saha çalışması ve araştırma sonuçlarına da göz önünde bulundurularak yeniden düşünülüp tartışılacaktır (bkz. Bölüm 2.4). Ek olarak, Göbekli Tepe, bu bölgedeki Neolitik hayat tarzının ortaya çıkışını tartışırken dikkate alınması gereken pekçok yerleşimden biridir ve bu konu, özellikle popüler kültür içerisinde sıklıkla göz ardı edilen bir gerçektir. Bu nedenle, Neolitik Çağ'ın Yukarı Mezopotamya'da ortaya çıkışı, Younger Dryas ve Erken Holosen arasındaki artzamanlı yerleşim modellerinin değişimi de göz önünde bulundurularak tartışılacaktır ve son olarak arkeofaunal kalıntıların bize iklim, çevre ve insan davranışı / kültürü arasındaki etkileşim hakkında neler söyleyebilecek olduğuna değinilecektir? Göbekli Tepe de bu bölgede bulunan pekçok yerleşim gibi, neolitik hayat tarzının ortaya çıkışı konusu içerisinde değerlendirilmesi gereken bir yerleşimdir. Başka bir deyişle, Göbekli Tepe'nin de, tıpkı diğer tarihöncesi yerleşimler gibi, önce kendi içerisinde değerlendrilmesi ve bu süreçten bağımısız gelişen bir alan olarak görülmemesi gerekmektedir (Clare, 2020). Bu tezde, neolitik hayat tarzının Yukarı Mezopotamya da ilk ortaya çıkışı Göbekli Tepe'den yeni elde edilen veriler ışığında, Younger Dryas ve Erken Holosen yerleşim şemalarını da göz önüne alarak değerlendirilecektir bu değerlendirme ve sonuçları sonrasında tekrar titizlikle tartışılacaktır.

Bu çalışma, tarihöncesi toplulukarın değişen yerleşim şemalarının, değişen çevresel koşullarla bağlantılı olup olmadığını anlamak için temel olarak Yukarı Mezopotamya'daki (Fırat ve Dicle havzaları) tarih öncesi topluluklardan elde edilen arkeofaunal verilere odaklanacaktır. Şimdiye kadar, tarihöncesi toplulukların geçim stratejilerini anlamak için ekolojik veriler üzerinde birçok çalışma yapılmıştır, ancak ne yazık ki bu çalışmalar bir yerleşim yeri, bir hayvan türü veya hedeflenen bir soru ile sınırlı kalmıştır.

Kısaca bu tezin cevap aradığı soruları toparlayacak olursak; ilk olarak iklimsel veriler incelenecek ve elde edilen bilgiler ışığında Geç Pleistosen ve Erken Holocene dönemlerin (arkeolojik olarak Geç Epipaleolitik, PPNA, EPPNB ve MPPNB dönemlerini kapsar) iklim koşullarının nasıl olduğu tanımlanıp anlatılacak. İklimin yeniden tasarlanıp anlatılması bizim sadece iklimsel koşulları değil aynı zamanda insanların değişen iklim koşullarına verdikleri tepkileri yani insan – iklim etkileşimini gösterecektir. Hayvanların iklimsel değişimlere verdikleri tepkilerin belirli bir şema oluşturup oluşturmadığıda anlaşılmaya çalışılacaktır. İklime dair veriler toplanılıp tekrar yaratıldıktan sonra bu çalışma yerleşim şemalarının daha iyi anlaşılabilmesi ve bir bağlamda anlaşılabilmesi için 14C örneklerinin / tarihlerinin yeniden değerlendrilmesi ile devam edecektir. Böylelikle tarihöncesi toplumların yerleşimleri terk edip etmediklerine veya bir diğer deyişle sürekli olarak yerleşimi iskan edip etmedikleri anlaşılmaya çalışılacaktır. Bazı yerleşimler için, yerleşimlerin belirli sürelerle iskan edildiği ve bir süre sonra terk edilip başka bir yerleşime geçildiği sonrasında tekrar ilk yerleşime geri dönüldüğü bilinmektedir, materyal kültür öğeleri bu yönde işaret etsede bizim burada ki amacımız tarih öncesi toplumların materyal kültür yanında yeme alışkanlıklarının da buna işaret edip etmediğini anlamaktır.

