ANIMAL BASED ECONOMY IN TROIA AND THE TROAS DURING THE MARITIME TROY CULTURE (C. 3000-2200 BC.)

AND

A GENERAL SUMMARY FOR WEST ANATOLIA

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EIDESSTATTLICHE VERSICHERUNG

Hiermit versichere ich, dass die vorliegende Arbeit mit dem Titel „ Animal Based Economy in Troia and the Troas during The Maritime Troy Culture (c. 3000-2200 BC.) and a General Summary for West Anatolia " selbstständig und ohne Benutzung anderer als der von mir angegebenen Hilfsmittel verfasst habe. Alle Stellen, die wortgetreu oder sinngemäß aus anderen Veröffentlichungen entnommen sind, wurden als solche kenntlich gemacht. Diese Arbeit hat noch keine anderen Stellen zum Zwecke der Erlangung eines Doktor-Grades vorgelegt.

Tübingen, 2010

(Can Yümni Gündem)

This dissertation is dedicated
to my beloved aunt Handan Sezen (†),
to my dear pal Horst Trossbach (†)
and
to my wonderful family
Fatma Bengü, Suavi, Ali, Meltem and Almira Ece

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Summary

This study deals with animal bone remains (only mammals) from Troy I to III, the so-called the Maritime Troy Culture (c. 3000 – 2000 BC, mainly the Early Bronze Age - EBA). The animal bone remains from the excavations reflect basically the red meat consumption of the ancient societies. The data of Troy were compared first of all within the settlement phases to observe the development of the livestock management. Another comparison of the livestock management with Troy's neighbouring settlements and archaeological sites in West Anatolia should show the similarities or differences within a culture and between the cultures.

The classical methods of archaeozoology were applied to achieve the best results. The animal bone remains were identified according to the respective zoological species and were counted to estimate the proportions of the different domestic animals in the livestock. Bone remains were weighed in order to calculate their contribution to the meat consumption of the inhabitants. The measurable animal bone remains of all kinds were measured to observe the possible chronological developments. Then these results were used to draw conclusions of the domestic animals´ history. Bone remains of all species were classified according to their age distribution in order to determine the killing pattern of domestic animals, which reveals the economical role and the exploitation of the domestic animals.

The first two phases of Troy are very similar in the livestock management. However Troy III shows differences: Pigs were now the main meat suppliers instead of cattle. The reason could be related to the stress periods of the town. An increase of pig-breeding allowed the inhabitants to have an easier access to fresh meat. Sheep were the most kept domestic animals. The role of the sheep-breeding changed economically at the beginning of Troy II by the latest. An early race of Wool-sheep was introduced into the livestock. The archaeological findings are supporting this theory clearly. Hunting played no big role at the beginning of the settlement. This changed quite clearly with Troy II and further in Troy III. The animal bone remains are proving that more and more fallow deer were hunted and brought into the settlement. It is possible that they were used as sacrificial animal. This cult was practiced more clearly in the later phases of the town (TR VI & TR VIII).

The livestock management of all the settlements in the Troad draw an analogous picture. But the earlier settlement phases in Kumtepe (A and B)(earlier as Troy) prove that the pig-breeding has changed in the course of time: during the Early Copper Age period the farmers have kept less pig and with the EBA the proportion of pigs rises clearly in the livestock. This

phenomenon could also be observed in Ulucak – Izmir. The reason might be the phenomenon of "Transhumance" groups. Both settlements were left after the Early Copper Age period and they were not used for awhile. The new settlers, at the Late Copper Age or the EBA, were possibly more sedentary, i.e. the pig-breeding was easier to practice.

The livestock management in West Anatolia revealed again a homogeneous picture, particularly in the EBA. Sheep made up the biggest portion of the livestock, except in Karataş-Semayük. However, cattle were the most important meat suppliers. The size of the domestic animals did not become any smaller after their domestication. The biggest differences were found in the wild fauna remains. The existence of wild Equids on the high plateau settlements and their absence on the cost settlements could be explained by the geographic, climatic and ecological differences.

The Maritime Troy Culture was followed by the Anatolian Troy Culture. The archaeological and the archaeozoological findings show that Troy III was not a comfortable period. There was a time of dry-climate in West Asian and the settlements there became smaller or were completely abandoned. It is to be expected that the emigrant people searched for new homes. This westward chain-reaction was possibly the reason of the demise of this era in Troy.

Zusammenfassung

Diese Arbeit beschäftigt sich mit Tierknochenresten (nur Säugertiere) aus Troia I bis III, der so genannten Maritimen Kultur (c. 3000 – 2000 BC, also hauptsächlich Frühbronzezeit - FBZ). Die Tierknochenreste aus den Ausgrabungen spiegeln hauptsachlich den Rotfleischkonsum der ehemaligen Gesellschaft wider. Die Daten von Troia wurden erst innerhalb der Siedlungsphasen verglichen, um die Entwicklung der Viehwirtschaft zu beobachten. Ein weiterer Vergleich der Viehwirtschaft mit Nachbarsiedlungen Troias und Fundstellen im Westen Anatoliens sollte die Ähnlichkeiten oder Unterschiede innerhalb einer Kultur und zwischen den Kulturen aufzeigen.

Die klassischen Methoden der Archäozoologie wurden angewandt um die besten Resultate zu erzielen. Die Knochenfunde wurden nach Arten geordnet und gezählt, um die Anteile der verschiedenen Haustiere am Tierbestand zu schätzen. Das jeweilige Gewicht der Knochenfunde aller bestimmten Arten ließ dann Schätzungen über ihren Beitrag zur Fleischnahrung der Einwohner zu. Die messbaren Knochenfunde aller bestimmten Arten wurden osteometrisch untersucht, um eventuelle zeitliche Entwicklungen zu ermitteln. Diese Ergebnisse wurden dann dazu benutzt, haustierkundliche Schlüsse zu ziehen. Die Bestimmung des Schlachtalters der Nutztiere erfolgte von jedem einzelnen möglichen Knochen. Daraus ergaben sich Einblicke auf die Wirtschaftsform und die Nutzungsweise der Haustiere.

Die ersten zwei Phasen von Troia sind sich in der Viehwirtschaft sehr ähnlich. Troia III zeigt dann Unterschiede: Anstelle von Rindern waren jetzt Schweine die hauptsächlichen Fleischlieferanten. Der Grund könnten die Stresszeiten, unter denen die Stadt glitten hatte, sein. Ein Anstieg der Schweinezucht ermöglichte den Leuten einen leichteren Zugang zu frischem Fleisch. Die am Meisten gehaltenen Haustiere waren Schafe. Die Rolle des Schafes änderte sich wirtschaftlich spätestens während des Anfangs von Troia II. Eine frühe Rasse des Wollschafes wurde in die Herden eingebracht. Die archäologischen Funde unterstützen diese Theorie ganz eindeutig. Die Jagd spielte keine große Rolle am Anfangspunkt der Siedlungszeit. Dies ändert sich ganz deutlich mit Troia II und weiter in Troia III. Die Funde belegen, dass mehr und mehr Damhirsche gejagt und dann in die Siedlung mitgebracht wurden. Es ist gut möglich, dass sie schon als Opfertier Verwendung fanden. Dieser Kult wurde in den späteren Phasen der Stadt (TR VI & TR VIII) klarer ausgeübt.

Die gesamten Siedlungen in Troas zeigten insgesamt ein ähnliches Bild. Aber die frühere Siedlungsphasen in Kumtepe (A und B)(jünger als Troia) beweisen, dass sich die Schweinezucht im Laufe der Zeit verändert hat: während der frühen Kupferzeit haben die Bauern weniger Schweine gehalten und mit der FBZ steigt der Anteil des Tieres im Viehbestand in Prozenten deutlich an. Dieses Phänomen wurde auch in Ulucak – Izmir beobachtet. Der Grund könnte mit der „Transhumanz“ – Gruppen erklärt werden. Die beiden Siedlungen wurden nach der frühen Kupferzeit verlassen und wurden eine weile nicht verwendet. Die neuen Siedler, mit Ende der Kupferzeit oder der FBZ, waren möglicherweise sesshafter, d.h. die Schweinezucht war einfacher auszuüben.

Die Viehwirtschaft im Westen Anatoliens zeigte wiederum ein homogenes Bild, besonders in der FBZ. Schafe machten den größten Anteil des Viehbestands aus, außer in Karataş-Semayük. Rinder hingegen waren die wichtigsten Fleischlieferanten. Die Größen der Haustiere wurden nach ihrer Domestikation nicht mehr kleiner: Die größten Unterschiede fanden sich in den Wildfaunaresten. Die Existenz der Wildequiden auf der Hochebene und ihr Fehlen am Meer könnte durch die geographischen, klimatischen und ökologischen Differenzen erklärt werden.

Die „Maritime Troia Kultur“ wurde durch der „Anatolian Troia Kultur“ ersetzt. Die archäologischen und die archäozoologischen Funde zeigen, dass Troia III keine bequeme Zeit gewesen ist, denn es gab eine Zeitlang eine Dürreperiode in Westasien. Die Städte in Westasien wurden kleiner oder ganz verlassen. Es ist zu erwarten, dass die Heimatlosen sich eine neue Heimat suchten und diese Kettenreaktion Richtung Westen war möglicherweise der Grund des Untergangs der Ära in Troia.

1. Introduction

Troy is probably one of the most well known ancient cities of the world. Many books were written and movies made about the love between Helena and Paris as well as the destruction of a famous and rich city after many years of war. However, none of these works are still as famous as the Iliad by Homer, the father of the epic poem.

The excavations of H. Schliemann during the 2nd half of the 19th century and the discovery of spectacular finds brought "Hisarlik Tepe" under the spotlight. Discoveries of treasure, architectural remains and the location of the settlement led people to assume that the location of Troy was finally revealed.

After Schliemann's excavations, Dörpfeld, Blegen and Korfmann worked at the same location to bring the hidden pieces of history to light. Today excavations at the site are directed by Ernst Pernicka. The results of the excavations indicate that the settlement was established just before the 3rd millennium BC. However, since few remains have been found from that period, little can be said except that the mound was partly inhabited at that time.

Past and present research indicates that the mound was definitely inhabited from the 3rd millennium BC to the 13th-14th centuries AD., with some interruptions. Similar archaeological finds, mainly ceramic and architectural remains, from different periods have been grouped together, and these groups reveal that in Troy different cultures were dominant at different times during this long period of occupation, such as the "Maritime Troy Culture" (Troy I - III)- or the "Anatolian Troy Culture" (Troy IV-V) and others.

The primary aim of archaeology is to study the cultural remains people have left behind them, to find out how ancient people lived, what was their everyday life like and to observe all kind of developments throughout time, as well as to understand the relationships between people and the environment. Studies of organic and non-organic remains from the excavations help us to reconstruct life in the distant past.

Principally the foundation remains of a building reveal that the people were living in houses. If these remains are studied further and connected with other results, then we may be able to interpret these foundations as part of a complex society in a settlement. It might be that the house belonged to a chief or a hunter. The location, small finds, organic remains, dimensions, and the like, from the house could lead us to this conclusion.

HANS-PETER UERPMANN and his archaeozoological team from the University of Tübingen have been working since 1988 on the faunal remains of Troy in order to understand not only the dietary habits of ancient society but also to reconstruct the environment of the site. Faunal remains from the excavations are frequent parts of the human garbage left behind, and thus, part of human culture.

This thesis deals with so-called "kitchen waste", more specifically, with the mammal remains from the Maritime Troy Culture. Animals were slaughtered or hunted so that people could maintain red meat in their diet. The non-organic finds from Troy indicate that these people were living in houses and using pots. The question is which animals were kept for dietary purposes and what roles did these animals play in the economic system?

1.1. Research Aims

The animal remains from Troy indicate that the existence of this ancient society was based on its knowledge on stockbreeding, on agriculture and the exploitation of the environment.

Many different kinds of nutritional resources are undoubtedly very important; indeed it is difficult to compare the importance, rank, degree, and level of these nutritional resources with each other for an ancient population. Only the mammal remains from the Early Bronze Age (EBA) were examined for this thesis to avoid complications involved in comparing too many food resources at one time with one another. The mammal remains alone cannot deliver exact results or the final picture on the animal-based subsistence economy[2] (stockbreeding) and hunting habits of the ancient Troyans.

Animal bones make up one of the largest groups of excavated material in the find inventory. If these animal remains were identified as human leftovers/kitchen waste, then their

[2] It is quite impossible to uncover the complete original bone refuse of an ancient settlement in an excavation for many different reasons, such as erosion, carnivore damage or damage which occurs during collecting or washing at the time of excavation. These factors made it impossible for us to account for all the bone remains. Therefore we cannot speak about 100% of the original livestock. The concept "livestock" is used in this study according to the examined bone material, thus reflecting the animal population as represented by the identified mammal remains. The appropriate term here would be "possible/probable livestock" since we cannot accurately estimate the numbers of different domestic animals in the herds of Troy five thousand years ago.

identification would help us understand the animal-based subsistence economy of these ancient societies. This study is based on the excavated animal bone remains from Troy during the 3rd Millennium BC.

The identification of these animal bones as kitchen waste would only show that these animals were killed and eaten by human beings. Therefore, more studies are needed on the animal bone remains in order to widen our perspective about the relation between human beings and animals.

Since Troy is a settlement, it is quite easy to distinguish the animal remains as kitchen waste. Small numbers of bone remains could have been brought to the settlement through other factors, such as dogs. Even though most of the animal remains in Troy are the result of human activity, they are not all useful in furthering our analysis due to their excavated locus or other such factors. The animal bone material should originate from clean and *in situ* deposits in order for them to be analyzed. Only such excavated animal bone material can help determine the animal-based subsistence economy of an ancient settlement.

The numbers of properly uncovered animal bone material from an excavation are important for us if we are to achieve meaningful statistical results. High numbers of examined material would help produce better results. Also, the faunal remains should be collected from the trenches as carefully and completely as possible. Animal bone material originating from only some trenches in an entire excavation area would not provide accurate results on the subsistence economy of ancient people; nevertheless, it is often quite impossible to excavate the whole archaeological area. Also the slaughtering or the garbage area might have been located outside of the settlement[3]. Therefore it is very important to collect the bone material from different parts of the settlement to avoid the misunderstandings that can be caused by focusing only on a certain locale in the overall excavated area.

An important step in identifying bone material would be to prepare a species list. Single bone remains should be compared with recent skeletal collections to create further classifications, in this case under the mammal remains, such as cattle, sheep, or fallow deer, and others. Even

[3] It might have been that some parts of the skeleton, especially the larger bones, were not brought to the settlement after the animals were slaughtered outside of the settlement. Or slaughtering was done in the settlement but the bones were dumped outside of the settlement.

the unidentified bone fragments could be grouped along their original sizes and used during analysis.

The contribution of each species to meat consumption can be determined by weighing the bone remains. The skeleton makes up between six to nine percent of the body weight (on average 7%). A sheep femur does not represent the same amount of meat as a cattle femur although they are both counted as one bone specimen. However, their respective weight is proportional to the represented meat. Thus, the weighing procedure is very important for estimating the meat contribution of each animal.

Taking measurements from the suitable bone remains will demonstrate the size and size changes of the wild and domestic animals over time, and for the latter also the aims of breeding, as well as the influence of the environment on animal stature[4].

Domestic animals were already accompanying human beings for several thousand years before Troy was established. The first settlers of Troy, together with their domestic animals, established their new settlement approximately at the beginning of the 3rd millennium BC. How the stockbreeding system first began in the newly established Troy, and its further development in the coming thousand years, is still little understood.

Since the beginning of domestication, animals were exploited for different reasons, such as for their flesh, for hides, labor, milk, and other reasons. The aim of this research is to determine these management motives for domesticating animals by way of studying the bone remains from the Maritime Troy Cultural period.

The first three settlement phases of Troy (Troy I – III) were grouped together by M. KORFMANN and called the "Maritime Troy Culture"[5] (2001:347). This culture lasted approximately 800 years. The Author studied the statistical results of the animal bone remains from this first settlement period in order to observe the development of the stockbreeding system. Distribution of the bone remains over the species was calculated to see potential numerical changes within the livestock per settlement phases.

[4] Further information on the analysis of the bone remains and on specifications to be obtained from archaeological bone material, such as age, sex, and the like, can be found in the Methods Chapter below.
[5] The Early Bronze Age period in Troy is called the "Maritime Troy Culture" and examined in detail in Chapter 2.1, Maritime Troy Culture.

Other types of analyses on the bone remains (i.e., weighing, kill-off pattern, gender) are performed in order to understand the lifetime products and slaughtering objectives of each domestic animal species by determining if the animals were kept mainly for meat, labour, wool, milk, and the like. Each stockbreeding system of a settlement period is compared within the period and with each other to determine the changes in subsistence economy of the ancient society over time.

There is no doubt that the domestic animals were kept at the beginning of domestication mainly for red meat as well as for hides. The people of ancient Troy were thus still dependent up to a certain point on their animals for gaining food during the Maritime Troy Culture, aside from the food produced through agriculture. Another aim of this study was to determine which domestic animals and how many were kept specifically for meat.

The excavated animal bone remains of mammals and birds reflect the red meat consumption of the people. The animal bone remains also help us understand the stockbreeding system (see above). However, the wild mammal remains in the assemblage indicate as well that the Troyans covered part of their red meat demand through hunting.

Wild mammal remains represent indirectly the contribution of game animal meat to the diet of ancient people[6] and at the same time the dependence of Troyans on their natural environment. Indeed all kinds of identified wild mammal remains become useful in reconstructing the environment of Troy, as they provide clues to the climate and the natural surroundings during the different periods of the settlement. The environment, climate and vegetation results help us to understand more fully the animal breeding system and therefore the daily life of Troyans as well.

Another aim of the research described below is to determine whether the archaeological division of the cultural periods is also valid for the animal breeding system or for the changes in the hunting habits of the Troyans, since the first three periods were originally divided according to the non-organic archaeological finds.

There were changes occurring to the producers of the Maritime Troy Culture probably due to the introduction or development of new materials, technologies, or styles. There might have

[6] It could be possible that some of the wild mammals were hunted for their fur or as trophy, and their meat was never used.

been many different reasons why these changes occurred in a population, such as trade with other groups, intensive immigration to the settlement, war, as well as political changes taking place in the settlement or in the region, new beliefs or changes in beliefs, environmental changes, smaller changes, pacts, natural disasters, and more.

These kinds of occurrences could have had an influence on the habits of the people in a short or long-term period or through the course of a lifetime, such as changes in architectural elements, changes in ceramic style and forms, changes in weapons, in the settlement patterns, and more. Zooarchaeological results from different periods could indicate to what degree the stockbreeding was influenced through these other facts occurring during these different settlement periods.

UERPMANN draws attention to the osteo-metric studies while stating *"... However, the factors affecting the size and development of animals should be brought to the attention… The main factors involved are the hereditary constitution of animals and their nutrition. With domesticated animals, these factors are virtually under human control. The stages of development recognized on domesticated animal bones are therefore indications of human will and are therefore cultural characteristics* (1973:317)." UERPMANN comments as well that "*…The main influences on the development of domesticated animals are therefore always cultural and economic…*" (1973:318). There is no doubt that the stockbreeding system was always flexible and changeable based simply on human will.

Did a conflict or a war cause changes in the stockbreeding system or did a new religion force people to change their meat consumption in Troy? Do the archaeological evidence (non-organic) and the zoo-archaeological results from the Maritime Troy Culture reveal a parallel development, e.g. the arrival of new elements bringing about new dietary habits? In other words, would a new group of people introduced into the culture produce new dietary habits?

Zoo-archaeological results alone cannot represent the entire picture of a people's daily life without the archaeological evidence from a site being considered as well, or vice versa. "Culture" is not based on only one element in human society. Earlier periods and cultures can better be understood if many different types of evidence from a site are studied and combined in the analysis.

The early people of Troy were not the first farmers to introduce stockbreeding into the region. The faunal remains from the earlier established settlements in the area have revealed that the farmers were already practicing animal breeding in the Troas at least since the 5th millennium BC. The author compared the results from Troy with the mammal remains studied from earlier and contemporary settlements in the Troas. This was carried out in order to observe the development of animal breeding and hunting habits in a specific region, which, in this case, could be called the development of the animal-based subsistence economy among the local settlements in the Troas.

Indeed there were many small and varying cultural regions in West-Anatolia, especially during the Early Bronze Age. The clear similarities of the archaeological finds from different settlements in West-Anatolia indicate that these different cultural groups had contact with each other. Trade could be the clue to a certain level of "communication" that these different groups shared. The groups were exchanging goods and were probably influencing each other in terms of ceramics, architecture and art, or even religious beliefs.

Comparing earlier or contemporary settlements from different cultural and regions of West-Anatolia presents us with the possibility of viewing a greater picture of life at that time through a much broader perspective. Another aim of this researchis is to determine whether these ancient groups from different cultural and regions maintained similarities or differences in their stockbreeding systems. Another question would address the geographical differences and their influence on the animal breeding system or in the game animal spectrum. It may prove possible to argue for an exchange having had occurred between different cultures in West-Anatolia with regard to knowledge on animal breeding systems in the Early Bronze Age.

The absence of writing in West-Anatolia during the 3rd millennium BC has made it impossible for us to appreciate more directly the animal-based subsistence economy of the Troyans and other West-Anatolian groups. Archeozoological remains and other archaeological finds have been combined for this thesis in order to determine the animal-based subsistence economy in Troy during the Maritime Culture. The results obtained from the mammal remains will bring us one step further in understanding the daily life of the Troyans.

2. The Maritime Troy Culture and the Early Bronze Age in Anatolia

2.1. The Maritime Troy Culture

The coastline of the North Aegean and the costal regions of the Marmara Sea were determined as the area of distribution of the "Maritime Troy Culture", which encompasses the first three settlement phases of Troy from c. 2920 to 2200 BC (KORFMANN 2006:4). In more general terms this is the period of the Early Bronze Age (EBA)

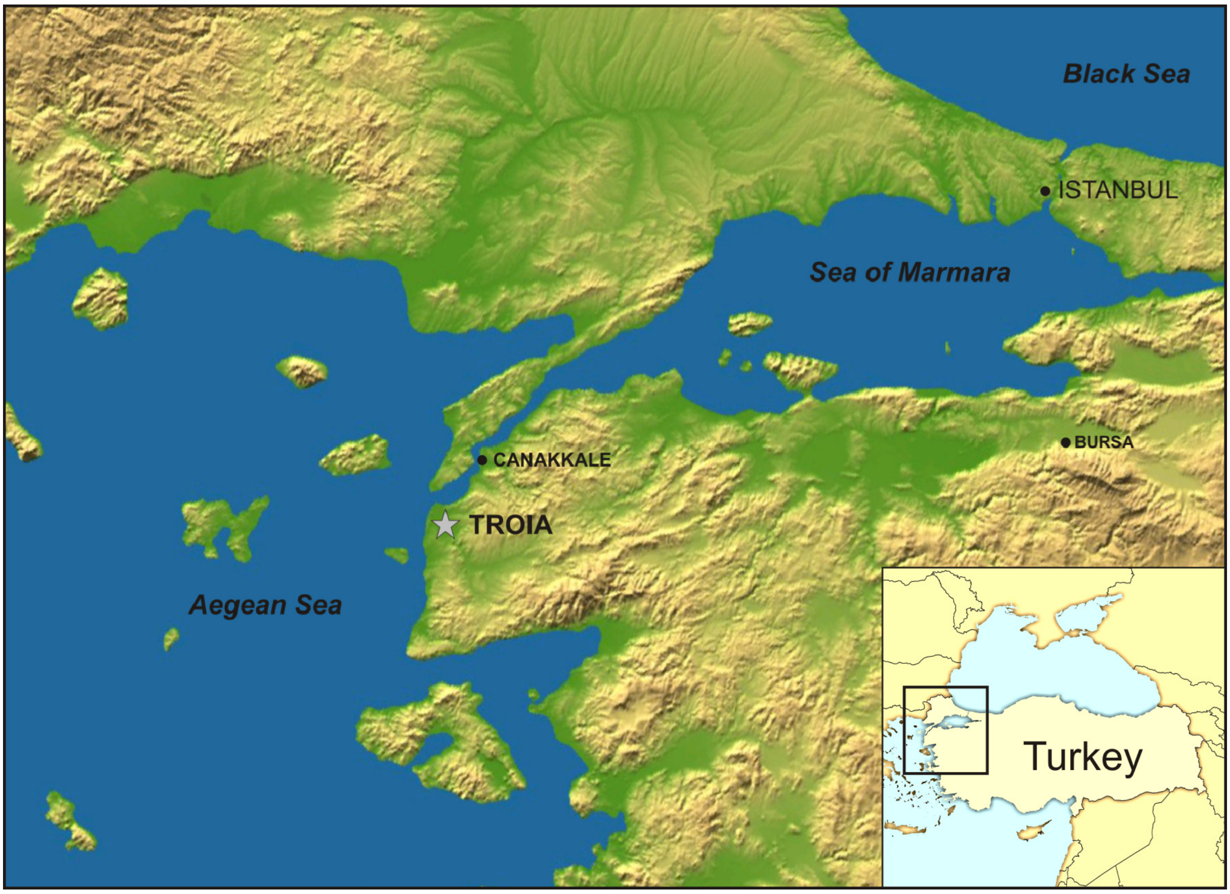
ÇALIS -SAZCI writes that one of the main goals of trading was to find copper and tin to produce bronze during the EBA. The mixture of copper and tin allowed for the production of harder, better and long-lasting devices and weapons. The limited amount of tin-resources on earth did not make trade of this material easy. Merchants had to travel long distances to find copper and tin or to sell the end products out of bronze. Transport through caravans was probably difficult, long and in the end brought very little profit since only a limited amount of goods could be carried at a time. Transporting goods by ship became an alternative to caravans, and was practiced since Neolithic times. Ships made it possible to carry goods in greater quantities more quickly than the caravans. These advantages brought, as expected, more profit to the merchants (ÇALIS-SAZCI 2006:201-202).

The strong currents between the Aegean and the Marmara Sea did not allow ships to sail easily farther to the north. The strategic location of Troy (Map 2-1), at the southeastern end of the Dardanelles, made it possible for the settlement to become a harbor city[7]. The newly introduced goods[8] from far-off lands are proof of intensive trade in which the city was involved during this period. Services that were offered to sailors and the trade they carried with them could explain the richness of the city. Small numbers of fish remains from the site of Troy indicate that this settlement can not be dismissed as simply a fishing village (ÇALIS-

[7] Currents and winds were very important for maritime transport, since at that time sailors could not sail against the wind. This changed only in the Roman period. Also, the strategic location of the city, at the southeastern end of the Dardanelles, made it possible for Troy to become a harbor city. Currents and winds at Dardanelle did not allow the sailors and merchants to travel farther north, to the Black sea, and to find new markets. The favorable winds from the southwest or southeast for sailors to cross the Dardanelle blow only, on average, ten to fifteen days a year. Those who wanted to sail to the north for new markets would have had to wait with their goods for the right winds in the Beşik-Bay, which lies ca. 7 km southwest of Troy, or Troy-Bay (ÇALIS-SAZCI 2006:202).

[8] The intensive trade brought luxury to Troy, for example through bronze tools and weapons and, precious and semiprecious stones such as lapis lazuli, carnelian, jade and amber from middle Asia. Vessels with forms from northern Syria were also in use (ÇALIS-SAZCI 2006:Abb.2) .

SAZCI 2006:202). The Maritime trade had lost its importance more or less during Troy III. However, several import goods were discovered from this period as well (ÇALIS-SAZCI 2006:207).



Map 2-1: The location of Troy and an overview of the Biga Peninsula.

2.2. The Early Bronze Age in Anatolia and the role of Troy

The border of Anatolia could be drawn simply as today's Turkey, except for the small part in Thrace. This part of the world was divided during the 3rd millennium into mainly three different cultures. The northern Syrian cultures dominated in the Southeast-Anatolian settlements; while the Karaz-Culture from the Caucasus was quite strong in East-Anatolia. The distribution of the third culture extended from west of the modern city of Sivas in the direction towards the Aegean Sea to Central- and West-Anatolia (EFE 2006:15). West Anatolia had already started to reveal its own cultural contours in the middle Copper Age (4th millennium BC.), independent of the Mesopotamian and Karaz-Culture. The different groups of this region developed together a certain ceramic and architectural tradition from the beginning of the Bronze Age (EFE 2006:16).

The local ceramic developments within the cultural region of west Anatolia could be observed during the Early Bronze Age II (EBA II). The geography in west Anatolia would have played a very important role in local ceramic developments. However, the political climate within the West-Anatolian Cultural region should not be forgotten. An increase in cultural and trade relations occurred between the different groups, while even local kingdoms could be observed in the region (EFE 2006:16). The islands of the Aegean and of Greece maintained their own developments in the same period. This entire culture can be considered a composite of many different small local cultures such as in West-Anatolia. Archaeological remains indicate a close relation between West-Anatolia and the islands of the Aegean during the middle of the Early Bronze Age (ca. 2500 BC.) (EFE 2006:16-17).

The relations between Anatolia and what is now Southeast Europe were not very intensive at the beginning of the Early Bronze Age. However, the influence of Anatolia could be followed into Bulgaria in the 2nd half of the 3rd millennium BC. The finds of treasure from Troy could even indicate a relation between West-Anatolia and Central-Europe. Troy was no longer a small coastal village during the first half of the 3rd millennium. Changes occurring both locally and farther away made it possible for Troy to gain more power in politics and in existing trade networks in the region. The goods originating from distant lands demonstrate the power of Troy with the beginning of the 2nd half of the 3rd millennium (EFE 2006:17).

2.3. Development of the West Anatolian Cultures and EBA I

West Anatolian culture extended over a region and had its own cultural influences. This development started already in the 4th millennium BC. Local groups, however, created and inserted their own experience and influence onto the dominant Anatolian culture. These local differences could be observed clearly with the beginning of the Bronze Age. Settlements in the Aegean region such as Bakla Tepe (Izmir), Limantepe, Emporion VII-VI, Kumtepe I B, Poliochni (black), Lemnos and Myrina reflect these local developments. The highland settlements such as Küllüoba, Demirchüyük and Kaklik Mevki (Afyon) developed their own unique cultural characteristics. There is not enough evidence[9] to prove whether the mound of

[9] Some chalky and burnt layers were found under an earlier Troy I fortification wall. A small area was excavated since then. The evidence about this period in Troy is still not well studied (RIEHL 1998:30).

Hisarlik (Troy) was intensively inhabited during the earlier periods of the Early Bronze Age (EFE 2006:17).

2.3.1. Transition Period
(Distribution of Ceramics, Architecture, and Metal Finds)

The red-slipped and polished wares dominated in West Anatolia, except for the Troy-Yortan-Culture region. The characteristic ceramic forms of the Copper Age were no longer in use. The "Schnabelkanne" (spouted jug) form was typical for the Early Bronze Age as well as "weithalsige Krüge" (wide-necked vessels) and large one-handled bowls with sloping sides (EFE 2006:17).

A small sample of EBA-I ceramic wares appear in the assemblage from the Copper Age in the Kaklik Mevkii, though the forms such as "one-handled bowls with sloping sides" and the EBA type amphora were still in use. The "red-slipped" wares were still represented sparsely in the ceramic inventory. (EFE 2006:17).

Neither a typical settlement nor a house pattern could be discerned from the archaeological remains. The round houses were in use in Myrina and Poliochni, whereas the rooms in Kumtepe B were rectangular. The houses in Küllüoba and Kakli Mevkii look as if they were constructed according to particular plans. This house pattern from both settlements could be compared with earlier phases of Kurucay (Phase 6). The houses in Bakla Tepe were free-standing apsidal structures on a lattice foundation. The settlement Küllüoba was surrounded by a fortification wall with a zigzag pattern. The houses were constructed with two to three rooms. The rear room was connected with the fortification wall. This model represented not only similarities with the Mersin XVI (late Copper Age) but might be a further development or modification of early periods in Kurucay (Phase 6). These architectural elements indicate the "Anatolisches Siedlungsschema[10]" (Anatolian settlement pattern) that had already occurred in the late Copper Age period (EFE 2006:17-18).

A small number of metal objects and simple tools are known from the north Aegean, though the metal objects, such as needles, knifes, daggers and a massive flat axe from Bakla Tepe prove a greater development in metallurgy had occurred in the middle Aegean. The influence

[10]The „Anatolian settlement pattern" is indicated by row-houses sharing common side walls with the neighboring houses. This settlement pattern was named by KORFMANN.

of west Anatolian metal work on the island settlements could be observed; on the island Naxos a similar axe was found in the cave of Zas (EFE 2006:18).

2.3.2. EBA I/early Troy I

(Cultural Regions and Ceramic, Architecture, and Metal Finds)

The borders between local groups in west Anatolia were clearly apparent with the beginning of the Early Bronze Age. Recent studies indicate that there were at least four main local groups in west Anatolia, represented by the Troy-Yortan, Phrygic-Bithynic, Beycesultan EBA-I and Lycic-Pisidic cultures. The little known southwest Anatolian region maintained strong relations with the Cyclades [11], which could be called the "Karish" Cultural region (EFE 2006:18).

The local ceramic cultures developed within these cultural regions. The distribution of the Troy-Yortan-Culture extended from the southeast coastal region of Thrace to Izmir. The eastern distribution border was the Beycesultan Cultural Region, in the interior of west Anatolia. Some regions are still not well known, such as the Iznik-Region; therefore the geographical distributions of some ceramic materials in west Anatolia are not clear during the Early Bronze Age I, making it difficult to place or classify them into a specific local culture (EFE 2006:18).

The distribution of the Troy-Yortan-Ceramic Culture covered a large area. Settlements within this region were influenced from all directions, and at the same time fostered their own local characteristics. This culture extended to the east along the Aegean shore to Izmir and its islands, as well as along a certain shoreline of Marmara and Thrace, mostly in its southern extent. The distribution of this ceramic style was not only observed in the seaside settlements, but also to the land's interior as well. These common similarities from different settlements constitute altogether the "Maritime-Troy-Culture". This epoch would have begun at the end of EBA-I (EFE 2006:18).

The main features of the Anatolian Bronze Age architecture began taking shape in the Early Bronze Age I. Typical features are radially distributed terrace houses with their back parts built against the inside of the fortress wall. The houses either surrounded an inner yard, as in

[11] The island group in the south Aegean is called Kykladen.

Demircihüyük, or opened up onto sinuous, winding streets and avenues, as in Thermi I-II. Similar elements occurred at Besik Tepe and in Troy I (EFE 2006:18).

Metal processing began developing in the same period in west Anatolia and Crete as well. Similarities between the ceramic assemblages from Troy and southeast Europe remain common but not necessarily typical (EFE 2006:18).

2.3.3. Early Bronze Age II: Middle-late Troy I and Troy IIa

(Local cultures during EBA II in west Anatolia - Architecture, Distribution of Ceramics and Metal Finds, Profit from Trade)

The local cultural borders revealed little differences at the beginning of EBA II. The borders of the Phrygic-Bithynic Culture expanded to the west and covered the region of Iznik. The Kapidagi region became the meeting point of two cultures, the Troy-Yortan and the Phrygic-Bithynic Culture (EFE 19:2006).

The Beycesultan EBA I cultural region dissolved while the Akşehir region became culturally more important during the EBA-II. New smaller local cultures developed in the south of the Phrygic-Bithynic cultural region, such as Tavşanli-Kütahya, Örencik-Altintas, Afyon, Kusura and Acipayam. This region could be called "mittelwestanatolische Binnenland-Kulturregion" or "südphryghische Kulturregion"[12]. (EFE 2006:19).

The distribution of Lycic-Pisidic culture expanded not only to the Elmalı and Burdur regions, but most probably to the Hoyran, Gencali and Beyşehir regions as well. The ceramics from Beyşehir indicate similarities with the Konya and central Anatolian ceramic zone. At least four ceramic zones were established in this large region: South and North Central Anatolian, Ankara and Polatlı. The cultural regions and single ceramic zones began to reveal more and more differences between one another over time (EFE 2006:19).

In the later periods of EBA II the settlements began developing into "cities" and the architectural elements began to display more impressive features. The alignment of the buildings changed in Troy II and "megaron" structures were built next to each other. Troy displayed its power through the remarkable fortification wall, gates, buildings and a lower

[12] Interior mid-west Anatolian cultural region or southphrygian cultural region.

city. These developments indicate as well that the settlement of Troy had changed into a very important center in the region, although no evidence has been found that the buildings were used for municipal or collective functions (EFE 2006:19).

A similar development from village to city could be observed in Küllüoba. This settlement consisted of an "upper" and a "lower" city. The buildings were built in the megaron style as well. The east gate leads to a 25 x 20 m courtyard. Three megarons built next to each other offer an impressive complex ('Komplex I'). They might have been used as a residence or palace for the leader of the community. Some architectural features of the settlement indicate similarities with Thermi IV-V. A second larger complex (31x22 m) was found south-east of Komplex I, and described as Komplex II (EFE 2006:20).

The influence of Mesopotamia can be observed during this period in two regions of west Anatolia, or so-called "Asia Minor". The first region is east of the Kizilirmak area, or Halys Arch. Ceramics characteristic of northern Syria and Cilician settlements appeared in this region. However, the wares were not imported, but produced locally. The local people began producing their ceramics on pottery wheels, thus imitating Syrian bottles (EFE 2006:21).

The second region could be drawn from Konya to Eskişehir, or even could include Iznik-Inegöl. The trade from Cilicia was accomplished via a pass over the Taros Dağlari to the Konya and Aksehir plains. The trade route from these bases could be followed farther into the interior of west Anatolia towards the Afyon-Altintas-Kütahya triangle. Three natural routes from this region lead to the Eskişehir Plain and upper Sakarya region, Bolvadin-Emirdag, Afyon-Kirka-Seyitgazi and the upper valley of Porsuk. The Eskişehir Plain could be exited in the direction of Iznik-Inegöl, via a pass at Bozüyük and Pazaryeri. The caravans from Cilicia could even have reached the settlements in the south of the Marmara region. The tradesmen must have used these natural trade routes due to the geography of the area, which made travel possible only by these routes into West Anatolia (EFE 2006:21).

Troy-Yortan-Ceramics were not only found in the Biga Peninsula. The influence of this ceramic tradition could be followed into the highlands of northwest Anatolia. The appearance of many Troy II ceramic forms and lids indicate a strong influence of the Troy-Yortan-Culture on the people of the highlands (EFE 2006:22).

There are bronze finds from Troy and Demircihüyük that actually originated from the eastern regions. Tin would have been imported from Iran or Afghanistan. This indicates another trade route from the east through Ankara, Polatli and Sirihisar. Three Bronze "mace-heads" from the Demircihüyük-Sarikent-Graveyard are copies of a mace-head from Alacahöyük, proving contact between northwest and central Anatolia. The relations between the east Aegean shore and the islands were still active. A "Vogelkopfnadel" (bird head needle) from Besik Tepe is a well-known object from the islands (EFE 2006:21-22).

Some of the settlements, which were established along the trade network, began gaining power with the onset of EBA II. These settlements controlled trade and traffic in their own regions. These developments caused changes in the society. New social groups grew in the community. Trade was carried out by tradesmen, and groups of people produced the requested products. A prominent person guaranteed these people protection against bandits in their respective regions, as caravans traveled from one settlement to the other in the pursuit of new customers. These circumstances made it possible for certain individuals to gain more importance and to live separate from the common people. Indications for a ruling class start appearing now among the archaeological finds of the settlements. The architecture became more impressive as these settlements grew richer through trade. More complex social groups were without doubt expanding. The trade with Syria/Cilicia brought writing to west Anatolia and an increase in the usage of seals (see EFE 2006:22).

2.3.4. Early Bronze Age III/Troy IIb – III and IV

(Changes in Ceramics during EBA III; Architecture during EBA III; Distribution of EBA III Ceramics and Trade; Troy IV)

The Troas and Cilicia were part of a wider trading network. Both ends of this network, Troy and Tarsus, were harbor settlements. During the period of the Early Bronze Age Tarsus - like Troy - was surrounded, by a strong fortification wall with an impressive gate. The Elmalı Plain and the Seven Lake Region were now connected to this trade network as well (EFE 2006:23).

The influence of these intense trade relations can be observed in the ceramic assemblages. The early Troy II material changed into a new ceramic style that was also used during Troy III. The Northwest Anatolian influence on the new ceramics is especially worth mentioning. The red-coated wares were produced on a potter's wheel, or "Troy Plate" (EFE 2006:23).

New ceramic forms as well as tankards and depas[13] were now being produced. Küllüoba provides a similar chronology in ceramic development. Red-coated wares and Troy Plates appeared with the beginning of EBA III. Red-coated tankards were in the ceramic collection and Depas Amphikypellon came from the next horizon (EFE 2006:23).

The tankard form produced on the potter's wheel was found in Troy together with red-coated wares. A tankard fragment was found in the late EBA II phases of Küllüoba, with handmade forms with one handle already present in the EBA II ceramic assemblage, one horizon earlier than at Troy. This material would be contemporal with Karataş-Semayük. (EFE 2006:23).

The influence of the Troas on the Izmir Region had lost its intensity during EBA III. This part of Anatolia had more contact with the islands of the Aegean. A "corridor house" was excavated at Limantepe revealing similar patterns as houses found in Greece. The "Amphoriskos" Nail from Bakla Tepe is another example of a find that confirms the relationship between west Anatolia and the Cyclade Islands. The distribution of marble idols, the so-called "Troy Type", in the Aegean area had already begun in EBA I. A similar find was found in the second level of Millet (EFE 2006:23).

The settlement of Troy developed into a city beginning with phase Troy IIc. A four-meter thick fortification wall separated the upper from the lower city. Two gates connected both parts of the city, with the southwest gate being a paved ramp (FM). A courtyard, which was additionally surrounded by walls in the upper city, with at least five megarons, could be reached through the two gates, the southeast gate (FO), and then again through a similar gate system. The megarons were built next to each other and directly opposite of the gateway. Megaron II A is ca. 35 x 20 m and consists of a covered entrance ("anteroom") and a large single hall (main room) containing a fireplace. The walls were ca. 1.40 m thick and the largest megaron was flanked by two other megarons. These structures might represent the residence of the ruler, with the administration of the city being controlled from this courtyard. The same system, Gate-Courtyard-Palace, could be observed in Küllüoba and Kanligecit[14] as well (EFE 2006:23-24).

[13] No chemical studies have been done as of yet, but the depas were most likely used for drinking (ÇALIS-SAZCI 2006).

[14] The settlement and construction pattern of Kanligecit is very similar to Troy II. The settlement consists of a citadel with megara and a lower city. The settlement is a small-scale version of Troy II. There are two kinds of ceramic assemblages: local Thracian and the characteristic forms of Anatolia including tankards. The evidence indicates that people of Anatolia lived here, while the settlement was a Thracian branch of the trade system

The upper city pattern changed during Troy IIg, though Megaron II A maintained its original form. The architecture of the upper city up until this more recent phase revealed many similarities to that of Thermi IV-V and Poliochni. The construction of the houses was commonly “megaroid” with three rooms being built in a row (EFE 2006:24).

A similar development could be observed in Limantepe. The settlement was divided into a fortification and a settlement. A second wall ring was built within the fortification walls. The tower, built in the shape of a horseshoe, reveals similarities with structures from the islands of the Aegean. The “corridor house” was found in the center of the upper settlement and was most probably the residence of the ruler. Troy and Limantepe might have been the capital cities of two kingdoms (EFE 2006:24).

Buildings constructed in the Megaron style were found further south of Limantepe as well, such as in Heraion on Samos Island or in Karataş-Semayük. on the Elmalı Plain. These excavated buildings share characteristics with those from Troy II. An earlier example of such a building was found in Semayük from the earlier phases of EBA II. Administration buildings from Beycesultan and Tarsus are not known, as this period was excavated only in a small area (EFE 2006:24).

The ceramic forms of EBA III are distributed over a large geographical area. Tankards, Depas or Troy A2-plates were found not only in west Anatolia but also in Bulgaria, the west Aegean islands, Cilicia, southeast Anatolia and Syria. Some ceramic forms from northern Syria and Cilicia, such as the Syrian Bottle or local imitations, were found to the west, at sites such as in Küllüoba, Troy, Palamari and Bulgaria (EFE 2006:24).

Trade relations between Troy and Mesopotamia, Iran as well as Afghanistan are evident in finds revealing new goldsmith technologies, as well as a ceremonial axe out of lapis lazuli, a mace-head out of faience[15] or some precious and semiprecious stones, including carnelian, jade, and amber from Troy II (EFE 2006:25-26).

(SAHOGLU 20053:46). The reason why this part of Thrace was of interest at that time was as a source of copper (KORFMANN 2001:365).

[15] A “mace-head” out of faience from late Troy II provides evidence that Troy had contact with the eastern Mediterranean. The material and shape indicate that the find originated from Egypt and belongs to the “piriform mace-head group”. They were used as weapons as well as ceremonial objects during the Pharaonic Period (MÜLLER 2006:218).

Tankard and Depas forms were found in the necropolis of Gedikli in the region of Islahiye (Gaziantep). The intensive use of the potter's wheel caused a growth in mass production and standardization among ceramic forms, which blurred the boundaries between different ceramic zones. "Simple wares without finish or polish increased in number, while contures of the vessels became smoother with a tendency toward larger, oval forms"(EFE 2006:25).

A seal in the shape of a foot from Küllüoba (EBA III) shares characteristics with seals from Tarsus and Konya-Karahüyük. Cilicia and Northwest-Anatolia were connected through a trade network over the Konya Region. New goldsmith techniques and precious or semiprecious stones found in Troy indicate that contact was not only limited to Cilicia but also extended farther to the Southeast as well as to certain regions of Asia (EFE 2006:25).

A continuity of the Troy II ceramic tradition could be observed in Troy III. Great numbers of pottery pieces were produced on the potter's wheel. The population of the city increased. The constructions within the upper city were no longer as impressive but increased in their density. The former tradition of house construction, however, was still practiced in this period, with clay bricks being placed over a stone foundation (CALIS-SAZCI 2006:206).

The intensity of trade during Troy II decreased remarkably in Troy III. A small "bird figurine" out of jade was found, indicating - at least from the material - that it must have been brought from Afghanistan or Siberia. These regions were already known for their tin resources and were visited by tradesmen. The Syrian bottle remains represent trade relations with Syria (CALIS-SAZCI 2006:206).

New ceramic forms become visible with the beginning of Troy IV, the second half of EBA III. The influence of interior Anatolia in Troy was quite remarkable with regard to ceramics, different forms of bowls, and architectural elements, such as the "Kuppelofen" (killn). Winfried Orthmann calls this epoch the "transition period". The characteristics of the new ceramics resemble those typical for the "Early Hittite Kingdom". The duckformed "Enten-Askos" vessels were typical for the period and they spread throughout the Aegean region (EFE 2006:26-27).

2.4. Trade during the EBA in Anatolia

Trade with far-off regions increased almost everywhere in Anatolia around the middle of the 3rd millennium BC. Maritime transport was at least as important as overland transport by means of caravans. The transporting of heavy goods over long distances could more easily be done by ship and increased profits. One of the reasons for trade with more distant regions was probably to find and exploit copper and tin resources. Tin resources were especially limited.

The tradesman, or merchant, must have been required to pay taxes or a certain percentage of his profit to the important personage of the settlements. This commanding individual would have protected the settlement and allowed trade among the merchants in the region. As the settlement grew richer, immigration increased to the settlements. These human movements caused different social groups to develop in the community. The protectors of the community or even the richer merchants as well could afford to live separately from the common members of society, leading to the development of a citadel and lower city.

The core group from the wealthy area of the settlement maintained control over the growing city. The existence of employer and working class relationships would have then developed. The establishment of colonies could even have taken place. The wealthy settlements were beginning to become the favorite targets for bandits and hostile settlements. Therefore these rich settlements would have had to build thicker and better fortification walls in order to avoid attacks and to protect their goods as well as their riches. This would have led settlements to join together[16] for self-protection against unfriendly intrusions into their territory. Settlement groups would have wanted to expand their defensive region, leading them to establish confederations or contracts with neighboring groups not so far away.

An increase in trade did not only cause a changing distribution of materials from south to north or vice versa. Indeed, international trade brought new social, economical and political changes to the people of the Early Bronze Age as might occur in today's world.

Especially the harbor cities such as Troy and Tarsus or Limantepe grew larger and more powerful in the second half of the 3rd millennium. Newly introduced goods and inventions,

[16] Immigrants most likely went to those settlements with a favorable topographic landscape for defending, expanding and controlling trade traffic as well as for securing the region.

including precious stones or the potter's wheel, were distributed from or delivered to these centers from other parts of the old world.

The traditional caravans, however, were still a means for travel and transport, employed to find new resources and to bring goods from the harbors to the inland settlements and vice versa. Some of these settlements were Gedikli, Acemhöyük, Kültepe, Polatlı, Küllüoba, Demircihüyük, Kaklık Mevkii, Beycesultan and Aphrodisias (ŞAHOGLU 2005: FIG 1). The caravans kept the relations between the different cultures fresh and dynamic in a large geographic landscape.

Political and cultural borders, especially in Anatolia, were re-drawn again in the second half of the Early Bronze Age III. The impressive architectural constructions in the settlements are no longer observed. Several important settlements lost their importance in certain regions and some colonies were abandoned, such as Kanlıgecit, in the second half of the Early Bronze Age III (ŞAHOGLU 2005:354). .

The relationships between Central-Anatolia and Mesopotamia became again more intensive at the beginning of the second millennium BC. The Assyrians established trade colonies in central Anatolia, including Kültepe. A trade network was quite active between central Anatolia and Mesopotamia; however, west Anatolia remained outside of this network. Tin demand was covered by Afghanistan and was brought to Anatolia via Mesopotamia. The merchants from Mesopotamia exchanged tin with gold and silver in Anatolia (ŞAHOGLU 2005:355).

2.5 Animal lifestock and trade during the Early Bronze Age

Most probably Bronze Age trade was not restricted to inorganic products. Life animals were surely part of the goods which were traded between different groups. It will, however, not be easy to follow the tracks of traded farm animals, unless they were absent in the respective area or missing within earlier contexts of the bone assemblage under consideration. A sudden appearance of such an animal in particular bone assemblages of a settlement[17] may indicate that the respective animals reached a site by the way of trade. Another possibility would be

[17] see Chapter 9.1.4.

the observation of a sudden shift in average size compared to earlier contexts. This could indicate the introduction of a new breed – potentially by the way of trade.[18]

Livestock trade within a certain culture is reasonable in order to prevent inbreeding and also for sharing experience with regard to animal management within a wider community. More (or less) advanced breeding systems for particular domesticates could thus be part of the cultural identity of particular groups or cultures and might therefore have the same geographical distribution as the respective culture.

An interesting question would be; if cultures/groups, which were more advanced in animal breeding, would have traded their animals or knowledge with the other cultures. Or – formulated more sharply – would the advanced cultures/groups have given up their advantage against the other groups? The answer would probably be “no”, as within today’s world economic politics.

Sheep size could probably reveal similarities within a certain culture or even with neighbouring cultures. However, it would also be expected to observe different sized sheep between different cultures during the same period. As larger size of domestic ungulates is usually considered to indicate more developed breeding systems, size differences might help determining directions of lifestock exchange. The results could therefore to some extent also reveal the nature of the relationships between the regions under concern. It is therefore of great importance to connect the outline of Bronze Age cultures in Anatolia and the Aegaean – as developed above in the introduction– with the results of the analysis of the animal remains from the Maritime Troy Culture, which are the main topic of this thesis.

3. Archaeozoological Methods applied to the Animal Remains from Troy

3.1. Determination of Bone Remains and Evaluation of Data

The animal bone material processed from different archaeological sites, mainly of the Early Bronze Age, provides the foundation of the present thesis. The results filtered from an assemblage of bone finds from an excavation must be organized in different stages in order to

[18] It is not always the case that the size of a certain species helps to decide if a new race is introduced (see Chapter 5.1).

to make them ready for interpretation and publication. That is to say, we need to make the bones "readable."

These important stages, or steps of analysis, must meet international standards in order to make the data useful for researchers throughout the world. One may use different evaluation programs in order to calculate results from the data, but the questions must be clear and globally understood if the results are to serve a practical purpose. Otherwise, excavated materials and the results obtained from them would remain isolated, and comparisons of data from other archaeological settlements could only be done at a certain level.

The animal bone material evaluated for this thesis was determined according to species and counted and weighed for quantification, age at death was estimated from epiphyseal fusion and growth stages, standard measurements of bones were examined and other observations were collected in order to gain information in the following areas:

- Bone remains are identified according to the respective zoological species in order to observe which domestic animals were kept in the settlement, as well as to understand which wild animal species were hunted and thus probably were present in the environment.
- Bone finds of each species were counted in order to estimate the portions of the different domestic and wild animals in the bone assemblage.
- Bone remains – which generally represent c. 7% of live body weight of all species – were weighed in order to calculate their contribution to the meat consumption of the inhabitants (e.g., a sheep has as many bones as cattle or fallow deer, but does not supply as much meat as cattle or fallow deer).
- Measurable bone remains of all species were osteometrically examined in order to study animal size and possible chronological developments.
- Bone remains of all species were classified according to their age distribution in order to determine the killing pattern of domestic animals, to record reasons for breeding certain species, as well as obtaining age information on single individuals.
- Traces on the bones can indicate work procedures during and after slaughtering (e.g., cut-marks or traces of fire), or may reveal possible pathological changes during the lifetime of the animal.

The information on identification, weight, measurements and the like from all bone remains was computerized. The KNOCOD Program was used to store and evaluate the information on all bone remains. This program was created in the 1970s by H.-P. UERPMANN (UERPMANN 1978), a program he continues to develop up until the present. The program analyzes data of archaeological animal bone remains, which are coded by the user during the input process into different columns (e.g., for the species 26=Bos or 71=*Dama dama* in columns 1+2, or for skeletal parts 24=Humerus or 42=Femur, etc.in clomns 3+4). For control the program translates the codes during input into plain language.

KNOCOD programs evaluated the input data. These programs help to create, for example, lists of species or tables of kill-off patterns. The Logarithmic Size Index (LSI) and "box&wisker" output diagrams can be produced with the KNLSICAL program. Many other diagrams or graphics were prepared from KNOCOD output exported into the Microsoft Excel Program.

3.2. Measurements

Measuring the bones allows statements to be made concerning size and stature of the animals, as well as on their physical development. The methodology used for measuring was summarized by VON DEN DRIESCH and published in 1976. The measurements were done with a caliper gauge, generally as fine as 0.5 mm on large animal species. These measurements were mainly used to produce LSI diagrams from archaeological material, e.g. from sheep, which could then be compared across different levels and with results from other settlements. Strongly burned and damaged bone remains were not measured because of size loss. Bone remains with open epiphyseal joints were also not measured.

3.3. What are Logarithmic Size indices (LSI)?

Normally only the same bones may be compared size-wise, e.g.a radius with a radius or a femur with a femur. The LSI allows the comparison of different skeletal elements, e.g., radius with femur. Thus, the number of comparable bones increases remarkably. A a complete skeleton of a standard animal is needed for the calculation of LSI, and therefore the standard is usually measured on recent animal skeletons. The LSI is calculated according to the following formula:

$$LSIx = \log x - \log m$$

Where x is the measurement of the archaeological bone and m is the corresponding measurement of the standard individual.

The results are represented as box&wiskers diagrams. The vertical centerline indicates the maximum and minimum values, the filled box indicates the standard deviation, and the internal horizontal line represents the average value. The external small box shows the quartiles and the outside horizontal line the median.

3.4. Age determination

The determination of the killing age of the domestic animals was made by dental data and epiphysis fusion. A goal in determining the slaughtering age of an animal is to understand the economical reasons for breeding and keeping the domestic animals (UERPMANN 1971:5). The results are compared with results from within the settlement and with results from other settlements in order to examine the use of domestic animals in different societies. The aging data from SILVER (1969) and HABERMEHL (1975) were utilized below as well as data provided by H.-P. UERPMANN for epiphysis fusion and tooth abrasion.

The estimated survival curves for small ruminants and cattle were produced with the help of dental and epiphyseal aging data from the entire Maritime Troy Culture, since one of the largest animal bone inventories for west Anatolia for this period originated from Troy. As Troy is the focus of this study, information from the other sites is also used to evaluate the material from Troy.

3.5. Sex determination

The gender of the animals could be determined depending on animal species on different skeletal parts. The gender identification could be done on the horncores, metapodials and pelvic remains of cattle, sheep and goat. The canine teeth are used to determine the sex of pig and equids (STAHL 1989: 13).

4. Animal Bone Material from Troy, Kumtepe, Yenibademli, Ulucak and Küllüoba

An archeaozoolgical team from the University of Tübingen identified the animal bone remains from the start of the new campaigns in Troy. The animal bone material was first identified on the site, while more difficult or special pieces were brought to Tübingen for further investigations. Over the years, many different researchers worked on the animal bone material. The same computer program was used every season and made possible a healthy and reliable continuation of the project.

Animal bone material from every excavated level in Troy was evaluated and stored separately so that observations on the animal-based economy for each horizon and vertical comparsions of the levels could be made. The animal bone material from the Maritime Troy Culture makes up only a certain portion of the overall computerized material.

The Maritime Troy Culture is not a horizon such as Troy Ib or Troy IIc. This term is given to the first three main settlement periods according to the similarities of the archaeological finds and not according to the archaeozoological remains. The Maritime Troy Culture column in the figures below facilitates comparisons of different cultures represented at Troy for future studies. Calculating three main cultural periods as one signifies the Maritime Troy Culture as representing practically the greater part of the Early Bronze Age of the settlement. This aids in comparing the Early Bronze Age of Troy with other Early Bronze Age settlements.

The author worked mainly on the mammal remains from Yenibademli, Ulucak and Küllüoba. Yenibademli is a very important site, since it is on an island and extremely close to the Troas. Ulucak represents the Copper Age and the Early Bronze Age of the Izmir region, which is south of Troas. Küllüoba is on the northwest highlands and located on the possible ancient caravan route to West Anatolia and the Marmara Region. These additional materials, analyzed below, from different regions, increase the number of sites examined here and help in observing the development of an animal-based economy in west Anatolia (s. a.).

4.1 Animal Bone Material from Troy

A total of 47,639[19] faunal remains, weighing 215,712 g, were put in the data set for analysis. A total of 25,586 fragments (153,506.4 g) were classified as mammal remains and 22,053 fragments (62,206.3 g) as non-mammal remains[20]. Tables 4-1 to 4-4 represent the faunal remains from each period and the entire Maritime Troy Culture.

Most of the non-mammal remains were identified from Troy II material, whereas very few non-mammal remains were found in the Troy III material. Shell[21], fish, birds and others are not implicitly used in this study, since the work presented here deals with animal management and red meat production (Fig. 4-1).

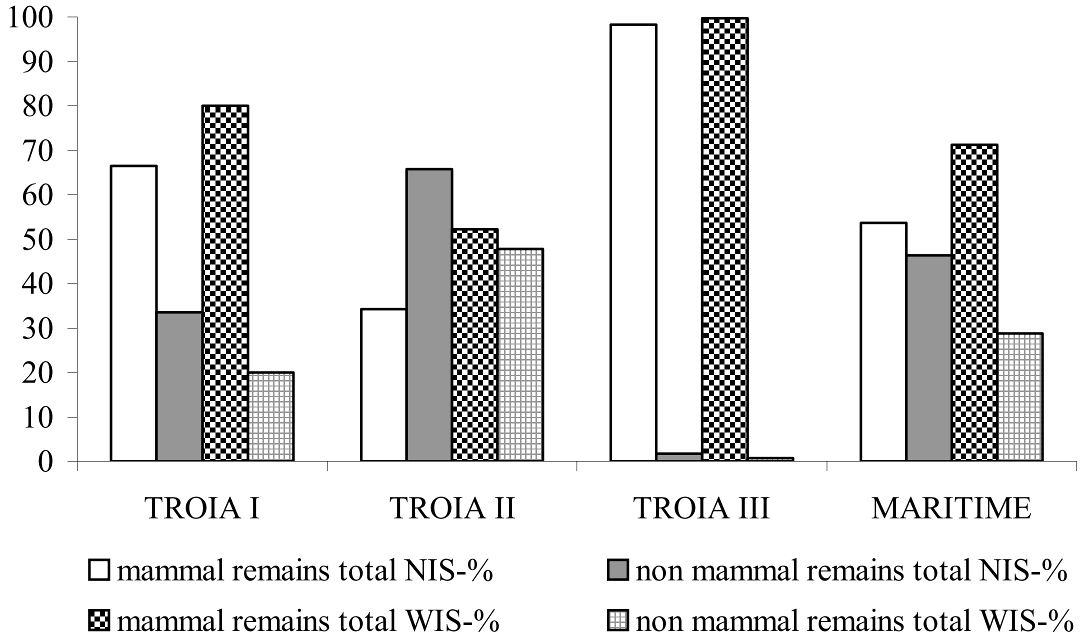


Fig. 4-1: Number of identified (NIS) mammal and non-mammal remains and their weight distribution (WIS) for the Maritime Troy Culture per phase as percentage[22].

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[19] The mixed material from Troy I to III is included in the material.

[20] The "non-mammal" concept is used for shell, fish, bird, amphibia and reptilian remains in this study. Indeed, shell remains are clearly dominant in this group.

[21] The shell remains were evaluated by C. Çakirlar.

[22] mammal remains in TR I- NIS =16721, TR II-N = 5005, TR III-N =2078, MARITIME-N =25586
mammal remains in TR I-WIS = 102735,80g, TR II-W =27400,50g, TR III-W =10858,60g, MARITIME-W =153506,40g /
non mammal remains in TR I-NIS =8442, TR II-N =9582, TR III-N =37, MARITIME-N =22053
non mammal remains in TR I-WIS =25745,80g, TR II-W =24998,20g, TR III-W =83,20g, MARITIME-W =62206,30g

Tab. 4-1: Species list for Troy I.

TAXONOMY	**NIS**	**NIS-%**	**WIS(g)**	**WIS-%**
Cattle BOS	2701	24,54	39010,40	43,53
Sheep, OVIS	452	4,11	4487,90	5,01
Goat, CAPRA	200	1,82	1907,80	2,13
Sheep or Goat, CAPRA/OVIS	4631	42,08	17262,80	19,26
Pig, SUS	2550	23,17	19790,00	22,08
Dog, CANIS	56	0,51	274,80	0,31
Domestic mammals total	**10590**	**96,22**	**82733,70**	**92,31**
Wild or Domestic Cattle	9	0,08	410,00	0,46
Wild or Domestic Goat	1	0,01	30,00	0,03
Sheep/Goat or Roe deer	2	0,02	20,10	0,02
Wild Boar or Pig	26	0,24	600,70	0,67
Wolf or Dog	1	0,01	12,00	0,01
Canidae indet.	19	0,17	52,00	0,06
Wild or Domestic mammals total	**58**	**0,53**	**1124,80**	**1,25**
Hedgehog, *Erinaceus* sp.	1	0,01	2,00	0,00
Hare, *Lepus capensis/europaeus*	66	0,60	107,90	0,12
Wolf, *Canis lupus*	3	0,03	36,40	0,04
Fox, *Vulpes vulpes*	3	0,03	9,40	0,01
Bear, *Ursus arctos*	1	0,01	20,00	0,02
Lynx, *Lynx lynx*	1	0,01	1,00	0,00
Lion, *Panthera leo*	2	0,02	46,80	0,05
Carnivora unident., small	18	0,16	53,60	0,06
Carnivora unident., medium	3	0,03	13,10	0,01
Carnivora unident., large	7	0,06	121,00	0,14
Wild Boar, *Sus scrofa*	64	0,58	1587,70	1,77
Fallow deer, *Dama dama*	161	1,46	1972,70	2,20
Red deer, *Cervus elaphus*	6	0,05	170,20	0,19
Roe deer, *Capreolus capreolus*	9	0,08	68,90	0,08
Aurochs, *Bos primigenius*	13	0,12	1558,00	1,74
Wild mammals total	**358**	**3,25**	**5768,70**	**6,44**
unidentified, small	63	1,10	30,10	0,23
unidentified, small to medium	105	1,84	98,50	0,75
unidentified, medium	3336	58,37	4014,7	30,63
unidentified, medium to large	1274	22,29	2646,40	20,19
unidentified, large	935	16,36	6294,90	48,02
unidentified, very large	1	0,02	23,00	0,18
unidentified	1	0,02	1,00	0,01
unidentified mammal remains total	**5715**	**100,00**	**13108,60**	**100,00**
identified mammal remains total	**11006**	**65,82**	**89627,20**	**87,24**
unidentified mammal remains total	**5715**	**34,18**	**13108,60**	**12,76**
mammal remains total	**16721**	**100,00**	**102735,80**	**100,00**
Aves unident.	87	1,03	118,10	0,46
Amphibia unident.	2	0,02	0,00	0,00
Reptilia unident.	21	0,25	44,20	0,17
Pisces unident.	38	0,45	97,70	0,38
Shells	8294	98,50	25485,80	98,99
non-mammal remains	**8442**	**100,00**	**25745,80**	**100,00**
mammal remains total	**16721**	**66,45**	**102735,80**	**79,96**
non-mammal remains total	**8442**	**33,55**	**25745,80**	**20,04**
processed material TOTAL	**25163**	**100,00**	**128481,60**	**100,00**

Tab. 4-2: Species list for Troy II.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
Cattle BOS	797	23,56	10433,50	42,95
Sheep, OVIS	185	5,47	2015,50	8,30
Goat, CAPRA	44	1,30	345,50	1,42
Sheep or Goat, CAPRA/OVIS	1627	48,09	5645,40	23,24
Pig, SUS	479	14,16	2993,40	12,32
Dog, CANIS	28	0,83	64,50	0,27
Domestic mammals total	**3160**	**93,41**	**21497,80**	**88,50**
Wild or Domestic Cattle	6	0,18	202,00	0,83
Wild Boar or Pig	3	0,09	31,20	0,13
Wild or Domestic mammals total	**9**	**0,27**	**233,20**	**0,96**
Rodentia unident., small	2	0,06	1,00	0,00
Rodentia unident., large	5	0,15	2,00	0,01
Hare, *Lepus capensis/europaeus*	20	0,59	45,50	0,19
Fox, *Vulpes vulpes*	3	0,09	8,30	0,03
Bear, *Ursus arctos*	1	0,03	2,00	0,01
Carnivora unident., medium	2	0,06	14,10	0,06
Wild Boar, *Sus scrofa*	10	0,30	189,20	0,78
Fallow deer, *Dama dama*	161	4,76	2133,80	8,78
Red deer, *Cervus elaphus*	4	0,12	123,00	0,51
Roe deer, *Capreolus capreolus*	1	0,03	2,00	0,01
Cervidae unident.	4	0,12	12,00	0,05
Aurochs, *Bos primigenius*	1	0,03	28,00	0,12
Wild mammals total	**214**	**6,33**	**2560,90**	**10,54**
unidentified, very small	6	0,37	1,30	0,04
unidentified, small	3	0,18	0,50	0,02
unidentified, small to medium	22	1,36	11,90	0,38
unidentified, medium	546	33,66	731,7	23,54
unidentified, medium to large	412	25,40	808,20	26,00
unidentified, large	235	14,49	1281,30	41,22
unidentified	398	24,54	273,70	8,80
unidentified mammal remains total	**1622**	**100,00**	**3108,60**	**100,00**
identified mammal remains total	**3383**	**61,45**	**24291,90**	**88,65**
unidentified mammal remains total	**1622**	**29,46**	**3108,60**	**11,35**
mammal remains total	**5005**	**90,92**	**27400,50**	**100,00**
Aves unident.	49	0,51	95,40	0,38
Pisces unident.	154	1,61	54,90	0,22
Reptilia unident.	1	0,01	0,50	0,00
Shells	9378	97,88	24847,40	99,39
non-mammal remains	**9582**	**100,00**	**24998,20**	**100,00**
mammal remains total	**5005**	**34,31**	**27400,50**	**52,29**
non-mammal remains total	**9582**	**65,69**	**24998,20**	**47,71**
processed material TOTAL	**14587**	**100,00**	**52398,70**	**100,00**

Tab. 4-3: Species list for Troy III.

TAXONOMY	**NIS**	**NIS-%**	**WIS(g)**	**WIS-%**
Cattle BOS	206	13,61	2379,90	24,40
Sheep, OVIS	119	7,86	1122,00	11,50
Goat, CAPRA	16	1,06	130,60	1,34
Sheep or Goat, CAPRA/OVIS	607	40,09	1904,60	19,53
Pig, SUS	437	28,86	2906,10	29,79
Domestic mammals total	**1385**	**91,48**	**8443,20**	**86,56**
Wild Boar or Pig	2	0,13	26,10	0,27
Canidae unident.	3	0,20	8,00	0,08
Wild or Domestic mammals total	**5**	**0,33**	**34,10**	**0,35**
Hedgehog, *Erinaceus europaeus*	1	0,07	1,00	0,01
Hare, *Lepus capensis/europaeus*	10	0,66	12,70	0,13
Bear, *Ursus arctos*	1	0,07	31,00	0,32
Weasel, *Mustela erminea/nivalis*	1	0,07	0,00	0,00
Carnivora unident., large	2	0,13	19,50	0,20
Wild Boar, *Sus scrofa*	3	0,20	39,00	0,40
Fallow deer, *Dama dama*	99	6,54	1000,40	10,26
Red deer, *Cervus elaphus*	2	0,13	16,10	0,17
Roe deer, *Capreolus capreolus*	2	0,13	18,00	0,18
Cervidae unident.	2	0,14	67,90	0,70
Aurochs, *Bos primigenius*	1	0,07	71,00	0,73
Wild mammals total	**124**	**8,19**	**1276,60**	**13,09**
unidentified, small	2	0,38	0,30	0,03
unidentified, small to medium	3	0,56	1,90	0,18
unidentified, medium	326	61,28	442,50	41,92
unidentified, medium to large	146	27,44	292,50	27,71
unidentified, large	54	10,15	312,00	29,56
unidentified	1	0,19	6,40	0,61
unidentified mammal remains total	**532**	**100,00**	**1055,60**	**100,00**
identified mammal remains total	**1514**	**72,86**	**9753,90**	**89,83**
unidentified mammal remains total	**532**	**25,60**	**1055,60**	**9,72**
mammal remains total	**2078**	**100,00**	**10858,60**	**100,00**
Aves unident.	26	70,27	41,10	49,40
Pisces unident.	6	16,22	8,00	9,62
Reptilia unident.	1	2,70	1,70	2,04
Shells	4	10,81	32,40	38,94
non-mammal remains total	**37**	**100,00**	**83,20**	**100,00**
mammal remains total	**2078**	**98,25**	**10858,60**	**99,69**
non-mammal remains total	**37**	**1,75**	**83,20**	**0,76**
processed material	**2115**	**100,00**	**10892,70**	**100,00**

Tab. 4-4: Species list for the whole Maritime Troy Culture (TR I/TR II/TR III and mixed material)

TAXONOMY	**NIS**	**NIS-%**	**WIS(g)**	**WIS-%**
Cattle BOS	4055	23,44	56781,80	41,99
Sheep, OVIS	859	4,96	8820,40	6,52
Goat, CAPRA	293	1,69	2704,90	2,00
Sheep or Goat, CAPRA/OVIS	7414	42,85	26712,20	19,76
Pig, SUS	3705	21,41	27394,20	20,26
Dog, CANIS	91	0,53	377,30	0,28
Domestic mammals total	**16417**	**94,88**	**122790,80**	**90,81**
Wild or Domestic Cattle	18	0,10	724,00	0,54
Wild or Domestic Goat	1	0,01	30,00	0,02
Sheep/Goat or Roe deer	2	0,01	20,10	0,01
Wild Boar or Pig	34	0,20	690,00	0,51
Wolf or Dog	1	0,01	12,00	0,01
Canidae unident.	24	0,14	62,00	0,05
Wild or Domestic mammals total	**80**	**0,46**	**1538,10**	**1,14**
Hedgehog, *Erinaceus europaeus*	2	0,01	3,00	0,00
Rodentia unident., small	5	0,03	2,00	0,00
Rodentia unident., large	7	0,04	3,00	0,00
Hare, *Lepus capensis/europaeus*	105	0,61	189,10	0,14
Wolf, *Canis lupus*	3	0,02	36,40	0,03
Fox, *Vulpes vulpes*	6	0,03	17,70	0,01
Bear, *Ursus arctos*	4	0,02	80,00	0,06
Weasel, *Mustela erminea/nivalis*	1	0,01	0,00	0,00
Lynx, *Lynx lynx*	1	0,01	1,00	0,00
Lion, *Panthera leo*	2	0,01	46,80	0,03
Carnivora indet., small	19	0,11	54,60	0,04
Carnivora indet., medium	5	0,02	27,20	0,02
Carnivora indet., large	9	0,05	140,50	0,10
Wild Boar, *Sus scrofa*	82	0,47	1911,90	1,41
Fallow deer, *Dama dama*	499	2,88	6058,90	4,48
Red deer, *Cervus elaphus*	14	0,08	379,30	0,28
Roe deer, *Capreolus capreolus*	12	0,08	88,90	0,07
Cervidae unident.	13	0,07	98,90	0,07
Aurochs, *Bos primigenius*	17	0,10	1743,00	1,29
Wild mammals total	**806**	**4,66**	**10882,20**	**8,05**

cont. Tab. 4-4: Species list for the whole Maritime Troy Culture
(TR I/TR II/TR III and mixed material)

TAXONOMY (Maritime)	NIS	NIS-%	WIS(g)	WIS-%
unidentified, very small	6	0,07	1,30	0,01
unidentified, small	69	0,83	31,90	0,17
unidentified, small to medium	130	1,57	112,30	0,61
unidentified, medium	4367	52,72	5377,20	29,39
unidentified, medium to large	1984	23,95	4069,10	22,24
unidentified, large	1313	15,85	8389,40	45,86
unidentified, very large	1	0,01	23,00	0,13
unidentified	413	4,99	291,10	1,59
unidentified mammal remains total	**8283**	**100,00**	**18295,30**	**100,00**
identified mammal remains total	**17303**	**67,63**	**135211,10**	**88,08**
unidentified mammal remains total	**8283**	**32,37**	**18295,30**	**11,92**
mammal remains total	**25586**	**100,00**	**153506,40**	**100,00**
Aves unident.	191	0,86	326,30	0,52
Amphibia unident.	3	0,01	0,10	0,00
Reptilia unident.	35	0,16	89,50	0,14
Pisces unident.	225	1,02	216,90	0,35
Shells	21599	97,94	61573,50	98,99
non-mammal remains	**22053**	**100,00**	**62206,30**	**100,00**
mammal remains total	**25586**	**53,71**	**153506,40**	**71,16**
non-mammal remains total	**22053**	**46,29**	**62206,30**	**28,84**
processed material TOTAL	**47639**	**100,00**	**215712,70**	**100,00**

4.1.1. The distribution of the bone remains according to species in the Maritime Troy Culture

Domestic animal remains from the Maritime Troy Culture are represented with c. 95% in the NIS and c. 91% of the WIS. The material from different phases indicates slight differences. The number of identified wild mammal remains increase from Troy I to III (Fig. 4-2). This fact could also be observed in the weight of the remains (Fig. 4-3).

The importance of wild animals increased clearly through the course of time. Very few bone remains could not be identified as wild or domestic animals, unknowns representing less than one percent of the total. The result of wild or domestic animal remains are not used in the evaluations but described in the tables and figures below.

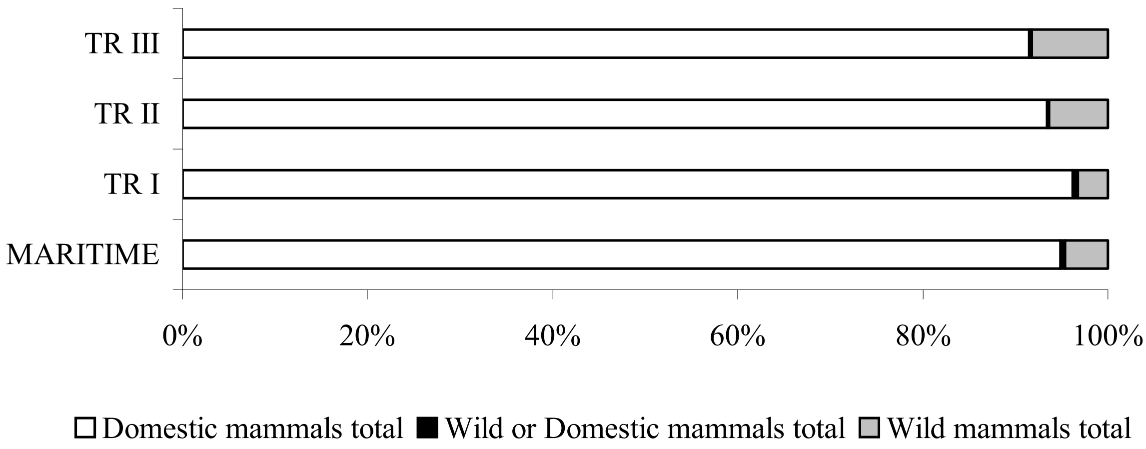

Fig. 4-2: The distribution of bone remains per domestic, wild or domestic and wild mammals for the Maritime Troy Culture and its phases in percentages[23].

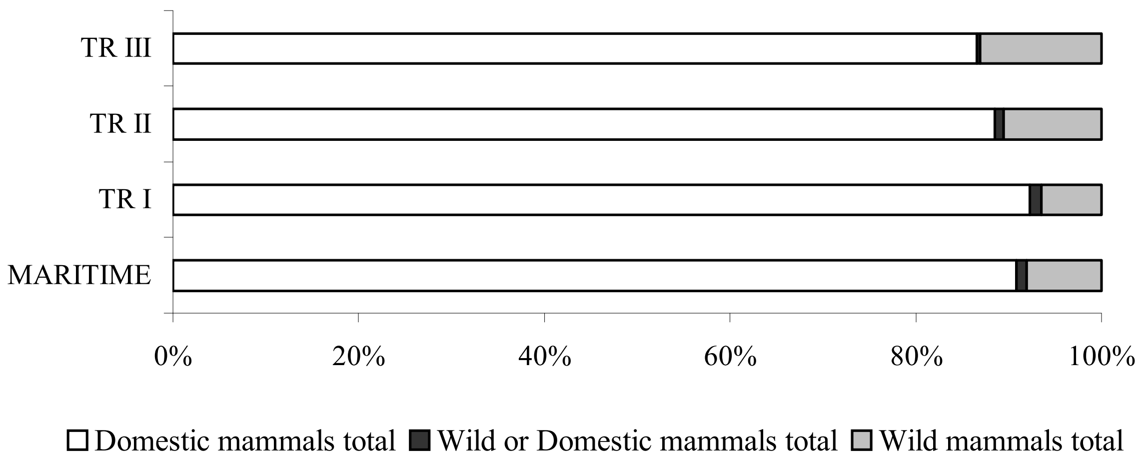

Fig. 4-3: The distribution of bone remains weight per domestic, wild or domestic and wild mammals for the Maritime Troy Culture and its phases in percentages[24].

Small ruminant remains make up the largest group in the bone assemblage, which indicates that they were the most kept animals among the possible livestock during the Maritime Troy Culture. Cattle and pig remains shifted to second and third place; cattle, though, decreased in importance noticeably during Troy III (Fig.4-4). This numerical decrease of cattle remains impacts the weight column as well. In the first two layers, cattle made up on average 43% of the bone weight among the mammal remains, decreasing later to c. 25% in Troy III (Fig.4-5). This lack of representation in the weight column was offset by small ruminants, pig and partly

[23] TR III-N =1514, TR II-N=3383, TR I-N=11006, MARITIME-N=17303
[24] TR III-W =9753,90g, TR II-W=24291,90g, TR I-W=89672,20g, MARITIME-W=135211,10g

by wild animals, mainly fallow deer. Dog was kept in small numbers during Troy I and II, with no evidence of dog found in Troy III.

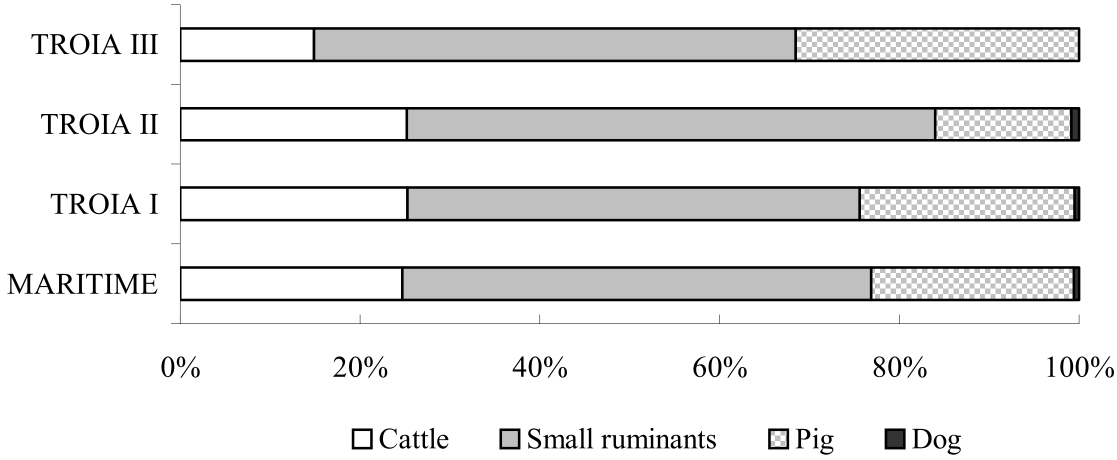

Fig. 4-4: The distribution of bone remains per domestic mammal species during the Maritime Troy Culture and its phases in percentages[25].

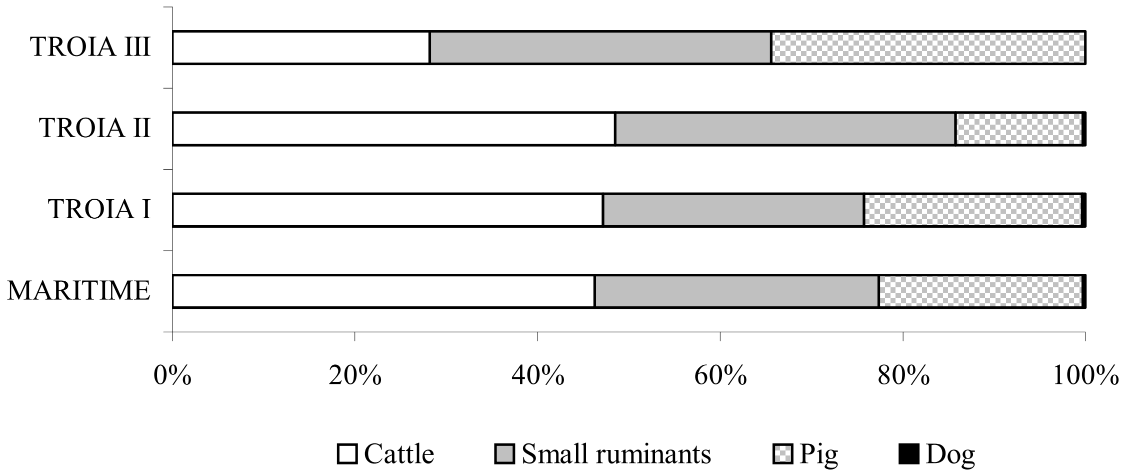

Fig. 4-5: The distribution of bone weight per domestic mammal species during the Maritime Troy Culture and its phases in percentages[26].

The wild animal remains during the Maritime Troy Culture are represented by c. 4.5% among the mammal remains, which equals c. 8% of the WIS. The percentage of identified wild animal remains increased from c. 3% to c. 8% through the course of time. This same increase could be observed in the weight column as well. The wild animal remains from Troy I weigh altogether c. 6% of the entire mammal remains weight; in Troy III the totals are approximately more than two-times this amount.

[25] TR III-N=1385, TR II-N=3160, TR I-N=10590, MARITIME-N=16417
[26] TR III-W=8443,20g, TR II-W=21497,80g, TR I-W=82733,70g, MARITIME-W=122790,80g

The wild mammal remains indicate that the animal most often hunted was certainly fallow deer. Hare was the second most hunted animal, though its contribution to the meat column is insubstantial. Aurochs and wild boar were hunted in Troy I, while fallow deer was the only hunted game animal in the other phases of the Maritime Troy Culture.

4.1.2. The unidentified bone material from the Maritime Troy Culture

More than c. 16,700 mammal remains were analysed from the Troy I period, 5005 from Troy II and c. 2070 from Troy III. Some of the remains could not be clearly identified to any species due to missing parts of the bones that are characteristic for the species or due to the small size of the fragments. The unidentified mammal remains make up altogether c. 32% (8,283) and weigh c. 12% (18,295.3 g) of the total mammal remains (Fig.4-6).

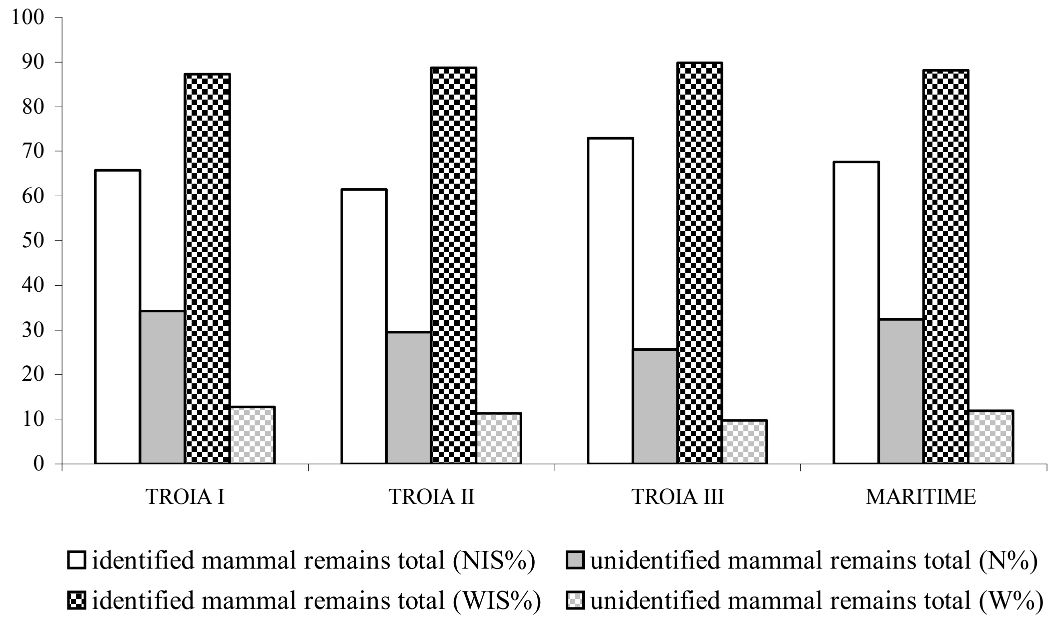

Fig. 4-6: The distribution of the identified and unidentified mammal remains and their weight in the Maritime Troy Culture per phase as percentages[27].

Approximately 35% of the bone remains from Troy I could not be classified to any species; this equals c. 30% from Troy II and 25% from Troy III. The weight of the unidentified bone remains per period, however, is not high, averaging c. 10% per period. These results indicate that the dimensions of the unidentified bone remains were too small for determining an exact

[27] identified mammal remains total in TR I-N=11006, TR II-N=3383, TR III-N=1514, MARITIME-N=17303
identified mammal remains total in TR I-W=89627,20g, TR II-W=24291,90g, TR III-W=9753,90g, MARITIME-W=135211,10g
unidentified mammal remains total in TR I-N=5715, TR II-N=1622, TR III-N=532, MARITIME-N=8283
unidentified mammal remains in TR I-W=13108,60g, TR II-W=3108,60g, TR III-W=1055,60g, MARITIME-W=18295,30g

identification. However, the unidentified bones were additionally classified according to their original size. Three groups are well represented (Fig. 4-7 and Fig. 4-8).

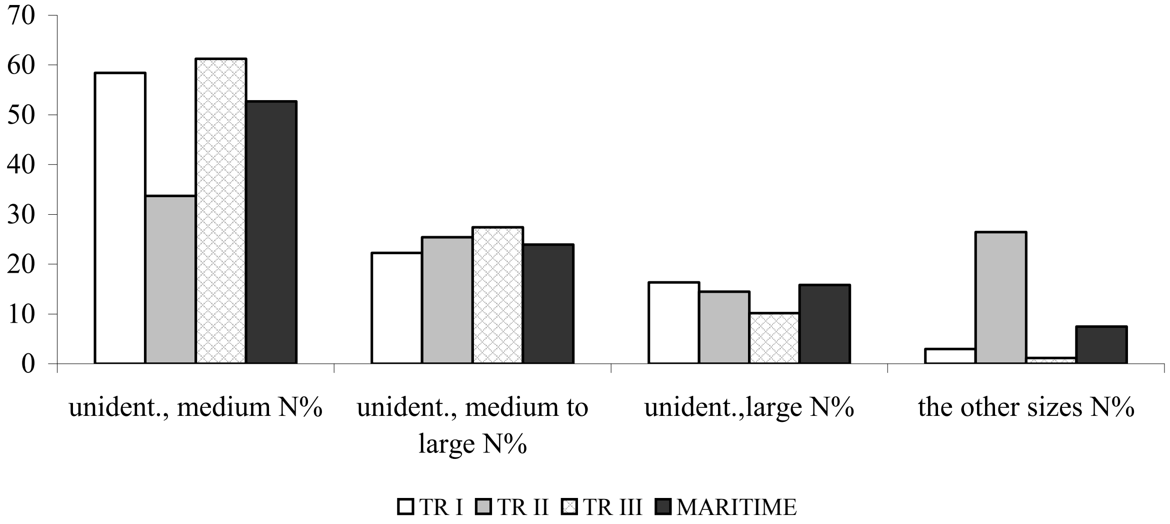

Fig. 4-7: The unidentified mammal remains as N%[28].

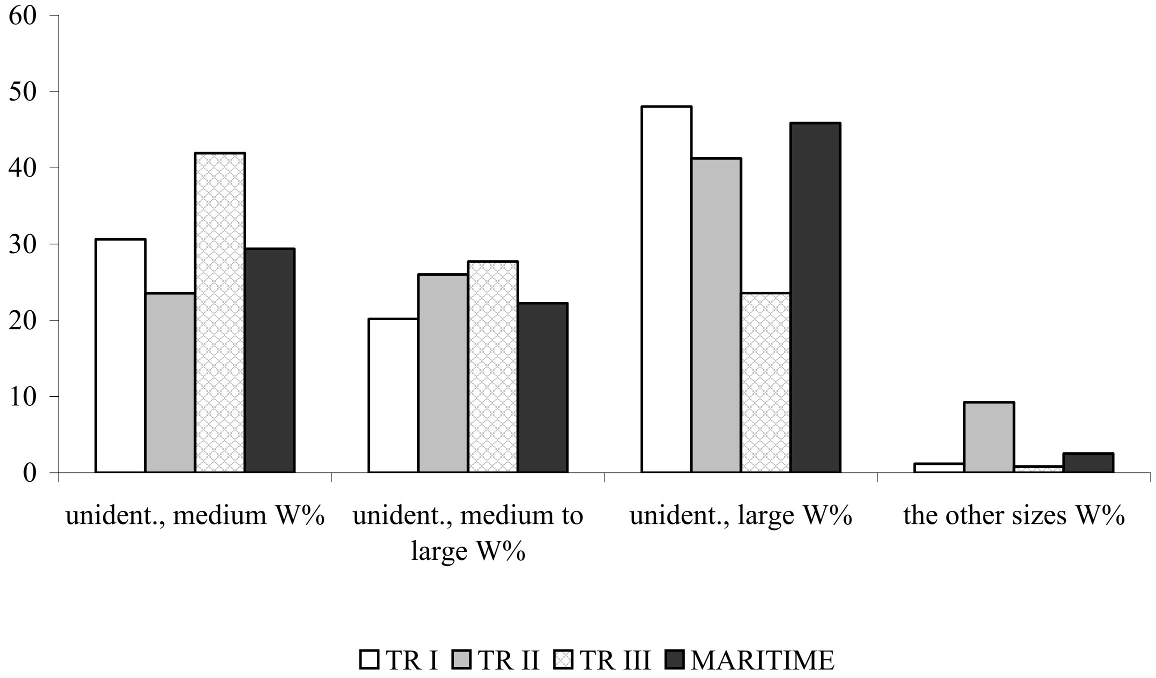

Fig. 4-8: The unidentified mammal remains as W%[29].

[28] unidentified medium N=4367, unidentified medium to large N=1984, unidentified large N=1313, other sizes N=619

[29] unidentified medium W=5377.20 g, unidentified medium to large W=4069.10 g, unidentified large W=8389.40 g, other sizes W=459.60 g

The unidentified bone remains from all time periods of the Maritime Troy Culture are grouped significantly in the range of medium-sized animals. Small ruminants or pig-sized animals could be categorised as medium-sized animals. This result reveals similarities with the identified medium-sized animals. They were dominant during all phases of the Maritime Troy Culture. The second largest group in number is represented by the fragments from medium-to-large-sized animals. This group could be limited to fallow deer, wild boar as well as some carnivores and possibly large-sized rams[30]. The third group is represented by large mammals including cattle, red deer, lion, bear and equids (Tab. 4-5).

Tab. 4-5: Potential species list including the original size of the unidentified bone remains.

Size of the mammal	**Potential species**
Medium mammals	Sheep, Goat, Pig, Roe deer, and similar sized species
Medium to large mammals	Fallow deer, Wild boar, Rams, and similar sized species
Large mammals	Cattle, Red deer, Lion, Bear, Equids, and sim. sized species

It is interesting to observe that the unidentified large-sized mammal remains, as NIS, as well as WIS, decrease during Troy III. This might be related to the decrease of cattle in the livestock during Troy III.

The increase of the unidentified remains of medium to large and the decrease of large unidentified animals is remarkable in Troy I to III. This phenomen is apparent among the clearly identifiable mammal remains as well. The number of fallow deer remains indicates an increase after Troy I. Cattle remains were identified less often over time, while an increase occurs in the fallow deer remains. These changes could also be observed on the unidentified remains.

4.1.3. Sheep to goat ratios and the possible Livestock in Troy during the Maritime Troy Culture

The diagrams provided here are not accurate enough to examine the actual occurrence of small ruminant remains from the Maritime Troy Culture (see above). The OVIS/CAPRA, unidentified domestic small ruminant remains, are represented simply by large numbers of

[30] In this group, however, bone fragments are included as well that could not be classified with certainty when originating from medium-sized or large-sized mammals. This may occur due to the small size of the bone fragment.

bone. We are only sure that these bones belong to either sheep or goat. But OVIS/CAPRA material does not represent an animal species, but for the purposes here, does indicate the relationship of identified sheep to goat bones, which offer a better picture of the flock population in Troy.

Table 4-6 (s. b.) shows the number of finds and the bone weight in the relation of sheep to goat. These numbers could help interpret the possible distribution of sheep and goat in the livestock.

The new figures after re-calculation indicate that sheep were more often kept than goat in all phases of the Maritime Troy Culture. More than 1/3 of the domestic animal remains were sheep in Troy I, making up nearly half of the domestic animal remains in Troy II-III. Goat remains decreased in the bone assemblage over the course of the time (Fig. 4-9).

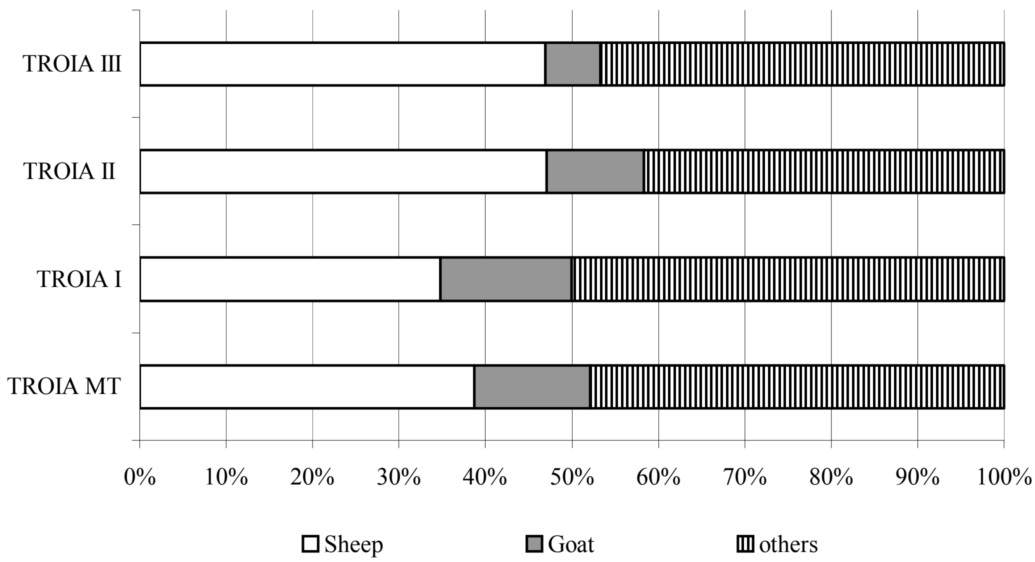

Fig. 4-9: Number of identified bone remains from sheep and goat among the identified domestic animals after re-calculations from Troy I, Troy II, Troy III and during the Maritime Troy Culture[31].

Goat remains were found in small numbers; their contribution, therefore, to the weight column is quite small. Goat decreased rapidly in importance after Troy I, while sheep remains increased. Sheep bone remains make up only one-fifth of the bone weight in Troy I, though in later phases sheep remains clearly increased, making up one-third of the bone weight in later periods (Fig. 4-10).

[31] TR III-N=1385, TR II-N=3160, TR I-N=10590, MARITIME-N=16417

Tab. 4-6: The Ratio between identified Sheep and Goat and possible NIS and NIS% as well as WIS and WIS% after re-calculations in the assemblage of identified mammal remains.

Number

TR I	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep	~ 2,30 : 1	~ 3683	~ 33,46
Goat		~ 1600	~ 14,54

TR II	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep	~ 4,20 : 1	~ 1499	~ 44,30
Goat		~ 357	~ 10,56

TR III	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep	~ 7,45 : 1	~ 654	~ 43,19
Goat		~ 88	~ 5,82

TROY MT	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep	~ 2,90 : 1	~ 6370	~ 36,81
Goat		~ 2196	~ 12,69

Weight

TR I	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep	~2,35 : 1	~ 16600	~ 18,52
Goat		~ 7058,5	~ 7,87

TR II	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep	~5,83 : 1	~ 6830	~ 28,11
Goat		~ 1176,4	~ 4,85

TR III	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep	~8,59 : 1	~ 2827	~ 28,98
Goat		~ 330,2	~ 3,39

TROY MT[32]	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep	~3,26 : 1	~ 29261	~ 21,64
Goat		~ 8976,5	~ 6,64

[32] The Maritime Troy Culture.

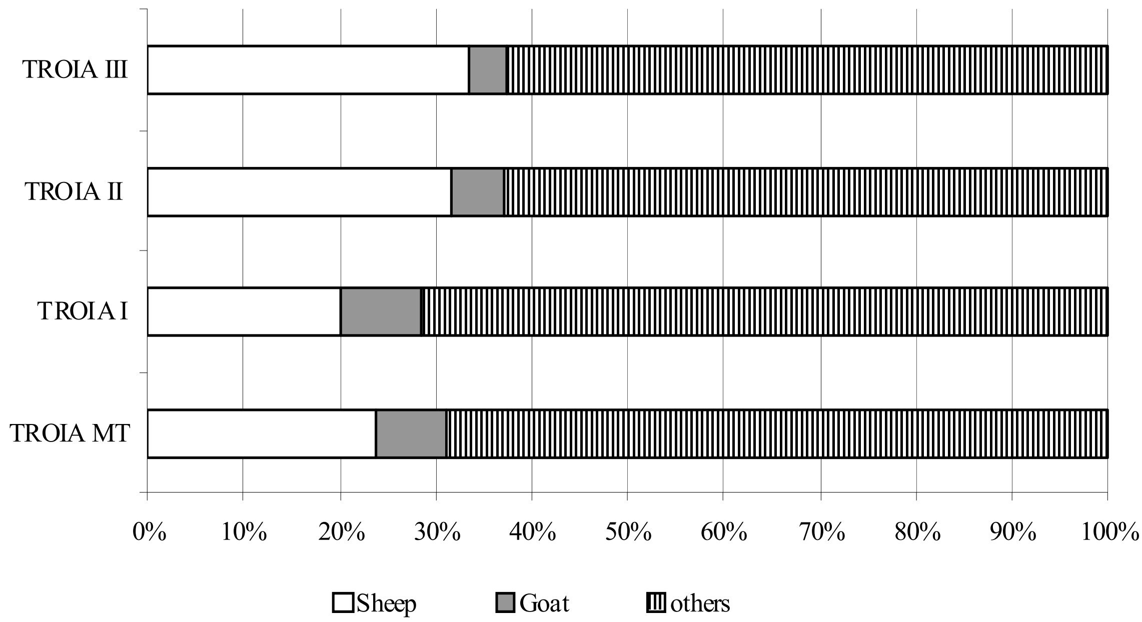

Fig. 4-10: Weight of the identified bone remains from sheep and goat for the Maritime Troy Culture and its phases in percentages among the identified domestic animals after re-calculation[33].

The general picture produced above for the small domestic ruminants from the Maritime Troy Culture illustrates that almost half of the remains originated from sheep and goat. The sheep remains stayed constant around 39% (23% of WIS) and goat around 13% (7% of WIS) (Fig. 4-11).

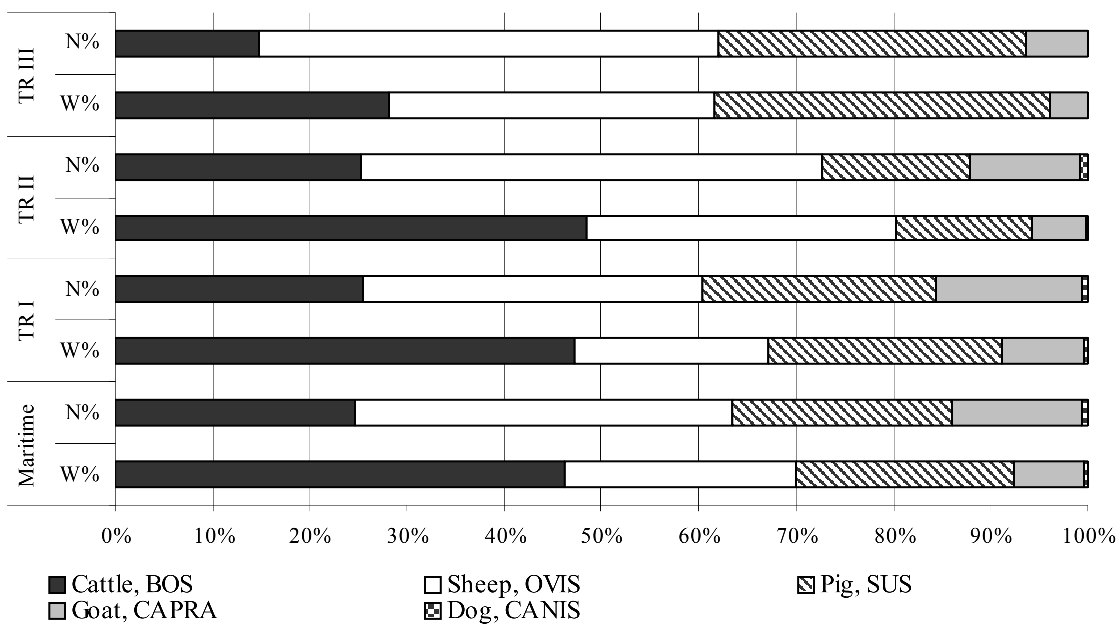

Fig. 4-11: The weight and identified bone remains from sheep and goat among the identified domestic animals after re-calculation from Troy I, Troy II, Troy III and the Maritime Troy Culture[34].

[33] TR III-W=8443,20g, TR II-W=21497,80g, TR I-W=82733,70g, MARITIME-W=122790,80g
[34] TR III-N=1385, TR II-N=3160, TR I-N=10590, MARITIME-N=16417
TR III-W=8443,20g, TR II-W=21497,80g, TR I-W=82733,70g, MARITIME-W=122790,80g

Sheep remains constitute the biggest group throughout the Maritime Troy Cultural periods. Cattle remains constitute the second largest group, except for in Troy III, with pig representing the second most identified domestic animal. Pig was otherwise in third place overall (Tab. 4-7).

Tab. 4-7: The first three animals most often kept among the Maritime Cultural periods.

Phase	Animal Husbandry
Troy III	Sheep-Pig-Cattle
Troy II	Sheep-Cattle-Pig
Troy I	Sheep-Cattle-Pig

4.2. Animal Bone Material from Kumtepe

Researchers from the University of Tübingen studied the organic remains. M. UERPMANN analysed the shell, fish and mammal remains. The results of the fauna studies are not as yet completely published. The first published information was used below to compare with the results from Troy. S. RIEHL studied the botanic remains.

Kumtepe lies on the western bank of the Kara Menderes Stream, south of Kumkale, in the southwest of the Çanakkale Province. It is 2.5 km away from the Dardanelles and 2 km away from the Aegean Sea. It could be described as a neighbouring mound to Troy (Map. 4-1)[35]. The mound reaches the height of 4 to 5 m and is approximately 80 x 100 m in dimensions. The Kara Menderes cuts into the eastern slope of the mound. More recently the mound was levelled by about 15 truckloads of stones, which were subsequently removed[36].

[35] The map is located at the very end of this Chapter.

[36] The first excavations took place during the 1934 campaign by J. Sperling and H. Z. Kosay. M. Korfmann directed the second campaign between 1993 and 1997. There are three main levels in the mound:
Kumtepe I a = Copper Age,
Kumtepe I b = Copper Age /EBA (pre-Troy I),
Kumtepe I c = Troy I.
Burnished in grey, brown and black shades, EBA pottery is typical for Kumtepe Ib, where bowls with inverted, thickened rims, interior-thickened rims, unrolled and out-rolled rims are quite common. Incised decorative markings were the preferred decorative motif. However, in the earlier level (Kumtepe Ia) the decorative elements are seldom while burnishing could be observed on a few examples. These earlier examples represent forms such as flat bases, plain sides, and tapering rims. The ceramic assemblage from Kumtepe Ic is identical to Troy I material. The existence of a Level II is known, though the entire level is missing due to damage.

4.3. Animal Bone Material from Yenibademli

The author was able to identify mostly mammal remains[37]. Approximately 14,750 faunal remains were examined from Yenibademli and c. 8,850 remains were recorded as mammal. One quarter of the bone remains could not be identified with certainty, and thus constitute a group appropriately labelled unidentified (Tab. 4-8, s. b.). All of the identified faunal remains weigh more than 118 kg, with c. 96 kg coming from the mammal remains. The bone material consisted primarily of domestic animals (small ruminants), while fallow deer (almost the only identified game animal) remains made up one-tenth of the identified mammal remains.

Yenibademli is an island mound settlement, situated today c. 1.5 km away from the sea on the northern side of Gökçeada (Imroz). Gökçeada is located in the North Aegean Sea. The site was reported first by N. FIRATLI in 1964 (Map. 4-1). H. HÜRYILMAZ has directed excavations there since 1996. The Büyük Dere (Ilissos Stream) flows near the western part of the mound site and is the largest body of running water on the island. The settlement was located at the south-south eastern shore at the end of a bay during the third millennium BC. Over time the bay has filled with the alluvial of the stream. Today the mound rests 18 m above sea level and is ca. 130 x 120 m in dimensions[38].

[37] C. Çakirlar worked on the shell remains.

[38] The site was occupied mainly during the Early Bronze Age II and would have been contemporary with Troy I. A settlement on the southern part of the mound dates to the end of the second millennium BC (Late Mycenaean Period).

Tab. 4-8: Species list for the Early Bronze Age of Yenibademli.

TAXONOMY	NIS	NIS-%	WIS-(g)	WIS-%
Cattle BOS	1434	21,21	39788,50	45,08
Sheep, OVIS	335	4,95	4742,70	5,37
Goat, CAPRA	118	1,75	2082,50	2,36
Sheep or Goat, CAPRA/OVIS	3145	46,52	16361,10	18,54
Pig, SUS	918	13,58	12292,60	13,93
Donkey, ASINUS	5	0,07	102,00	0,12
Dog, CANIS	49	0,72	376,10	0,43
Domestic mammals total	**6004**	**88,80**	**75745,50**	**85,82**
Wild or Domestic Cattle	9	0,13	1031,00	1,17
Wild or Domestic Sheep	1	0,01	14,00	0,02
Wild or Domestic Sheep/Goat	2	0,03	41,00	0,05
unidentified smaller ruminant	1	0,01	6,90	0,01
Wild Boar or Pig	23	0,34	702,30	0,80
Wild or Domestic mammals total	**36**	**0,53**	**1795,20**	**2,03**
Rodentia unident., small	1	0,01	0,90	0,00
Hare, *Lepus capensis/europaeus*	4	0,06	8,50	0,01
Fox, *Vulpes vulpes*	16	0,24	69,10	0,08
Carnivora unident., small	5	0,07	27,50	0,03
Carnivora unident., medium	1	0,01	5,80	0,01
Wild Boar, *Sus scrofa*	4	0,06	18,80	0,02
Fallow deer, *Dama dama*	680	10,06	10449,80	11,84
Roe deer, *Capreolus capreolus*	1	0,01	16,00	0,02
Cervidae unident.	6	0,09	61,80	0,07
Wild goat, *Capra aegagrus*	3	0,04	59,40	0,07
Wild mammals total	**721**	**10,66**	**10717,60**	**12,14**
unidentified, small to medium	1	0,05	0,40	0,01
unidentified, medium	1440	69,20	3258,90	41,39
unidentified, medium to large	247	11,87	1342,90	17,06
unidentified, large	391	18,79	3270,60	41,54
unidentified	2	0,10	0,20	0,00
unidentified mammal remains total	**2081**	**100,00**	**7873,00**	**100,00**
identified mammal remains total	**6761**	**76,46**	**88258,30**	**91,81**
unidentified mammal remains total	**2081**	**23,54**	**7873,00**	**8,19**
mammal remains total	**8842**	**100,00**	**96131,30**	**100,00**
Aves unident.	8	0,14	13,20	0,06
Reptilia unident.	24	0,41	120,70	0,54
Pisces unident.	5	0,08	15,30	0,07
Shells	5850	99,37	21977,80	99,33
non-mammal remains	**5887**	**100,00**	**22127,00**	**100,00**
mammal remains total	**8842**	**60,03**	**96131,30**	**81,29**
non-mammal remains total	**5887**	**39,97**	**22127,00**	**18,71**
processed material TOTAL	**14729**	**100,00**	**118258,30**	**100,00**

4.4. An Overview of the general composition of the Animal Bone Remains from Troas and Yenibademli during the Maritime Troy Culture

Even though Troy was the longest occupied settlement in the region, it was not the only prehistoric site in the Troas region. There are other earlier or contemporary sites that existed near Troy that have lost their importance over time and were subsequently abandoned. Beşik-Sivritepe[39] and the first layers of Kumtepe (A-B) were dated earlier than Troy I, while Kumtepe I C as well as Beşik-Yassıtepe[40] are contemporary with Troy I on the mainland. The island settlement of Yenibademli on Gökçeada contains material that is dated to Troy I (see Chronology Table 4-9). These four sites are very important for understanding the animal husbandry and red meat consumption in the Troas Region.

Tab. 4-9: The Chronology of some of the important sites mentioned in this study.

SITE	~ BC.	Author	Publication
Kumtepe A	4805-4370	B. Kromer et al.	Troai and the Troad
Kumtepe B	3370-2910	B. Kromer et al.	Troai and the Troad
Kumtepe C	=Troy I	H.-P. Uerpmann	Troai and the Troad
Troy I	2920-2550	M. Korfmann	Traum und Wirklichkeit
Troy II	2550-2250	M. Korfmann	Traum und Wirklichkeit
Troy III	2250-2200	M. Korfmann	Traum und Wirklichkeit
Maritime Troy Culture	3000-2200	M. Korfmann	Traum und Wirklichkeit
Besiktepe	2850-2600	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Yenibagdemli	=EBA II / Troy I	H. Hüryilmaz	personal contact
Ulucak CA	CA	A. Çilingiroglu	Ulucak Höyük. Excavations Conducted between 1995 and 2002
Ulucak EBA	EBA	A. Çilingiroglu	Ulucak Höyük. Excavations Conducted between 1995 and 2002
Fikirtepe Neo.	5900-5300	TAY	TAY
Ilipinar (X) NEO.	5900-5300	TAY	TAY
Ilipinar (IX) NEO. to CA.	5100-5000	TAY	TAY
Ilipinar (V-VI)	4700-4300	TAY	TAY
Ormanfidanligi	4300-3300	T. Efe	Orman Fidanligi
Küllüoba TP	3300-3000	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Küllüoba EBA I	3000-2700	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Küllüoba EBA II	2700-2400	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Küllüoba EBA III	2400-2000	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Demircihüyük/E. E.B.A	3100-2700	Rau	Knochenfunde von Säugertieren aus dem Demircihüyük
Demircihüyük/L. E.B.A	2700-2400	Rau	Knochenfunde von Säugertieren aus dem Demircihüyük
Karataş-Semayük.	EBA I-II-III	B. Hesse & D. Perkins	Faunal remains from Karataş-Semayük. In SW Anatolian: An Interim Report
Bogazköy CA	5000	von den Driesch	Bogazköy-Berichte 7
Bogazköy EBA	2000	von den Driesch	Bogazköy-Berichte 7
Korucutepe EBA	2600-2300	M.N. van Loon	Korucutepe 1
Lidar Höyük EBA	3000-2000	Kussinger	Tierknochenfunde vom Lidar Höyük in Südostanatolian

[39] Fauna remains from Beşik-Sivritepe were analysed by von den Driesch and Boessneck. The number of identified mammal remains small; therefore these results are not used in the present study.
[40] von den Driesch 1999.

This chapter provides details on the general composition of the animal bone remains from Troas and Yenibagdemli during the Maritime Troy Culture and earlier periods. The contemporary settlements Kumtepe IC, Beşik-Yassıtepe, Yenibademli and Troy I are compared below as well.

Most of the identified mammal remains from Troas and Yenibademli are from domestic animals. Only Yenibademli contains identified domestic animals making up less than 90% of the total. The wild mammal remains represent c. 11% of the assemblage in Yenibademli. This represents three times more than the contemporary sites of Beşik-Yassıtepe and Troy I, and most probably of Kumtepe IC. Domestic animal remains from Troas and Yenibademli are again clearly dominant in the weight column (Fig. 4-12 and Fig. 4-13).

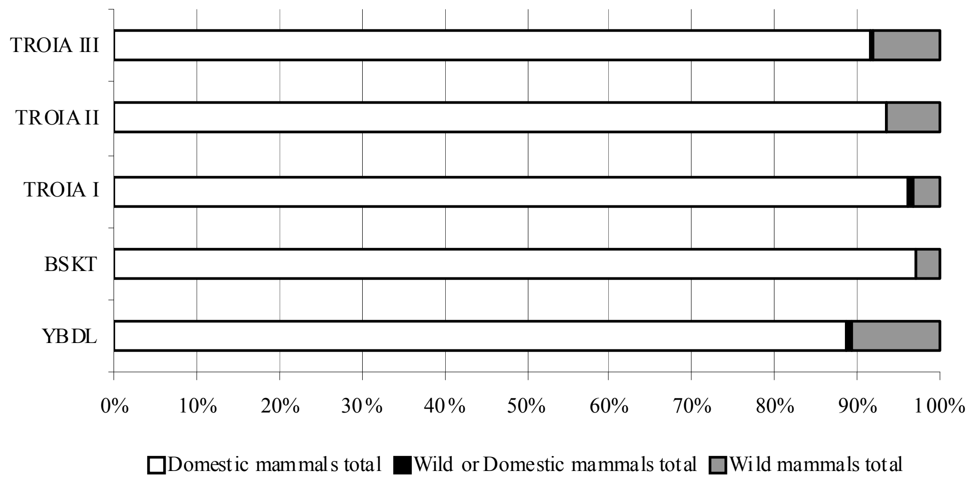

Fig. 4-12: Number of identified mammal remains from Troy III, Troy II, Troy I, Beşik-Yassıtepe and Yenibademli.

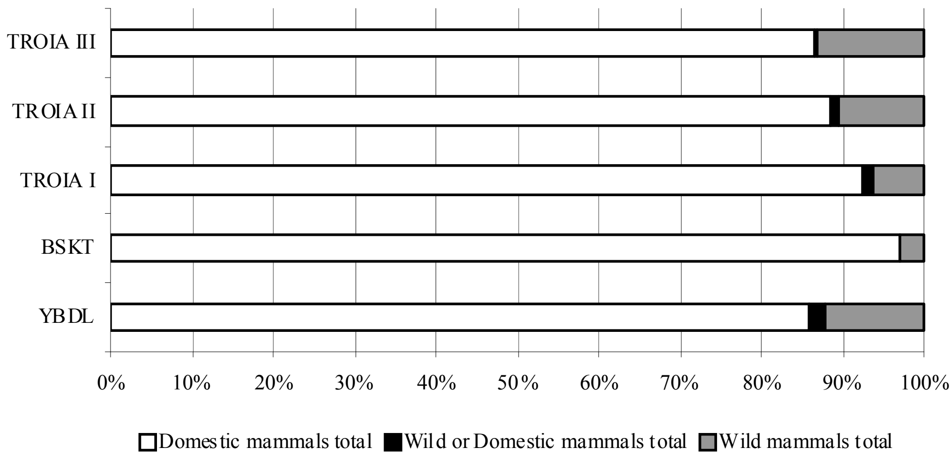

Fig. 4-13: Weight distribution of identified mammal remains from Troy III, Troy II, Troy I, Beşik-Yassıtepe and Yenibademli.

Seven domestic mammals were clearly identified in the settlements of Troas and Yenibademli before and during the Early Bronze Age. The typical domestic mammals expected to be found for these epochs are cattle, sheep, goat, pig and dog, remains of which are identified from the settlements. Horse and donkey remains, however, were identified in the assemblages of Beşik-Yassıtepe and Yenibademli. Indeed, the Equid remains cannot be related to the Early Bronze Age, nor could they derive from earlier periods as well.

The earliest appearance of domestic horse and donkey in the Troas was during Troy VI (c. 1700-1600 BC.[41]), that is, in the Middle to Late Bronze Age (UERPMANN 2003:256). VON DEN DRIESCH reported that the equid remains from Beşik-Yassıtepe (only horse) originate from disturbed layers, from the Archaic or Hellenistic epoch (VON DEN DRIESCH 1999:444). The donkey remains from Yenibademli would have also originated from disturbed layers, in this case from the Late Mycenae period (end of the 2nd Millennium[42]).

Hunted species are important for reconstructing the environment of Troas and Yenibademli. Fallow deer was the most hunted animal in the region. It is also possible to find some of the following species in the region: hare, red deer, wild boar and aurochs, as well as lion, wolf, bear, and others.

Remains of fowl from Troy and Beşik-Yassıtepe were identified by KRÖNNECK[43] and by VON DEN DRIESCH[44]. These finds help in reconstructing the environment of Troas during the Early Bronze Age.

4.4.1. Distribution of Domestic Animals in Troas and Yenibademli

Kumtepe A[45] is the oldest settlement in Troas from which animal remains are studied. The time of the settlement has been divided into two periods, namely Early and Late (M. UERPMANN 2006:285). The first settlers of Kumtepe seem obviously to have been interested in keeping sheep and cattle in large numbers, according to the identified bone remains.

[41] KORFMANN 2001:348
[42] TAY
[43] KRÖNNECK 1995.
[44] von den Driesch 1999: 451-454
[45] M. UERPMANN and H-P. UERPMANN published only the bone weights in percentages from Kumtepe A-B-C in "Archäologie eines Siedlungshügels und seiner Landschaft" and "Troy and the Troas." This information is based on M. UERPMANN´s results. The weight results are used to determine the number of identified species. The results, NIS- % and WIS-%, from other sites in Troas are used to produce a logical NIS-% diagram from Kumtepe.

Probably sheep were kept more than cattle. Pigs were kept in very small numbers. The importance of pig breeding, though, increased in the later periods of Kumtepe A. (Fig.4-14) (M. UERPMANN 2006:Fig.1).

Kumtepe B represents suddenly a different picture. In this phase, pig remains are the most identified domestic mammals, making up over 40% of the total identified assemblage. Sheep remains were no longer dominant, making up the second largest category, followed by cattle. These two earlier phases of Kumtepe represent former animal husbandry patterns in Troas before the Early Bronze Age.

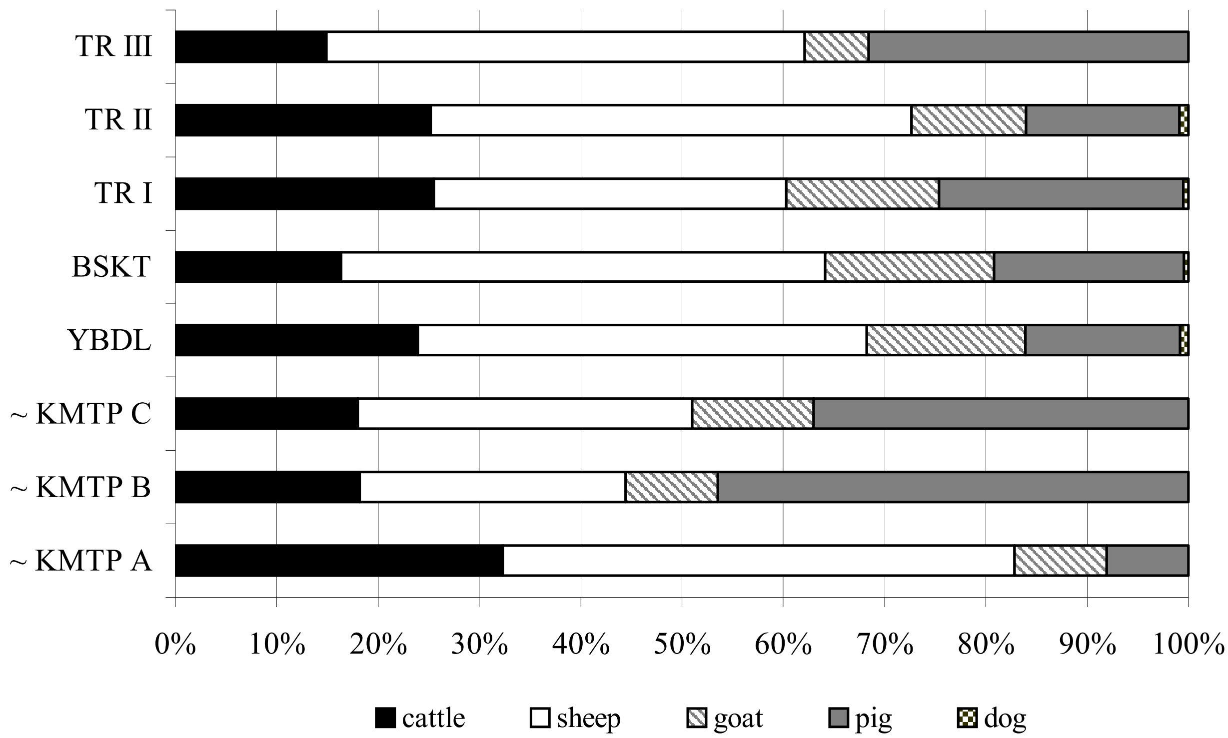

Fig. 4-14: Number of identified domestic mammal remains in the Troas settlements: Troy III, Troy II, Troy I, Beşik-Yassıtepe, Yenibademli, ~ Kumtepe C, ~ Kumtepe B and ~ Kumtepe A.

During Kumtepe C there was again a change in the domesticated animal spectrum. The number of sheep remains increased, whereas the pig remains decreased (UERPMANN 2003: Fig.1 and 254). Kumtepe was no longer the only settlement in the surrounding area during the Early Bronze Age. Contemporary settlements such as Troy, Beşik-Yassıtepe and Yenibademli were established, and Kumtepe begins to reveal similarities and differences with other contemporary settlements.

In Troy I and Yenibademli cattle represented more than 20% of the domestic animal remains, though less than 20% in Beşik-Yassıtepe and Kumtepe. Pig lost its importance during Kumtepe C. However, at no other site in Troas was pig kept in such large numbers as at Kumtepe during period C.

At all the other sites the domestic small ruminant remains represent the largest group. The proportion of sheep in the livestock was always noticeably more than of goat. In Beşik-Yassıtepe and Yenibademli goat was kept less often than at Troy I and Kumtepe C. Sheep were the most kept domesticated animal in the region, except for in Kumtepe, where pig and sheep were probably kept in similar amounts during Kumtepe C.

Sheep remains in the bone assemblages increased in importance after the second half of the millennium, to be exact, during Troy II and III (2550-2200 BC.). Cattle remains in Troy during phase II remained nearly constant during phase I, though in phase III cattle breeding lost half of its importance, while pig and small ruminants increased in number.

Cattle remains are almost in every period and settlement the group most highly represented overall in Troas and Yenibademli. Cattle remains made up more than 60% of the identified domestic mammal remains in Kumtepe A, while sheep remains made up c. 30%. The contribution of pig and goat remains to the weight column is less than ten percent. A radically different picture emerges during Kumtepe B. Pig remains make up c. 50% of the total numbers in the weight column. Cattle remains make up c. 30% of the whole weight among the domestic animals for the same period. Small ruminants, mostly from sheep, make up the rest of the recorded remains (UERPMANN 2003: Fig.1) (Fig.4-15).

Kumtepe C produced similar weight percentages for cattle, small ruminants and pig remains, with goat remains recorded in very small amounts. In Troy I, cattle remains made up approximately 45% of the weight column, with pig in second place. Small ruminants made up around 30% of the weight column, one-third of the total being goat. The contribution of cattle remains to the weight column in Beşik-Yassıtepe was little bit more than 40%. Small ruminants equaled 40 % of the remains, goat making up one quarter of the total, and pig remains producing one-fifth of the recorded weight. Half of the weighed material from the domestic remains in Yenibagdemli came from cattle, followed by sheep and pig. Goat made up only one-tenth of the weighed material from the identified domestic mammal remains.

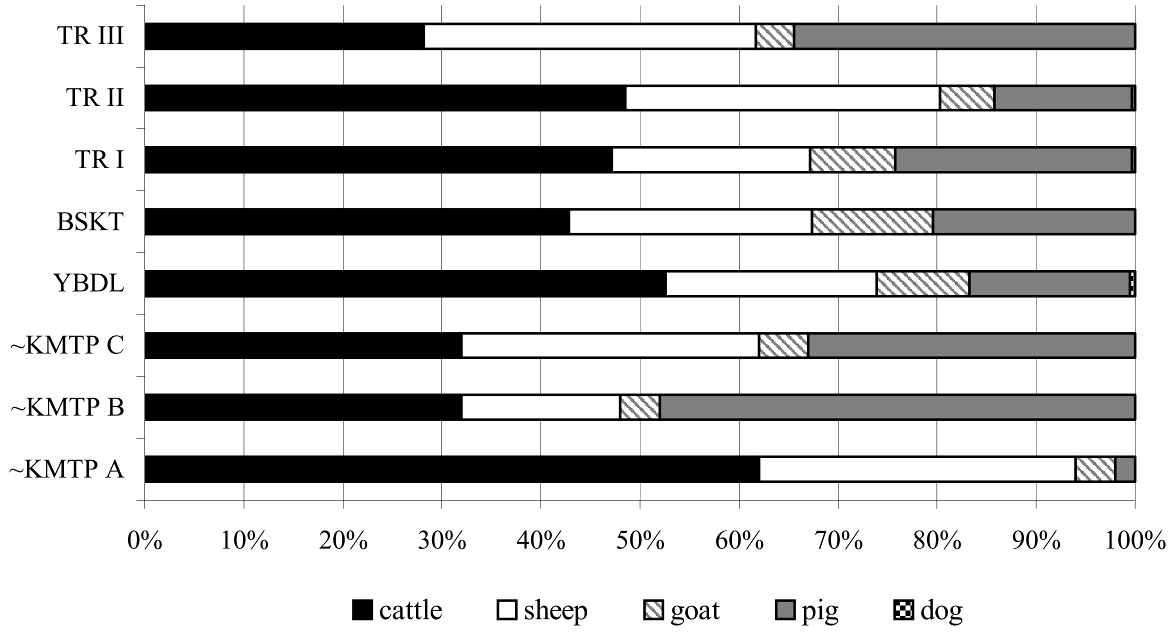

Fig. 4-15: Weight distribution of identified domestic mammal remains in the Troas settlements: Troy III, Troy II, Troy I, Beşik-Yassıtepe, Yenibademli, ~ Kumtepe C, ~ Kumtepe B and ~ Kumtepe A.

The bone assemblages from Troy I and Troy II are similar, while identified sheep remains increase in number and weight in Troy II, and pig remains decrease in the weight column in Troy II. Troy III reveals a very similar pattern as in Kumtepe C with regard to the weight category. Cattle remains make up c. one-third of the weight column as do sheep and pig remains.

4.5. Animal Bone Material from Ulucak

Most of the mammal remains[46] (2004-2005) were analyzed for this thesis at the Ege University in Izmir. The entire collection of animal remains from the Early Bronze Age II period recovered up until the 2005 excavations and most of the material from the Late Copper Period were recorded as computerized data.

Approximately 3,100 pieces of bone were identified from the Copper Age periods. A total of c. 1,650 remains were classified as domestic animal, and c. 300 remains were recorded as wild mammal. The wild animal remains make up c. 18,2 % of the identified mammal remains (Tab. 4-10).

[46] C. Çakirlar identified the shell remains.

A total of 1,600 fauna remains were identified as mammal from the Early Bronze Age layers. Domestic animals make up the majority with 930 pieces, while the wild animal remains make up altogether c. 250 pieces, with any remaining pieces classified as unidentified. Identified domestic animal remains make up c. 13,3 kg and wild fauna c. 5 kg of the total weight (Tab. 4-11)

Ulucak Höyük is located in West Anatolia, ca. 25 km from Konak along the Izmir-Turgutlu-Ankara motorway. The site is 220.86 m above sea level (Map 4-1). The University of Ege and the Ministry of Culture, in cooperation with the Izmir Archeologically Museum, have been working together at the mound site since 1995, under consultative efforts of A. ÇILINGIROGLU. The mound is ca. 120 x 140 m in dimensions and 6 m above the plain (ÇILINGIROGLU, A. 2004).

A cemetery, dated to the Early and Middle Bronze Age, located 200 m east of the mound, was also excavated. Most of burials were found in pithoi. The mound was also occupied from the Late Neolithic to the Late Roman-Early Byzantine period. No cemetery from the Neolithic period was discovered[47]. The following phases occurred in Ulucak: I - Late Roman - Early Byzantine / II - Early Bronze Age II / III - Late Copper Period / IV - Late Neolithic Period (ÇILINGIROGLU, A. 2004).

[47] Pottery, unrelated to the architectural remains, from the Early Bronze Age III was found in the mound. More material was uncovered in the cemetery, with burials dating to the Middle Bronze Age. There is no evidence found in the mound that can be associated with this period. The settlement pattern during the Early Bronze Age II is characterized by oval and circular defense walls in the "Anatolian Settlement Pattern", examples of such being found in Demircihüyük, Thermi V, Troy, and others. The western part of the mound offers insight into the general plan of the area. The architectural remains from the Late Copper Period are too few in number to be interpreted here. There are two main groups of ceramics from the Early Bronze Age II that are fine and coarse. The paste color is gray or brown. The fine paste contains mica and sand. Forms include carinated bowls, S-profiled bowls and jars, inverted rim, simple rimmed and round shaped bowls, among others. The ceramics are typical for western Anatolia. The black and red burnished ware and inverted rim bowls from Ulucak are also found in Troy II, Poliochni, Thermi, Kumtepe, and other sites. The simple rimmed bowls and spouted jugs reveal similarities with the Eskişehir Region, Demircihüyük. The black and gray group of ceramics from Ulucak is associated with the Yortan A-type, from the Balıkesir Region. Generally speaking, it is possible to associate this period with Troy IIb, if wheel-made ceramics are considered. Few ceramics were found from the Late Copper Period. They include hand-made pieces with a coarse paste. Ceramic temper includes mostly large coarse to medium-coarse sand, followed by mica and lime. The ceramic finds are black, gray or gray-brown in color and well fired. They exhibit a mostly zig-zag and line decoration on the interior side. Grooves are another form of decoration. In west Anatolia similar ceramics, in both technology and typology, are observed in Baklatepe and Ilıpınar Level V. Burnished decoration is peculiar to ceramics of the Late Copper Period in Ulucak. This form of decoration is found as well in Kumtepe IA, Beşik-Sivritepe, Beycesulten, Hoca Çeşme and Toptepe Level I (ÇILINGIROGLU, A. 2004).

Tab. 4-10: Species list for the Copper Age of Ulucak.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
Cattle BOS	434	21,79	10285,00	47,40
Sheep, OVIS	51	2,56	547,60	2,52
Goat, CAPRA	22	1,10	459,00	2,12
Sheep or Goat, CAPRA/OVIS	1040	52,21	4650,90	21,43
Pig, SUS	114	5,72	1107,50	5,10
Dog, CANIS	17	0,85	155,10	0,71
Domestic mammals total	**1678**	**84,24**	**17205,10**	**79,29**
Wild or Domestic Cattle	16	0,80	393,00	1,81
Wild Boar or Pig	6	0,30	163,00	0,75
Wild or Domestic mammals total	**22**	**1,10**	**556,00**	**2,56**
Rodentia unident., small	2	0,10	1,00	0,00
Hare, *Lepus capensis/europaeus*	19	0,95	43,20	0,20
Fox, *Vulpes vulpes*	2	0,10	5,20	0,02
Carnivora unident., small	1	0,05	11,00	0,05
Carnivora unident., large	2	0,10	3,90	0,02
Wild Boar, *Sus scrofa*	7	0,35	247,00	1,14
Fallow deer, *Dama dama*	247	12,40	3478,90	16,03
Red deer, *Cervus elaphus*	2	0,10	42,00	0,19
Roe deer, *Capreolus capreolus*	5	0,25	33,70	0,16
Cervidae unident.	4	0,20	51,00	0,24
Aurochs, *Bos primigenius*	1	0,05	21,00	0,10
Wild mammals total	**292**	**14,66**	**3937,90**	**18,15**
unidentified, medium	810	71,68	2082,50	47,54
unidentified, medium to large	172	15,22	940,00	21,46
unidentified, large	148	13,10	1357,60	30,99
unidentified mammal remains total	**1130**	**100,00**	**4380,10**	**100,00**
identified mammal remains total	**1992**	**63,81**	**21699,00**	**83,20**
unidentified mammal remains total	**1130**	**36,19**	**4380,10**	**16,80**
mammal remains total	**3122**	**100,00**	**26079,10**	**100,00**
Aves unident.	2	3,28	5,30	2,83
Pisces unident.	1	1,64	0,10	0,05
Reptilia unident.	9	14,76	39,50	21,07
Shells	49	80,33	142,60	76,05
not mammal remains	**61**	**100,00**	**187,50**	**100,00**
mammal remains total	**3122**	**98,08**	**26079,10**	**99,29**
not mammal remains total	**61**	**1,92**	**187,50**	**0,71**
processed material TOTAL	**3183**	**100,00**	**26266,60**	**100,00**

Tab. 4-11: Species list for the Early Bronze Age of Ulucak.

TAXONOMY	**NISP**	**NIS-%**	**WIS(g)**	**WIS-%**
Cattle BOS	200	16,72	5679,10	30,42
Sheep, OVIS	62	5,18	814,30	4,36
Goat, CAPRA	23	1,92	391,10	2,10
Sheep or Goat, CAPRA/OVIS	454	37,96	2914,60	15,61
Pig, SUS	177	14,80	3424,10	18,34
Dog, CANIS	16	1,34	142,40	0,76
Domestic mammals total	**932**	**77,93**	**13365,60**	**71,60**
Wild Boar or Pig	11	0,92	327,00	1,75
Wild or Domestic mammals total	**11**	**0,92**	**327,00**	**1,75**
Hare, *Lepus capensis/europaeus*	5	0,42	27,30	0,15
Wild Boar, *Sus scrofa*	8	0,67	253,90	1,36
Fallow deer, *Dama dama*	228	19,06	4499,50	24,10
Roe deer, *Capreolus capreolus*	9	0,75	162,30	0,87
Cervidae unident.	3	0,25	31,20	0,17
Wild mammals total	**253**	**21,15**	**4974,20**	**26,65**
unidentified, medium	249	56,21	754,70	32,87
unidentified, medium to large	127	28,67	804,40	35,04
unidentified, large	67	15,12	736,60	32,09
unidentified mammal remains total	**443**	**100,00**	**2295,70**	**100,00**
identified mammal remains total	**1196**	**72,97**	**18666,80**	**89,05**
unidentified mammal remains total	**443**	**27,03**	**2295,70**	**10,95**
mammal remains total	**1639**	**100,00**	**20962,50**	**100,00**
Aves unident.	1	0,15	0,50	0,03
Reptilia unident.	3	0,44	7,00	0,46
Shells	681	99,42	1524,70	99,51
not mammal remains	**685**	100,00	**1532,20**	100,00
mammal remains total	**1639**	**70,52**	**20962,50**	**93,19**
not mammal remains total	**685**	**29,48**	**1532,50**	**6,81**
processed material TOTAL	**2324**	**100,00**	**22494,70**	**100,00**

4.6. Animal Bone Material from Küllüoba

H-P. UERPMANN and the author analyzed the bone material on site in the summer of 1996. The work was continued in 1997 with the contribution of M. UERPMANN. The author analysed the material further in 2000 at the University of Istanbul for his Master's thesis. The work was taken up again in 2005 on site and later at the University of Istanbul. Excluding the material from Level 6, bone material in similar quantities was analysed from all the other levels.

Approximately 9,800 bone remains (c. 92,6 kg) were identified as mammal. Approximately one quarter of the bone remains, or one-tenth of the total weight (c. 9,5 kg), could not be further identified . Domestic animals make up the majority of the finds. Game animals made up only c. 3.3 % of the identified material. The lists of species from each period have been recorded separately, except for the material from EBA II and III. This material was calculated together due to the limited amount of finds from EBA III. Otherwise the material from the EBA periods is grouped together (Tab. 4-12, 4-13 and 4-14).

The mound lies some 1300 m south of the village of Yenikent and 15 km northeast of Seyitgazi, the district capital. The nearest larger city is Ekişehir, 35 km southwest of Küllüoba. The mound is very flat (c. 9.5 to 10 m in height) and 150 x 250 m in dimensions. Three cones are noticeable on the mound. Due to the surface material, trenches were opened on the western and eastern cones of the mound. The excavation has been continuing since 1996 under the direction of T. EFE and the Eskisehir Archaeological Museum[48] (Map. 4-1).

[48] Few architectural remains were uncovered from the early levels. In Level 5 (the transition from the Late Copper Age to the Early Bronze Age), rectangular and trapezoid houses were found that were built side by side. The outer walls formed by the houses resemble a fortification wall to the outside. Similar building patterns can be observed in Demircihüyük, and at Küllüoba, though for an earlier period. The houses were built with mud brick on a stone foundation. The Early Bronze Age II features offer the best settlement pattern, with an Upper City/Castle and Lower City. The Upper City/Castle includes a fortification wall between the Lower City and one gateway discovered on the eastern side of the fortification wall. There are two very large Complexes inside the walls. Complex I dates to the early period of the Early Bronze Age II. Three megarons are located next to each other in a courtyard. The middle megaron is about 23 m long and the other two, smaller megarons were placed on either side of the main megaron and used as multi-rooms. Access between the buildings was made easily available inside of Complex I. T. EFE called this structure a "palace" (EFE 2002). The second Complex dates to the late Early Bronze Age II. It includes an enormous megaron, typical in plan, with its ante-chambers and its fire place in the middle of the room, and many small annexes, such as a kitchen or depots, holding individual walls, and referred to as Complex II. The main megaron is ca. 8 x 32 m and and was built with mud bricks on a stone foundation. Silos, storage pithoi and graining stones are found everywhere in the structure. They indicate that a huge amount of grain was kept and intensively worked in this Complex, which probably belonged to the most important person/chief of the settlement. These large megarons and complexes are also known from Troy and Poliochni. The garbage pits identify the finds to the Early Bronze Age III. Little information is available concerning the architecture (Fidan and Efe 2008). The Late Copper ceramics are mostly black burnished and plain wares (Level 6). No red-slipped burnished ware was discovered. Over time, the black unslipped wares from the Late Copper period changed to gray/brown and red-slipped burnished ware, while the bowls reveal a simple

Tab. 4-12: Species list for the Transition Period (TP) of Küllüoba.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
unidentified, small to medium	5	2,50	1,60	0,20
unidentified, medium	82	41,00	135,20	18,50
unidentified, medium to large	13	6,50	38,00	5,20
unidentified, large	100	50,00	557,30	76,10
unidentified mammal remains total	**200**	**100,00**	**732,10**	**100,00**
Cattle BOS	111	22,38	2577,10	40,41
Sheep, OVIS	21	4,23	327,70	5,14
Goat, CAPRA	8	1,61	69,60	1,09
Sheep or Goat, CAPRA/OVIS	218	43,95	1123,20	17,61
Pig, SUS	78	15,73	912,60	14,31
Dog, CANIS	14	2,82	150,10	2,35
Domestic mammals total	**450**	**90,73**	**5160,30**	**80,92**
Wild or Domestic Cattle	5	1,01	364,20	5,71
Wild or Domestic Sheep	3	0,60	81,00	1,27
Wild or Domestic Sheep/Goat	6	1,21	71,60	1,12
Wild Boar or Pig	3	0,60	36,20	0,57
Wild or Domestic mammals total	**17**	**3,43**	**553,00**	**8,67**

profile. The first characteristic feature of the Early Bronze Age came from the third level. The red-slipped burnished ware began appearing in the assemblage and continued to increase in number. Bowls with simple profiles were more often in use. Level 2 pottery, from the Early Bronze Age, shares many characteristics with pottery from Demircihüyük. The red-cross blow is indicative of the Bronze Age as well. The red-slipped burnished ware began a rapid appearance. Bowls with simple profiles were common. The fine black-fluted ware in Level 2 from Küllüoba could be associated with finds from Beycesultan XVIII-XVII, as well as from Demircihüyük, Phases D to G. Demircihüyük and Küllüoba pottery exhibit similar qualities; however, the favoured forms from Demircihüyük, such as cross-band bottles or beaked-spouted jugs with tubular spouts, are only represented by one or two sherds. The Early Bronze Age II ceramics from both settlements reveal more differences. Typical forms from both sites begin to appear more seldomly in the assemblages. Tankards and *depas amphikypellon* were the favoured forms in the Early Bronze Age II period. Very large storage pithoi were in use. Troyan Plates - A2 - were produced as well. In the Early Bronze Age III and transitional periods most of the forms were still in use. The Troyan Plates are less frequent. The wheel marks can be identified on the surface of the plates. Depas decrease in number as well and become more capacious and conical (T. EFE and M.TÜRKTEKI 2004). The typical forms and colour of pottery from Küllüoba in the Early Bronze Age I and II periods, principally the red and black wares, were collected from the Upper Sakarya Basin; the material shares characteristics with the Demircihüyük pottery. "The Upper Sakarya Pottery Group" is found distributed southeast of the Demircihüyük cultural region and north of Beycesultan pottery. The transition period, in North-west Anatolia, dominated the characteristics of the Late Copper ceramic tradition. In the Early Bronze Age, pottery groups began to exhibit local characteristics. The early period of the Early Bronze Age in Küllüoba probably corresponds to the Late Uruk, Early Bronze IA, in north Syria, and the Early Bronze Age I probably corresponds to the Early IB in Eastern Anatolia (T. EFE AND D. AY 2000). Küllüoba was located on a very important spot in the area. It maintained a key position between different regions.The influences of difficult cultures, identified in the find material, testify to this. The development of ceramics from the Late Copper to the Early Bronze Age could be observed here.

cont. Tab. 4-12: Species list for the Transition Period (TP) of Küllüoba.

Rodentia unident., small	1	0,20	0,40	0,01
Hare, *Lepus capensis/europaeus*	4	0,81	10,00	0,16
Fox, *Vulpes vulpes*	2	0,40	3,00	0,05
Equidae unident.	5	1,01	78,00	1,22
Equus hydruntinus	4	0,81	161,00	2,52
Wild Boar, *Sus scrofa*	1	0,20	17,00	0,27
Fallow deer, *Dama dama*	3	0,60	48,10	0,75
Red deer, *Cervus elaphus*	4	0,81	131,00	2,05
Cervidae unident.	1	0,20	157,00	2,46
Aurochs, *Bos primigenius*	2	0,40	20,00	0,31
Wild Goat, *Capra aegagrus*	1	0,20	9,40	0,15
Wild Sheep, *Ovis orientalis*	1	0,20	29,00	0,45
Wild mammals total	**29**	**5,85**	**663,90**	**10,41**
identified mammal remains total	**496**	**71,30**	**6377,20**	**89,70**
unidentified mammal remains total	**200**	**28,70**	**732,10**	**10,30**
mammal remains total	**696**	**100,00**	**7109,30**	**100,00**

Tab. 4-13: Species list for the EBA I of Küllüoba.

TAXONOMY	**NIS**	**NIS-%**	**WIS(g)**	**WIS-%**
unidentified, medium	146	55,70	224,40	23,80
unidentified, medium to large	3	1,10	6,00	0,60
unidentified, large	112	42,70	708,80	75,50
unidentified	1	0,40	0,10	0,00
unidentified mammal remains total	**262**	**100,00**	**939,10**	**100,00**
Cattle BOS	173	25,63	2833,70	42,36
Sheep, OVIS	34	5,04	261,40	3,91
Goat, CAPRA	12	1,78	135,30	2,02
Sheep or Goat, CAPRA/OVIS	358	53,04	1510,20	22,57
Pig, SUS	21	3,11	179,60	2,68
Dog, CANIS	5	0,74	32,40	0,48
Domestic mammals total	**603**	**89,33**	**4952,60**	**74,03**
Wild or Domestic Cattle	12	1,78	475,00	7,10
Cattle oder Red deer	5	0,74	55,70	0,83
Wild or Domestic Sheep	13	1,93	135,20	2,02
Wild or Domestic Goat	2	0,30	65,00	0,97
Wild or Domestic Sheep/Goat	7	1,04	75,50	1,13
Wild Boar or Pig	2	0,30	32,10	0,48
Wild or Domestic mammals total	**41**	**6,07**	**838,50**	**12,53**
Hare, *Lepus capensis/europaeus*	2	0,30	2,50	0,04
Wild Horse, *Equus ferus*	1	0,15	106,00	1,58
Equidae unident.	2	0,30	15,40	0,23
Equus hydruntinus	4	0,59	292,00	4,36
Fallow deer, *Dama dama*	6	0,89	54,90	0,82
Aurochs, *Bos primigenius*	2	0,30	219,00	3,27
Wild sheep, *Ovis orientalis*	13	1,93	179,10	2,68
Caprinae unident.	1	0,15	30,00	0,45
Wild mammals total	**31**	**4,59**	**898,90**	**13,44**
identified mammal remains total	**675**	**72,04**	**6690,00**	**87,69**
unidentified mammal remains total	**262**	**27,96**	**939,10**	**12,31**
mammal remains total	**937**	**100,00**	**7629,10**	**100,00**
non-mammal remains	**5**	**100**	**10,20**	**100**
mammal remains total	**937**	**99,47**	**7629,10**	**99,87**
non-mammal remains total	**5**	**0,53**	**10,20**	**0,13**
processed material TOTAL	**942**	**100,00**	**7639,30**	**100,00**

Tab. 4-14: Species list for the EBA II&III of Küllüoba.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
unidentified, small	1	0,06	0,50	0,01
unidentified, small to medium	10	0,56	6,70	0,10
unidentified, medium	872	48,55	1579,20	23,91
unidentified, medium to large	11	0,61	86,20	1,30
unidentified, large	900	50,11	4932,70	74,68
unidentified	2	0,11	0,20	0,00
unidentified mammal remains total	**1796**	**100,00**	**6605,50**	**100,00**
Cattle BOS	1441	27,87	29800,50	49,32
Sheep, OVIS	273	5,28	3302,20	5,47
Goat, CAPRA	66	1,28	957,90	1,59
Sheep or Goat, CAPRA/OVIS	2322	44,91	10811,70	17,89
Pig, SUS	680	13,15	9942,20	16,45
Dog, CANIS	135	2,61	1230,30	2,04
Domestic mammals total	**4917**	**95,11**	**56044,80**	**92,76**
Wild or Domestic Cattle	10	0,19	275,00	0,46
Hausrind oder Red deer	8	0,15	102,10	0,17
unidentified smaller ruminant	49	0,95	650,7	1,08
Wild Boar or Pig	25	0,48	605,40	1,00
Equidae unident.	3	0,06	132,00	0,22
Wolf or Dog	4	0,08	22,80	0,04
Canidae unident.	2	0,04	4,30	0,01
Wild or Domestic mammals total	**101**	**1,95**	**1792,30**	**2,97**
Rodentia unident., small	12	0,23	14,30	0,02
Hare, *Lepus capensis/europaeus*	15	0,29	46,90	0,08
Wolf, *Canis lupus*	1	0,02	12,00	0,02
Fox, *Vulpes vulpes*	16	0,31	109,70	0,18
Hyaena hyaena	1	0,02	28,00	0,05
Carnivora unident., mittel	1	0,02	8,00	0,01
Equidae unident.	2	0,04	31,00	0,05
Equus hydruntinus	2	0,04	54,00	0,09
Wild Boar, *Sus scrofa*	8	0,15	247,50	0,41
Fallow deer, *Dama dama*	38	0,74	517,00	0,86
Red deer, *Cervus elaphus*	10	0,19	224,20	0,37
Cervidae unident.	6	0,12	152,30	0,25
Aurochs, *Bos primigenius*	10	0,19	581,00	0,96
Wild Goat, *Capra aegagrus*	5	0,10	69,90	0,12
Wild Sheep, *Ovis orientalis*	25	0,48	489,50	0,81
Wild mammals total	**152**	**2,94**	**2685,30**	**4,44**
identified mammal remains total	**5170**	**74,22**	**60422,40**	**90,15**
unidentified mammal remains total	**1796**	**25,78**	**6605,50**	**9,85**
mammal remains total	**6966**	**100,00**	**67027,90**	**100,00**
non-mammal remains	**21**	**100,00**	**106,20**	**100,00**
mammal remains total	**6966**	**99,70**	**67027,90**	**99,84**
non-mammal remains total	**21**	**0,30**	**106,20**	**0,16**
processed material TOTAL	**6987**	**100,00**	**67134,10**	**100,00**

Map. 4-1: Map of Anatolia and the location of the settlements mentioned in this study. 1- Beşik-Yassıtepe, 2- Beycesultan, 3- Boğazköy,4- Demircihüyük, 5- Fikirtepe, 6- Ilıpınar, 7- Kaman Kale Höyük, 8- Kanligeçit, 9- Karataş-Semayük, 10- Korucutepe, 11- Kumtepe, 12- Küllüoba, 13- Liddar Höyük, 15- Orman Fidanlığı, 16- Pendik, 17- Tarsus – Gözlükule, 18- Ulucak, 19- Yenibademli

5. Remarks on the Domestic Fauna of Troy

5.1. Sheep, OVIS and Goat, CAPRA

Heavy fragmenting of the bones from small domestic ruminants made it impossible to assign every bone to either sheep or goat. The well-known distinguishing parts on the bones were mostly destroyed or no longer present. The study by J. BOESSNECK, H. -H. MÜLLER and M. TEICHERT (1964) was used to separate the very similar domestic small ruminant remains from each other. The unidentified small domestic ruminant remains were entered into the databank as ovicaprid, OVIS/CAPRA, in order to avoid invalid conclusions.

The relation between the human hunter and wild sheep or goat changed around 10,000 years ago. A new epoch began between human beings and animals. The domestication of sheep and goat made it possible for people to have access to fresh meat at any time. There were advantages from the side of prey as well. Small ruminants began having human beings as protectors against other predators. The domestication of sheep took place most likely in the southeast of Anatolia and the domestication of goat in the Zagros and Levant (UERPMANN 2007: 55-74).

There are visible changes in animals following domestication. The size of the body and the horns grew smaller or shorter. Sheep coats began to change as well. The ancestor to sheep had a short hairy outer-coat with a woolly under-coat. The moulting of wild sheep took place in the spring. This was no longer the case among domestic sheep. After domestication the outer-coat was eliminated and, with the biological change, the wool began to grow continuously. Some primitive sheep from India or Africa have a similar coat. The fine wool exists under the short kemp coat. The brain capacity grew smaller among domestic animals (RYDER 1983).

Sheep are very useful animals for humans. The living animal provides milk, wool and dung as fertilizer and fuel. Butchering provides meat, hide, fat and bone marrow. Bones and horns can be converted to artefacts, and the intestines could be used as raw material, e.g., for rope.

The goat has been called the "the cow of the poor man". PAYNE (1985) pointed out that in contemporary Greece the principal value of goat for human nutrition lies in milk production; goat milk contains three-times more protein and six-times more calories than beef. The rough wool, called Mohair, is used in the carpet industry. An Angora goat can supply up to 6 kg of Mohair (HERRE, W. and M. RÖHRS 1990:156).

5.1.1. Small ruminants and the relationship of sheep to goat among mammal remains

Sheep remains are the most often identified animal remains from the Maritime Troy Culture. Their importance became more significant over time as the presence of goat decreased in the bone assemblage. This is also the case for the weight category. There is a clear increase in the weight of sheep remains, as the weight of goat remains decreased (here again Tab. 5-1).

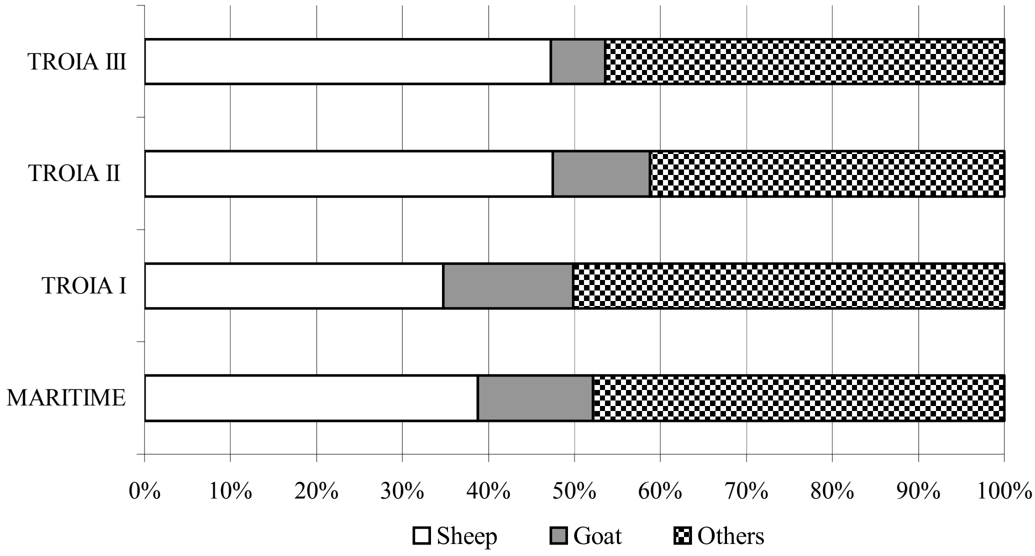

Fig. 5-1: Number of the identified bone remains from goat, sheep and other mammal remains among the identified mammal remains after re-calculations from Troy I, Troy II, Troy III and during the Maritime Troy Culture.

Sheep remains make up c. 33.5% of all mammal remains[49] in Troy I. Their remains increase by one-third in the coming two phases and reach a total 44.3% of the mammal remains in Troy II and c. 43.2% in Troy III (Fig. 5-1). This is also the case for the weight category. Sheep remains make up c. 18.5% of the total weight[50], an increase of c. 28% in Troy II and c. 29% in Troy III. The decrease in goat bone remains and total weight becomes clearly apparent (Fig. 5-2).

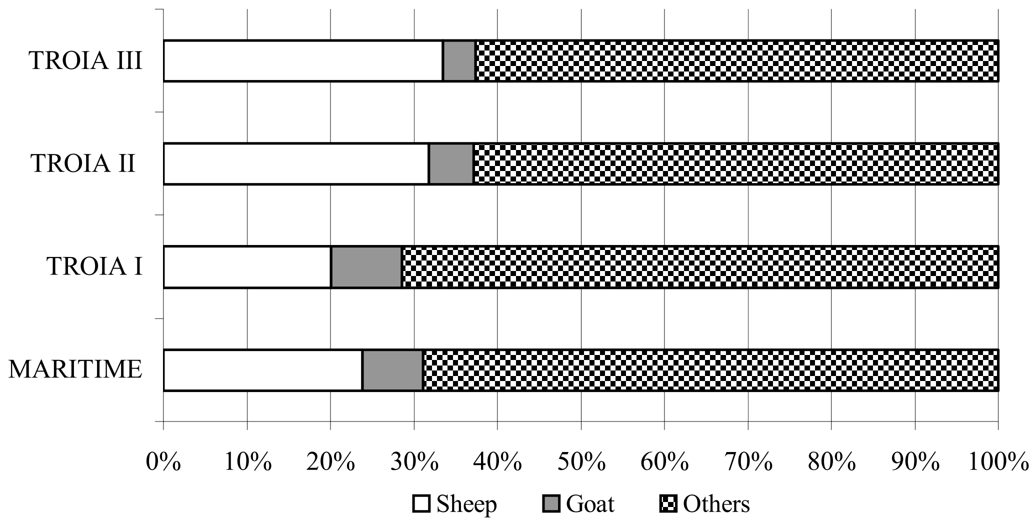

Fig. 5-2: Weight of the identified bone remains from goat, sheep and other mammals among the identified mammal remains after re-calculations for Troy I, Troy II, Troy III and during the Maritime Troy Culture.

[49] This amount is equal to c. 34.5% NIS of the identified domestic mammal remains.
[50] This amount is equal to c. 20% WIS of the identified mammal remains.

5.1.2. The bone distribution of sheep, goat and sheep/goat

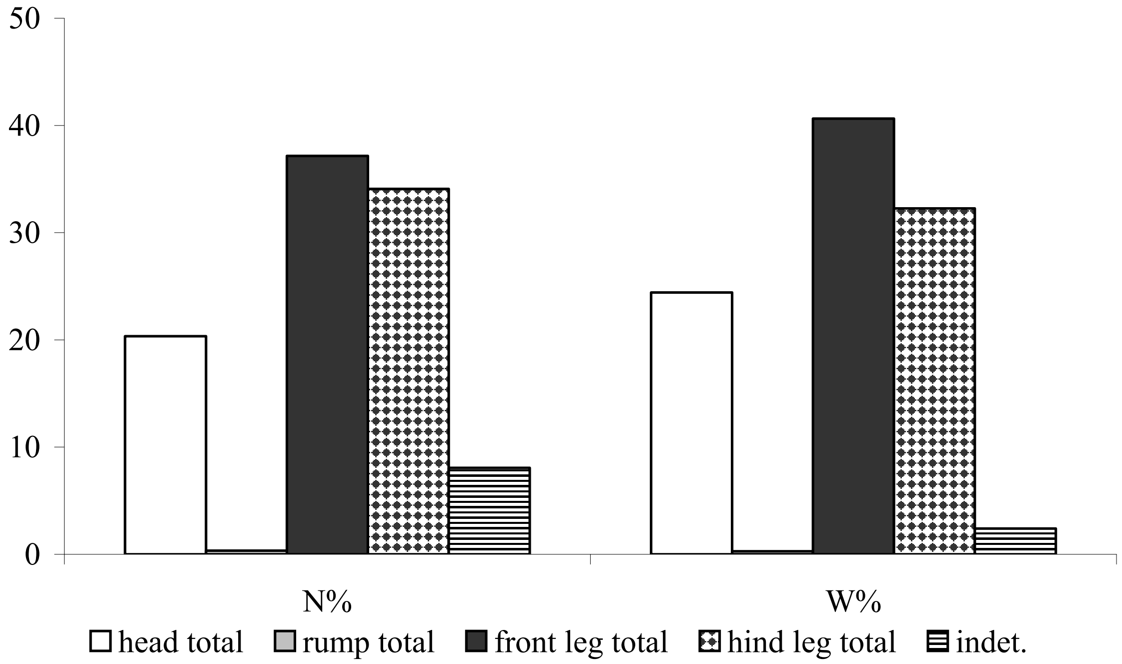

Fig. 5-3 D**:** The distribution of sheep remains from the Maritime Troy Culture as a whole.

The distribution of sheep bone remains from Troy I, Troy II, Troy III and during the entire Maritime Troy Culture is illustrated in Tables 5-2 A to 5-2 D and represented by the Figures 5-3 A to 5-3 D. At first glance one finds that rump bones are missing from all the tables and figures. Some vertebrae from the Troy I material were identified as sheep. Differentiating between sheep or goat is difficult based on the vertebrae alone. The front and hind legs are strongly represented in number and weight in the assemblage. The head remain results are close to the reference sample[51] (Fig. 5-4 and Tab. 5-3), except for in Troy II and Troy III. Very few bone parts were identified as sheep in Troy II. The weight of the head parts is heavier in Troy III than the reference sample. The reason is that other body parts are found in greater numbers but not by greater weight.

[51] The reference sample is a male Cameroon hair sheep with a shoulder height of 60 cm and a weight of 30 kg. This sample is without horns and kept in the University of Tübingen under the label CP 101.

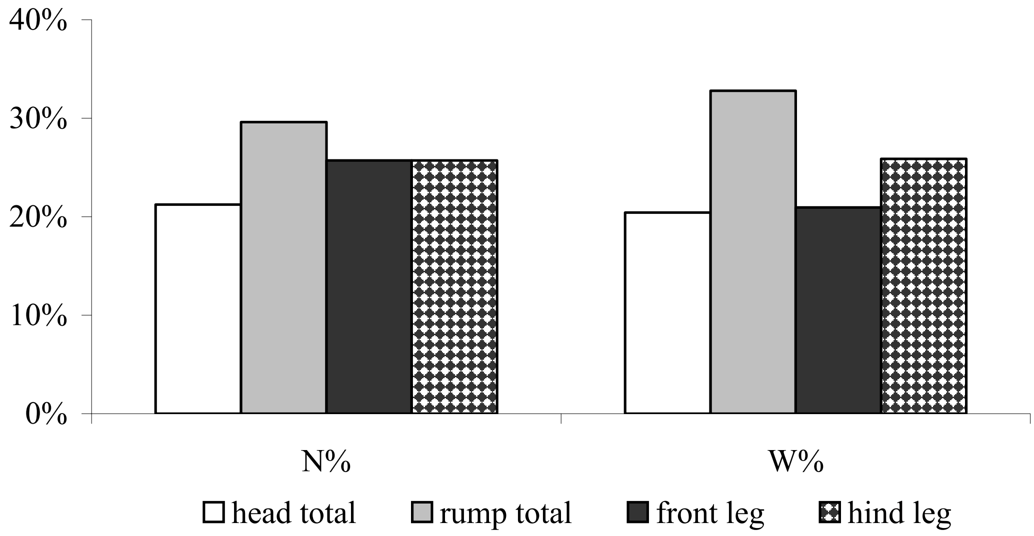

Fig. 5-4: The distribution of skeletal parts among Cameroon hairy sheep.

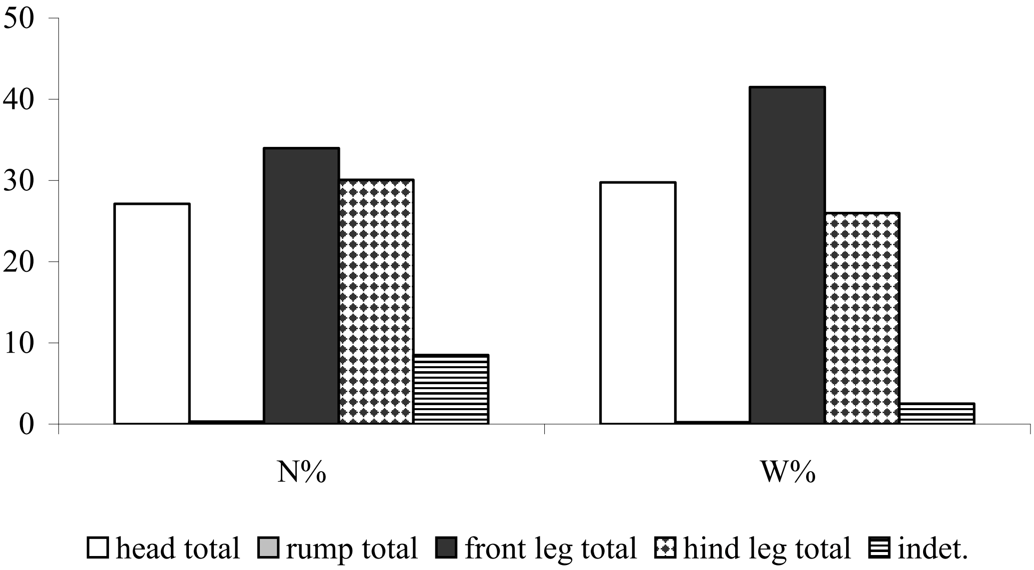

Fig. 5-5 D: The distribution of goat remains for the Maritime Troy Culture.

The distributions of goat bone remains from Troy I, Troy II, Troy III and from the Maritime Troy Culture as a whole are described in Tables 5-4 A to 5-4 D and Figures 5-5 A to 5-5 D. Only one vertebra was identified as goat. The other body parts are from the rump. The front leg remains are well represented in the weight category. Troy I represents a relatively similar pattern to that of the Maritime Troy Culture as a whole (Fig. 5-5 D). The front leg remains from goat in Troy II dominate in both number and weight. This phenomenon could be applied for Troy III as well; however, in this case the hind leg remains dominate. The head remains from these phases remain low in both number and weight.

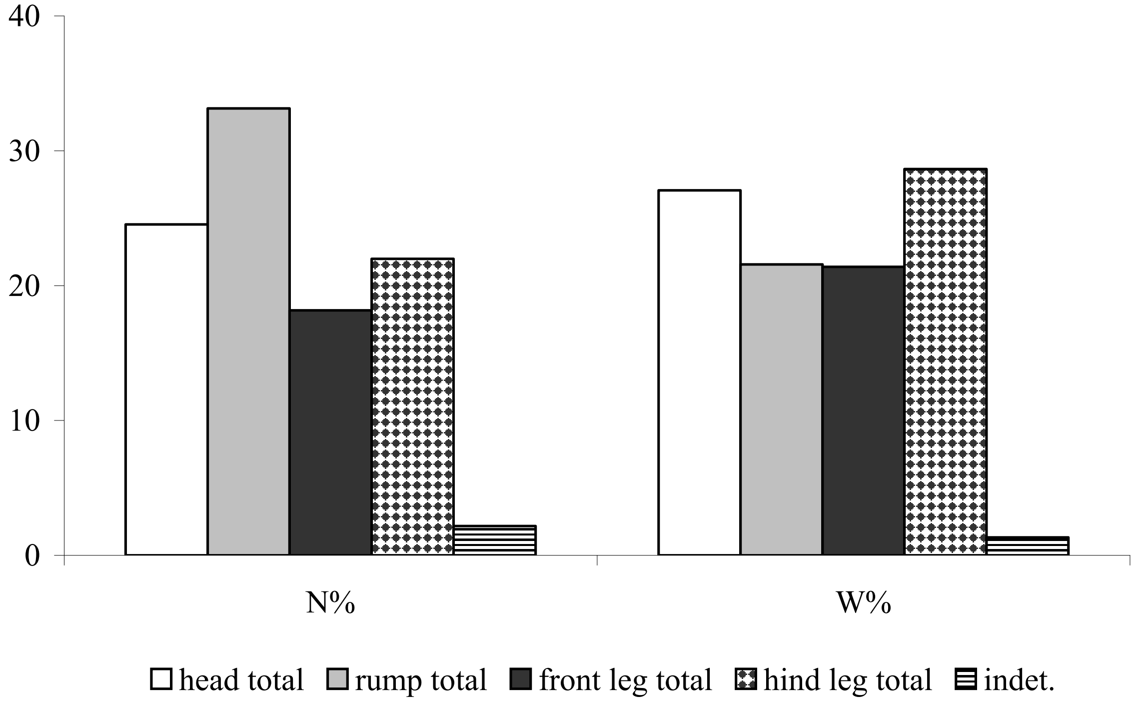

Fig. 5-6 D: The distribution of small ruminant remains during the Maritime Troy Culture.

The distribution of small ruminant remains from Troy I, Troy II, Troy III and during the entire Maritime Troy Culture is described in Tables 5-5 A to 5-5 D and Figures 5-6 A to 5-6 D.

The mandible and loose teeth are very common among the head remains. The mandibles were probably hammered for bone marrow and therefore broken. The rib finds are found at a nearly 1:2 ratio as compared to vertebra remains. Radius/Ulna and humerus remains from the front leg are strongly represented in the assemblage, while tibia and femur remains are represented from the hind leg. Tibia, vertebra and loose teeth remains are all weighed separately at around ten percent or more. The head and hind leg remains are more strongly represented than they should be in the weight category (Fig. 5-6 D).

One-third of the material representing finds from Troy I in the NIS% and WIS% consists of head remains from small ruminants. The numbers indicate that slaughtering took place in the settlement or that the heads of small ruminants were brought to the settlement for further treatment (Fig. 5-6 A). In the other two phases, head remains decrease and rump remains increase. Generally, the bone remains from the different parts of the skeleton of small domestic ruminants are well represented. This can be said of the meat-holding bones as well.

5.1.3. The Gender of the small ruminants

5.1.3.1. Sheep

Thirty-eight sheep remains from the Maritime Troy Culture reveal sexual characteristics, namely, five horn-fragments, eight skull-fragments and twenty-five acetabular pelvic fragments.

Twenty-tree bone remains date to Troy I. Seven pelvic pieces reveal the sexual characteristics of ewe. One skull and two pelvic remains could have been from ewe (? ♀). One pelvic remain might be from a wether (? C). One pelvic fragment is from a wether. Four pieces, one horned skull and two pieces from a pelvis are either from rams or wether. One pelvic remain could be from a ram (? ♀) (Tab. 5-6).

Tab. 5-6: Sheep remains revealing sexual characteristics per phase in number, including skeletal part and sex.

Phase	Number	Sketal	Sex
Troy I	7	Pelvis	♀
Troy II	1	Pelvis	♀
Troy III	3	Pelvis	♀
Troy I	1	Skull	? ♀
Troy I	2	Pelvis	? ♀
Troy I	1	Pelvis	? C
Troy III	1	Pelvis	? C
Troy I	1	Pelvis	C
Troy II	1	Pelvis	C
Troy I	1	Horn	♂ or C
Troy I	1	Skull	♂ or C
Troy I	2	Pelvis	♂ or C
Troy III	1	Pelvis	♂ or C
Troy III	1	Skull	? ♂
Troy I	1	Pelvis	? ♂
Troy II	1	Pelvis	? ♂
Troy III	2	Pelvis	? ♂
Troy I	4	Horn	♂
Troy I	2	Skull	♂
Troy II	3	Skull	♂
Troy II	1	Pelvis	♂

Four horn pieces and two skull remains can definitively be sexually assigned to ram. Three skull remains and one pelvic remain from Troy II were identified as well as ram. The other three pelvic remains from this phase were recorded as ewe, wether and possible ram. Five acetabular pelvic fragments from Troy III could have been sexed three times to ewe, one time each as possible wether and ram or wether. Two more pelvic fragments were identified as possible rams, and a skull piece and the measured pelvic remains with their possible gender are represented in Table 5-7.

Tab. 5-7: Ten pelvic measurements from sheep with gender.

Pelvis	**LA (mm)**	**SEX**
TROI0129/ 253 TR I	22	♀
TROI0717/ 17 TR I	25	♂ or C
TROI0705/ 97 TR I	27	♀
TROI0727/ 101 TR I	27	♀
TROI1252/ 2 TR I	28	♂ or C
TROI0705 / 96 TR I	28,5	♀
TROI0101/ 17 TR I	31	♂
TROI9032/ 22 TR II	27	C
TROI6561/ 2 TR III	24,5	♀or C
TROI0082/ 51 MIX	28,5	♀
Mean val.	**27**	
std. dev.	**2,4**	
coeff. var.	**8,9**	

If the definitive ewes and rams make up their own group, and all the unassigned sexed material, such as ? ♂ as well as ♂ or C, are assigned to wether, than most of the sheep could have consisted in at least 45% wether (Fig. 5-7).

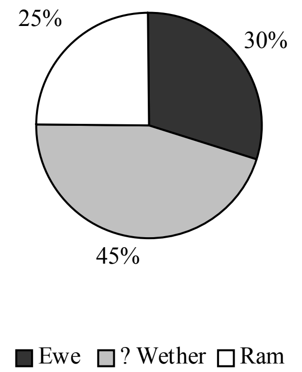

Fig. 5-7: The possible portions of ewes, rams and wethers among sheep during the Maritime Troy Culture (n=38).

5.1.3.2. Goat

Eight goat bone remains from Troy I were recorded as does. These include one skull and seven pelvic remains. One pelvic remain from Troy I is sexed as ? ♀. Two horn and two pelvic remains, from Troy I are recorded as rams (Tab. 5-8).

Tab. 5-8: Goat remains exhibiting sexual characteristics per phase in number, including skeletal part and sex.

Phase	Number	Skeletal	Sex
Troy I	1	Skull	♀
Troy I	7	Pelvis	♀
Troy I	1	Pelvis	? ♀
Troy I	2	Horn	♂
Troy I	2	Pelvis	♂

5.1.4. The Dental Aging of Sheep and Goat

The teeth were determined to genus according to their dental characteristics. The well-known characteristic pattern on the M_3-M_2 and MP_3 are used to identify genus. The dental data, chewing-grade, from sheep, goat and OVIS/CAPRA were analyzed separately. This information is used to determine mortality among small ruminants.

5.1.4.1. The Dental Aging of Sheep

The aging panorama on the remains of sheep teeth is fairly broad (Tab. 5-9). Therefore, the author considered single chew among specific aging groups (Tab. 5-10). The number of "M3 moderately worn" remains is high. The numbers in the dental data from Troy II and III are very low. Therefore, they are counted together with Troy I.

A small amount, namely 6 %, of lambs were slaughtered. The second group, 15%, was killed between the age of 12 and 24 months. One fifth of the sheep was butchered within their third year. The rest, around 60%, were kept and killed between the ages of three and six years (Fig. 5-8).

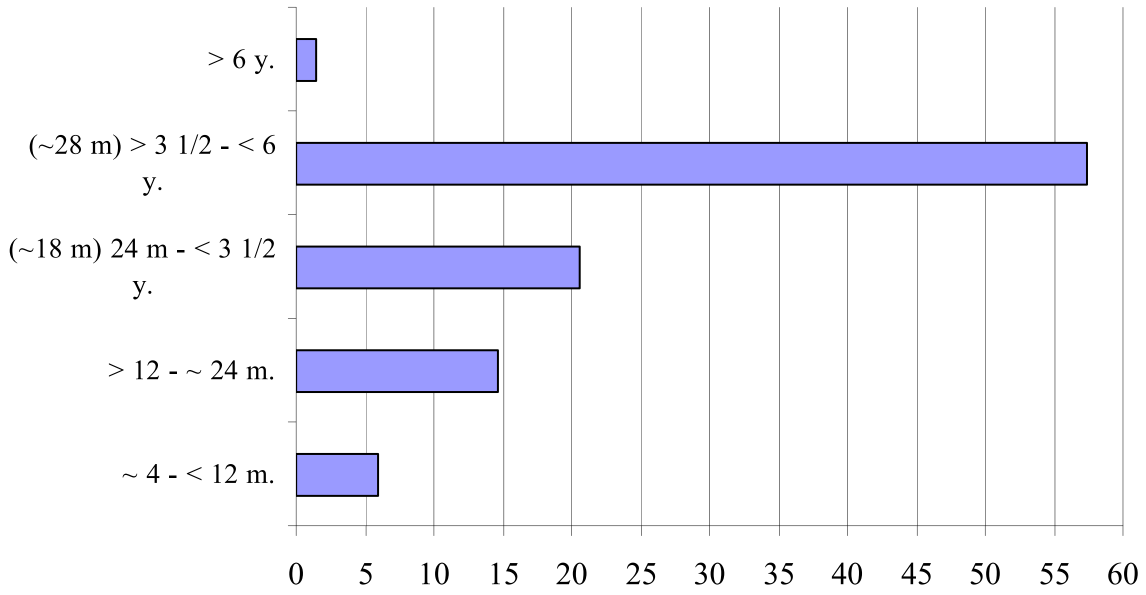

Fig. 5-8: Specific dental aging groups for sheep in percentage during the Maritime Troy Culture.

5.1.4.1.1. Crown height of the M_3 from Sheep

The height of the M_3 crown from sheep was measured between the front and the middle root (pls. look at the sheep-M_3 measurements). This measurement indicates the degree of abrasion. The longer an animal lives, the more it uses its teeth, and the lower the teeth become due to chewing. The slaughtering, breeding and the selection of these animals could be observed through crown-height data. Figure 5-9 reveals two clearly distinguishable groups:

The break-trough of the M_3 occurs around the age of 1 ½ years of the animals, and over time the crown of the M_3 tooth becomes lower due to abrasion. The first group described above, and designated **A**, indicates that the M_3 remains could have come from animals between the ages of 1 ½ and ca. 3 ½ - 4 years old[52].

[52] The number in the boxes above the points represent the age of the animal in months when it was killed. The chewing process of the teeth might reveal a different number. The number of months must therefore be considered an estimate.

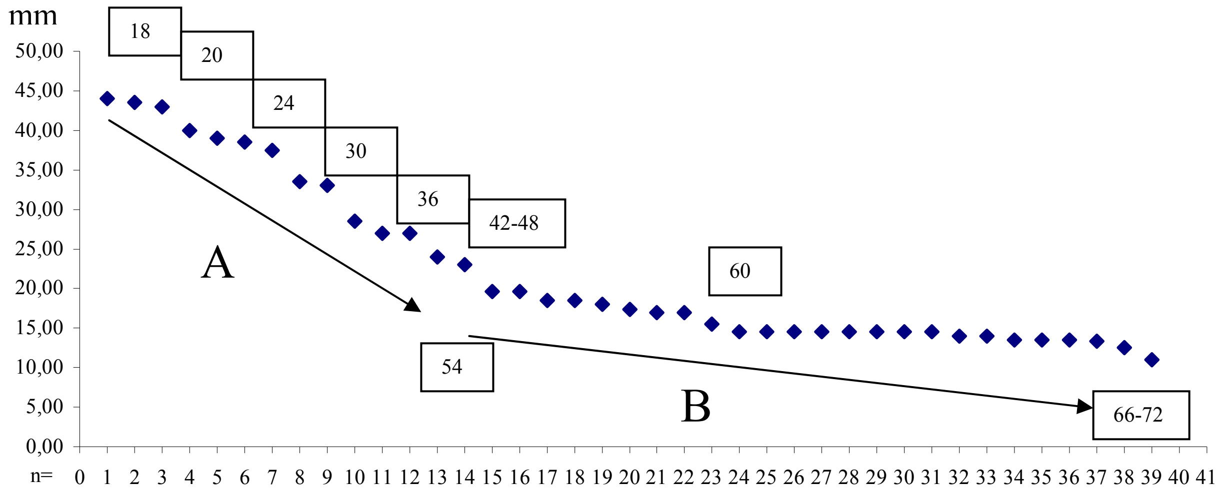

Fig. 5-9: M_3 crown height of sheep in mm for the entire Maritime Troy Culture. The numbers in the boxes represent the estimated ages in months of the slaughtered sheep

The animals represented in group **B** got clearly older than group **A**. The slaughtering period of the animals in group **B** was closer together than in group **A**, indicating the age of animals in group **B** was more homogenous than in group **A**.

5.1.4.2. The Dental Aging of Goat

According to dental aging, the slaughtering of goat began quite early. Seventeen percent of the kids were already killed before they had reached 10 months of age. Thirteen percent of them were butchered within ca. one and half years of age. Seventy percent of the goats in the flocks were between two and 6 years of age; however, only a small amount of the 70% were kept after their sixth year (Tab. 5-11, Tab. 5-12 and Fig. 5-10).

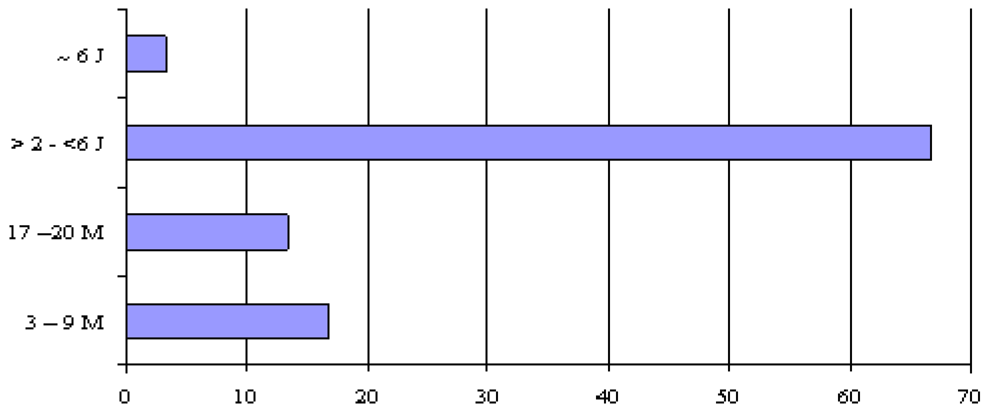

Fig. 5-10: Specific dental aging groups for goat in percentages during the Maritime Troy Culture.