Ancak tezin üçüncü ve ana konusunu oluşturacak olan doneler, Fırat ve Dicle havzalarından seçilmiş olan yerleşimlerden elde edilen arkeofaunal (hayvan kemikleri) verilerden oluşmaktadır. Bildiğimiz gibi av (dolayısıyla hayvanlar), tarih öncesi topluluklarda hayatta kalmak için önemli bir gerekliliktir. Sürüleri takip etmek, tuzağa düşürmek ve avlamak günlük yaşamlarının önemli bir parçasını oluşturmaktaydı ve bu tarihöncesi toplulukların ne yediği veya yemediği araştırmacılar için her zaman önemli bir araştırma konusu olmuştur. Hayvan kemikleri, iklim, geçim ve hatta ritüel / inanç sistemleri gibi geçmiş çevresel unsurları yeniden canlandırmak için kullanılabilir. İşte bu araştırmada, öncelikle hangi hayvanın zaman içinde hangi yerleşimde yüzde kaç oranında tüketildiğini anlamak için bölge içerisinde bulunan yerleşimlerden ele geçmiş hayvan kemiklerinin yüzdeleri kullanılacaktır. Hayvan kemikleri üzerine yapılan ilk değerlendirmenin ardından, aynı bölgedeki yerleşimler, geçim şekillerindeki farklılıkları veya benzerlikleri görmek için birbirleriyle karşılaştırılacaktır.

Yerleşim özelinde yapılan değerlendirmeyi tamamladıktan sonra bu araştırma, Fırat ve Dicle bölgelerinden gelen faunal (hayvan kemikleri) verilerin karşılaştırılmasıyla devam edecek ve ortak " kültürlerin / değerlerlerin " şekillenmesinde, hayvanların tüketim kalıplarının mı yoksa doğanın kendisinin mi olduğunu ortaya çıkaracak. Son olarak, insanlar ve hayvanlar arasındaki etkileşimlerinin artzamanlı gelişimi ele alınacaktır. Doğal olarak, bu araştırmada, Geç Pleistosen'den MPPNB'ye kadar olan süreçte birçok yerleşimin bir bölgede terk edilirken diğer bir bölgede çoğalmaya başladığını göreceğiz (bkz. Figür 7-11).

Umuyoruz ki, 14C verilerine dayalı zaman çizelgesi içerisinde yeniden yaratılan tarihöncesi doğal koşullar, faunal verilerle birlikte, PPNA'nın sonunda Dicle'deki (Doğu alt bölge) yerleşim yerlerinin kaybolmasını, Urfa bölgesindeki EPPNB'deki yerleşimlerin yoğunlaşması (özellikle Göbekli Tepe'ye benzer T sütunlu yerleşim alanlarının) ve PPNA Avcı-Toplayıcı krizinde (bkz. Figür 9) çevresel unsurların etkilerini daha iyi anlayacağız.

Doğu ve Batı olarak Güneydoğu Anadolu Bölgesini iki doğal coğrafi sınıra ayırabiliriz. Batı bölümü olarak adlandırdığımız bu alt bölge, kuzeyde doğu Toros dağlarının etekleriyle, güneyde ise günümüz Türkiye-Suriye sınırı; batıda Amik-Maraş grabenini (fay hattı) çevreleyen tepelerden, doğuda Karacadağ masifinin lav tabakalarına kadar uzanır. Bu en batıdaki alt bölge, Doğu Akdeniz'den gelen batı (denizsel) hava etkilerinin etkisi altındadır. Kalker platoları ile karakterize edilir. (bkz. Figür 2).

Batı alt bölgesi kendi içerisindede ayrıca batı ve doğu farklı kısımlarına bölünmüştür. Batıda (bkz. Figür 2 711 Erol), platonun eğimi kuzeybatıdan güneydoğuya azalırken, doğuda (bkz. Figür 2; Erol 712) Urfa platoları olarak adlandırılan bir alan bulunmaktadır. baskın coğrafi öğesi, doğuda Karacadağ masifinin lav tabakalarıyla kaplı, neredeyse yatay olarak uzanan bir kireçtaşı tabakasıdır. Platonun düşük düzeyde parçalanması, bölgenin karakteristik özelliklerini daha baskın hale getirir. İklim, yazın sıcak ve kurak ve kışın soğuk, kuru kışlar ile karakterize edilebilir ve bu da oldukça geniş alanları kaplayan step bitki örtüsü ile sonuçlanır. Platoyu bölen alçak eşik alanlarında dağınık kuru orman oluşumları görülmektedir. Batı alt bölgesi, bu tezde ele alınan Kuzey Suriye bölgesini (ve tabiki içerisinde yer alan tarihöncesi yerleşimleri) de içerecek şekilde Türkiye-Suriye sınırının güneyine kadar uzanır. Bu bölge, kuzeydeki karşılaştığımız manzaranın hem fiziksel (coğrafi) hem de iklimsel olarak devamı niteliğindedir. Bu bölgede Fırat, karakteristik kuru bozkırda alanlarında verimli bir alüvyon vadileri yaratmıştır ve bu vadiler tarihöncesi toplumların yerleşimleri için uygun alanları oluşturmuştur. (Akkermans ve Schwartz. 2009 s.6)

Doğu alt bölgesi; kuzeyde doğu Toros dağlarının eteklerinden başlar, güneyde ise günümüz Türkiye - Irak sınırıyla devam eder; batıda Karacadağ masifinin lav tabakalarından doğuda Hakkari Dağlarına kadar uzanır. Coğrafik özellikleri genel olarak platolar ile karakterize edilemiştir diyebiliriz. Alçak kesimlerde step bitki örtüsü bulunurken, bu alanları çevreleyen kısımlar kuru orman oluşumlarına sahiptir. Doğu alt bölgesi ayrıca kuzey ve güney kısımlara ayrılmıştır. Kuzeyde tepelerle çevrili alçak platolarıyla (Yukarı Dicle) (bkz. Figür 2; 721 Erol'dan sonra) ve güneyde Mezozoik ve Eski Tersiyer oluşumlarının oluşturduğu büyük asimetrik antiklinal yapı ile karakterize edilen Mardin Esigi bulunur (bkz. Figür 2; 722 Erol'dan sonra). Doğu alt bölgesi, bu tezde ele alınan Kuzey Irak bölgelerini de içerecek şekilde Türkiye-Irak sınırının güneyine uzanır.

Güneydoğu Anadolu Bölgesinin modern iklimsel ve coğrafi alt bölgelerini anladıktan sonra. Bu çalışma için Younger Dryas ve Erken Holosen'i kapsayan Paleoiklim verilerini anlamak önemlidir. Bununla birlikte, Yukarı Mezopotamya için şimdiye kadar Geç Pleistosen ve Erken Holosen dönemleri için yüksek çözünürlüklü / yüksek kaliteye sahip paleoiklim verileri bulunmamaktadır.

Bugüne kadar elde edilmiş olan, bu tezin kapsamı içerisinde yer alan odak bölgesindeki bu dönemlerden paleoiklim ve paleoçevresel koşullarla ilgili çoğu bilgi, arkeolojik alanlarda yapılan arkeobotanik ve arkeofaunal çalışmalardan gelmektedir. Bunlar, iskan edilen dönemlerde bu yerleşimlerdeki çevresel koşulların yerel anlamda yansıtır. Bununla birlikte, bu veriler bitki ve hayvan türlerinin pozitif seçilimini yansıttıkları için daha genel paleoiklim ve paleoçevresel koşulların herhangi bir yeniden canlandırılması konusunda sorunludurlar. Bu nedenle, bu çalışmada, bize daha büyük ölçekli (küresel, bölge üstü) paleoiklim ve çevresel şartlar hakkında daha fazla bilgi veren paleoiklim verilerini dikkate almak daha yararlı olacaktır.

Bu amaçla, farklı Palaeoiklim kayıtlarına başvurulmalıdır. Bunlar arasında Grönland buz tabakaları (GISP2 Potasyum, GRIP Delta-O18), deniz (LC21) ve göl sediman çekirdekleri (Eski Acıgöl, Zenbar, Van Gölü ve Ölü Deniz) ve speleothems (Soreq Mağarası) bulunmaktadır.