5.1.4.3. The Dental Aging of Small Ruminants

All the dental data from sheep, goat and OVIS/CAPRA were analyzed to create a general overview of the mortality of small ruminants and to compare this with the analysis of epiphysis fusions (Tab. 5-13 and Tab. 5-14).

Tab. 5-14: Specific dental aging groups for domestic small ruminants for Troy I, Troy II, Troy III and for the entire Maritime Troy Culture.

Age	**TR I**	**TR II**	**TR III**	**MTC**
~ 4 - < 12 m	8	5	3	16
> 12 - ~ 24 m	17	3	3	23
(~18 m) 24 m - < 3 1/2 y	44	10	7	61
(~28 m) > 3 1/2 - < 6 y	139	18	7	164
> 6 y	25	2	1	28
6 - 8 y	29	12	-	41
> 8 y	9	1	1	11
10 - 12 y	1	-	-	1
Total:	**272**	**51**	**22**	**345**

One quarter of the small ruminants were killed in Troy I before they reached c. three years of age. Ten percent of this group was butchered at an even earlier age. Therefore, the proportion of the very young small ruminants that were killed is very low. The ages of half of the small ruminant flock remained constant, between 2 ¼ and 6 years old. Approximately one quarter of the flock lived beyond their sixth year. Only one example in the assemblage was from an animal older than ten years of age (Fig. 5-11).

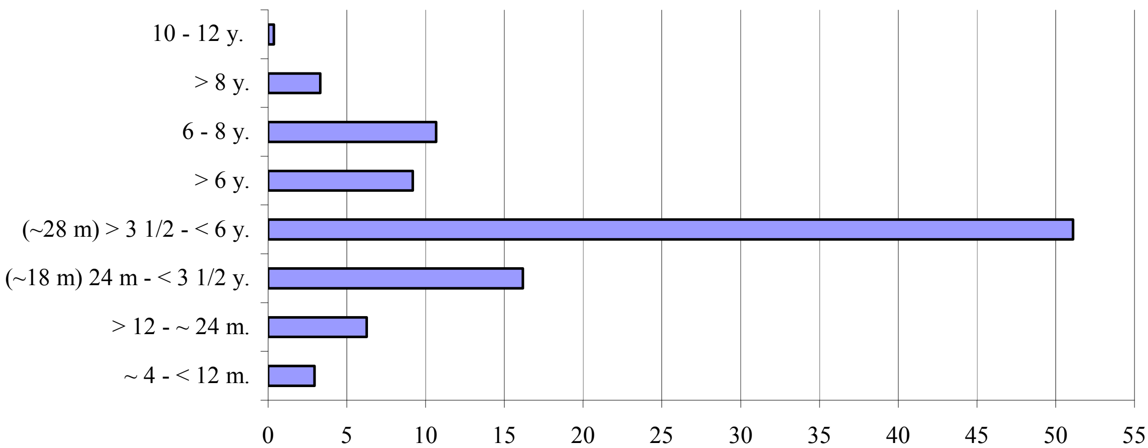

Fig. 5-11: Dental aging of domestic small ruminants from Troy I, in percentages.

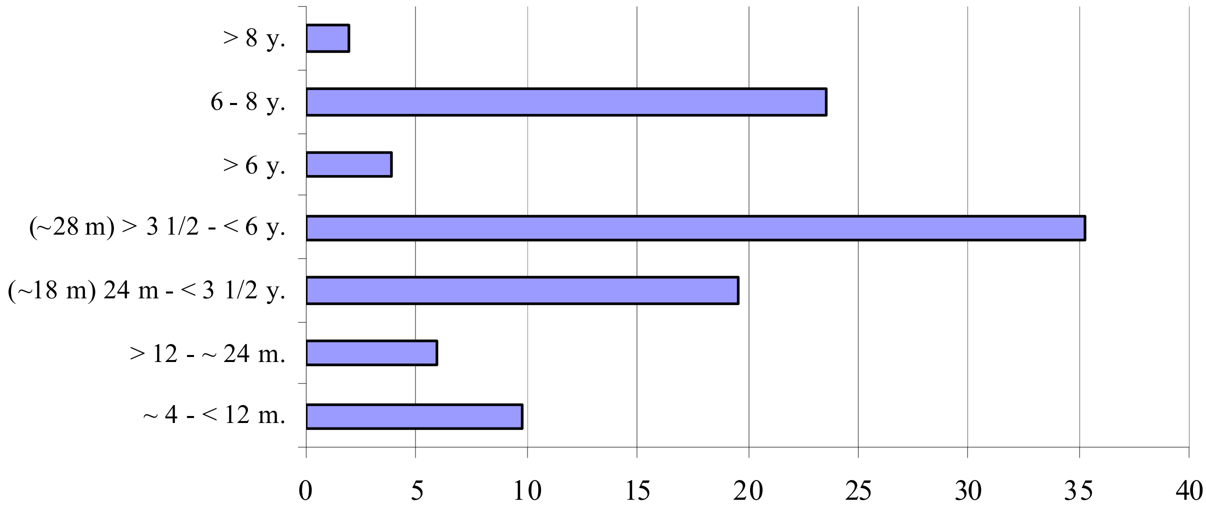

Fig. 5-12: Dental aging of domestic small ruminants from Troy II, in percentages.

The kill-off pattern of small ruminants from Troy II reveals a different pattern than it was found in Troy I. Seventy percent of the animals were killed before they reached their sixth year. Among this group, half of them were slaughtered approximately within their third year. The percentage of the very young small ruminants that were killed grows to ten percent. One quarter of the small ruminants can be aged to between six and eight. A very small percentage of the animals reached an age over 8 years (Fig. 5-12).

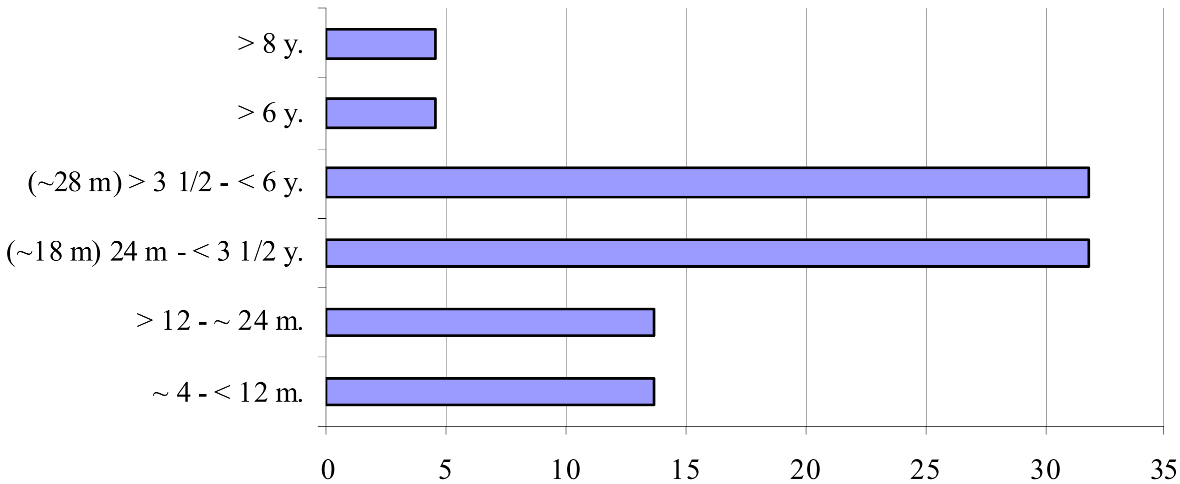

Fig. 5-13: Dental aging of domestic small ruminants from Troy III, in percentages.

The dental data from Troy III are too few to form any general opinion on the kill-off pattern of small ruminants. Fifteen percent of the very young small ruminants were killed; the percentages increased further in this age group after Troy II. The same number of animals was killed while in their second year of age. Approximately 60 percent of the animals were kept and killed between their second and sixth year of age. The pattern of killing among the animals in the flock between three and six years of age decreased further in Troy III, representing one-third of the flock. Ten percent of the small ruminants lived past their sixth year (Fig. 5-13).

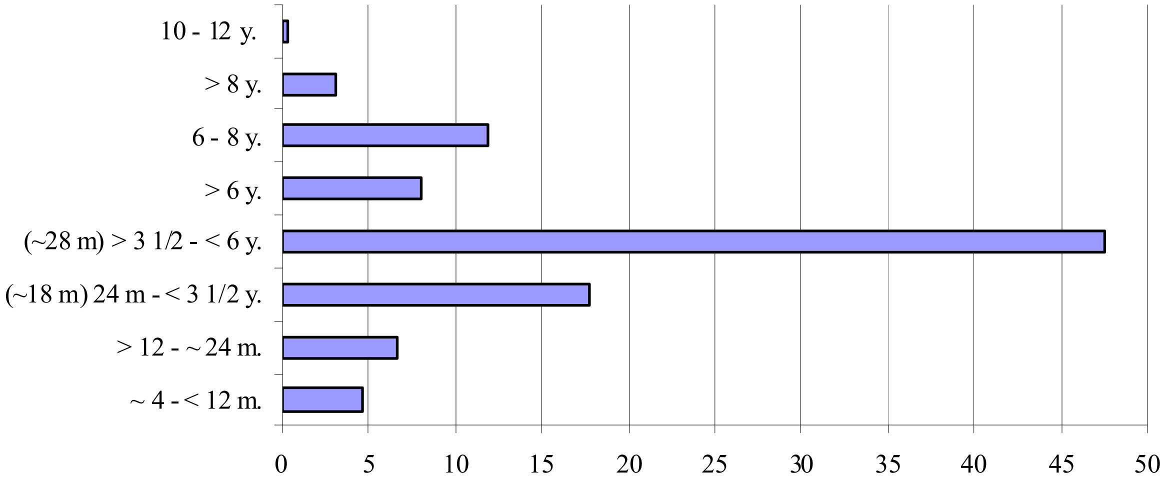

Fig. 5-14: Dental aging of domestic small ruminants during the Maritime Troy Culture, in percentages.

The mortality schema for all of Troy during the Maritime Culture reveals that c. one-third of the animals did not advance beyond three and half years of age. Only five percent of very young small ruminants were killed and seven percent were slaughtered between the end of their first and beginning of their second year. More than 45% of the flock was generally between the ages of 3 ½ and six years. Less than one quarter of the flock was older than six years of age. At least 12% of the animals were killed between the ages of 6 and 8 years. Only one dental find could be aged older than ten years (Fig. 5-14).

5.1.5. The Epiphysis Aging for Sheep and Goat

The fusion periods for the joints of sheep and goat were grouped into seven main categories. The material from Troy I and II is rich enough to produce a survival curve for our analysis here. Epiphysis fusion is possible up to the age of 60 months in small ruminants. Afterwards the joints are all closed.

In most of the cases involving sheep and goat the survival curve climbs higher after a certain period of months, which is in reality not possible. This could only be possible, if new older animals would have joined the small ruminants flocks from outside, which seems highly improbable. Thus, the high curve demonstrates the absence of identified non-fused elements from sheep and goat, which most probably is due to insufficient preservation of the unfused bones. The estimated survival curve was produced through dental and epiphysis aging results of small ruminants from the entire Maritime Troy Culture.

The results of epiphysis fusion in the skeletal elements of sheep, goat and OVIS/CAPRA from the Maritime Troy Cultural phases are initially represented separately in the tables below.

5.1.5.1. The Epiphysis Aging for Sheep

Epiphysis fusion in sheep from Troy I indicates that lambs were killed in very small numbers. Regular slaughtering was carried out on animals between 18 and 24 months of age. The absence of identified non-fused bones from sheep has created the high end of the curve in the figures below (Tab. 5-15 and Fig. 5-15).

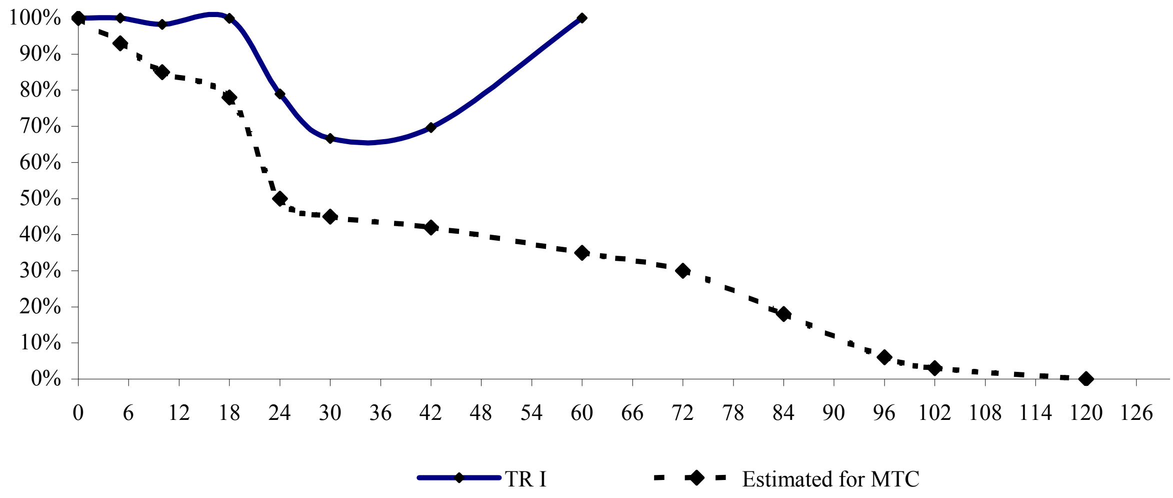

Fig. 5-15: The survival curve of sheep from Troy I according to the epiphysis fusion data and the estimated survival curve of the small ruminant population according to calculations on dental and epiphysis data from the entire Maritime Troy Culture.

Five percent of the lambs were killed from Troy II. In contrast to Troy I, the slaughtering continued further in animals between five month and one year of age. Regular slaughtering was carried out on animals between 18 and 30 months of age. Approximately half of the animals reached an age older than 2 ½ years. Data considering older animals are unreliable due to the absence of identified non-fused bones (Tab. 5-16 and Fig. 5-16).

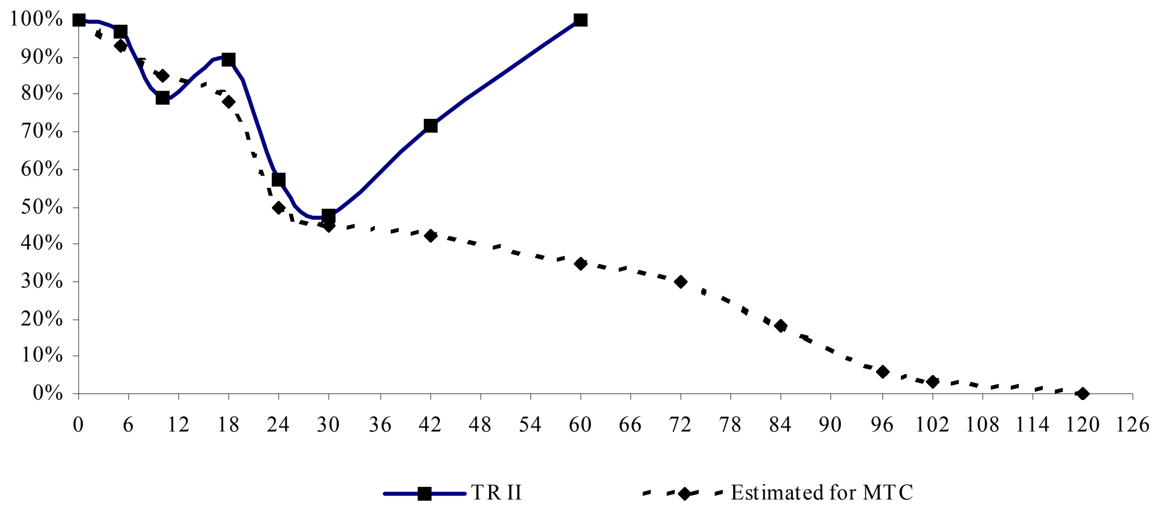

Fig. 5-16: The survival curve for sheep in Troy II according to the epiphysis fusion data and the estimated survival curve of the small ruminant population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

Around eight percent of the young animals were killed before they reached one year of age in Troy III. Regular slaughter occurred on animals between the ages of 1 ½ to 2 ½ years, representing half of the animals killed in this time period. Slaughtering occurred less frequently in animals between the ages of 2 ½ and 3 ½ years (Tab. 5-17 and Fig. 5-17).

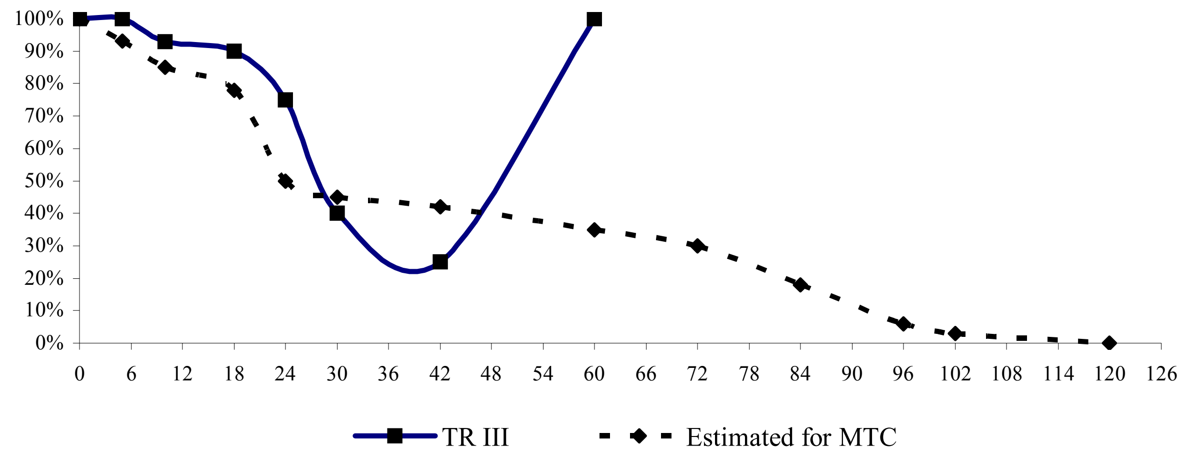

Fig. 5-17: The survival curve for sheep in Troy III according to epiphysis fusion data and the estimated survival curve for the small ruminant population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

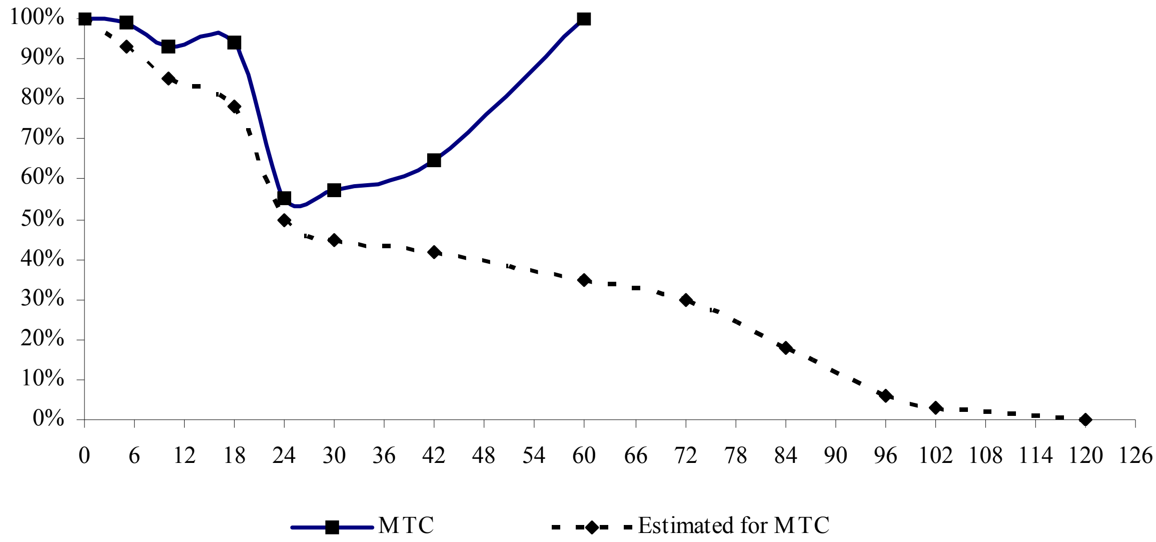

Fig. 5-18: The survival curve for sheep from the Maritime Troy Culture according to epiphysis fusion data and the estimated survival curve for the small ruminant population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

Epiphysis fusion data on the wholefor sheep remains from the Maritime Troy Culture indicate that seven percent of the slaughtered animals were younger than 1 ½ years of age, and most were slaughtered between the ages of 5 to 10 months. Slaughtering increases suddenly by more than five times after a lull, and the animals were killed in larger numbers between the ages of 18 months and two years. The absence of identified non-fused bones made it impossible to observe the slaughtering activities for sheep that reached an age older than two years (Tab. 5-18 and Fig. 5-18).

5.1.5.2. The Epiphysis Aging for Goat

Epipyhseal fusion data for goat are few for the entire Maritime Troy Culture. Most of the data derive from Troy I. The absence of identified non-fused bones for goat creates an unrealistic survival curve for the Maritime Troy Culture (Tab. 5-19 and Fig. 5-19).

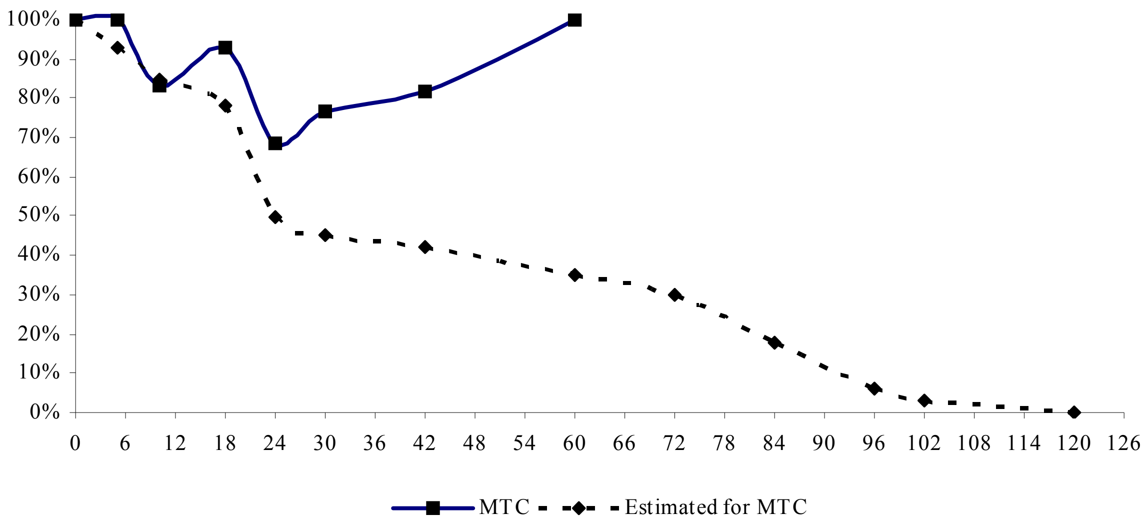

Fig. 5-19: The epiphysis fusing periods for goat during the Maritime Troy Culture according to epiphysis fusion data and the estimated survival curve for the small ruminant population according to calculations on dental and epiphysis data from the entire Maritime Troy Culture.

5.1.5.3. The Epiphysis Aging for Small Ruminants

Over fifteen hundred small ruminant remains from the Maritime Troy Culture produce epiphysis fusion data, including data from both sheep and goat. Finds from Troy I dominate the assemblage, followed by finds from Troy II, with Troy III material too scant for proper comparisons.

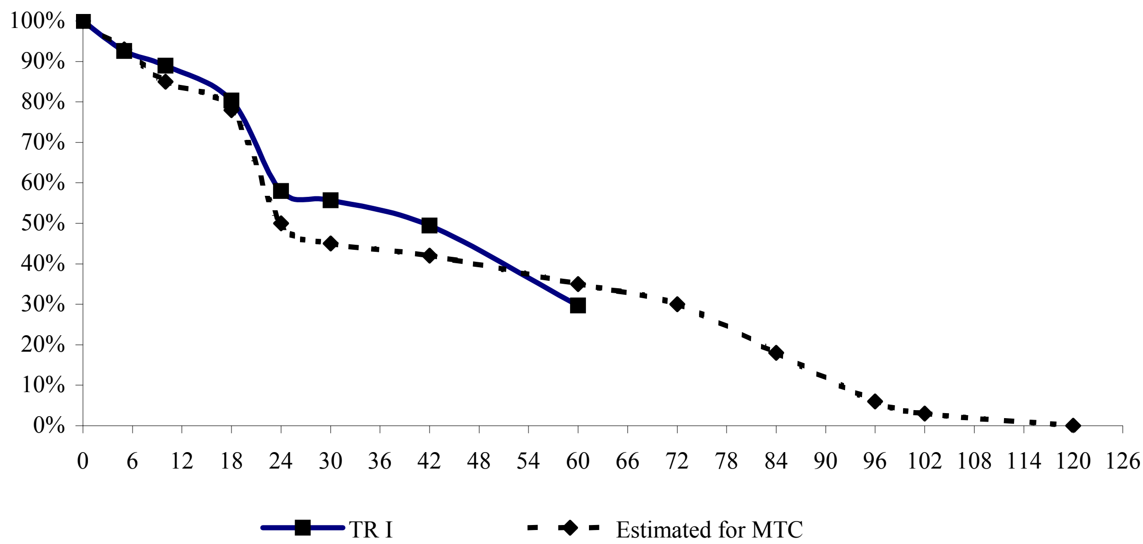

Fig. 5-20: The survival curve for small ruminants in Troy I according to the epiphysis fusion data and the estimated survival curve for the small ruminant population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

During the period of Troy I, at least 11% of immature small ruminants were killed by the age of 10 months. Regular slaughtering occurred after animals had reached an optimal weight, and altogether 40% of the animals in the flock did not reach the end of their second year. Slaughter began to decrease among animals older than 2 years of age. Approximately 30% of the animals in the flock were at least five years old (Tab. 5-20 and Fig. 5-20).

The survival profile of the small ruminants from Troy II reveals a completely different pattern. The mortality percentage of infant and juvenile animals is quite high, at around 30%, indicating that one-fifth of the small ruminants were killed in the first five months and that altogether half of the animals did not reach the age of two. More than one-third of the animals were killed between the ages of 1 ½ and 2 years. Slaughtering of animals older than 2 years slowed down, as in the case of Troy I. Little bit more than 20% of the small ruminants in the flock advanced beyond the age of five years (Tab. 5-21 and Fig. 5-21).

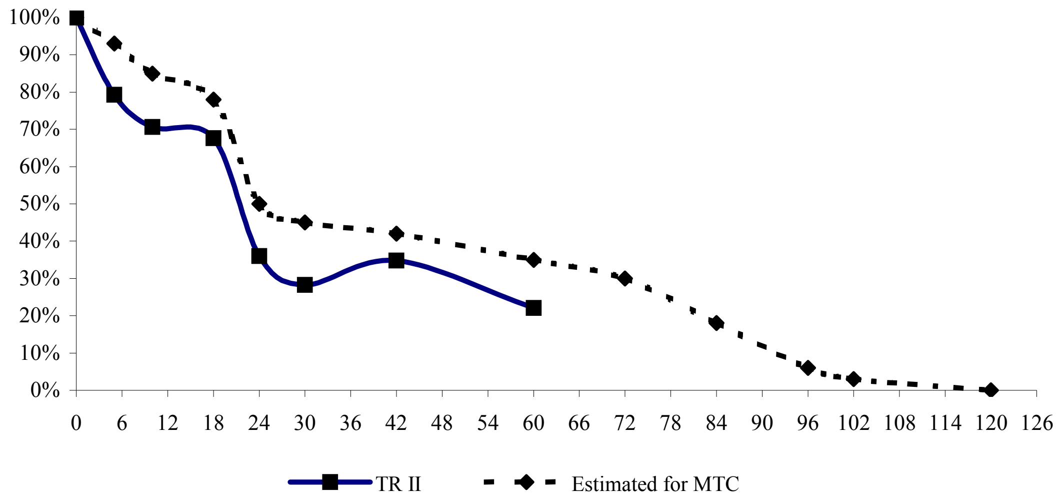

Fig. 5-21: The survival curve for small ruminants in Troy II according to the epiphysis fusion data and the estimated survival curve for the small ruminant population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

Around 30% of the immature small ruminants were killed in Troy III. Only one-third of the animals reached an age older than two years. At least one-fifth of the small ruminant flock consisted of animals that were 42 months of age. The absence of identified non-fused bones from the small ruminants in Troy III presents us with very rough results for the analyzed material (Tab. 5-22 and Fig. 5-22).

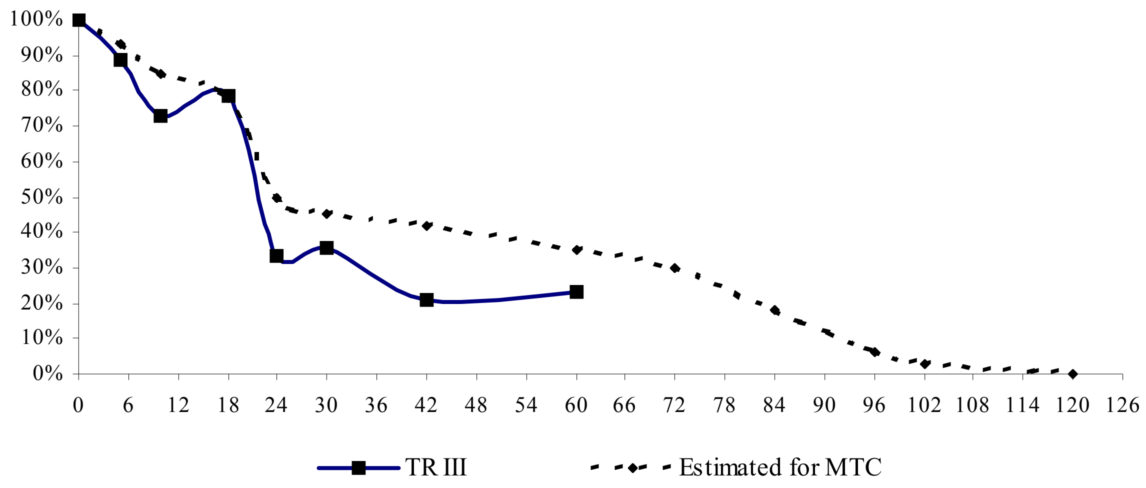

Fig. 5-22: The survival curve for small ruminants in Troy III according to the epiphysis fusion data and the estimated survival curve for the small ruminant population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

Analysis of epiphysis fusion from the Maritime Troy Cultural period on the whole indicates that around 23% of the animals were killed as they were nursed or while they were juveniles. Animals between the ages of 10 and 18 months appear to have been spared from slaughter. As they reached their end-weight, at c. 18 months of age, the animals were butchered more regularly. More than one-third of the animals in the flock between the ages of 18 and 24 months were killed. The animals older than two years of age in the flocks were kept in steady numbers and were killed on a smaller scale. One quarter of the small ruminants in the flock probably reached the age of five years (Tab. 5-23 and Fig. 5-23).

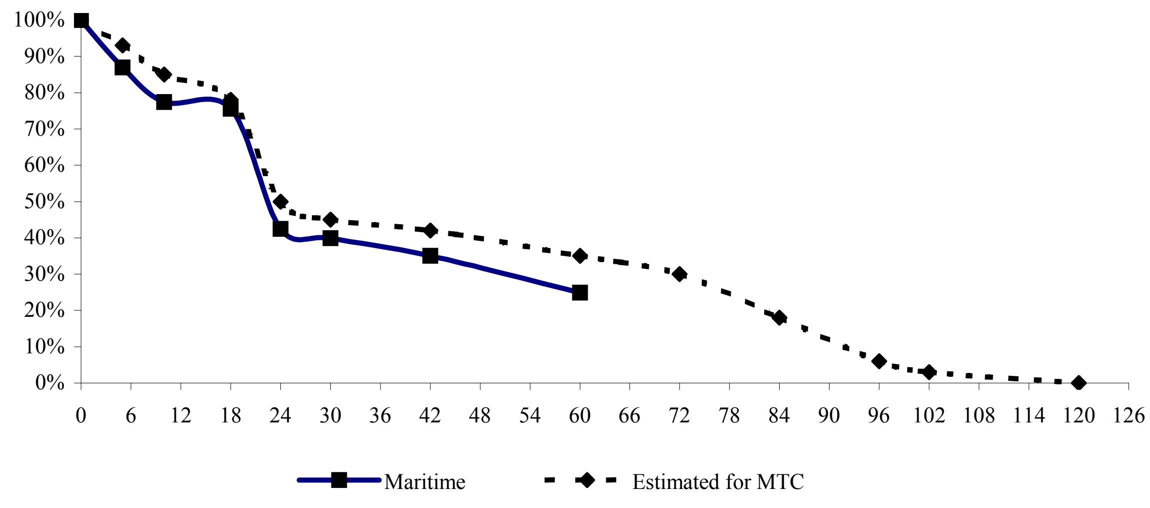

Fig. 5-23: The survival curve for small ruminants during the Maritime Troy Culture according to the epiphysis fusion data and the estimated survival curve for the small ruminant population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

5.1.6. Size of the Small Ruminants

The size of sheep in the Maritime Troy Cultural period was rather small. The shoulder height of sheep was calculated according to the method provided by TEICHERT (1975). The complete bone remains from sheep indicate that the shoulder heights of the animals were between 56.5 and 59.9 cm (Tab. 5-24). The material is too small for a proper analysis of gender based on shoulder height. No complete long bones from goat were identified.

Tab. 5-24: The shoulder height of the sheep based on calculations made from identified intact long bones.

Phase	Find NR.	Radius/mm	Faktor	SH/cm
TR I	9033/122	144,2	4,02	57,9
TR II	6601/ 7	140,5	4,02	56,5
		MC/mm		
TR II	6636/ 13	122,5	4,89	59,9
MIX	6654/ 35	119,5	4,89	58,5
		MT/mm		
TR II	6601/ 25	130,5	4,54	59,3
MIX	6629/ 65	128,5	4,54	58,4

Altogether more than 400 sheep bones, from the entire Maritime Troy Culture, were measured. Most of the measured bones were dated to Troy I. The LSI distributions indicate that the sizes of the sheep from different phases were clearly smaller than the standard animal. The size difference between the phases is very small (Fig.5-24).

The size of sheep from the Troy I period was clearly smaller than our standard animal, while even smaller sheep were kept in Troy II. In Troy III, the size of sheep was quite similar or on average even larger than those from Troy I. This group might possibly have been rams. The general picture shows that the Troyans kept small sheep.

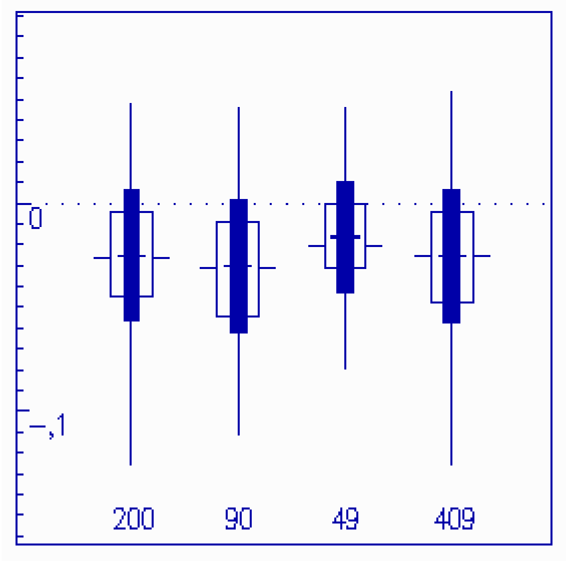

Fig. 5-24: The LSI calculation of sheep remains from Troy I, Troy II, Troy III and the entire The Maritime Troy Culture.

More than 100 goat bones were used in the LSI calculation. The size of goat obviously was smaller than our standard animal. Goats grew increasingly larger after Troy I. The material from Troy III is very small, though it seems that the size of the goat did not change in this short period. Generally the size of the goat was small. This could be a response of human selection as well the absence of experience with goat breeding (Fig. 5-25).

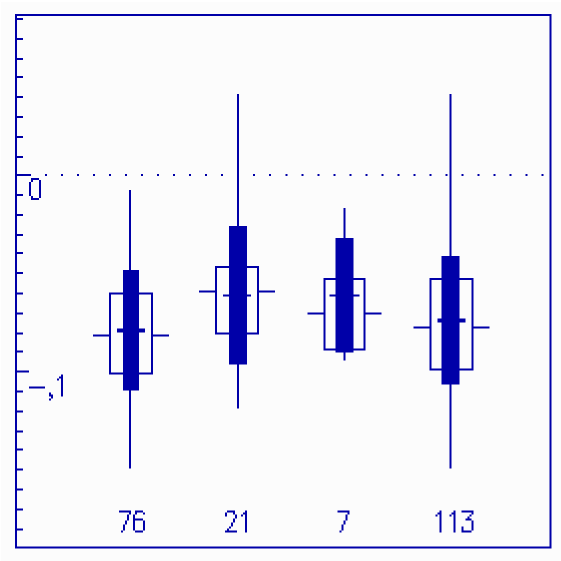

Fig. 5-25: The LSI calculation of goat remains from Troy I, Troy II, Troy III and the entire the Maritime Troy Culture.

5.1.7. Conclusion

Sheep and goat made up altogether more than half of the livestock during the Maritime Troy Cultural period. Sheep was always the most often kept animal in any phase in the Maritime Troy Culture, while the number of goats in the flocks became less important over time. Approximately one quarter of the Troyan meat demand was covered through the mutton during the Maritime Troy Culture.

Clearly identified ewes make up 30% of the flock, while rams make up 25% and possible wether remains 45% of the flock, which includes all indeterminate sexed bone remains. The identified material is simply too small for us to develop a clear picture of the kept animals. Ewes in general would have been kept in large numbers in order to secure the flock and to satisfy milk demand. Wethers were kept primarily for their wool and rich fatty meat. The rams were the first animals that were culled for slaughter or possibly for trade. Few rams occur to maintain reproduction.

RYDER had reported from Turkey different sheep breeding systems he had observed from the mid-1970s, including transhumance and stationary flocks (RYDER 1983: 213-221).

<u>Transhumance flock</u>: RYDER came across such a flock in west Anatolia, as the animals were being moved by truck from Aydin to Denizli. The flock was comprised of 380 sheep. The owner had used only 15 rams on 350 ewes. The birth rate was not good, as he obtained only 280 lambs. If the ewes had been given extra fodder before mating, the birth rate might have been around 95%. Most of the lambs were sold in order to milk the ewes. The milk was used for cheese and sometimes butter.

<u>Stationary flocks</u>:
1 - The flock was observed on a plateau between Denizli and Çivril. Only three rams were used for mating with 250 ewes and the stock farmer had 240 lambs. The ewes were brought to the village at night for milking.
2 - The second flock was kept close to the first one. Four rams were mated with 250 ewes. The lack of fodder caused a 25 % loss of lambs.

RYDER mentioned that the adult sheep were shorn on the 15th of May and the lambs one month later, which was one month earlier than in the mountains. The two different kinds of flocking systems mentioned above share one similarity: no castrated animals were mentioned as occurring in the flocks. The young animals were either killed or sold to obtain the milk from the ewes, while the adult animals, or ewes, were shorn for wool. Most of the lambs were killed for meat. Ewes were kept for milk production and lambing. The wool was shorn from the ewes and from very few rams. Young immature rams were culled for the first slaughter or for marketing and selling. These two different sheep management systems are based first on milk, then wool and meat.

Indeed, the number of identified infant sheep in the material from the Maritime Troy Culture is simply very low. This might be the case due to young animals being killed or sold at markets. The "gentle" bones of very young animals erode faster as compared to the more solid bones from older animals. This might be the real reason why most of the identified and classified bones come mainly from mature animals. This "distorted" identification can lead to misunderstandings with regard to the kill-off pattern and the breeding aims of animals in the past.

The kill-off profiles (based on dental and epiphysis material) among the small ruminants[53] during the Maritime Troy Culture reveal the following differences:

Troy I farmers were focused on acquiring the lifetime products of small ruminants, such as wool and milk; however, these animals were also an important meat supplier. Small ruminant breeding during Troy II was carried out for more multiple purposes than what we find during Troy I. Noteworthy is that one quarter of the animals were killed between their sixth and eighth year of age. According to the different aging data, there were four main factors involved in small ruminant management:

- The killing pattern of infant and juvenile animals, involving not only a few examples, could indicate a possible usage of milk from the mother animals and definitely the consumption of meat as well as the usage of hides. Male animals might have made up the largest portion of the group.

[53] The number of sheep was much more dominant than that of goat in the small ruminant flocks (see Capital Material and above). The kill-off pattern of small ruminants would then apply mainly for sheep.

- Another older group was killed and kept between the time that the animals reached their optimal-weight and the age of 3 ½ years. This group was kept for meat, wool and for hides. A small number of males, and mostly the castrated animals, might have made up this group, while the females were mostly kept for reproduction. Females were milked as well.

- The third group consisted of animals c. six years old, revealing a strategy for obtaining wool, milk and maintaining reproduction. The female and castrated animals were probably dominant in this group.

- The members of the last group, animals between six and eight years of age, were kept to maximise wool and possibly milk production. Most of the animals between these ages would have been female and castrated animals.

Farmers of Troy II were focused on all the products obtained from small ruminants. Meat was of most importance, followed by wool, milk and hides.

Troy III farmers for the most part kept small ruminants in the flocks from three different age groups according to aging analyses. The primary focus was meat, followed by wool and milk production. Young animals were killed primarily for meat. The animals between two and 3 ½ years of age were kept and killed for wool, milk and meat. The older animals, older than 3 ½ years of age, were kept primarily for wool, reproduction and milk. If we, however, examine the general picture of small ruminant management during the Maritime Troy Culture, general similarities occur for each period, up to one point.

There are two main groups of animals in each period and in all of the material for the mature animals. Their percentages or ratios to each other change little, but parallels are noticeable.
Mature animals were killed roughly between 1 ½ and 3 ½ of age. The second group reached a more advanced age and consisted of animals older than 3 ½ years. These results could indicate the following:

1-Group (1 ½ to 3 ½ years old) = Absence of young animal bones could indicate that a great number of animals reached maturity. The productive ewes were kept longer in order to secure the flock. Not only the female animals were allowed to age in the flocks but the male animals as well. If all of the animals were allowed to age in the flock, than the small ruminant flock would have exploded in number. Therefore, some of the newly born animals were probably either sold in the markets or were killed somewhere other than at the settlement (maybe during transhumance activity in cooler places).

This indicates without a doubt that the male animals were first culled for slaughtering or for selling. But a certain percentage of them were kept for longer periods[54]. The male animals were castrated before they reached a mature age in order to avoid conflicts during mating. They were killed around two years of age. This slaughtered group probably consisted of mostly females and wethers. They were also killed for meat. This occurred probably after they had almost reached their optimal-weight. Their wool was used as well, as were their hides.

2-Group (older than 3 ½ years) = This group consists of mainly ewes and wethers. Ewes can produce offspring, wool and milk, as well as meat. The old wethers in this group might have been kept to maximize wool production. Some older animals were kept as leaders among the flock.

Small ruminants began to be killed at an early age in Troy II and III. The dental and epiphysis aging results indicate that there was a clear increase in the slaughtering of young animals. This could be associated with the social life and other dynamics of the settlement.

The developments within the settlement in Troy II after Troy I could offer further explanations. The archaeological finds indicate that the settlement during Troy II was no longer a coastal village but rather an important harbor city. These changes might have influenced the eating habits of the people. The increase in young small ruminant remains from Troy II might demonstrate that people were consuming higher quality choices of meat than the people of Troy I. The wealthier dynamic of the settlement might be the reason for the increased consumption of young sheep and goat meat[55], or probably for the management of well-organized and healthier small ruminant flocks as well.

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[54] If the birth rate of male to female lambs is 1:1.

[55] One-third of the identified mammal bone remains originate from outside the citadel (lower city) and mainly from the D7 trench. The killing pattern of the small ruminants according to the epiphysis aging data (dental material was too sparse to be considered here) from D7 indicates that the animals were killed during the nursing period, but not as regularly as in the citadel. Regular slaughtering was carried out on animals 18 months of age

During Troy III, the forced slaughtering might have occurred for the consumption of young small ruminants[56]. One third of the animals reached the age of 3 ½ years. Another possibility is that the consumption of milk increased in the later periods of the Maritime Troy Culture. This is why many lambs at nursing age were killed. Their meat and hides, though, were surly not wasted.

The lack of written sources from Anatolia during the Maritime Troy Culture makes it difficult to reconstruct the herding systems. Few rams are needed for many female animals in order to maintain successful reproduction. Therefore, the flocks probably consisted of mainly female and castrated animals (in this case wethers). Wether remains from other Early Bronze Age settlements have been reported as well, such as from Demircihüyük[57], Küllüoba[58] and Hassek-Hüyük[59].

Around 70% of the goat flock consisted of adult animals between the ages of two and six years. They were kept most probably for meat, milk and mohair, which indicates that most of the goats were does. One-third of the animals, probably the males, were killed very young for their meat. Castration of goats is not common.

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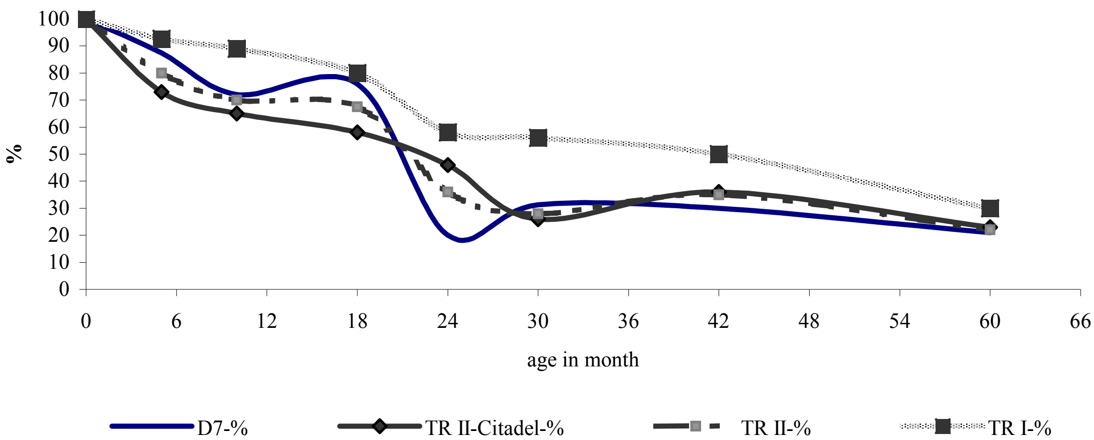
outside of the citadel, while in the citadel one quarter of the animals were killed before they reached 6 months of age, and the slaughtering continued regularly thereafter. There was no sudden intensive period of slaughtering in the citadel as did occur in the lower city.



People in the citadel consumed more young animal meat than the rest of the settlement, which could be explained by the existing hierarchy in the society/or with a complex society. One-third of the animals reached the age of two and a half years in both parts of the settlement. The survival curve from D7 shows that the killing pattern of small ruminants shared no similarity with that from Troy I. The killing age pattern of small ruminants after Troy I, during Troy II, changed in the citadel and lower city.

56 Again one-third of the identified mammal bone remains from Troy III come from the citadel. However, the aging material of small ruminants from the lower city is too few in numbers for a proper comparison with material from the citadel.

57 RAUH, page 40. Northwest Anatolia, close to the modern city of Eskisehir.

58 GÜNDEM, page 71 and 79. Northwest Anatolia, close to modern city of Eskisehir.

59 STAHL, page 63. Southeast Anatolia, in the Urfa Province.

Sheep shoulder height reached a maximum of c. 60 cm, which might be comparable with the Cameroon's hair ram of today. The LSI distribution of sheep among the phases reveal that sheep from Troy I and III are similar in size, though the average size of the sheep in Troy III was larger than in Troy I. Troy II sheep were slightly smaller than sheep from Troy I and III. Goat size was very small as compared to the standard animal. Goats became larger over time.

5.2. Cattle, BOS

Cattle were the first domesticated large mammals in the history of animal husbandry. Cattle originated from *Bos primigenius*. They existed in Anatolia until the Middle Ages (KUSSINGER 1988:154-158). Cattle were considered a valuable possession. They produced milk that could be used in different ways, such as for producing cheese, yogurt, or butter. They also produced dung that can be used as fertilizer, for heating or for construction (e.g., when mixed with earth) and used as wall plaster. Cattle were used as a draft animal. After slaughtering they provided meat, fat and bone marrow. Their bones and horns were also used as raw material for the production of tools. Their hides were used for multiple purposes, such as for clothes or as curtains, blankets, and the like.

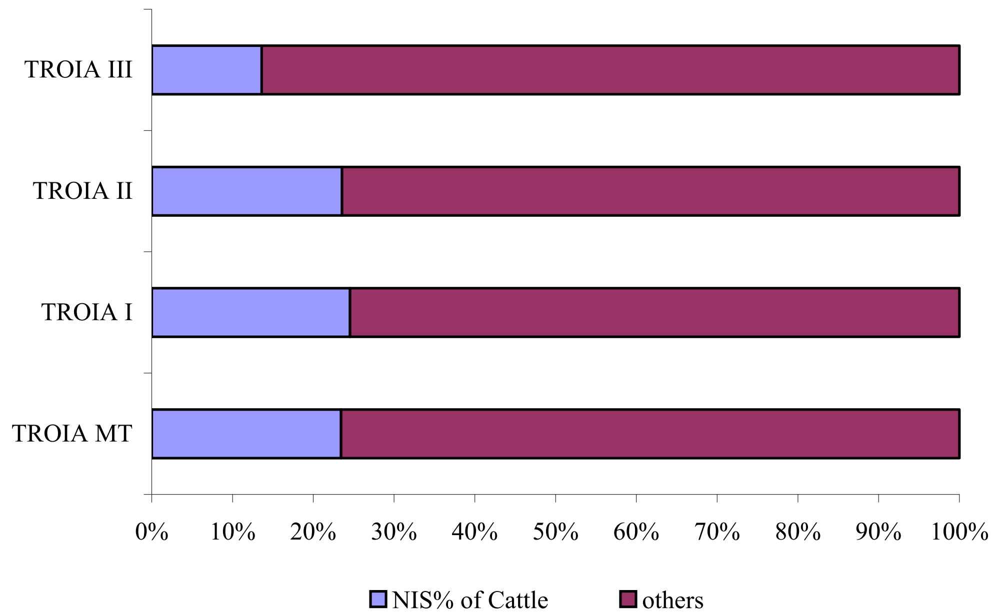


Fig. 5-26: NIS% of the cattle remains among the identified mammal remains for the Maritime Troy Culture and its phases.

4,055 bones and teeth from the entire Maritime Troy Culture[60] have been identified as cattle, BOS. They make up altogether c. 23.5% of the identified mammal remains and c. 42% of the weight of all the identified mammal remains (Tab. 5-4). Cattle remains rank highest among finds from the Maritime Troy Culture. However, this does not apply to all phases. Cattle lost around fifty percent of its importance by Troy III (Fig. 5-26 and Fig.5-27).

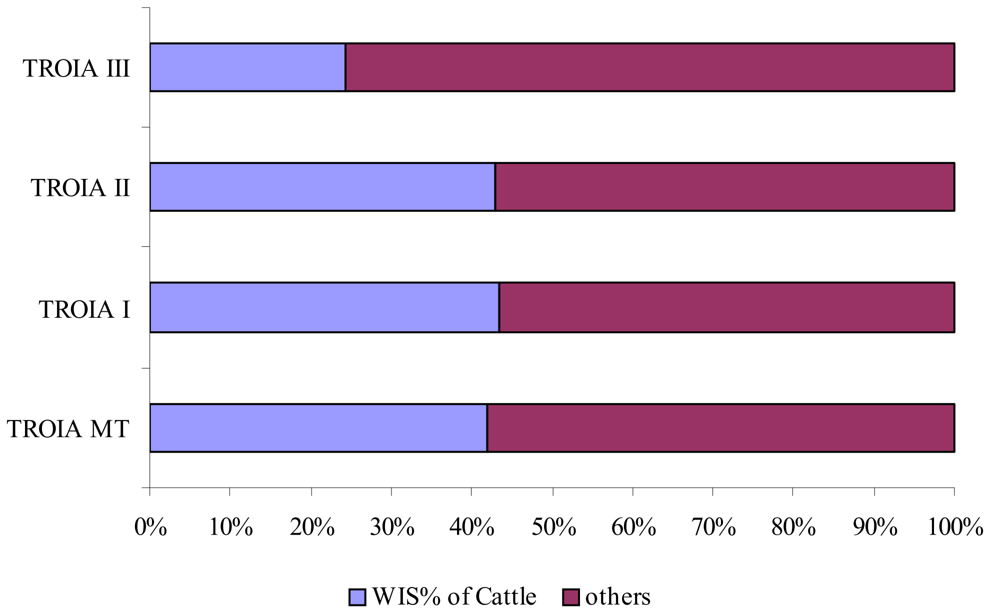


Fig. 5-27: WIS% of the cattle remains among the identified mammal remains for the Maritime Troy Culture and its phases.

Troy III lasted only around 50 years and is understood as the continuation of Troy I – II. However, the faunal assemblage reveals remarkably different features than Troy I-II. Great architectural changes took place inside the settlement with changes also occurring with regard to animal husbandry, the economy and red meat consumption as well (KORFMANN 2001: 348). Cattle were no longer the favourite meat supplier. Only c. 13% of the kept animals were cattle, rather than ca. 25% of the whole domestic animals in Troy I-II. They were replaced by small ruminants, and more specifically by pig.

5.2.1. Bone distribution of Cattle

All body parts of cattle are represented in the assemblage. Skeletal element distribution of cattle reveals, in general, a similar pattern per phase in the Maritime Troy Culture (Tab. 5-25 A to 5-25 D and Fig. 5-28 A to 5-28 D). The head fragments, in the NIS% and WIS% totals,

[60] The mixed material is included.

seem quite high for the entire period (c. 18% and 16%). Skull and mandible remains were probably smashed to gain access to the brain and bone marrow. These parts, especially the skull, were also broken due to natural pressures accumulating underneath the surface. A great number of skull, face, mandible and lose teeth fragments in the assemblage were thus altered. Indeed, the complete skull consists of many small parts, such as the face structure (nasal or orbital part), the teeth (as many as 32 teeth in an adult animal), two hyoids, and the outside of the frontal part of the skull, and more.

One complete skull from our comparative collection[61] of middle-sized cattle[62] accounts for c. 17% of the animal's entire weight, and eventually at least roughly 20% of the whole skeleton (Tab. 5-26 and Fig. 5-29). The number of identified head parts and the weight of identified head parts from the Maritime Troy Culture are quite similar with the comparative skull.

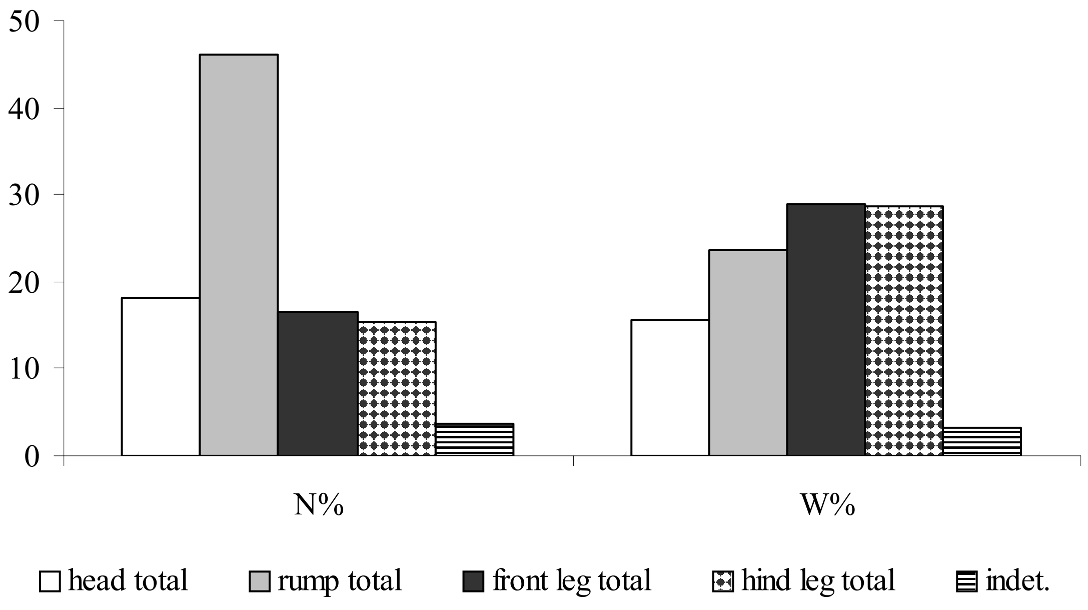


Fig. 5-28 D: Distribution of skeletal parts and weight of the cattle remains during the Maritime Troy Culture.

[61] BOS 30 originates from the United Arab Emirates.
[62] The skull is hornless.

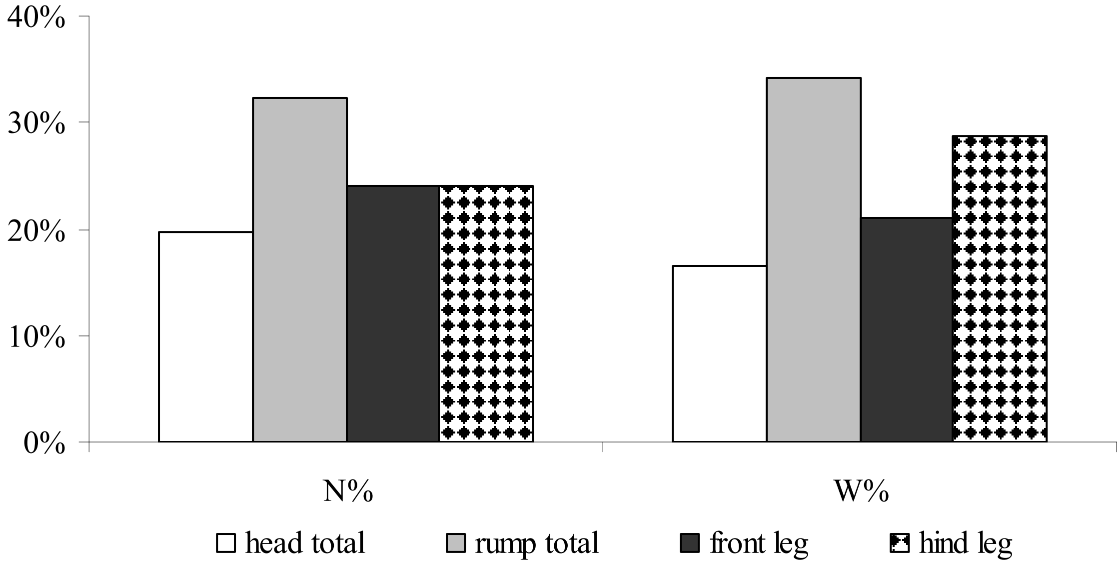


Fig. 5-29: Distribution of skeletal parts and their weights of BO30 from the U.A.E.

The identified vertebra and rib finds among the cattle remains make up a large portion of the finds for all periods of the Maritime Troy Culture. However, the total weight is not as high as their quantity. Normally these numbers should be around c. 33% in number and c. 34% in weight. The ribs and some parts of vertebrae, such as the *spinous*- or *transverse process*, are very fragile. They can break easily, e.g., by smashing a rib, one can produce many fragments. It is very seldom to find a complete rib or a vertebra. This is the reason why they represent such high numbers in the assemblage, but do not weigh what we would expect.

Front and hind legs from the Maritime Troy Culture assemblage are represented less than would be expected, while they are well represented in the weight category. This could be explained by the fact that, though they represent few finds in the assemblage, the size of these remains is relatively large (= they weigh more). The weight of the hind leg finds is nearly identically with the comparative cattle.

Rump finds seem to occur in huge numbers; therefore, front and hind legs appear in small relative numbers. Indeed front leg weight totals cover the lack of the rump total weights. This phenomenon could be observed in all phases of the Maritime Culture. The front leg finds are more compact and larger than other parts of the skeleton.

Single tables per phase for skeletal element distribution of cattle indicate that ribs are the most identified skeletal part, making up between 30-35% of the total, and are the heaviest group, between 11-15% of the total. Vertebrae follow ribs in both categories, except for in Troy III. Fragments from the head are also rich in number, while the front leg parts (scapula, humerus and radius/ulna) represent more in the weight column, followed by hind leg remains (femur and tibia). The meat-holding bones are also well represented.

Skeletal element distribution of cattle indicates that the slaughtering of cattle probably took place in the settlement or somewhere close to the settlement. Chop, cut and fire traces on the bones reveal that they make up the kitchen waste of the Troyans. Most of the chew marks on the bones were probably made by dogs.

Altogether 12 horn fragments were identified. None of these fragments were measurable and none show sexual characteristics. They include corpus or end fragments. Only one example is identified with the skull.

5.2.2. The Gender of the Cattle Remains

Only 15 cattle remains from the Maritime Troy Culture exhibit sexual characteristics, one metacarpus und 14 acetabular pelvic fragments (Tab. 5-27). A Metacarpus fragment from Troy II indicates a bull, whereas half of the acetabular pelvic fragments exhibit sexual characteristics of cows (four from Troy I and three from Troy II), while two are possible cows (Troy I), two are bull or oxen (Troy I and II) and two might be bull (Troy I and Troy III). Only two of the finds could definitely be sexed as bull (Troy II).

Tab. 5-27: Identified pelvis remains from cattle and their probable gender.

	Cow	**Cow?**	**Oxen/Bull**	**Bull?**	**Bull**
TROY I	4 Pelvis	2 Pelvis	1 Pelvis	1 Pelvis	/
TROY II	3 Pelvis	/	1 Pelvis	/	1 MC
TROY III	/	/	/	1 Pelvis	2 Pelvis

With few data stretching over a long period of time, it is impossible to speak of sex ratios for the cattle population. Three pelvises were measured and are listed in Table 5-28. We might roughly conclude that a large portion of the herd consisted of cows.

Tab. 5-28: Measured pelvis remains from cattle and their probable gender.

Pelvis	LA	G
TROI0705 / 26 TR I	60	♀
TROI0762/ 1 TR I	66	♀
TROI0766/ 2 TR I	63	**m/c**
Mean val.	**63**	
std. dev.	**3,3**	
coeff. var.	**5,2**	
N =	**3**	

5.2.3. Kill-off pattern of Cattle

Enough material was available to reconstruct a kill-off pattern for the cattle population from the Maritime Troy Culture, although most of the cattle remains suitable for aging originate from Troy I. Cattle remains from Troy III, on the whole, are simply too few for us to draw any conclusions on the kill-off pattern during this period.

5.2.3.1. The Dental Aging of Cattle

The dental aging for the entire Maritime Troy Culture indicates that c. one-fifth of the animals were butchered before they reached two years of age. Most of the cattle were kept and killed between the ages of two and eight years. A small group of the animals did advance beyond the age of eight years in the cattle herd. Indeed, the period in question extends over so much time that no clear regular slaughter patterns properly emerge (Tab. 5-29 to 5-31 and Fig. 5-30).

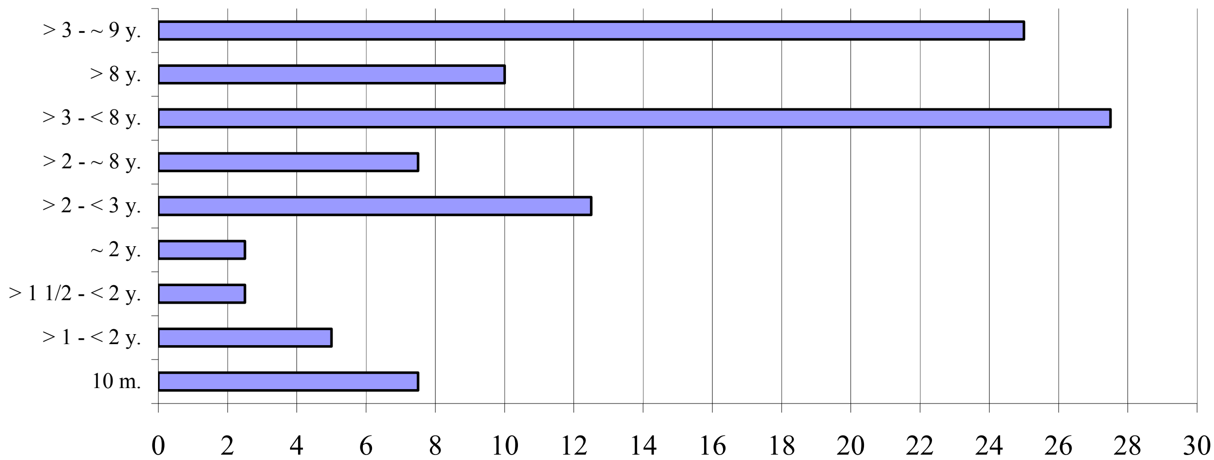


Fig. 5-30: The Dental aging of cattle during the entire Maritime Troy Culture in percentages (n=40).

5.2.3.2. Epiphysis fusion of Cattle in the Maritime Troy Culture

Regular slaughtering during the Maritime Troy Culture on the whole began between the 18th and c. 26th month of the animals, according to the epiphysis fusion. Between the 26th and 42nd month the curve does not go sharply down but rather gradually, while c. half of the herd survived this period until the beginning of the second slaughtering phase. This phase was not as extreme as the first. One-third of the cattle clearly advanced beyond five years of age (Tab. 5-32 to 5-34 and Fig. 5-31 to 5-34).

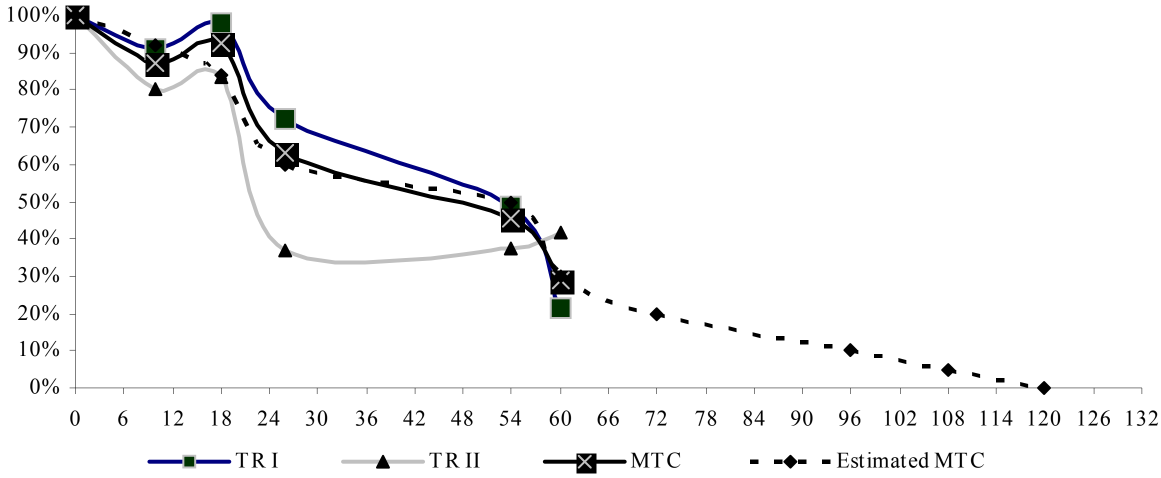


Fig. 5-34: The survival curve of the cattle in Troy I-II according to the epiphysis fusion data and the estimated survival curve of the cattle population according to calculations on the dental and epiphysis data from the entire Maritime Troy Culture.

5.2.4. Size of the Cattle

Except for one metacarpus from Troy II, there were no other intact long bones found in the whole assemblage. The shoulder height is calculated according to the method devised by FOCK (1966). The metacarpus has a complete length of 199.5 mm. This measurement should be multiplied by a factor of 6.0 to obtain the approximate shoulder height. The result is ca. 1.20 m (1,197 mm). This might be comparable to a middle-sized cow (cf. RAUH 1981: 22).

The LSI distributions indicate that the sizes of the cattle from different phases were slightly smaller than the "standard animal63" (Fig. 5-35). But larger individuals occurred in the herds as well. The upper extremities above the standard line are representing oxen and above that the bulls[64].

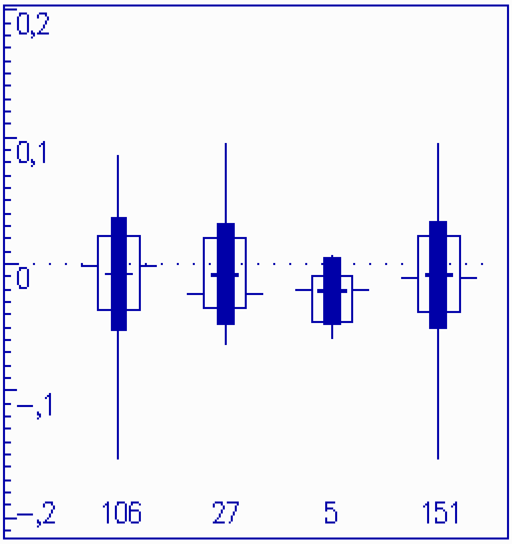


Fig. 5-35: The LSI calculation of cattle remains from Troy I, Troy II, Troy III and the entire Maritime Troy Culture.

The size difference between the phases is minimal. Troy I and II are almost identical. Five measurements from Troy III say little about the size of the cattle. In general, medium-sized cattle were mainly kept during the Maritime period.

5.2.5. Conclusions

Cattle played an important role in animal husbandry during the Maritime Troy Culture, especially in its first two phases. More than ten percent of the cattle were butchered at a young age during the Maritime Troy Cultural period overall. This enabled the consumption of choice and better tasting meat. The regular slaughtering of cattle began before they reached their mature period. . It was no longer economical to keep the bulls, which is why they were probably slaughtered first. It is likely that the oxen and cows were kept longer.

[63] BOS 30 had a shoulder height of ca. 1.19 m (1,194 mm after measuring the MC - 199,0 x 6,0 -). The formation of the pelvis exhibits the sexual characteristic for a female individual.
[64] The LSI (standard animal) is based on the thickness of the bone and not its length, which is true for all LSI-calculations in this thesis.

The advantage for keeping oxen is that they tend to be calmer after castration. Castration prevents them from mating and also reduces fighting among bulls for dominance within the herd in matters of reproduction. Secondly, they were probably used for labour after castration. Thirdly, oxen were kept to meet the demand for red meat –, though the animals were not kept too long, as advanced age would have lessened the quality of the meat. Cows were responsible for reproduction, meat and maybe for milk. Fewer bulls in the herd would still have been enough for purposes of reproduction.

In Troy II cattle were slaughtered at an earlier age than in Troy I. More than 15 % of the cattle population had already landed in the cooking pots within the first 18th months of their life. Regular slaughtering began between the 18th and 26th month of age. More than two-thirds of the cattle population did not advance beyond the age of two-and-a-half years. After this period no radical slaughtering occurred. The calves were slaughtered in the first months of life in order to gain high-quality meat in Troy II, but also possibly to obtain milk from the mother-cows as well as to process their soft hides. Fodder consumption of the animal as related to body weight is considered optimal at c. two years of age, the age marking the second phase of regular slaughtering. The young bulls were probably killed first for meat consumption, which could have also aided in keeping milk production constant. The cows were probably kept in greater numbers for purposes of reproduction. The oxen were kept as meat suppliers and would have been periodically slaughtered. The oxen that were left to grow old were probably the draft animals.

Animal breeding and meat consumption during Troy III is represented by another system. Small ruminants, mostly sheep, and pigs covered most of the meat demand. The animal-based survival economy during Troy III was not clearly a straight continuation of Troy I-II.

UERPMANN points out as well that: "*In den Übergangsphasen IV und V von Troia sind im Subsistenzsystem sowohl auf pflanzlicher wie tierischer Seite starke Veränderungen gegenüber der vorhergehenden Maritimen Troia-Kultur zu erkennen. Im tierischen Sektor zeichnen sich insbesondere in der Phase IV wirtschaftliche Stress-Situationen ab.*" (UERPMANN 2001: 317). It is possible to observe the changes in the subsistence system (Subsistenzsystem) as well in the changes of flora and fauna from the Maritime Troy Culture to Troy IV/V, especially the stress situation in the animal sector during Troy IV. However, this stress period in the animal sector had already begun during Troy III. Cattle management, or live stock management in general, began showing another pattern already at the end of Troy II and during Troy III[65].

The high consumption of meat from young cattle in Troy II could be compared as well to the consumption of meat from young small ruminants during the same period. The increase of young animals killed during Troy II reflects that the people could produce more calf meat than the people of Troy I. This could be explained by the growing wealth of the settlement and a better managed cattle-herding system during Troy II (see also Chapter 5.1.7). More cattle remains could be aged from the citadel than from the lower city. This fact does not offer material for a propper comparison of both parts of the settlement. It is clear, however, that the people in the settlement during Troy II had more calf meat than the people of Troy I.

Excluding one metacarpus from Troy II, there were no other intact long bones in the whole assemblage. The shoulder height was estimated at ca. 1,20 m. The LSI distributions from the different phases, or all phases grouped together, indicate that in general middle-sized cattle might have been kept during the Maritime Troy Culture.

5.3. Pig, SUS

Pig originated from wild boar, *Sus scrofa*. The domestication of wild boar has been documented in southeastern Anatolia (BENECKE 1994:250). In Troy, 3,705 bone remains were identified as pig from the entire Maritime Troy Culture (Tab. 4-4).

The distribution of the pig remains per phase among the domestic animals shows clear differences. One-fifth of the kept domestic animals were pig during the Maritime Troy Culture and again one-fifth of the red meat demand was supplied by pig as well. After calculating the possible number of sheep and goat[66], pig breeding occupied third place in Troy I and II, and second place in Troy III. During Troy II the consumption of pig meat clearly decreased, although it was the third most kept animal. Pig breeding became very important during Troy III and pork was the most consumed meat (Fig. 5-36 and 5-37).

[65] Bone material from Troy III came from a certain part of the mound. This might well be the reason for the lack of cattle remains in the assemblage.
[66] Please see Chapter 6.1.

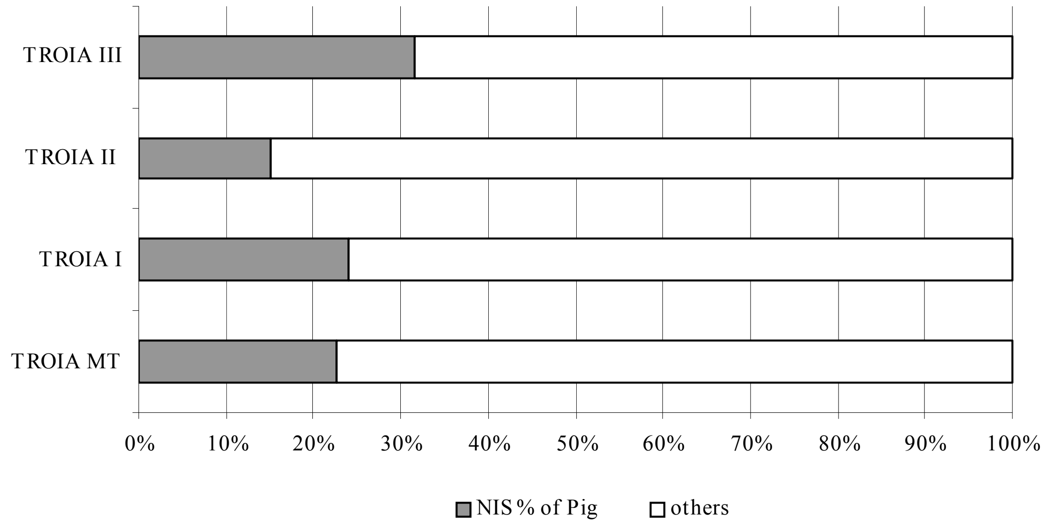


Fig. 5-36: NIS-% of the pig remains among the domestic animals for the Maritime Troy Culture and its phases.

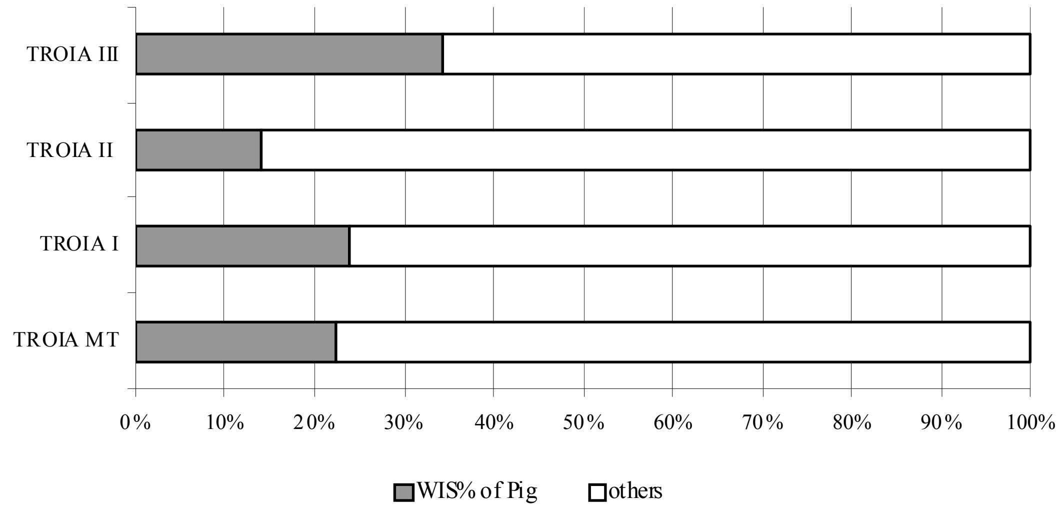


Fig. 5-37: WIS-% of the pig remains among the domestic animals for the Maritime Troy Culture and its phases.

5.3.1. The bone distribution of pig

The distribution of pig bone remains per phase is described in Tab. 5-35 A to 5-35 D and in Fig. 5-38 A to 5-38 D. The similarities in the diagram information for each phase are obvious. Head and rump remains are highly represented for the entire Maritime Troy Culture (Fig. 5-38 D). The front and hind leg remains are fewer, while the weights of the remains of both extremities almost match the weight of the standard animal[67] (Tab. 5-36 and Fig. 5-39).

[67] Only the bone weight of skeleton SU12 in the Tübingen collection was taken for comparison.

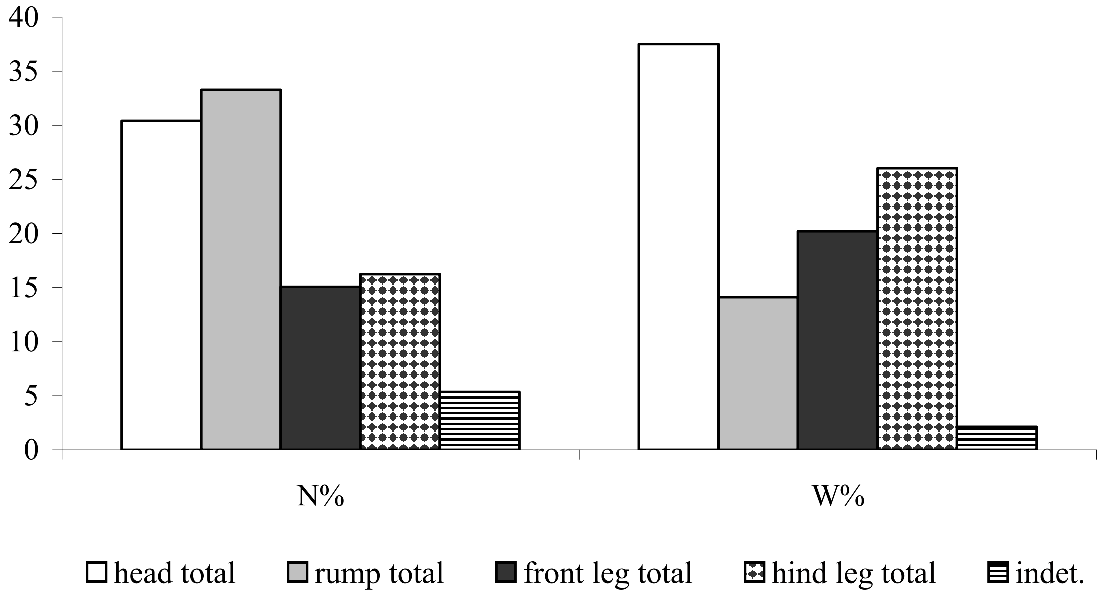


Fig. 5-38 D: Distribution of skeletal parts and weight of pig remains during the Maritime Troy Culture.

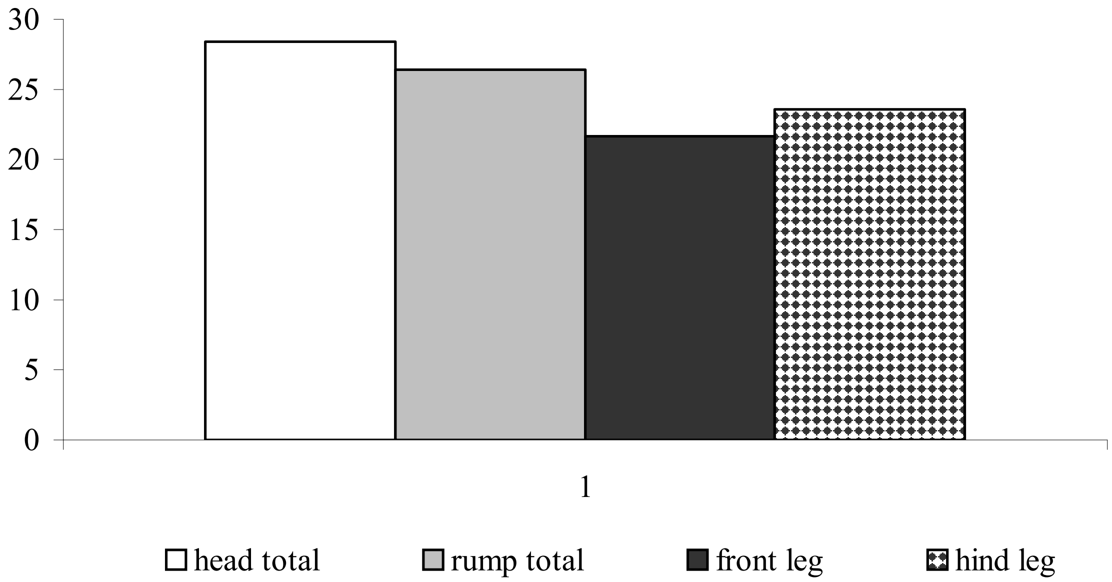


Fig. 5-39: Distribution of skeletal weight of the standard pig SU12.

Though the identified number of leg bones might be few, the size of the remains is large enough, reflecting the figures in the weight category. The head remains weigh in all phases around 10% more than in the standard animal, producing contrary results when compared to the rump remains. The contribution of skull and mandible parts to the total weight of pig remains is quite high.Due to heavy fragmentation the number of identified ribs may appear high, but their total weight is low.

The distribution of pig bone remains seems to reflect that slaughtering of pigs took place in or somewhere close to the settlement. This is indicated by the high number of identified head parts. Long bones, scapula and pelvic remains are well represented in the number and weight categories.

5.3.2. Pig Gender

Forty-six pig remains from the Maritime Troy Culture exhibit sexual characteristics (Tab. 5-37). Most of the sexed remains were discovered in Troy I. They are mostly canines. Boar remains are clearly dominant in the assemblage (1:2,8). A group of productive sows were kept to secure the herd and were slaughtered before they proved unproductive[68]. If this had not been the case we would have found more remains of very old animals in the assemblage.

Tab. 5-37: Pig bones with sexual characteristics per phase and the Maritime Troy Culture.

Phase	**Troy I**	**Troy II**	**Troy Maritime**
Canines/Root hole	11♀ / 33 ♂	1 ♀ / 1 ♂	12 ♀ / 34 ♂

5.3.3. Kill-off pattern of Pigs

5.3.3.1. Epiphysis fusion in Pigs

A high percentage of young animals were killed in their first year of life according to the epiphysis fusion of pig remains during the Maritime Troy Culture. During Troy I and III approximately 40% of the animals were slaughtered, young (< 12 months). In Troy II these were more then 60%.

In Troy I, 40% of the pigs were older than two years of age, decreasing to 20% in Troy II, and becoming only 15% of the total livestock in Troy III. In Troy I c. 8% of the animals were over 2 ½ years of age, becoming c. 17% in Troy II. The epiphysis fusion data from Troy III indicate that pigs did not live past 3 ½ years. The absence of identified unfused bones of pig is misleading from Troy I, which when presented by the curve, illustrates numbers that are highly unexpectedrising. The opposite case is presented for Troy II, with the curve falling

[68] COLUMELLA had pointed out that the sows were productive until they were c. seven years old. The more productive they are, the faster they age. The boars were used for mating until their third or fourth year. Afterwards they were castrated so that they would become fatter (COLUMELLA 238).

down to zero. A very small percentage of animals advanced beyond five years of age, equaling only around 2% of the total (Tab. 5-38 to 5-41 and Fig. 5-40 to 5-43).

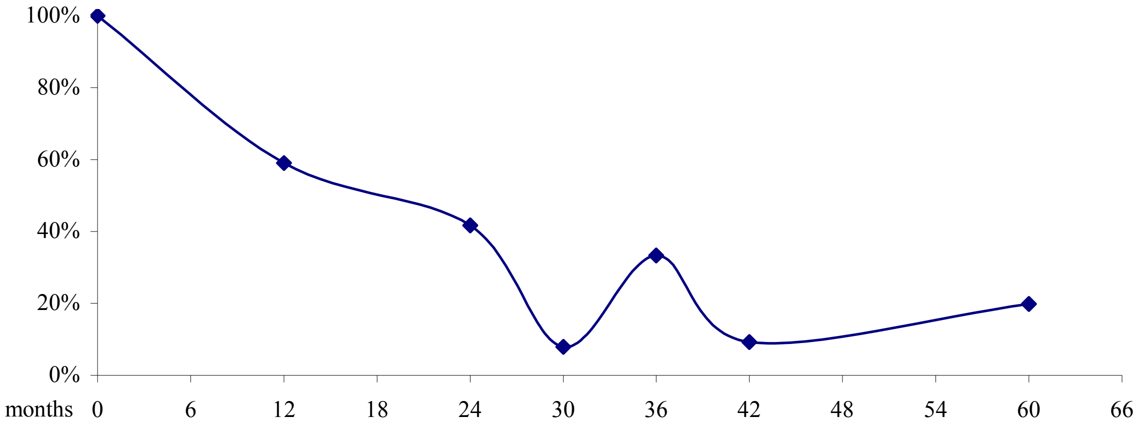


Fig. 5-40: The survival curve of pig in Troy I.

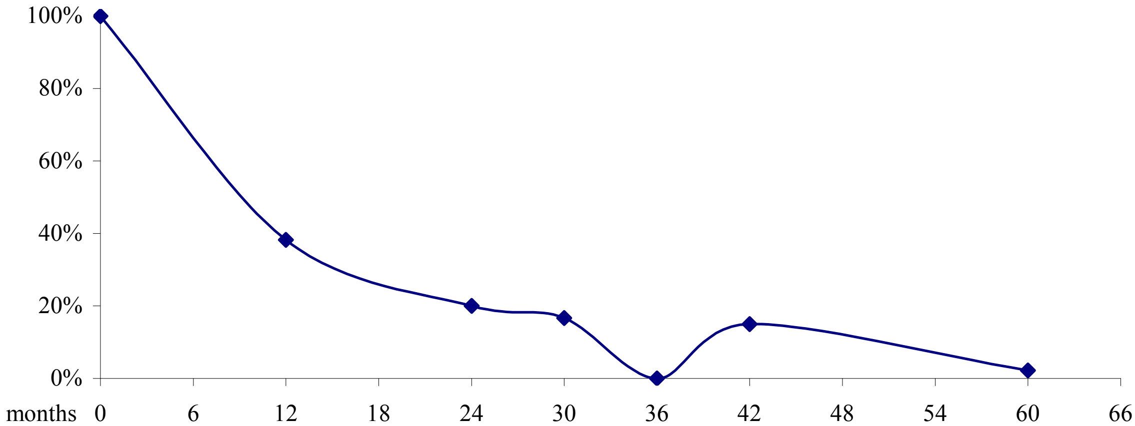


Fig. 5-41: The survival curve of pig in Troy II.

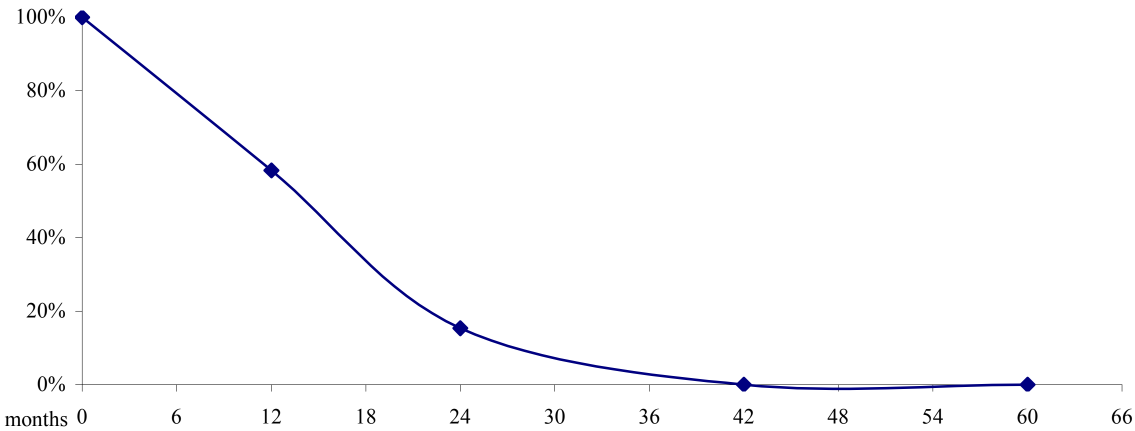


Fig. 5-42: The survival curve of pig in Troy III.