Younger dryas 1.200 yıl sürmüştür. Kara ve deniz çekirdeklerinde kayıt olmuş ani iklim değişikliği olaylarının en güzel örneklerinden biridir. Kuzey yarım kürede 12.900 – 11.600 ka cal BP de meydana gelmiş çok soğuk ve kurak bir iklim değişikliğidir. ‘’Genç" adı ise bu dönem hızlı sıcaklık düşüşü olaylarının son dönemi olduğu için seçilmiştir (bkz. Figür 12). YD'nin insan popülasyonları üzerindeki etkileri muhtemelen aşırı boyuttaydı ve bereketli hilal çevresinde tarımın başlamasına katkıda bulunmuş olabilir (Bar-Yosef, 2002). Sıcaklık düşüşü bitki türlerini çeşitlerini ve kaynaklarına erişimi etkilemiştir, örneğin yabani tahılların veriminde azalma meydana gelmiştir. Yine bu dönem de Batı Anadolu'da bitki örtüsü ormanlık alanlardan steplere dönüşmüştür ve Anadolu'nun doğu kesimi son buzul bozkıları ile kaplanmıştı.

Holosen dönem ise yağışlı bir dönem olarak düşünülebilir. Önceki dönem ile karşılaştırıldığında, bu dönemde yağış seviyesi önemli ölçüde artmakta, bitki örtüsü ve erozyon süreci de değişmektedir. Holosen üç ana aşamaya ayrılabilir: erken Holosen (c.9.5-5.0 ka calBC), orta Holosen (c.5.0-3.0 ka calBC) ve geç Holosen (c. 3.0 ka calBC günümüze kadar). Erken Holosen koşullarının MÖ onuncu binyılın ortalarında başlamasının ardından, yağışlarda güçlü artış olmuştur; bu aşama Levant bölgesinde nemli dönem olarak adlandırılmıştır (c. 8.2-6.6 ka calBC; bkz. Clare 2016 s.24-31). Bu dönemde yağış miktarında ki artış, özellikle ölü denizin su seviyesinde belirgindir (bkz. Figür 12). MÖ 6.6 da Levant bölgesinin Nemli Dönemi sona erdi ve sözde küçük buzul çağı koşulları (8.2 ani ve kısa iklim degişikliği) ile ilişkilendirilen altı yüzyıllık iklim değişikliği başladı (Clare, 2016). 8.2 olayından sonra, (6-5 ka calBC) yağmurlu koşullar geri döndü.

Şu anda, Türkiye Güneydoğu Anadolu, Kuzey Suriye ve Irak'taki 22 Geç Pleistosen ve Erken Holosen yerleşiminden yüzlerce 14C örneği bulunmaktadır. Bu bölgeler aynı zamanda MÖ 10. ve 9. binyıllarda neolitikleşmenin ilk olarak başladığı ve gerçekleştiği çekirdek bölgeyi oluşturur (Yukarı Mezopotamya) (Clare, et al. 2020). Neolitik araştırmalar özellikle son yıllarda oldukça hız kazanmıştır. Dicle Havzası'ndaki Ilısu barajı projesi, Körtik Tepe (Younger Drayas'dan başlayarak PPNA'nın sonuna kadar) (Coşkun vd. 2012), Gusir Höyük (Karul 2011), Hasankeyf Höyük (Miyake vd. 2012), Boncuklu Tarla ve Çemka Höyük (Kodaş 2019) gibi nispeten yeni kazılardan elde edilen ve daha önce başlatılan kazılardan elde edilmiş olan 14C tarihlerinin üzerine eklenmesiyle, örneğin, Çayönü (Erim - Özdoğan 2011), Demirköy (Rosenberg 2011b), Hallan Çemi (Rosenberg 2011a) Kuzey Irak'ta Qermez Dere (Watkins 1995) ve Nemrik 9 (Kozlowski 2002), büyük bir 14C veri koleksiyonu elde edilmiş oldu.

Suriye Fıratının kuzey kesimindeki Tabqa ve Tishrin baraj projeleri de, tıpkı diğer baraj projeleri gibi, Neolitik dönem araştırmalarına katkıda bulunmuştur bu sayede pek çok yeni tarihöncesi yerleşim alanı bulunmuş tarihlenmiş ve literatüre kazandırılmıştır. Bu araştırmada kullanılacak olan 14C verileri, Abu Hureyra, Tell Mureybet (Tabqa Baraj Projesi), Jerf el Ahmar, Dja'de-el-Mughara, Tell 'Abr 3

(Tishrin Baraj Projesi) gibi çeşitli yerleşimlerden alınmıştır. Daha kuzeyde, Fırat boyunca başka Neolitik yerleşim yerleri arasında Akraçay Tepe, Mezraa Teleilat ve 1999'un başlarında Atatürk barajı suları altında kalmış olan Nevali Çori yerleşimi de bulunmaktadır. Şu ana kadar UNESCO Dünya Mirası Listesi'nde yer alan Göbekli Tepe, kısa bir süre önce Tektek Dağları'nda bulunan Harbetsuvan Tepesi, Karahan Tepe ve B. Çelik tarafından yapılan araştırmalardan bilinen diğer birçok T-sütunlu yerleşim alanından sadece üç T-Sütunlu yerleşim alanı kazılmıştır (Çelik 2019). Yenimahalle'den anlayabileceğimiz gibi, Şanlıurfa'nın kalbinde muhtemelen birkaç tane daha T Sütunlu / Neolitik yerleşim yeri olması gerekmektedir (Çelik 2011).
Epipaleolitik, yerleşik hayatın ilk defa tecrübe edilmeye çalışıldığı ve Levant'ta evcilleştirme öncesi ekimin yapıldığı Paleolitik dönemin son aşamasıdır ve bu süreç genellikle Natufian kültürü olarak anılır. Çoğu Natufian yerleşimi, Suriye'nin kuzey kesimlerinden bilinmektedir. Özellikle bu tezin odak noktası olarak belirlenen bölgenin içerisinde yer alan Dicle Havzası'nın doğu kesimlerinde, litik buluntulardan da anlaşılabileceği gibi çok daha güçlü bir Zarzian etkisi vardır. Levant bölgesinde yaklaşık 15.000 - 11.500 B.P arasında epipaleolitik avcı toplayıcıların tarımdan önce yerleşik ya da yarı yerleşik yaşamı tecrübe ettikleri ilk dönemdi. Abu Hureyra'nın Natufian evresinde, tahılların özellikle " çavdar" yetiştirildiğine dair kanıtlar vardır ve bu epipaleolitik avcı-toplayıcı grupların yalnızca avlanmaya değil aynı zamanda ekime de bel bağladığını gösterir. Epipaleolitik mimarisi, küçük ve yarı toprağa gömülü yapılardan oluşur (Grossman, 2013). Bu dönemi Levant ve Yukarı Mezopotamya da (Bereketli Hilal) PPNA (Çanak Çömleksiz Neolitik A) takip eder c. 12.000 - 10.800 B.P. Bu dönem, küçük oval - yuvarlak kerpiç evler, ekin yetiştiriciliği, avcılık ve binaların tabanının altına yerleştirilen gömülerle karakterize edilmiştir (Mithen, 2006). PPNB, c. 10.800 - c. 8.500 BP bu dönem bir önceki dönem olan PPNA'dan farklıdır; insanlar evcilleştirilmiş hayvanlara ve tarıma daha fazla güvenmeye başladı. Bu döneme ait çakmaktaşı alet setleri oldukça farklıdır ve naviform çekirdekler bu dönemin ana unsurlarını oluşturur. Dikdörtgen ve daha bitişik yapılar bu dönemin mimarisini karakterize etmekte ve yapıların duvar ve tabanları kil-kireç sıvası ile kaplanmaya başlanmıştır. (Chazan, 2017).

Elde edilen veriler analiz edildikten sonra bazı ilginç sonuçlara ulaşılmıştır. Sonuç olarak, bu çalışmanın başında bahsedilen amaçlara son bir kez daha bakacak olursak, göreceğimiz gibi, bu çalışmanın amaçlarına ilişkin tüm sorular, yayınların mevcut durumu ve çeşitli nedenlerle yeterince cevaplanmamıştır. Bununla birlikte, mevcut yayınlardan toplanan çevresel, kronolojik, yerleşim ve hayvan kemiklerine ait veriler ile gösterilebilecek insan – hayvan - çevre etkileşimleri hakkında çok ilginç ve daha önceden çok fazla bilinmeyen bazı önemli bilgiler de ortaya çıkarılmıştır.