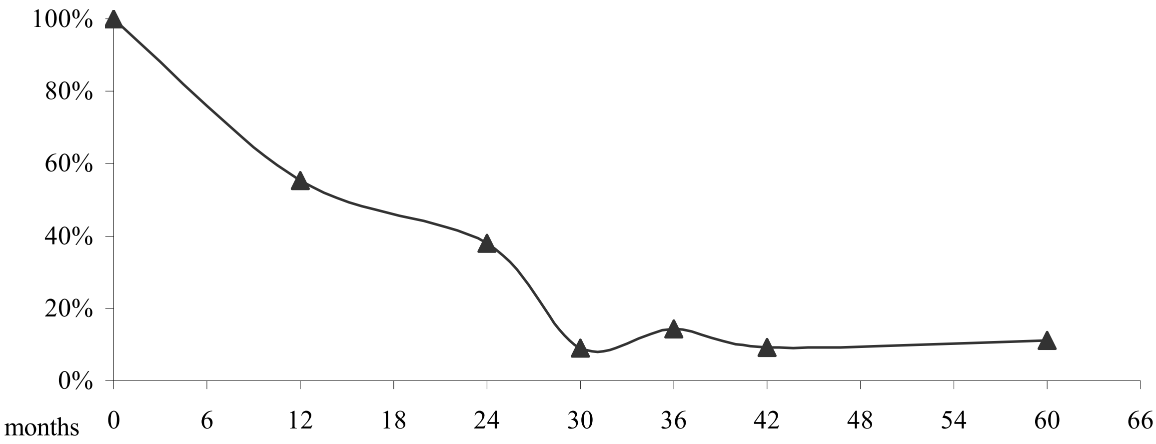


Fig. 5-43: The survival curve of pig during the Maritime Troy Culture.

All epiphysis fusion data of pig from the Maritime Troy Culture indicate that c. 45% of the animals could not have been older than one year of age. Only 40% of the animals lived beyond two years of age, and only around 9% from this group were kept further beyond the age of 2 ½ years. The absence of identified unfused bones in the assemblage makes the curve confusing. The pigs that reached the age of five made up one-tenth of the pig-herd.

5.3.3.2. The Dental Aging of Pig

Most of the information we have on the dental aging of pig in terms of the kill-off pattern originates from Troy I (Tab. 5-42). The information was processed together for all periods, as we have no dental aging data from Troy III and very little from Troy II (Tab. 5-43).

The dental aging data from pig demonstrates that 15% of the animals were killed in their first six months (Tab. 5-44). More than one-third of the pigs in the herd were already killed in their first year of life. A third group, c. one quarter of the animals, was slaughtered by one and half years of age. Around one-third of the animals reached an age of approximately two years or older. Only 5% from this last group were older than two and half years. There was only one example in this last group of an animal killed over the age of 3 ½ years (Fig.6.3.-11).

Tab. 5-44: Specific dental aging groups for pig during the Maritime Troy Culture.

Aging group in months	**N**
~ 4 – 6/10	18
~ 10 – 12/14	41
~ 14 – 16/18	29
~18 – 24	20
~ 24 – 30	7
> 30	6
Total	**121**

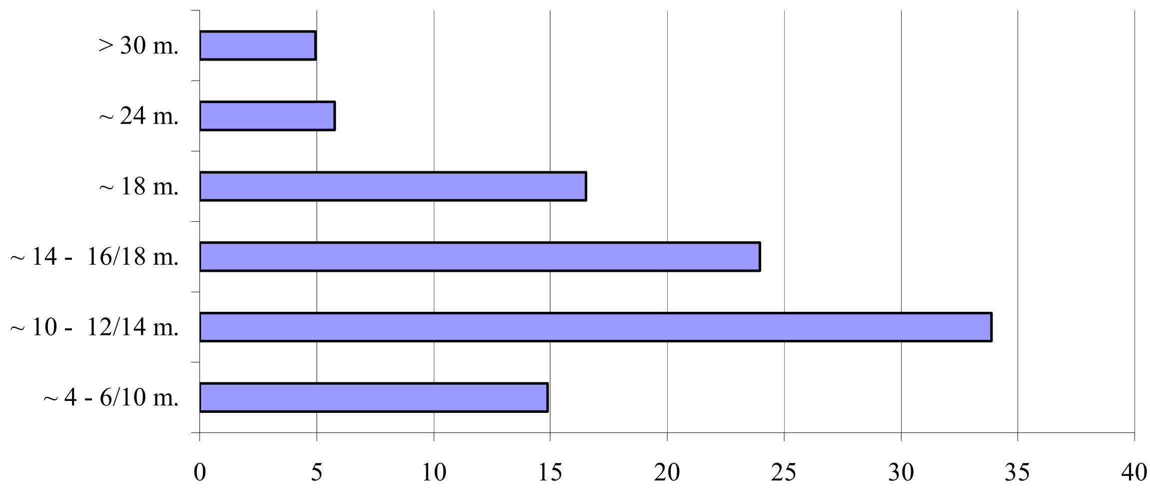


Fig. 5-44: Specific dental aging groups for pig showed in percentages for the Maritime Troy Culture (n=121).

The dental and epiphysis aging data are consistent with one another. Regular slaughtering began with piglets only six months old. The slaughtering continued at a rapid pace among the animals that were two years of age. A small group of animals advanced beyond the age of 2 ½ years.

5.3.4. Pig Size

The size of the pigs became smaller over time. In Troy I pigs were larger than in the following phases. The size difference is not great among the phases; but it is clear that the average size of the animals became smaller. This could be explained by the possibility that - while large pigs occurred in all phases - the number of the smaller animals increased. The greater picture reveals that pigs from the Maritime Troy Culture were smaller than our standard animal, a female wild boar (SU12) (Fig. 5-45).

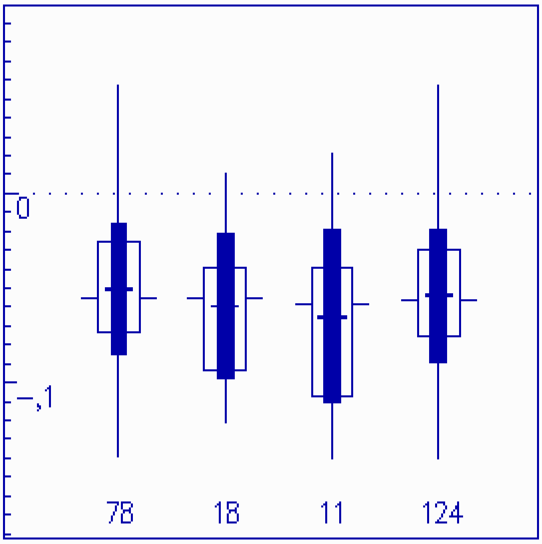


Fig. 5-45: LSI calculations for pig remains from Troy I, Troy II, Troy III and the entire Maritime Troy Culture.

5.3.5. Conclusions

In summary, pig was the third most important domestic animal during the Maritime Troy Culture. The contribution of pig to the meat demand of Troyans decreased in Troy II, although it was the third-most kept animal. Suddenly, though, the demand for pork became enormous. Pigs were subsequently kept in large numbers during Troy III. This increasing interest for pig during Troy III could be explained as follows:

- As the population of the settlement increased, the demand for red meat grew as well, which was met and supplied by pig. Because sows have a high birth rate, they were able to reproduce very quickly, thus satisfying the human population's need for meat.
- The environment was favorable for pig breeding. Oak forests had expanded and now covered the rich pasture, possibly leading to the decreasing number of cattle.
- Well-known changes took place in the city during Troy III. A different culture might have influenced the dietary habits of the human population of Troy III. The city might have been under pressure during Troy III. KORFMANN has described Troy III as follows: "*Die Bebauung im Innenbereichen der Burg wurde nun zunehmend dichter*

und kleinteiliger: Eine rasche Abfolge von mindestens vier Bauphasen - darunter eine, die durch eine große Brandkatastrophe ihr Ende fand – lässt auf zunehmend schwierige Lebensverhältnisse schließen " (KORFMANN 2001: 348). This statement lends support to the notion that Troy III maintained a different social and economical climate as had existed in Troy I and II. The density of buildings increased in the citadel. Archeologists have found at least four phases of building, one of which having been destroyed by a catastrophic fire. KORFMANN suggested that all these factors led to deteriorating living conditions. This stress can be observed through analysis of the animal husbandry.

The interest in cattle breeding lessened during Troy III, which could be explained as follows:

- Cattle need more space than other domestic animals.
- Cattle need much more fodder than do other domestic animals.
- The cow reaches maturity by c. two years of age.
- The cow's gestation period lasts c. 280 days.
- Cows can give birth once each year.
- Cattle nearly reach their optimal weight at c. 24 months.
- Cattle are attractive prey for enemies or bandits because they are usually kept in herds outside the settlement, where they can easily be taken away.
- Cattle might have been under danger because of disease[69] during Troy III.

The interest in pig breeding increased due to the following:

- Pigs do not need as much space as cattle.
- Pigs are omnivore; they do not waste or choose fodder. They can eat all kinds of kitchen garbage from the human population.
- Pig gestation lasts around 112-114 days.
- They can produce many piglets.
- Sows are already mature by eight months.

The architectural remains and the catastrophic fire indicate the difficult times faced by the people of Troy III (see above). Most probably the city was more often under attack. Animal

[69] This might have been a disease which does not affect the bones. No pathology marks were reported on the cattle remains from Troy III.

bone remains testify partly to this situation. The advantage of keeping pig in large numbers during Troy III could be summarized as follows:

> Pigs are smaller than cattle and need less fodder. They are omnivores, do not waste fodder and are not choosy eaters, which might have been very important, as Troyans were busy defending their city[70].
>
> Cattle could be controlled easier and might have been easier to keep in groups or herds. This might have made it more convenient for enemies to steal cattle and get away quickly. It is not easy to drive pigs away in groups, as they run off in all directions when frightened. Tus, a preference for pigs might be another reason why cattle were kept in smaller numbers so as not to lose them to enemies.
>
> Pigs can produce a lot of offspring at one time and mature in eight months, while ruminants only rarely produce twins. These factors concerning pigs were most probably deemed useful to the people within the settlement, as the city suffered from various pressures, including starvation.
>
> The kill-off patterns indicate that none of the pig remains came from individuals older than 3 ½ years of age. During Troy III pig herds were made up of rather young animals and experienced a great deal of turnover. The animals were killed very young, even before they reached their optimal-weight. As the sows reached maturity, they began to produce offspring. The sows were not kept until they no longer could reproduce (no older animal remains were identified within the assemblage). Meat demand, during periods of stress in Troy III, might have been met by slaughtering younger animals.

The slaughtering of pigs began at six months during the Maritime Troy Culture. Many were killed even before reaching optimal weight. The high birth rate among pig enables such practices.

[70] If we suppose that the destruction during the Troy III was caused through the attacks to the city.

Pig size decreased after Troy I. This could be due to lack of information or an insufficient number of measured boar remains in the assemblage of Troy II and III. It is obvious that pigs were only kept for their meat and probably for their hides.

5.4. Dog, CANIS

Dog is the oldest domestic animal in the history of mankind. They originated from the wolf, *Canis lupus*. There were altogether 91 bone remains identified as dog from the Maritime Troy Culture. Most of the material is dated to Troy I, followed by Troy II (Tab. 4-1 and 4-2). No dog remains were identified from Troy III.

Dog was kept in very small numbers during the Maritime Troy Culture. Only 0.55% of the animal remains are from dog (Tab. 4-4). Four bone remains reveal traces of burning and two show slight signs of cut marks. The cut marks are located on a rib and thoracic vertebra. The burn marks do not indicate direct consumption, though cut marks provide stronger evidence for the consumption of dog meat.

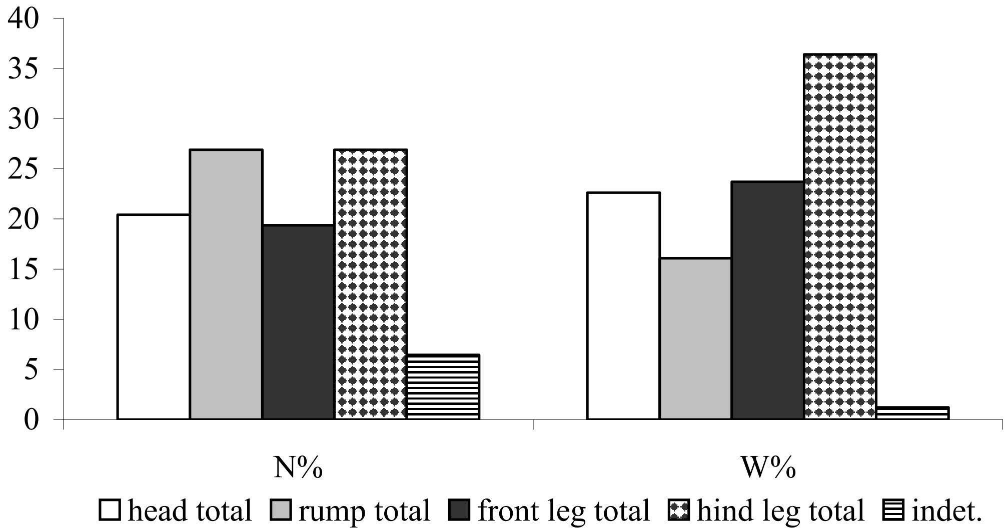


Fig. 5-46: Skeletal part distribution and weight of the dog remains from the Maritime Troy Culture.

Vertebra and skull parts are well represented in the dog assemblage. They are followed by tibia, radius/ulna, metapodials, humerus and pelvis. Hind leg remains make up the heaviest group. Tibia and pelvis remains were found in a more intact condition than the other bone remains, which might explain why they weigh more. Almost all the bones are represented in the assemblage, except the sesamoid bones[71] (Tab. 5-45 and Fig. 5-46).

Dental data are not used for aging the dogs. Traces of dog-gnawing on many bones indicate that dogs were given bone as fodder or that the bones were found by dogs in the garbage or outside the settlement. The more bone they had available to them, the more their tooth-surface began wearing away. It is difficult to determine how often they consumed bone, but for this reason only the epiphysis data were used for aging. The few epiphysis data from Troy I and II indicate that the dogs were allowed to age beyond 3 ½ years (Tab. 5-46 and 5-47).

Dog size during the Maritime Troy Culture was quite small when the finds are compared with an Arabian Wolf (Fig. 5-47). The Arabian Wolf is, though, quite small when compared to its relatives in Europe. There are no intact long bones to calculate shoulder height.

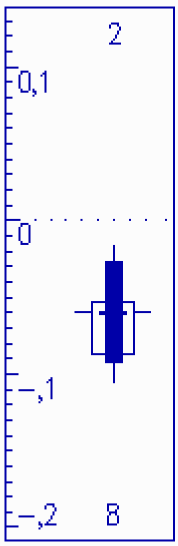


Fig. 5-47: The LSI calculation of dog remains from the Maritime Troy Culture.

Statements on race and size of the dogs cannot be made easily, as there are so few finds on which to base our analysis. The dogs might have been eaten in very small numbers. The contribution of dog to meat consumption was so small that it is only worth mentioning.

Dogs were kept most likely to guard the sheep. They watched over the domestic animals while the flocks were outside the city, or when the sheep spent the night somewhere else, or

[71] They are not easy to find while excavating, or they became lost during the washing process.

during grazing. Dogs secured and guarded farm animals and property against predators and thieves.

Dog size is unclear for the assemblage, but they were definitely smaller than the Arabian Wolf. They might have been similar to medium-sized dogs, though there is no evidence for larger individuals. Due to a lack of evidence in the assemblage, we cannot determine the race of thedogs. The absence of dog remains[72] from Troy III could be accidental. Or they could have been killed during periods of stress, but no bone remains from this time have as yet been identified as dog.

COLUMELLA pointed out that there are three main groups of dogs:

- The first group was used to watch and defend the farm and the neighbourhood from hostile attacks by strangers.
- The second group would have been used to scare off people and predators.
- The third and last group was kept for hunting (COLUMELLA 242).

The duties of dogs were probably the same during the Maritime Troy Culture.

5.5. Domestic Animal Management in the Troas and at Yenibagdemli between 5000 – 3000 BC.

5.5.1. Overview of the earlier Domestic Animal Management in the Troas and at Yenibagdemli

Up to now the animals and the animal economy of the Maritime Troy Culture were described. The different types and numbers of animals kept at Kumtepe A and B during the preceding period (Chalkolithic and Earliest Bronze Age) are significant enough to deserve further attention. Major changes occurred during this period with regard to animal husbandry and red meat consumption. Apparently there was no continuity of traditions from Kumtepe A to Kumtepe B. A layer of soil between A and B could explain the reason for this clear difference. This layer is called chernozem[73], or steppe soil, and indicates a hiatus in the occupation of the site (UERPMANN 2003: 261 and M. UERPMANN 2006: 285).

[72] There only three unidentified canidae remains from Troy III.
[73] It is called “Black Earth” as well and contains a very high percentage of humus.

The mound was not inhabited for more than thousand years. The people of Kumtepe B came and settled at the same spot with a different form of animal husbandry. UERPMANN (2003:254) mentioned that the very low presence of pig during Kumtepe A cannot be linked to the typical oak-dominated forest in the region, nor does this fit with the dominance of cattle during Kumtepe A.

Kumtepe B offers a very different distribution pattern when compared to Kumtepe A. Pigs were kept and slaughtered in great numbers, while ruminants, mainly cattle, decreased significantly in number. Cattle in Kumtepe C were probably kept in similar numbers as in Kumtepe B, while pigs lost their importance. UERPMANN writes "*The shift of the faunal spectrum from Kumtepe B to C towards less pigs and more small ruminants might reflect such changes to the surrounding vegetation*" (2003:254). The author shares UERPMANN's opinion. Further, the increase of small ruminants, especially of sheep, could be related with economic changes that required the products gained from sheep.

The kill-off pattern of domestic animals from Kumtepe has not yet been published. After publication of the analysis by M. UERPMANN (2006), the aims of animal husbandry practiced in Kumtepe become better understood. Kumtepe B, dated to the last period of the late Copper Age, could well be called "the transition period" to the Early Bronze Age, as observed within the domestic animal distribution. There is a similar domestic animal pattern found in Kumtepe C as well. The shift, however, to an increased interest in small ruminants is remarkable. This interest grew in Troy I, as observed in the cattle remains as well. Pigs were kept in smaller numbers at Troy itself, which might have occurred because of the open landscape around Troy, where pigs would have had a lack of forage.

Other contemporary settlements show similarities in animal management. All the settlements of the Troas during Troy I were practicing more or less the same type of animal husbandry. The animals most often kept were small ruminants, or sheep. Cattle were the main supplier of meat for the contemporary settlements in the Troy I period. Cattle covered more than half of the meat demand in the island settlement Yenibademli[74]. The percentage was around 45% in

[74] Among the domestic animals.

Beşik-Yassıtepe and Troy[75]. In Kumtepe domestic animals[76] were consumed in nearly equal numbers.

Animal husbandry shifted in the second half of the 3rd millennium BC in the Troas. Troy II shared similarities with the settlements of the Troas during Troy I, but the interest in sheep increased, as interest in pigs decreased when compared with Troy I. Small ruminants dominated during Troy III, and the number of kept cattle clearly decreased, to be replaced mainly by pig.

5.5.2. Cattle Herd Management

Cattle were kept as a supply of meat and as draught animals during Troia I. Small numbers of animals were killed before they reached 1½ years of age. The herd system for cattle was carried out mainly for the production of meat. The regular slaughtering of cattle began before they reached their mature period and continued as they were almost fully weighted. The cows were kept to maintain the herd numbers. The inhabitants may have even tried to enlarge the herd as a precaution against diseases, thieves and predators. Dental aging indicates that there were animals older than nine years. This group was kept for fieldwork.

A similar cattle herd management was practiced in Beşik-Yassıtepe. VON DEN DRIESCH reported that cattle were the main meat supplier for the inhabitants. Little less than half of the cattle did not advance beyond the age of 2½ years. The other c. 30% of the animals were killed between 2½ and 3 years of age. Twenty percent became older than three years of age, and half of this last group became even older than five years of age. This last group was kept apparently to secure the herd and for fieldwork (VON DEN DRIESCH 1999:446).

The cattle management in Yenibademli reveals similar patterns. Half of the animals in the herd would not reach 2½ years of age, having mainly been killed for meat. The larger part of the herd was kept to ages between 2½ and 4½ years. This group was kept to maintain the herd and to secure meat. Cattle were then slaughtered after they had reached the age of 4½ years. This smaller, older group of cattle might have been kept for maintaining the size of the herd, but also as draught animals (Tab. 5-48 and Fig. 5-48).

[75] Among the domestic animals.
[76] Sheep and goat were counted together in this case.

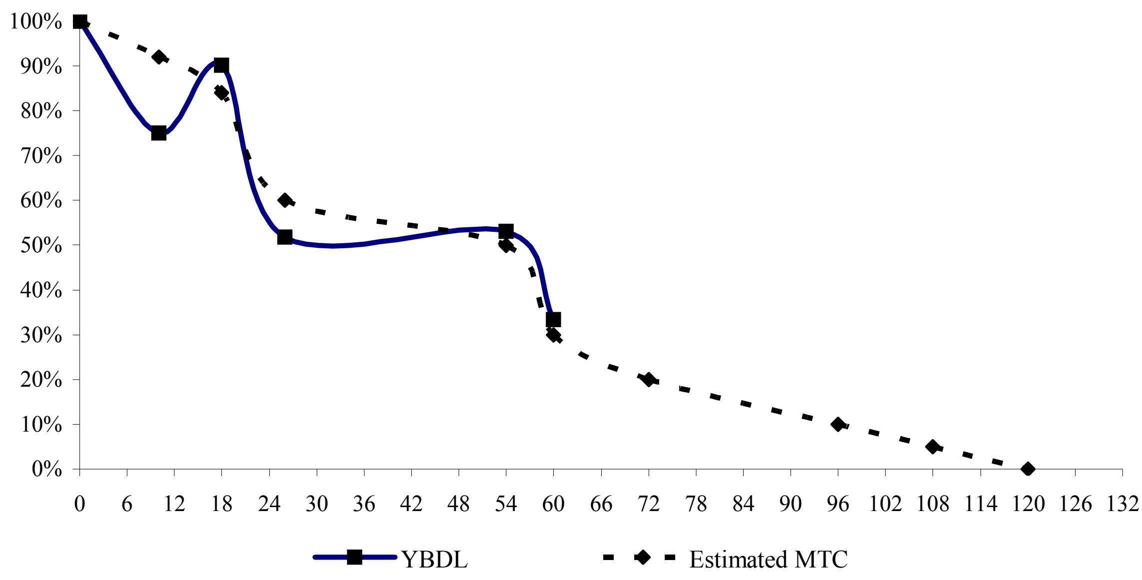


Fig. 5-48: The survival curve of the cattle in Yenibademli and the estimated survival curve of the cattle herd according to calculations of dental and epiphsis data from the entire Maritime Troy Culture.

The settlements mentioned above reveal the same cattle breeding pattern. Inhabitants of the Troas and Yenibagdemli kept more or less the same amount[77] of cattle during Troia I. The first regular slaughtering began as they almost reached to the mature stage and carried out as the weight of the animals stood in an optimal relationship with the fodder consumption. This first group probably consisted of bulls. The older group was kept for reproduction purposes, whereas the cows might have been kept as milk suppliers as well. Oxen were kept mainly for their meat and the older ones for their use as work animals.

The cows in the last group, with animals older than five years of age, were kept mainly for securing the herd offspring, and the oxen mainly as work animals; however, their meat was not necessarily wasted. We do not have many very young animal remains identified in the assemblages, indicating that there would not have been a forced slaughter among the cattle during this period in the Troas. In periods of stress, the young animals, which logically would have meant first the bulls, would have been killed in large numbers to save fodder as well as to cover the meat demand of the inhabitants. Another reason for choosing younger animals for slaughter is with regard to the time it takes for ruminants to gain sexual maturity. It is better to keep mature animals for the sake of securing further offspring.

[77] Calculated as a percentage.

At first glance, cattle management during Troia II reveals no differences to Troia I. Cattle were kept in the same amounts, and meat consumption among the inhabitants remained almost the same. But the kill-off pattern of cattle was different than in Troia I. There was an increase in the number of slaughtered calves. This might indicate an indirect usage of milk or an increased interest in calf flesh.

Around 65% of the cattle were killed before they reached c 2 years of age, just before they got maturely old. The bulls would have more likely been killed in this period, as they were fat enough to be slaughtered. The rest of the cattle herd was kept to secure herd numbers as well as for work animals.

During Troia III[78] cattle breeding took on another face. The cattle herd became clearly smaller, and as a result there was a decrease in beef consumption. Cattle were no longer the main meat supplier during Troia III. More than 20% of the animals were killed within 1½ years of age. The slaughter seldom occurred among animals between the ages of 1½ and 2½ years. After this quiet period, they were killed rapidly. According to epiphyses results, no animal was found older than 5 years of age. Only one piece of dental data indicates that possibly one individual reached 9 years of age.

Cattle were kept mainly for meat during Troia II and III as well. Only the slaughtering age pattern reveals differences. Bulls lived probably for a shorter period of time than cows. Most probably cows were kept alive longer for reproduction purposes and maybe due to the demand for milk; however, if the kill-off pattern data from Troia III are correct, than the cows did not live much longer than the bulls. This pattern might indicate a period of stress for the people of Troia III and subsequent forced slaughtering.

5.5.2.1. Cattle Size

The size of the cattle during Kumtepe A, in the early Copper Age, was larger than in some later settlements of the Troas (UERPMANN 2001: Fig 1) (Fig. 5-49). However, the size of the cattle grew smaller during Kumtepe B/C and appeared nearly identical to the size of cattle in Troy I (M. UERPMANN 2006: Fig.7). Cattle were on average of medium size during Kumtepe B/C, Troy I and Yenibademli and therefore smaller than their relatives from Kumtepe A. The

[78] Troia III faunal remains provide very little information about the killing pattern of cattle.

size of the cattle from Beşik-Yassıtepe reveals more similarities with Kumtepe A. This phenomenon in Beşik-Yassıtepe might be due to the predominance of measured bull remains in the assemblage[79]. The size of the cattle during Troy II did not change when compared to Troy I. Troy III cattle were smaller than middle-sized cattle, though this phase is represented by very little measurable material (Fig. 5-12).

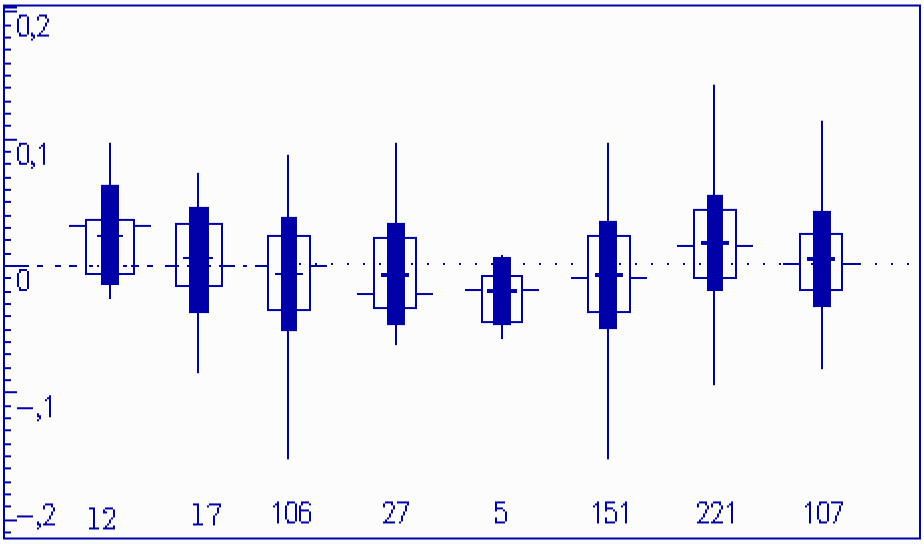


Fig. 5-49: Size of the cattle in the Troas and Yenibademli during the Early Bronze Age (Kumtepe A, Kumtepe B/C, Troy I, Troy II, Troy III, the entire Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

5.5.3. Small Ruminant Management

Sheep were probably the most kept animal during Kumtepe A. The new settlers of Kumtepe B brought with them another breeding and management system and kept considerably less sheep. Indeed, in the following phase – phase C – increased interest occurred again in keeping sheep. Therefore, goat was kept in small numbers in all phases of Kumtepe.

Sheep management from Kumtepe C can be compared directly with Troy I, with c. 35 % of the domestic animals being sheep. In Beşik-Yassıtepe and Yenibademli, sheep (together counted as small ruminants) made up c. 40% of domestic animals. Goat was kept more or less in same amount in the Troas during the first half of the 3rd millennium BC; they made up between 10-15% of the domestic animals.

[79] If the size of the cattle from Kumtepe B/C is similar to Troy I and Yenibademli, it might indicate that there are measured aurochs-cow remains in the Beşik-Yassıtepe cattle bone assemblage.

Lambs, were killed in small numbers during Troy I. Sheep were slaughtered generally when they reached their approximate end weight. Half of the sheep flock consisted of animals between 3½ and 6 years of age in Troy I. One-third of the sheep in Yenibademli were culled for slaughtering between 1½ and 3½ years of age, and a large part of the sheep flock consisted of animals between 3½ and 6 years of age, or c. 70% (Tab. 5-49 and Fig. 5-50).

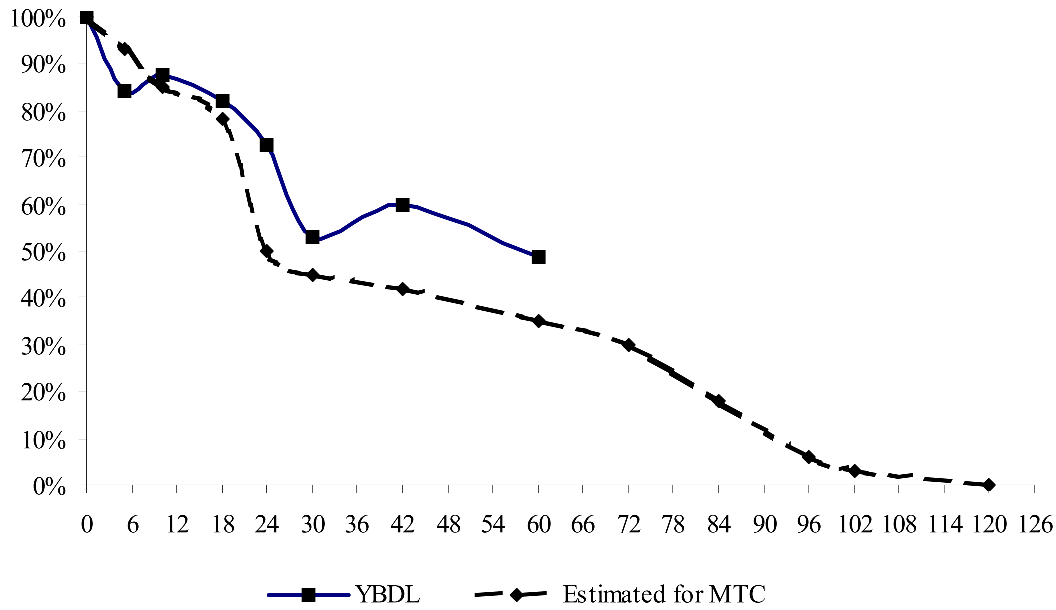


Fig. 5-50: Survival curve of small ruminants in Yenibademli, illustrated with the estimated survival curve of small ruminants for the entire Maritime Troy Culture.

Almost one-third of the goats in Troy I did not reach an age older than 20 months, while two-thirds of the goats lived between two and six years of age.

In Troy I, small ruminants were killed in small amounts in their first year, equaling c. ten percent of the animals between a year and two years of age. These animals were slaughtered mainly to fulfill demands for meat and probably for their hides as well. They must mainly have been mailes from sheep and goat. Goat kids were probably killed for the sake of the milk production of their mothers.

One-third of the small ruminants were killed when younger than 12 months of age in Beşik-Yassıtepe[80]. Almost one-fourth of the slaughtered animals were older than one but younger

[80] Sheep and goat remains were published together as “small ruminants” from Beşik-Yassıtepe.

than two years of age. One-third of the small ruminant flock consisted of animals between the ages of two to four years, and 15% of the flock grew older than four years.

Small ruminants in Troy I began to be killed regularly as they reached their end-weight (with c. 18 month of age). The difference between Troy and Yenibademli with regard to small ruminant management would have been that in Yenibademli they began to be killed regularly after they had reached the age of two (according to the epiphysis results). Yenibademli farmers slaughtered their small ruminants as they fully reached their end weight.

This general picture of Troy and Yenibademli was slightly different from Beşik-Yassıtepe. One-third of the small ruminants were killed when younger than 12 months of age in Beşik-Yassıtepe. VON DEN DRIESCH pointed out that the amount of killed young animals indicates milk use (1999: 446-448).

The small ruminants can produce two lambs per year, so that the young animals could have been slaughtered without causing any danger to the main flock. VON DEN DRIESCH mentioned that not only animals over 4 years of age were kept for throwing lambs; indeed, animals between 2 and 4 years could have been kept for the same purpose. Remains of ewes and does are known to appear more often than remains of rams for the entire assemblage. VON DEN DRIESCH writes that milk production was in the center of small ruminant management in Beşik-Yassıtepe during the Early Bronze Age (1999: 446-448).

During Troy II the slaughter of small ruminants younger than one year of age increased. Three aging groups should be mentioned here[81]:

- The first group would have been castrated animals killed for their valuable rich fatty meat. Their wool and soft hides were collected as well.
- The second group would have been used for securing the flock and as a wool supplier. They made up c. one-fourth of the flock. This group probably consisted for the most part of female ruminants for milk.They were also kept to secure the flock and maximize wool production. Two-thirds of the small ruminants from Troy II would not have gotten older than 3½ years of age. These animals were kept and killed for meat and hides (they were probably

[81] Other main aging groups were between 18 and 42 months of age, 3½ and 6 years of age and 6 to 8 years of age.

sheared already two times, while the ewes threw at least one litter of lambs). Less than one-third of the flock was used mainly for their lifetime products and for reproduction.

- The last group, ten percent of the animals, would have been kept mainly for reproduction and milk use.

Three main age groups occurred among the domesticated ruminants during Troy III. The first group was killed generally before they reached their optimal weight for meat (c. half of the flock, – probably more oftenmale animals). The second small ruminant group was kept between the ages of 2 and 3 ½ years for their wool, milk and meat (including mainly the females, the castrated sheep and few rams). The last group, older than 3 ½ years of age, were kept primarily for wool, reproduction and milk (mostly female and castrated animals).

5.5.3.1. Size of the Small Ruminants

The size of sheep from Kumtepe A during the Copper Age was clearly smaller than Troy I. One sheep radius remain provides a shoulder height of ~58 cm from Troy I. Another such remain measured 58.3 to ~67 cm from Beşik-Yassıtepe and another from the island settlement measured 67,2 to 68,5 cm. The LSI-diagram from Besiktepe illustrates that the sheep were a little larger than those from the neighbouring settlement of Troy I. Yenibademli provides another pattern, with sheep again slightly larger than those at Beşik-Yassıtepe (Fig. 5-51).

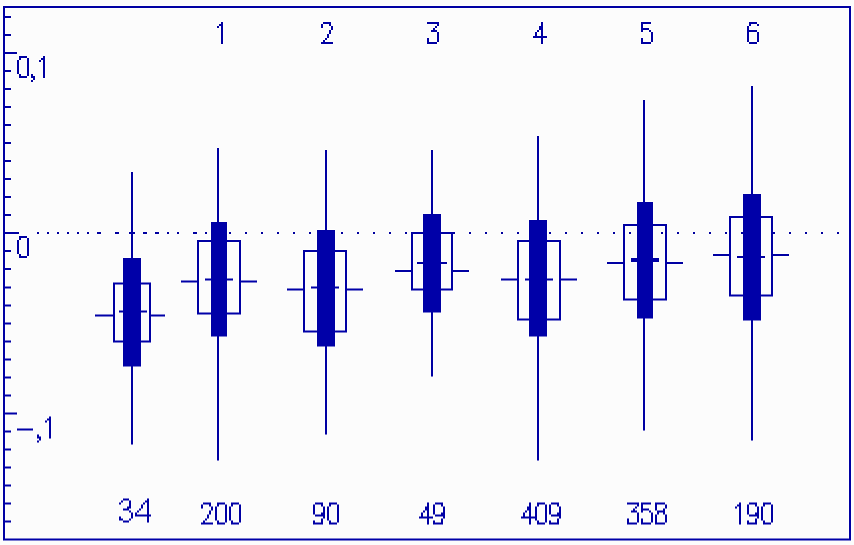


Fig. 5-51 Sheep size in the Troas and Yenibademli during the Early Bronze Age (Kumtepe A, Troy I, Troy II, Troy III, the entire Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

A minimal decrease occurred in the size of sheep during Troy II. During Troy III the size of sheep was slightly larger than in Troy I. Small sheep were no longer kept in the last period such as was the case in Troy I and II.

The size of the goat changed from settlement to settlement. Goats from Beşik-Yassıtepe were slightly larger than Troy I, while even smaller examples were kept in Troy I. Yenibademli goats were larger than their mainland relatives. During Troy II and III the size of goats increased while smaller animals could no longer be observed in the flock as observed in Troy I (Fig. 5-52).

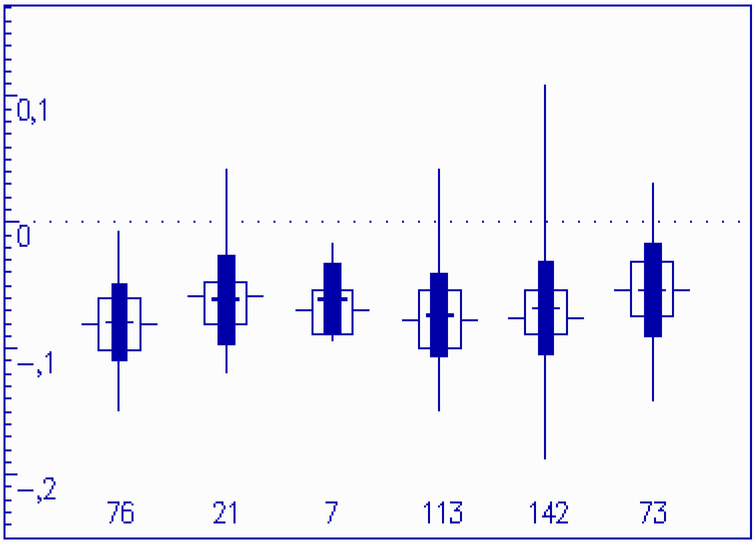


Fig. 5-52: Goat size in the Troas and Yenibademli during the Early Bronze Age
(Troy I, Troy II, Troy III, the entire Maritime Troy Culture,
Beşik-Yassıtepe, Yenibademli).

5.5.3.2. Development of "Small Ruminant" Management in the Troas and Yenibademli from the 5th to 3rd millennium BC

Small ruminants were the most often kept animals in the Troas and at Yenibademli; indeed sheep and goats played a very important role in the animal-based subsistence economy. Sheep were the most often kept animal in Kumtepe C and were the second main supplier of meat for the inhabitants. During the end of the Copper Age, and with the coming influence of new settlers (Kumtepe B), sheep lost their importance and were kept in smaller numbers. Their contribution to meat consumption therefore decreased.

The Early Bronze Age marked the turning point for sheep management. This could be explained by the increased interest in lifetime products. Sheep were the most often kept animal in settlements[82] of the Troas and Yenibademli. In the first half of the third millennium they were mainly kept for meat and wool. VON DEN DRIESCH (1999: 448) reports that the aim of small ruminant breeding at Beşik-Yassıtepe was focused on milk production (see above). , Based on the analysis presented here, wool production might have been just as important as milk production in Beşik-Yassıtepe during Troy I, and not only in the later periods of Beşik-Yassıtepe.

Animals between two to four years of age in Beşik-Yassıtepe might have been kept for wool production as well; this is also true for the animals older than four years of age. One-third of the small ruminants were killed before they reached one year of age in Beşik-Yassıtepe. These animals might have been killed for milk use from the mother animal, but also for the following reasons: If the inhabitants wanted to avoid an increase in the flock, they might have first killed the nursing lambs and immature animals[83]. Only a certain number of them were kept, probably more often the ewes. The older animals produced offspring and wool. The milk from the ewes might have been used after the lambs were slaughtered.

If the farmers of Beşik-Yassıtepe wanted to breed small ruminants for milk, they would have killed many of the offspring younger than c. three or four months of age[84]. Less than 10% of this age group was killed in the settlement. This represents only 10 lambs/kids for every 100 newborn small ruminants. Ninety of them would have been further nursed. The total of killed offspring is simply too low for us to claim that milk production was the most important economic variable.

The number of identified ewe remains is higher than rams in Beşik-Yassıtepe, which is not surprising. If all the rams were allowed to reach maturity, then they would have necessarily been kept away from the ewes to minimize the stress among mature rams as well as in the flock. Most probably the rams were castrated[85] in large numbers in order to keep them calm[86].

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[82] Sheep and pig might have both been dominant during Kumtepe C.
[83] The castration of rams would have helped control the population of the flock, though there are no castrated small ruminants reported from Beşik-Yassıtepe .
[84] This is the nursing period for offspring.
[85] Castration was practiced on the oxen (von den DRIESCH 1999:448). The farmers of Beşik-Yassıtepe would have been already familiar with this method and its advantages.

This might have been the first larger group to be killed in the different settlements, between one and two years of age in Beşik-Yassıtepe, and 1½ -3½ years of age in Troy and Yenibademli. The better quality wool and the richer fatty meat from castrated sheep should be mentioned here as well. The animals that were allowed to reach an older age were used mainly for reproduction and wool production. The very old small ruminants from all settlements of the Troas might have been females, kept for their milk, and for their role as leaders in the flocks (Tab. 5-50).

Tab. 5-50: The aim of small ruminant breeding for different age groups and the probable killing age, including the likely gender of slaughtered animals.

Killing Age	Breeding Aims	Mainly Killed Gender
<4 M	Milk production of mothers, hides, balance in flock, very little for meat	Male
~6 M	Hides, balance in flock, little for meat	Male
~12 M	Meat, hides, balance in flock	Male
1 1/2 -2 Y	Little wool/mohair production, meat, little help in enlarging the flock, hides, milk	Castrated
2-3 1/2 Y	Wool/Mohair, milk, help in enlarging the flock, meat, hides	Castrated
3 1/2-6 Y	Mainly wool/mohair production, help in enlarging the flock, milk, meat, hides	Female ?/ Castrated
6-8 Y	Maximize the wool/mohair production, meat, hides, very little help in enlarging the flock	Female / Castrated
>8 Y	Leader animals	Female and Castrated

The kill-off pattern of the small ruminants indicates changes in the second half of the 3rd millennium BC in the Troas. More than ten percent of the small ruminants were killed in Troy II, before they reached an age older than four months, most likely for their meat, for their smooth hides, and probably to balance the flock as well as for obtaining milk from the mothers. Rams were killed probably before they approached one year of age. The older small ruminants were killed mainly for meat consumption while the castrated animals were probably culled first. The older animals were mainly kept to secure the flock and to obtain their wool.

An increase occurred, especially during Troy III, in the slaughtering of small ruminants younger than four months of age. The group of animals older than 3½ years began to dwindle in number. The farmers of Troy III were more focused on the meat and not as much on the lifetime products. This was probably because of a period of stress during Troy III.

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[86] If the birth rate of both genders is 1/1, than most of the rams somehow reached maturity. Otherwise many young killed animal remains would have been identified in the assemblage. Castration was most likely used to control the flock and reduce tension.

5.5.4. Pig Breeding

The reasons for pig breeding are not so complex as they are for domestic ruminants. The aim of keeping pigs was to secure meat and probably leather. However, the interest on the pig keeping was changed from settlement to settlement and especially from one time period to another.
At the beginning of the 5th millennium[87] pigs were kept in very small numbers, and their contribution to meat consumption was minimal. However, this picture changed during the later period of Kumtepe A. This might be explained as follows:

- The amount of identified remains reveals that the early Kumtepe A inhabitants might not have been fond of pork, though the natural environment of Kumtepe A was suitable for pig keeping.

- The early Kumtepe A population might still have been living from transhumance[88]. The ruminants could be kept together as herds or flocks more easily than the pigs. Small numbers of pigs were kept mainly in the village. These pigs might have been eaten by the guards of the village, since the other inhabitants went with their ruminants to cooler places for better pasture during the summer. As the population density in Kumtepe A increased, people began covering a larger portion of their red meat demand through pig.

- They neither practiced transhumance nor liked eating pork; indeed, as they came to and settled the spot of Kumtpepe A, they had simply very few pigs. This group was probably nomadic in origin, and therefore would not have had many pigs. The number of the pigs increased over time (M. UERPMANN 2006: Abb1).

Pig breeding became clearly more important among the new settlers of Kumtepe B. Pigs were kept in greater numbers and were the most consumed animals. The number of kept pigs decreased again during Kumtepe C. However, over thirty percent of meat consumption was

[87] Kumtepe A.
[88] *"Older sources use the term transhumance for vertical seasonal livestock movement, typically to higher pastures in summer and to the lower valleys in winter. The herders have a permanent home, typically in the valley. Only the herds and a subset of people were necessary to tend them in travel. This is termed fixed transhumance below."* (http://esnet.oneworld.net/sections/livestock-farming/)

still covered by pig. In no other settlement of the Troas, except Kumtepe, were pigs kept in large numbers during the beginning of the Early Bronze Age period. In Troy I pig represented over one-fifth of all domestic animals, and less than one-fifth in Beşik-Yassıtepe and Yenibademli (Tab. 5-51).

Pig was the second meat supplier of the inhabitants in Troy I and third in Beşik-Yassıtepe and Yenibademli. Most of the pigs were killed before they approached their optimal weight in Troy I. The pig herd was kept quite young. Animals over 2½ years in age were kept to secure the pig herd. This was not different in Beşik-Yassıtepe. Only 15% of the pigs reached an age older than two years and were kept for a time to produce piglets. Only a few pigs were found to be older than three years of age in Beşik-Yassıtepe, and only a small number of animals were older than 2½ years of age in Yenibademli.

The kill-off pattern of pig demonstrates clearly that these animals were kept for their meat. Not many animals got very old, and even the productive sows were killed. Strong evidence was found that the most often kept animals were boars. They grew larger than sows and provided more meat. People probably slaughtered sows first so that the boars could have more fodder. The fate of the pigs in future time periods was not all that different.

Pig management decreased after Troy I in the Troy II period; however, it became of top importance in Troy III. During Troy III pig was the number one meat supplier. One-fifth of the pigs reached an age older than two years in Troy II, a number that only reached 15% in Troy III. Few animals reached five years of age in Troy II, while no pig was found older than 3½ years of age during Troy III.

Pig breeding shows no population differences in the second half of the 3rd millennium BC. The animals were kept to cover the meat demand of the Troas inhabitants. The great number of pigs that were kept and eaten during Troy III could have undergone force-slaughtering. The sows could reproduce many piglets, which could have been the key reason for keeping so many pigs: to cover the meat demands and to have access to fresh meat.

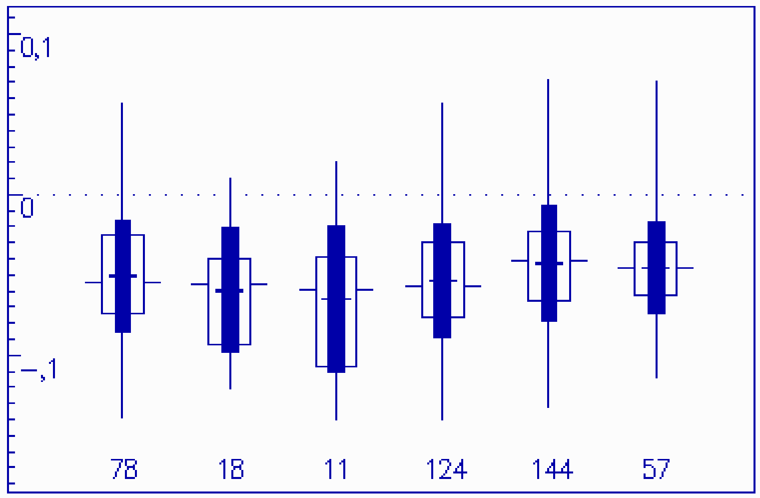


Fig. 5-53: Pig size in the Troas and Yenibademli during the Early Bronze Age
(Troy I, Troy II, Troy III, the whole Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

The size of the pigs during the first half of the 3rd millennium BC was quite homogeneous among the settlements of the Troas and Yenibademli, though clearly smaller than the size of wild boars. Very few examples of large animals were recovered which might have been wild boars. In the second half of the 3rd millennium BC pigs remained more or less the same size. However, there were now smaller examples in the pig herds as compared with remains from the first half of the 3rd millennium BC (Fig. 5-53).

6. The Wild Mammal Fauna

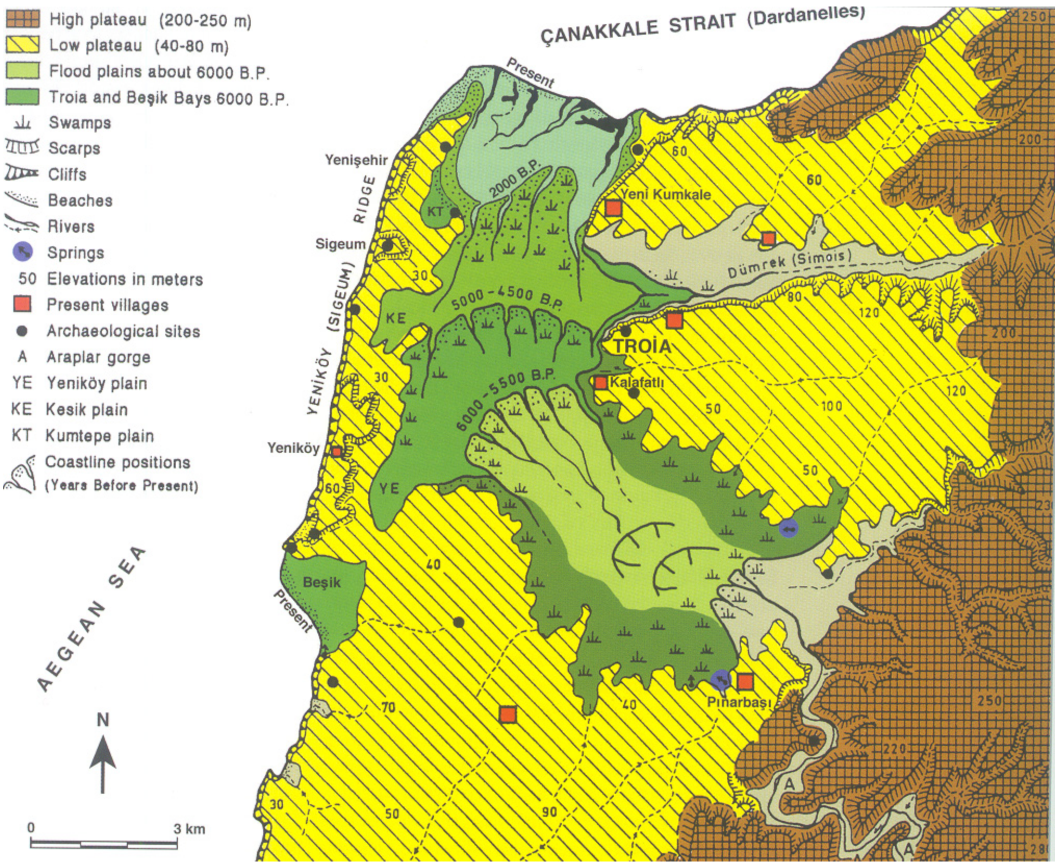
The current natural environment of Troy will be described below in order to present a general picture of the modern climate and vegetation as well to provide a summary of the recent formation of the Skamander Valley. The second part of the chapter will deal with identified wild mammal remains from the Maritime Troy Culture. These animals existed in the ancient environment of the Troas. The environmental changes in the past and possible reasons for these changes are discussed in the conclusions.

6.1. The current natural environment in the vicinity of Troy

We examine below the so-called modern/current environment of Troy and its surroundings. Some of the wild mammals still existing today in the region are described as well. The geographical changes in the region from 5000 to 4000 years BP, at the time the settlement was first established, and therefore during the Maritime Troy Culture can be understood as follows: The antique changes in the geographic features were mostly shaped through the two main rivers that flow through the region, namely, the Karamenderes (Skamander) and Dümrek (Simois) rivers.

The terrestrial sediments (earth/alluvial) carried by these rivers overfilled the marine regions of the time, expanding the land in the direction of the sea, namely in the direction of the Dardanelles. The evolution of the Troyan Bay could be observed clearly in Map 6-1 based on KAYAN 2006.

RIEHL wrote that the ruins of Troy are six kilometres away from the delta coast today, while documents from the 12th century AD prove that this distance at an earlier period was two kilometres between the city and delta coast (1999:2). The map (6-1) illustrates that Troy was established directly on the coast, but also indicates the present situation of the site in the region (see above). Flood plains from different rivers managed to overfill the entire region with fertile earth.



Map 6-1: The geographical changes in the region from 5000 to 4000 years BP that took place during the existence of Troy (after KAYAN 2000).

RIEHL described the general climate after GÜLDALI as follows: "*The general climate of the eastern Mediterranean coast is dominated by, on the one hand, the continental-tropical atmospheric movements in the months of summer (May-September), which bring mainly dry winds, and on the other, the cyclones of heavy precipitation dominant from November until May, which come from the west.*" (1999:3).

The average precipitation over 40 years is calculated at c. 650 mm in Çanakkale (ca. 25 km NNE of Troy), where most of the rainfall occurs on average in November, December and January. The most recorded rainfall over 40 years was c. 980 mm and the lowest was c. 415 mm[89] (Fig. 6-1). Therefore RIEHL wrote concerning the precipitation: "*The palaeogeographical results imply that aridity could not have been a problem in Troy in any of periods under concern*" (1999:3).

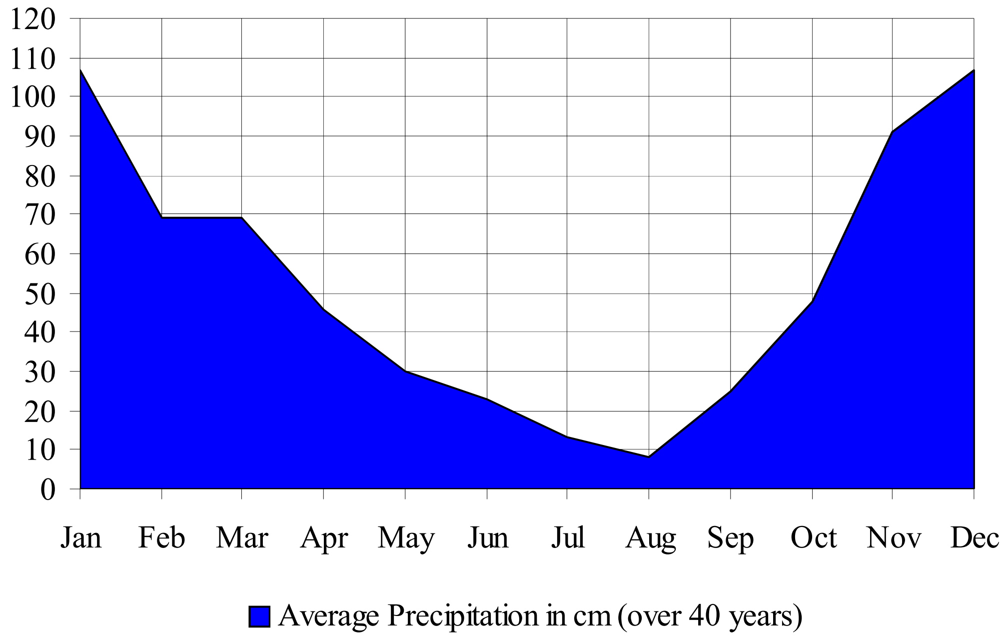


Fig. 6-1: The average precipitation in the region.

The average temperature in the region is 15 °C after over a period of 18 years. Summer months are the hottest period of the year, with a mean value from c. 23.5 °C, followed by autumn (16 °C), spring (c. 12,5 °C) and winter, with an average of c. 6,5 °C. The average high temperature was recorded as 18 °C per year, and 11 °C for the lowest temperature over a

[89] This information originated from www.weatherreports.com.

period of 18 years. Approximately 180 days per year are recorded as warmer than 14.5 °C in the region[90] (Fig. 6-2).

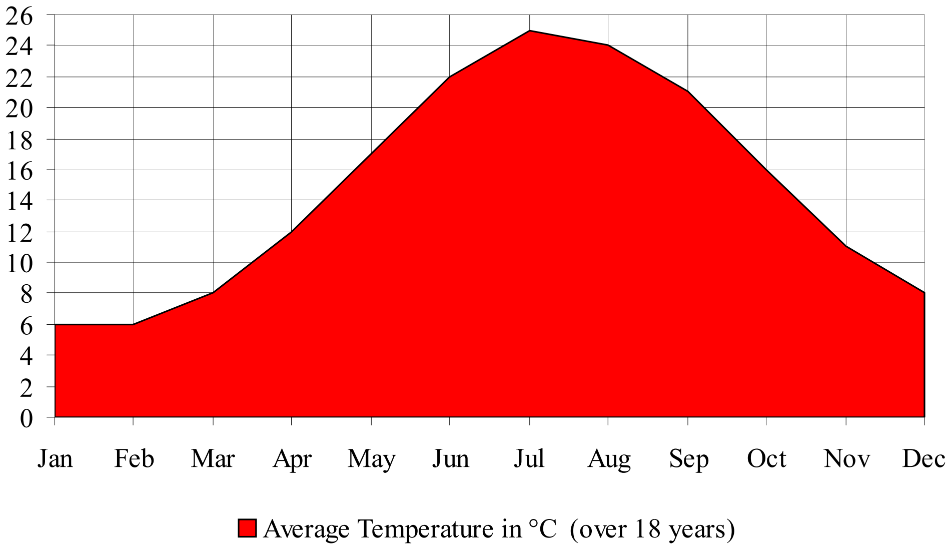


Fig. 6-2: The average temperatures in the region.

The modern vegetation[91] in the region is summarized by RIEHL (1999:52-54): There are not many untouched habitats left in the area around Troy, since tourism and agriculture dominate at the coast of most of the regions on the Mediterranean. Tomatoes, cotton, pulses and mostly naked wheats are planted in the valley, while mainly fruit trees, such as cultivated olive and almond, are present on the Low Plateau. The ruminants are grazed in the arable fields on the High Plateau, since agriculture is only partially practiced in that region.

High Plateau – The plains are cleared for new fields. The open *Pinus* woods (*P. halepensis* and *brutia*), and sometimes large amounts of *Juniperus oxycedrus*, appear as the main types of tree in the High Plateau.

Low Plateau – Troy is located on the low plateau and RIEHL writes, "... *is characterised by patches of dark green Quercus cocifera shrubs, lighter green-brown small thorny cushions, dominated by Sarcopoterium spinosum, and yellow areas of grass vegetation, combined with other small-seeded legumes. Several different types of maquis could be observed in the Troad*". A semi-arid climate supports the existence of maquis and phrygana vegetation. The

[90] This information originated from www.weatherreports.com.
[91] The ancient vegetation results are described in detail in Chapter 7.

main surface vegetation is the phrygana, along with cereal fields, and olive and almond plantations.

Scamander Valley – The Scamander River and its delta is characterised by three types of semi-natural vegetation, namely Cyperaceae, Gramineae and Juncaceae, whereas *Phragmites australis* is a common plant on the banks of small streams. The delta region plants, which are also found on the site, thrive depending on water supply. Sheep flocks graze in these regions today.

Plantations and arable fields – Two main fruit trees, namely almond and olive trees, make up the majority of trees in the area around Troy. However, almond has not as yet been identified among the archeaobotanical remains. A few vineyards are located in the vicinity of some small villages, which are relatively close to the High Plateau. There are other species, for example *Trifolium spp., Scorpiurus muricatus, Echium sp. Galium aparine,* and others, which have been identified in the archeaobotanical remains. Monocrop cultivation is dominant in the region. Members of the Chenopodietea are in the majority among the weed groups, whereas other abundant species include *Anthemin spp., Fumaria officinalis* and *Stellaria media*.

6.2. The identified wild mammal remains from the Maritime Troy Culture

Altogether 806 bones were identified as wild mammal remains from the Maritime Troy Culture (Tab. 4-4). This makes up less than five percent of all identified mammal remains and c. eight percent of the entire weight. The distribution of remains per phases indicates clearly that hunting gained twice as much importance over time. The contribution of game animals to the assemblage reached its highest percentage in Troy III. Thirteen percent of red meat was supplied by hunted animals, as compared to ten percent in Troy II and around c. six percent in Troy I (Fig. 6-3).

Altogether thirteen wild mammal species could be identified. Most remains are from fallow deer, followed by hare and wild boar remains (Tab. 4-4). Twelve bone remains could be roughly classified only according to their sizes or family as rodentia, while thirty-four remains were identified as carnivora and twelve remains as cervidae.

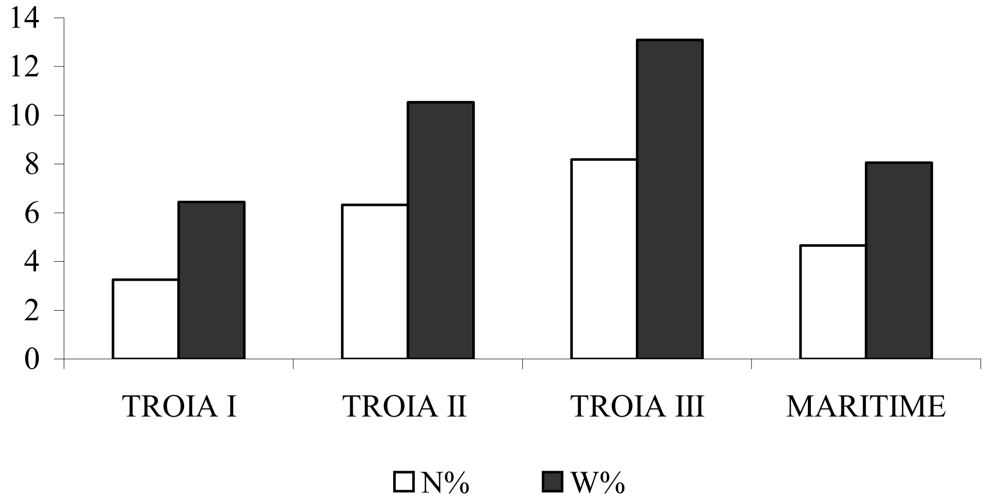


Fig. 6-3: Number of identified wild mammal remains and their weight distribution in the Maritime Troy Culture per phase as percentage among the identified mammal remains.

Small rodentia remains are mouse sized, while large rodentia remains could be beaver, considering the proximity of the river to the settlement. Small carnivora could be fox or wild cat, medium sized lynx or wolf and large carnivore remains leopard, lion or bear[92].

6.2.1. Hedgehog, *Erinaceus sp.*[93]

A humerus from Troy I, as well as part of a mandible from Troy III, was identified as hedgehog. DEMIRSOY[94] reported that they still exist all over Anatolia (DEMIRSOY 1996:564). This author has observed hedgehogs in Troas region as well[95].

6.2.2. Hare, *Lepus europaeus* (Pic. 6-1)

Hare is represented with one hundred and five remains. They are all from "brown hare", which is still very common in Turkey, as far as sufficient nourishment conditions are present (KUMERLOEVE 1975:110).

Among the total of the identified mammal remains, there are a few hare remains – less than one percent, c. 0.15% of the entire weight. However, among the identified wild mammal remains, hare makes second place with 13% of the NIS. Because of the small size of hare, it made a very small contribution to the weight for all identified wild animals, namely, c. 1,75%.

[92] It is possible to find that some animals mentioned here are in the identified wild mammal list.
[93] Hedgehog is only represented by mandible and humerus remains for the entire Maritime Troy Culture.
[94] DEMIRSOY 1996 called them *Erinaceus concolor.*
[95] This animal might have died in its nest under the earth or the bones might have been moved by other small animals under the earth, and for this reason the hedgehog should not be considered as belonging to Troy I. The existence of hedgehog in this region is clear, however.

Hare remains are quite common per all phases as well, and always rank second within the wild mammal assemblage. However, their contribution to red meat demand was minimal.´

Pic. 6-1: Hare, *Lepus europaeus*[96].

The distribution of the remains indicates that the most identified bones originate from the hind leg in every phase. Except for sesamoid bones, most of the other skeletal parts are represented. They were difficult to find due to their very small size. Tibia, radius/ulna and ribs are well represented in the hare assemblage. Tibia finds make up one quarter of the assemblage's entire weight. The mandible finds indicate that, after hunting, at least some of the hares were brought whole to the settlement (Tab. 6-1 and Fig. 6-4).

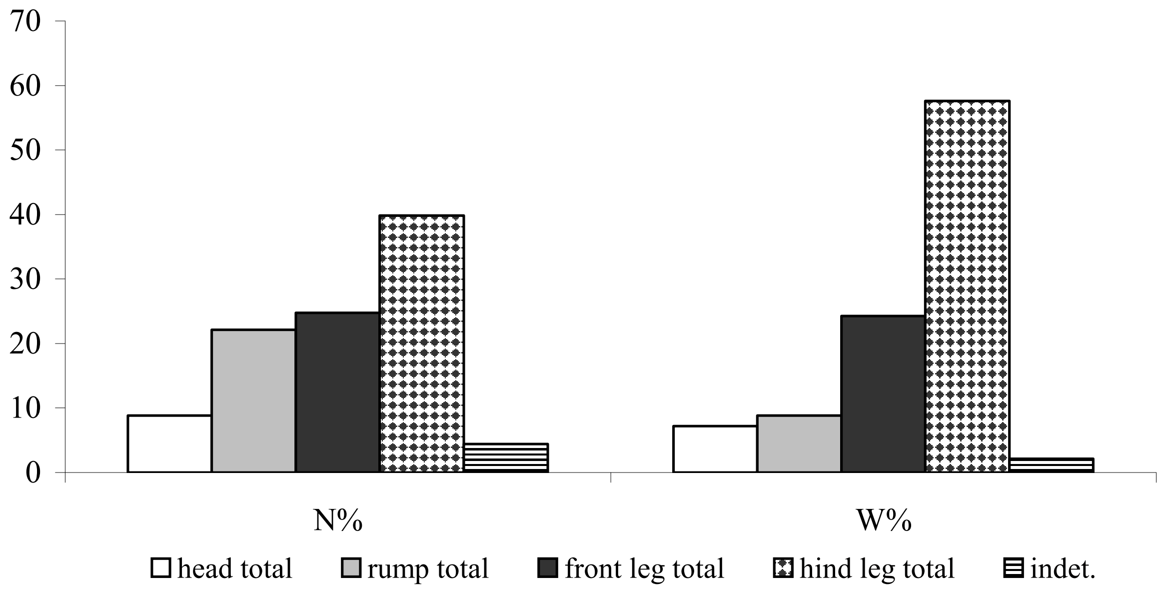


Fig. 6-4: Distribution of skeletal parts and weight of the hare remains from the Maritime Troy Culture.

[96] http://www.arlelodge.co.uk/graphics/brownhare1.jpg

Humerus and rib remains reveal the effects of fire. This does not directly indicate that they were eaten, however, not to eat them would have been a waste of delicious meat. The fur was also kept, but bones do not reveal cut/scratch marks, which are usually indicators of a fur removal process. Hares were hunted most probably in the proximity of the settlement. It was always important for the hunters not to return to the settlement empty handed.

The size of hare reveals no major differences over time. It could be said that during the Maritime Culture hares did not alter in size and stayed a homogeneous group.

6.2.3. Red Fox, *Vulpes vulpes* (Pic. 6-2)

Six bone remains were identified as red fox and originate from Troy I and II: three remains out of each phase. KUMERLOEVE reported that red fox is found nearly throughout all of Anatolia and can exist in cold as well as in mountain forest areas. He saw a red fox from the coastal range as well as at elevations of approximately 2500 m (KUMERLOEVE 1975:94). The author collected remains of a single fox from Troy in 1996, which were quite recent.

Two mandibles and a loose mandibular tooth from Troy I, and a loose maxillary tooth, a scapula and a femur from Troy II were identified as red fox (Tab. 6-2). The quantity of the remains is too low for us to draw any conclusions.

Foxes were regarded most likely as vermin and killed by the dogs or by people. Interest in fox fur is not evident, unless the fur was removed outside the settlement and none of the bone remains brought into the city.

Pic. 6-2: Red fox, *Vulpes vulpes*[97]

[97] http://www.statesymbolsusa.org/IMAGES/Mississippi/red_fox2.jpg.

6.2.4. Wolf, *Canis lupus*

Only three bone remains were identified as wolf and were uncovered from Troy I. They include a facial fragment and a scapula and tibia fragment. DEMIRSOY described that wolves still exist in Anatolia, where steppe and forest are present (DEMIRSOY 1996:574).

The tibia is measurable, while the face-fragment and scapula provide no measurements. The measurements from the tibia indicate a large wolf – possible belonging to a male (Bd=32,0 and Dd=23,0 mm). Wolfs are still dangerous predators for domestic animals. Especially in winter, if they cannot find food, they come closer to where livestock are kept and attack farm animals. Otherwise they are very careful to avoid humans and their dogs. Hunters might have killed the large wolf and brought it back to the settlement as a trophy.

6.2.5. Bear, *Ursus arctos* (Pic. 6-3)

Four bone remains were identified as bear and found in all phases of the Troy Maritime Culture (one mandible fragment, one second phalanx and two unidentified metapodial fragments). KUMERLOEVE mentioned that if the natural setting[98] allows, bears can exist everywhere in Anatolia (KUMERLOEVE 1975:95).

It is quite possible that the bear was killed for its fur and was brought to the settlement with the claws; therefore, the existence of a second phalanx could be explained (Bp=16,5 and Dp= 16,0 mm). The other possibility would have been that the bear was very close to the settlement, attracted by the domestic animals, and was subsequently killed[99].

Pic. 6-3: Bear, *Ursus arctos*[100]

[98] They prefer semi-open country, usually in mountainous areas.
[99] A brown bear called Bruno was killed in Bavaria in June of 2006. It came quite close to the villages, attracted by the lure of farm animals, such as sheep or fowl.
[100] http://i214.photobucket.com/albums/cc212/turlunet/Ayilar/400pxbrownbearusfish1ti5.jpg.

6.2.6. Lynx, *Lynx lynx* (Pic. 6-4)

A single metatarsal bone was identified as lynx in the Maritime Troy Culture assemblage. It was found in the Troy I bone material. Lynx is still found in many regions of Anatolia, as well as in Çanakkale (DEMIRSOY 1996:576).

The lynx might have been killed for its fur and brought to the settlement with the claws, explaining the occurrence of the metatarsal bone - similar to what was already mentioned for the bear's finger bone. Another possibility could be that dogs killed it as it was trying to steal young animals.

Pic. 6-4: Lynx, *Lynx lynx*[101]

6.2.7. Lion, *Panthera leo* (Pic. 6-5)

A rib fragment and mandible with ramus were identified as lion remains from the material of Troy I. The memoirs of the Emir Usama ibn Munkidh describe his lion hunt campaigns during the 12th century in northern Syria and south-eastern Anatolia. KUMERLOEVE wrote that DANFORD shot a lion somewhere close to Birecik in southeast Anatolia in 1870 (KUMERLOEVE 1975:103).

Lions, *Panthera leo*, were a frequent element of the fauna in Europe until the end of the Pleistocene. The existence of lion remains from the European sites after the last Ice Age is

[101] http://bp1.blogger.com/_Gr_fpy1kJmA/Rxk2q6e3wjI/AAAAAAAAFS4/0QevtOYcqg8/s400/Eurasian-Lynx.jpg.

rare. However, they did exist in the Balkans. Aristoteles and Herodot (c. 500 BC.) mentioned the existence of lions in Macedonia. Xerxes reported that lions killed some of the baggage camels while he was in Macedonian in 480 BC. The question arises as whether these lions belong to the "Cave lions" (*Panthera leo spelea*) or to the "Indian, or Asiatic, lions" (*Panthera leo persica*) (BECKER 1986:167-173).

Lion remains found in the context of the Maritime Troy Culture probably originated from the Asiatic Lion, the *Panthera leo persica.* The last of these lions still exist today in India[102]. They are much smaller and lighter than their African relatives, and Asiatic male lions have less mane. The ears come through the mane of Asiatic male lions, which is not the case for African male lions. The largest measured Asiatic lion is 292 cm, as compared to the African lion measuring c. 350 cm (KHALAF-VON JAFFA 2006)[103].

Pic. 6-5: *panthera leo persica*[104]

6.2.8. Weasel, *Mustela nivalis*

A femur from Troy III was identified as weasel. Weasels are common animals of Anatolia (DEMIRSOY 1996:575). They still exist in the Troas region today[105].

[102] The last members of this lion group, around 350 lions, are living under protection in the "Gir Forest National Park of western India".
[103] Norman Ali Khalaf-von Jaffa 2006: " Der Asiatische oder Persische Loewe (*Panthera leo persica*)."In: Gazelle: The Palestinian Biological Bulletin. Number 49. January 2006. pp. 1-5.
[104] http://www.geocities.com/jaffacity/asiatic_lion.jpg.
[105] Weasels were observed in the region by the author.

6.2.9. Wild Boar, *Sus scrofa* (Pic. 6-6)

Altogether eighty-two bone remains from the Maritime Culture in Troy were identified as wild boar (Tab. 6-3). DEMIRSOY reported that they are present everywhere except in a very few regions of Anatolia. They favor habitats with rich flora and any type of forest (DEMIRSOY 1996:579). They still exist in the Troas region (reported to the author by local farmers).

Most of the wild boar remains come from Troy I. Only three bone remains from Troy III were identified as wild boar. The contribution of wild boar to meat consumption on the whole is very little, though it always ranked third among the most hunted game animals. It is quite clear that over time hunting of wild boar diminished through the different phases (Fig. 6-5).

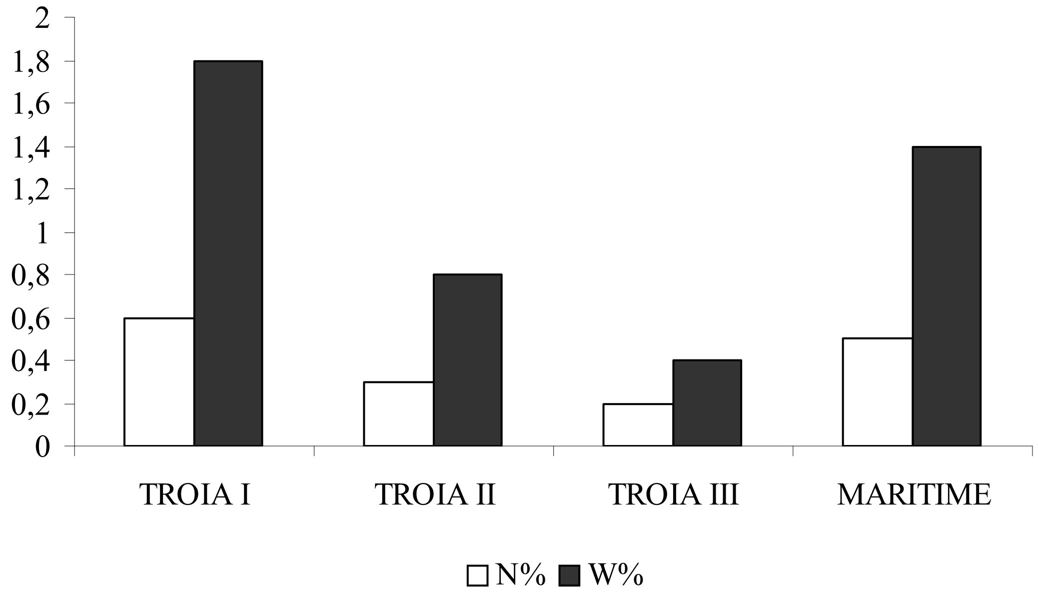


Fig. 6-5: The proportion of wild boar, *Sus scrofa*, remains and weight among the identified mammal remains.

The size difference between pig and wild boar is clearly represented in Figure 6-6. Most of the measurable bones come from Troy I. The small wild boars that are represented in the box plot might be female wild boars, or they could also be domestic boars.

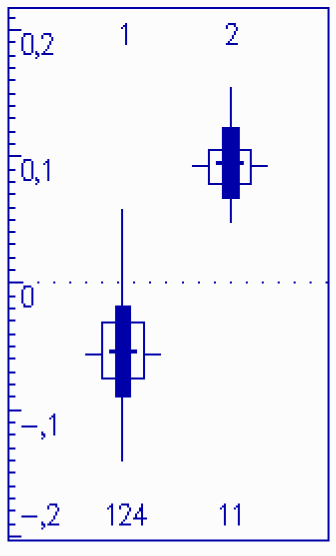


Fig. 6-6: The LSI calculation of pig and wild boar, *Sus scrofa*, remains from the Maritime Troy Culture illustrating size differences.

Most of the hunted wild boars were adult animals. Only two bone remains, tibia distal and radius proximal, reveal open epiphyses. The finds represent two individuals that were probably hunted as they were younger than two years. Eight male wild boars have been recorded based on the dental data.

Pic. 6-6: Wild Boar, *Sus scrofa* [106]

Wild boars were killed probably due to the damage they afflicted in the fields of Troy. They still cause damage to the fields in the Troas. Another reason they were killed might have been due to wild boars attacking domestic boars during mating time. For whatever reason they were hunted, their meat was consumed as well.

[106] http://www.jagen-brandenburg.de/assets/images/Wildschwein.jpg.

One interesting point is that while hunting increased in the settlement over time, hunting of wild boar was seen to decrease over the same period. The period during the Maritime Troy Culture when hunting most often occurred was during Troy III, when wild boar was hunted the least (Fig. 6-7).

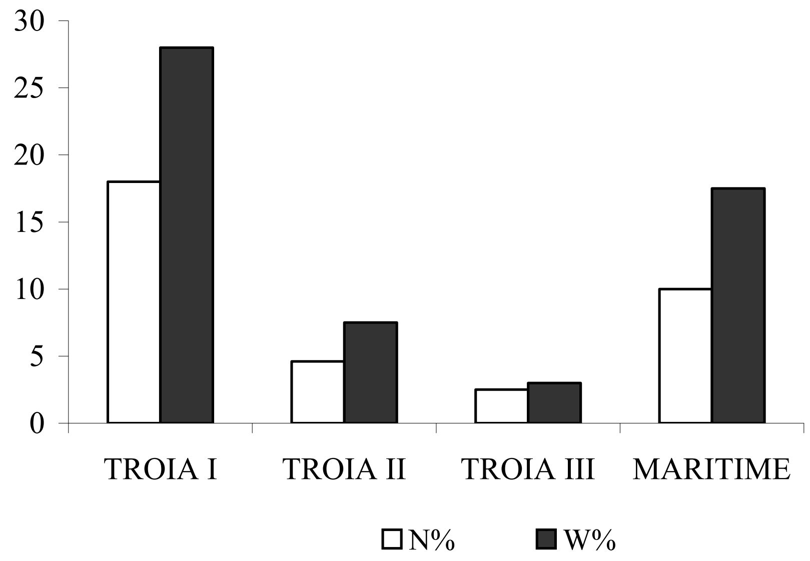


Fig. 6-7: The portion of wild boar remains and weight among the wild mammal remains.

The hunters might not have influenced this selection. The environment could have caused a kind of "forced selection". Troyans probably exploited all the resources that the environment had to offer. The oak trees, which made up the foraging areas for wild boars, were cut down in this long period, and the ruminants did their part in not allowing the trees to regenerate. Also, the wild boars followed the boundaries of the forest to find food, leading them to areas too far away for hunters.

The climate during Troy III was different than in the other two periods. A drier climate dominated western Asia (WEISS 1997). This might have caused negative effects on forest growth and water resources in west Anatolia. These two factors are critical for the survival of wild boars. However, an increase in hunting fallow deer could be observed along with the decrease in hunting wild boar. This could indicate a new hunting strategy among the hunters of Troy. Their focus changed to fallow deer.

6.2.10. Roe deer, *Capreolus capreolus* (Pic. 6-7)

Twelve bone remains, coming from all phases of the Maritime Troy Culture, were identified as roe deer (Tab. 6-4). The animal still exists today in Trakhia, northwest Anatolia, Hakkari and in the forests of the Black Sea Region (DEMIRSOY 1996:580).

Pic. 6-7: A male (left) and female Roe deer, *Capreolus capreolus*[107]

The finds of roe deer only prove that they were hunted and existed in the environment of Troas. They were hunted in very small numbers and their place in red meat consumption was proportionally very low.

6.2.11. Fallow Deer, *Dama dama* (Pic. 6-8)

Fallow deer remains make up the most dominant group of identified wild mammals during the Maritime Culture in Troy. UERPMANN wrote, concerning the so-called European fallow deer, that: *„…the Romans were the first to bring this species to Central Europe... A review of earlier identifications of this species from Europe has shown that after an early, interglacial, occurrence, no fallow deer were left [in Europe] during the Upper Pleistocene and Early Holocene…The borderlands of the Aegean Sea were the only part of Europe where the fallow deer occurred prior to the time when the Romans and other seafaring peoples started to interfere with its distribution. The main population of autochthonous fallow deer lived in western and southern Anatolia, which must be considered as the original homeland of this species. The common name 'European' fallow deer should rather be changed to 'Anatolian' fallow deer in cases where this animal has to be discriminated from its Mesopotamian cousin*

[107] http://www.robertefuller.com/RobertEFullersite/Images/courting-roe-deer-lrge.gif.

"(UERPMANN 1987: 57). The fallow deer is a native animal of Anatolia. DEMIRSOY included in his tables that they still exist in the forests of the south and southwest of Anatolia, and on the Mediterranean coast (DEMIRSOY 1996: 580).

Approximately three percent of the identified mammal remains from the Maritime Troy Culture are from fallow deer. This equals c. 4.5% of the entire weight for identified mammals (Tab. 4-4). Fallow deer were clearly more often hunted in each period than in the earlier period. During Troy III even ten percent of red meat demand were covered by fallow deer (Fig.6-8).

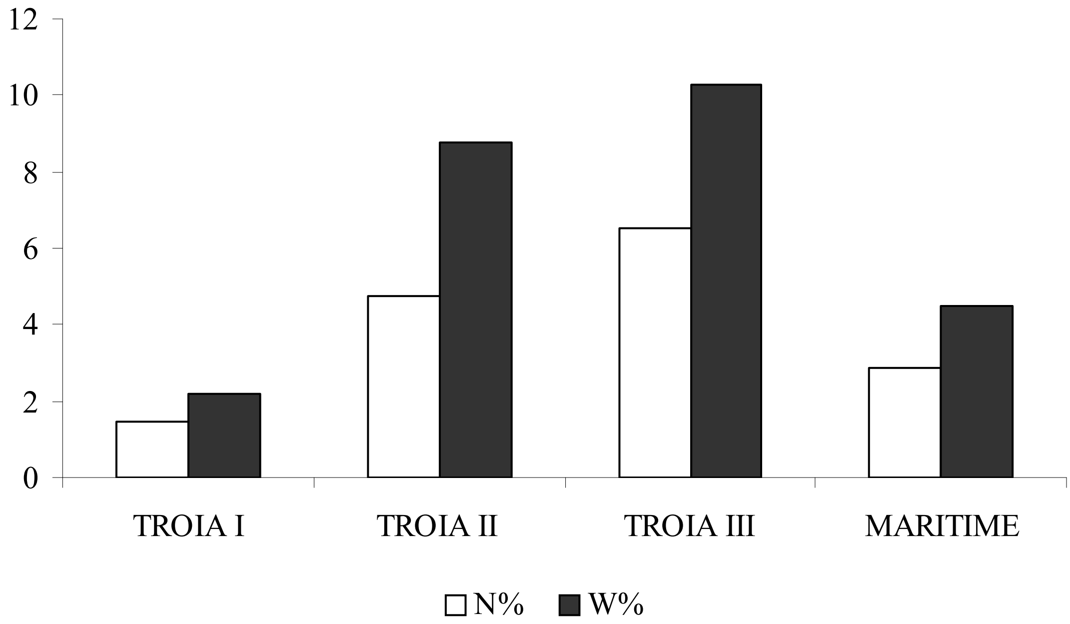


Fig. 6-8: The proportion of fallow deer, *Dama dama*, remains and weight among all identified mammal remains.

Fallow deer was always the most hunted animal among the wild animals. The contribution of fallow deer to red meat consumption among the wild animals during Troy II and III was around 80%, while only c. 35% during Troy I. Fallow deer were clearly more often hunted in the later phases of the Maritime Troy Culture (Fig.6-9).

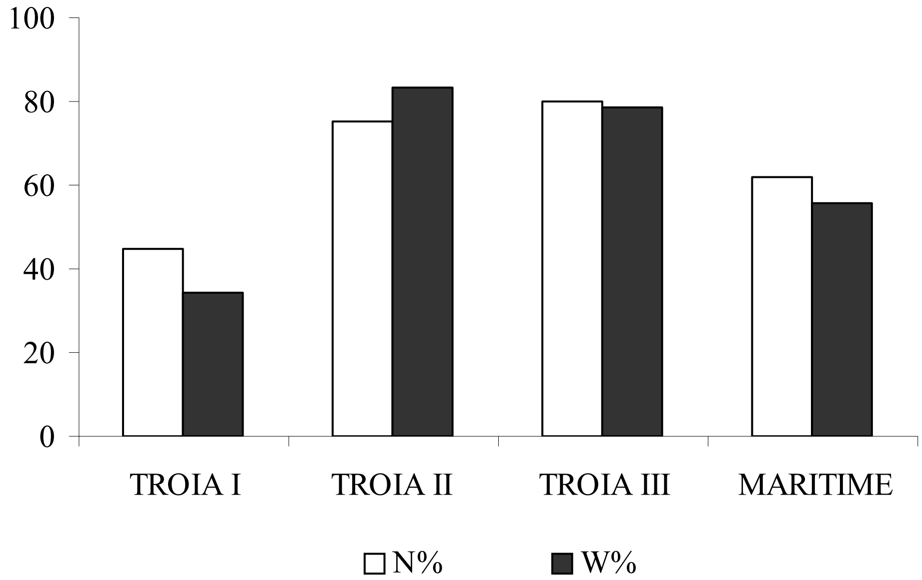


Fig. 6-9: The proportion of fallow deer (*Dama dama*) remains and bone weight in comparison to all wild mammal remains.

The distribution of the bone remains in the Maritime Culture of Troy demonstrates that the bones most often identified came from the hind leg. This factor clearly influenced the weight category as well. There are small differences in the phases, though in general we can say that the factors remained constant per phase. Tibia is generally the most identified skeletal element, followed by radius /ulna and pelvis. Metacarpal and Metatarsal remains together are well represented (Tab. 6-5 A to 6-5 D and Fig. 6-10 A to 6-10 D).

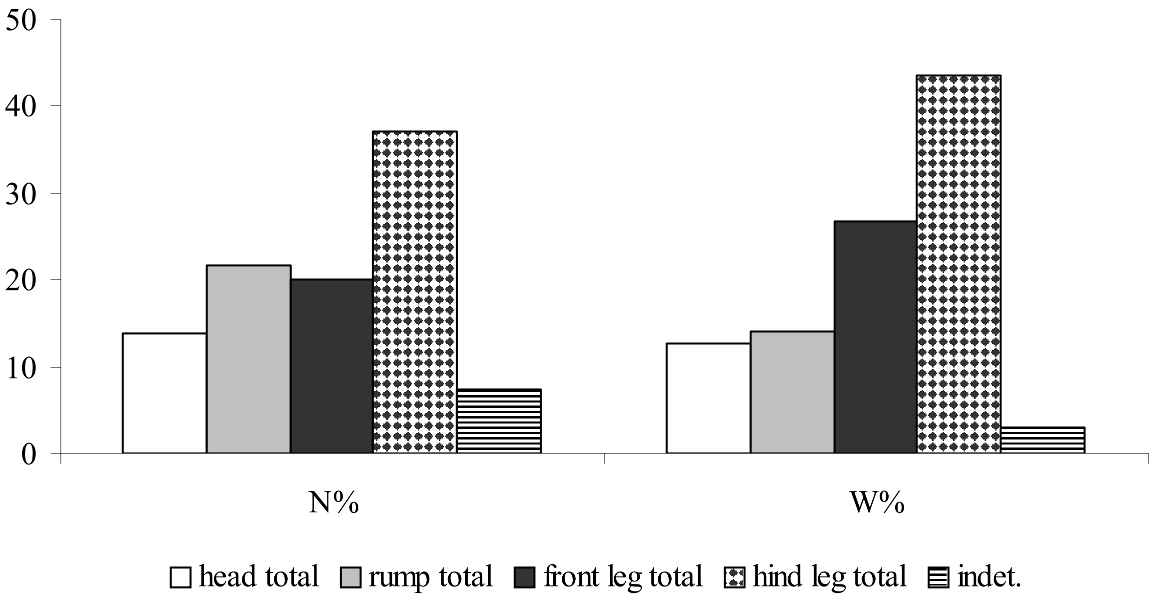


Fig. 6-10 D: Distribution of skeletal parts and weight of the fallow deer remains for the Maritime Troy Culture.

There are only c. 25 antler pieces among c. 500 identified fallow deer remains, which could indicate that they were simply collected from time to time in the forest. However, the other identified skull parts with antler or without reveal that the hunters at times brought the entire fallow deer to the settlement. The dental data show that mostly animals older than two or three years were hunted. Only one example was brought to the settlement that was around six months of age[108].

The size of the fallow deer varies during the Maritime Cultural phases. In Troy I, the animals were smaller than in both later phases. During Troy III the size of fallow deer reaches its greatest level. The information on the whole reveals that fallow deer from the Troy Maritime Culture were much larger than their European relatives[109]. The higher ratio of more measured male fallow deer might have been the reason for size variability among the phases (Fig. 6-11).

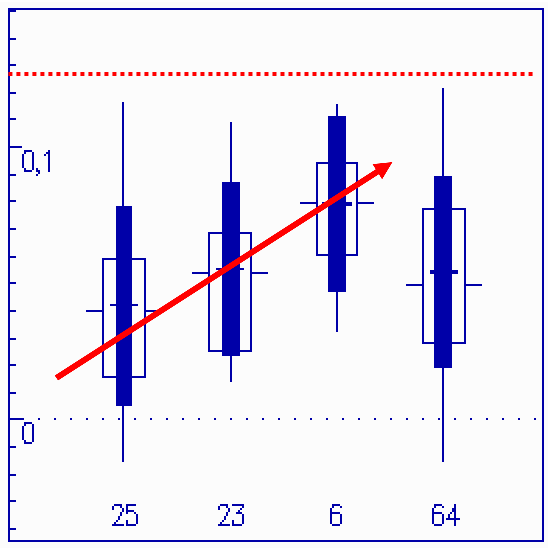


Fig. 6-11: The LSI calculation of fallow deer, *Dama dama*, remains from Troy I, Troy II, Troy III and the whole Maritime Troy Culture.