Birinci adımdan başlayacak olursak (bkz. Bölüm 1), belirlenmiş olan amaç çerçevesinde Geç Pleistosen'den Erken Holosen'e (10.900 ve 7.700 CalBC), özellikle Geç Epipaleolitik, PPNA, EPPNB ve MPPNB'yi kapsayan bir zaman periyodunu kapsan bir sürecin iklim koşullarının daha iyi bir şekilde canlandırmaktı. Gördüğümüz üzere gibi, batı ve doğu alt bölgelerini kapsayan bu tezin odak bölgesi, tatmin edici paleoiklim arşivlerine sahip değildir. Bu nedenle, Geç Pleistosen (Younger Dryas) ve Erken Holosen çevre koşullarına ilişkin bilgilerimizin çoğu, arkeolojik kazılar sırasında toplanan verilerden gelmektedir özellikle arkeobotanik (bitki kalıntıları) ve faunal (hayvan kemikleri) buluntu grupları. Ek olarak, yakın bölgelerden veya Grönland'ın buz çekirdekleri gibi uzak mesafelerden gelen paleoiklim arşivlerinden veriler ve bilgiler, M.Ö. 11. - 8. binyılda Yukarı Mezopotamya'daki çevre koşullarını daha iyi anlamak için çok yardımcı olmuşlardır.

Mevcut paleoçevresel verilere göre, Yukarı Mezopotamya bölgesi, Epipaleolitik'ten Geç Çanak Çömlek Öncesi Neolitik'e kadar büyük bir iklim ve çevresel değişim geçirdi ve bunun yansımları canlı ve cansız çevre üzerinde görülmektedir. Younger Dryas'ta (M.Ö.10.900-9.600) Yukarı Mezopotamya, bugün olduğundan daha kuru ve daha soğuk bir iklime sahipti. Bu soğuk ve daha kuru hava, ormanlık alanlarda azalmaya ve bozkırlarda daha fazla artışa neden oldu. Görünüşe göre bu koşullar, "ilk kez" yerleşik köyler inşa etmeye başlayan avcı-toplayıcılar için çok uygun görünüyordu: Batı alt bölgesinde, bu ilk köylerin ve köylülerin kanıtı Söğüt Tarlası, Biris Mezarlığı, Uluk Mevkii, Kulabtar Kaya Altı Siginakları ve Hamam Mevkii'den gelmektedir. Doğu alt bölgesinde bulunan epipaleolitik avcı-toplayıcı gruplar; şu şekilde sıralanabilir Abu Hureyra, Tell Qaramel ve Tell Mureybet (Kuzey Suriye), Körtik Tepe, Boncuklu Tarla, Cemka Höyük, Qermez Dere, Shanidar Mağarası ve Nemrik`9 (Dicle Havzası).

Erken Holosen'e geçiş yaklaşık 9.600 calBC de gerçekleşmiştir ve verimli / daha iyi bir iklim ve çevre koşulları ile karakterize edilir. Genç Dryas'ın aksine iklim daha nemli ve daha sıcak olmaya başlamıştır. Aşamalı olarak yeniden ormanlar ortaya çıkmıştır aynı zamanda step bitki örtüsü varlığını devam etttirmiştir çünkü bu alanlar, avcı-toplayıcı grupların yabani buğdayların evcilleştirme öncesi ekimini pratik etmeye devam etmeleri için önemli bir kaynaktı. Bu süre zarfında, toplam 39 tarihöncesi yerleşimi içeren avcı toplayıcı (PPN) yerleşim yerlerinin sayısında çarpıcı bir artış meydana gelmiştir. Bunların 27'si batıdan ve 12'si doğu alt bölgesindendir (bkz. Tablo 2).