Fallow deer was a very important red meat supplier for the ancient people of Troy during the Maritime Culture. The most hunted game animal was fallow deer in all three phases. In Troy III, ten percent of the red meat demand was covered by fallow deer. The remains show that the hunters at times brought whole animals to the settlement. Most of the animals were killed within the age of two and three.

[108] According to HABERMEHL 1985:54.
[109] One female and male fallow deer were measured and calculated for the standard animal. Both individuals are in the comparative collection of the archaeozoology institute at the University of Tübingen. The female fallow deer is labeled CE 10 and male CE 13. They both originated from Bavaria.

Hunting fallow deer increased over time. This might be correlated with the density of the human population. The increase in red meat demand of the people might have been met this way. It is possible that the number of agricultural fields increased, and that the fields grew larger, expanding very near to the forests. The fallow deer used this opportunity to eat the planted cereals, which might have been the reason why they were killed by farmers/hunters and brought to the settlement.

Pic. 6-8: A male Fallow deer and female (behind), *Dama dama*[110].

The size of the hunted fallow deer increased clearly from Troy I to III. The first size increase was already remarkable during Troy II. Although we have only six measured fallow deer remains from Troy III, it is still possible to observe that an increase occurred. This increase could be observed from Troy I to II as well.

Indeed there were already large fallow deer in the forest of Troas during Troy I and II[111]. However, the hunters of Troy I did not concentrate on hunting large fallow deer. The hunting

[110] http://images.google.de/imgres?imgurl=http://www.bildarchiv-hamburg.de/hamburg/parks/hirschpark/011_14898_hirsch_geweih.jpg&imgrefurl=http://www.bildarchiv-hamburg.de/hamburg/parks/hirschpark/index.htm&h=400&w=282&sz=41&hl=de&start=9&um=1&tbnid=gEtWfxOdL__rVM:&tbnh=124&tbnw=87&prev=/images%3Fq%3Ddamhirsch%2Bmotiv%26um%3D1%26hl%3Dde.

[111] The Figure 6-11 demonstrates that the slim upper line of the box&whiskers from each phase from the Maritime Troy Culture reach almost to the same highest spot.

strategy of the Troy hunters changed clearly over time, with hunters focused on killing large male fallow deer. This change had already begun in Troy II.

6.2.12. Red Deer, *Cervus elaphus* (Pic. 6-9)

Only fourteen bone remains were identified as red deer among the Maritime Troy Culture material. DEMIRSOY mentions that they are still common animals in the forests of Anatolia (DEMIRSOY 1996:580).

Approximately half of the identified remains from red deer were antler fragments (Tab. 6-6). They might have simply been collected in the forest. Red deer makes no real strong contribution to the red meat supply. The remains are found in all phases of the Troy Maritime Culture. We may assume that red deer was a local animal of Troas.

Pic. 6-9: A young (left), female (middle) and male red deer, *Cervus elaphus*[112].

6.2.13. Aurochs, *Bos primigenius* (Pic. 6-10)

Seventeen bone remains were identified as Aurochs. Other archaeozoological evidence indicates that they existed in Anatolia (see UERPMANN 1987). According to KUMERLOEVE, they were already extinct around the middle of the first millennium BC (KUMERLOEVE

[112] http://images.google.de/imgres?imgurl=http://upload.wikimedia.org/wikipedia/commons/d/df/Red_deer.jpg&imgrefurl=http://commons.wikimedia.org/wiki/Image:Red_deer.jpg&h=298&w=300&sz=28&hl=de&start=28&um=1&tbnid=pGG5e5bi70JluM:&tbnh=115&tbnw=116&prev=/images%3Fq%3Dred%2Bdeer%26start%3D20%26ndsp%3D2.

1975:107). However, KUSSINGER pointed out that she found aurochs remains in Lidar Hüyük dating to Mediaeval[113] times (KUSSINGER 1988:154-158).

Each phase of the Troy Maritime Culture provided aurochs remains. Thirteen remains came from Troy I, while one example came from each of the later phases and two from the mixed material (Tab. 6-7). The contribution of aurochs meat to the meat consumption of Troy during the Maritime Culture was very low (Tab. 4-4). They were hunted mostly during Troy I. They might have been killed as well, as they tried to get into the cattle flock to mate or as they disturbed the bulls in the domestic flock. The size of the aurochs was clearly larger than cattle, though a few small examples of aurochs could have been from a large domestic bull or from a female aurochs or vice versa (Fig. 6-12).

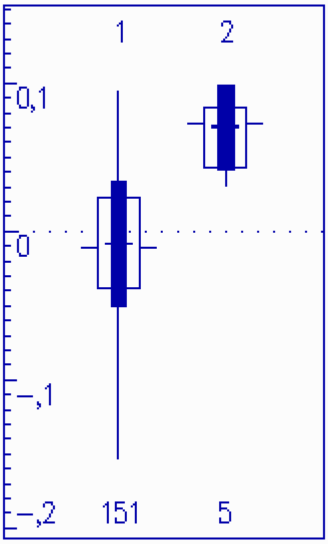
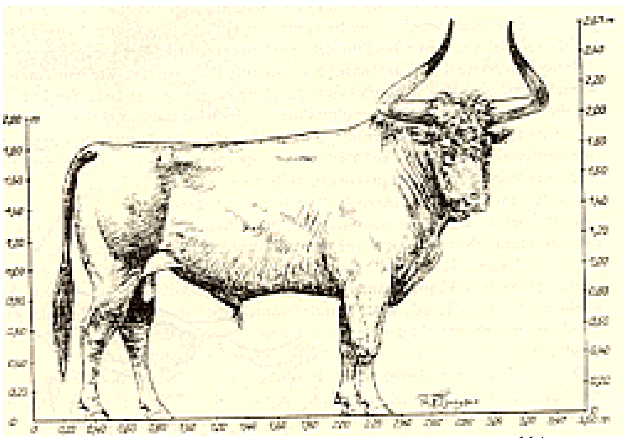


Fig. 6-12: The LSI calculation of cattle and aurochs, *Bos primigenius*, remains from the Maritime Troy Culture showing size difference.


Pic. 6-10: Aurochs, *Bos primigenius*[114]

[113] Archaeologists have dated this period from the 4th to 13th centuries AD (KUSSINGER 1988:7).
[114] http://www.payer.de/entwicklung/entw08196.gif.

6.2.14. Conclusion

Hunting became more important over time for the Troyans during the Maritime Troy Culture. More than ten percent of the red meat supply came from game animals in Troy III, a figure which was c. 10% in Troy II and less then seven percent in Troy I. Fallow deer was always the most hunted animal, followed by hare and wild boar.

The contribution of the game animals to meat consumption was almost completely supplied by fallow deer alone. Ten percent of the entire meat demand during Troy III was covered by fallow deer. Fallow deer made up c. 80% of the hunted animals in the last two phases of the Maritime Troy Culture; a figure up from c. 45% during Troy I. This increase in fallow deer hunting could be due to the following reasons:

- Increasing human population led to an increase in fallow deer hunting to cover demand for meat.
- Difficult and stressful periods increased hunting to cover demand for red meat.
- Damage caused by the animals to the fields of Troy led to more hunting to secure harvest.
- Fallow deer population increased within a favourable habitat, leading to better hunting conditions.
- Immigrants introduced their hunting habits in Troy II (see bottom).
- Certain groups in the settlement, in this case the upper city inhabitants or so-called ruler class, hunted and consumed fallow deer meet.
- Fallow deer were used during the cultic ceremonies as an animal offering.

The increase in the human population might have forced people to find other red meat resources to cover their protein need while preserving their own farm animals. This might be the reason as well that fallow deer meat was consumed in big portion during the difficult times of Troy III as means of replacing the meat lost by the absence of cattle.

The density of the fallow deer population could have also increased in the woods under favourable conditions. Settlers would have hunted them easily. The increase in the fallow deer population in the Troas region might have had another consequence. They might have damaged the fields of Troy to find fodder and were subsequently killed by the farmers.

The hunting tradition of fallow deer continued into the later phases of Troy as well. In Troy VI-VIIa the contribution of fallow deer to meat consumption[115] was c. 19% (UERPMANN 2003: 252-Fig.1), while reaching more than a quarter of whole meat requirement during Troy VIII (FABIŠ 2003:267-TABLE 1). UERPMANN states that "…*Starting in Troy VI, it seems to have been a favourite animal for offerings…–both in Troy VI/VIIa and during the classical times of Troy VIII/IX- might also be related to the cultic role of the fallow deer. In any case, the high frequency of this animal in the later periods is more likely an effect of social or cultural peculiarities than of environmental developments*." (UERPMANN 2003:256).

Troy II is very important for the entire history of Troy. Archaeologists have proven the advancements of this period with the finds. The further development of bronze production or the use of the potter's wheel is known. The imported archaeological finds confirm the evidence of overseas trade, and the well-known treasure indicates the richness of the city. There was now definitely a citadel and lower city that was surrounded by a fortification made of wood. In the citadel there were huge megarons that were probably used for meetings or for cult purposes (KORFMANN 2001:347).

The archaeological finds clearly represent social differences among groups in ancient Troy during phases II and III. The lower city was established probably for the common members of the community, whereas the citadel was designated for the ruling family. The key members of the settlement met together in these megarons to make important decisions. It is most likely that fallow deer meat, namely the so-called delicious meat, was served to these influential people in the biggest megaron.

There might be another reason that the valuable meat was served to the same important people of Troy as well as to the spiritual leader/leaders. No archaeological finds from the Maritime Troy Culture era have been uncovered to prove definitively that a cultic building or area in the citadel existed[116]. This does not necessarily mean that there were no open-air cultic activities practiced by the spiritual leader/s in the citadel or in the lower city.

The Maritime Troy Culture might have seen the beginnings of cult-like or religious practices that continued until the end of Troy history. These practices might have begun with the earlier

[115] Proportions among the meat-producing animals (WIS%).
[116] SAZCI presumes that a megaron from Troy III in square G6 might have been used for cultic purposes (SAZCI 2003:384).

residents of the Troas region rather than in Troy II; however, the citadel material from Troy I does not originate from the same locations as during Troy II and III[117]. This could be the reason why the proportion of fallow deer remains among mammal remains is lower than expected, or it could mean that cult-like or religious ceremonies did not occur regularly.

The distribution of bone remains from Troy I, though, resembles that of Troy II. The high frequency of hind leg remains from Troy I and II is clearly evident[118]. The same phenomena could be observed in the Hellenistic Period as well as in Troy VIII[119] (FABIŠ 2003:267-TABLE 1). The proportion of hind leg remains from the Maritime Troy Culture and from Troy VIII is almost identical[120].

It might be possible that the hind legs of fallow deer were the chief offerings during ceremonies, and that the meat was consumed around the open-air sanctuaries by members of the community as well as by spiritual leaders. This might also have been based on claims by the ruling family that they receive certain quantities of the hunted fallow deer. Over time this practice became tradition, or possibly a cultic activity.

A very simple explanation might hold true, that the people gathered after a common hunt and celebrated the richness of the hunt. Certain parts were eaten together, maybe among the men/hunter members of the community. Other parts of the animal were kept by the hunter, or shared. This might be the reason for the high frequency of hind legs at certain places in the settlement. This might have been the beginning of cult activity as well.

Eighty percent of the antler remains were found in the citadel of Troy II and III, while the rest were uncovered directly next to the outer wall of the citadel[121]. It might be possible that antler from fallow deer was used for the cultic ceremonies by the spiritual leader, or as decorating material.

[117] The citadel material from Troy II and III is located to the centre of the citadel, whereas the lower-city material is coming from outside the citadel walls.
[118] Troy III fallow deer bone distribution reveals slight differences; this might be based on a forced economy and social reasons.
[119] Most of the identified material from Troy VIII comes from sanctuary contexts (FABIŠ 2003:267).
[120] The hind leg remains make up ca. 38% of the NIS and 47.5% of the WIS from Troy VIII and ca. 37% of the NIS and ca.43,5% of the WIS from the Maritime Troy Culture.
[121] This might change, if more and larger squares from the Maritime Troy Cultural phases are opened.

The sudden increase in the frequency of fallow deer remains within the Maritime Troy Cultural phases might mark the beginning of the new role given to fallow deer as animal offerings in cultic activities. The frequency of fallow deer remains grew further within Troy II. The human population in the settlement increased with time, and more fallow deer were hunted and brought to the settlement to be sacrificed as offerings. This might indicate that the ceremonies were also being held regularly. The increase in size of the hunted fallow deer might be related to these cultic ceremonies. The spiritual leaders demanded larger and stronger male fallow deer to sacrifice to their gods.

6.3. Hunted fauna in the Troas and Yenibagdemli from the 5th millennium to the end of the 3rd millennium BC.

The natural environment of the Troas provided a wide range of wild fauna in prehistoric times. Fallow deer was the most hunted animal during early Kumtepe A. Over time, however, fallow deer grew less important as a meat supplier within Kumtepe A. This loss of protein was supplemented by pig breeding (M. UERPMANN Abb1: 2006).

During Troy I the fallow deer was again the most hunted animal, but their contribution to meat consumption was very low (see above). The identified wild mammal remains make up c. 3% of the bone assemblage in Beşik-Yassıtepe, which corresponds again to c. 3% of the complete weight of the finds. Fallow deer was by far the most hunted animal, followed by hare (Fig. 6-13).

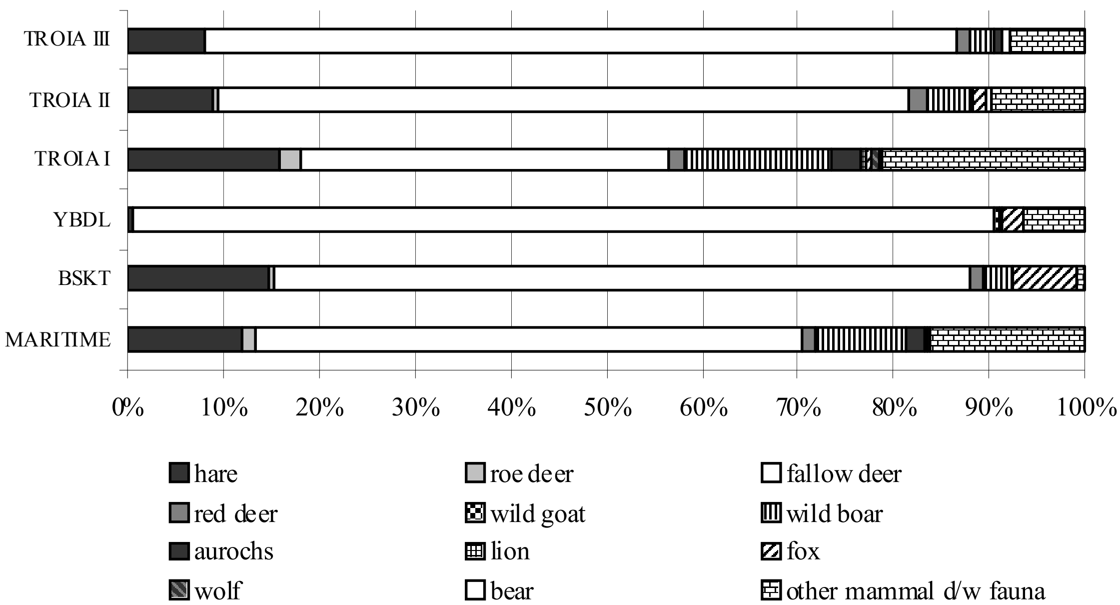


Fig. 6-13: Distribution of the wild animal remains in percentages among the wild fauna.

Ten percent of the identified mammals from Yenibademli were wild mammals and made a c.12% contribution to the meat demand (Fig. 6-14). In the island settlement fallow deer was almost the only animal hunted in large numbers. The other identified wild animals are in fact in the minority. The interest in game animals increased in the coming phases of Troy, namely, Troy II and III. Fallow deer was certainly the most hunted animal during the Maritime Troy Culture.

Fallow deer was the extra meat bonus in the Troas. In early Kumtepe A, more than c. 15% of the meat demand was covered by fallow deer[122], while the people in late Kumtepe A hunted clearly less than their ancestors. The new settlers of Kumtepe B demonstrated little interest in hunting[123]. Fallow deer covered only a small percentage of the total meat demand. This was also the case in Troy I. Fallow deer represents only c. 2% of the complete mammal bone weight.

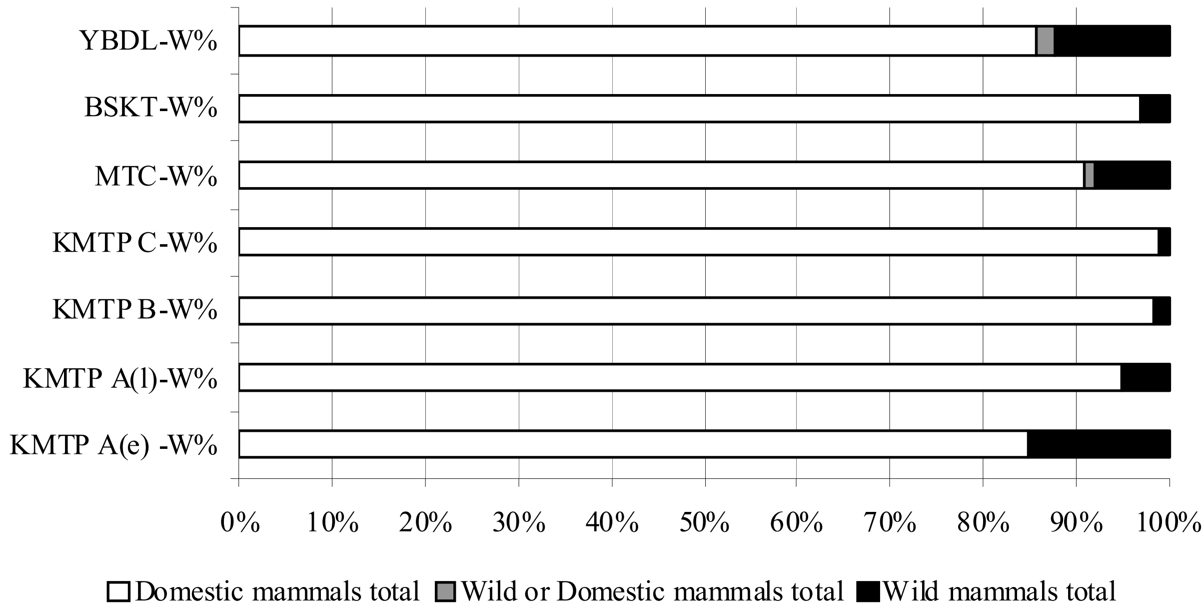


Fig. 6-14: The distribution of weight for bone remains per domestic, wild or domestic and wild mammals from Yenibademli, Beşik-Yassıtepe, the Maritime Troy Culture and Kumtepe, given in percentages.

The mainland people[124] were not interested in hunting in the first half of the 3rd millennium BC. Fallow deer, though, was a very important source of red meat in the island settlement of

[122] Fallow deer was the 3rd main meat supplier, after sheep.
[123] M. Uerpmann 2006:Fig.1.
[124] All wild meat consumption in Beşik-Yassıtepe totalled only ca. three percent of meat consumption as a whole.

Yenibademli[125]. Ten percent of the mammal remains were identified as fallow deer, equaling c. 12% of the entire bone weight. Fallow deer was the fourth main meat supplier for the island people, just after pig[126]. This could indicate that the inhabitants of Yenibademli kept the the livestock in low numbers since there was enough fallow deer to hunt on the island. It is possible again that fallow deer were hunted in great numbers as they were grazing in fields of cereals.

The island people might have been forced to hunt more than mainland people, since they might have had limited suitable fields for agriculture on the island. The possible high density of the fallow deer population on the island might have made it easier to hunt them as well.

The other wild animals were hunted in very small numbers on the mainland as well as on the island. The hare was the second most hunted animal, but its contribution to meat consumption was very small. Wild boars were hunted in Troy more than in Beşik-Yassıtepe.

The increased hunting of fallow deer in Troy II and III is very remarkable. There could have been different reasons for this increase (see above). One theoretical possibility is that the Yenibademli people came to the mainland and settled in Troy. These people might have continued their hunting activities, which they had been practicing a great deal longer than the mainland groups.

The duration of Troy III lasted for c. fifty years. In this short period the city had to be rebuilt four times. This difficult time for the people of Troy can still be observed among the architectural remains. Due to the hardship of this period, people might have been forced to hunt far more than in earlier time periods in order to acquire red meat.

The size of the fallow deer in the Troas during the first half of the 3rd millennium BC shows slight differences. The measured fallow deer remains from Beşik-Yassıtepe indicate that they were slightly larger than their Troy I relatives, while the assemblage from Yenibademli is nearly as large as Troy I. In the coming phases of Troy[127] the fallow deer grew in size. The changes in size would have been based on the killed animal's gender. The further increase of

[125] The fallow deer remains from Yenibademli, such as skull-antler-tooth, indicate that the animals were hunted on the island and probably not brought from the mainland. The antler pieces among the fallow deer remains make up only 3.2% of the NIS and 5.3% of the WIS.
[126] The number one meat supplier was cattle, followed by sheep.
[127] There are only six measured fallow deer remains from Troy III.

the box&whisker in the diagram below indicates the existence of male animal remains in the assemblages (Fig. 6-15).

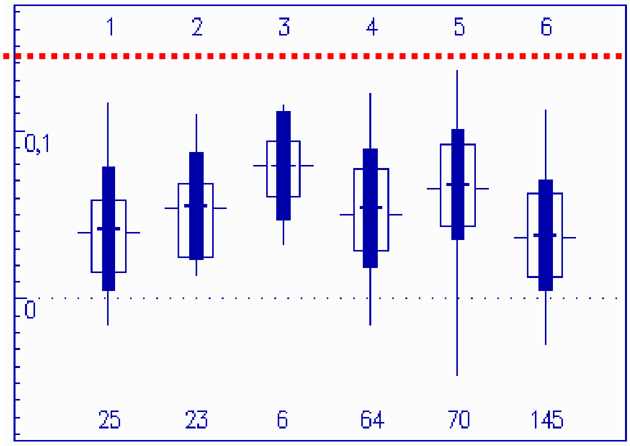


Fig. 6-15: Size of the fallow deer, *Dama dama*, in the Troas during the Early Bronze Age (Troy I, Troy II, Troy III, the whole Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

The small-sized fallow deer that were hunted at Yenibademli could indicate more females among the measured fallow deer remains in this assemblage. However, the box&whisker diagram illustrates at the same time that large fallow deer already existed on the island. The people of Yenibademli clearly hunted more female fallow deer than did the mainland hunters of phases II and III and of Beşik-Yassıtepe[128].

Large wild animals such as bear and lion might have been killed during social activities or to protect domestic animals. The furs were brought to the settlement as a trophy. The other small carnivores might have been killed for their fur or they were disposed off as vermin.

The complete wild mammal spectrum uncovered so far in the settlements of the Troas is composed of hedgehog, hare, weasel, beaver, fox, wild cat, lynx, wolf, lion, bear, wild boar, roe deer, fallow deer, red deer, and aurochs. Apart from hare and wild boar, other species are very rare in the bone remain assemblage of the Troas before and during the Early Bronze Age. The fallow deer population, that was so often hunted, no longer exists in the region. However, a few small, middle- and large-sized wild animal species, as well as birds, exist in "Kazdaği - Ida Mountain- National Park", c. 120 km southwest of Troy. Other wild animal fauna in the park include bear, wild cat, roe deer, wolf, fox, jackal, wild boar, eagle, falcon, and others[129].

[128] It would be difficult to suggest that the fallow deer population on the island was smaller than on the mainland relatives due to environmental reasons. The size of the hunted fallow deer from Troy I and Yenibademli is almost the same. The size of the fallow deer from the island and mainland was probably similar.
[129] www.kultur.gov.tr and www.milliparklar.gov.tr.

7. Food Recources in the Troas and an introduction to some of the ancient vegetation

As the people of Kumtepe first arrived on the cape, they were already able to use the land as pastures for animal breeding and due to their knowledge of agriculture. The domesticated animals and cultivated plants probably covered a large part of their nutritional needs, though hunting, some fishing, as well as fruit and mollusk gathering,[130] were still part of the people's daily activities (see UERPMANN 2003: 253).

Lentil and bitter vetch were abundant in the assemblage of identified flora remains in Kumtepe A, followed by weeds such as red-pea (*Lathyrus cicera/sativus*) (Pic. 7-1). Fig remains were identified in great numbers in the assemblage of Kumtepe A[131], though overall the percentages of crop remains are higher than those of wild plants (RIEHL 1999: 39). Rich oyster remains and the fallow deer remains were the result of exploiting marine resources and products from the woods (UERPMANN, H.-P. 2001: 317 and M. UERPMANN 2006: 286).

Pic. 7-1: *Lathyrus cicera.*[132]

The fields of Kumtepe A would have been cultivated on the narrow cape and away from the seashore. The animals grazed away from the fields, probably in the areas where maquis and phrygana grew. They were probably also taken to the riverbanks. Further inland, the ruminants grazed in the forest, while the small numbers of kept pigs searched especially for their favored acorns. The hunting of fallow deer[133] in large numbers and the gathering of

[130] Especially in the second half of Kumtepe A (M. UERPMANN 2006:ABB.2).
[131] Figs were not cultivated at that time (UERPMANN&UERPMANN 2001:317).
[132]http://www.retamatour.com/web/02web/flora/fichas/fotosgran/bulbosherbaceas/dicotiledoneas/Lathyrus-cicera01.jpg.
[133] Especially during the early phase of Kumtepe A.

uncultivated fruits indicate that the borders between humans and nature were as yet not so clearly drawn.

People of early Kumtepe A were still quite dependent on nature, or they were still practicing their older traditions. During the later period of Kumtepe A, cattle and sheep were the most kept and eaten animals. They probably grazed away from the crop fields on the peninsula of Kumtepe. UERPMANN writes, "*However, the faunal spectrum of Kumtepe A does not really meet the expectations based on the outlined reconstruction of the environment. The very low representation of pigs especially is not in accordance with an oak-dominated vegetation, nor does the dominance of cattle agree with the general picture of a Mediterranean village economy*[134]" (2003:254).

In early Kumtepe A, pig remains are found in small percentages despite the fact that the favored food of pigs was plenty to be found in the woods. This might be due to transhumance activity or the fact that pork was not favoured among the inhabitants. The animal management of the inhabitants of Kumtepe in the beginning of the 5th millennium was not in accordance with the environment. This reason might have forced the ancient people of Troas to exploit natural sources for food.

After the above cited sentence UERPMANN writes: "*These expectations are met to a much larger extent by the faunal spectrum of Kumtepe B …*" in describing the situation in Phase B of Kumtepe (2003:254). The new settlers came to the peninsula more than one thousand years later with another type of animal breeding system. The new animal management was more suitable to the Troas environment. Pig rearing suddenly increased, and a large part of the meat demand was now covered by this animal. The oak forest and the marshland (wetland) were very suitable foraging grounds for pigs (UERPMANN 2003: 254).

M. UERPMANN (2006: 286) has pointed out that tuna was introduced as a new element in the diet, and consumption of shell products increased during Kumtepe B. The new farmers concentrated mostly on emmer, whereas barley and einkorn were planted additionally (Pic. 7-2 and Pic. 7-3). Fig remains were again identified, and grape consumption began during this period (RIEHL 1999:39/84). Hunting lost its importance dramatically. This could be due to the

[134] The environment is more suitable for small ruminants to graze. The dominance of small ruminants would be expected. In the hot regions small animals are slaughtered and the meat shared or consumed quickly so that the meat does not go bad.

fact that the subsistence economy of the new settlers was based primarily on better-managed stockbreeding, agriculture and exploitation of the sea rather than hunting.

Pic. 7-2: Einkorn[135]

Pic. 7-3: Emmer[136]

The flora samples from under the Troy I[137] fortification wall represent a very broad species spectrum. RIEHL (1999:30) writes that "*Only a few crop remains are represented; there were single rachis remains of barley and a few grape and fig seeds. More than 80% of the plant remains came from open, not too dry vegetation, namely Trifolium sp.* (Pic. 7-4)*, Medicago*

[135] http://www.vurv.cz/altercrop/images/einkorn2.jpg.
[136] http://www.hofgrub.de/pflanzenzucht/i_emmer1.jpg.
[137] This layer is older than Troy I and was found in a sondage south of the Schliemann trench (see Korfmann 1991b).

sp., Carex divulsa (Pic. 7-5) *and Poa trivialis type…With the evidence for very diverse habitat…, the plant remains in this context have to be interpreted as deriving from animal dung…*".

If these people consumed grapes, this layer cannot be contemporary with or older than Kumtepe A, since the first grape remains were identified from Kumtepe B3[138]. The inhabitation of the mound might have already begun before the Early Bronze Age, though no faunal material has up to now been identified. Therefore it is not possible to speculate about the subsistence of people through domestic animals, as well as through other resources.


Pic. 7-4: *Trifolium sp.*[139]


Pic. 7-5: *Carex divulsa*[140]

UERPMANN (2003:254) writes for Kumtepe B that, "…*Cattle and the small ruminants will also have grazed in the forest, but their preference are the open parts where grass forms a strong undergrowth. These animals actually transform forests into more open habitats by selective feeding on tree shoots, thus suppressing natural rejuvenation of the forest. The shift of the faunal spectrum from Kumtepe B to C towards less pigs and more small ruminants might reflect such changes to the surrounding vegetation.*" So the environment, altered through ruminant activity, caused a shifting in animal management.

The new settlers at Kumtepe maintained a different subsistence economy. Their existence was now mainly based on farm animals and agriculture (Kumtepe B). Pigs were kept in large

[138] The material of this layer represents open vegetation. During B3 people began consuming grapes (RIEHL 1998: 38/84).
[139] http://www.miyosi.co.jp/ababa/osusume/images/09trifolium.jpg.
[140] http://www.smgrowers.com/imagedb/Carex_tumilicola.jpg.

numbers and were the main supply of meat for the inhabitants. The decrease in ruminant management is remarkable.

The favorable environmental conditions made it now possible to keep more ruminants during Kumtepe C (see above); in this case, farmers kept sheep. Their products, as well as their meat, were no doubt in demand. The interest in pig keeping decreased during Kumtepe C. The people had simply little interest in hunting or in exploiting marine resources during this period. The consumption of legumes continued, but instead of lentil people consumed beans (broad bean – *Vicia faba* – Pic. 7-6). Apart from figs, grapes were now gathered and hunting declined in importance. Fallow deer was occasionally hunted. Shell remains indicate that the new settlers were not unfamiliar with the sea. Exploiting wild environmental resources became clearly less important during Kumtepe C, becoming apparently a minor additional activity.

Pic. 7-6: *Vicia faba*.[141]

Hunting was not that common in Troas in the first half of the 3rd millennium BC. Inhabitants of Troy, Kumtepe and Beşik-Yassıtepe did not radically exploit their environment for other red meat resources. In Yenibademli, however, over ten percent of the meat demand was covered by wild animals; namely fallow deer (see the wild fauna section in this chapter).
The high number of shell remains from the mainland and island settlements indicates the additional exploitation of the sea. VON DEN DRIESCH (1999:Tab.16) produced a shell list from Beşik-Yassıtepeby. *Patella* (Pic. 7-7), *Mytilus edulis, Ostrea edulis* and especially *Cerastroderma glaucum*[142] are the most common identified species, and information from

[141] http://www.fava-beans.com/Vicia-faba.jpg.
[142] More than 30,000 of the ca. 36,840 remains from the complete shell assemblage (von den DRIESCH 1999:Tab.16).

Troy I[143] indicates similar finds. All four species are edible and were collected for consumption.

Pic. 7-7: *Patella caerulea*[144]

Patella were collected as they were still attached to the rocks or cliffs in water. Alternatively, *Mytilus and Ostrea* prefer shallow water where they attach themselves to the possible surroundings. *Cerastroderma glaucum* could exist in sandy shallow regions and more often in the mouth of rivers. The shell gathering activity in Yenibademli was as popular as on the mainland. On the island patella was the most often collected species, whereas *Ostrea edulis* and *Cerastroderma glaucum* (Pic. 7-8) came in second in equal amounts.

Pic. 7-8: *Cerastroderma glaucum*[145]

Shells were not the only possible food resource that the sea offered to people. Fishing clearly took place in Troy[146] and Beşik-Yassitepe[147]. Fish remains from Beşik-Yassıtepe consisted

[143] The percentages of the species from the Troy assemblage are available in the Ph.D. thesis from C. Çakirlar. The shells are mentioned only to illustrate the different nutritional resources, which are found in Yenibagdemli and Ulucak as well.
[144] http://www.gastropods.com/Shell_Images/P-R/Patella_caerulea_5.jpg.
[145] http://www.schule-bw.de/unterricht/faecher/biologie/meer/fauna/muscheln/ceraglau.jpg.

almost exclusively of tuna, *Thunnus thynnus*, whereas Troy included a greater variety of fish, with c. one-third of the fish remains coming from tuna. M. UERPMANN & W. van NEER (2000:248) mentioned that "*Tunas are epipelagic and mesopelagic fish which migrate over long distances. Their migration brings them regularly close to the shore*[148].". Tuna were fished during their migration period, from the Aegean to the Black Sea and vice versa (Pic. 7-9).

Pic. 7-9: *Thunnus thynnus* (Wikipedia).

Some of the tuna vertebra finds from the Bronze Age layers of Troy indicate that, according to calculations based on the size of vertebra, several examples of tuna were between 2.5m and 4 m long (M. UERPMANN 2006: 287). Most of the fish caught at Troy (I-IV) were coastal species and probably came from estuarine contexts. Fish found in mid-water or close to the surface are of lesser importance (W. van NEER and M. UERPMANN 1998: Fig.4). The very few fish remains among the animal remains from Troy reveal that fish only made a small contribution to the nutrition of the people of Troy[149] (M. UERPMANN and W. van NEER 2000:173).

The tuna vertebra remains from Beşik-Yassıtepe indicate that the caught fish were on average two meters long[150]. VON DEN DRIESCH wrote that the Beşik Bay was an ideal place to catch and to slaughter tuna. The preparated tuna meat was transported to the Beşik-Yassıtepe settlement and probably also further to Troy. VON DEN DRIESCH wrote that the economic

[146] W. van NEER and M. UERPMANN (1998:243-252).
[147] VON DEN DRIESCH (1999:454-456).
[148] The migration of the red tunas from the Aegean to the Black Sea would have been between April and September. The return from the Black Sea to the south would have been in September and December (W. van NEER and M. UERPMANN 2000: 175).
[149] The number of fish remains increased after sieving the botanical samples. The weight of fish remains among the other fauna remains remained quite small, as only very small-sized fish remains were included on the fish remain list (M. UERPMANN and W. van NEER 2000:173).
[150] The identified tuna fish remains include 40 individuals (out of 350 vertebra from the Troy I period). If tuna were on average two meters long, than tune meat totalled c. 1,600 kg (VON DEN DRIESCH 1999:454).

importance of tuna fishing should not be underestimated (VON DEN DRIESCH 1999: 454-456). There are very low numbers of fish remains from Yenibademli (only 5 pieces), which might be the real reason for the high interest in hunting fallow deer.

Archaeobotanic research for the Early Bronze Age[151] in Troy indicates that legumes, including bitter vetch and lentil, were rarely consumed, but that cereals, in particular emmer, are well represented. The weed group consists mainly of plants that live close to rivers. Figs and grapes were also consumed intensively. The botanic samples show that farmers planted on the low plateau as well as on the riverbanks (RIEHL 1999:397), and that olives were collected, probably for consumption and maybe also to press oil[152] (RIEHL 1999:Abb.10). Archaeobotanic research for Yenibademli was done by OYBAK-DÖNMEZ[153]. The results indicate that mainly emmer, barley and legumes were consumed. Some grape seeds were identified at the island settlement as well (HÜRYILMAZ 2006: 36).

7.1. Summary

Two settlement locations, mainland and island, are known from Troas. Along with their corresponding environments, they produced different subsistence economies. Animal breeding was quite important on the mainland, while hunting played an important role on the island. The exploitation of the sea is seen at both kinds of settlements, Cardium consumption was quite high on the mainland, while patella consumption was high on the island. This difference could be a result of different environmental conditions. The estuary of the Skamander was an ideal place for cardium to colonize (see ÇAKIRLAR 2007:161). Alternatively, the rich rocky environment of Yenibademli made it possible for the inhabitants to collect patella in large quantity (see ÇAKIRLAR 2007:162).

Tuna and *Sparus aurata* were eaten on the mainland, while only a few fish remains were found in Yenibademli. The scarcity of marine resources, caused by weak fishing, could have been supplemented by fallow deer hunting.

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[151] The earliest flora samples in the Troas from the Early Bronze Age are from late Troy I. The samples belong to late Troy I or Troy II. Out of 19 samples, 69 species were identified (RIEHL 1999:40).

[152] RIEHL reported that it is not clear if the olive remains came from cultivated or wild forms. If olives were pressed to gain oil, than it would have been done in the fields. Evidence has been found to prove olive-oil production in the settlement (RIEHL 2006: 304).

[153] Oybak-Dönmez, E. 2005. "The Early Bronze Age Crop Plants from Yenibademli (Gökçeada), Western Turkey" *Environmental Archaeology* 10/1: 39-49. (Zitat fehlt im Literaturverzeichnis !!!!)

Botanic research from the Early Bronze Age indicates that emmer and einkorn remains are identified in high numbers, and bitter vetch and lentil remains are found in the archeaobotanic samples. The weed group consists mainly out of plants that live close to fresh water rivers. The Low Plateau and riverbanks were used for planting, and figs and grapes were gathered from the area. It is not yet clear if olives were collected for consumption or to press oil.

8. The mammalian fauna and its relation to humans and the environment in West Anatolia during the 3rd millennium BC

Anatolia is surrounded by the Black Sea in the north, the Mediterranean Sea in the south and the Aegean Sea in the west. The concept "West Anatolia" is used here roughly for the geographic region west of the modern city Sivas and the Ceyhun River. This region is also known for the archaeological sites of west Anatolian cultures and its local expressions (EFE 2006:15). Troy is located at the western end of this region.

The Early Bronze Age settlements were widely spread across the region. The number of settlements increased dramatically after the Copper Age (TAY-CBS)[154]. However, faunal remains from only a few of the excavated sites have as yet been analyzed. The published faunal data from the Neolithic and Copper Age settlements in west Anatolia help in describing the development of animal husbandry and the exploitation of the environment. The environmental conditions of the settlements are varied and include coastal settlements (such as Neolithic Fikirtepe and EBA-Troy), highland settlements (such as Copper Age Orman Fidanlığı and EBA-Küllüoba), as well as island settlements (such as Yenibademli.).

8.1. Importance of Domestic Animals

All assemblages from different periods and settlements clearly reveal that most of the identified bone material is from domestic animals (Fig. 8-1). The wild animal remains, however, indicate that people also exploited their environment to cover a part of their red meat demand. The proportion of the meat provided by wild animals changed over time. But there is no specific pattern demonstrating a decrease or an increase in hunting in different periods or regions.

[154] Please check the home page of TAY and further link to the pages http://taygis.tayproject.org/TAYGIStr.html.

As shown in Fig. 8-1, people from the earlier periods, such as in Fikirtepe or Ilıpınar X-IX, hunted more. In the Copper Age there was a visible decrease in hunting, apart from in Ulucak-CA. Hunting for sources of red meat lost its importance in the transition period in the north of the Aegean, at Kumtepe B[155], whereas wild animals were still an important resource in the highlands (Küllüoba- TP).

In the EBA settlements, domestic animals dominated the assemblages. The island people exploited wild natural resources for red meat more than the mainland people. Hunters of the highland settlements hunted more rarely than at the other settlements.

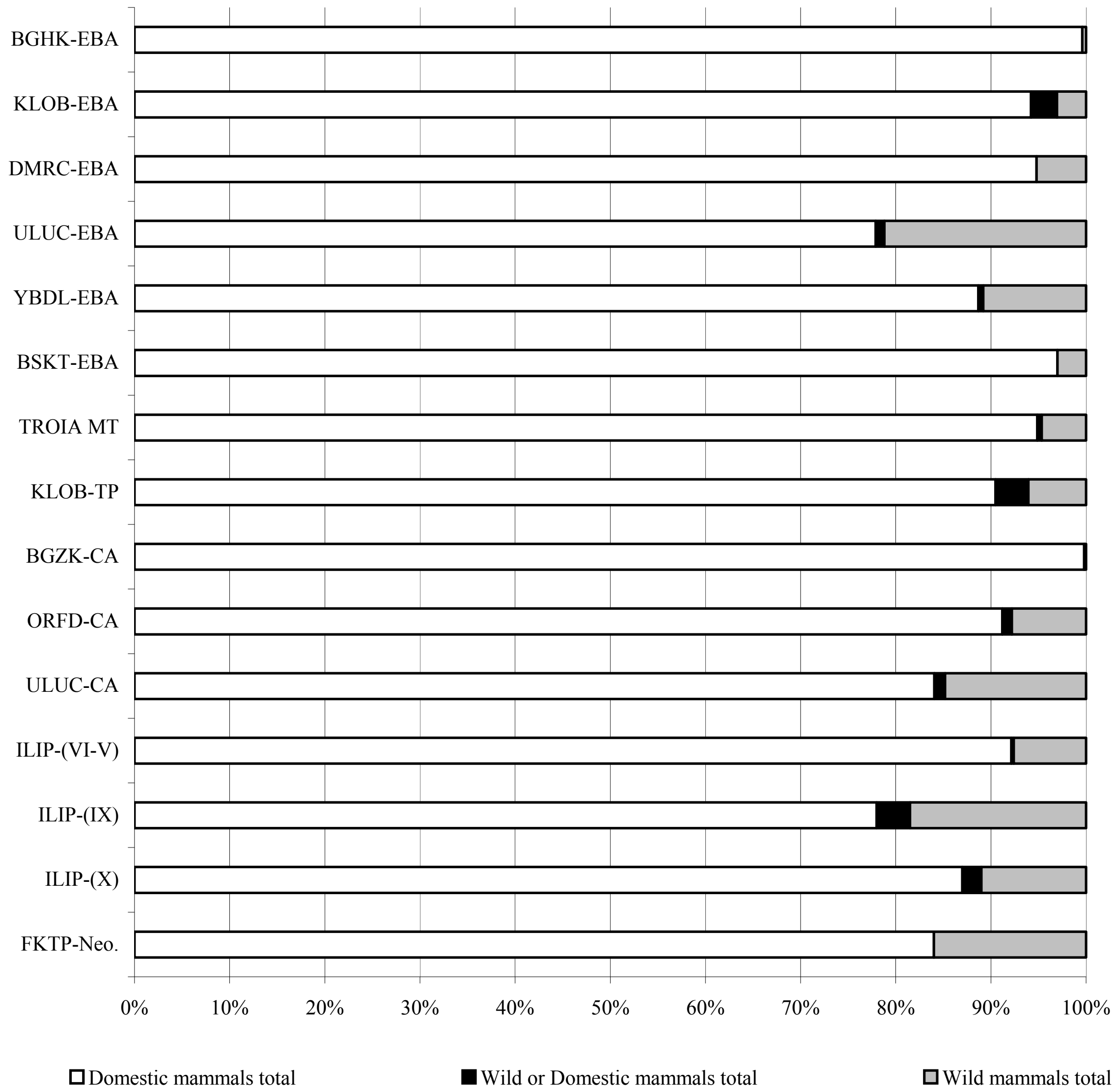

Fig. 8-1: The distribution of bone material among domestic and wild animals from the Neolithic to the Early Bronze Age periods at settlements in West Anatolia.

[155] The NIS% results from Kumtepe were interpreted from the WIS% diagram (M. UERPMANN 2006).

There are actually three interesting settlements from the Early Bronze Age. In Ulucak, during the EBA, hunting became more important than during the Copper Age. A large portion of the demand for red meat was covered by game animals, whereas in Boğazköy and Karataş-Semayük people seemed to have rarely hunted.

8.1.1. Animal Husbandry

Although dogs are a favourite animal for many people, other domestic animals were kept more frequently but not in equal proportions (Fig. 8-2 to 8-4). At least 15% of the domestic animals in west Anatolia were cattle, except for the Copper Age settlement of Orman Fidanlığı-CA (c. 7%). An essential part of the animal population in the Neolithic settlement of Fikirtepe-N was cattle. Though cattle management was not practiced as intensively in other early settlements as in Fikirtepe-N, it was still very important. Probably one-fifth of the kept animals were cattle until the Early Bronze Age.

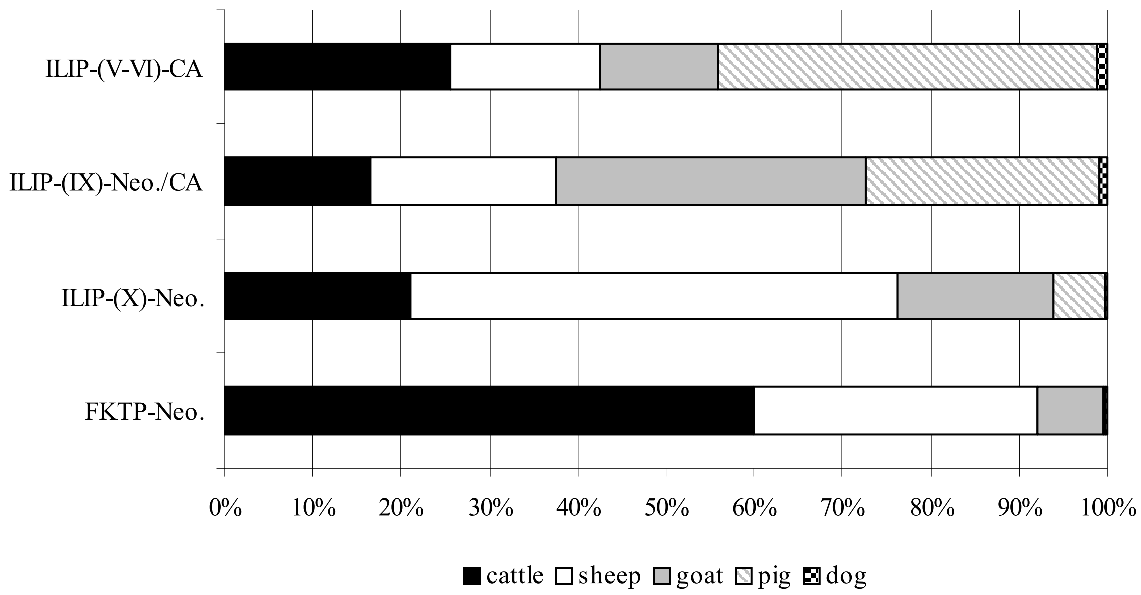

Fig. 8-2: Number of identified mammal remains from Fikirtepe-Neo., Ilıpınar-(X)-Neo., Ilıpınar –(IX)-Neo. to CA and Ilıpınar- (V-VI)-CA.

Cattle management in west Anatolia during the EBA shows four different patterns. In the north and middle Aegean, cattle made up one-fifth of the animals, while they made up half of the possible farm animals in the southern regions[156]. In the northwest highland settlements of

[156] Karataş-Semayük.

Küllüoba and Demircihüyük, another pattern was identified. One-quarter of the domestic animals were cattle. The cattle herd in Boğazköy made up one-third of the identified domestic mammal remains.

In the Neolithic, small ruminants were kept in large numbers, from 40% of the domestic animals in Fikirtepe to over 70% in Ilıpınar. The Copper Age settlements provide very different patterns in small ruminant management. They made up ca. 85% of the identified domestic mammal remains in Orman Fidanlığı. Although no direct similarities could be observed, it can be stated that two-thirds of the possible livestock consisted of sheep and goat.

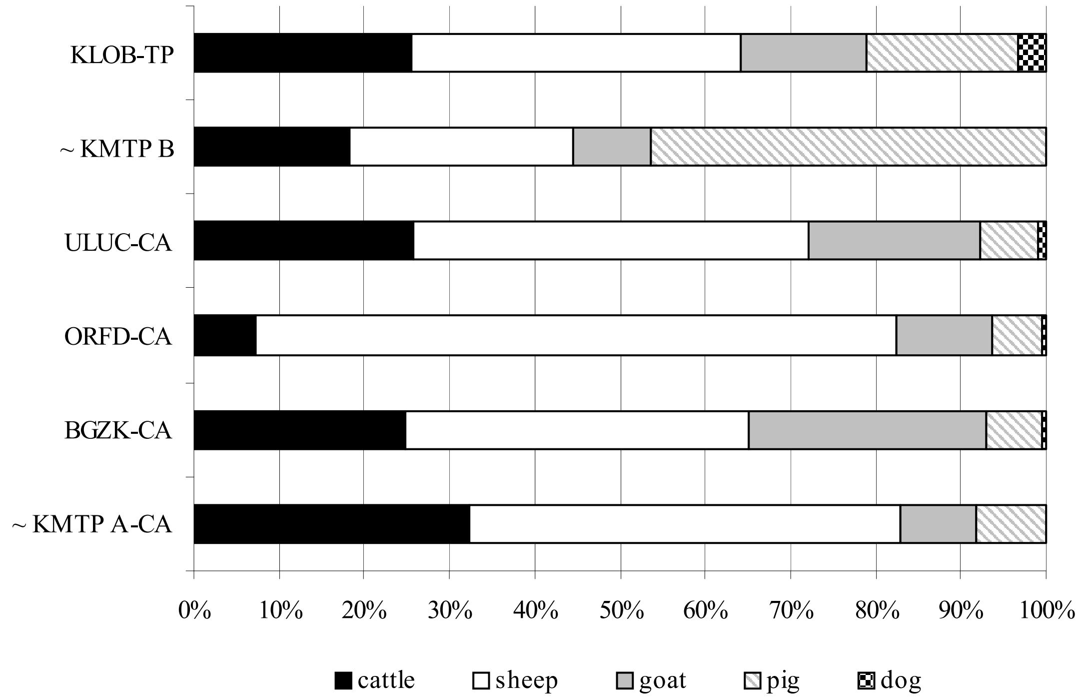

Fig. 8-3: Number of identified mammal remains from Kumtepe A-CA, Boğazköy-CA, Orman Fidanlığı-CA, Ulucak-CA, Kumtepe B and Küllüoba-TP.

During the transitional period to the EBA in Kumtepe B in the north Aegean, the number of small ruminants decreased to 35%. In the highland site of Küllüoba TP, the amount went up to over 50% of all identified mammal remains. The domestic animals from the middle Aegean (Ulucak-EBA) and highlands settlements (Küllüoba, Demircihüyük), as well as from Boğazköy, consisted of c. 55% of sheep and goat during the EBA. In the southern regions of west Anatolia this amount decreases to 40% in the Karataş-Semayük-EBA.

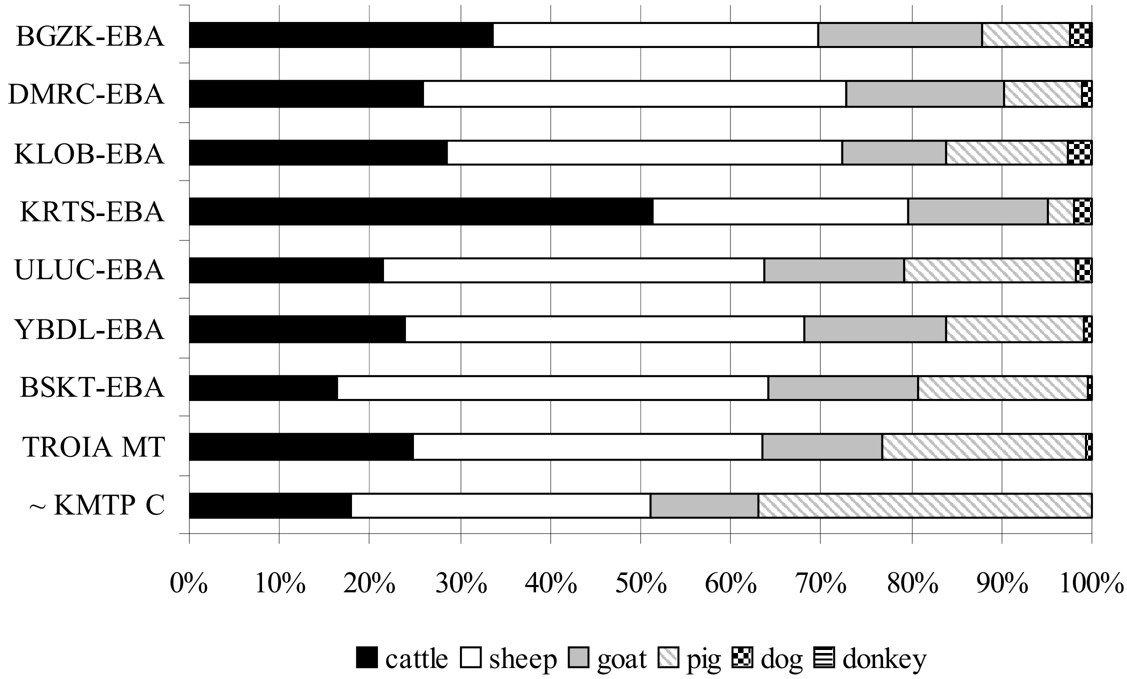

Fig. 8-4: Number of identified mammal remains from Boğazköy-EBA, Demircihüyük-EBA, Küllüoba-EBA, Karataş-Semayük-EBA, Ulucak-EBA, Yenibademli-EBA, Beşik-Yassıtepe-EBA, the Maritime Troy Culture and Kumtepe C-EBA.

In general, more sheep were kept than goats. Ilıpınar was an exception to this during the transitional period from the Neolithic to the Copper Age. The predominance of sheep can be observed from the Neolithic to the Early Bronze Age.

Pigs were kept in different proportions. The interesting point is that the number of pigs increased with the different successive periods of settlements, such as in Ulucak and Kumtepe. The general data show that pig breeding increased in the Early Bronze after the Neolithic and Copper Age.

Dog remains are present almost in all the studied settlements. The contribution of dog to domestic animal remains is, however, very small. The proportion of dog bones from Küllüoba is clearly more numerous than in the other settlements, followed by the Boğazköy-EBA, Karataş-Semayük-EBA and Ulucak-EBA.

Although sheep played numerically the most important role in west Anatolia, it was cattle that delivered the main proportion of red meat to most of the settlements (Fig. 8-5 and 8-6). Cattle were slaughtered and eaten very frequently in Fikirtepe-Neo. Cattle bones made up 85% of the WIS.

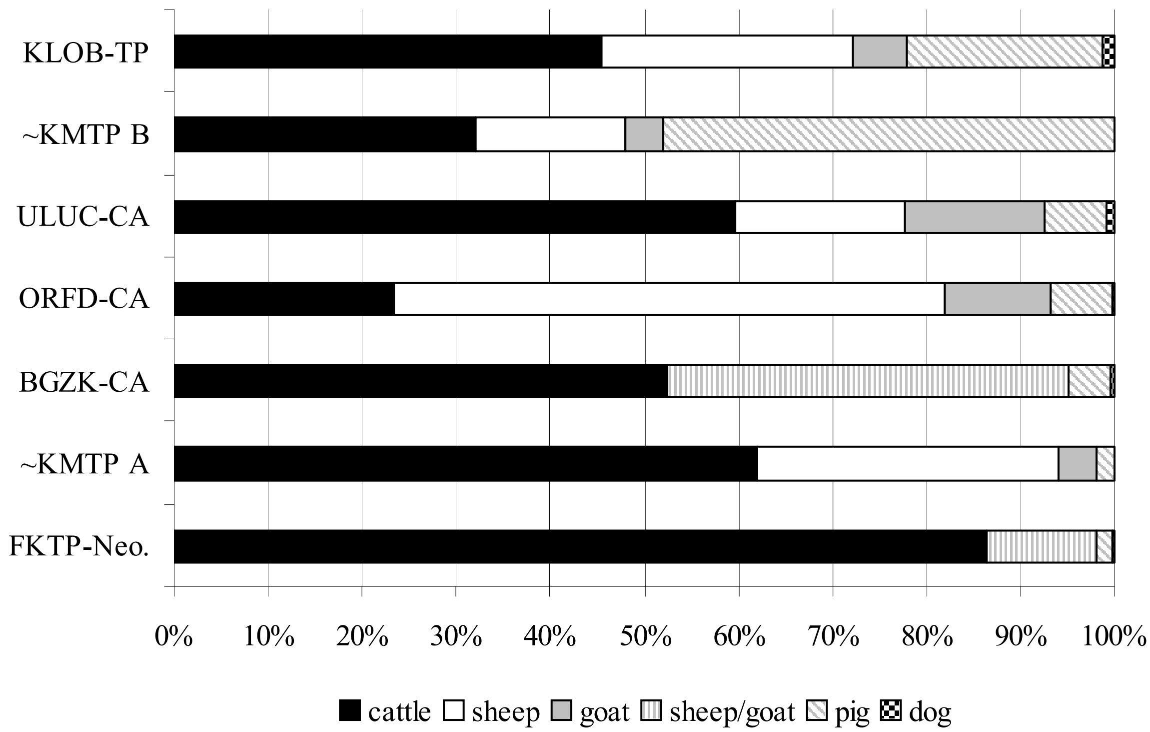

Fig. 8-5: Weight distribution of identified mammal remains from Küllüoba-TP (from the Copper Age to the EBA), Kumtepe B, Ulucak-CA, Boğazköy-CA., Kumtepe A-CA and Fikirtepe-Neo.

The consumption of beef decreased in the Copper Age and the contribution of small ruminants increased with regard to meat demand. Cattle still covered clearly more than 50% of the demand for meat. Only the Copper Age settlement of Orman Fidanlığı shows another pattern. Here cattle covered only c. one-fourth of the red meat demand, while sheep became the main meat supplier for people.

Pork consumption was quite low during the Neolithic and Copper Age. Goat covered third place as meat supplier among the domestic animals in Kumtepe A, Ulucak-CA and Orman Fidanlığı-CA.

In the north Aegean during the transitional period, dietary habits seem to have changed. Pork became the most highly demanded meat source in Kumtepe B, with small ruminants covering only c. one-fifth of the total meat demand. However, in the highland site of Küllüoba-TP, during the same period, cattle were still the main supplier of meat, followed by sheep and pig.

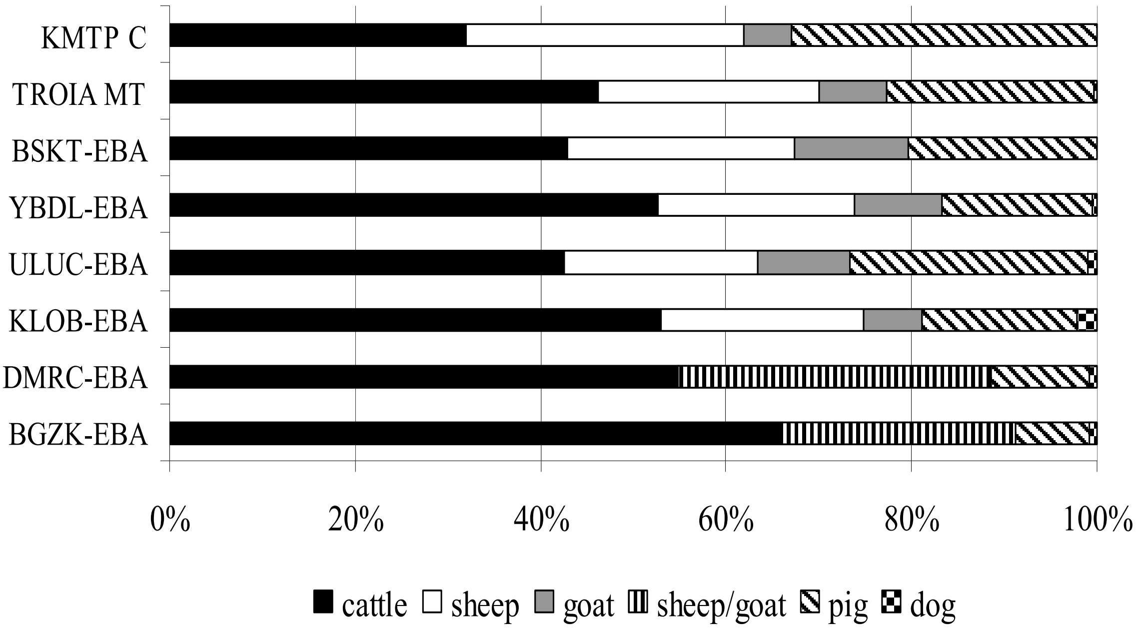

Fig. 8-6: Weight distribution of identified mammal remains from Kumtepe C, the Maritime Troy Culture, Beşik-Yassıtepe-EBA, Yenibademli-EBA, Ulucak-EBA, Küllüoba-EBA, Demircihüyük-EBA and Boğazköy-EBA.

The north and middle Aegean settlements present a similar pattern during the EBA. The average contribution of cattle to meat consumption within these settlements was c. 45%, and over 50% in the island settlement. Sheep covered more than one-fifth of the demand for meat. The change in pork consumption in Ulucak-EBA is very remarkable. Pig was now the second largest supplier of meat. To the south, cattle were quite dominant as meat supplier. Cattle were clearly the first meat supplier in Karataş-Semayük. Cattle covered four-fifths of the supply for meat, followed by pig in Karataş-Semayük.

Cattle covered more than half of the meat demand in the highlands of northwest Anatolia (Küllüoba and Demircihüyük). Small ruminants, indeed sheep, maintained second place. The consumption of pork in Küllüoba was clearly more than in the neighbouring settlement of Demircihüyük. Boğazköy fits into this picture as well, with 65% of the consumed meat being cattle.

The consumption of pork increased in contrast to the Copper Age; however, the small ruminants, probably sheep, contributed still more to the diet. Donkey remains become part of the assemblage, but include only a very few finds. Dog remains make up a very small proportion of the total bone weight from almost all the settlements in west Anatolia.

8.1.2. Kill-off pattern of Domestic Animals in West Anatolia

The slaughtering ages of domestic animals reflect the aim of breeding. There are many different economical reasons to keep herds: for meat, wool, hide, milk, and sometimes for combinations of these. One advantage of domestication is in obtaining meat without exerting much energy. With time, the observations and new experiences of farmers led to a possible shift. Animals were not kept only for their meat, but also for wool, milk, hides and as draft animals.

8.1.2.1. Kill-off pattern of Cattle

BOESSNECK and VON DEN DRIESCH (1979:18-22) have pointed out that there were more cow than bull remains identified in the Neolithic site of Fikirtepe. Remains of several new born animals and others only a few days old were recognized in the cattle bone assemblage. The dental aging results demonstrate that the cattle were slaughtered mainly between the ages of 3 to 7 years; however, epipyseal results indicate three main slaughtering age groups: calf and young animals (2 years of age), the sub-adult cattle (3 years of age) and mature cattle (> 3 years of age). Age distribution of cattle in the herd was one-third young and two-third adult animal.

UERPMANN (2001: 192) determined from the assemblage of Orman Fidanlığı-CA that some of the killed cattle were calves (younger than one year of age), and the other cattle remains were slaughtered before their 4th year. Indeed, the majority of the cattle bones are from sub-adult animals. Few remains are from adult, though not from very old animals.

Cattle were regularly killed between the 18th and the 30th month of age in the Copper Age phase of Ulucak. Half of the cattle did not become older than 2.5 years of age. The slaughter was occasionally continued among the animals that were older than the age of 2.5 (Tab. 8-1 and Fig. 8-7). The strongly chewed premolars and molars in the dental assemblage from cattle provide evidence of older kept animals in the herd.

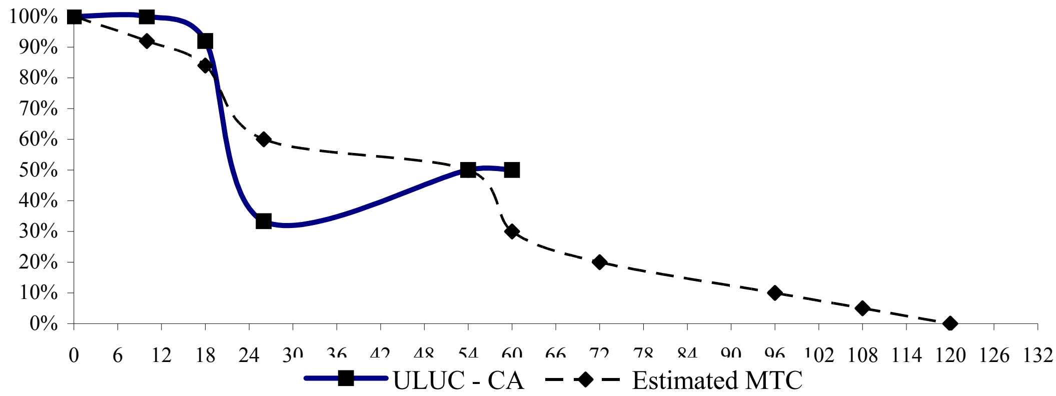

Fig. 8-7: The survival curve of the cattle in Ulucak during the Copper Age according to the epiphysis fusion data and the estimated survival curve of cattle population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

In the Troas during the EBA, cattle were killed mainly after 1½ years of age. In Beşik-Yassıtepe and Yenibademli, c. 50% of the cattle could reach the age of 2 ½ years; however, this figure was more than 60% in Troy. One-third of the cattle in Besiktepe were killed between 2 ½ and 3 years of age, and only 10% of the herd reached an age older than 5 years. In Yenibademli they were killed after 4 ½ years of age. The very strongly chewed premolars and molars from Troy and Yenibademli indicate that some of the animals reached nine years of age and were maybe even older.

The slaughtering of young animals began quite late in the Ulucak-EBA. Only ten percent of the calves were killed, and large numbers of the animals became older than 4.5 years of age. A few examples of strongly chewed premolars and molars indicate old animals in the cattle population (Tab. 8-2 and Fig. 8-8).

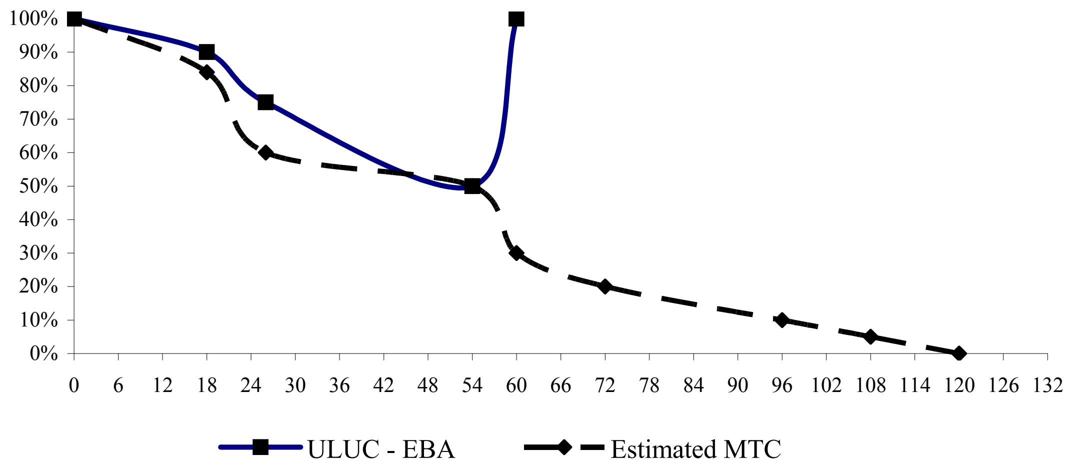

Fig. 8-8: The survival curve of the cattle in Ulucak during the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of cattle population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

HESSE and PERKINS (1974:156-157) considered the kill-off pattern of cattle in Karataş-Semayük only from certain fused bones. This makes it difficult to determine the estimated slaughtering rhythm. From the distal radius and proximal femur, they have calculated that about 85% of the cattle survived until at least 3½ years of age, and only 10% of them were killed as they reached the age of 2½ years[157]. The results of so-called EBA II are slightly different from EBA I. In this period only five percent of the cattle were killed in the first 2 ½ years of life according to the fused distal metapodial. However, c. 70% of the cattle survived and were killed after reaching 3½ years of age according to the fused proximal femur, distal femur, proximal tibia and distal radius.

At Küllüoba (GÜNDEM 2003:54-55) the slaughtering of cattle began at earlier ages. Cattle were started to be slaughtered regualry with the age of two (Tab. 8-3 and Fig. 8-9). Dental remains indicate that some cattle became much older than nine years of age. The slaughtering pattern in the highland settlement of Demircihüyük was quite regular during EBA. One-third of the animals were killed in the first 30 months, another one-third at the age of 4, and again one-third became older than 4 years of age (RAUH 1981:16-18).

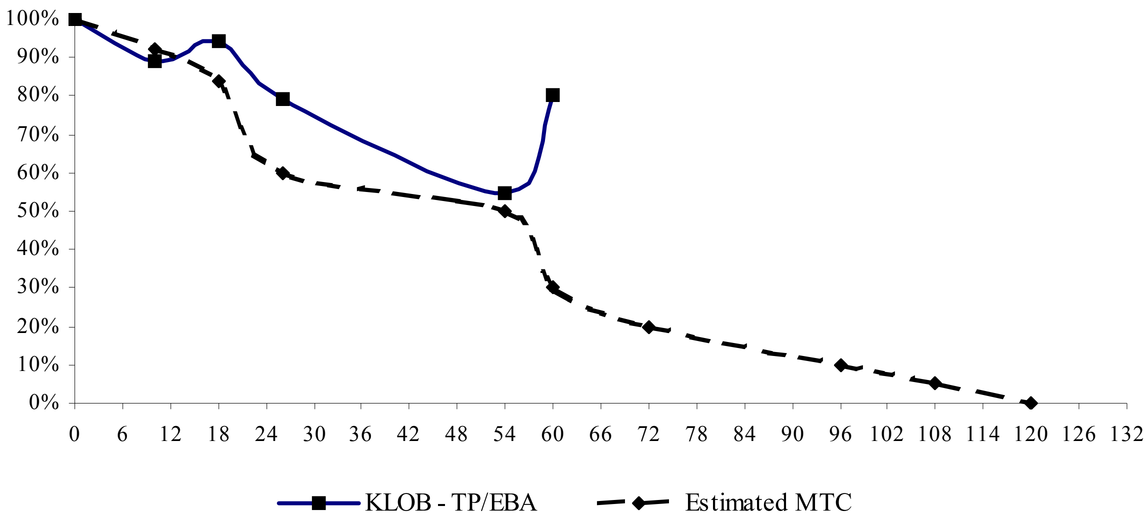

Fig. 8-9: The survival curve of the cattle in Küllüoba during the Transition Period and the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of cattle population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

[157] This was calculated from the fused distal metapodials. HESSE and PERKINS divided the EBA into two. These results are from the so-called EBA I period.

8.1.2.2. Kill-off pattern of Small ruminants

Half of the small ruminants were slaughtered before maturity in the Neolithic settlement of Fikirtepe (BOESSNECK and VON DEN DRIESCH 1979: 25). The epiphysis data from Ulucak-CA indicate that at least 40% of the small ruminants did not survive beyond 1½ years of age and half of them did become older than 2½ years, but only a few strongly chewed molars indicate that there were older animals in the flock (Tab. 8-4 and Fig. 8-9).

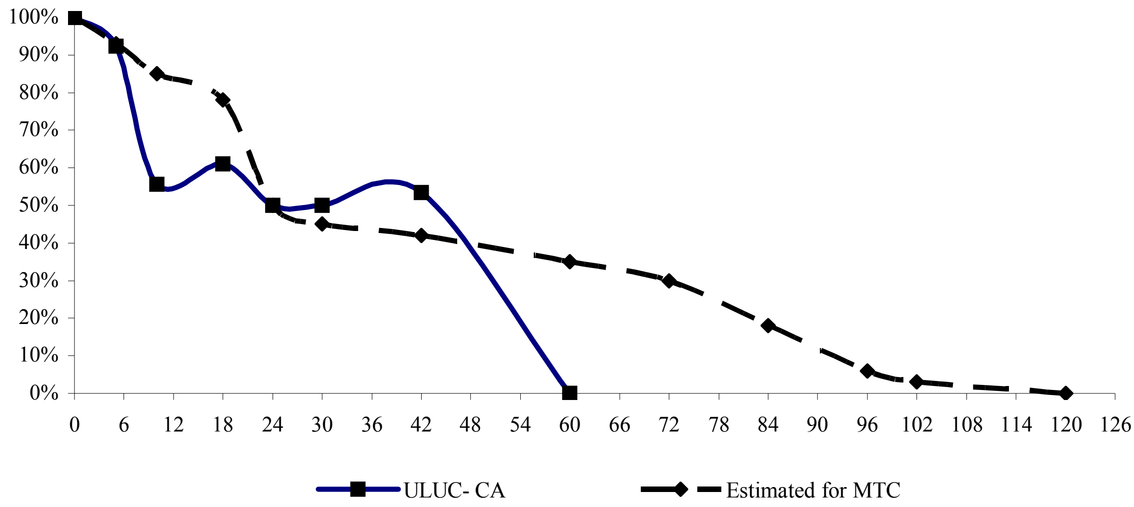

Fig. 8-10: The survival curve for small ruminants in Ulucak during the Copper Age according to the epiphysis fusion data and the estimated survival curve of small ruminants population according to calculations on dental and epiphsis data from the entire Maritime Troy Culture.

The young sheep were killed in small numbers in Troy during the Maritime Culture. Regular slaughtering began with 1 ½ years. The sheep flock mainly consisted (c. 50%) of animals between 3½ and 6 years of age. Only a few animals reached an age older than 8 years according to the dental remains. Approximately fifteen percent of the goats did not reach the age of one year. Two-thirds of the kept goats were between two and six years old. A small number of goats reached an age older than six years. One-third of the small ruminants in Beşik-Yassıtepe did not live past one year. Regular slaughtering began among the animals between one and four years old. Only 15% of the animals could reach an age older than four years (VON DEN DRIESCH 1999). Small ruminants from the island settlement of Yenibademli went through three main slaughtering periods. The number of young animals killed was very small; however, one-third of the animals were killed between c. one and two years of age. The second group, or one-third of the animals, was slaughtered between two and 3½ of age and the remaining one-third were killed at the age of six years. The few, strongly chewed molars, indeed M_3, were from animals older than six years of age.

The slaughtering pattern of small ruminants from Ulucak-EBA is not very clear. Half of them were killed between one and two years of age, whereas there are not many very young animal remains in the assemblage. The remaining population was killed probably between 2 to 3½ and 3½ to 6 years of age. There are only a few strongly chewed molars that come from older small ruminants (Tab. 8-6 and Fig. 8-10).

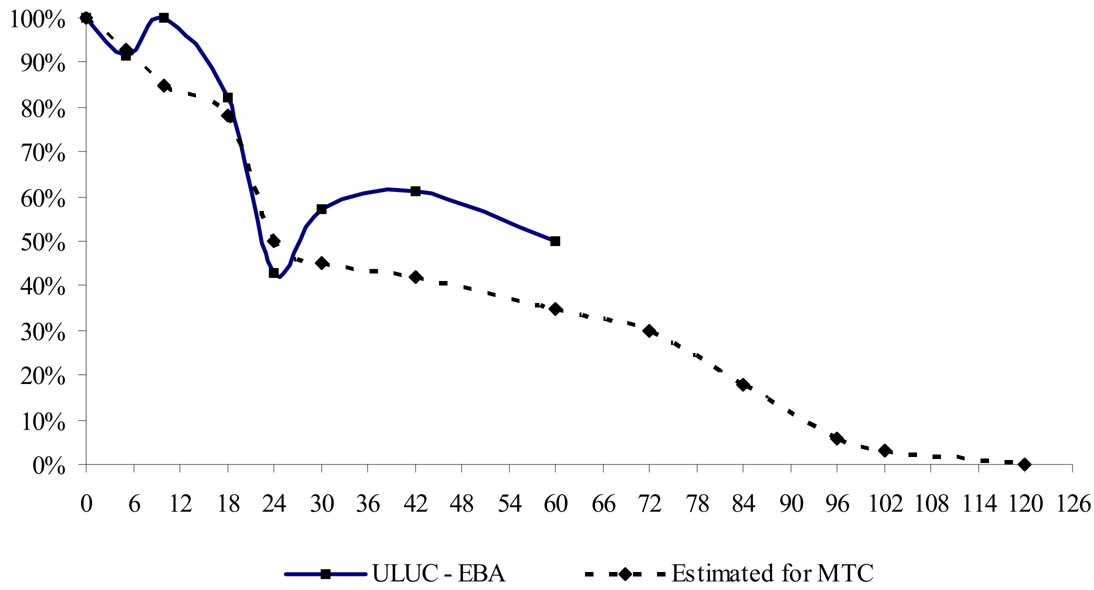

Fig. 8-11: The survival curve of the small ruminants in Ulucak during the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of small ruminants population according to calculations of dental and epiphsis data from the entire Maritime Troy Culture.

HESSE and PERKINS (1974:157) examined again only certain fused bones[158] of small ruminants in Karataş-Semayük-EBA. Approximately 25% of the animals were killed in the 15th month of age and c. 60% of the animals reached an age older than three years.

[158] They are calculated from the mandible for the 15th month, distal tibia 24th month, distal metapodia 30th month and proximal femur, distal femur distal radius and proximal tibia for 36-42 months.

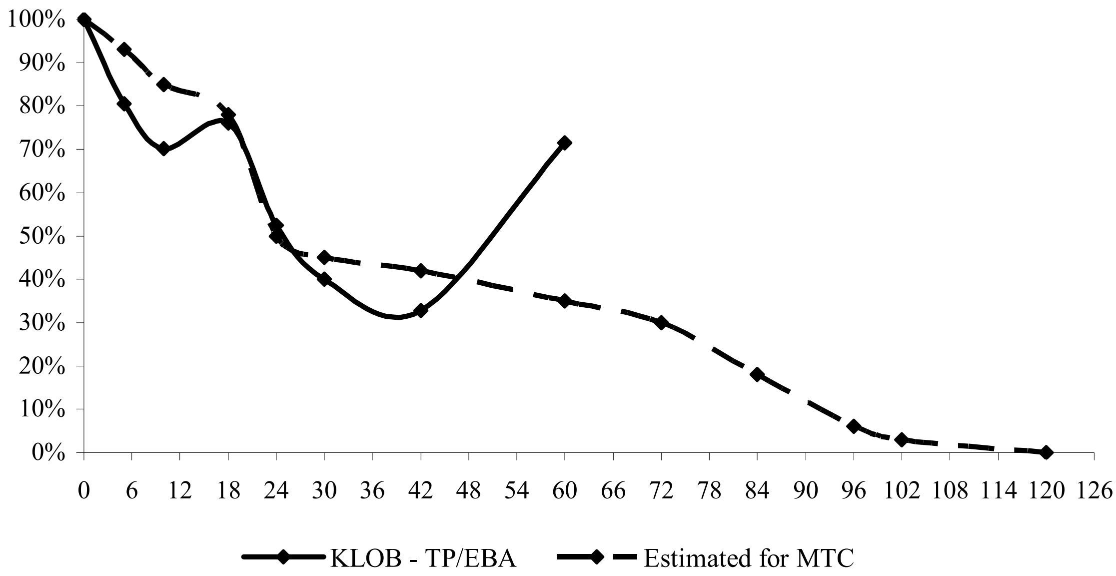

Fig. 8-12: The survival curve of the small ruminants in Küllüoba during the Transition Period and the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of small ruminants population according to the calculation of dental and epiphysis data from the entireMaritime Troy Culture.

The dental data of small ruminants from Küllüoba - TP/EBA reveal that more than one-fifth of the flock was kept and slaughtered between the ages of 3 (c. 9%) and 18 (c. 13,5%) months. However, the core-group was kept and killed between 1 ½ and 3 ½ years of age (c. 55%). Little more than one-fifth of the animals were between 3 ½ and 6 years old, and only 2% of the animals reached an age older than six years. The epiphysis data support the assumption that small ruminants were killed in large numbers in their first year of life, and altogether c. 30% of them could survive up to the age of 3 ½ (Tab. 8-6 and Fig. 8-12). If the dental and epiphysis data are considered together, the scheme is not that very different. Approximately one-third of the animals reached an age older then 3 ½ years (GÜNDEM 2003: 74-76).

The livestock herders of Demircihüyük killed their small ruminants in three different age stages. Approximately one-quarter of the animals were killed before they reached their first year, and another quarter was culled among the animals between one and two years of age. Half of the small ruminants reached an age older than two years, and were killed at the age of 3, 4 and 5 (RAUH 1981:39). One-third of the small ruminant remains from Boğazköy-EBA were from young animals, whereas two-thirds of the animals were full-grown (VON DEN DRIESCH and PÖLLATH 2004:5).

8.1.2.3. Kill-off pattern of Pigs

Dental data from Ulucak-CA were used to determine the kill-off pattern of pig[159], since epiphysis data are difficult to analyze. Most of the pigs were killed during the Copper Age in Ulucak before they have reached one year of age (Tab. 8-7).

The dental and epiphysis data from pigs support each other in Troy during the Maritime Culture. Regular slaughtering already began with animals c. six months old. The slaughtering continued rapidly among the animals that were two years old. A small group of the animals reached an age older than 2 ½ years. In Beşik-Yassıtepe ten percent of the pigs were killed before they reached six months of age. One-third of the animals were culled for slaughter between the ages of 6 and 12 months. A few animals reached an age older than three years, whereas most of them were killed between the ages of one and two years (VON DEN DRIESCH 1999). In Yenibademli only a few pigs reached an age over 2½ years, whereas 40% of them were killed in their first year and over 55% between their first and second year.

The kill-off pattern of pig from Ulucak-EBA indicates that c. two-thirds of the animals were killed before they could reach the age of 2½ years (Tab. 8-8 and Fig. 8-13).

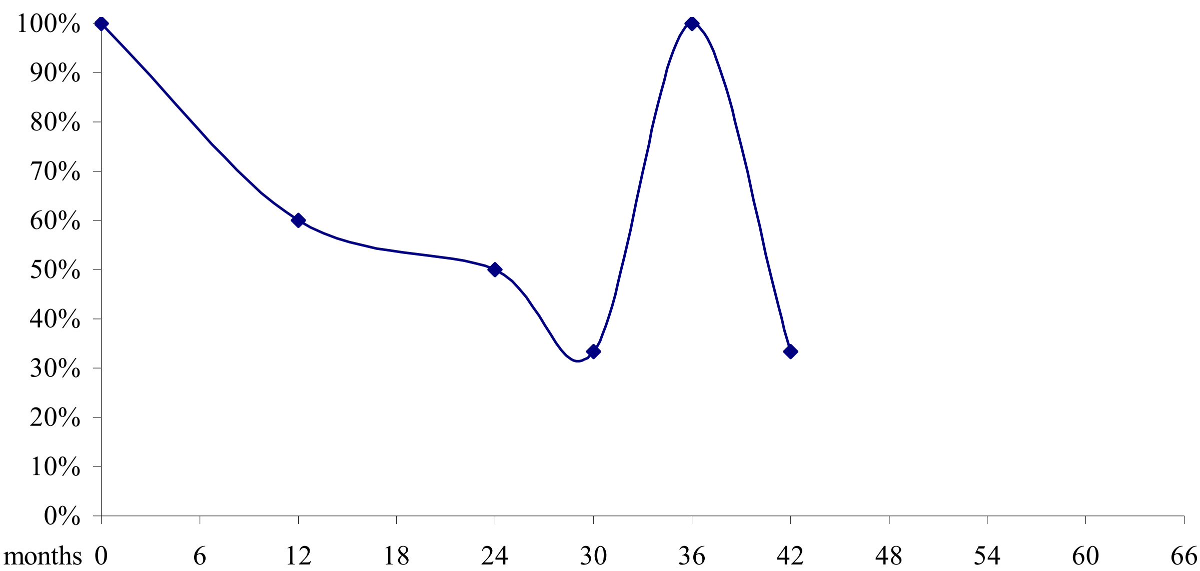

Fig. 8-13: The survival curve of pig in Ulucak during the Early Bronze Age.

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159 Only one canine remain is heavily worn, the other 14 dental remains from pig are not worn or are slightly worn. (Nine M1 were slightly worn whereas one M1 was not worn.)

The slaughtering of pig began very early in Küllüoba. They were killed regularly between one and three years of age. According to the dental and epiphysis data, few animals could be aged between three and half and five years (Fig. 8-14) (GÜNDEM 2003:105). RAUH reported that the pigs were quite often killed in their first year in Demircihüyük. Approximately two-thirds of the pigs were culled for slaughter between 3 and 24 months. Very few pigs reached an age older than three years (1981:83).

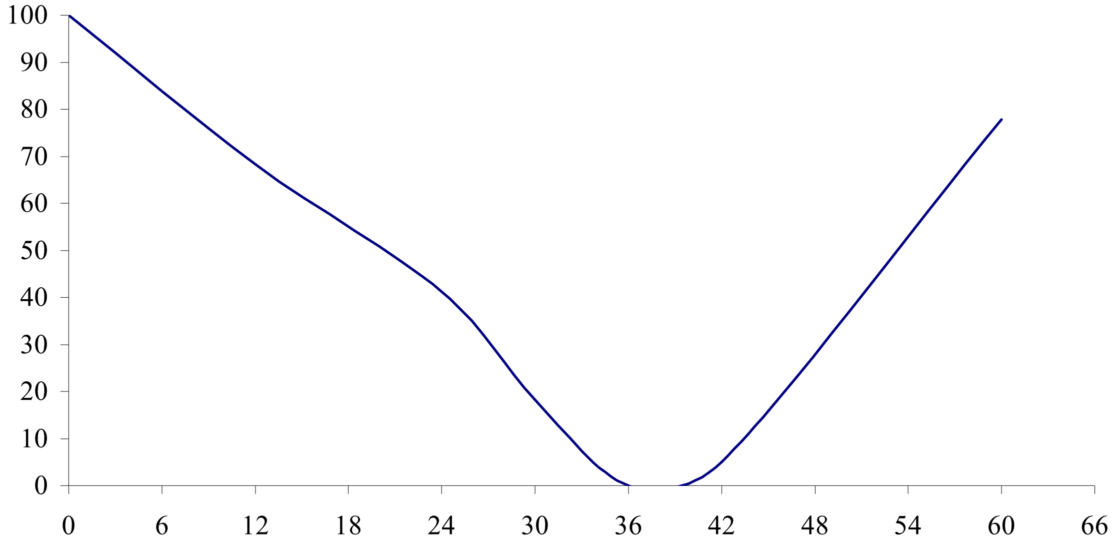

Fig. 8-14: The survival curve of pig in Küllüoba – TP/EBA.

8.1.3. Size of the Domestic Animals in West Anatolia

8.1.3.1. Size of Cattle

The cattle measurements from the Neolithic settlement of Fikirtepe[160] were computerized by the author as well in order to determine the general size development of cattle in west Anatolia (Fig. 8-16). The size of the cattle in Fikirtepe is much larger than that of the standard animal (BO30) used for this study. The calculation of the LSI is based on the width and depth measurements of the bones and therefore LSI only reflects the weight of the animals. However, the cattle in Fikirtepe may generally have been taller, i. e. larger in shoulder height than the BO30-standard animal. The cattle bones from Fikirtepe were visibly broader and deeper than those of the standard animals which were used by the author (BO30) and by von den DRIESCH & PÖLLATH[161] (VON DEN DRIESCH and PÖLLATH 2004:Tab.36).

[160] BOESSNECK and VON DEN DRIESCH 1979:TAB.4.
[161] VON DEN DRIESCH and PLÖLLATH used their own standard animal for cattle (MANHART 1998, Tab. 103).

However, the cattle remains from another Neolithic site, Pendik, which is very close to Fikirtepe, were clearly smaller than those of their relatives from Fikirtepe (VON DEN DRIESCH and PÖLLATH 2004:Tab.36 and here Fig. 8-17). The cattle bones from Fikirtepe were not classified by the BOESSNECK and von den DRIESCH as either domestic cattle or aurochs, *"…übergangsbereich zwischen Ur und Hausrind von einer Urkuh sein kann."* (BOESSNECK and VON DEN DRIESCH 1979:10).

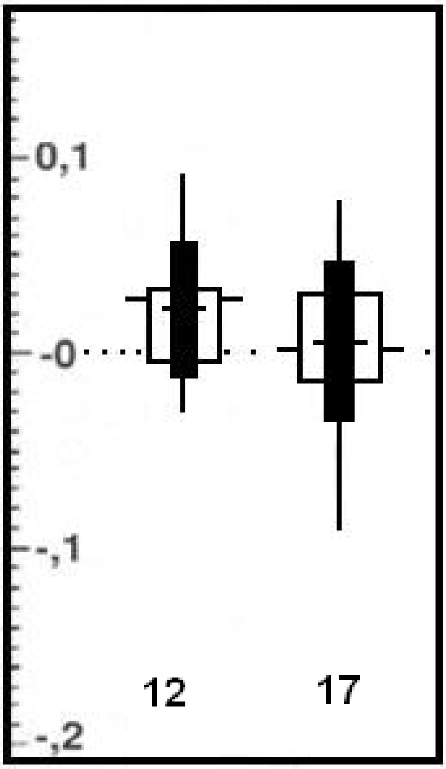

Fig. 8-15: Size of the cattle during Kumtepe A (UERPMANN 2001: Fig 1) and Kumtepe B/C (M. UERPMANN 2006: Fig.7) (modified by the author).

The shoulder height from the cattle remains in Fikirtepe is calculated according to the method proposed by FOCK (1966) from an intact found metacarpus[162] (with factor 6,0). Metacarpus has a whole length of 232 mm, which provides a shoulder height of c. 1.39 m (1392 mm) (BOESSNECK and VON DEN DRIESCH 1979:10-14).

[162] The metacarpus is sexed as male and the size variation fits to aurochs. If the calculations for shoulder height were to be done with different factors from different suggestions, then the results would be as follow: 1,46 m or 1,55 m (BOESSNECK and VON DEN DRIESCH 1979:10-14).

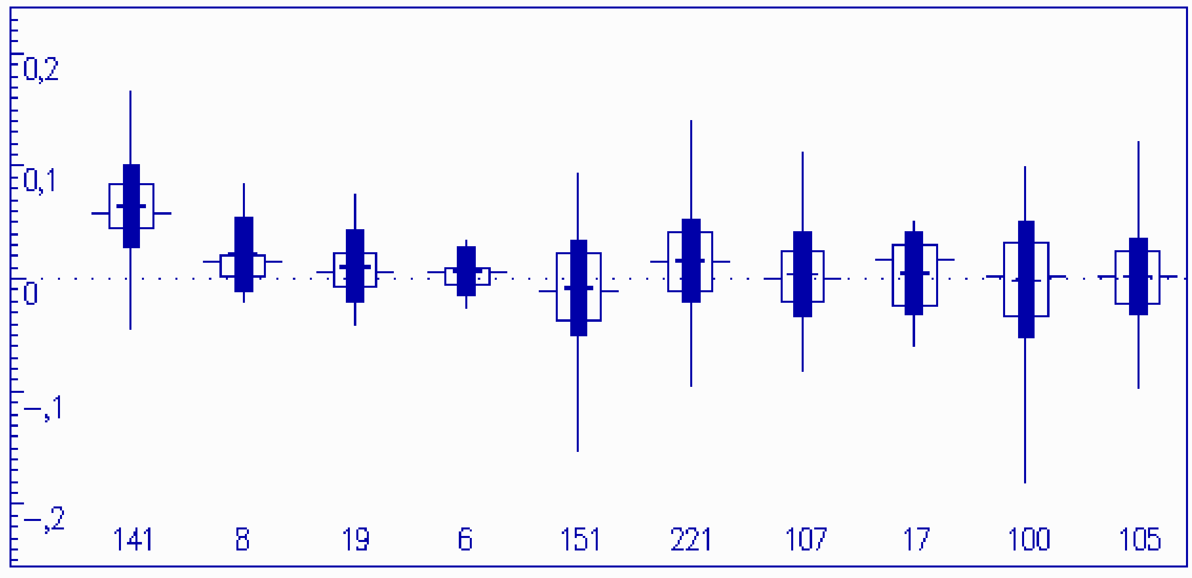

Fig. 8-16: The LSI-distribution of cattle remains from Fikirtepe-N, Orman Fidanlığı-CA, Ulucak-CA, Küllüoba-TP, Troy MT, Beşik-Yassıtepe-EBA, Yenibademli-EBA, Ulucak-EBA, Karataş-Semayük-EBA and Küllüoba-EBA.

The small number of measured cattle remains from the transitional period of Küllüoba shows similarities with the standard animal – BO30. Kumtepe B and C material were published together. The cattle on average were slimmer and smaller than in the earlier phase of Kumtepe A. There were still large-sized cattle in the herd, such as found in Kumtepe A; however, smaller cattle were more often kept (Fig. 8-16).

Copper Age cattle from Kumtepe A were clearly smaller and slimmer than their Neolithic relatives from Fikirtepe-N and Pendik-N. Indeed it could be possible that a few female aurochs are included among the measured assemblage of Kumtepe A. However, smaller cows/cattle are more noticeable. With regard to the size of the cattle, both of the other Copper Age settlements, Ulucak-CA and Orman Fidanlığı-CA, present a very similar picture to that of Kumtepe A. Indeed the kept cattle from Ulucak-CA were on average smaller than the ones in the temporal settlements (Fig. 8-15 and Fig. 8-16).

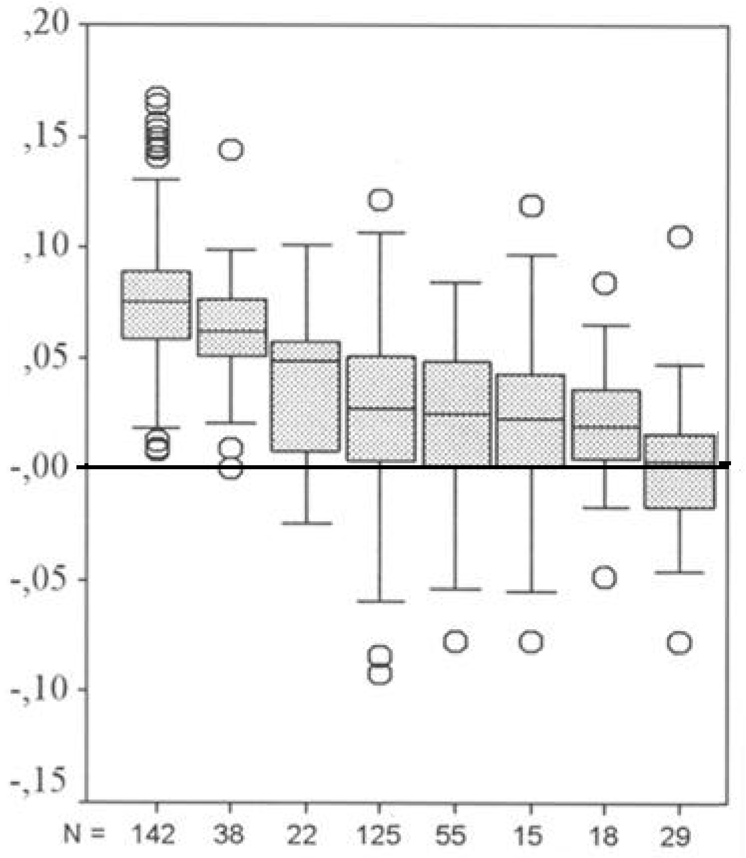

Fig. 8-17: The LSI-distribution of cattle remains from Fikirtepe-N, Pendik-N, Demircihüyük-EBA/1, Beşik-Yassıtepe-EBA, Demircihüyük-EBA/2, Boğazköy-EBA, Demircihüyük-MBA and Kaman Höyük-Assyria period (VON DEN DRIESCH and PÖLLATH 2004:Fig. 4)(modified by the author).

On the other hand, during the Maritime Culture in Troy, the average size of the cattle became slightly smaller as BO30, though there were still larger animals in the herd than the standard. Apart from one metacarpus from Troy II, there were no other intact long bones in the whole assemblage. The shoulder height is calculated at ca. 1.20 m, similar to BO30.

The average size of the cattle from Beşik-Yassıtepe was clearly larger than the average from Troy. The shoulder heights[163] of the cows varied between 1.11 m to 1.25 m, and 1.17m to 1.36 m for the bulls. A metatarsus was identified as oxen based on its slim shape. It provides a shoulder height of 1.42 m. An intact tibia was calculated and provided a shoulder height of 1.38 m and was also identified as oxen (von den Driesch 1999: 448). One whole metacarpus from Yenibademli provides a shoulder height of 1.22 m. The smallest cattle were kept in

[163] Factors, which are used to calculate the shoulder height, are not published von den Driesch.

Troy. Ulucak-EBA conforms to this picture as well. The average size of the cattle was about the same as BO30.

The size of the cattle from Karataş-Semayük was very similar to the relatives from the North Aegean. Two intact metacarpi provide a shoulder height of 1.05 m and 1.15 m (with a factor of 6.0).

The highland settlement of Küllüoba has cattle similar in size to contemporary west Anatolian cattle. The shoulder height of cattle was calculated as ca. 1.23 m according to an intact metacarpus, whereas the shoulder height of cattle was between ca. 1.16 m and 1.27 m in Demircihüyük[164] (RAUH 1981:Tab.7-i). If the size of the cattle from Demircihüyük and Küllüoba are compared, then the cattle from Demircihüyük were larger than the ones from Küllüoba.

In Boğazköy-EBA cattle were generally larger than the standard animal and were similar in size to the cattle from the other highland settlement in Demircihüyük (VON DEN DRIESCH and PÖLLATH 2004:Fig. 4) (here Fig. 8-18). Two intact metacarpae provide the shoulder height of 1.17 m and 1.25 m (with a factor of 6.0) (VON DEN DRIESCH and PÖLLATH 2004:Tab.36).

8.1.3.2. Sheep Size

The sheep kept in Fikirtepe were much slimmer than the standard animal[165] (female wild sheep, *Ovis orientalis*), whereas the sheep from Pendik-N were clearly bigger than those in the contemporary settlement of Fikirtepe. The variation in shoulder height was between 55 cm and 66.5 cm[166] in Fikirtepe (BOESSNECK and VON DEN DRIESCH 1979: FIG 6-TAB 8 and here Fig. 8-18).

The inhabitants of Kumtepe A kept sheep of the same size as those in Fikirtepe-N during the Copper Age, whereas the sheep in the contemporary settlement of Ulucak-CA were only slightly larger than Kumtepe A sheep, but on average clearly smaller than the standard animal (Fig. 8-19).

[164] The shoulder height of cattle in Demircihüyük was also calculated from the metacarpae.
[165] The shoulder height of the standard animal in this case was not calculated due to the fact that the wild sheep have longer legs as the domestic animal. VON DEN DRIESCH and PÖLLATH used the same standard animal as the author for sheep and goat.
[166] The shoulder length is calculatedaccording to the method from TEICHERT (1975).

The size of the sheep from Orman Fidanlığı-CA was still smaller than the standard animal; however, very few individual sheep in the flock were of similar size as or slightly larger than the standard animal, which indicates a similarity with the other highland settlement of Boğazköy-CA. Sheep from Küllüoba during the transitional period were still the same size as those of the earlier settlement Orman Fidanlığı-CA on the highlands (Fig. 8-21).

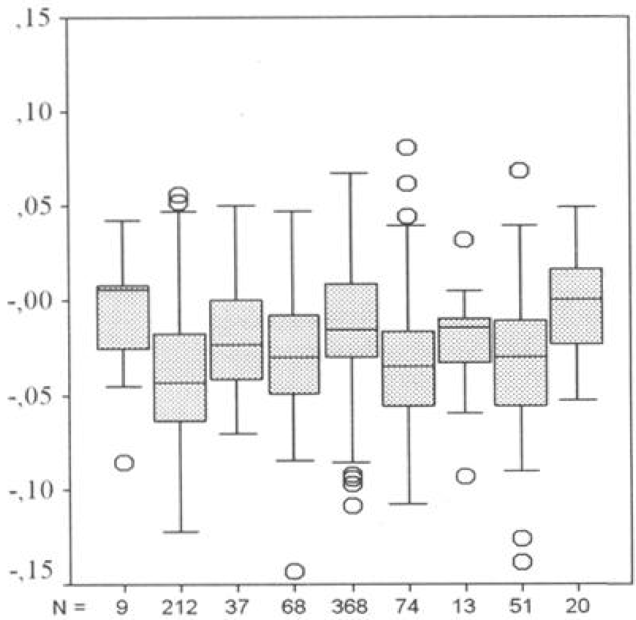

Fig. 8-18: The LSI-distribution of sheep remains from Bogazkoy-CA, Fikirtepe-N, Pendik-N, Demircihüyük-EBA/1, Beşik-Yassıtepe-EBA, Demircihüyük-EBA/2, Boğazköy-EBA, Demircihüyük-MBA and Kaman Höyük-Assyria (VON DEN DRIESCH and PÖLLATH 2004:Fig. 6)(modified by the author).

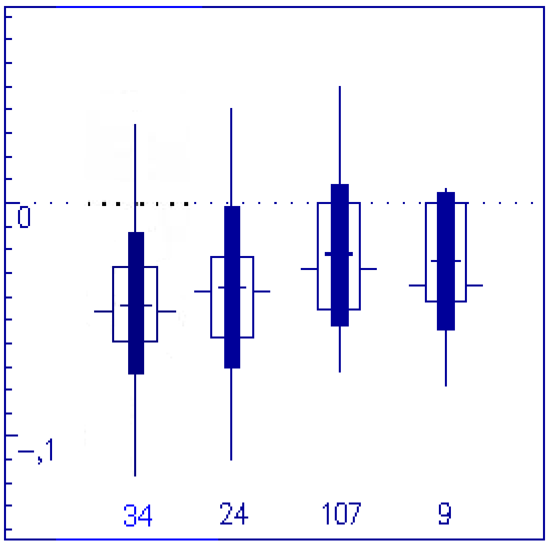

Fig. 8-19: The LSI-distribution of sheep remains from Kumtepe A (UERPMANN 2001: Fig 1) (modified by the author), Ulucak-CA, Orman Fidanlığı-CA and Küllüoba-TP.

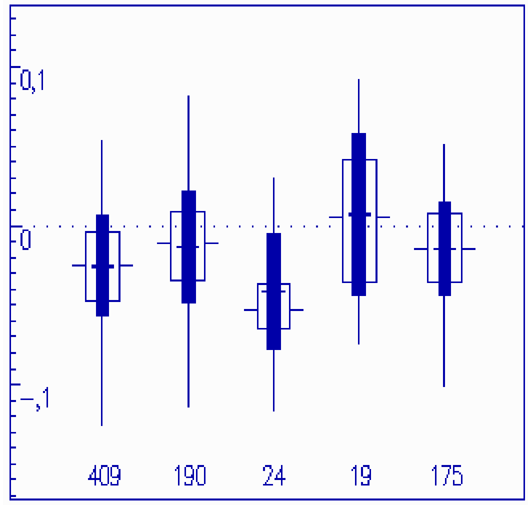

Fig. 8-20: The LSI-distribution of sheep remains from the Maritime Troy Culture-EBA, Yenibağdemli-EBA, Ulucak-EBA, Karataş-Semayük-EBA and Küllüoba-EBA.

In the Troas sheep were generally more slender than the standard animal. The number of stout sheep, though, increases, especially in Beşik-Yassıtepe and Yenibademli. Sheep shoulder height was calculated for the entire Maritime Troy Culture from different kinds of six intact bone remains, and the size of the sheep in Troy was calculated between 56.5 cm and almost 60 cm. In Beşik-Yassıtepe shoulder height was calculated between 58.3 cm and c. 67 cm. In the island settlement, the shoulder heights vary from 67.2 cm to 68.5 cm. The sheep size in Ulucak-EBA was generally more slender than in the contemporary settlements and shows similarities with the earlier period of Ulucak (CA) (Fig. 8-20).

The sheep remains from Karataş-Semayük indicate that there were animals both smaller and larger than the standard animal (female wild sheep)[167] in the flock. Size of the sheep in Küllüoba-EBA shows no difference to the size of sheep found in the Küllüoba transitional period. In Demircihüyük the sheep were smaller than those in the neighboring settlement of Küllüoba. Some of the sheep remains from Küllüoba-EBA reveal that some individuals were clearly bigger than a female wild sheep (Fig. 8-20).

The shoulder height of the sheep in Küllüoba was calculated between 50 cm and 57 cm, and in Demircihüyük shoulder height of sheep was calculated between c. 50 cm to 69 cm (RAUH 1981: Tab 19).

[167] It seems very likely that wild small ruminants (such as wild sheep and goat or *Dama dama*) were also included in this graph.

The size of the sheep in Boğazköy clearly decreased during the EBA after the Copper Age and was similar to sheep in other highland settlements (Fig. 8-18). One sheep metacarpus was identified from the mixed material between the Copper Age-EBA and provides a shoulder height of 58 cm (VON DEN DRIESCH and PÖLLATH 2004:Tab.37).

8.1.3.3. Goat Size

The average size of goats from different settlements in west Anatolia was clearly smaller and more slender than the standard (calculations based on a female and male wild goat). There were only a few animals that had the same proportions.

The earliest goat remains from Fikirtepe-N are smaller than the standard animal. However, there was a slight size increase in the Copper Age settlement of Orman Fidanlığı-CA. This phenomenon did not change in the north Aegean during the EBA. Goats in the Troas region were clearly smaller than the standard during the EBA, and much smaller than the goats of Fikirtepe-N and Orman Fidanlığı-CA. Goats of the EBA settlements, though, are similar in dimensions, and the largest goats were kept in Yenibademli. Ulucak-EBA goat could be put into this group as well (Fig. 8-21 and Fig. 8-22).

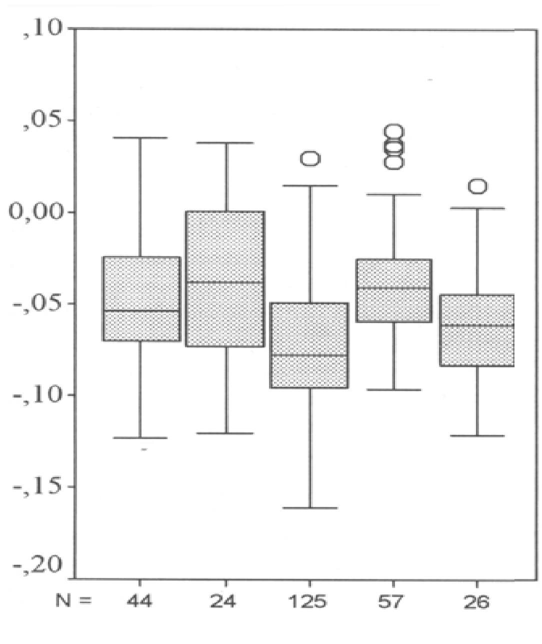

Fig. 8-21: The LSI-distribution of goat remains from Fikirtepe-N, Demircihüyük-EBA/1, Beşik-Yassıtepe-EBA, Demircihüyük-EBA/2 and Boğazköy-CA/EBA. (VON DEN DRIESCH and PÖLLATH 2004:Fig. 7) (modified by the author).

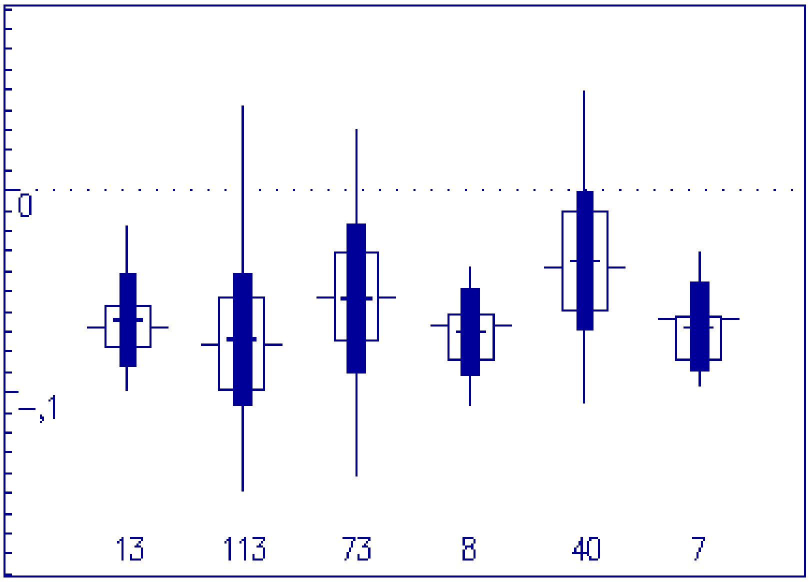

Fig. 8-22: The LSI-distribution of goat remains from Orman Fidanligi-CA, the Maritime Troy Culture-EBA, Yenibademli -EBA, Ulucak-EBA, Küllüoba-EBA and Karataş-Semayük.-EBA.

On average the strongest goats were kept in the highland settlement of Küllüoba and Demircihüyük during the EBA. The goats from both sites were quite similar. Measured goat material from Boğazköy-EBA is scant, but it could be said that the dimensions of the goats were smaller than the ones from Küllüoba and Demircihüyük (VON DEN DRIESCH and PÖLLATH 2004: FIG 7).

8.1.3.4. Pig Size

There are not many measured pig bones from the earlier period settlements. Copper Age pigs from Ulucak were visibly smaller than female wild boar, though one example had the same proportions. In the highland settlement of Orman Fidanlığı during the Copper Age small pigs were kept as well and were even smaller than those in Ulucak. The transitional period from Küllüoba indicates that the pigs got even smaller (Fig. 8-23).

The EBA settlements in the Troas provide more information concerning pig size. Only very few examples were equal in size to the female wild boar. The smallest pigs were kept in Troy, and the fattest in Beşik-Yassıtepe. Similar large examples were as well found in the other west Anatolian shore settlement, in Ulucak-EBA.

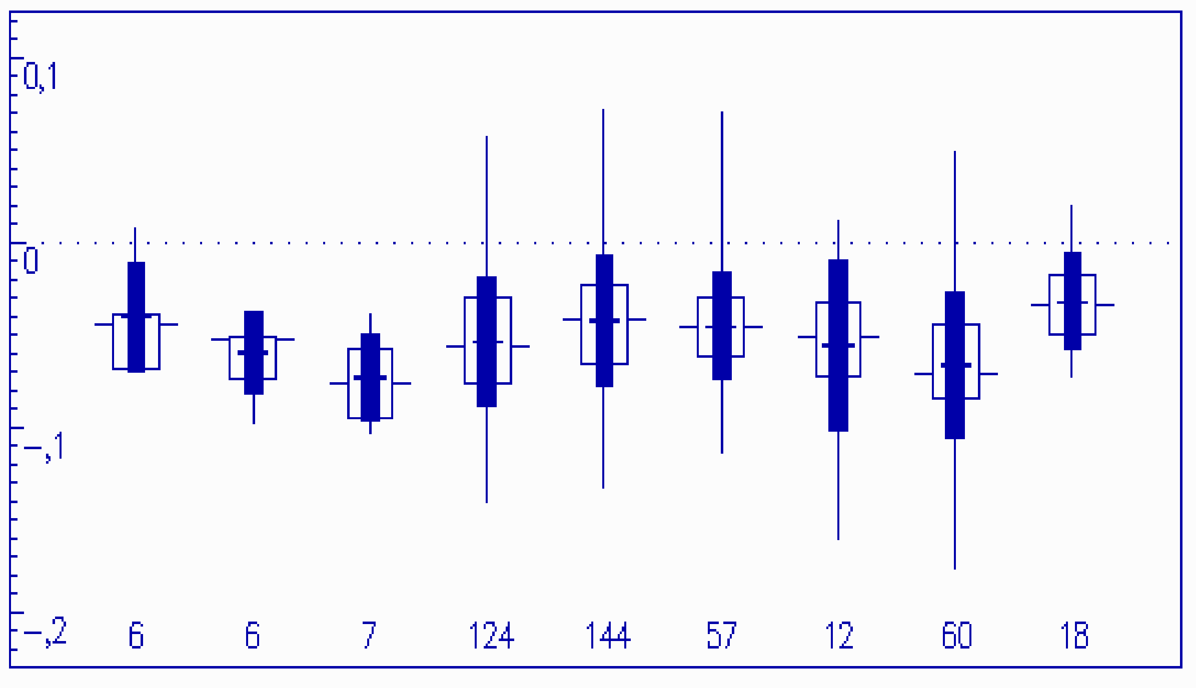

Fig. 8-23: The LSI-distribution of pig remains from Ulucak-CA, Orman Fidanlığı-CA, Küllüoba –TP, the Maritime Troy Culture, Beşik-Yassıtepe-EBA, Yenibademli-EBA, Ulucak-EBA, Küllüoba-EBA and Karataş-Semayük-EBA.

The size of the pigs became on average smaller in the highland settlement of Küllüoba. The smallest pig of west Anatolia during the EBA was kept in Küllüoba. Pig remain measurements from the neighboring settlement of Demircihüyük show that the size of the pigs was almost the same as in Küllüoba (GÜNDEM 2003:107).

8.1.3.5. Dog Size

The size of the dogs in west Anatolian settlements was quite variable. The Ulucak remains are remarkably smaller than the standard (Arabian Wolf). The size of dogs in Troy were also much smaller than the Arabian Wolf, but more variations were found as well. However, the contemporary island settlement of Yenibademli had larger dogs than Troy. Some of them were even larger than the Arabian Wolf. In Küllüoba dogs were generally smaller than the standard, but there were also some large individuals (Fig. 8-24).

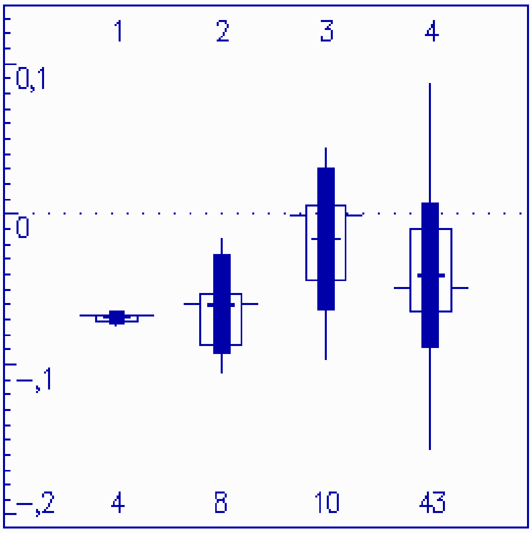

Fig. 8-24: The LSI-distribution of dog remains from Ulucak – CA/EBA, the Maritime Troy Culture, Yenibademli-EBA and Küllüoba-TP/EBA.

8.1.4. Animal Management

Domestic animals dominated the faunal assemblages in all the Neolithic, Copper Age and Early Bronze Age settlements. The consumption of meat from wild animals varied over time and in the different settlements. Ruminants were clearly the most kept animals, and among them, small ruminants were more often kept.

The results clearly indicate that cattle were kept mainly to supply meat. Young bulls were most likely slaughtered for meat. Most of the bulls that grew older were probably castrated. The older animals were most probably used as draft animals. Cows were kept to secure herd numbers.

Cattle management during the EBA presents four different patterns. Cattle made up one-half of the identified farm animals in the southwest regions,[168] whereas they made up one-fifth of the domestic animal remains in the Aegean. The northwest highlands present another pattern: one-fourth of the identified domestic animal remians were cattle. The cattle herd in Boğazköy made up one-third of the remains. The southwest settlements were undoubtedly dependent of cattle.

[168] Karataş-Semayük.

Cattle were slaughtered mainly after they reached 1½ years of age, when the fodder consumption and the weight of the cattle stood almost in an optimal relationship. They were mainly kept when they were between three and over six years of age. The dental results provide evidence for older animals as well. The size of cattle during the Bronze Age presents a similar picture. A decrease in size after the Neolithic could be observed[169]. The size of the cattle from Beşik-Yassıtepe and Boğazköy were slightly different than the cattle from other EBA settlements.

Small ruminants, sheep and goat, were kept in large numbers. They were almost the most often kept domestic animals in all settlements. Together they come in second place as greatest meat suppliers. Sheep alone were usually the second most important meat supplier, before pig; sometimes they shift between second and third place. Sheep meat was most consumed in Orman Fidanlığı-CA. Goat was in general the fourth greatest meat supplier among farm animals (see above).

Young sheep were killed more frequently in the earlier settlements, such as in Fikirtepe or Ulucak-CA. The Early Bronze Age settlements indicate more or less similar kill-off patterns, and the sheep flocks consisted mainly of c. 2½ and 3 to six year old animals. This demonstrates that sheep were kept mainly for their lifetime products. Apart from being kept to secure the flock through reproduction, they were also kept for meat, wool and probably milk. If the main purpose of their breeding was to maintain a meat supply, they would have been slaughtered in large numbers after they had reached their end-weight, since after a certain period they do not gain weight but use up the fodder.

Immature rams were probably killed at an early age. With this method a farmer could maintain a balance in the population of the sheep flock. The number of the young killed sheep does not equal half of the sheep remains, and indicates that many rams reached maturity. Upon the age of maturity, or just before, they were castrated to avoid the fighting among rams caused by mating. A small number of rams are enough to maintain adequate reproduction in a flock. Castrated rams were kept for their valuable wool and for their rich fatty meat. The ewes were kept for wool, lambs and milk. Ewes were probably the last ones to be culled for slaughter, and then only if necessary. They might have been killed after a certain age. The older animals were kept probably for wool and as leaders among the flock.

[169] The cattle remains from Fikirtepe are in any many cases a great deal larger than standard, even if there are some measured auochs remains or not.

Goats are known for their rich milk and probably for mohair production. However, the amount of the goat remains is not enough to uncover the purposes of breeding. The aging results of goat from Troy show that 70% of them were kept between two and over six years of age. In this period they might have been producing kids, and some of the female kids were probably kept to secure the herd and probably for mohair. The others were culled for slaughter to gain meat and leather.

The size of the goat was very different in west Anatolia. The decrease in size after Neolithic Fikirtepe is remarkable as compared with Copper Age Orman Fidanlığı. The goats of the Troas region represent a nearly homogenous group, whereas the farmers from Yenibademli kept slightly larger goats than those from Troy, Beşik-Yassıtepe and Ulucak during the Early Bronze Age. The two highland settlements Küllüoba and Demircihüyük had goats of nearly the same size during the Early Bronze Age. They were generally smaller than the standard but larger than the temporal relatives from the north Aegean. The goats of the central Anatolian settlement Boğazköy[170] were relatively smaller than those of the other highland settlements; however, the similarity in size with the goats from the Troas region is worth noting.

Pig breeding was clearly practiced for meat and probably for leather. The pigs were most often killed when they were quite young or after they had reached their end-weight, at three years of age. They were kept in varying amounts in the livestock. In the early periods the interest in pig breeding was not very high, such as in Fikirtepe, Ilıpınar and Kumtepe A. In the later phases of Ilıpınar the interest in pig breeding increased, especially during Ilıpınar-CA. This was not everywhere the same as pig was not kept in other Copper Age settlements in great numbers (in Orman Fidanlığı-CA, Ulucak-CA or Boğazköy-CA).

Pig was clearly the most consumed animal during the transitional period to the Early Bronze Age in the north Aegean (in Kumtepe B). There was less interest in pig in highlands of Küllüoba-TP as compared to the seaside. Pig meat covered on average c. 20% of the meat consumption of the Troas settlements during the Maritime Culture. The figure was over one-third in Kumtepe C.

The increase in pork consumption during Ulucak-EBA is remarkable, more than three times as in Ulucak-CA. This phenomenon is already known from Kumtepe as well. Ulucak was

[170] The measurable material from the Copper Age and Early Bronze Age was calculated all together for the LSI-diagram.

settled in the early Copper Age. After this period, during the so-called late Copper Age, there are no signs of pig consumption. The mound was inhabited again during the Early Bronze Age[171]. New Early Bronze Age settlers of Ulucak and Kumtepe were more interested in pig breeding.

The other settlements during the EBA, such as Karataş-Semayük, Demircihüyük, and Boğazköy-EBA, received c. 10% of their meat from pig. However, the consumption of pork in the highland settlement of Küllüoba was 15%. Usually pig was the third largest meat supplier of the people and sometimes the fourth, such as in Kumtepe A or Boğazköy-CA.

The size of pig differed in the Copper Age settlements, although there is very little measurable material. Pigs, during the Copper Age and Early Bronze Age, were mostly smaller than their wild ancestors. It is possible that more boars were kept in the Early Bronze Age settlements. A certain amount of sows were most likely kept to maintain the herd's numbers. The other sows were killed for meat and more fodder for the boars, since the boars could produce more meat.

Dog remains were identified in most of the west Anatolian settlements. They were kept for hunting as well as for guarding the livestock, the barns and property. Another important job of the dogs was to keep the settlement clean by eating the kitchen-garbage. Dog meat consumption in the human diet is rather insignificant. However, dog meat was eaten, especially in the highland settlement of Küllüoba. Nine percent of the dog remains[172] from Küllüoba revealed either fire or cut marks (GÜNDEM 2003:114). There were, however, only two dog remains showing cut marks in Troy from among 91 bones. Most of the dog remains were identified in Küllüoba, Boğazköy-EBA, Karataş-Semayük and Ulucak-EBA.

The dogs were mainly medium in size. However, larger sized dogs were kept in Küllüoba, Yenibademli and Demircihüyük (RAUH 1981:122). The biggest dogs were kept in Yenibademli. They were probably very strong shepherd dogs. The aim of dog breeding and the race of the dogs from early periods cannot be known. The strongly built dogs might have been kept to protect the settlements and their livestock from wolf, lion, bear or other large predators.

[171] Personal communication, Aylin ERDEM.
[172] Apart from the skull and dental remains.

8.2. Wild Mammal Spectrum

The fallow deer was without any doubt the most hunted animal in west Anatolia. Wild boar and hare in Fikirtepe-Neo. were the most hunted game animals, after fallow deer. The second and the third most hunted animals in Ilıpınar were roe deer, hare and wild boar. The fallow deer was almost the only hunted animal in both periods of Ulucak, whereas there are very few wild boar and hare remains in the bone assemblage. The Troas region shows no difference in this respect, with fallow deer again the most hunted animal. The other animals most often hunted in Troas were hare, wild boar and fox.

Wild equids and hare were the most hunted animals in Orman Fidanlığı, while the red deer remains are noteworthy as well. In the transitional period in Küllüoba, the game animals most often favored were wild equids, red deer and hare, with fallow deer and wild sheep remains worth noting as well. These last two species were clearly hunted more during the EBA in Küllüoba, followed by hare, aurochs and wild equids. Fallow deer remains dominate the wild mammal assemblage from the neighboring settlement of Demircihüyük, followed by hare, wild boar, fox and wild equids.

Many other wild animal remains were identified in these settlements, though with less frequency. There are very few wolf remains. They were found in Fikirtepe, Troy and Küllüoba. Lion remains were found in Troy. Wildcat remains were identified in Fikirtepe, Beşik-Yassıtepe and Demircihüyük. The larger members of the wild cat family, namely lynx, were found in Küllüoba and Boğazköy. Hyena is represented with only one bone from Küllüoba. Remains of brown bear were found in Fikirtepe, Ilıpınar, Troy and Demircihüyük.

The contribution of the wild animals to red meat consumption was not that high in many west Anantolian settlements, though the hunters from Ulucak exploited this resource quite intensively. In both periods together, hunted animals represent c. 20% of the entire meat consumption, though c. 15% at Kumtepe A. The game animal most often hunted was fallow deer in both settlements. Wild boars were hunted in most of the settlements, but not as frequently. Hare were hunted frequently; however because of their body size they could not supply much meat.

Wild horse remains were identified only in Orman Fidanlığı-CA and Demircihüyük. Wild horses were important meat resources for the people of Orman Fidanlığı-CA. *E. hydruntinus* remains were found in Orman Fidanlığı, Küllüoba and Demircihüyük.

It is quite clear that people exploited animals close to their habitat. The existence of fallow deer in the forests of the coast made them an easy prey for the human hunters. This could be observed clearly in Fikirtepe, Ilıpınar, Kumtepe, Troy, Beşik-Yassıtepe, Yenibademli and Ulucak. These settlements were established on the coast or close to it. However, the forests of the highlands were suitable habitats for the fallow deer as well. Demircihüyük was established on the eastern border of the former forest belt, which crossed from the northwest of the highland plateau in the direction northeast-southwest (RAUH 1981). The percentage of fallow deer remains decreases clearly in the entire mammal remain assemblage of Orman Fidanligi and Küllüoba due to the location of the settlement beyond the forest belt, to the southeast.

The amount of fallow deer remains changed with the settlement phases as well. In Kumtepe A there are many fallow deer remains, although the new settlers seemed to have little interest in this red meat resource. Troy hunters began paying more attention to fallow deer with the onset of Troy II, and the percentage of fallow deer remains in the mammal remain assemblage increased rapidly, such as in Ulucak.

The size of the fallow deer from the different settlements seems to vary. However, a male and female fallow deer were calculated for the standard. The diagram demonstrates that most of the hunted fallow deer were males. Female fallow deers were most probably hunted as well, but the measured remains indicate that they were in the minority.

Explanations for the sudden increase in the number of fallow deer among the mammal remains have already been discussed in a previous chapter (6.2.14.). These so-called possibilities might have been simply of the end result of a tradition that took years to develop. The "non-existence" of a temple area or altar during the Maritime Troy Cultural period does not necessarily indicate that the people then did not practice cult or religious ceremonies. It has been suggested here that fallow deer was not hunted only to cover part of the human population's red meat demand but also the demand for meat as part of a religious belief.

UERPMANN wrote: *"Fallow deer bones are found at even higher frequencies in the sanctuary area of Troy. Starting in Troy VI, it seems to have been a favorite animal for offerings…"* (2003:256). The early stages of these offering ceremonies with fallow deer had started probably sometime during the Maritime Troy Culture, and the practice was subsequently repeated in the later periods of Troy.

9. Concluding observations on the faunal remains of the Maritime Troy Culture

More than 25,600 mammal remains were identified in order to understand the animal-based subsistence economy and its development during Troy I to III, or the so-called "Maritime Troy Culture". Determining the spectrum of wild fauna from the identified bone assemblage furthers our efforts in reconstructing the environment of this ancient society and the Troas during the 3rd Millennium BC.

9.1. The development of livestock-management during the Maritime Troy Culture

9.1.1 Small Ruminants

Animal breeding during the Maritime Culture in Troy fits well within the general term of "Mediterranean village economy". According to the bone remains, small ruminants, indeed sheep, made up the biggest portion of the possible livestock in the settlement during the first three periods. Sheep breeding grew clearly more important in Troy II, while the importance of goat breeding decreased over time.

Sheep remains indicate that they made up c. 35% of the farm animals during Troy I. The portion of sheep in the livestock during the last two periods would have made up c. half of all domestic animals. Therefore, goat breeding clearly became less important. The portion of goat remains among the identified mammal remains was c. 15% during Troy I, decreasing to c. 6% in Troy III.

The small ruminant flock consisted mainly of two different aged groups during the Maritime Troy Culture. The first group consisted of animals between 1 ½ and 3 ½ years of age, whereas the second group was made up of animals older than 3 ½ years old. The difference between

Troy I and Troy II /III would have been influenced by the increase in younger small ruminants that had been killed.

The size of the sheep during the Maritime Troy Culture throughout the different periods in question does not indicate great variation. Most of the sheep in Troy during the Maritime Culture were clearly smaller than a female wild sheep. A few remains, probably from rams, reveal the existence of larger domestic sheep in the assemblage.
The existence of smaller sheep disappears in the sheep flocks over time. The average shoulder height of sheep would have been around 58.5 cm, according to calculations made from six identified intact long bones.

The size of the goat varies greatly in the different periods of the Maritime Troy Culture; however, it is possible to observe, on average, a general size increase over time.

9.1.2 Cattle

Bone remains from cattle indicate that they were kept less than sheep but more than goat in Troy during the Maritime Culture. One quarter of the possible farm animals consisted of cattle in Troy I and II, while in the last period of the Maritime Culture cattle were kept in smaller numbers, making up c. 15% of the possible livestock during Troy III.

Cattle remains from Troy I and II produce sufficient data concerning the kill-off pattern. The regular slaughtering began among the 18 month old animals in both periods; however, the percent of calves killed in Troy II was higher than Troy I.

The size of cattle does not vary greatly over the different periods of Troy during the Maritime Troy Culture. One measured bone provides a shoulder height of c. 1,20 m.

9.1.3 Pig

Pig and cattle were kept almost in equal numbers in Troy I, while the number of pigs in the bone assemblage of Troy II decreased by ten percent, making up 15% of the possible livestock. Pig represents another variable in Troy III. It made up around one-third of the farm animal remains in this period. Pig breeding grew two times more important than in the previous period.

Most of the pigs from the Maritime Troy Culture were killed regularly from 4-6 months of age until 18 months of age. Very few pigs could reach an age older than 2 ½ years.

The size of pigs experienced no great variation during the Maritime Troy Culture; however, pigs were clearly smaller than a wild sow.

9.1.4 The lack of equids during the Early Bronze Age

The sixth species and one of the most important domestic animals overall, the donkey, began making an appearance at the end out of the Early Bronze Age in the centre of Anatolia, but much later, though, in Troy.

The donkey is the first known domesticated equid. Domestication took place most probably somewhere in North Africa and/or in Mesopotamia during the 4th millennium BC. This process might have happened in the same or close to the same time periods and in different regions (UERPMANN 1987:141-142).

The earliest remains of the donkey from the highland of Anatolia were recorded from Boğazköy. Earlier donkey remains in west Anatolia from Beşik-Yassıtepe and Yenibademli, must be dated by radiocarbon to guarentee that these finds do not originate from disturbed contexts.

The oldest horse and donkey remains from Troy are dated to Troy VI. UERPMANN (2003:256) states that *"The appearance of the horse and donkey in period VI has probably nothing to do with the environment either, but reflects the general spread of the domestic horse in the Near East during the first half of the second millennium B.C."*. This means that the donkey was also present in Troy at the latest between c. 1700-1300 BC.[173] The oldest donkey remains from Boğazköy are dated to c. 2000 BC, which is some 300 to 700 years earlier than at Troy, but about 2000 years after the domestication of this pack animal.

[173] Troy VI ("Die Troianische Hochkultur") is dated by KORFMANN (2001:348) between c. 1700 and 1300 B.C.

Other known earlier donkey remains from Anatolia were identified by STAHL (1989:104-109) from Hassek Höyük[174] and by KUSSINGER (1988:98-101) from Lidar Hoyuk[175]. These settlements are located in southeast Anatolia close to Mesopotamia and the Levant.

Archaeological finds indicate that there were trade connections, between Anatolia and the other parts of the then civilized World. The existence and arrival of imported materials could be explained by sea transport. However, imported materials at some sites in the central highlands of Anatolia can only have been brought there by caravans. It is known that trade intensified between Anatolia and neighbouring regions, especially during the 2nd half of the 3rd millennium B.C. If we assume that donkeys were involved in this trade, how could the absence of donkey remains from West Anatolian settlements be explained in the 3rd millennium BC? The following reasons should be considered:

- Donkey caravans would probably have entered Anatolia from Mesopotamia or the Levant. This would indicate that Anatolian groups in principle knew of the existence of this animal. They could, however, not domesticate donkeys themselves, because the animal did not exist in wild form in their region.

- Traders from other regions, who had donkeys did not want to lose their exclucive transport power by trading these animals to the locals. They wanted to keep this advantage to themselves. If only castrated males were used for overland transport, this monopoly would not haven been lost, even if animals were stolen or left behind for other reasons, because they would not have been suitable for breeding.

- From the central highlands onward overland transport may have been managed with oxen, which are also suitable for use as pack animals or may have pulled carts. Coastal sites like Troy would probably rather have been reached by sea-transport.

- The presence of donkeys in west Anatolia may have been very low. Their remains are thus very difficult to find.

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174 Donkey remains from Hassek Hoyuk were identified from the Copper Age (3400- 3100) and Early Bronze Age (3100-2750) layers.

175 Donkey remains from Lidar Hoyuk were identified from the Early Bronze Age (3000-2000) layers.

Many more sites in Anatolia should be examined to determine the reasons why donkey remains were so rare or completely absent during the 3rd millennium BC. The existence of donkeys in the earlier periods of the EBA in SE Anatolia is logical due to the shorter distance to northern Mesopotamia, and due to the dominance of North Syrian cultures in southeast Anatolian settlements. Another possibility might have been that the wild form of donkey[176], *E. africanus,* inhabited North Mesopotamia, which made them easier to catch and domesticate.

9.2. Exploitation of domestic animals for lifetime products and slaughtering in Troy

There are two ways of procuring the products from domestic animals: either while they are alive or after they have been slaughtered. Lifetime products could be determined by calculating the portions of the species, according to the bone remains, in the possible livestock and by the killing age.

The farmers could acquire meat, hides, fat and bone marrow from the slaughtered animals. Bones and horn could be converted to tools. The intestines could be used as raw material, e.g., for threads or ropes.

9.2.1. Lifetime products of domestic animals

Small ruminants, or sheep, always made up the largest group of domestic animals. Therefore, sheep must have had an important role in the life of Troyans. Lifetime products from sheep could be listed as follows: wool, milk and dung, used as fuel and fertilizer.

The archaeological remains especially from Troy II indicate that sheep management concentrated on obtaining wool. The kill-off patterns of sheep reveal that farmers tried to gain as much lifetime products from sheep as possible. Troyans did not allow the number of sheep to decrease in the livestock even during the difficult periods experienced in Troy III. Sheep flocks were the most important product of the Troyans during the Maritime Culture and therefore sheep were kept in large numbers (see Chapter 9.2.1.1 for the relation between archaeological finds and archaeozoological remains.).

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[176] Wild donkey remains were identified from Shams es-Din (Halaf period) by UERPMANN (1982). Although there are many bone remains from different equids sp. found in Northern Syria, it is still difficult to determine wild donkey remains from other remains such as hemionus sp. and different types of equids sp.

Goats were kept in small numbers. They were kept for their valuable milk and for probable mohair production. The interest in goat breeding lost its importance after Troy I. Seventy percent of the goats in the flocks were probably kept and killed between two and over six years of age, though only a small number of the 70% were kept after their sixth year. This could indicate that they were kept mainly for milk. The high percent of identified female goats also suggests the importance of milk production from goat.

Cattle are very valuable to possess. They produce milk that can be used in different ways, such as for cheese, yogurt, among others. They also produce dung that can be used as fertilizer, for heating or as a raw material for construction (for example, when mixed with earth) and used as wall plaster. Cattle are still used as a draft animal.

Some of the strongly worn molars from the Maritime Troy Culture indicate that farmers kept the cattle as draft animals. The cattle killed at an early age from Troy II could indicate milk use from the cows.

Dogs were kept in all settlement periods of the Maritime Troy Culture. They were kept as sheep dogs and watch or guard dogs. Dogs protected the domestic animals against predators or bandits as the farm animals were kept out side of the city, were kept at separate locations at night or were found to wander astray. They were also guarding property, such as barns and farms. Apart from guarding they worked to keep the settlements clean by eating organic waste. The aid dogs provided in hunting should be mentioned here as well.

9.2.1.1. Mental Acrobatics: The size of sheep and spindle whirls = wool sheep in Troy during the early periods?

BOESSNECK and VON DEN DRIESCH (1979:32) identified the Neolithic sheep remains from Fikirtepe as „Hair sheep", since they were small and slender. The bigger and stouter sheep remains from Korucutepe[177] and Boğazköy, as compared to the sheep remains from Fikirtepe, were identified as "Wool sheep".

[177] BOESSNECK and VON DEN DRIESCH 1975.

UERPMANN (2001:193) pointed out as well that, "*Contrary to cattle, the late Chalcolithic sheep from Kumtepe A were not similar to those from Orman Fidanlığı, but markedly smaller. The increase in the size from Kumtepe A to phase I of Troy was interpreted as related to the introduction of the wool sheep. However, the sheep of Troy I were very similar in size to the much earlier sheep bones from Orman Fidanlığı, which – according to their earlier date - most probably are hair sheep. This shows how difficult it is to explain size shifts in domestic animals. In order to improve this situation it is most important to create a better database for osteometric comparisons*."

Sheep of similar size were observed in west Anatolia from the Neolithic to the Early Bronze Age. It is important here that the size of sheep did not actually become smaller in the Copper Age since the time of domestication[178]. Different sized sheep were kept within the Neolithic period (Fikirtepe and Pendik) as well as within the Copper Age period (Kumtepe A and Orman Fidanligi).

It is very difficult to trace the development of wooly sheep in west Anatolia, since the size of the earlier form of wool sheep was probably similar with that of hair sheep. Indeed, a size difference cannot be observed among the measured sheep remains in the time from Troy I to Troy II, probably due to the fact that no real size difference actually existed between the sheep races. However, it is possible to observe a size increase and a decrease in the number of small-sized sheep in the flocks, especially from Troy II to Troy III. The Troyans created this size difference over time through a certain breeding system used to obtain more wool, or they might have imported a new race of sheep.

The sheep remains themselves provide another clue. The number of small ruminants slaughtered young noticeably increased during Troy II and Troy III, as compared to Troy I. Therefore, these young culled animals might have been the hair sheep[179] killed for their meat (see bottom).

Secondly, apart from bone remains, artefacts have been uncovered that were used to produce yarn/cord from wool. Fiber gained from certain plants could also have been worked as yarn

[178] BENECKE 1994:108.
[179] Actually, the small ruminant results provide a clearer picture when examined altogether, since most of them were probably belonging to sheep. Reasons for slaughtering young small ruminants are discussed in a previous chapter (see the chapter – Sheep and Goat).

by using a spindle whirl. However, plant remains of this kind have not been found in the Maritime Troy Culture, but only turn up in the Middle Bronze Age (e.g., *Linum sp*., linen; see RIEHL 1999:104). Consequently, the enormous number of spindle whirls found in Troy II could indicate wool production[180].

Thirdly, the evidence for looms would be critical here. Looms were used and are still used for webbing the fabric/textile from the yarn/cord. The first evidence for looms, or for the so-called webbing complex, from Troy was excavated from layer Ic[181]. Therefore, if all the evidence is put together like pieces of a puzzle, the second period of Troy I and the beginning of Troy II saw the introduction of an early form of wool sheep to the pastures of Troy.

Hair sheep probably did not disappear right after the arrival of the new breed. They were kept further for meat, whereas wool sheep breeding was more concentrated on wool-production. Both sheep races were kept at the same time but probably were not crossbred in order to protect a pure wool sheep race.

Maintaining the hair sheep would have made sense, especially if wool sheep breeding proved too difficult. First of all, disease could become a problem for the new sheep that was before unknown to the farmers. Second, how long the new breed needed to adjust to the environment was unknown. The farmers probably started to reduce the number of the hair sheep only after the number of wool sheep increased and dominated the flocks[182]. Hair sheep were possibly kept further only to supply the meat demand. This tradition, keeping hair sheep for meat demand, might have lasted longer than our estimation, even the adoption of the former wool sheep to the environment was hunderet percent successfully.

[180] Around 10,000 spindle whirls from Troy II were collected during the last 22 excavation seasons (between 1871 and 1993). This number would increase to 22,000 pieces when we include the reports written by Schliemann in 1884_ (…, zudem steht noch die von Schliemann 1884-303 aufgestellte Anzahl von 22000 Stück zur Diskussion) (BALFANZ, 1995:138). BALFANZ wrote that so many spindle whirl finds, especially from late Troy II, could indicate a mass production of textile or at least cord. This would have been during the time period when wool sheep were introduced in Troy (1995:137).
[181] Troy Ic is dated to the early period of Troy I. This early period (a-b-c) is dated to between 2850 and 2650 B.C. (KROMER, KORFMANN, JABLONKA 2003:47-48). "…Die Weiterverarbeitung der gesponnenen Garne zu Stoffen an senkrechten Gewichtswebstühlen ist in Troy ab Troy Ic in Form von Webgewichten dokumentiert. In Troy IIg wurde mit den Gebäudekomplexen 200, 202, 203, 205 und 206 ein Bereich intensiver Textilherstellung erfasst. Während in den Räumen 200 und 206 jeweils ein Webstuhl stand, fanden sich dort und in den angrenzenden Hausbereichen über 60 Spinnwirtel..." (BALFANZ, 1995:137).
[182] The Troyans would not have received hundreds of wool sheep all at once.

The second wave of larger and more robust wool sheep arriving in Anatolia would have been at the beginning of the second millennium BC. Sheep remains from Kaman-Kalehöyük during the Assyrian Period could have been from the new wool sheep. Stock farmers in Anatolia might have acquired the first examples of this "new" wool sheep by trading with the Assyrians to start their own breeding (VON DEN DRIESCH and PÖLLATH 2004:23).

The size of the sheep from Kaman-Kalehöyük during the Assyrian Period was clearly larger than 3rd millennium BC sheep. However, there were still smaller-sized sheep in the flocks. The measured sheep material from Demircihüyük-MBA was clearly smaller than at the contemporary settlement Kaman-Kalehöyük. It is possible that this new wool sheep was not distributed in the highlands of Northwest Anatolia (VON DEN DRIESCH and PÖLLATH 2004:23).

The increase of spindle or loom weights over time in Troy might indicate growing human population, with the demand for wool no longer understood simply in terms of local needs but of greater production for the sake of trade (see BALFANZ 1995). Troy I and II were clearly different with regard to size of the settlement. During Troy I the people might have been producing textiles simply for their own needs, but in Troy II for the expansion of trade.

It is clear that sheep bones alone cannot determine the role of wool production in the expansion of the settlement, since the measured sheep material could have originated from hair sheep or from the early form of wool sheep with the beginning of or toward the second half of the 3rd millennium. The other archeological finds should be taken to consideration. The existence or lack of any kind of archeological material could better complete the picture we have of the periods in question. But the fact that so many spindle whirls were uncovered[183] must point to trade either in spindle whirls themselves or in fabric or textiles.

9.2.2. Slaughtering Management of Domestic Animals[184]

Small ruminants were very important meat suppliers in Troia, with sheep playing the more important and goats playing the least important role for the Trojans among the domestic

[183] The number of produced spindle whirls cannot be accurately estimated, since they were made of wood as well.
[184] This section deals only with meat consumption. Secondary products acquired after slaughtering are discussed in the section "General Economy based on Animals".

animals. Small ruminants were subjected to two main periods of slaughtering. The very young small ruminants that were killed, never in great numbers, were probably killed for their delicious meat and soft hides. The main slaughtering began in all time periods around the 18th month. The farmers waited to slaughter the animals till their fodder consumption and their body weight were in an optimal relationship.

Very young small ruminants, or those during the nursing period, were slaughtered for the milk use of the ewes or female goats. Their meat was consumed as well. Young small ruminants were slaughtered in larger percentages in Troia II and III.

Cattle were the main meat suppliers during the first two periods of the Maritime Troia Culture. Beef covered approximately half of the people's meat demand in these periods. However, this changed during Troia III when cattle became the third largest supplier of meat after sheep and pig.

The regular slaughtering of cattle, very probably of the bulls, began shortly before they reached sexual maturity and continued while fodder consumption and body weight of the animals were in an optimal relationship. A small number of bulls were probably kept in the cattle herd for reproduction, and the rest of the bulls, and those not killed as calves, were castrated[185]. Castrating bulls helps keep them calm and promotes weight gain. Their calmness also helped the farmers to use them as draft animals. The amount of killed calves increased in Troia II, which would indicate milk use or an increase in demand for calf-meat.

Pigs were kept only for meat demand. Kill-off patterns from each period reveal that most of them did not reach maturity. The remains of boars are in the majority. Farmers let them live longer since they can gain more weight than the sows. Their skins were probably used as well. Pigs were the main meat supplier of the people during Troia III.

9.3. Exploitation of the Environment in Troy

Wild animal remains are represented in different proportions among the identified mammal remains. The increase of wild mammals in the fauna remains is clearly observed. Wild mammal remains from Troy I do not make up more than four percent of the identified

[185] Probably the castration of the bulls took place when they were very young animals, so that they could gain more weight throught their life-time.

mammal assemblage. However, the proportion of wild mammal remains increased to six percent in Troy II and to approximately eight percent in Troy III. Therefore, wild mammal remains in the last period of the Maritime Troy Culture experienced a twofold increase as compared to Troy I.

Most of the identified wild mammal remains are from fallow deer in all the periods of the Maritime Troy Culture, followed by hare and wild boar. Fallow deer remains make up c. 1.5% of the mammal remains during Troy I and c. 4.75% during Troy II. The increase of fallow deer remains could be best observed in the last period of the Maritime Troy Culture. Fallow deer remains increased c. 4.5 times after Troy I, which covers c. 6.5% of the identified mammal remains of Troy III.

The hare remains among the identified mammals stay constant over time. They make up in every period of the Maritime Troy Culture c. 0.6% percent of the mammal remains. Wild boar remains from the different periods were identified in different proportions. Wild boar remains make up c. 0.6% of the mammal remains from Troy I, and decreased twofold in Troy II. Wild boar remains make up only 0.2% of the Troy III mammal remains. The decrease of wild boar remains from Troy I to Troy III is clearly observed.

The other wild animal remains were identified in small numbers or were not from all the periods of Maritime Troy Culture. Some of the identified wild mammal remains include lion, lynx, wolf, fox, red deer, roe deer, aurochs, and others.

The size of the fallow deer during the Maritime Troy Culture varies clearlyin the different periods. The average (mean) value of the fallow deer remains increases over time. The wild boar and aurochs remains were larger than their domestic forms.

Mammals were not the only wild animal remains that were brought to the settlement. Fish and shell remains indicate exploitation of marine products, while a small amount of identified bird remains reveal that they also valued by hunters.

9.4. Contribution of the Wild Fauna to the general meat consumption in Troy

The Troyans exploited their environment in order to find additional food resources. Hunting wild mammals, mostly fallow deer, increased after Troy I during the last two periods of the Maritime Troy Culture. Only 2% of the meat consumption was covered by fallow deer during Troy I. However, this changed by a factor of 4 - 5 in the following periods: Fallow deer covered 8% of the red meat during Troy II and 10% during Troy III. The contribution of the other wild mammal remains was not as great as with fallow deer. Hunting of wild boar even experienced a decrease over the same time period. While the proportion of wild mammal remains in total is highest in Troy III, wild boar was hunted the least at that time.

With regard to the increase in fallow deer remains one has to look at the phase Troy II in particular. ÜNLÜSOY (2006:141) reports that many pits in the earth were found from the last period of Troy II-Middle, a period that ended with a catastrophic fire. These pits are located in- and outside of the houses. The pits might have been built for storage purposes, a function already known from other settlements and periods. These storage-pits might indicate some instability of this period.

Hunting for meat always was an important activity during difficult periods. It is possible that hunting fallow deer increased in this later period of Troy II-Middle, although the portion of consumed pig meat was clearly lower than Troy I and III (see the section on Pigs). If these periods were difficult and unstable for the Troyans, then they would probably also have changed their methods of animal breeding. They would have increased the number of pigs in the livestock to create an easier supply of red meat than accomplished by fallow deer hunting. It can be assumed that the difficult period did not last so long as to change the breeding management during Troy II. The pits described above could have been dug simply to store the cereals after a good harvest.

It has already been suggested here that one of the main reasons for the increase in fallow deer hunting could have been tied to ritual or cultic ceremonies or activities[186]. Certain body parts

[186] Special meaning might have been attached to fallow deer as it was the source of red meat in difficult times, when hunting took on a different role for the settlement, a role given symbolic meaning by its new found importance.
This is the reason as well why many fallow deer remains were uncovered from the area of sanctuary of Troy VIII. FABIŠ states, "…*The numerous finds of fallow deer bones in the area of sanctuary of Troy VIII prove that this species had been used in sacrificial ceremonies linked with ancient gods. From other sites, not only from*

of the fallow deer were used during these practices[187]. The meat was not wasted, which made fallow deer again an important element of the food resources in Troy during the Maritime Culture. Especially during Troy III, fallow deer covered a very important part of the red meat demand[188].

Wild boars existed in the region as well, covering 2% of the meat demand during Troy I. Hunters of Troy seemed to have concentrated on fallow deer, which could lead us to the conclusion that this animal was special for the Troyans. They were also easy to find in the high plateau of Troas.

The size of the fallow deer brought to the settlement grew larger over time. This indicates that a focus developed on large male animals for ceremonial purposes (see the section on Fallow deer). Ritual leaders might have specifically ordered these animals to be hunted. The large male fallow deer might have been a prestige symbol of the ruling class.

It is proposed here that the increase in fallow deer remains reflects the animal's role as an offering. This interpretation is supported by evidence from studies on later periods from Troy (from VI and VIII). But there is no evidence from the archaeological material[189], apart from

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Troy, there are, for instance, representations of Artemis with fallow deer. A golden rhyton in the form of a deer head with antlers typical of Dama dama from Panagurište in Bulgaria (Zeuner 1963, Fig. 20:14) is another example of links between fallow deer and ancient religious or cult activities. A close relation between man and fallow deer, and a deep veneration of this creature, also found its reflection in the representations of the this species on coins." (FABIŠ 2003:274). The relation between TroyanTroyans and fallow deer is clear during Troy VIII (or more so in the Troy VI layers- UERPMANN 2003:256), due to the existence of a sanctuary and the numerous finds of fallow deer bones in the area. There must have been a starting point for when fallow deer became an animal offering, before the people built their sanctuary to offer their sacrifice to their Gods. The absence of cultic areas during the Maritime Troy Culture might indicate that ceremonies took place in open areas.

[187] Domestic animals (or any kind of eatable animal or plant) were certainly used for offerings, though this is not easy to prove. They were one of the main elements in the nutrition system and therefore common remains in the settlement.

[188] M. UERPMANN wrote that the young slaughtered pigs and game animal remains (fallow deer) from Troy IV are clearly dominant in some of the find complexes from Troy IV, the so-called period of crisis. She mentioned that the loss of possible livestock during the war periods could have been quickly replaced by pig, since they are able to reproduce quickly, as well as game animals. They were an important source in meat production (2006:286). M. UERPMANN's description fits well with the situation in Troy III. H.-P. UERPMANN, though, has mentioned that for the samples excavated by BLEGEN from Troy IV, *"…The high percentage of fallow deer is obvious, but the value of this sample is limited, because there is an obvious lack of sheep and goat bones, which might be due to selection by the excavators…*" (2003:259). That is why it would be worth studying more fauna material from Troy IV in order to achieve better results in understanding this complex period.
There was a early slaughtering of ruminants during Troy II, and the reasons for this have already been discussed in Chapter 5.1 Sheep, OVIS and Goat, CAPRA, footnote number 5, and in Chapter of 5.2 Cattle, BOS and further in 5.2.5. Conclusion.

[189] No construction or location in the entire settlement is reported as a "cultic building[189] or area" during the Maritime Troy Culture; however, this does not mean that open-air cultic activities did not take place in the citadel or in the lower city.

the bone remains, that fallow deer was brought to the settlement for ceremonies during the Maritime Troy Culture or were possibly tamed for these events.

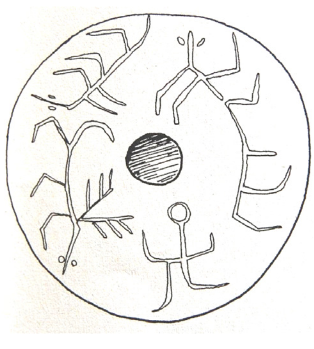
The Maritime Troy Culture might have been the starting point or developing period of a cult or religion, in which the fallow deer played an important role. This cult or religion was certainly practiced in the later periods (see also UERPMANN 2003: 256 and FABIŠ 2003: 274).

9.4.1. The use of deer motives in archaeological objects

BALFANZ wrote that the „Hirsch" (Deer)[190] was one of the most often used animal motifs on the spindle whirls. The schematised deer-motifs depict mainly the male animals. In four cases deer are shown with humans, which could be interpreted as deer hunts[191].

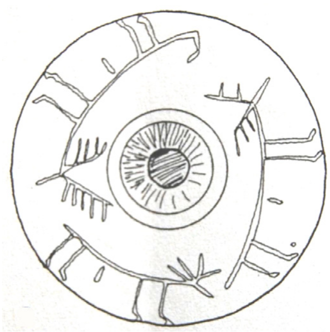
BALFANZ noticed that the "Hirsch" and "Hirschjagd" took on more importance in the life of the Troyans, thus explaining the "Hirsch"- motifs on the spindle whirls. The rarity of "natural scenes" on the objects found in Troy is already known, and when found, then mostly on spindle whirls. The existence of these kinds of motifs on these objects might relate to cultic/religious beliefs. Grave goods such as "Hirsch- und Hakenkreuzstandarten" from Alaca Höyük strengthen the argument that "deer" was a cultic symbol (BALFANZ 1995:132-133).

Another point should be made here with reference to BALFANZ (1995): The "Hirschmotive" on the spindle whirls seem to depict Red Deer, *Cervus elephus.*; The antlers of the animals on the spindle whirls share more similarities to those of Red Deer than to Fallow Deer antlers. They appear straighter and not shovel-shaped as the antlers of Fallow Deer (Pic. 9-1).



Pic. 9-1: Spindle whirl from Troy III (after Balfanz 1995:Fig. 30/1)

[190] BALFANZ used „Hirsch" and did not differentiate between the species.
[191] EASTON dated these finds - which are excavated from Schliemann - to Troy III or to earlier periods (Balfanz 1995:132).



Pic. 9-2: Spindle whirl from Troy III (after Balfanz 1995:Fig. 30/2)

Our research indicates that the increase in “Hirschknochen (deer bones)” in Troy actually begins already in Troy II[192]. The deer remains, though, are not from Red Deer (*Cervus elephus*)” but from Fallow Deer (*Dama dama*). The amount of identified red deer bones is very small (14 pieces from the Maritime Troy Culture in total, and only a few bones from the later phases Troy IV and V). About half of them came from antler, which could indicate that they were not from hunted animals but collected from anywhere in the surroundings or imported as raw material. Finds from the second half of the third millennium BC and from later periods, especially from Alaca Höyük, indicate that the Red Deer had a significant meaning for the people of Alaca Höyük (Pic. 9-3 and Pic. 9-4)

Pic. 9-3: Bronze Red Deer “Kultstandarte”[193] from Alaca Höyük, ca. 2300-2100 BC.
(after AKURGAL & HIRMER 1961:1).

[192] Part of the old excavated animal bone material from Troy IV is kept in the Çanakkale Musuem. This animal bone collection was reanalysed. UERPMANN noticed that; *“…They might belong to a context of Trioa IV where the American excavations of the 1930s found many bones fallow deer (Blegen et al. 1951). A sample of these bones is still kept in the collections of the Archaeological Museum in Çanakkale. The high percentage of fallow deer is obvious, but the value of this sample is limited, because there is an obvious lack of sheep and goat bones, which might be due to selection by the excavators…”* (UERPMANN 2003:259).

[193] A ritual standard.

Pic. 9-4: Bronze Red Deer "Kultstandarte" from Alaca Höyük ca. 2300-2100 BC.
(after AKURGAL & HIRMER 1961:IV).

Fallow deer (Damhirsch)-motifs from later periods in Anatolia are known as well (Pic. 9-5). "The Protector-God of the Fields" from the city Viyanavanta was depicted on a deer between the 15th and the 13th century BC (AKURGAL & HIRMER 1961:52).The antlers of this deer are definitively those of a Fallow Deer.

Pic. 9-5: A "Steatitrelief" from Alaca Höyük, ca. 15th to 13th century BC.
(after AKURGAL & HIRMER 1961: 47b).

Other Fallow Deer motifs were found depicted as reliefs on orthostats, for example at Alaca Höyük (14th to 13th centuries BC), and in Kargamish at a later time period, pictured with Gilgamesh (1050-850 BC) (Pic. 9-5 and Pic. 9-6). This last one might, however, show a Mesopotamian Fallow Deer (*Dama mesopotamica*).

Pic. 9-5: Fallow Deer and Wild Boar Hunt on the orthostat of the fortification wall of Alaca Höyük c. 14th to 13th centuries BC. (after AKURGAL & HIRMER 1961: 94).

Pic. 9-6: Gilgamesh pictured with fallow deer (possibly a Mesopotamian fallow deer) and other wild animals on the orthostat of Kargamish, c. 1050-850 BC (after AKURGAL & HIRMER 1961: 113).

The ancient artists were already depicting the difference between the Red and the two kinds of Fallow Deer, indicating that the accurate representation of these animals meant something to the people at that time. Therefore it is always important to state what kind of "Deer" is pictured on archaeological finds.

9.5. General Economy Based on Animals

9.5.1. General Meat Consumption

The main meat suppliers of the people were cattle, sheep and pig. They were eaten in different proportions in different periods. Sheep were not the top meat supplier, even though sheep remains dominate the bone assemblage. Wethers were not only kept for their wool but for their rich fatty meat as well. Goat supplied the least amount of meat among the domestic animals.

During Troy I cattle were the top meat supplier, followed by pig and sheep. In Troy II cattle were again supplying most of the meat, followed now by sheep and pig. Pigs were the main supplier of meat in Troy III, the last period, followed by sheep. Cattle were of less importance, being third among the meat suppliers. This radical change in stockbreeding and animal management would have been influenced by the difficult times faced by the inhabitants during the Troy III phase. The city was rebuilt four times in fifty years, which lead archaeologists to assume that the people of Troy III did not have an easy life. Cattle covered half of the meat demand during Troy I and II. However in Troy III, this animal covered only c. 15% of the demand. Pig and sheep now met the greatest demand for meat, with pork consumption alone doubling after Troy II.

This fact supports archaeologists who describe "the difficult periods of Troy III." The increase in pork consumption reveals that Troyans mainly had to use the animal which provided the fastest reproduction and turnover of input and output. The capability of giving birth to many offspring at once, of reaching sexual maturity in a short period and of eating every kind of fodder made pig a very important animal. Cattle need much more time to mature and they usually produce usually one calf per year, This indicates as well that they would amount to a greater loss if taken away by enemies.

The meat demand was not only covered by domestic animals. Game animals, and mainly fallow deer, were another meat source. Other game animals were not hunted in great numbers. A rapid increase in fallow deer remains could be observed from Troy I to III, with fallow deer being the fourth largest meat supplier for the human population in Troy II and III. 10% of the red meat eaten during Troy III was covered through fallow deer.

9.5.2. Domestic Animals and their Role in the Internal and External Economy

Shifts to different kinds of animal breeding systems took place for economic reasons and due to varying subsistence dynamics. The increase in sheep breeding was beneficial to the outer economy, while the increase in pig breeding in the last period of the Maritime Troy Culture was beneficial for internal subsistence or even for survival.

Sheep management was probably important for meat and hides from its very onset. They were preferred in this region due to their ability to adapt to the environment. The middle or the late phases of Troy I saw the rising importance of sheep breeding.

Textile production was probably of significance for the exchange economy of the settlement. Therefore, it is tied to the richness and rapid development of the city starting in Troy II. This rapid development most certainly was tied to the settlement’s location and to its fabric production. Trade-ships anchored and waited at Troy or Beşik-Bay in order to pass the Dardanelles with favourable winds and sail towards the Black Sea. Site location and local production allowed the Troyans to do business with foreign tradesmen. The practice of organized trade and the geographical advantage brought richness and probably political power to the people of Troy. The valuable and necessary trade goods acquired from foreign merchants were exchanged against textiles and other potential local products of Troy. It would, however, be irrational to think that the Troyans were only trading with their fabrics and only with overseas-tradesmen. Nevertheless, textile production might have covered an important part of their income.

Cattle were one of the most important meat suppliers for the people in Troy and probably were quite useful animals in daily life. Farming was probably another most important source of food for the city. The city grew bigger and bigger over time as did the human population. Therefore, the farmers were very busy with their fields to produce a good harvest for their people. The results of dental aging indicate that cattle grew old in the settlement; probably indicating that the oxen were used in the fields for labour (Pic. 9-7). This was, however, not the only duty performed by cattle.

Pic. 9-7: Oxen doing fieldwork[194].

[194] http://images.google.de/imgres?imgurl=http://i1.trekearth.com/photos/70344/34.jpg&imgrefurl=http://www.trekearth.com/gallery/Middle_East/Turkey/photo678147.htm&h=533&w=800&sz=175&hl=de&start=12&um=1&tb

The archaeological results indicate that the city was rebuilt many times during the Maritime Troy Culture. With Troy II the lower city was most certainly surrounded by a wooden fortification wall. These facts point to the use of much wood or lumber, and this heavy construction material was probably transported to the city with the help of oxen. One of the important duties of the oxen was to transport goods to different regions (Pic. 9-8). Such work-animals are kept longer due to the time it takes to teach them to work and to obey. Therefore, they were a very valuable element for farmers and traders.

Pic. 9-8: Oxen as transport animals[195].

The use of milk from the ruminants cannot be proven without chemical studies on the ceramic finds. Bones from very young ruminants killed at the settlement could, however, indicate that their mothers were for milk production. The farmers probably used the milk to produce yogurt, cheese, and the like.

Pigs were clearly kept for one reason only: that is for meat demand. Pork was probably one of the most often traded meat in the open markets. The existence of pig in the settlement was a kind of insurance for the farmers. Replacing ruminants in the case of loss was not as easy as replacing pigs because of their fast and strong reproduction. Therefore, farmers could slaughter their pigs without damaging other farm animals. The skin of pigs was probably also

nid=xASjm3iCVFpKRM:&tbnh=95&tbnw=143&prev=/images%3Fq%3Dkara-saban%26um%3D1%26hl%3Dde%26rls%3DGGGL,GGGL:2006-13,GGGL:de%26sa%3DN

[195] http://images.google.de/imgres?imgurl=http://kursunlukoyu.org/v1/images/stories/haber/okuz%2520arabasi.jpg&imgrefurl=http://akbulutkoyu.blogcu.com/4664143/&h=679&w=685&sz=107&hl=de&start=8&um=1&tbnid=OOrwHSh82z86tM:&tbnh=138&tbnw=139&prev=/images%3Fq%3Dka%25C4%259Fn%25C4%25B1lar%2B%26um%3D1%26hl%3Dde%26rls%3DGGGL,GGGL:2006-13,GGGL:de%26sa%3DG

not wasted and probably used in the production of certain items; . Lard must have been one of the most important components in the kitchen and a resource for producing light.

The skin of domestic and wild mammals was one of the most important products after slaughtering or hunting. Skin was very valuable in producing many different objects used in daily life. The people produced objects such as clothes, shoes, blankets, carpets, water-skins (Pic. 9-9), hats, war-shields (Pic. 9-10), bags (Pic. 9-11), curtains, tents (Pic. 9-12), sails, and others from animal skins. Furs from wild mammals were probably important as trophies to decorate the living rooms and as trade items (Pic. 9-13).

Pic. 9-9:Water-skin.[196]

Pic. 9-10: Shield made of animal skin.[197]

[196] www.pbase.com/bmcmorrow/image/58299209

[7]http://images.google.de/imgres?imgurl=http://www.sportingwoodcreations.com/mm5/graphics/00000001/shields.jpg&imgrefurl

Pic. 9-11: Leather bag.[198]

Pic. 9-12: Tent out of leather.[199]

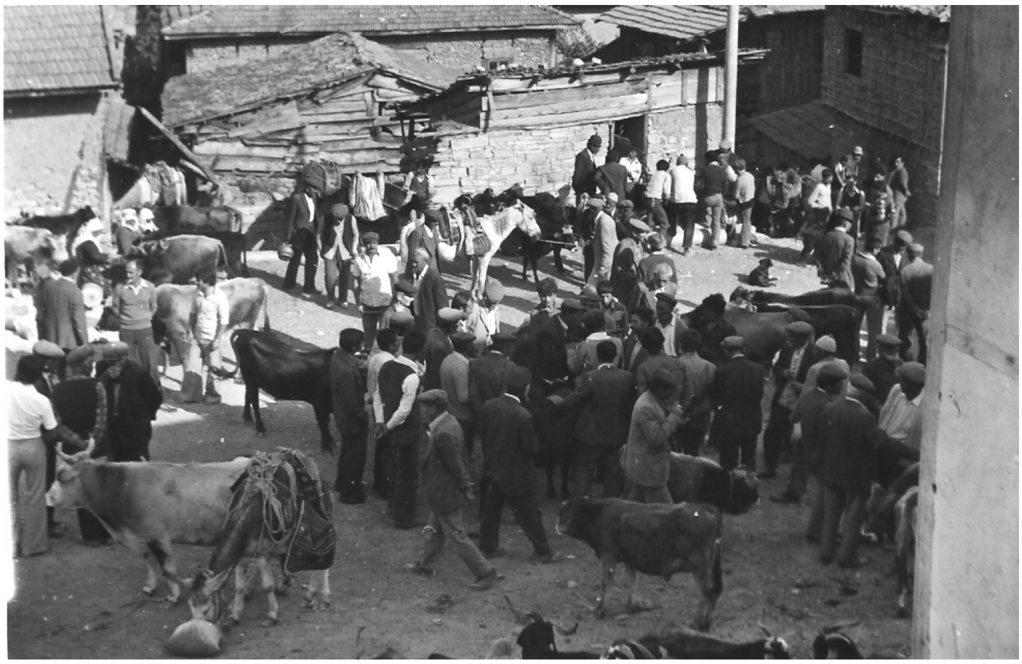
Pic. 9-13: Lion skin as decorative element.[200]

Small finds from Troy indicate clearly that the animal bones, horns and antler were worked to produce tools used in daily life. ZIDAROV (2006:229), when considering bone-tools from the

[198] http://fantasytrade.de/images/LW%20010.jpg.
[199] http://ruestungsschmiede.de/armour_ah6411.jpg.
[200] http://www.africanskins.com/products/skins/images/lion_skin/P1010168.JPG.

Early Bronze Age, mentions that the wear patterns on the pointed tools made from cattle ribs indicate that they were probably used as linen combs to work fiber-rich plants such as nettle, linen or cannabis. Bone was a raw material used to produce arms and other battle equipment in the later periods of Troy (VI-VII). The pointed tools from bones were probably used for making holes in skins or furs, and different sized needles made from bone were used for sewing.

Domestic animals were most likely also used as trade items as well. They were exchanged for certain items. It is difficult to know how animals were moved, whether by sea transport or over land by caravans (Pic. 9-14).



Pic. 9-14: An animal bazaar.[201]

A sudden size change or other developments in certain species could lead us to the conclusion that a new race of the respective species appeared in the region. One might assume that a new race of sheep arrived in Troy at the middle or end of Troy I. The LSI-calculations, however, do not help us determine any size difference at this time. However, the small finds in the form of spindle whirls from the excavation help us to trace the development in the sheep of Troy at this time (compare section 9.2.1.1).

[201] http://img143.imageshack.us/img143/6035/resim3002wl1.jpg.

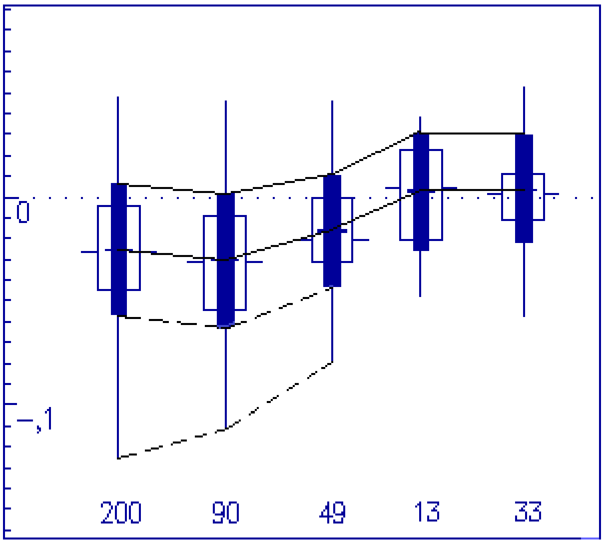


Fig. 9-1: The LSI-calculations of sheep remains from Troy I, Troy II, Troy III, Emar-Early Bronze Age IV and Emar-Middle Bronze Age.

Figure 9-1 illustrates that the average size of sheep increases from Troy II to Troy III (black lines). Emar-EBA IV[202] (2400/2300-2000 B.C.) and Troy II-III (2500-2200 B.C.) are alsmost contemporary settlements; however, the LSI-calculations show that the sheep in Emar were clearly larger than the Troy II-III sheep. The farmers in Mesopotamia were already breeding new and larger sheep races. They were a few steps ahead of their contemporaries in West Anatolia.

Another reason why sheep grew bigger in Troy was probably because farmers were breeding only the new race of sheep and not mixing them with other races. Bigger and better wool–producing sheep were chosen for reproduction (see below). This selection caused a size increase in sheep, and probably an increase in wool and meat production. This new breeding management caused as well the gradual disappearance of the small-sized sheep in the flocks (short lines in Fig. 9-15).

9.6. Environmental changes in the Troas during the Maritime Troy Culture

The existence of the people of Troy and of their domestic animals for eight hundred years in the region during periods described above gave a new form to the natural environment. The Troyans exploited their environment for the sake of their own survival. These changes of the environment had already begun in Troy I. For four hundred years domestic ruminants grazed

[202] Emar is located in Northern Syria and was excavated by U. Finkbeiner. The author studied the animal bone material.

the area and pigs searched for food in the oak forests, altering the landscape in particular by hindering the level of forest regeneration.

Farmers cleared the woods and prepared areas for new fields, while carpenters cut wood for construction purposes. Women and children probably cut and collected wood for fire from the surroundings of the settlement. These demands caused damage to the forests as well, forcing the forest belt to move inland.

The identified waterfowl remains represent a landscape with rivers, small ponds and swamp areas. The remains of great bustards in the Troy I material indicate the occurrence of open areas, fields and grassland. Rainy seasons and melting snow on the mountains kept rivers suitable for foraging waterfowl (KRÖNNECK 2003:282).

Tab. 9-1:Possible habitats of the wild fowl identified from the settlements of Troas.[203]

Wild fowl remains	**TR I**	**TR I/II**	**TR II/III**	**TR III**	**Habitat**
Grey geese, *Anser sp*	√	-	√	√	**11-10**
Shelducks, *Tadorna*	√	-	-	-	**11-10-13**
Shoveler, *Anas clypeata*	√	-	-	-	**11-10-13**
Mallard, *Anas plathyrhynchos*	√	-	-	-	**11-10-13**
Pintail, *Anas acuta*	-	-	-	√	**11-10-13**
Vultures	-	-	-	√	**4-3-12**
Eagles, *Aquila sp.*	-	√	-	-	**12-8-13**
Buzzards, *Buteo sp.*	√	-	-	-	**8-9-3**
Coot, *Fulica atra*	-	√	-	-	**11-10-13**
Great bustard, *Otis tarda*	√	-	-	-	**3-4**
Stock dove, *Columba oenas*	-	-	√	-	**12-8-9**
Eared owls, *Asio sp.*	-	-	-	-	**8-13-3**

1-Pasture/high grass	**8-Woods/mixed**
2-Pasture/short grass	**9-Open woods**
3-Open land	**10-Meadows**
4-Steppe	**11-Water**
5-Savanna	**12-Cliff areas**
6-Woods/deciduous forest	**13-Swamp**
7-Woods/coniferous forest	**14-Almost everywhere**

The lower plateau close to the settlement during Troy I was probably used for agriculture. Over time, fields occupied larger portions of the lower plateau as the population of the settlement increased.

[203] These species were identified from Troy and Beşik-Yassıtepe.

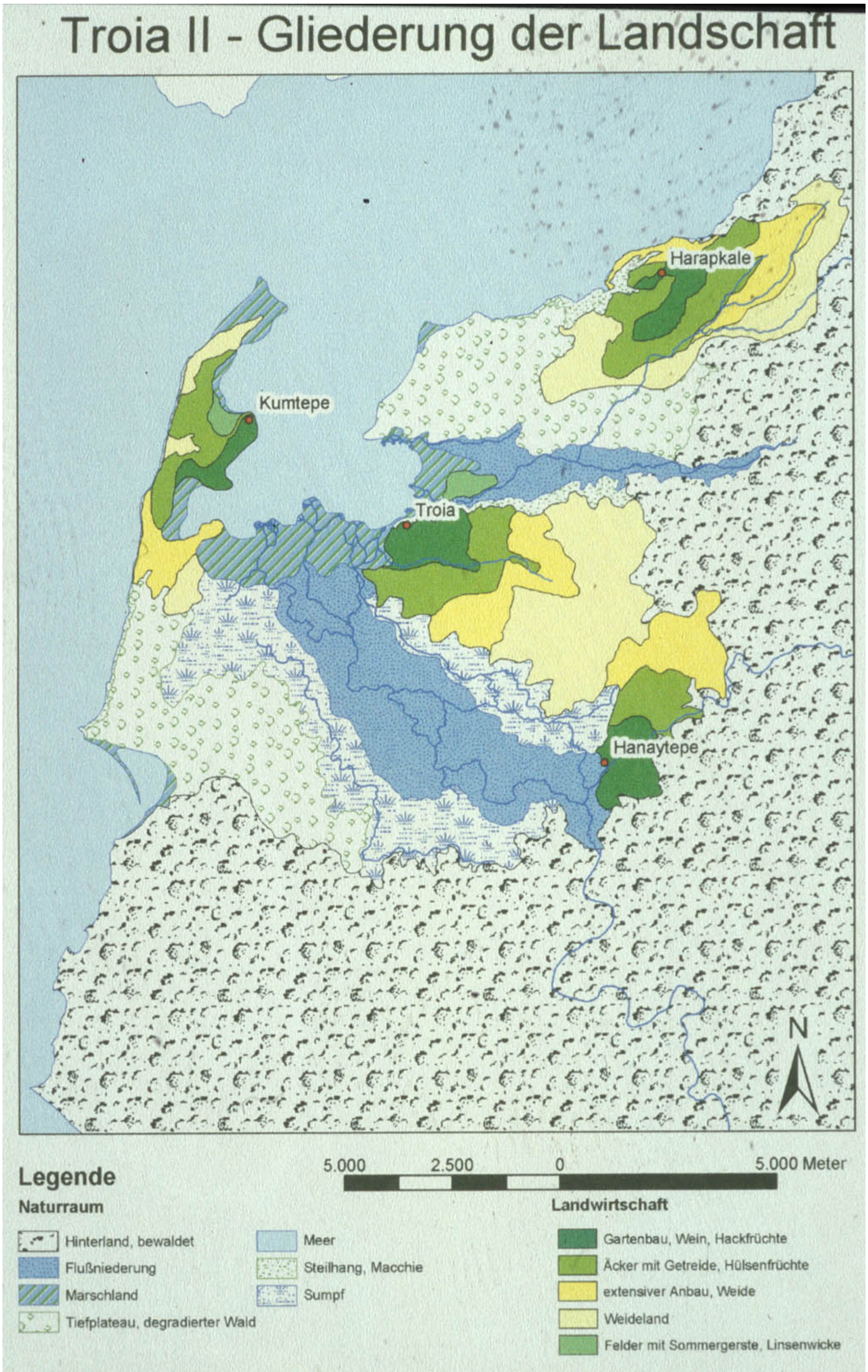
During Troy II, further damage caused by ruminant overgrazing and by forest exploitation for lumber and firewood should be mentioned here as well. ÜNLÜSOY (2006:138-142) writes that the settlements of the middle and late periods of Troy II were destroyed through catastrophic fire. Fire certainly caused an increase in the lumber demand for rebuilding houses in the settlement, which further depleted the forests.

The number of farm animals probably increased with the increase in the human population during Troy II. Farmers cleared more fields to increase their harvest, and the increase in domestic animals gave way to more grassland in the region. The ruminants grazed further away from the lower city and therefore away from the newly cleared fields, in the direction of the woods and flood plains of the Skamander River. These developments damaged the forests even further. The environment around the settlement during Troy II would have changed to more grassland since the Troy I period.

The environment around the settlement during Troy III would have changed even further after Troy II. The settlement was renewed four times in fifty years, which meant the need for more lumber. The forests were cut faster than they could regenerate. Another consequence of constant rebuilding was the distance that developed between the forests and the settlement. The people of Troy needed to spend more time and energy in obtaining lumber. The negative outcome of intensive grazing should be mentioned here as well.

KRÖNNECK described the environment of Troy as: *"According to Van Zeist and Bottema (1991), the natural vegetation of the Troad was a deciduous forest. At the beginning of the Troy settlement, this forest was partly reduced by man into macchia, fields and grassland. This is shown by palaeo-botanical investigations (Riehl 1999a,b). The clearings may already have been large enough to explain the presence of the great bustard found among the Troy I material. The environment did not change much after this time, perhaps it was sometimes drier or wetter, but there was no forest again. The lower plateau and its slope were a more or less open landscape. The moister and more fertile soils there were cultivated and drier and more rocky areas were grassland or bore a sparse shrub vegetation. Single trees or woods were spread throughout the area. The floodplains were crossed by river channels with sandbanks, bogs, pools and small lakes. Riverine forests grew on the stabilized banks and the all other types of wetland vegetation will have developed according to the dynamics of the rivers. Lagoons may have formed at the mouth of the rivers where salt-marshes may have* *completed the diversity of the habitats where most of the bird remains found at Troy must have originated. Figure 2 shows a reconstruction of natural habitats in the area around Troy based mainly on the maps and descriptions of the nineteenth century. Although the coastline has moved several kilometers north since the time of Troy I, the general distribution of habitats would have been similar in the past.*" (2003:282).

The environmental damage caused by the human population and their domestic animals in the area around Troy created an open habitat. The woods were cleared in eight hundred years for firewood and construction material. The damage caused by intensive grazing did not allow the forests to regenerate, causing them to vanish in the area over time. Deciduous forest survived probably on the high plateau while the former forested regions became grassland. Areas close to the settlement were used for agriculture and the number of fields grew as the density of the human population increased in the settlement. The domestic ruminants were taken farther away from the fields to graze. All these reasons caused an open landscape to develop during the Maritime Troy Culture.



Map. 9-1: Environmental reconstruction of the landscape of Troy II by KRÖNNECK[204] (unpublished).

[204] Thanks are due to Petra KRÖNNECK, who produced this environmental reconstruction of the landscape around Troy II from the geological, botanical, and climatic data and according to information presented by KAYAN (2003:202).

10. The End of the Maritime Troy Culture - A Case of Abrupt Climate Change?

According to WEISS (1997) an abrupt climate change took place in Anatolia, the Levant, Mesopotamia, the Gulf Area and down to East Africa around 2200 BC. This assumption is based on geoclimatic data. According to WEISS the dry climate caused difficult periods for farming, and eventually led to the abandonment of cities and whole landscapes..The groups, which abandoned their sites, were searching for suitable environments to conquer or to settle again. A chain reaction ensued, and the transcient groups began driving each other into different regions.

Troy was not directly affected by arid periods (RIEHL 1999:3). This did not necessarily stop the settlement, though, from being affected by becoming a target for other groups. The city may perhaps been under pressure or influence of groups from farther east, moving in waves into the region of Western Anatolia. This may have been the reason for rebuilding Troy several times during phase III, possibly due to attacks made on Troy during a fifty-year period.[205] Eventually, the Troyans lost control over their city. Thus, the arid climate in east and southeast Anatolia could indirectly have caused the end of the “Maritime Troy Culture”. The succeding “Anatolian Troy Culture” began in c. 2200 BC and lasted until c. 1700 BC.

Given the present indications for severe climatic changes, this example from the past should advise us not to be careless in trying to avoid potential causes and to prepare for potential consequences of being affected, directly or indirectly – like the ancient Troyans, who went through deep crises some 4200 years ago.

[205] KORFMANN 2001: 348 and see pls. 5.3.5.

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Abbreviations

ant.	anterior
B	breadth
BC	breadth of the caput
Bd	distal breadth
BFd	breadth of the distal articular surface
BFp	breadth of the proximal articular surface
BG	breadth of the glenoid cavity
BM2	breadth of M2
BM3	breadth of M3
Bp	proximal breadth
BPC	breadth across processus coronarius
BSTP	Beşik-Yassıtepe
BT	breadth of the trochlea
BTP	breadth of the trochlea patellaris
CA	copper age
coeff.var.	coefficient variable
D	depth
DC	diameter of the caput
DD	depth of the diaphysis
Dd	distal depth
DFd	depth of the distal articular surface
Dl	lateral depth
Dl	depth of the lateral side
Dm	medial depth
Dm	depth of the medial side
DMRC	Demircihüyük
Dp	proximal depth
DPA	depth over the processus anconeus
EBA	early bronze age
GB	greatest breadth
GD	greatest depth
GL	greatest lenght
GLC	greatest length from the caput
GLl	greatest lenght of the lateral side
GLm	greatest lenght of the medial side
GLP	greatest length of the processus glenoidalis
H	height
Hcan	height of the vertebral canal
HM3	crown heıght of M3
HofM1	height of mandible in the front of M1
ILIP	Ilıpınar

KRTS	Karataş-Semayük
L	lenght
LA	lenght of acetabula
LG	length of the glenoid cavity
Ll	lateral length
Lm	medial length
LM2	lenght of M2
LM3	lenght of M3
LMR	length of the molar row
Lphys	physiological length
LPR	length of the premolar row
LTR	length of the cheektooth row
mean val.	mean value
MIX	The mix material from Maritime Troia Culture
MT	Maritime Troia Culture
ORMF	Orman Fidanlığı
post.	posterior
SD	smallest breadth of the diaphysis
SDO	smallest depth of the olecranon
SHDia	smallest height of the diastema
SLC	smallest length of the collumn
std.dev.	standart deviation
TR I	TROIA I
TR II	TROIA II
TR III	TROIA III
YBDL	Yenibademli

Animal Based Economy in Troia and the Troas During The Maritime Troy Culture (c. 3000-2200 BC.)