İkinci adımın amacı (bkz. Bölüm 1) şu şekilde açıklanabilir, arkeolojik verilerle yerleşim ve yerleşim safhalarının mevcut radyokarbon verilerin kullanılmasıyla kronolojik bir çizgiye yerleştirmek adına yapılan bir analizdi. Bu değerlendirme Güneydoğu Türkiye, Kuzey Suriye ve Irak'taki Geç Pleistosen ve Erken Holosen yerleşim alanlarından birkaç yüz 14C tarihinin yeniden değerlendirilmesini içeriyordu. Bu veriler, yerleşimin genel seviyelenmesini ve yerleşim dönemlerini anlandırmaya yetsede insan – hayvan arasında ki etkileşimin artzamanlı değişimini ve dönüşümünü gösterecek yüksek çözünürlüklü veriler maalesef halen daha değildir. Karşılaşılan en büyük sorun, AMS tarihlendirme yönteminden önce analiz edilen birçok eski 14C ölçümünün çoğunlukla yüksek standart sapmasıydı.

Son olarak, bu çalışma içerisinde baktığımız 4.000 yıllık dönem boyunca insan-hayvan etkileşimlerini şekillendiren paylaşılan `` kültür / değerler '' olup olmadığını ortaya çıkarmak için iki alt bölgeden gelen fauna verilerini karşılaştırmak amacıyla üçüncü adıma (bkz. Bölüm 1) dönüyoruz. Epipaleolitik (Younger Dryas) ile başlayarak, tarihöncesi toplumların iskan ettiği yerleşim alanlarının arkeolojik araştırmalarının sayısı (geç dönemlere göre) Neolitik (PPN) yerleşim yerlerine kıyasla daha azdır. Bu dönemde hayvanların kullanımı ile ilgili en iyi bilgiler az sayıda yerleşimden gelmektedir. Bu yerleşim alanları genellikle Epipaleolitik'ten Neolitik'e süreklilik eğilimi gösterirler ve bu yerleşimler şu şekildedir Abu Hureyra ve Tell Mureybet (batı alt bölgesi) ve Körtik Tepe ve Shanidar Mağarası'dır (doğu alt bölgesi). Bölüm 3 ve 4'te gördüğümüz gibi, Epipaleolitik avcı-toplayıcılar, bu dönem için diğer bölgelerden de bilinen bazı çok karakteristik stratejiler uyguladılar, örn. Güney Levant. Bu avlanma stratejileri "Geniş Spektrum" olarak adlandırılır. Diğer bir deyişle, bu dönemin avcıları Younger Dryas'ın çevre koşullarına çok iyi adapte olmuşlardır. Hayvanlardan yararlanma stratejileri, çok sayıda farklı türün avlanmasından ibarettir, bu şekilde Epipaleolitik gruplar mümkün olduğu kadar çok farklı kaynağı kullanıyor ve çevreden faydalanabildikleri kadar faydalanıyorlardı. Son olarak, Epipaleolitik dönemden elde edilen faunal veriler, Epipaleolitik avcı-toplayıcı grupların yerleşimlerinin etrafındaki her ortama çok iyi alıştıklarını açıkça göstermektedir. Bu durum özellikle orta ve büyük memelilerin (ceylan, keçi, koyun, domuz, sığır / yaban öküzü) farklı yüzdelerinde açıkça görülmüştür.

Erken Holosen'de iklim şartları daha iyi hale geldiğinde işler değişmeye başladı ve bölgedeki hayvan kaynakları da dahil olmak üzere çevrede değişikliklere yol açtı. Her iki alt bölgede de avcıların Younger Dryas'ın geniş spektrumlu stratejilerinden yavaş yavaş vazgeçtiklerine ve geniş spektrum stratejisini bırakmaya başladıklarına ve sonra belirli hayvanları avlamakta uzmanlaşmaya başladıklarına dair kanıtlar vardır; örneğin, batı alt bölgesinde, özellikle Urfa civarında, avcılar sözde çöl tuzaklarının varlığından da anlaşılacağı gibi ceylan avı için tuzak kullanmaya başladılar. Ek olarak, EPPNB'den hayvan kontrolü için birçok kanıt vardır ve bu, MPPNB döneminde ise evcilleştirilmiş hayvan türlerinin sayısının artmasına neden olmuştur.

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