AND

A General Summary for West Anatolia

Dissertation
zur Erlangung des Grades eines Doktors der Philosophie
der Geowissenschaftlichen Fakultät der Eberhard Karls Universität Tübingen

PART II
TABELS & FIGURES

vorgelegt von
Can Yümni GÜNDEM
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2010

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[1] * = only in the second band.

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4.1 Animal Bone Material from Troy

Tab. 4-1: Species list for Troy I.

TAXONOMY	**NIS**	**NIS-%**	**WIS(g)**	**WIS-%**
Cattle BOS	2701	24,54	39010,40	43,53
Sheep, OVIS	452	4,11	4487,90	5,01
Goat, CAPRA	200	1,82	1907,80	2,13
Sheep or Goat, CAPRA/OVIS	4631	42,08	17262,80	19,26
Pig, SUS	2550	23,17	19790,00	22,08
Dog, CANIS	56	0,51	274,80	0,31
Domestic mammals total	**10590**	**96,22**	**82733,70**	**92,31**
Wild or Domestic Cattle	9	0,08	410,00	0,46
Wild or Domestic Goat	1	0,01	30,00	0,03
Sheep/Goat or Roe deer	2	0,02	20,10	0,02
Wild Boar or Pig	26	0,24	600,70	0,67
Wolf or Dog	1	0,01	12,00	0,01
Canidae indet.	19	0,17	52,00	0,06
Wild or Domestic mammals total	**58**	**0,53**	**1124,80**	**1,25**
Hedgehog, Erinaceus europaeus	1	0,01	2,00	0,00
Hare, *Lepus capensis/europaeus*	66	0,60	107,90	0,12
Wolf, *Canis lupus*	3	0,03	36,40	0,04
Fox, *Vulpes vulpes*	3	0,03	9,40	0,01
Bear, *Ursus arctos*	1	0,01	20,00	0,02
Lynx, *Lynx lynx*	1	0,01	1,00	0,00
Lion, *Panthera leo*	2	0,02	46,80	0,05
Carnivora uniden., small	18	0,16	53,60	0,06
Carnivora uniden., medium	3	0,03	13,10	0,01
Carnivora uniden., large	7	0,06	121,00	0,14
Wild Boar, *Sus scrofa*	64	0,58	1587,70	1,77
Fallow deer, *Dama dama*	161	1,46	1972,70	2,20
Red deer, *Cervus elaphus*	6	0,05	170,20	0,19
Roe deer, *Capreolus capreolus*	9	0,08	68,90	0,08
Aurochs, *Bos primigenius*	13	0,12	1558,00	1,74
Wild mammals total	**358**	**3,25**	**5768,70**	**6,44**
unidentified, small	63	1,10	30,10	0,23
unidentified, small to medium	105	1,84	98,50	0,75
unidentified, medium	3336	58,37	4014,7	30,63
unidentified, medium to large	1274	22,29	2646,40	20,19
unidentified, large	935	16,36	6294,90	48,02
unidentified, very large	1	0,02	23,00	0,18
unidentified	1	0,02	1,00	0,01
unidentified mammal remains total	**5715**	**100,00**	**13108,60**	**100,00**
identified mammal remains total	**11006**	**65,82**	**89627,20**	**87,24**
unidentified mammal remains total	**5715**	**34,18**	**13108,60**	**12,76**
mammal remains total	**16721**	**100,00**	**102735,80**	**100,00**
Aves uniden.	87	1,03	118,10	0,46
Amphibia uniden.	2	0,02	0,00	0,00
Reptilia uniden.	21	0,25	44,20	0,17
Pisces uniden.	38	0,45	97,70	0,38
Shells	8294	98,50	25485,80	98,99
not mammal remains	**8442**	**100,00**	**25745,80**	**100,00**
mammal remains total	**16721**	**66,45**	**102735,80**	**79,96**
not mammal remains total	**8442**	**33,55**	**25745,80**	**20,04**
processed material TOTAL	**25163**	**100,00**	**128481,60**	**100,00**

Tab. 4-2: Species list for Troy II.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
Cattle BOS	797	23,56	10433,50	42,95
Sheep, OVIS	185	5,47	2015,50	8,30
Goat, CAPRA	44	1,30	345,50	1,42
Sheep or Goat, CAPRA/OVIS	1627	48,09	5645,40	23,24
Pig, SUS	479	14,16	2993,40	12,32
Dog, CANIS	28	0,83	64,50	0,27
Domestic mammals total	**3160**	**93,41**	**21497,80**	**88,50**
Wild or Domestic Cattle	6	0,18	202,00	0,83
Wild Boar or Pig	3	0,09	31,20	0,13
Wild or Domestic mammals total	**9**	**0,27**	**233,20**	**0,96**
Rodentia uniden., small	2	0,06	1,00	0,00
Rodentia uniden., large	5	0,15	2,00	0,01
Hare, *Lepus capensis/europaeus*	20	0,59	45,50	0,19
Fox, *Vulpes vulpes*	3	0,09	8,30	0,03
Bear, *Ursus arctos*	1	0,03	2,00	0,01
Carnivora uniden., medium	2	0,06	14,10	0,06
Wild Boar, *Sus scrofa*	10	0,30	189,20	0,78
Fallow deer, *Dama dama*	161	4,76	2133,80	8,78
Red deer, *Cervus elaphus*	4	0,12	123,00	0,51
Roe deer, *Capreolus capreolus*	1	0,03	2,00	0,01
Cervidae uniden.	4	0,12	12,00	0,05
Aurochs, *Bos primigenius*	1	0,03	28,00	0,12
Wild mammals total	**214**	**6,33**	**2560,90**	**10,54**
unidentified, very small	6	0,37	1,30	0,04
unidentified, small	3	0,18	0,50	0,02
unidentified, small to medium	22	1,36	11,90	0,38
unidentified, medium	546	33,66	731,7	23,54
unidentified, medium to large	412	25,40	808,20	26,00
unidentified, large	235	14,49	1281,30	41,22
unidentified	398	24,54	273,70	8,80
unidentified mammal remains total	**1622**	**100,00**	**3108,60**	**100,00**
identified mammal remains total	**3383**	**61,45**	**24291,90**	**88,65**
unidentified mammal remains total	**1622**	**29,46**	**3108,60**	**11,35**
mammal remains total	**5005**	**90,92**	**27400,50**	**100,00**
Aves uniden.	49	0,51	95,40	0,38
Pisces uniden.	154	1,61	54,90	0,22
Reptilia uniden.	1	0,01	0,50	0,00
Shells	9378	97,88	24847,40	99,39
not mammal remains	**9582**	**100,00**	**24998,20**	**100,00**
mammal remains total	**5005**	**34,31**	**27400,50**	**52,29**
not mammal remains total	**9582**	**65,69**	**24998,20**	**47,71**
processed material TOTAL	**14587**	**100,00**	**52398,70**	**100,00**

Tab. 4-3: Species list for Troy III.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
Cattle BOS	206	13,61	2379,90	24,40
Sheep, OVIS	119	7,86	1122,00	11,50
Goat, CAPRA	16	1,06	130,60	1,34
Sheep or Goat, CAPRA/OVIS	607	40,09	1904,60	19,53
Pig, SUS	437	28,86	2906,10	29,79
Domestic mammals total	**1385**	**91,48**	**8443,20**	**86,56**
Wild Boar or Pig	2	0,13	26,10	0,27
Canidae uniden.	3	0,20	8,00	0,08
Wild or Domestic mammals total	**5**	**0,33**	**34,10**	**0,35**
Hedgehog, *Erinaceus europaeus*	1	0,07	1,00	0,01
Hare, *Lepus capensis/europaeus*	10	0,66	12,70	0,13
Bear, *Ursus arctos*	1	0,07	31,00	0,32
Weasel, *Mustela erminea/nivalis*	1	0,07	0,00	0,00
Carnivora uniden., large	2	0,13	19,50	0,20
Wild Boar, *Sus scrofa*	3	0,20	39,00	0,40
Fallow deer, *Dama dama*	99	6,54	1000,40	10,26
Red deer, *Cervus elaphus*	2	0,13	16,10	0,17
Roe deer, *Capreolus capreolus*	2	0,13	18,00	0,18
Cervidae uniden.	2	0,14	67,90	0,70
Aurochs, *Bos primigenius*	1	0,07	71,00	0,73
Wild mammals total	**124**	**8,19**	**1276,60**	**13,09**
unidentified, small	2	0,38	0,30	0,03
unidentified, small to medium	3	0,56	1,90	0,18
unidentified, medium	326	61,28	442,50	41,92
unidentified, medium to large	146	27,44	292,50	27,71
unidentified, large	54	10,15	312,00	29,56
unidentified	1	0,19	6,40	0,61
unidentified mammal remains total	**532**	**100,00**	**1055,60**	**100,00**
identified mammal remains total	**1514**	**72,86**	**9753,90**	**89,83**
unidentified mammal remains total	**532**	**25,60**	**1055,60**	**9,72**
mammal remains total	**2078**	**100,00**	**10858,60**	**100,00**
Aves uniden.	26	70,27	41,10	49,40
Pisces uniden.	6	16,22	8,00	9,62
Reptilia uniden.	1	2,70	1,70	2,04
Shells	4	10,81	32,40	38,94
not mammal remains total	**37**	**100,00**	**83,20**	**100,00**
mammal remains total	**2078**	**98,25**	**10858,60**	**99,69**
not mammal remains total	**37**	**1,75**	**83,20**	**0,76**
processed material	**2115**	**100,00**	**10892,70**	**100,00**

Tab. 4-4: Species list for the whole Maritime Troy Culture
(TR I/TR II/TR III and the mix material)

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
Cattle BOS	4055	23,44	56781,80	41,99
Sheep, OVIS	859	4,96	8820,40	6,52
Goat, CAPRA	293	1,69	2704,90	2,00
Sheep or Goat, CAPRA/OVIS	7414	42,85	26712,20	19,76
Pig, SUS	3705	21,41	27394,20	20,26
Dog, CANIS	91	0,53	377,30	0,28
Domestic mammals total	**16417**	**94,88**	**122790,80**	**90,81**
Wild or Domestic Cattle	18	0,10	724,00	0,54
Wild or Domestic Goat	1	0,01	30,00	0,02
Sheep/Goat or Roe deer	2	0,01	20,10	0,01
Wild Boar or Pig	34	0,20	690,00	0,51
Wolf or Dog	1	0,01	12,00	0,01
Canidae uniden.	24	0,14	62,00	0,05
Wild or Domestic mammals total	**80**	**0,46**	**1538,10**	**1,14**
Hedgehog, *Erinaceus europaeus*	2	0,01	3,00	0,00
Rodentia uniden., small	5	0,03	2,00	0,00
Rodentia uniden., large	7	0,04	3,00	0,00
Hare, *Lepus capensis/europaeus*	105	0,61	189,10	0,14
Wolf, *Canis lupus*	3	0,02	36,40	0,03
Fox, *Vulpes vulpes*	6	0,03	17,70	0,01
Bear, *Ursus arctos*	4	0,02	80,00	0,06
Weasel, *Mustela erminea/nivalis*	1	0,01	0,00	0,00
Lynx, *Lynx lynx*	1	0,01	1,00	0,00
Lion, *Panthera leo*	2	0,01	46,80	0,03
Carnivora indet., small	19	0,11	54,60	0,04
Carnivora indet., medium	5	0,02	27,20	0,02
Carnivora indet., large	9	0,05	140,50	0,10
Wild Boar, *Sus scrofa*	82	0,47	1911,90	1,41
Fallow deer, *Dama dama*	499	2,88	6058,90	4,48
Red deer, *Cervus elaphus*	14	0,08	379,30	0,28
Roe deer, *Capreolus capreolus*	12	0,08	88,90	0,07
Cervidae uniden.	13	0,07	98,90	0,07
Aurochs, *Bos primigenius*	17	0,10	1743,00	1,29
Wild mammals total	**806**	**4,66**	**10882,20**	**8,05**

cont. Tab. 4-4: Species list for the whole Maritime Troy Culture
(TR I/TR II/TR III and the mix material)

TAXONOMY (Maritime)	NIS	NIS-%	WIS(g)	WIS-%
unidentified, very small	6	0,07	1,30	0,01
unidentified, small	69	0,83	31,90	0,17
unidentified, small to medium	130	1,57	112,30	0,61
unidentified, medium	4367	52,72	5377,20	29,39
unidentified, medium to large	1984	23,95	4069,10	22,24
unidentified, large	1313	15,85	8389,40	45,86
unidentified, very large	1	0,01	23,00	0,13
unidentified	413	4,99	291,10	1,59
unidentified mammal remains total	**8283**	**100,00**	**18295,30**	**100,00**
identified mammal remains total	**17303**	**67,63**	**135211,10**	**88,08**
unidentified mammal remains total	**8283**	**32,37**	**18295,30**	**11,92**
mammal remains total	**25586**	**100,00**	**153506,40**	**100,00**
Aves uniden.	191	0,86	326,30	0,52
Amphibia uniden.	3	0,01	0,10	0,00
Reptilia uniden.	35	0,16	89,50	0,14
Pisces uniden.	225	1,02	216,90	0,35
Shells	21599	97,94	61573,50	98,99
not mammal remains	**22053**	**100,00**	**62206,30**	**100,00**
mammal remains total	**25586**	**53,71**	**153506,40**	**71,16**
not mammal remains total	**22053**	**46,29**	**62206,30**	**28,84**
processed material TOTAL	**47639**	**100,00**	**215712,70**	**100,00**

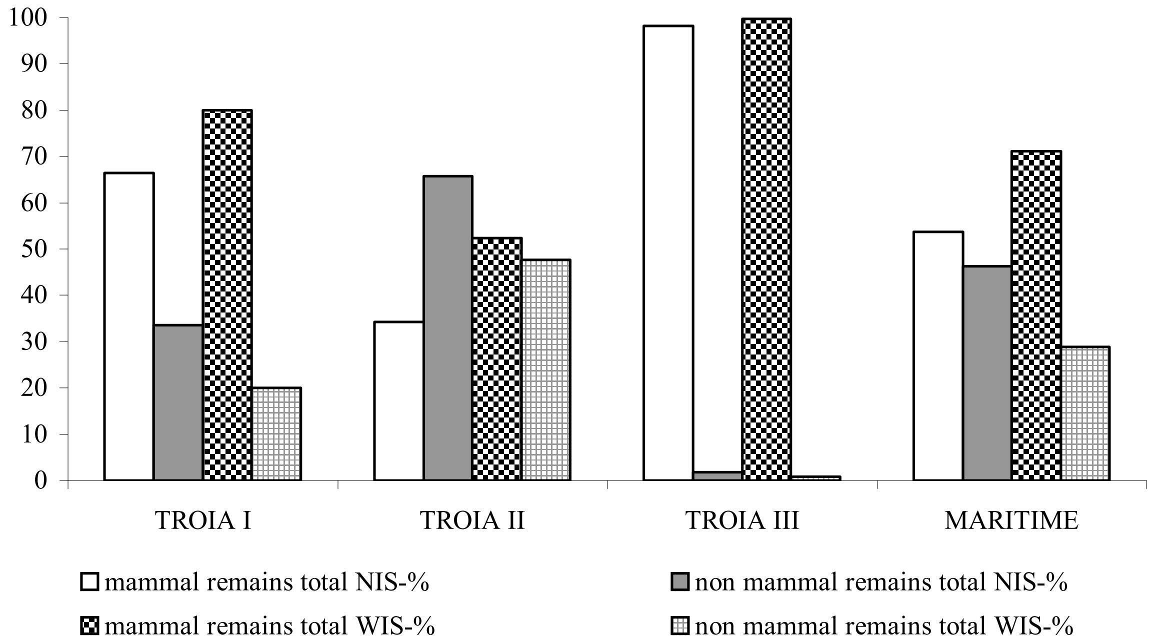

Fig. 4-1: Number of identified mammal and non-mammal remains and their weight distribution the in Maritime Troy Culture per phase as percentage
(mammal remains in TR I- N[2] =16721, TR II-N = 5005, TR III-N =2078, MARITIME[3]-N =25586 / mammal remains in TR I-W[4] = 102735,80g, TR II-W =27400,50g, TR III-W =10858,60g, MARITIME-W =153506,40g / non mammal remains[5] in TR I-N =8442, TR II-N =9582, TR III-N =37, MARITIME-N =22053 / non mammal remains in TR I-W =25745,80g, TR II-W =24998,20g, TR III-W =83,20g, MARITIME-W =62206,30g)

4.1.1. The distribution of the bone remains according to Species in the Maritime Troy Culture

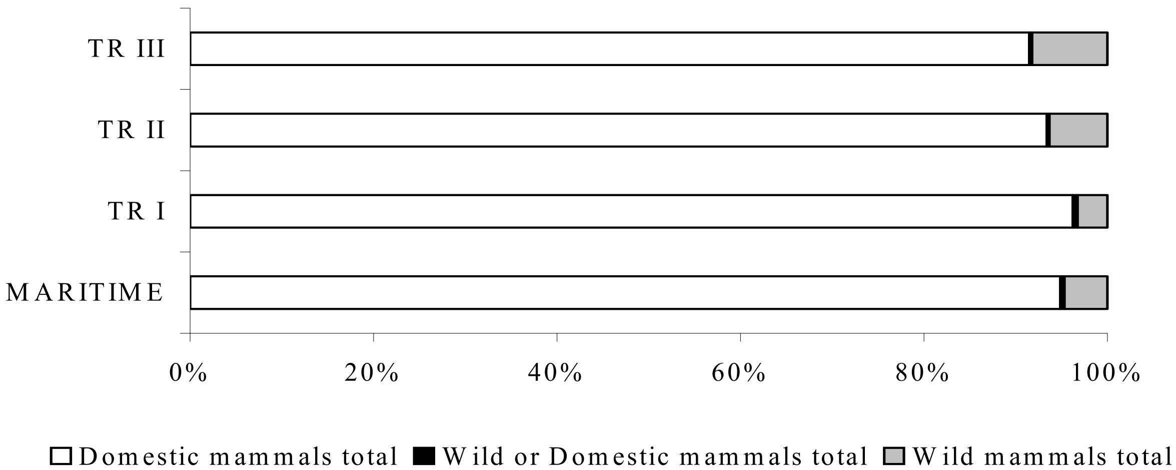

Fig. 4-2: The distribution of bone remains per domestic, wild or domestic and wild mammals for the Maritime Troy Culture and its phases in percentage
(TR III-N=1514, TR II-N=3383, TR I-N=11006, MARITIME-N=17303).

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[2] N = Number
[3] The whole Maritime Troy Culture material.
[4] W= Weight
[5] Non mammal remains in tables appear under the title “not mammal remains”.

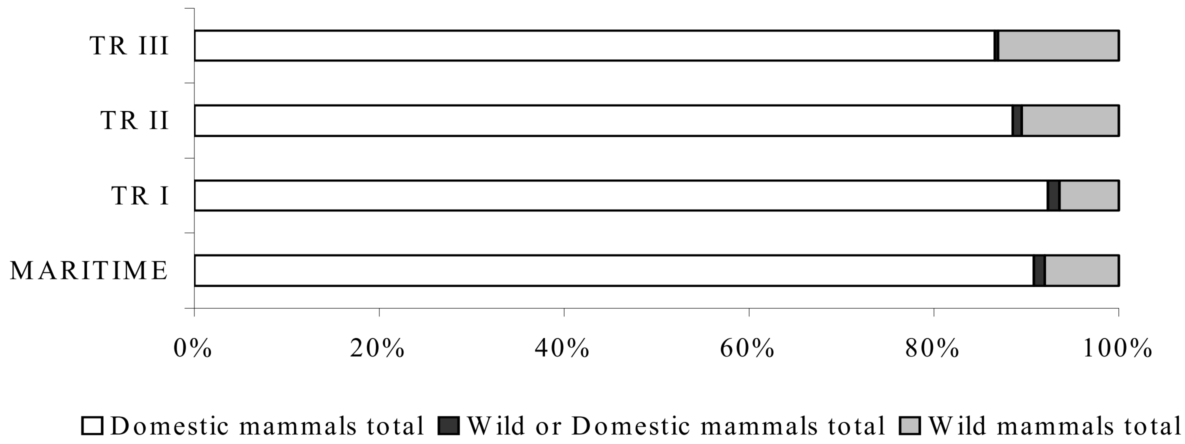

Fig. 4-3: The distribution of bone remains weight per domestic, wild or domestic and wild mammals for the Maritime Troy Culture and its phases in percentage
(TR III-W=9753,90g, TR II-W=24291,90g, TR I-W=89672,20g, MARITIME-W=135211,10g).

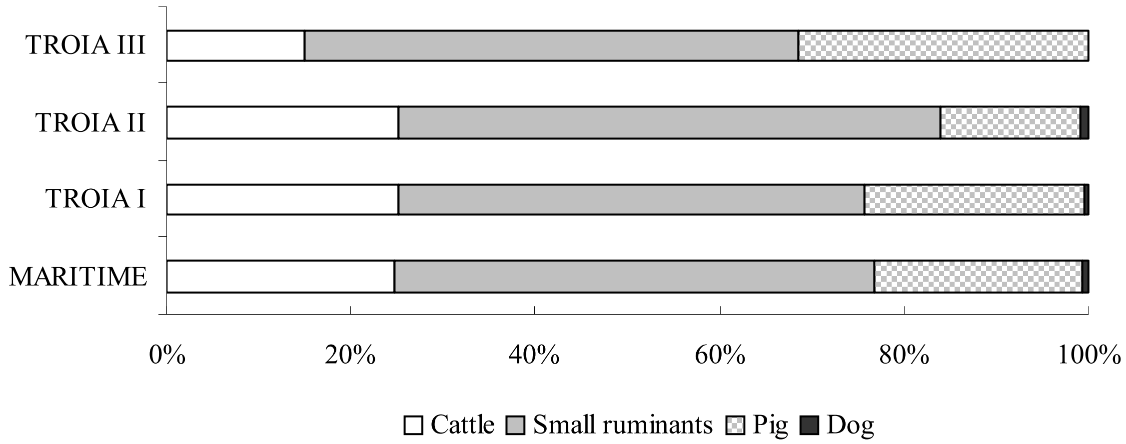

Fig. 4-4: The distribution of bone remains per domestic mammals species during the Maritime Troy Culture and its phases in percentage
(TR III-N=1385, TR II-N=3160, TR I-N=10590, MARITIME-N=16417).

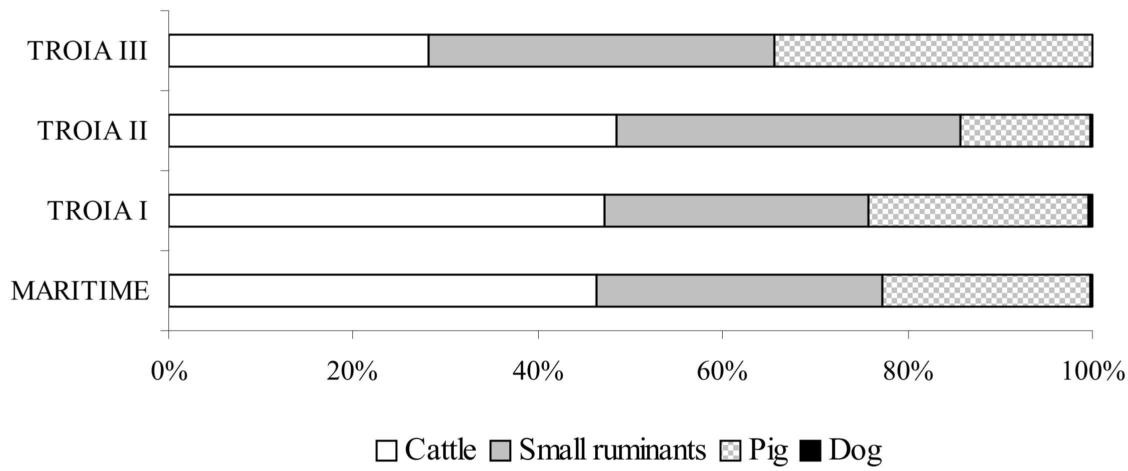

Fig. 4-5: The distribution of bone remains weight per domestic mammal species during Maritime Troy Culture and its phases in percentage
(TR III-W=8443,20g, TR II-W=21497,80g, TR I-W=82733,70g, MARITIME-W=122790,80g).

4.1.2. The unidentified bone material from the Maritime Troy Culture

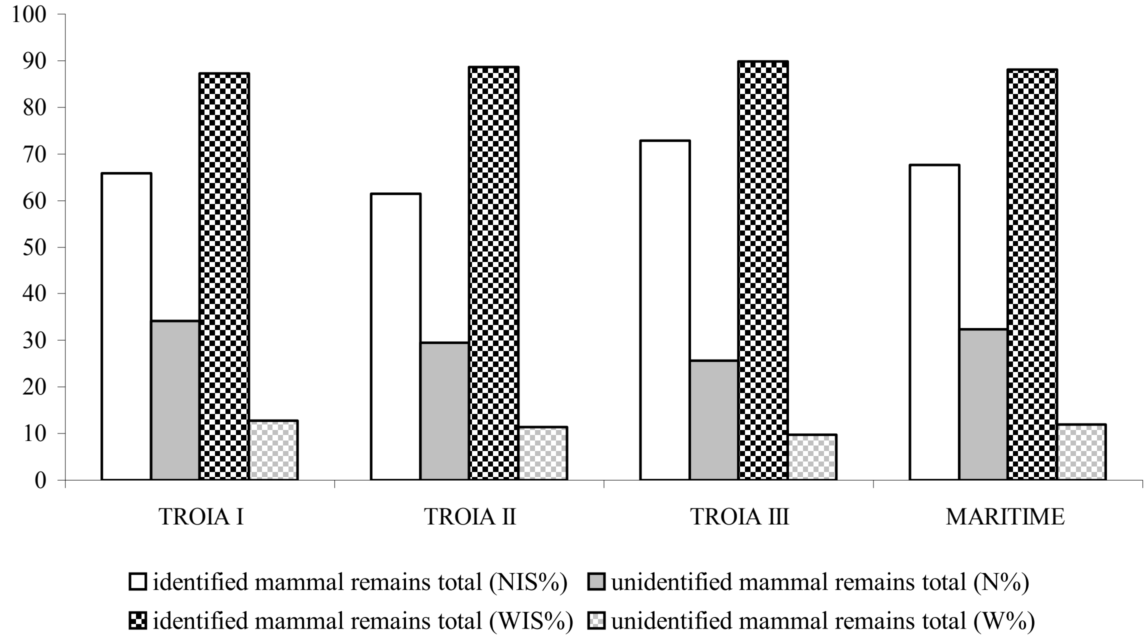

Fig. 4-6: The distribution of the identified and unidentified mammal remains and their weight in the Maritime Troy Culture per phase as percentage
(identified mammal remains total in TR I-N=11006, TR II-N=3383, TR III-N=1514, MARITIME-N=17303 / identified mammal remains total in TR I-W=89627,20g, TR II-W=24291,90g, TR III-W=9753,90g, MARITIME-W=135211,10g / unidentified mammal remains total in TR I-N=5715, TR II-N=1622, TR III-N=532, MARITIME-N=8283 / unidentified mammal remains in TR I-W=13108,60g, TR II-W=3108,60g, TR III-W=1055,60g, MARITIME-W=18295,30g).

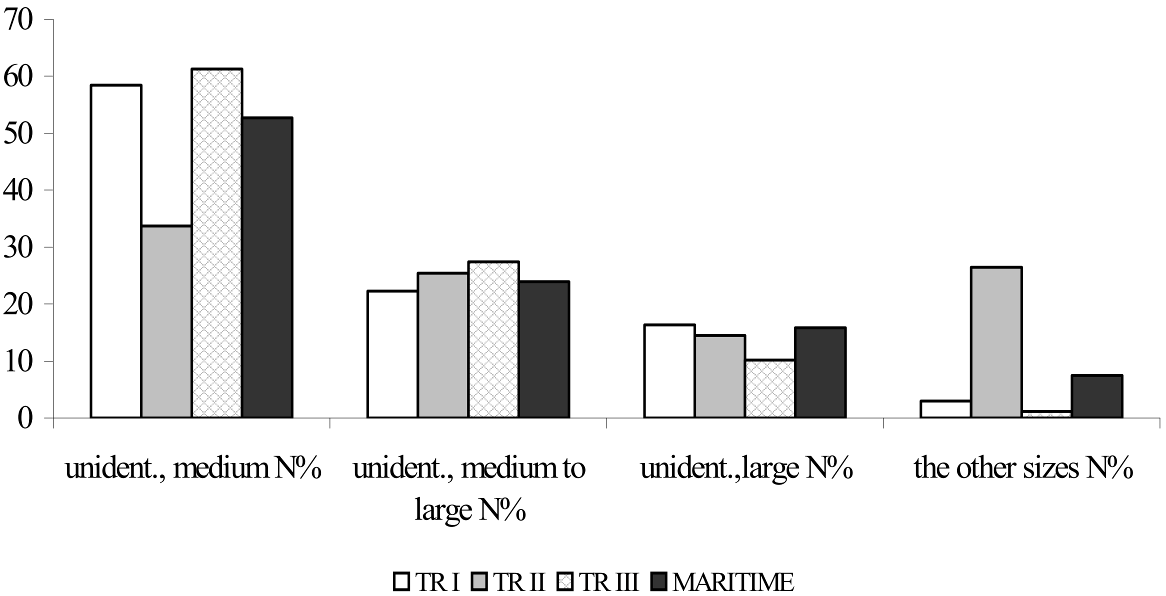

Fig. 4-7: The unidentified mammal remains as N%
(unidentified medium in N=4367, unidentified medium to large in N=1984, unidentified large in N=1313, other sizes in N= 619)

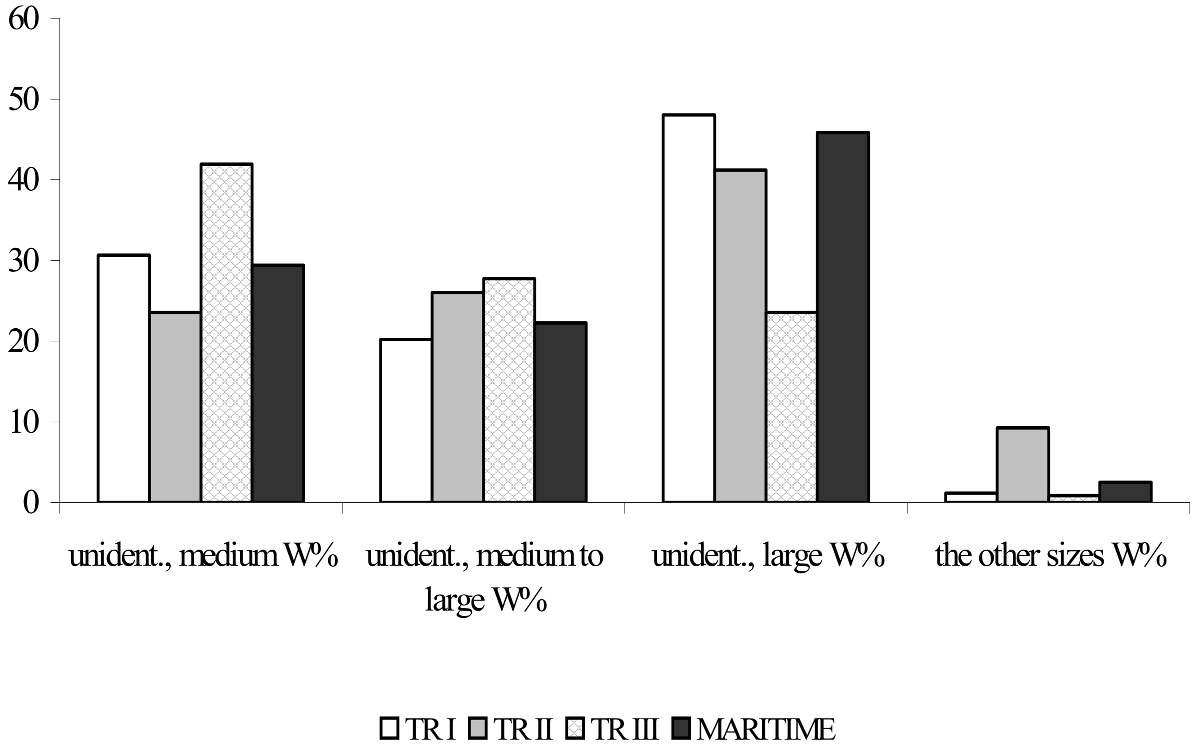

Fig. 4-8: The unidentified mammal remains as W%
(unidentified medium in W=5377,20g, unidentified medium to large in W=4069,10g, unidentified large in W=8389,40g, other sizes in W=459,60g).

Tab. 4-5: Potential species list up to the original size of the unidentified bone remains.

Size of the mammal	**Potential species**
Medium mammals	Sheep, Goat, Pig, Roe deer, similar sized
Medium to large mammals	Fallow deer, Wild boar, Rams, similar sized
Large mammals	Cattle, Red deer, Lion, Bear, Equids, similar sized

4.1.3. Calculations after the relation sheep to goat for a better impression about the possible Livestock in Troy during the Maritime Troy Culture

Tab. 4-6: The Ratio between identified Sheep and Goat and possible NIS and NIS% as well as WIS and WIS% after the re-calculations in the assemblage of identified mammal remains.

Number

TR I	Ratio between Sheep and Goat	NIS	NIS%
Sheep		~ 3683	~ 33,46
Goat	~ 2,30 : 1	~ 1600	~ 14,54

TR II	Ratio between Sheep and Goat	NIS	NIS%
Sheep		~ 1499	~ 44,30
Goat	~ 4,20 : 1	~ 357	~ 10,56

TR III	Ratio between Sheep and Goat	NIS	NIS%
Sheep		~ 654	~ 43,19
Goat	~ 7,45 : 1	~ 88	~ 5,82

TROY MT	Ratio between Sheep and Goat	NIS	NIS%
Sheep		~ 6370	~ 36,81
Goat	~ 2,90 : 1	~ 2196	~ 12,69

Weight

TR I	Ratio between Sheep and Goat	WIS(g)	WIS%
Sheep		~ 16600	~ 18,52
Goat	~2,35 : 1	~ 7058,5	~ 7,87

TR II	Ratio between Sheep and Goat	WIS(g)	WIS%
Sheep		~ 6830	~ 28,11
Goat	~5,83 : 1	~ 1176,4	~ 4,85

TR III	Ratio between Sheep and Goat	WIS(g)	WIS%
Sheep		~ 2827	~ 28,98
Goat	~8,59 : 1	~ 330,2	~ 3,39

TROY MT	Ratio between Sheep and Goat	WIS(g)	WIS%
Sheep		~ 29261	~ 21,64
Goat	~3,26 : 1	~ 8976,5	~ 6,64

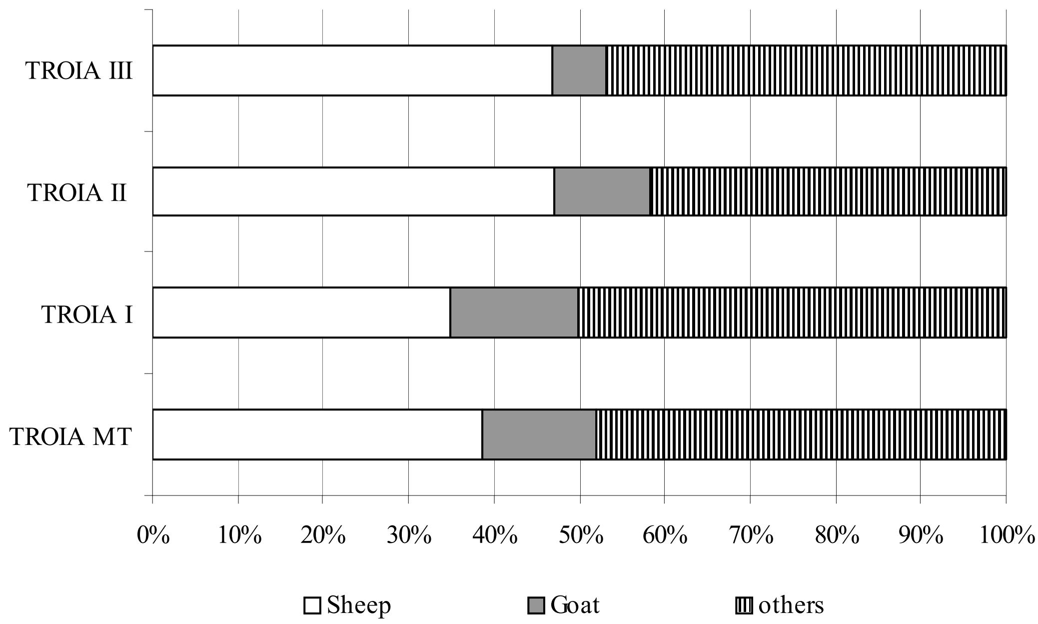

Fig. 4-9: Number of the identified bone remains from sheep and goat among the identified domestic animals after the re-calculations form Troy I, Troy II, Troy III and during the Maritime Troy Culture (TR III-N=1385, TR II-N=3160, TR I-N=10590, MARITIME-N=16417).

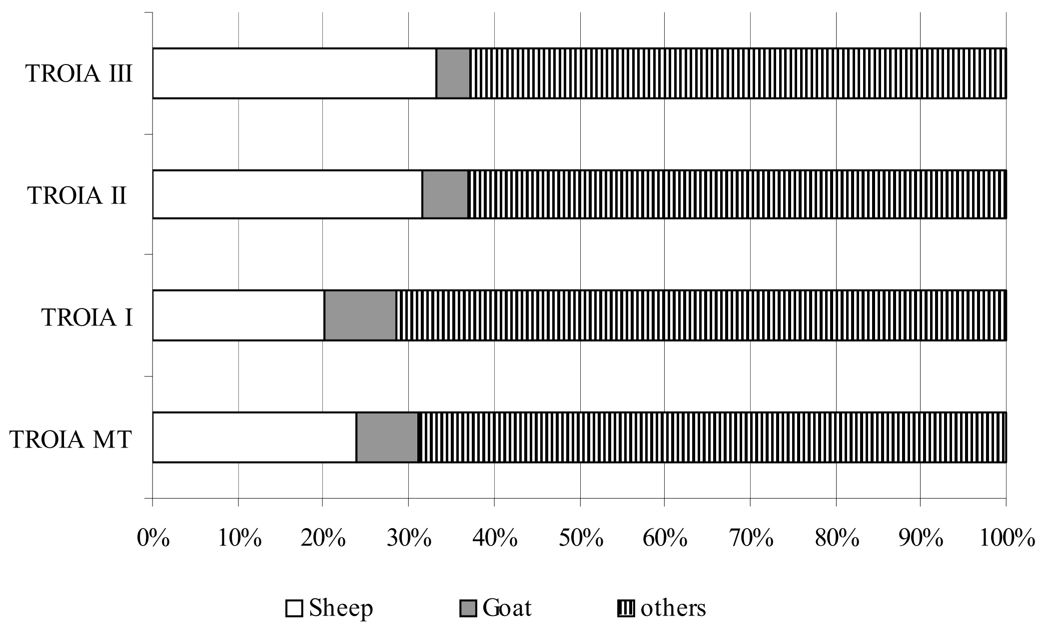

Fig. 4-10: Weight of the identified bone remains from sheep and goat for the Maritime Troy Culture and its phases in percentage among the identified domestic animals after the re-calculations (TR III-W=8443,20g, TR II-W=21497,80g, TR I-W=82733,70g, MARITIME-W=122790,80g).

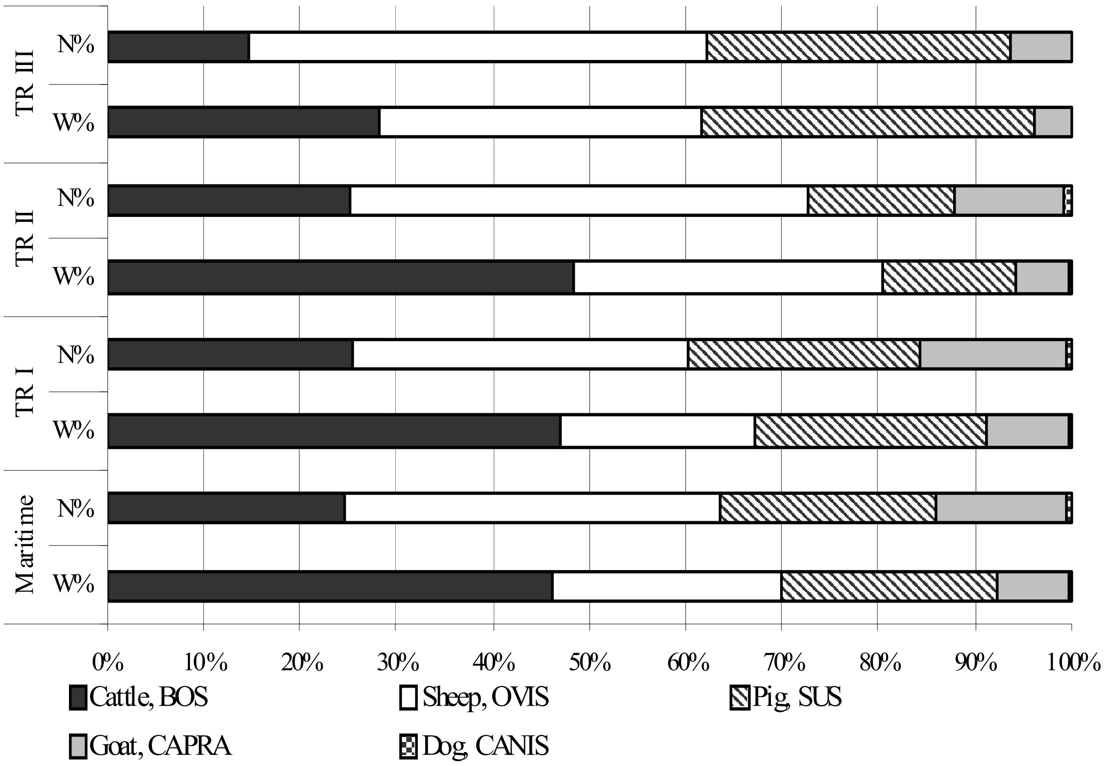

Fig. 4-11: Weight and the identified bone remains from sheep and goat among the identified domestic animals after the re-calculations form Troy I, Troy II, Troy III and during the Maritime Troy Culture (TR III-N=1385, TR II-N=3160, TR I-N=10590, MARITIME-N=16417 and TR III-W=8443,20g, TR II-W=21497,80g, TR I-W=82733,70g, MARITIME-W=122790,80g).

Tab. 4-7: The first three most kept animals and their contribution to the meat demand.

Phase	**Animal Husbandry**
Troy III	Sheep-Pig-Cattle
Troy II	Sheep-Cattle-Pig
Troy I	Sheep-Cattle-Pig

4.3. Animal Bone Material from Yenibademli

Tab. 4-8: Species list for the Early Bronze Age of Yenibademli.

TAXONOMY	NIS	NIS-%	WIS-(g)	WIS-%
Cattle BOS	1434	21,21	39788,50	45,08
Sheep, OVIS	335	4,95	4742,70	5,37
Goat, CAPRA	118	1,75	2082,50	2,36
Sheep or Goat, CAPRA/OVIS	3145	46,52	16361,10	18,54
Pig, SUS	918	13,58	12292,60	13,93
Donkey, ASINUS	5	0,07	102,00	0,12
Dog, CANIS	49	0,72	376,10	0,43
Domestic mammals total	**6004**	**88,80**	**75745,50**	**85,82**
Wild or Domestic Cattle	9	0,13	1031,00	1,17
Wild or Domestic Sheep	1	0,01	14,00	0,02
Wild or Domestic Sheep/Goat	2	0,03	41,00	0,05
unidentified smaller ruminant	1	0,01	6,90	0,01
Wild Boar or Pig	23	0,34	702,30	0,80
Wild or Domestic mammals total	**36**	**0,53**	**1795,20**	**2,03**
Rodentia uniden., small	1	0,01	0,90	0,00
Hare, *Lepus capensis/europaeus*	4	0,06	8,50	0,01
Fox, *Vulpes vulpes*	16	0,24	69,10	0,08
Carnivora uniden., small	5	0,07	27,50	0,03
Carnivora uniden., medium	1	0,01	5,80	0,01
Wild Boar, *Sus scrofa*	4	0,06	18,80	0,02
Fallow deer, *Dama dama*	680	10,06	10449,80	11,84
Roe deer, *Capreolus capreolus*	1	0,01	16,00	0,02
Cervidae uniden.	6	0,09	61,80	0,07
Wild goat, *Capra aegagrus*	3	0,04	59,40	0,07
Wild mammals total	**721**	**10,66**	**10717,60**	**12,14**
unidentified, small to medium	1	0,05	0,40	0,01
unidentified, medium	1440	69,20	3258,90	41,39
unidentified, medium to large	247	11,87	1342,90	17,06
unidentified, large	391	18,79	3270,60	41,54
unidentified	2	0,10	0,20	0,00
unidentified mammal remains total	**2081**	**100,00**	**7873,00**	**100,00**
identified mammal remains total	**6761**	**76,46**	**88258,30**	**91,81**
unidentified mammal remains total	**2081**	**23,54**	**7873,00**	**8,19**
mammal remains total	**8842**	**100,00**	**96131,30**	**100,00**
Aves uniden.	8	0,14	13,20	0,06
Reptilia uniden.	24	0,41	120,70	0,54
Pisces uniden.	5	0,08	15,30	0,07
Shells	5850	99,37	21977,80	99,33
not mammal remains	**5887**	**100,00**	**22127,00**	**100,00**
mammal remains total	**8842**	**60,03**	**96131,30**	**81,29**
not mammal remains total	**5887**	**39,97**	**22127,00**	**18,71**
processed material TOTAL	**14729**	**100,00**	**118258,30**	**100,00**

4.4. An Overview about the general composition of the Animal Bone Remains from the Troas and Yenibademli during the Maritime Troy Culture

Tab. 4-9: The Chronology of some of the important sites mentioned in this study.

SITE	~ BC.	Author	Publication
Kumtepe A	4805-4370	B. Kromer et al.	Troai and the Troad
Kumtepe B	3370-2910	B. Kromer et al.	Troai and the Troad
Kumtepe C	=Troy I	H.-P. Uerpmann	Troai and the Troad
Troy I	2920-2550	M. Korfmann	Traum und Wirklichkeit
Troy II	2550-2250	M. Korfmann	Traum und Wirklichkeit
Troy III	2250-2200	M. Korfmann	Traum und Wirklichkeit
Maritime Troy Culture	3000-2200	M. Korfmann	Traum und Wirklichkeit
Besiktepe	2850-2600	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Yenibagdemli	=EBA II / Troy I	H. Hüryilmaz	personal contact
Ulucak CA	CA	A. Çilingiroglu	Ulucak Höyük. Excavations Conducted between 1995 and 2002
Ulucak EBA	EBA	A. Çilingiroglu	Ulucak Höyük. Excavations Conducted between 1995 and 2002
Fikirtepe Neo.	5900-5300	TAY	TAY
Ilipinar (X) NEO.	5900-5300	TAY	TAY
Ilipinar (IX) NEO. to CA.	5100-5000	TAY	TAY
Ilipinar (V-VI)	4700-4300	TAY	TAY
Ormanfidanligi	4300-3300	T. Efe	Orman Fidanligi
Küllüoba TP	3300-3000	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Küllüoba EBA I	3000-2700	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Küllüoba EBA II	2700-2400	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Küllüoba EBA III	2400-2000	C. Y. Gündem	Die Funde von Wild-und Haussäugertiren aus dem Bronzezeitlichen Küllüoba
Demircihüyük/E. E.B.A	3100-2700	Rau	Knochenfunde von Säugertieren aus dem Demircihüyük
Demircihüyük/L. E.B.A	2700-2400	Rau	Knochenfunde von Säugertieren aus dem Demircihüyük
Karataş-Semayük.	EBA I-II-III	B. Hesse & D. Perkins	Faunal remains from Karataş-Semayük. In SW Anatolian: An Interim Report
Bogazköy CA	5000	von den Driesch	Bogazköy-Berichte 7
Bogazköy EBA	2000	von den Driesch	Bogazköy-Berichte 7
Korucutepe EBA	2600-2300	M.N. van Loon	Korucutepe 1
Lidar Höyük EBA	3000-2000	Kussinger	Tierknochenfunde vom Lidar Höyük in Südostanatolian

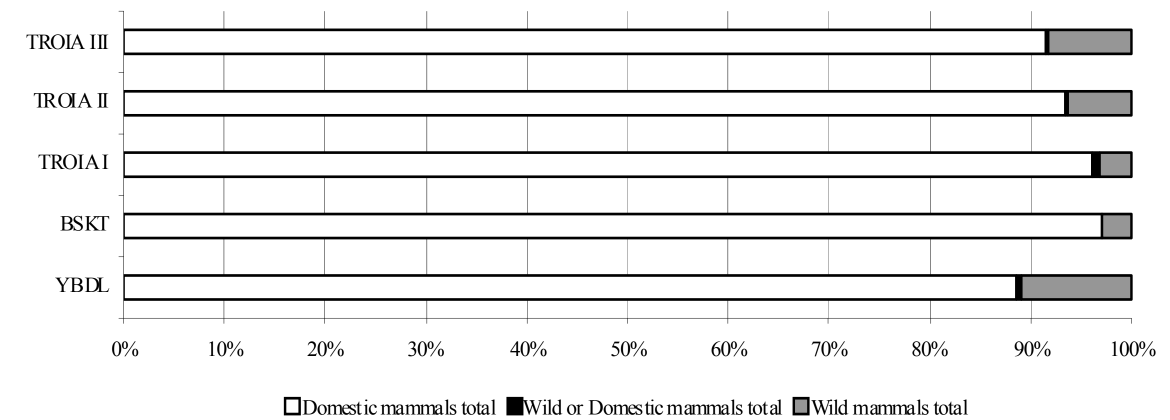

Fig. 4-12: Number of identified mammal remains from Troy III, Troy II, Troy I, Beşik-Yassıtepe and Yenibademli.

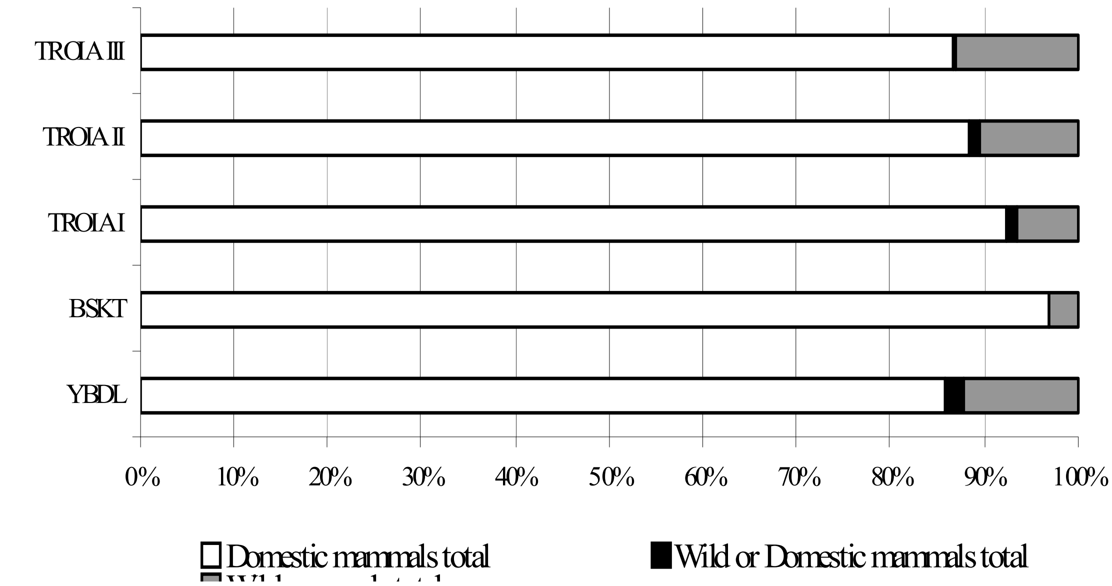

Fig. 4-13: Weight distribution of identified mammal remains from Troy III, Troy II, Troy I, Beşik-Yassıtepe and Yenibademli.

4.4.1. Distribution of Domestic Animals in the Troas and Yenibademli

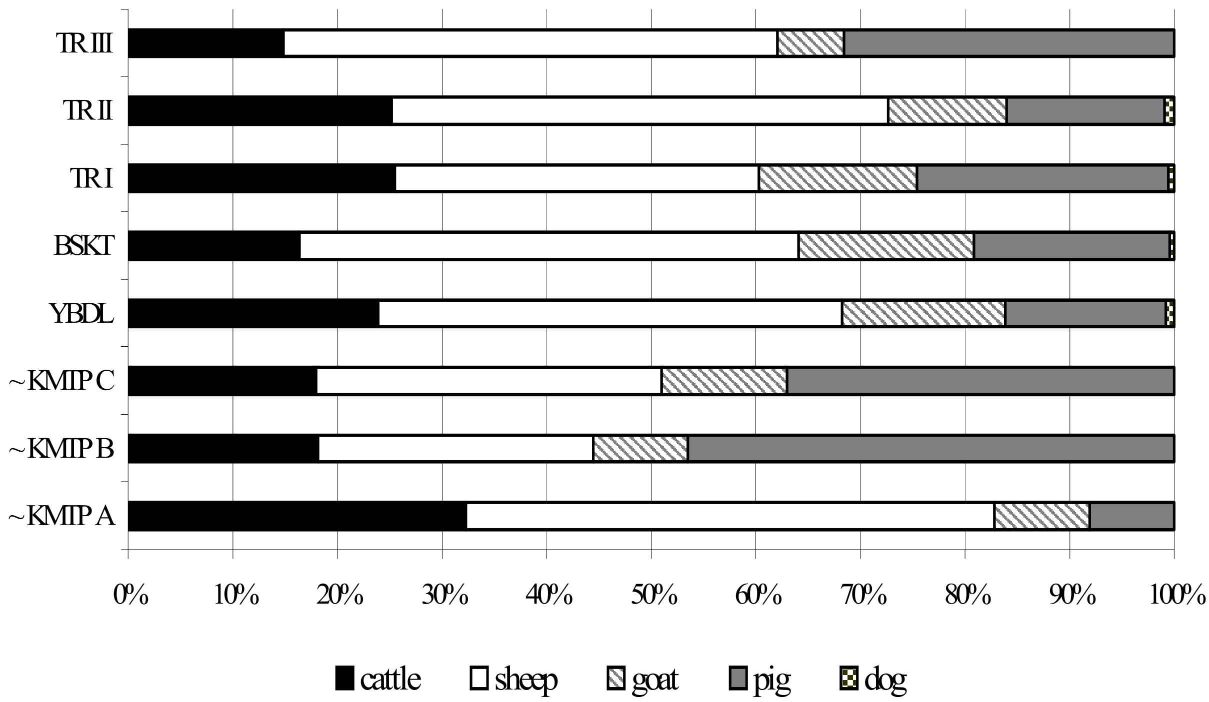

Fig. 4-14: Number of identified mammal remains in the Troas settlements: Troy III, Troy II, Troy I, Beşik-Yassıtepe, Yenibademli, ~ Kumtepe C, ~ Kumtepe B and ~ Kumtepe A.

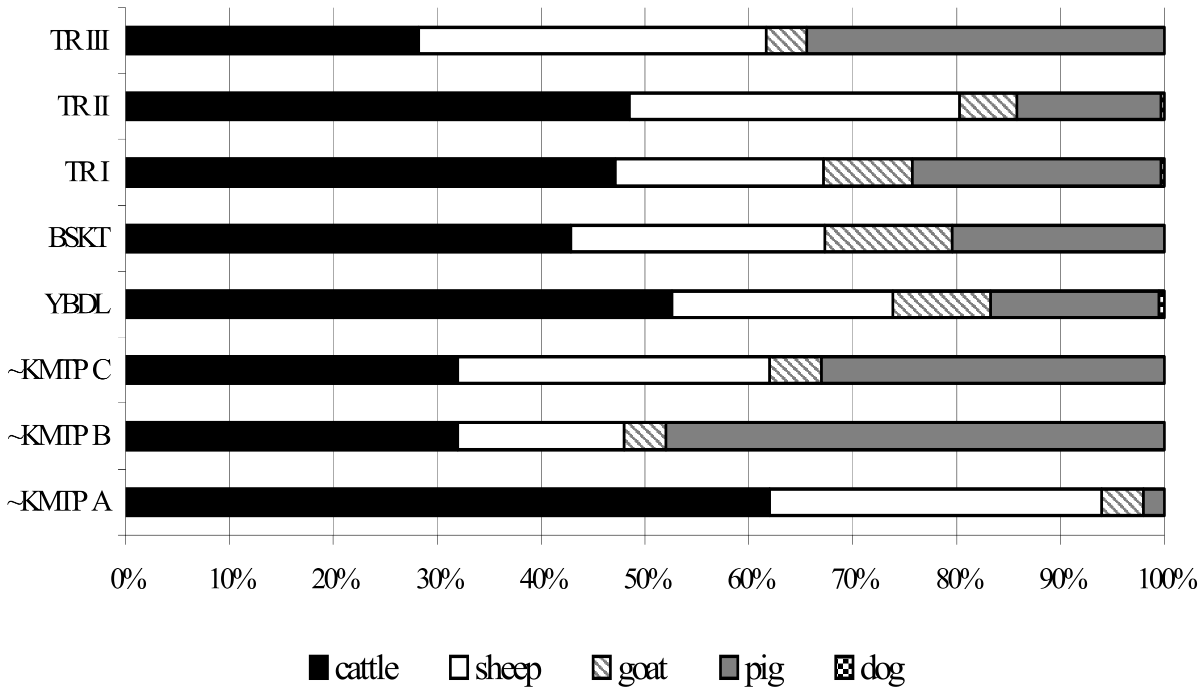

Fig. 4-15: Weight distribution of identified mammal remains in the Troas settlements. Troy III, Troy II, Troy I, Beşik-Yassıtepe, Yenibademli, ~ Kumtepe C, ~ Kumtepe B and ~ Kumtepe A.

4.5. Animal Bone Material from Ulucak

Tab. 4-10: Species list for the Copper Age of Ulucak.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
Cattle BOS	434	21,79	10285,00	47,40
Sheep, OVIS	51	2,56	547,60	2,52
Goat, CAPRA	22	1,10	459,00	2,12
Sheep or Goat, CAPRA/OVIS	1040	52,21	4650,90	21,43
Pig, SUS	114	5,72	1107,50	5,10
Dog, CANIS	17	0,85	155,10	0,71
Domestic mammals total	**1678**	**84,24**	**17205,10**	**79,29**
Wild or Domestic Cattle	16	0,80	393,00	1,81
Wild Boar or Pig	6	0,30	163,00	0,75
Wild or Domestic mammals total	**22**	**1,10**	**556,00**	**2,56**
Rodentia uniden., small	2	0,10	1,00	0,00
Hare, *Lepus capensis/europaeus*	19	0,95	43,20	0,20
Fox, *Vulpes vulpes*	2	0,10	5,20	0,02
Carnivora uniden., small	1	0,05	11,00	0,05
Carnivora uniden., large	2	0,10	3,90	0,02
Wild Boar, *Sus scrofa*	7	0,35	247,00	1,14
Fallow deer, *Dama dama*	247	12,40	3478,90	16,03
Red deer, *Cervus elaphus*	2	0,10	42,00	0,19
Roe deer, *Capreolus capreolus*	5	0,25	33,70	0,16
Cervidae uniden.	4	0,20	51,00	0,24
Aurochs, *Bos primigenius*	1	0,05	21,00	0,10
Wild mammals total	**292**	**14,66**	**3937,90**	**18,15**
unidentified, medium	810	71,68	2082,50	47,54
unidentified, medium to large	172	15,22	940,00	21,46
unidentified, large	148	13,10	1357,60	30,99
unidentified mammal remains total	**1130**	**100,00**	**4380,10**	**100,00**
identified mammal remains total	**1992**	**63,81**	**21699,00**	**83,20**
unidentified mammal remains total	**1130**	**36,19**	**4380,10**	**16,80**
mammal remains total	**3122**	**100,00**	**26079,10**	**100,00**
Aves uniden.	2	3,28	5,30	2,83
Pisces uniden.	1	1,64	0,10	0,05
Reptilia uniden.	9	14,76	39,50	21,07
Shells	49	80,33	142,60	76,05
not mammal remains	**61**	**100,00**	**187,50**	**100,00**
mammal remains total	**3122**	**98,08**	**26079,10**	**99,29**
not mammal remains total	**61**	**1,92**	**187,50**	**0,71**
processed material TOTAL	**3183**	**100,00**	**26266,60**	**100,00**

Tab. 4-11: Species list for the Early Bronze Age of Ulucak.

TAXONOMY	**NISP**	**NIS-%**	**WIS(g)**	**WIS-%**
Cattle BOS	200	16,72	5679,10	30,42
Sheep, OVIS	62	5,18	814,30	4,36
Goat, CAPRA	23	1,92	391,10	2,10
Sheep or Goat, CAPRA/OVIS	454	37,96	2914,60	15,61
Pig, SUS	177	14,80	3424,10	18,34
Dog, CANIS	16	1,34	142,40	0,76
Domestic mammals total	**932**	**77,93**	**13365,60**	**71,60**
Wild Boar or Pig	11	0,92	327,00	1,75
Wild or Domestic mammals total	**11**	**0,92**	**327,00**	**1,75**
Hare, *Lepus capensis/europaeus*	5	0,42	27,30	0,15
Wild Boar, *Sus scrofa*	8	0,67	253,90	1,36
Fallow deer, *Dama dama*	228	19,06	4499,50	24,10
Roe deer, *Capreolus capreolus*	9	0,75	162,30	0,87
Cervidae uniden.	3	0,25	31,20	0,17
Wild mammals total	**253**	**21,15**	**4974,20**	**26,65**
unidentified, medium	249	56,21	754,70	32,87
unidentified, medium to large	127	28,67	804,40	35,04
unidentified, large	67	15,12	736,60	32,09
unidentified mammal remains total	**443**	**100,00**	**2295,70**	**100,00**
identified mammal remains total	**1196**	**72,97**	**18666,80**	**89,05**
unidentified mammal remains total	**443**	**27,03**	**2295,70**	**10,95**
mammal remains total	**1639**	**100,00**	**20962,50**	**100,00**
Aves uniden.	1	0,15	0,50	0,03
Reptilia uniden.	3	0,44	7,00	0,46
Shells	681	99,42	1524,70	99,51
not mammal remains	**685**	100,00	**1532,20**	100,00
mammal remains total	**1639**	**70,52**	**20962,50**	**93,19**
not mammal remains total	**685**	**29,48**	**1532,50**	**6,81**
processed material TOTAL	**2324**	**100,00**	**22494,70**	**100,00**

4.6. Animal Bone Material from Küllüoba

Tab. 4-12: Species list for the Transition Period (TP) of Küllüoba

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
unidentified, small to medium	5	2,50	1,60	0,20
unidentified, medium	82	41,00	135,20	18,50
unidentified, medium to large	13	6,50	38,00	5,20
unidentified, large	100	50,00	557,30	76,10
unidentified mammal remains total	**200**	**100,00**	**732,10**	**100,00**
Cattle BOS	111	22,38	2577,10	40,41
Sheep, OVIS	21	4,23	327,70	5,14
Goat, CAPRA	8	1,61	69,60	1,09
Sheep or Goat, CAPRA/OVIS	218	43,95	1123,20	17,61
Pig, SUS	78	15,73	912,60	14,31
Dog, CANIS	14	2,82	150,10	2,35
Domestic mammals total	**450**	**90,73**	**5160,30**	**80,92**
Wild or Domestic Cattle	5	1,01	364,20	5,71
Wild or Domestic Sheep	3	0,60	81,00	1,27
Wild or Domestic Sheep/Goat	6	1,21	71,60	1,12
Wild Boar or Pig	3	0,60	36,20	0,57
Wild or Domestic mammals total	**17**	**3,43**	**553,00**	**8,67**
Rodentia uniden., small	1	0,20	0,40	0,01
Hare, *Lepus capensis/europaeus*	4	0,81	10,00	0,16
Fox, *Vulpes vulpes*	2	0,40	3,00	0,05
Equidae uniden.	5	1,01	78,00	1,22
Equus hydruntinus	4	0,81	161,00	2,52
Wild Boar, *Sus scrofa*	1	0,20	17,00	0,27
Fallow deer, *Dama dama*	3	0,60	48,10	0,75
Red deer, *Cervus elaphus*	4	0,81	131,00	2,05
Cervidae uniden.	1	0,20	157,00	2,46
Aurochs, *Bos primigenius*	2	0,40	20,00	0,31
Wild Goat, *Capra aegagrus*	1	0,20	9,40	0,15
Wild Sheep, *Ovis orientalis*	1	0,20	29,00	0,45
Wild mammals total	**29**	**5,85**	**663,90**	**10,41**
identified mammal remains total	**496**	**71,30**	**6377,20**	**89,70**
unidentified mammal remains total	**200**	**28,70**	**732,10**	**10,30**
mammal remains total	**696**	**100,00**	**7109,30**	**100,00**

Tab. 4-13: Species list for the EBA I of Küllüoba.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
unidentified, medium	146	55,70	224,40	23,80
unidentified, medium to large	3	1,10	6,00	0,60
unidentified, large	112	42,70	708,80	75,50
unidentified	1	0,40	0,10	0,00
unidentified mammal remains total	**262**	**100,00**	**939,10**	**100,00**
Cattle BOS	173	25,63	2833,70	42,36
Sheep, OVIS	34	5,04	261,40	3,91
Goat, CAPRA	12	1,78	135,30	2,02
Sheep or Goat, CAPRA/OVIS	358	53,04	1510,20	22,57
Pig, SUS	21	3,11	179,60	2,68
Dog, CANIS	5	0,74	32,40	0,48
Domestic mammals total	**603**	**89,33**	**4952,60**	**74,03**
Wild or Domestic Cattle	12	1,78	475,00	7,10
Cattle oder Red deer	5	0,74	55,70	0,83
Wild or Domestic Sheep	13	1,93	135,20	2,02
Wild or Domestic Goat	2	0,30	65,00	0,97
Wild or Domestic Sheep/Goat	7	1,04	75,50	1,13
Wild Boar or Pig	2	0,30	32,10	0,48
Wild or Domestic mammals total	**41**	**6,07**	**838,50**	**12,53**
Hare, *Lepus capensis/europaeus*	2	0,30	2,50	0,04
Wild Horse, *Equus ferus*	1	0,15	106,00	1,58
Equidae uniden.	2	0,30	15,40	0,23
Equus hydruntinus	4	0,59	292,00	4,36
Fallow deer, *Dama dama*	6	0,89	54,90	0,82
Aurochs, *Bos primigenius*	2	0,30	219,00	3,27
Wild sheep, *Ovis orientalis*	13	1,93	179,10	2,68
Caprinae uniden.	1	0,15	30,00	0,45
Wild mammals total	**31**	**4,59**	**898,90**	**13,44**
identified mammal remains total	**675**	**72,04**	**6690,00**	**87,69**
unidentified mammal remains total	**262**	**27,96**	**939,10**	**12,31**
mammal remains total	**937**	**100,00**	**7629,10**	**100,00**
not mammal remains	**5**	**100**	**10,20**	**100**
mammal remains total	**937**	**99,47**	**7629,10**	**99,87**
not mammal remains total	**5**	**0,53**	**10,20**	**0,13**
processed material TOTAL	**942**	**100,00**	**7639,30**	**100,00**

Tab. 4-14: Species list for the EBA II&III of Küllüoba.

TAXONOMY	NIS	NIS-%	WIS(g)	WIS-%
unidentified, small	1	0,06	0,50	0,01
unidentified, small to medium	10	0,56	6,70	0,10
unidentified, medium	872	48,55	1579,20	23,91
unidentified, medium to large	11	0,61	86,20	1,30
unidentified, large	900	50,11	4932,70	74,68
unidentified	2	0,11	0,20	0,00
unidentified mammal remains total	**1796**	**100,00**	**6605,50**	**100,00**
Cattle BOS	1441	27,87	29800,50	49,32
Sheep, OVIS	273	5,28	3302,20	5,47
Goat, CAPRA	66	1,28	957,90	1,59
Sheep or Goat, CAPRA/OVIS	2322	44,91	10811,70	17,89
Pig, SUS	680	13,15	9942,20	16,45
Dog, CANIS	135	2,61	1230,30	2,04
Domestic mammals total	**4917**	**95,11**	**56044,80**	**92,76**
Wild or Domestic Cattle	10	0,19	275,00	0,46
Hausrind oder Red deer	8	0,15	102,10	0,17
unidentified smaller ruminant	49	0,95	650,7	1,08
Wild Boar or Pig	25	0,48	605,40	1,00
Equidae uniden.	3	0,06	132,00	0,22
Wolf or Dog	4	0,08	22,80	0,04
Canidae uniden.	2	0,04	4,30	0,01
Wild or Domestic mammals total	**101**	**1,95**	**1792,30**	**2,97**
Rodentia uniden., small	12	0,23	14,30	0,02
Hare, *Lepus capensis/europaeus*	15	0,29	46,90	0,08
Wolf, *Canis lupus*	1	0,02	12,00	0,02
Fox, *Vulpes vulpes*	16	0,31	109,70	0,18
Hyaena hyaena	1	0,02	28,00	0,05
Carnivora uniden., mittel	1	0,02	8,00	0,01
Equidae uniden.	2	0,04	31,00	0,05
Equus hydruntinus	2	0,04	54,00	0,09
Wild Boar, *Sus scrofa*	8	0,15	247,50	0,41
Fallow deer, *Dama dama*	38	0,74	517,00	0,86
Red deer, *Cervus elaphus*	10	0,19	224,20	0,37
Cervidae uniden.	6	0,12	152,30	0,25
Aurochs, *Bos primigenius*	10	0,19	581,00	0,96
Wild Goat, *Capra aegagrus*	5	0,10	69,90	0,12
Wild Sheep, *Ovis orientalis*	25	0,48	489,50	0,81
Wild mammals total	**152**	**2,94**	**2685,30**	**4,44**
identified mammal remains total	**5170**	**74,22**	**60422,40**	**90,15**
unidentified mammal remains total	**1796**	**25,78**	**6605,50**	**9,85**
mammal remains total	**6966**	**100,00**	**67027,90**	**100,00**
not mammal remains	**21**	**100,00**	**106,20**	**100,00**
mammal remains total	**6966**	**99,70**	**67027,90**	**99,84**
not mammal remains total	**21**	**0,30**	**106,20**	**0,16**
processed material TOTAL	**6987**	**100,00**	**67134,10**	**100,00**

5. Remarks on the Domestic Fauna of Troy

5.1. Sheep, OVIS and Goat, CAPRA

5.1.1. Small ruminants and the relationship of sheep to goat among mammal remains

Tab. 5-1: The Ratio between identified Sheep and Goat and possible NIS and NIS% as well as WIS and WIS% among the Sheep, Goat and small ruminants in the assemblage of identified mammal remains.

Number

TR I	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep		~ 3683	~ 33,46
Goat	~ 2,30 : 1	~ 1600	~ 14,54

TR II	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep		~ 1499	~ 44,30
Goat	~ 4,20 : 1	~ 357	~ 10,56

TR III	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep		~ 654	~ 43,19
Goat	~ 7,45 : 1	~ 88	~ 5,82

TROY MT	**Ratio between Sheep and Goat**	**NIS**	**NIS%**
Sheep		~ 6370	~ 36,81
Goat	~ 2,90 : 1	~ 2196	~ 12,69

Weight

TR I	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep		~ 16600	~ 18,52
Goat	~2,35 : 1	~ 7058,5	~ 7,87

TR II	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep		~ 6830	~ 28,11
Goat	~5,83 : 1	~ 1176,4	~ 4,85

TR III	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep		~ 2827	~ 28,98
Goat	~8,59 : 1	~ 330,2	~ 3,39

TROY MT	**Ratio between Sheep and Goat**	**WIS(g)**	**WIS%**
Sheep		~ 29261	~ 21,64
Goat	~3,26 : 1	~ 8976,5	~ 6,64

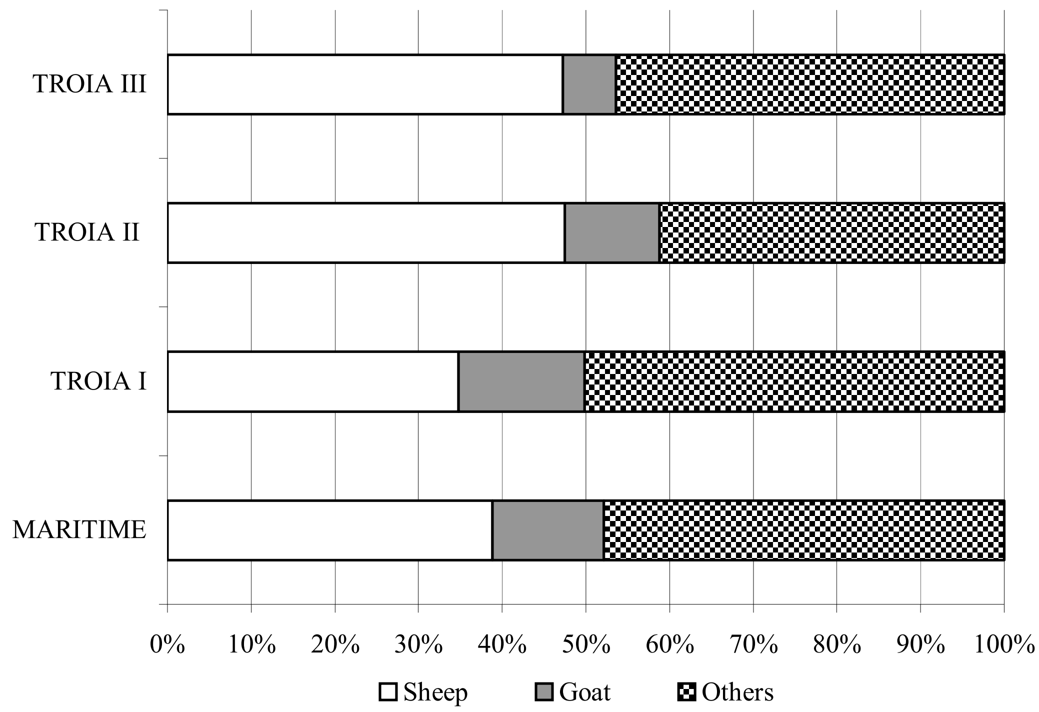

Fig. 5-1: Number of the identified bone remains from goat, sheep and other mammal remains among the identified mammal remains after re-calculations from Troy I, Troy II, Troy III and during the Maritime Troy Culture.

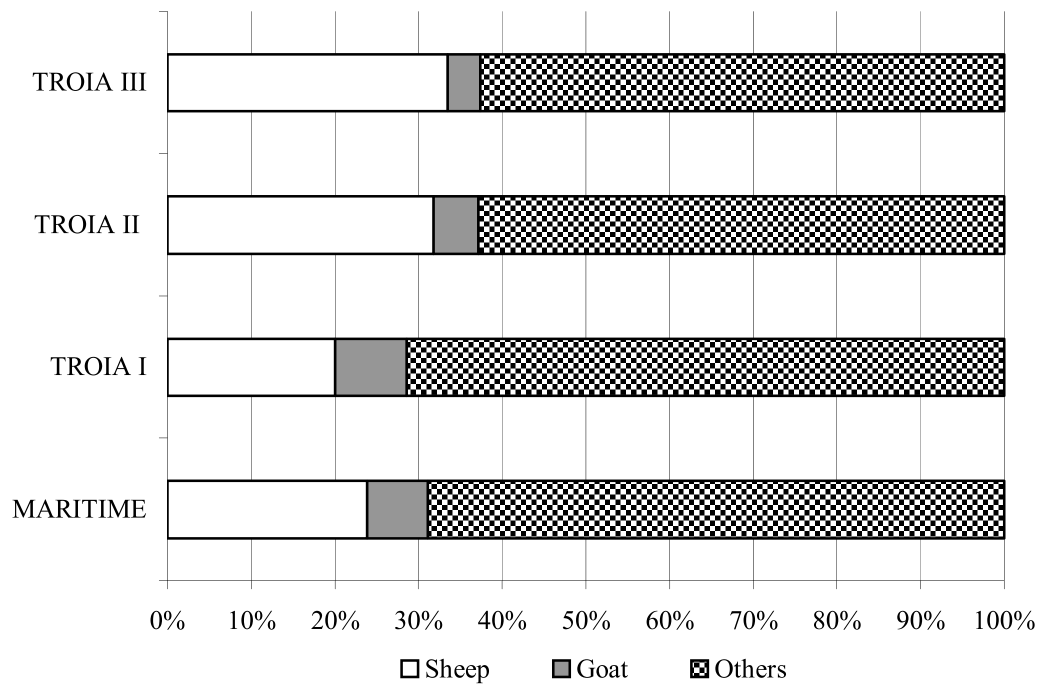

Fig. 5-2: Weight of the identified bone remains from goat, sheep and other mammals among the identified mammal remains after re-calculations for Troy I, Troy II, Troy III and during the Maritime Troy Culture.

5.1.2. The bone distribution of sheep, goat and sheep/goat

Tab. 5-2 A: The distribution of sheep remains form Troy I.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	22	4,87	102,00	2,27
skull with horn core	4	0,88	49,10	1,09
skull	11	2,43	136,40	3,04
mandible	24	5,31	472,60	10,53
loose teeth	46	10,18	321,30	7,16
head total	**107**	**23,67**	**1081,40**	**24,10**
vertebra	2	0,44	25,50	0,57
ribs	1	0,22	0,90	0,02
rump total	**3**	**0,66**	**26,40**	**0,59**
scapula	26	5,75	368,70	8,22
humerus	43	9,51	650,30	14,49
radius and ulna	54	11,95	569,70	12,69
carpals	2	0,44	2,70	0,06
metacarpal	37	8,19	327,30	7,29
front leg total	**162**	**35,84**	**1918,70**	**42,75**
pelvis	19	4,21	271,20	6,04
femur	7	1,55	73,20	1,63
tibia	36	7,96	470,70	10,49
astragalus	22	4,87	117,10	2,61
calcaneus	36	7,96	246,20	5,49
tarsals	4	0,88	15,00	0,33
metatarsal	13	2,88	130,30	2,90
hind leg total	**137**	**30,32**	**1323,70**	**29,49**
indet. metapodial	3	0,66	9,00	0,20
indet. phalanges	40	8,85	128,70	2,87
TOTAL	**452**	**100,00**	**4487,90**	**100,00**

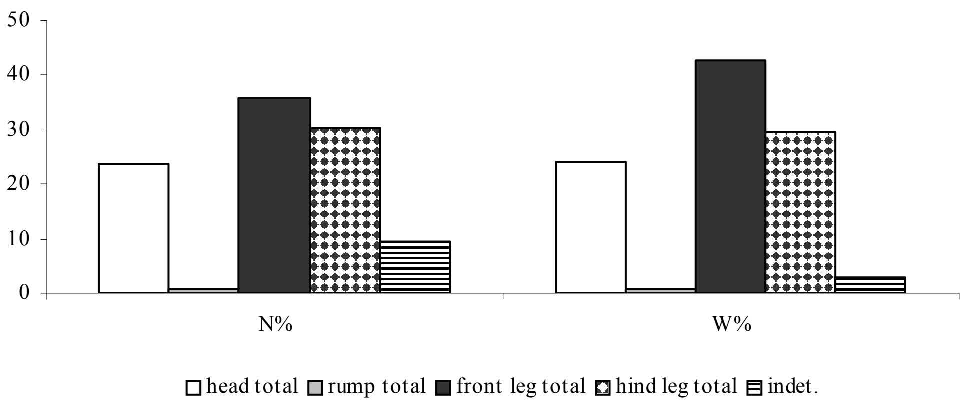

Fig. 5-3 A: The distribution of sheep remains for Troy I.

Tab. 5-2 B: The distribution of sheep remains form Troy II.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	2	1,08	23,00	1,14
skull with horn core	1	0,54	9,30	0,46
skull	5	2,70	84,00	4,17
mandible	11	5,95	285,00	14,14
loose teeth	6	3,24	24,70	1,23
head total	**25**	**13,51**	**426,00**	**21,14**
scapula	10	5,41	124,80	6,19
humerus	17	9,19	271,20	13,46
radius and ulna	29	15,68	234,40	11,63
carpals	4	2,16	5,00	0,25
metacarpal	16	8,65	196,70	9,76
front leg total	**76**	**41,09**	**832,10**	**41,29**
pelvis	8	4,32	56,90	2,82
femur	4	2,16	78,00	3,87
tibia	24	12,97	307,20	15,24
astragalus	6	3,24	34,10	1,69
calcaneus	19	10,27	115,60	5,74
tarsals	1	0,54	6,00	0,30
metatarsal	9	4,86	123,40	6,12
post. phalanges	1	0,54	1,80	0,09
hind leg total	**72**	**38,91**	**723,00**	**35,87**
indet. phalanges	12	6,49	34,40	1,71
TOTAL	**185**	**100,00**	**2015,50**	**100,00**

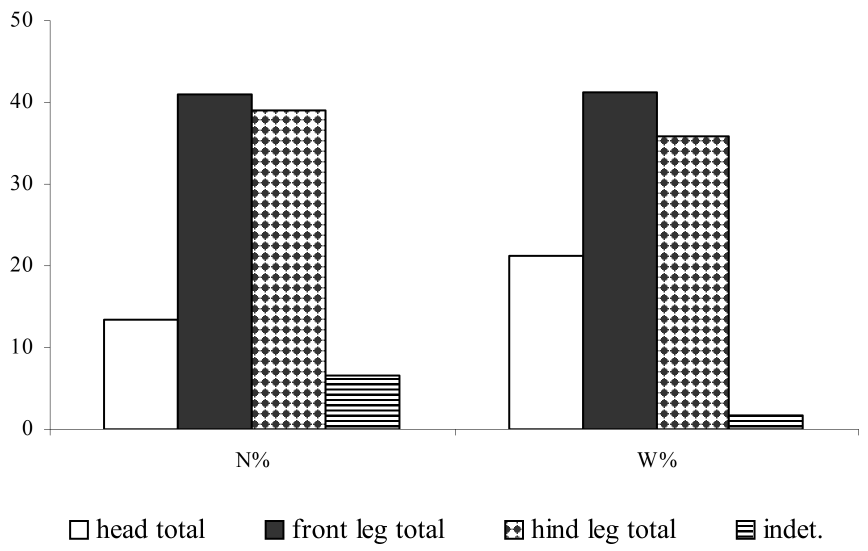

Fig. 5-3 B: The distribution of sheep remains for Troy II.

Tab. 5-2 C: The distribution of sheep remains form Troy III.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
skull	3	2,52	24,00	2,14
mandible	10	8,40	292,00	26,02
loose teeth	9	7,56	38,40	3,42
head total	**22**	**18,48**	**354,40**	**31,58**
scapula	4	3,36	34,60	3,08
humerus	13	10,92	160,30	14,29
radius and ulna	11	9,24	60,20	5,37
carpals	1	0,84	3,00	0,27
metacarpal	7	5,88	49,80	4,44
front leg total	**36**	**30,25**	**307,90**	**27,45**
pelvis	8	6,72	67,70	6,03
femur	4	3,36	54,00	4,81
tibia	11	9,24	139,60	12,44
astragalus	12	10,08	71,60	6,38
calcaneus	6	5,04	34,80	3,10
metatarsal	5	4,20	53,20	4,74
hind leg total	**46**	**38,65**	**420,90**	**37,51**
indet. phalanges	15	12,62	38,80	3,46
TOTAL	**119**	**100,00**	**1122,00**	**100,00**

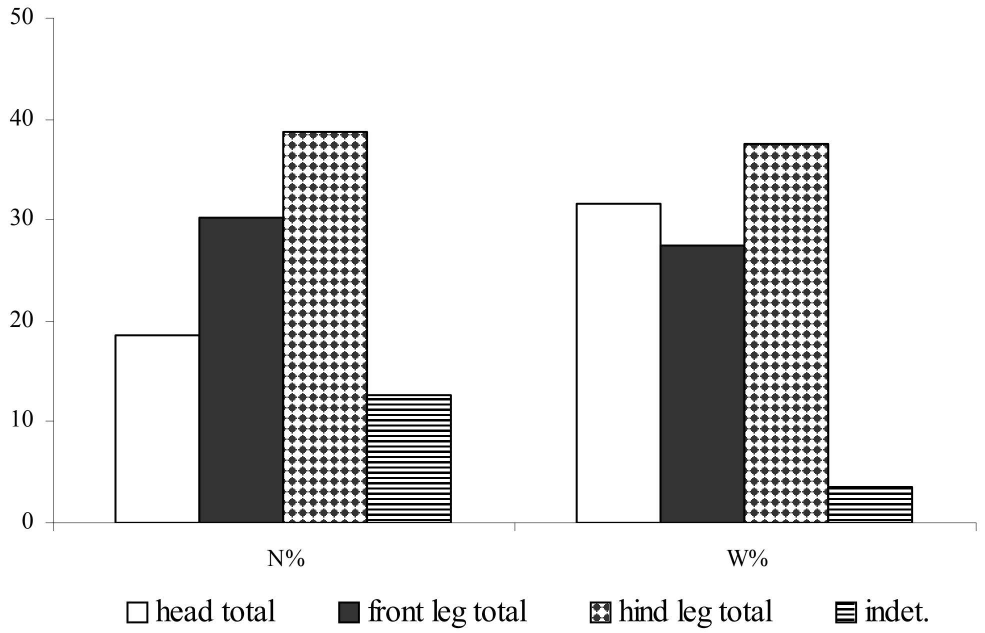

Fig. 5-3 C: The distribution of sheep remains for Troy III.

Tab. 5-2 D: The distribution of sheep remains form Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	25	2,84	127,00	1,41
skull with horn core	6	0,68	61,40	0,68
skull	19	2,16	244,40	2,72
mandible	57	6,48	1313,60	14,63
loose teeth	72	8,18	446,40	4,97
head total	**179**	**20,34**	**2192,80**	**24,42**
vertebra	2	0,23	25,50	0,28
ribs	1	0,11	0,90	0,01
rump total	**3**	**0,34**	**26,40**	**0,29**
scapula	50	5,68	634,10	7,06
humerus	87	9,89	1282,80	14,28
radius and ulna	155	13,07	1073,30	11,95
carpals	7	0,80	10,70	0,12
metacarpal	68	7,73	647,80	7,21
front leg total	**367**	**37,16**	**3648,70**	**40,63**
pelvis	39	4,43	454,80	5,06
femur	16	1,82	218,20	2,43
tibia	85	9,66	1083,50	12,07
astragalus	47	5,34	262,80	2,93
calcaneus	69	7,83	452,60	5,04
tarsale	7	0,80	27,00	0,30
metatarsal	36	4,09	396,90	4,42
post. phalanges	1	0,11	1,80	0,02
hind leg total	**300**	**34,08**	**2897,60**	**32,26**
indet. metapodial	3	0,34	9,00	0,11
indet. phalanges	68	7,73	205,90	2,29
TOTAL	**880**	**100,00**	**8980,40**	**100,00**

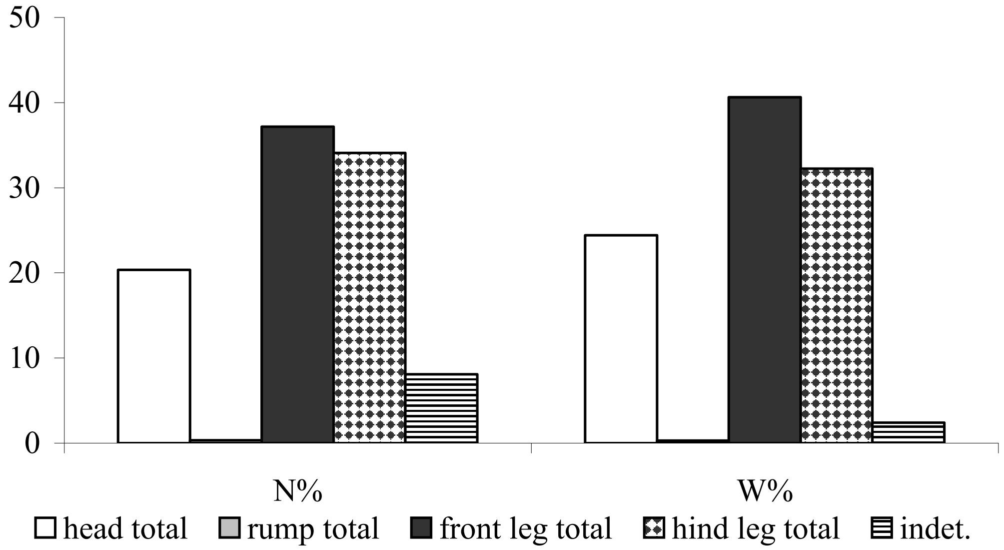

Fig. 5-3 D: The distribution of sheep remains for Maritime Troy Culture.

Tab. 5-3: The distribution of the comparative sheep skeletal form a Cameroon hair sheep.

skeletal element :	N	N%	W- (g)	W%
Skull	1	**0.56**		
Face	1	**0.56**	172	**14.76**
Jaws	2	**1.12**	65	**5.58**
Teeth	32	**17.88**		
Zungenbein	2	**1.12**	1	**0.09**
head total	**38**	**21.23**	**238**	**20.42**
Vertebra	27	**15.08**	240	**20.59**
Rips and sternum	26	**14.53**	142	**12.18**
rump total	**53**	**29.61**	**382**	**32.78**
Scapula	2	**1.12**	43	**3.69**
Humerus	2	**1.12**	67	**5.75**
Radius/Ulna	4	**2.23**	63	**5.41**
Metacarpus	2	**1.12**	37	**3.17**
Phalangen 1-2-3 anterior	12	**6.70**	20	**1.72**
Basispodium/Sesamknochen	24	**13.41**	14	**1.20**
front leg	**46**	**25.70**	**244**	**20.94**
Pelvis	2	**1.12**	49	**4.20**
Femur	2	**1.12**	79	**6.78**
Tibia	2	**1.12**	86	**7.38**
Patella	2	**1.12**	4	**0.34**
Talus	2	**1.12**	9	**0.77**
Calcaneus	2	**1.12**	11	**0.94**
Metatarsus	2	**1.12**	39	**3.35**
Phalanges 1-2-3 posterior	12	**6.70**	14.4	**1.24**
Basipodium/Sesamknochen	20	**11.17**	10	**0.86**
hind leg	**46**	**25.70**	**301.4**	**25.86**
sum	**179**	**100.00**	**1165.4**	**100.00**

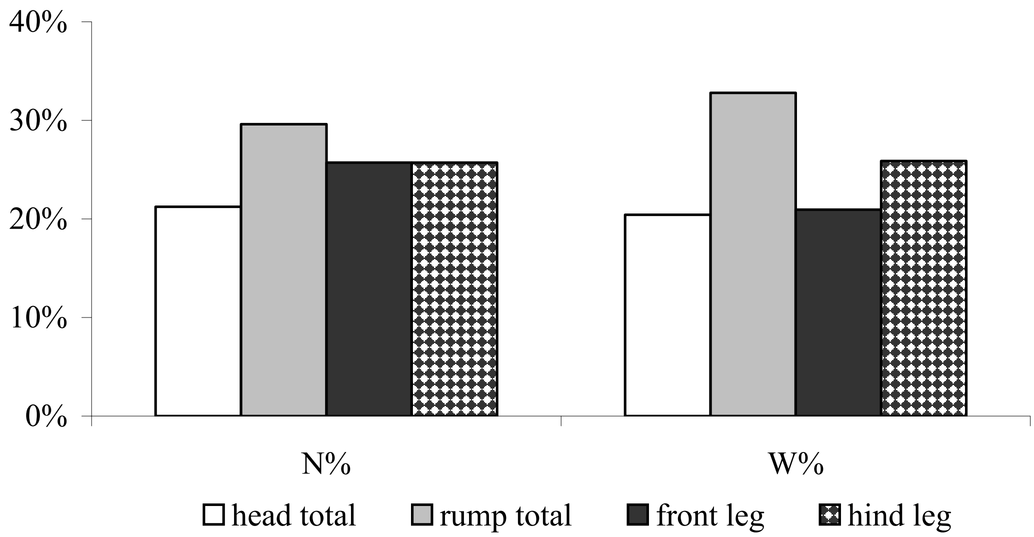

Fig. 5-4: The distribution of skeletal parts among Cameroon hairy sheep.

Tab. 5-4 A: The distribution of goat remains form Troy I.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	17	8,50	116,20	6,09
skull with horn core	7	3,50	76,90	4,03
skull	7	3,50	109,00	5,72
mandible	15	7,50	191,60	10,04
loose teeth	14	7,00	138,60	7,26
head total	**60**	**30,00**	**632,30**	**33,15**
vertebra	1	0,50	7,00	0,37
rump total	**1**	**0,50**	**7,00**	**0,37**
scapula	11	5,50	121,90	6,39
humerus	21	10,50	291,90	15,30
radius and ulna	24	12,00	271,90	14,25
metacarpal	9	4,50	69,90	3,66
front leg total	**65**	**32,50**	**755,60**	**39,60**
pelvis	13	6,50	94,00	4,93
femur	4	2,00	51,20	2,68
tibia	10	5,00	104,20	5,46
astragalus	11	5,50	56,10	2,94
calcaneus	10	5,00	56,80	2,98
metatarsal	9	4,50	102,30	5,36
hind leg total	**57**	**28,50**	**464,60**	**24,36**
indet. metapodial	2	1,00	8,00	0,42
indet. phalanges	15	7,50	40,30	2,11
TOTAL	**200**	**100,00**	**1907,80**	**100,00**

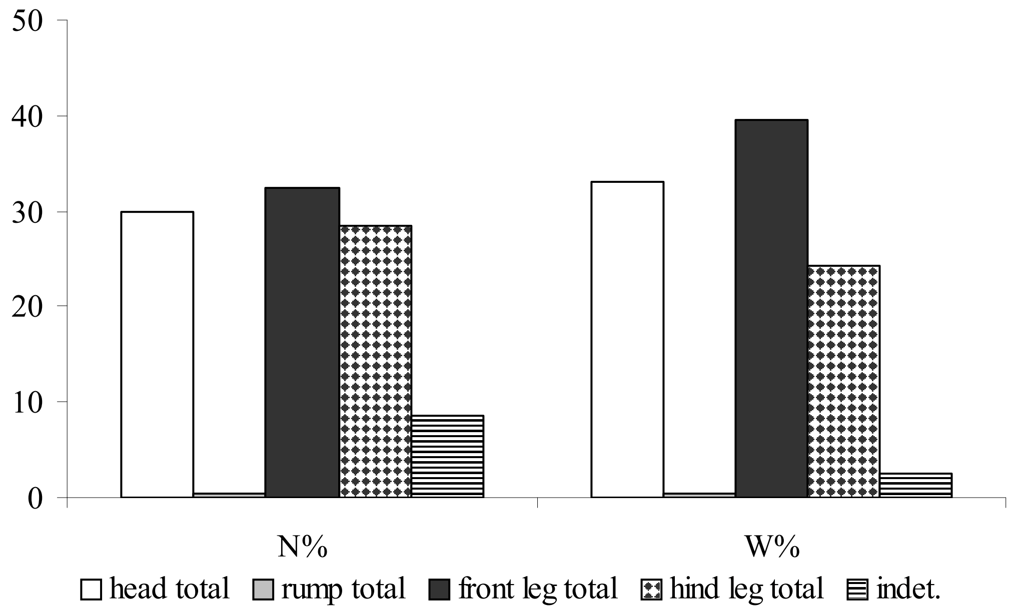

Fig. 5-5 A: The distribution of goat remains for Troy I.

Tab. 5-4 B: The distribution of goat remains form Troy II.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	1	2,27	6,60	1,91
skull with horn core	3	6,82	37,10	10,74
mandible	1	2,27	4,50	1,30
loose teeth	2	4,55	6,60	1,91
head total	**7**	**15,91**	**54,80**	**15,86**
scapula	4	9,09	42,00	12,16
humerus	6	13,64	71,00	20,55
radius and ulna	3	6,82	35,50	10,27
metacarpal	6	13,64	52,00	15,05
front leg total	**19**	**43,18**	**200,50**	**58,03**
tibia	3	6,82	33,30	9,64
astragalus	3	6,82	11,00	3,18
calcaneus	3	6,82	16,70	4,83
metatarsal	3	6,82	15,10	4,37
Hind leg total	**12**	**27,27**	**76,10**	**22,03**
indet. metapodial	2	4,55	2,10	0,61
indet. phalanges	4	9,09	12,10	3,50
TOTAL	**44**	**100,00**	**345,50**	**100,00**

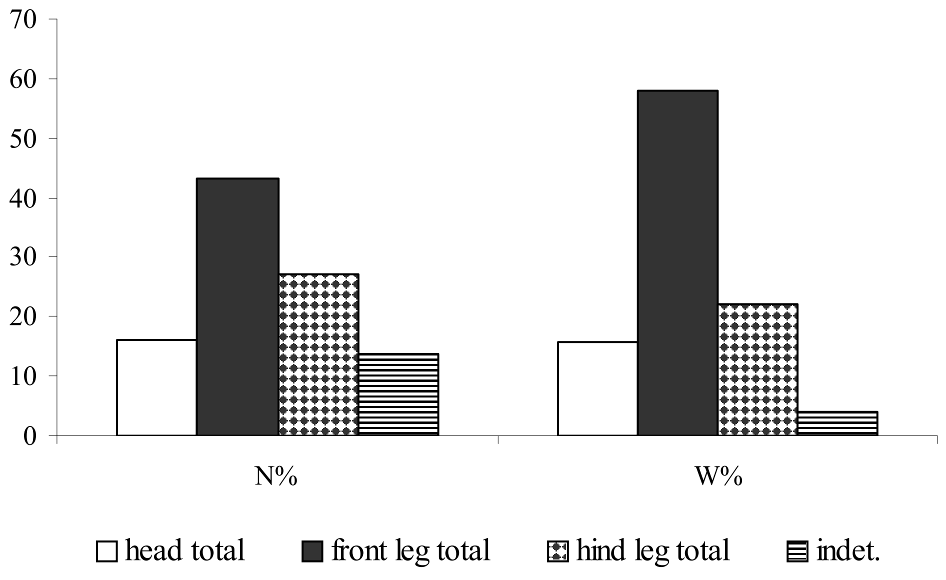

Fig. 5-5 B: The distribution of goat remains for Troy II.

Tab. 5-4 C: The distribution of goat remains form Troy III.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
skull	2	12,50	8,10	6,20
head total	**2**	**12,50**	**8,10**	**6,20**
scapula	3	18,75	24,00	18,38
radius and ulna	2	12,50	24,00	18,38
front leg total	**5**	**31,25**	**48,00**	**36,76**
pelvis	2	12,50	17,10	13,09
tibia	2	12,50	37,40	28,64
astragalus	1	6,25	6,00	4,59
calcaneus	2	12,50	10,00	7,66
post. phalanges	1	6,25	2,00	1,53
hind leg total	**8**	**50,00**	**72,50**	**55,51**
indet. phalanges	1	6,25	2,00	1,53
TOTAL	**16**	**100,00**	**130,60**	**100,00**

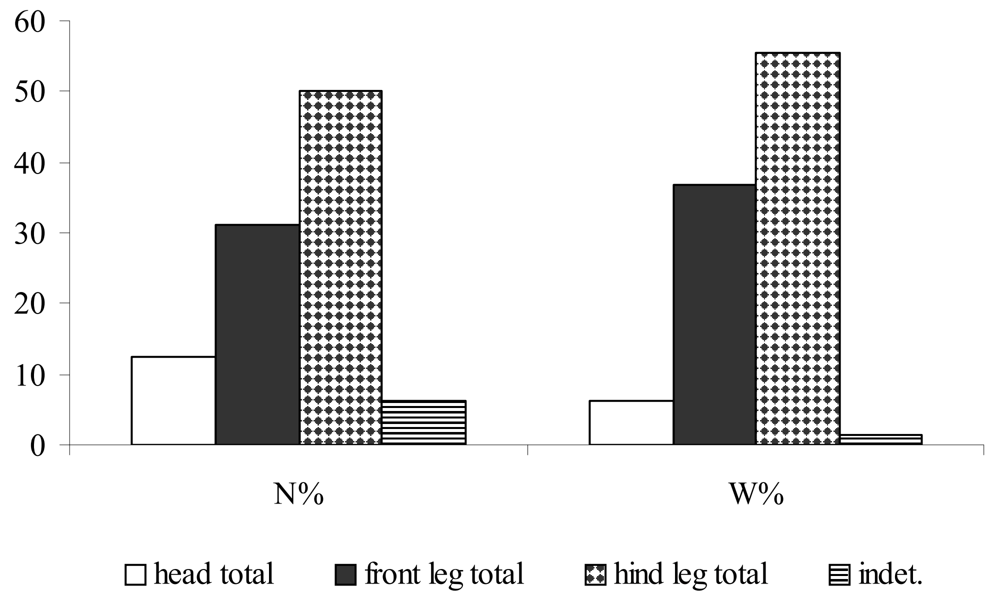

Fig.. 5-5 C: The distribution of goat remains for Troy III.

Tab. 5-4 D: The distribution of goat remains form the Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	22	7,19	149,80	5,38
skull with horn core	12	3,92	156,00	5,60
skull	8	2,61	10,2,10	3,67
face fragments	1	0,33	15,00	0,54
mandible	20	6,54	244,10	8,77
loose teeth	20	6,54	162,20	5,82
head total	**83**	**27,12**	**727,10**	**29,78**
vertebra	1	0,33	7,00	0,25
rump total	**1**	**0,33**	**7,00**	**0,25**
scapula	22	7,19	230,90	8,29
humerus	32	10,46	412,90	14,83
radius and ulna	32	10,46	363,40	13,05
metacarpal	18	5,88	147,90	5,31
front leg total	**104**	**33,99**	**1155,10**	**41,48**
pelvis	17	5,56	123,10	4,42
femur	5	1,63	58,20	2,09
tibia	18	5,88	212,90	7,64
astragalus	17	5,56	82,10	2,95
calcaneus	20	6,54	109,50	3,93
metatarsal	14	4,58	135,40	4,86
post. phalanges	1	0,33	2,00	0,07
hind leg total	**92**	**30,07**	**723,20**	**25,97**
indet. metapodial	4	1,31	8,00	0,29
indet. phalanges	22	7,18	62,40	2,23
TOTAL	**306**	**100,00**	**2784,90**	**100,00**

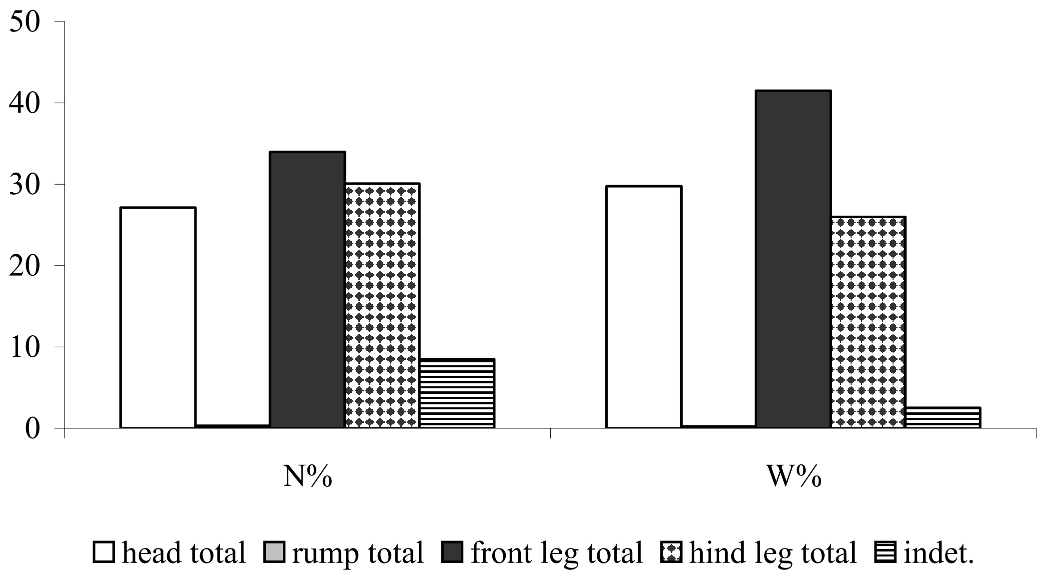

Fig. 5-5 D: The distribution of goat remains for the Maritime Troy Culture.

Tab. 5-5 A: The distribution of small ruminants remains form Troy I.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	13	0,28	28,50	0,17
skull with horn core	4	0,09	17,80	0,10
skull	222	4,79	669,90	3,88
face fragments	166	3,58	781,70	4,53
mandible	400	8,64	1723,70	9,99
loose teeth	521	11,25	2060,70	11,94
hyoid	4	0,09	9,40	0,05
head total	**1330**	**28,72**	**5291,70**	**30,66**
vertebra	450	9,72	1807,20	10,47
ribs	792	17,10	1130,70	6,55
rump total	**1242**	**26,82**	**2937,90**	**17,02**
scapula	226	4,88	822,40	4,76
humerus	242	5,23	1347,30	7,80
radius and ulna	336	7,26	1328,90	7,70
carpals	11	0,24	15,10	0,09
metacarpal	107	2,31	423,80	2,45
ant. phalanges	1	0,02	2,00	0,01
front leg total	**923**	**19,93**	**3939,50**	**22,82**
pelvis	167	3,61	790,30	4,58
femur	287	6,20	1221,30	7,07
patella	8	0,17	28,10	0,16
tibia	447	9,65	2348,10	13,60
astragalus	6	0,13	25,50	0,15
calcaneus	25	0,54	85,50	0,50
tarsals	8	0,17	23,20	0,13
metatarsal	100	2,16	355,10	2,06
post. phalanges	1	0,02	2,00	0,01
hind leg total	**1049**	**22,65**	**4879,10**	**28,27**
indet. metapodial	50	1,08	126,10	0,73
sesamoids	1	0,02	0,00	0,00
indet. phalanges	36	0,78	88,50	0,50
TOTAL	**4631**	**100,00**	**17262,80**	**100,00**

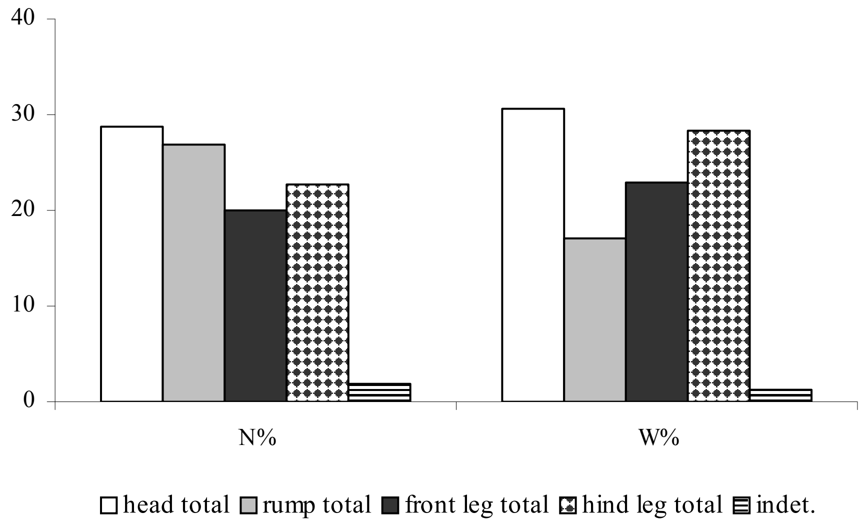

Fig. 5-6 A: The distribution of small ruminants remains for Troy I.

Tab. 5-5 B: The distribution of small ruminants remains form Troy II.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	5	0,31	15,10	0,27
skull with horn core	2	0,12	7,00	0,12
skull	39	2,40	128,60	2,28
face fragments	47	2,89	201,20	3,56
mandible	78	4,79	314,00	5,56
loose teeth	97	5,96	346,30	6,13
hyoid	1	0,06	0,20	0,00
head total	**269**	**16,53**	**1012,40**	**17,93**
vertebra	231	14,20	947,60	16,79
ribs	540	33,19	896,60	15,88
rump total	**771**	**47,39**	**1844,20**	**32,67**
scapula	68	4,18	206,60	3,66
humerus	70	4,30	392,50	6,95
radius and ulna	58	3,56	241,00	4,27
carpals	7	0,43	6,10	0,11
metacarpal	23	1,41	128,60	2,28
front leg total	**226**	**13,89**	**974,80**	**17,27**
pelvis	56	3,44	243,00	4,30
femur	94	5,78	523,80	9,28
patella	4	0,25	12,40	0,22
tibia	129	7,93	824,10	14,60
astragalus	3	0,18	5,00	0,09
calcaneus	7	0,43	19,00	0,34
tarsals	2	0,12	5,00	0,09
metatarsal	29	1,78	108,00	1,91
hind leg total	**324**	**19,91**	**1740,30**	**30,82**
indet. metapodial	9	0,55	20,10	0,36
indet. phalanges	28	1,72	53,60	0,95
TOTAL	**1627**	**100,00**	**5645,40**	**100,00**

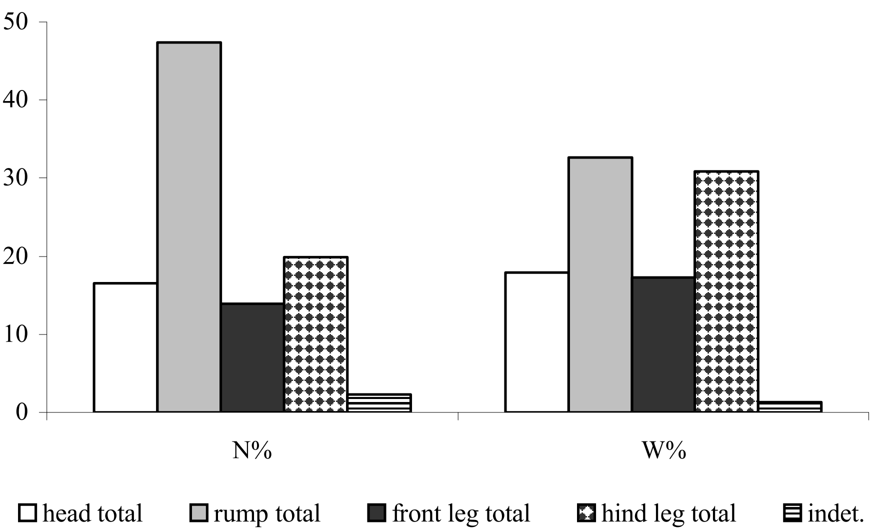

Fig. 5-6 B: The distribution of small ruminants remains for Troy II.

Tab. 5-5 C: The distribution of small ruminants remains form Troy III.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
skull	20	3,29	41,60	2,18
face fragments	23	3,79	109,80	5,76
mandible	20	3,29	70,30	3,69
loose teeth	42	6,92	160,50	8,43
head total	**105**	**17,29**	**382,20**	**20,06**
vertebra	107	17,64	405,70	21,30
ribs	194	31,96	298,30	15,66
rump total	**301**	**49,60**	**704,00**	**36,96**
scapula	23	3,79	53,00	2,78
humerus	30	4,94	139,00	7,30
radius and ulna	32	5,27	174,60	9,17
carpals	2	0,33	2,00	0,11
metacarpal	5	0,82	13,00	0,68
front leg total	**92**	**15,15**	**381,60**	**20,04**
pelvis	12	1,98	44,30	2,33
femur	29	4,78	119,40	6,27
patella	1	0,16	3,00	0,16
tibia	45	7,41	216,20	11,35
malleolare	1	0,16	1,00	0,05
astragalus	1	0,16	4,00	0,21
calcaneus	1	0,16	3,90	0,20
tarsals	1	0,16	2,00	0,11
metatarsal	11	1,81	34,00	1,79
hind leg total	**102**	**16,80**	**427,80**	**22,46**
indet. metapodial	2	0,33	3,00	0,16
indet. phalanges	5	0,82	6,00	0,32
TOTAL	**607**	**100,00**	**1904,60**	**100,00**

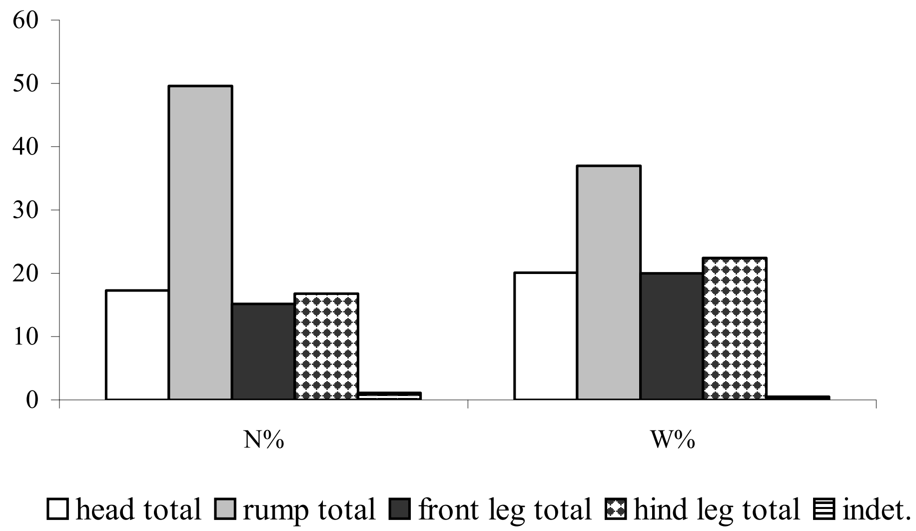

Fig. 5-6 C: The distribution of small ruminants remains for Troy III.

Tab. 5-5 D: The distribution of small ruminants remains form the Maritime Troy Culture.

skeletal elements:	**NIS**	**NIS-%**	**WIS-(g)**	**WIS-%**
horn core	19	0,25	44,60	0,16
skull with horn core	6	0,08	24,80	0,09
skull	297	3,89	905,10	3,27
face fragments	250	3,27	1136,50	4,11
mandible	549	7,18	2446,00	8,84
loose teeth	747	9,78	2920,50	10,56
hyoid	7	0,09	9,60	0,03
head total	**1875**	**24,54**	**7487,10**	**27,07**
vertebra	852	11,15	3401,50	12,30
ribs	1680	21,99	2564,20	9,27
rump total	**2532**	**33,14**	**5965,70**	**21,57**
scapula	337	4,41	1143,00	4,13
humerus	377	4,93	2077,80	7,51
radius and ulna	500	6,54	2039,50	7,37
carpals	21	0,27	24,20	0,09
metacarpal	153	2,00	628,40	2,27
ant. phalanges	1	0,01	2,00	0,01
front leg total	**1389**	**18,17**	**5914,90**	**21,39**
pelvis	279	3,65	1246,60	4,51
femur	475	6,22	2180,50	7,88
patella	16	0,21	52,50	0,19
tibia	667	8,73	3591,40	12,99
malleolare	1	0,01	1,00	0,00
astragalus	12	0,16	42,50	0,15
calcaneus	40	0,52	126,40	0,46
tarsals	12	0,16	32,20	0,12
metatarsal	177	2,32	645,90	2,34
post. phalanges	1	0,01	2,00	0,01
hind leg total	**1680**	**21,99**	**7921,00**	**28,64**
indet. metapodial	65	0,85	160,20	0,58
sesamoids	2	0,03	0,00	0,00
indet. phalanges	98	1,29	207,10	0,75
TOTAL	**7641**	**100,00**	**27656,00**	**100,00**

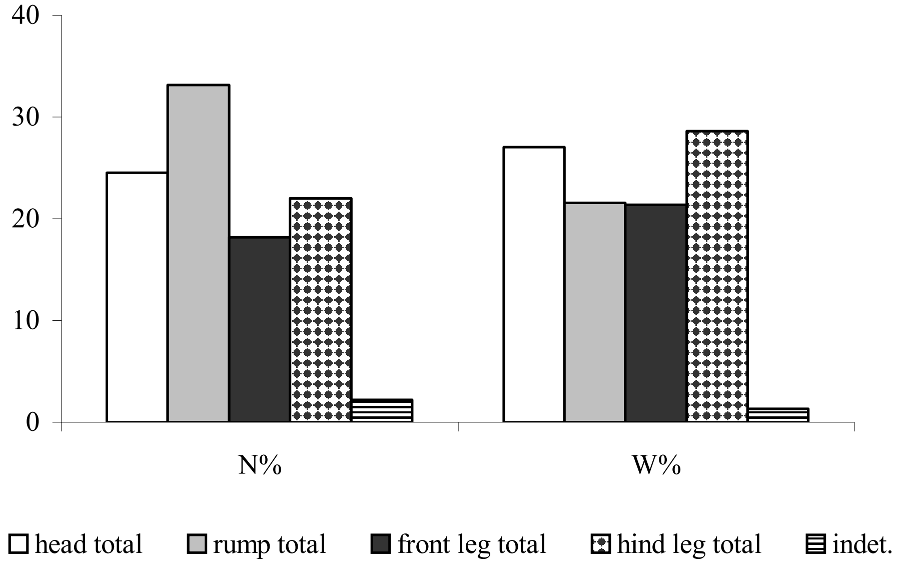

Fig. 5-6 D: The distribution of small ruminant remains during the Maritime Troy Culture.

5.1.3. The Gender of the small ruminants

5.1.3.1. Sheep

Tab. 5-6: Sheep remains showing sexual characteristics per phase in number with skeletal part and sex.

Phase	Number	Sketal	Sex
Troy I	7	Pelvis	♀
Troy II	1	Pelvis	♀
Troy III	3	Pelvis	♀
Troy I	1	Skull	? ♀
Troy I	2	Pelvis	? ♀
Troy I	1	Pelvis	? C
Troy III	1	Pelvis	? C
Troy I	1	Pelvis	C
Troy II	1	Pelvis	C
Troy I	1	Horn	♂ or C
Troy I	1	Skull	♂ or C
Troy I	2	Pelvis	♂ or C
Troy III	1	Pelvis	♂ or C
Troy III	1	Skull	? ♂
Troy I	1	Pelvis	? ♂
Troy II	1	Pelvis	? ♂
Troy III	2	Pelvis	? ♂
Troy I	4	Horn	♂
Troy I	2	Skull	♂
Troy II	3	Skull	♂
Troy II	1	Pelvis	♂

Tab. 5-7: Ten pelvis measurements from sheep with gender.

Pelvis	LA (mm)	SEX
TROI0129/ 253 TR I	22	♀
TROI0717/ 17 TR I	25	♂ or C
TROI0705/ 97 TR I	27	♀
TROI0727/ 101 TR I	27	♀
TROI1252/ 2 TR I	28	♂ or C
TROI0705 / 96 TR I	28,5	♀
TROI0101/ 17 TR I	31	♂
TROI9032/ 22 TR II	27	C
TROI6561/ 2 TR III	24,5	♀or C
TROI0082/ 51 MIX	28,5	♀
Mean val.	**27**	
std. dev.	**2,4**	
coeff. var.	**8,9**	

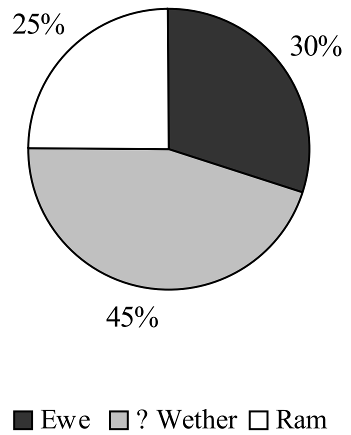

Fig. 5-7: The possible portions of ewes, rams and wethers among sheep during the Maritime Troy Culture (n=38).

5.1.3.2. Goat

Tab. 5.- 8: Goat remains showing sexual characteristics per phase in number with skeletal part and sex.

Phase	Number	Sketal	Sex
Troy I	1	Skull	♀
Troy I	7	Pelvis	♀
Troy I	1	Pelvis	? ♀
Troy I	2	Horn	♂
Troy I	2	Pelvis	♂

5.1.4. The Dental Aging of small ruminants

5.1.4.1. The Dental Aging of Sheep

Tab. 5-9: Dental aging of sheep for Troy I, Troy II, Troy III and during Maritime Troy Culture.

Dental Aging for Sheep	**Age**	**TR I**	**TR II**	**TR III**	**TM**
Milk premolar slightly worn	**~ 4 – 9 M**	1	-	2	3
Milk premolar heavily worn	**> 12 – < 24 M**	3	-	1	4
Premolar before changing	**~ 2 J**	3	2	-	5
Premolar changing	**> 2 J**	1	-	-	1
Premolar slightly worn	**> 2 ¼**	-	-	1	1
Premolar moderately worn	**< 2 ¼ - ~ 6 J**	2	-	1	3
Premolar heavily worn	**> 6 J**	-	-	1	1
M_1 slightly worn	**< 3 – 36 M**	1	-	-	1
M_1 moderately worn	**> 3 – 6 J**	1	-	-	1
M_2 erupting	**9 M**	-	-	1	1
M_2 slightly worn	**< 1 ½ - < 3 J**	1	-	-	1
M_2 moderately worn	**> 3 - < 6 J**	8	-	-	8
M_3 before erupting	**15 - 18 M**	1	-	1	2
M_3 erupting	**1 ½ J**	-	1	1	2
M_3 not worn	**> 1 ½ - < 2J**	-	2	-	2
M_3 slightly worn	**> 2 - < 3 ½ J**	4	-	1	5
M_3 moderately worn	**> 3 ½ - < 6 J**	20	4	3	27
SUM:		**46**	**9**	**13**	**68**

Tab- 5-10: Specific dental aging groups for sheep during Maritime Troy Culture.

Age	**N**
~ 4 - < 12 m	4
> 12 - ~ 24 m	10
(~18 m) 24 m - < 3 ½ y	14
(~28 m) > 3 1/2 - < 6 y	39
> 6 y	1
Summe:	**68**

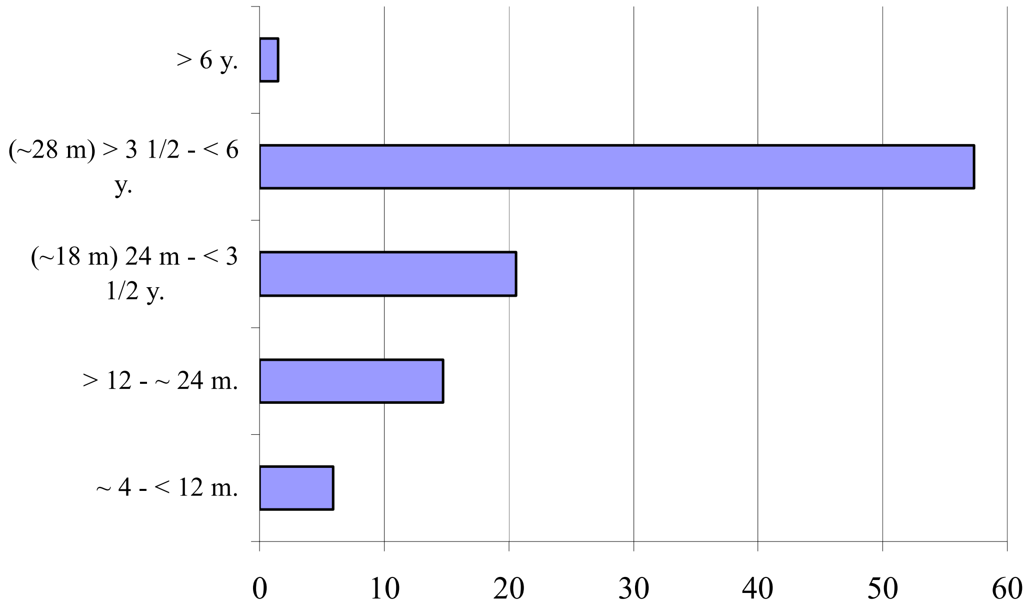

Fig. 5-8: Specific dental aging groups for sheep in percentage during the Maritime Troy Culture.

5.1.4.1.1. The crown height of the M_3 by Sheep

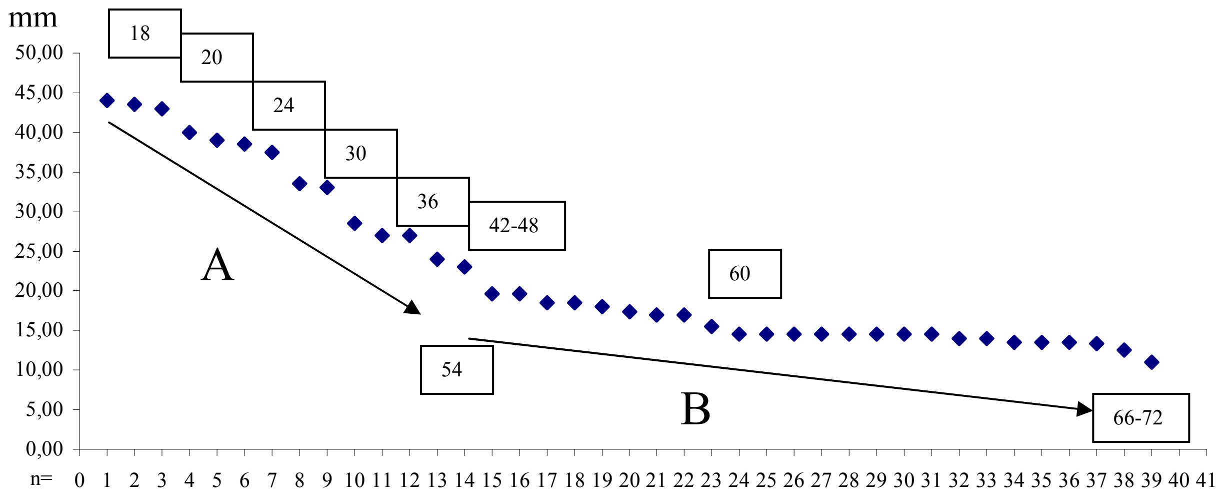

Fig. 5-9: M_3 crown height of sheep in mm for the entire Maritime Troy Culture. The numbers in the boxes represent the estimated ages in months of the slaughtered sheep

5.1.4.2. The Dental Aging of Goat

Tab. 5-11: Dental aging of goat from Troy I, Troy II and during Maritime Troy Culture.

Dental Aging	**Age**	**TR I**	**TR II**	**TM**
Milk premolar not worn	**~ 3 M**	1		1
Milk premolar slightly worn	**3 M**		1	1
M_1 erupting	**~ 3 M**	1		1
M_1 slightly worn	**~ 5 ½**	1		1
M_2 erupting	**8 - 9 M**	1		1
Milk premolar heavily worn	**17 – 20 M**	3	1	4
M_3 slightly worn	**> 2 - < 3 ½ J**	4		4
Premolar moderately worn	**> 2 ¼ - < 6 J**	1		1
M_3 moderately worn	**> 3 ½ - < 6 J**	14	1	15
M_1 heavily worn	**~ 6 J**	1		1
SUM:		**27**	**3**	**30**

Tab. 5-12: Specific dental aging groups for goat during Maritime Troy Culture.

Age	**Number**
3 – 9 M	5
17 –20 M	4
> 2 - <6 J	20
~ 6 J	1
Summe:	**30**

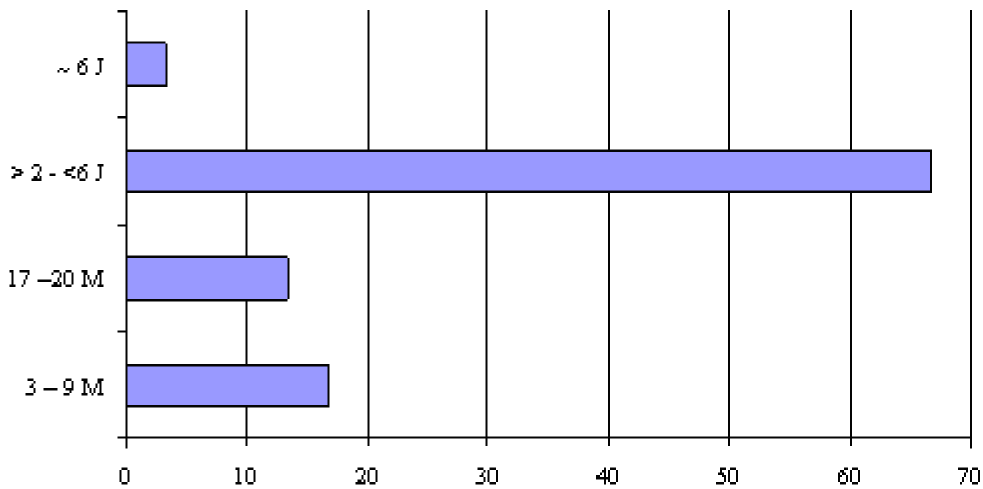

Fig. 5-10: Specific dental aging groups for goat in percentages during the Maritime Troy Culture.

5.1.4.3. The Dental Aging of Small Ruminants

Tab. 5-13: Dental aging of domestic small ruminants for Troy I, Troy II, Troy III and during the Maritime Troy Culture.

Dental Aging	**~ Age**	**TR I**	**TR II**	**TR III**	**TM**
Milk premolar not worn	**< 4 M**	2	5	2	9
Milk premolar slightly worn	**~ 4 – 9 M**	4	-	-	4
Milk premolar heavily worn	**> 12 – < 24 M**	14	-	1	15
Premolar before changing	**~ 2 J**	7	2	-	9
Premolar changing	**> 2 J**	5	-	2	7
Premolar slightly worn	**> 2 ¼ J**	6	1	4	11
Premolar moderately worn	**> 2 ¼ - ~ 6 J**	30	4	3	37
Premolar heavily worn	**> 6 J**	20	2	1	23
M_1 erupting	**3 M**	1	-	-	1
M_1 slightly worn	**> 3 – 36 M**	3	1	-	4
M_1 moderately worn	**> 3 – 6 J**	8	-	-	8
M_1 heavily worn	**> 6 J**	5	-	-	5
M_2 erupting	**9 M**	1	-	1	2
M_2 slightly worn	**> 1 ½ - < 3 J**	4	-	-	4
M_2 moderately worn	**> 3 - < 6 J**	23	-	-	23
M_2 heavily worn	**> 8 J**	3	-	-	3
M_3 before erupting	**15 - 18 M**	1	-	1	2
M_3 erupting	**1 ½ J**	-	2	1	3
M_3 not worn	**> 1 ½ - < 2J**	2	1	-	3
M_3 slightly worn	**> 2 - < 3 ½ J**	17	5	1	23
M_3 moderately worn	**> 3 ½ - < 6 J**	50	14	4	68
M_3 heavily worn	**10 – 12 J**	1	-	-	1
Molars not worn	**~ 2 J**	2	1	-	3
Molars slightly worn	**2 - 6 J**	28	-	-	28
Molars moderately worn	**6 – 8 J**	29	12	-	41
Molars heavily worn	**> 8 J**	6	1	1	8
SUM:		**272**	**51**	**22**	**345**

Tab. 5-14: Specific dental aging groups for domestic small ruminants for Troy I, Troy II, Troy III and during Maritime Troy Culture.

Age	**TR I**	**TR II**	**TR III**	**MT**
~ 4 - < 12 m	8	5	3	16
> 12 - ~ 24 m	17	3	3	23
(~18 m) 24 m - < 3 1/2 y	44	10	7	61
(~28 m) > 3 1/2 - < 6 y	139	18	7	164
> 6 y	25	2	1	28
6 - 8 y	29	12	-	41
> 8 y	9	1	1	11
10 - 12 y	1	-	-	1
Summe:	**272**	**51**	**22**	**345**

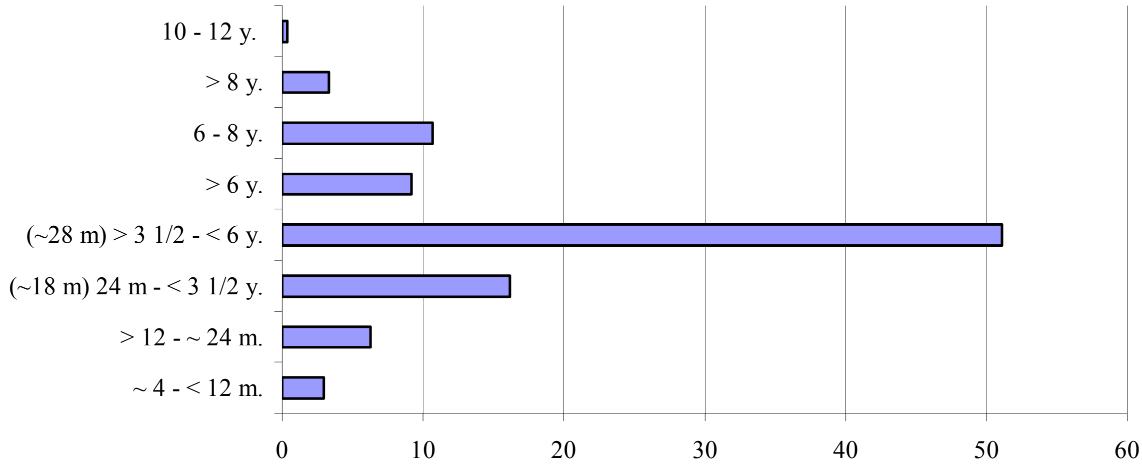

Fig. 5-11: Dental aging of domestic small ruminants during Troy I in percentage.

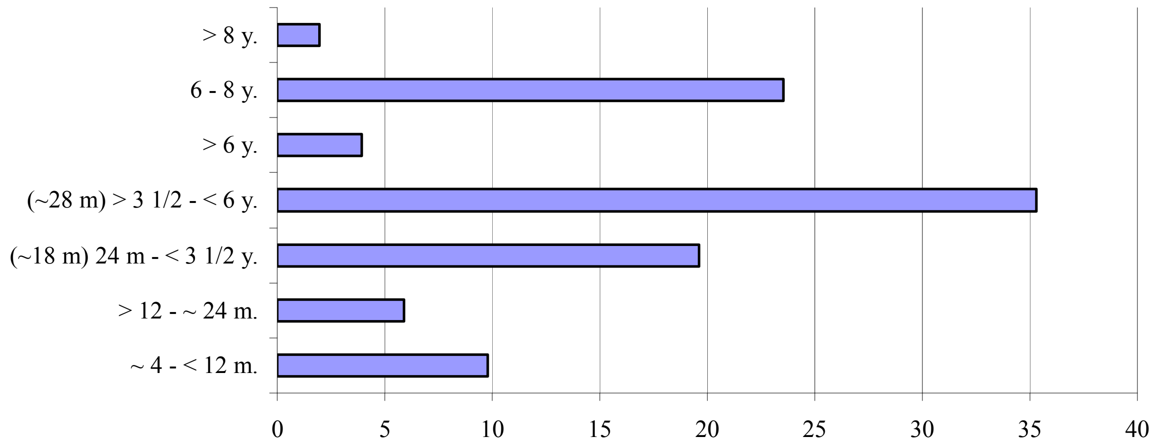

Fig. 5-12: Dental aging of domestic small ruminants during Troy II in percentage.

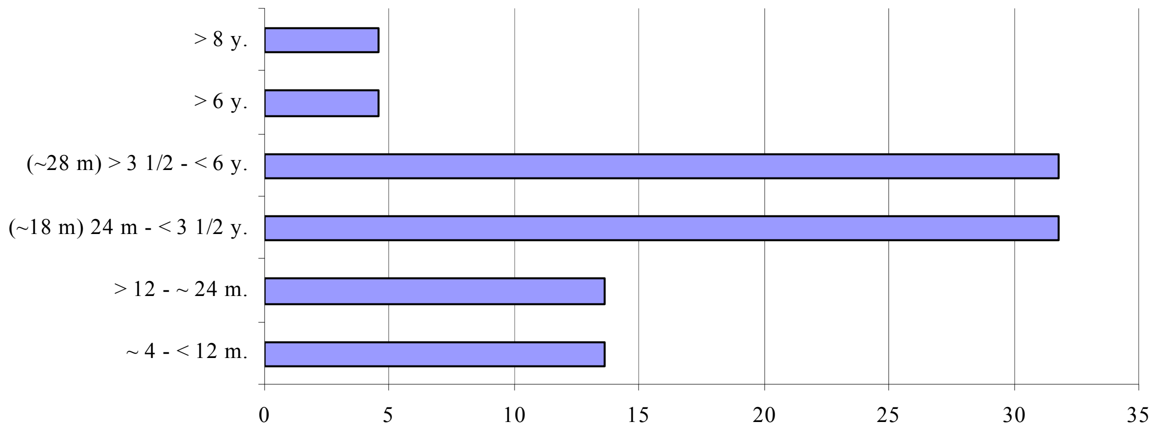

Fig. 5-13: Dental aging of domestic small ruminants during Troy III in percentage.

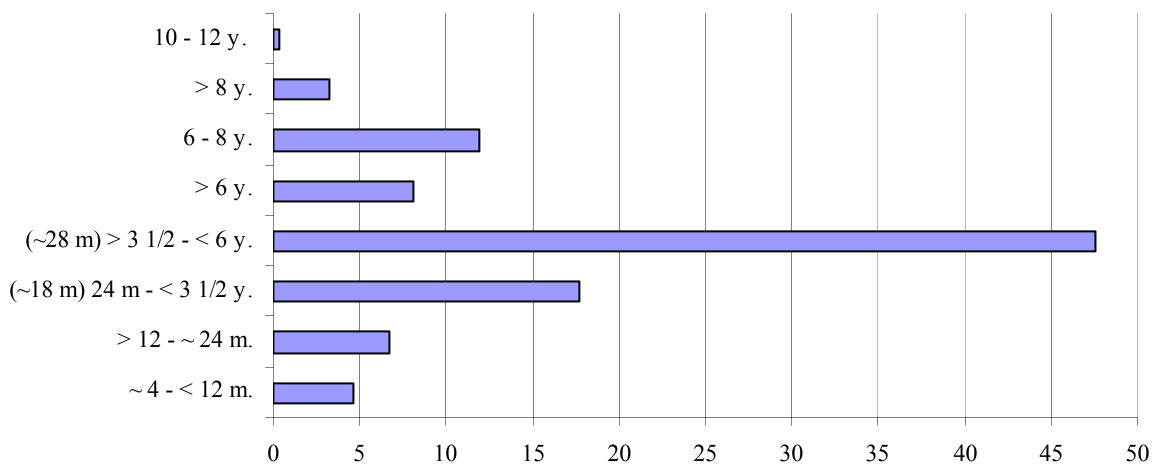

Fig. 5-14: Dental aging of domestic small ruminants during Maritime Troy Culture in percentage.

6.1.5. The Epiphysis Aging for Small ruminants

6.1.5.1. The Epiphysis Aging for Sheep

Tab.5-15: The epiphysis fusing periods of sheep during Troy I.

TROY I Sheep (OVIS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	38	0	0		
Radius prox.	24	0	0	**100**	**5**
Scap.-corac.	25	0	0		
Ilium-ischium	12	0	1		
Phal.2 prox.	4	0	0		
Phal.1 prox.	29	0	1	**98,22**	**10**
Tibia dist.	31	0	1	**99.94**	**18**
Metapods. dist.	15	0	4	**78,94**	**24**
Calcaneus prox.	22	1	12		
Femur prox.	3	0	1	**66,66**	**30**
Humerus prox.	2	0	0		
Ulma prox.	5	0	2		
Radius dist.	12	1	5		
Femur dist.	1	0	2		
Tibia prox.	2	0	1	**69,69**	**42**
Pelvis caud.	3	0	0	**100**	**60**

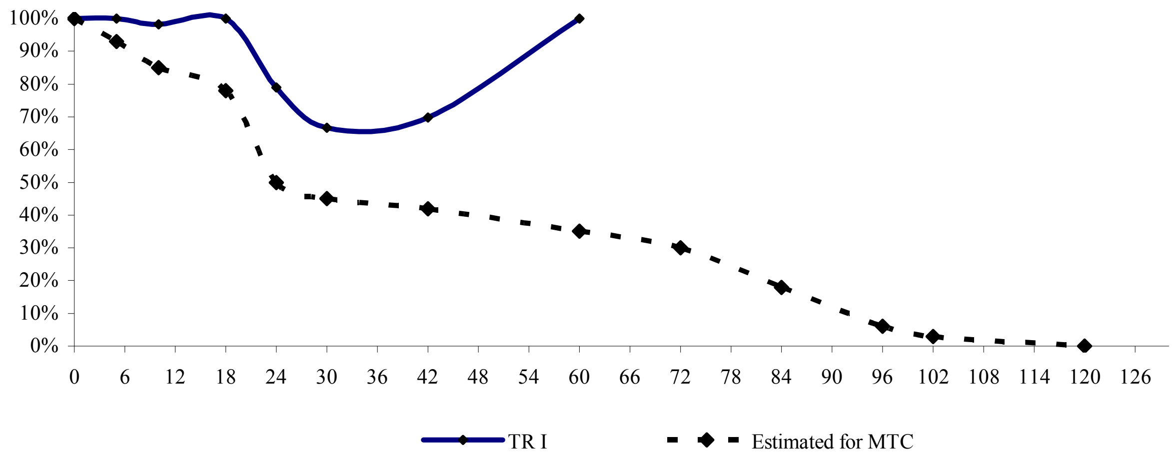

Fig. 5-15: The survival curve of the sheep during Troy I after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

Tab. 5-16: The epiphysis fusing periods of sheep during Troy II.

TROY II Sheep (OVIS)	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Humerus dist.	14	2	1		
Radius prox.	12	0	0	**96,55**	**5**
Scap.-corac.	7	0	1		
Ilium-ischium	4	0	1		
Phal.1 prox.	6	2	3	**79,16**	**10**
Tibia dist.	15	2	2	**89,47**	**18**
Metapods. dist.	4	0	3	**57,14**	**24**
Calcaneus prox.	9	0	10	**47,36**	**30**
Ulma prox.	4	0	2		
Radius dist.	4	0	2		
Femur dist.	2	0	2		
Tibia prox.	2	3	0	**71,42**	**42**
Pelvis caud.	1	0	0	**100**	**60**

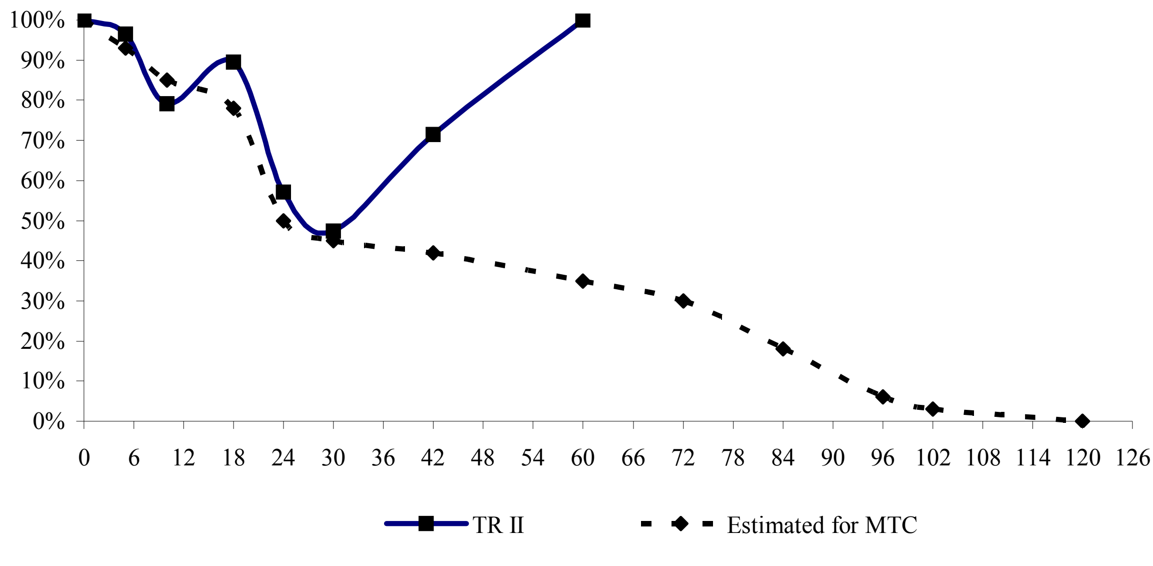

Fig. 5-16: The survival curve of the sheep during Troy II after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

Tab. 5-17: The epiphysis fusing periods of sheep during Troy III.

TROY III Sheep (OVIS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	6	0	0		
Radius prox.	4	0	0	**100**	**5**
Scap.-corac.	2	0	0		
Ilium-ischium	1	0	0		
Phal.2 prox.	3	0	0		
Phal.1 prox.	7	0	1	**92,85**	**10**
Tibia dist.	7	2	1	**90,00**	**18**
Metapods. dist.	3	0	1	**75,00**	**24**
Calcaneus prox.	4	0	2		
Femur prox.	0	0	4	**40**	**30**
Humerus prox.	1	0	1		
Ulma prox.	1	0	2		
Radius dist.	0	0	1		
Femur dist.	0	0	1		
Tibia prox.	0	0	1	**25**	**42**
Pelvis caud.	1	0	0	**100**	**60**

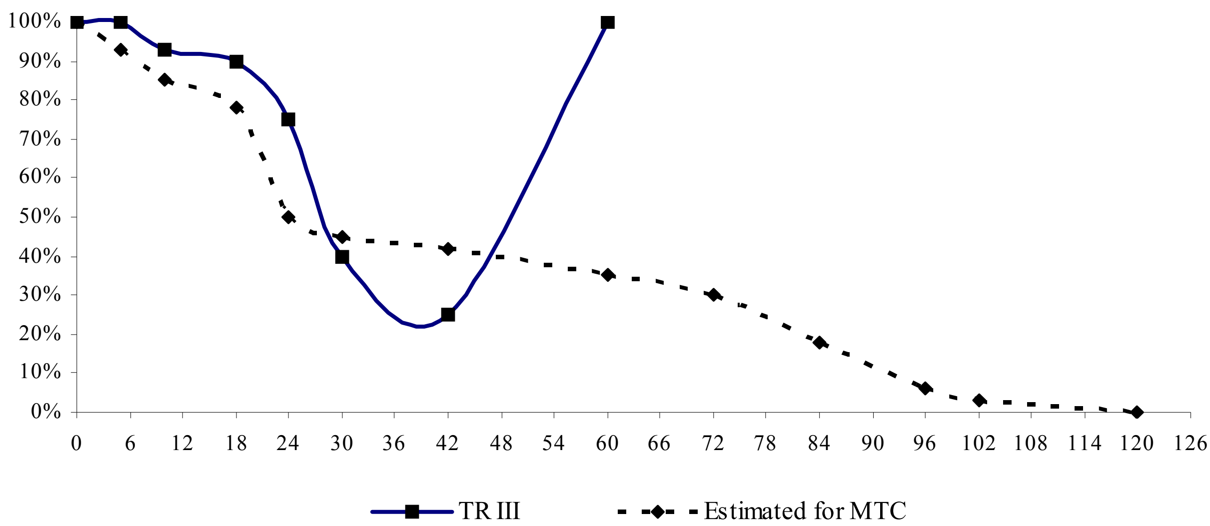

Fig. 5-17: The survival curve of the sheep during Troy III after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

Tab. 5-18: The epiphysis fusing periods of sheep during the Maritime Troy Culture.

Maritime Culture Sheep (OVIS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	58	2	1		
Radius prox.	40	0	0	**99,99**	**5**
Scap.-corac.	33	0	1		
Ilium-ischium	17	0	2		
Phal.2 prox.	7	0	0		
Phal.1 prox.	42	2	5	**92,66**	**10**
Tibia dist.	53	4	4	**93,44**	**18**
Metapods. dist.	22	0	8	**55**	**24**
Calcaneus prox.	35	1	24		
Femur prox.	3	0	5	**57,35**	**30**
Humerus prox.	3	0	1		
Ulma prox.	10	0	6		
Radius dist.	16	1	8		
Femur dist.	3	0	5		
Tibia prox.	4	3	2	**64,51**	**42**
Pelvis caud.	5	0	0	**100**	**60**

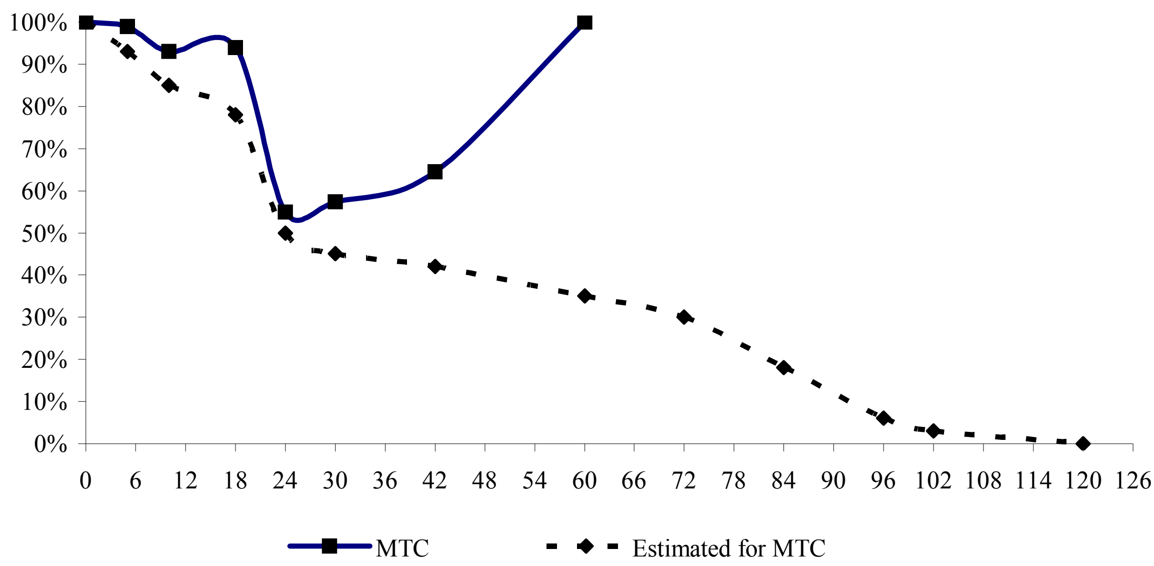

Fig. 5-18: The survival curve of the sheep for the Maritime Troy Culture after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

5.1.5.2. The Epiphysis Aging for Goat

Tab. 5-19: The epiphysis fusing periods of goat during Maritime Troy Culture.

Maritime Culture Goat (CAPRA)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	23	1	0		
Radius prox.	18	1	0	**100**	**5**
Scap.-corac.	10	0	2		
Ilium-ischium	7	0	1		
Phal.2 prox.	3	0	0		
Phal.1 prox.	13	1	4	**83**	**10**
Tibia dist.	14	1	1	**93**	**18**
Metapods. dist.	13	0	**6**	**68,5**	**24**
Calcaneus prox.	10	0	4		
Femur prox.	3	0	**1**	**76,5**	**30**
Humerus prox.	2	0	1		
Ulma prox.	2	0	0		
Radius dist.	5	0	2		
Femur dist.	0	0	1		
Tibia prox.	0	0	0	**81,81**	**42**
Pelvis caud.	1	0	0	**100**	**60**

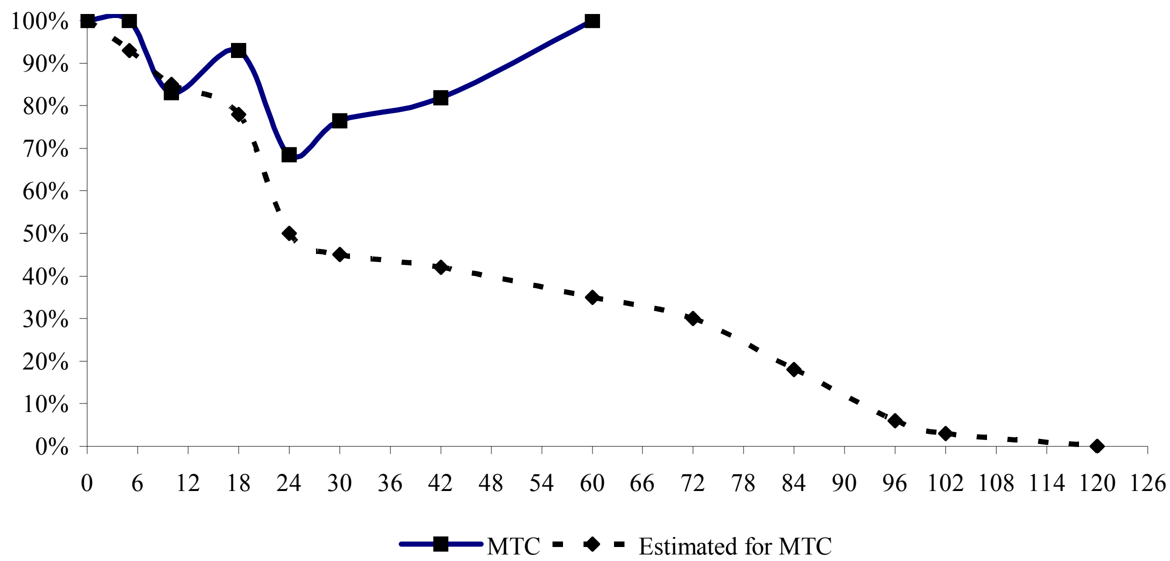

Fig. 5-19: The epiphysis fusing periods of goat during the Maritime Troy Culture after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

5.1.5.3. The Epiphysis Aging for Small Ruminants

Tab. 5-20: The epiphysis fusing periods of small ruminants during Troy I.

TROY I small ruminants	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	74	2	10		
Radius prox.	61	1	1	**92,6**	**5**
Scap.-corac.	43	0	1		
Ilium-ischium	46	0	7		
Phal.2 prox.	14	0	2		
Phal.1 prox.	49	1	9	**88,95**	**10**
Tibia dist.	48	1	12	**80,32**	**18**
Metapods. dist.	29	0	21	**58,00**	**24**
Calcaneus prox.	29	1	22		
Femur prox.	14	0	13	**55,69**	**30**
Humerus prox.	7	0	7		
Ulma prox.	8	0	9		
Radius dist.	18	1	14		
Femur dist.	4	0	9		
Tibia prox.	10	0	10	**49,48**	**42**
Pelvis caud.	10	0	2		
Wirbel	69	5	127	**29,68**	**60**

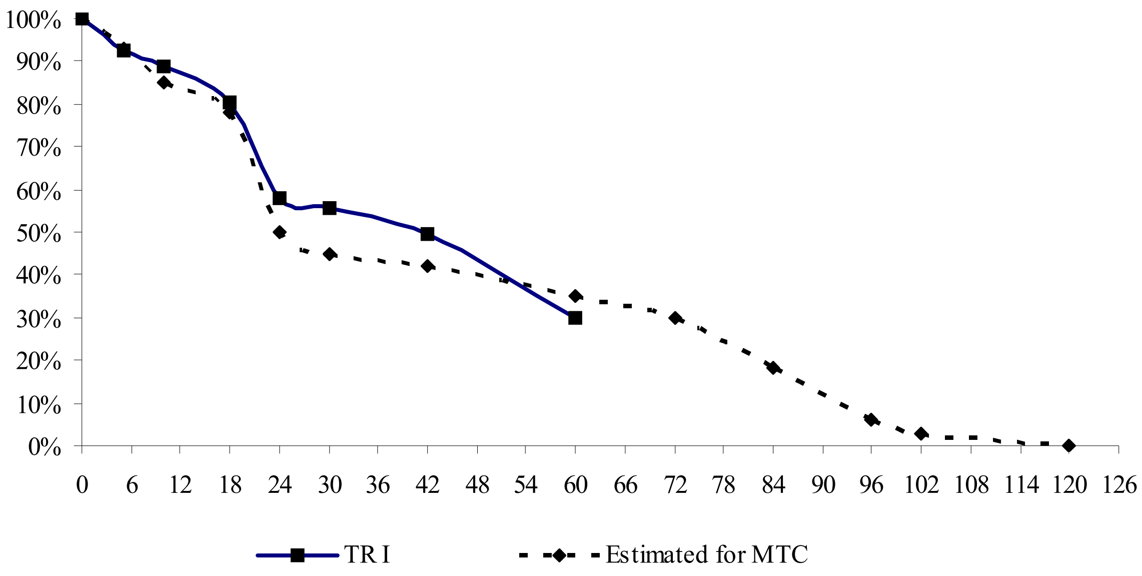

Fig. 5-20: The survival curve of the small ruminants in Troy I after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

Tab. 5-21: The epiphysis fusing periods of small ruminants during Troy II.

TROY II small ruminants	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Humerus dist.	26	3	7		
Radius prox.	17	0	5	**79,31**	**5**
Scap.-corac.	13	0	2		
Ilium-ischium	10	0	7		
Phal.2 prox.	3	0	2		
Phal.1 prox.	19	3	9	**70,58**	**10**
Tibia dist.	21	2	11	**67,64**	**18**
Metapods. dist.	9	0	16	**36,00**	**24**
Calcaneus prox.	11	0	15		
Femur prox.	2	0	18	**28,26**	**30**
Humerus prox.	0	0	8		
Ulma prox.	6	0	6		
Radius dist.	5	0	9		
Femur dist.	7	0	11		
Tibia prox.	3	3	11	**34,78**	**42**
Pelvis caud.	1	0	0		
Wirbel	39	3	152	**22,05**	**60**

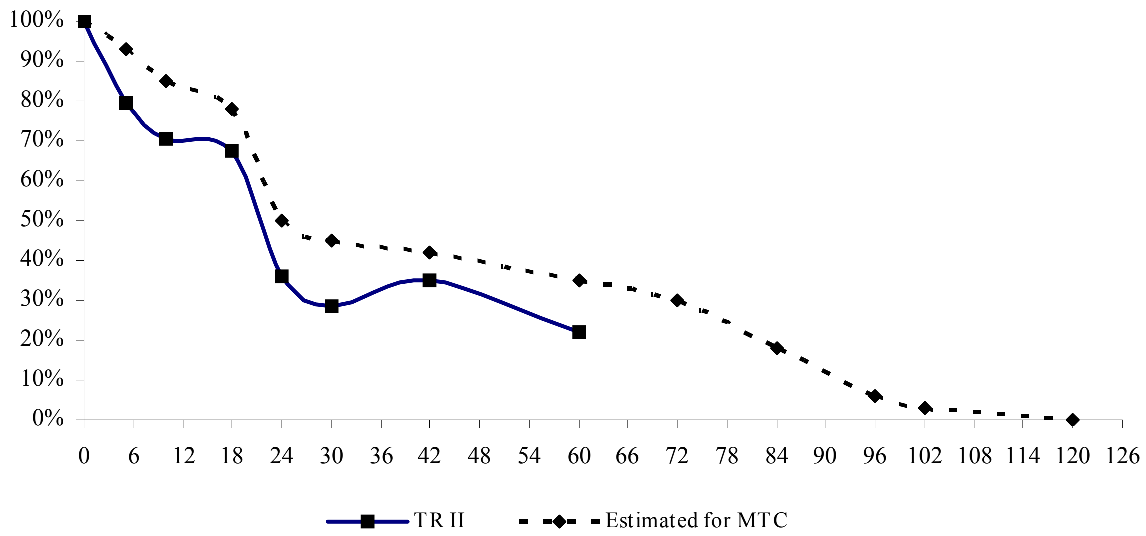

Fig. 5-21: The survival curve of the small ruminants in Troy II after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

Tab. 5-22: The epiphysis fusing periods of small ruminants during Troy III.

TROY III small ruminants	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	9	0	1		
Radius prox.	7	0	1	**88,88**	**5**
Scap.-corac.	2	0	1		
Ilium-ischium	1	0	1		
Phal.2 prox.	5	0	2		
Phal.1 prox.	8	0	2	**72,72**	**10**
Tibia dist.	8	3	3	**78,57**	**18**
Metapods. dist.	3	0	6	**33,33**	**24**
Calcaneus prox.	5	0	3		
Femur prox.	0	0	6	**35,71**	**30**
Humerus prox.	1	0	5		
Ulma prox.	1	0	5		
Radius dist.	0	0	3		
Femur dist.	1	0	3		
Tibia prox.	2	0	3	**20,83**	**42**
Pelvis caud.	1	0	0		
Wirbel	12	8	70	**23,07**	**60**

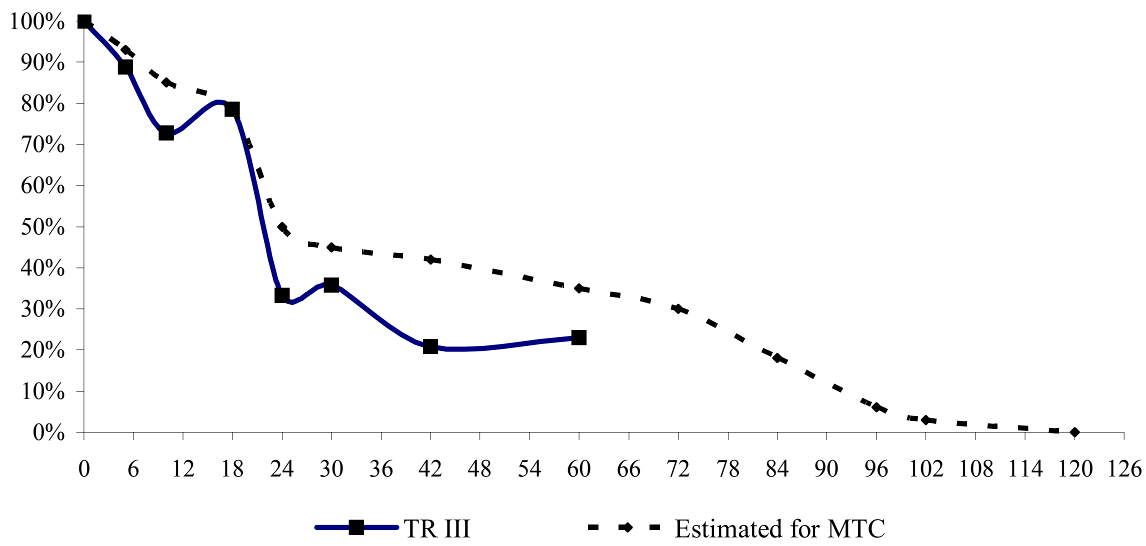

Fig. 5-22: The survival curve of the small ruminants in Troy III after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

Tab. 5-23: The epiphysis fusing periods of small ruminants during Maritime Troy Culture.

Maritime Culture small ruminants	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	109	5	18		
Radius prox.	85	1	7	**88,88**	**5**
Scap.-corac.	58	0	10		
Ilium-ischium	57	0	10		
Phal.2 prox.	22	0	13		
Phal.1 prox.	76	4	23	**79,48**	**10**
Tibia dist.	77	6	35	**70,33**	**18**
Metapods. dist.	41	0	44	**48,23**	**24**
Calcaneus prox.	45	1	40		
Femur prox.	16	0	47	**41,61**	**30**
Humerus prox.	8	0	20		
Ulma prox.	15	0	20		
Radius dist.	23	1	26		
Femur dist.	12	0	23		
Tibia prox.	15	3	24	**40,52**	**42**
Pelvis caud.	12	0	2		
Wirbel	120	16	349	**29,65**	**60**

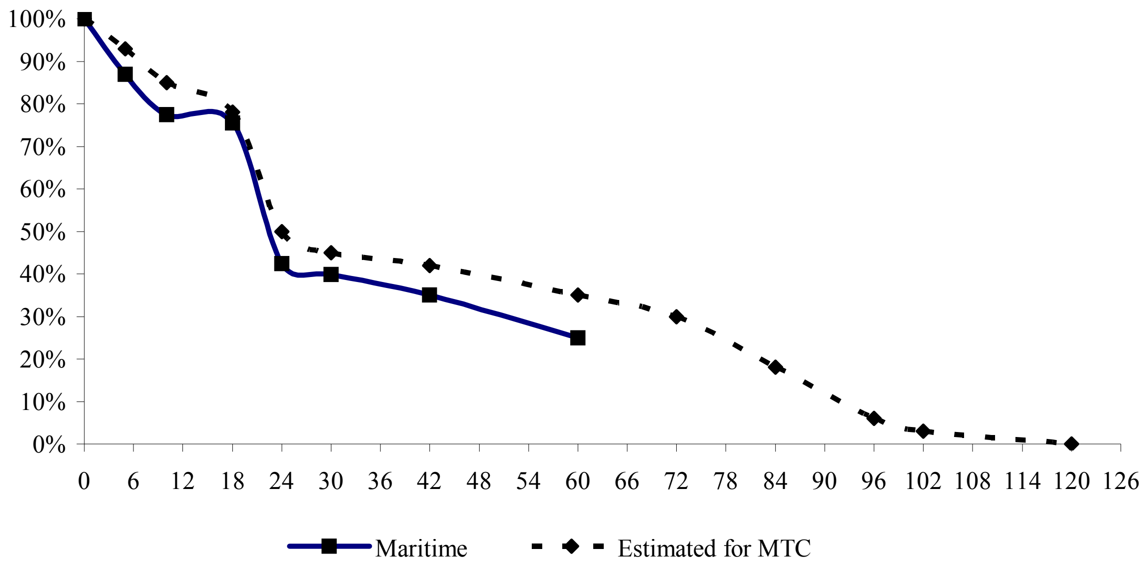

Fig. 5-23: The survival curve of the small ruminants during the Maritime Troy Culture after the epiphysis fusion data and the estimated survival curve of small ruminants population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

5.1.7. Size of the Small Ruminants

Tab. 5-24: The shoulder height of the sheep after calculating from identified intact long bones.

Phase	Find NR.	Radius/mm	Faktor	SH/cm
TR I	9033/122	144,2	4,02	57,9
TR II	6601/ 7	140,5	4,02	56,5
		MC/mm		
TR II	6636/ 13	122,5	4,89	59,9
MIX	6654/ 35	119,5	4,89	58,5
		MT/mm		
TR II	6601/ 25	130,5	4,54	59,3
MIX	6629/ 65	128,5	4,54	58,4

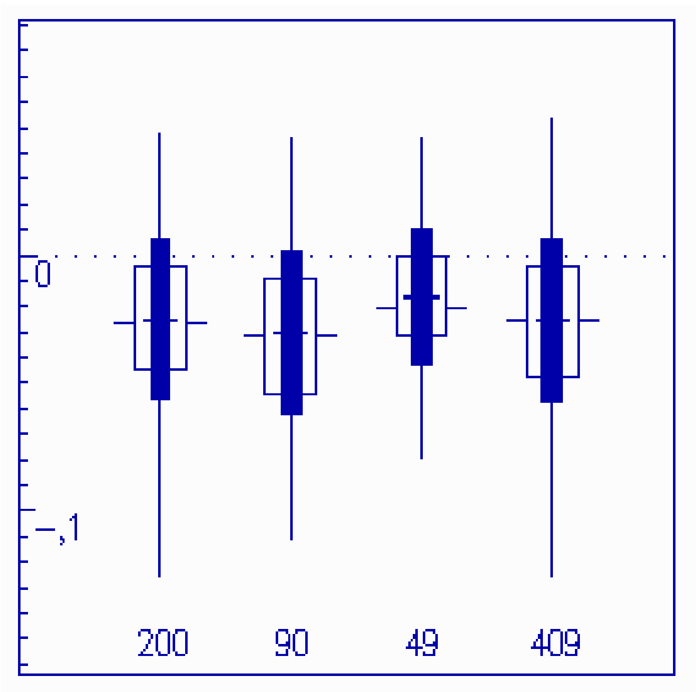

Fig. 5-24: The LSI calculation of sheep remains from Troy I, Troy II, Troy III and the whole Maritime Troy Culture.

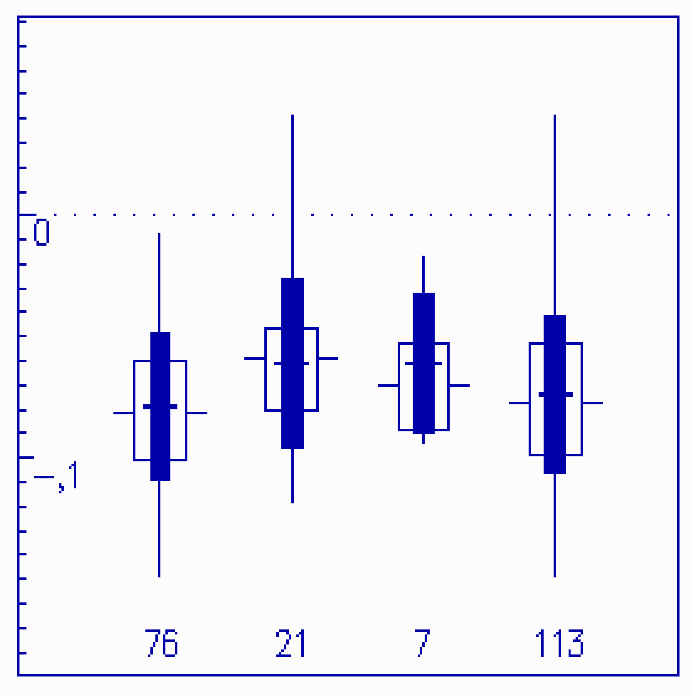

Fig. 5-25: The LSI calculation of goat remains from Troy I, Troy II, Troy III and the whole Maritime Troy Culture.

5.2. Cattle, BOS

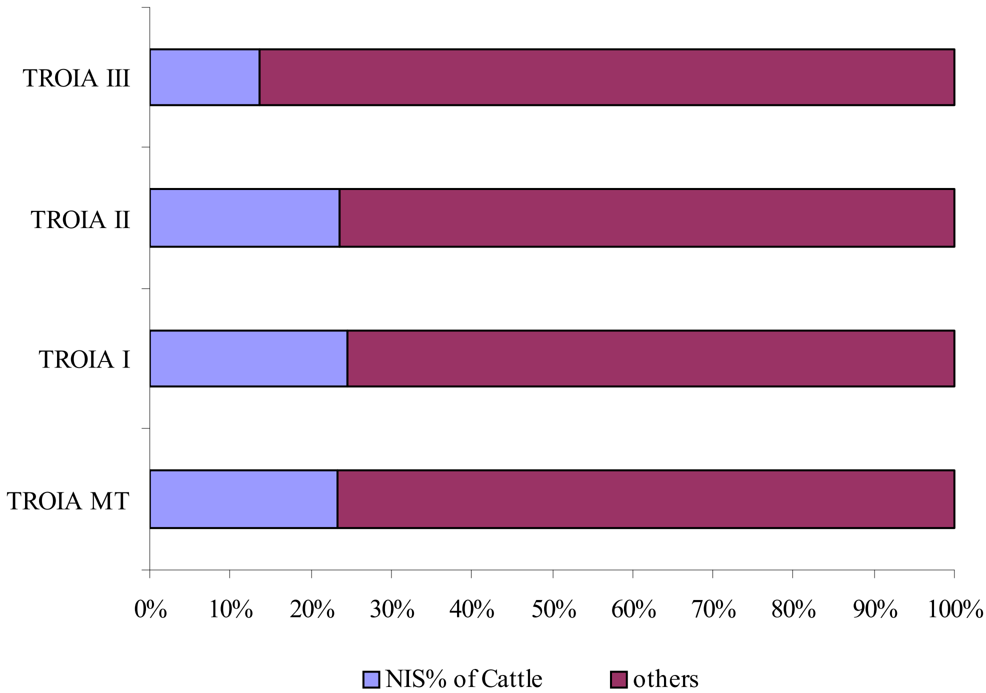

Fig. 5-26: NIS% of the cattle remains among the identified mammal remains for the Maritime Troy Culture and its phases.

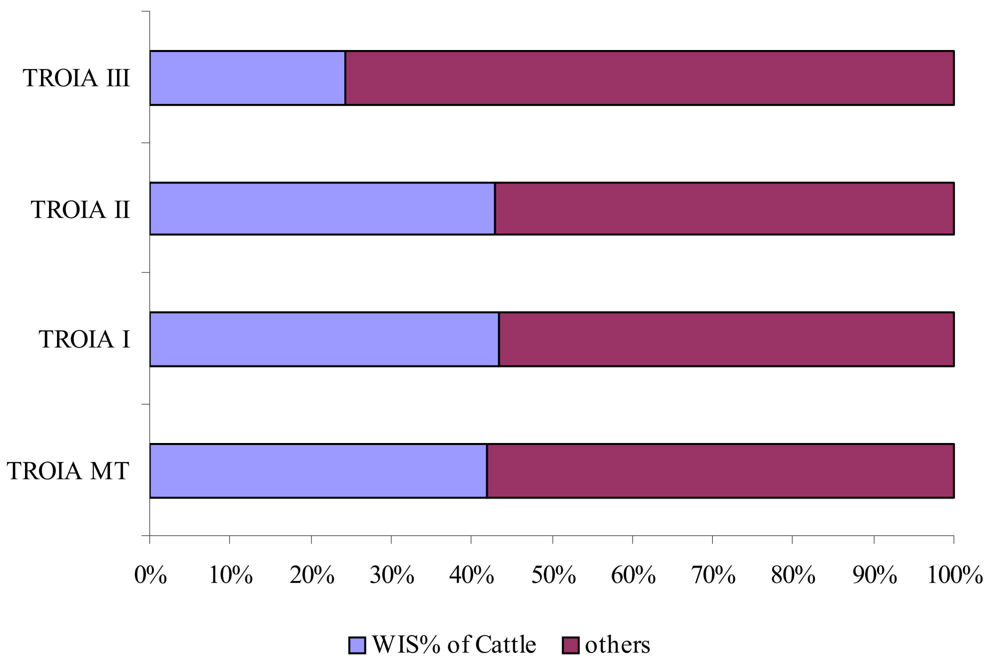

Fig. 5-27: WIS% of the cattle remains among the identified mammal remains for the Maritime Troy Culture and its phases.

5.2.1. The bone distribution of Cattle

Tab. 5-25 A: The distribution of cattle remains form Troy I.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	9	0,33	60,30	0,15
skull	115	4,26	810,30	2,08
face fragments	60	2,22	644,40	1,65
mandible	111	4,11	2277,10	5,84
loose teeth	123	4,55	1310,90	3,36
hyoid	5	0,19	19,10	0,05
head total	**423**	**15,66**	**5122,10**	**13,13**
vertebra	327	12,11	4378,80	11,22
ribs	957	35,43	4640,50	11,90
rump total	**1284**	**47,54**	**9019,30**	**23,12**
scapula	161	5,96	2750,20	7,05
humerus	74	2,74	3087,60	7,91
radius and ulna	129	4,78	3278,80	8,40
carpals	41	1,52	500,40	1,28
metacarpal	34	1,26	1636,00	4,19
ant. phalanges	27	1,00	539,10	1,38
front leg total	**466**	**17,26**	**11792,10**	**30,22**
pelvis	104	3,85	2467,90	6,33
femur	97	3,59	2506,80	6,43
patella	6	0,22	153,70	0,39
tibia	104	3,85	2629,50	6,74
malleolare	9	0,33	95,30	0,24
astragalus	22	0,81	901,00	2,31
calcaneus	21	0,78	690,90	1,77
tarsals	23	0,85	728,90	1,87
metatarsal	41	1,52	1395,60	3,58
post. phalanges	12	0,44	225,00	0,58
hind leg total	**439**	**16,25**	**11794,60**	**30,24**
indet. metapodial	16	0,59	257,50	0,66
sesamoids	5	0,19	13,60	0,03
indet. phalanges	68	2,52	1011,20	2,59
TOTAL	**2701**	**100,00**	**39010,40**	**100,00**

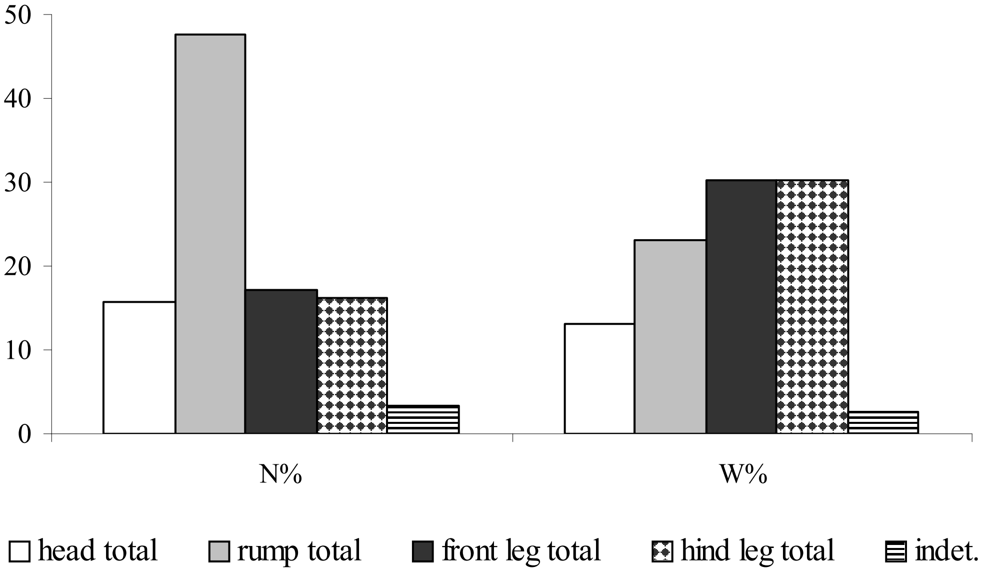

Fig. 5-28 A: Distribution of skeletal parts and weight of the cattle remains in Troai I.

Tab. 5-25 B: The distribution of cattle remains form Troy II.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	1	0,13	3,00	0,03
skull with horn core	1	0,13	9,00	0,09
skull	59	7,40	314,80	3,02
face fragments	47	5,65	452,40	4,34
mandible	40	5,02	920,10	8,82
loose teeth	42	5,27	502,70	4,82
hyoid	1	0,13	2,00	0,02
head total	**191**	**23,72**	**2204,00**	**21,13**
vertebra	104	13,50	946,60	9,07
ribs	245	30,74	1566,80	15,02
rump total	**349**	**44,24**	**2513,40**	**24,09**
scapula	34	4,27	436,90	4,19
humerus	23	2,89	770,70	7,39
Radius and ulna	25	3,14	723,00	6,93
carpals	13	1,63	140,60	1,35
metacarpal	13	1,63	794,00	7,61
ant. phalanges	9	1,13	142,00	1,36
Front leg total	**117**	**14,68**	**3007,20**	**28,82**
pelvis	25	3,14	658,40	6,31
femur	21	2,63	642,00	6,15
patella	1	0,13	9,00	0,09
tibia	22	2,76	325,40	3,12
astragalus	8	1,00	149,80	1,44
calcaneus	6	0,75	239,10	2,29
tarsals	5	0,63	78,00	0,75
metatarsal	4	0,50	94,00	0,90
post. phalanges	10	1,25	156,00	1,50
Hind leg total	**102**	**12,80**	**2351,70**	**22,54**
indet. metapodial	12	1,31	128,60	1,23
sesamoids	5	0,63	10,40	0,10
indet. phalanges	21	2,63	218,20	2,08
TOTAL	**797**	**100,00**	**10433,50**	**100,00**

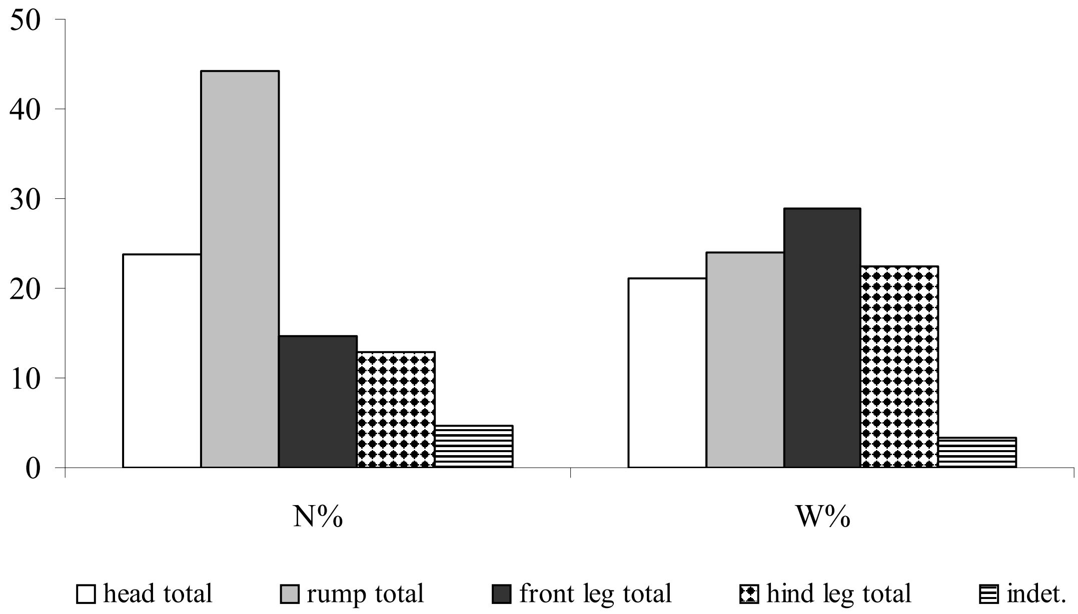

Fig. 5-28 B: Distribution of skeletal parts and weight of the cattle remains in Troai II.

Tab. 5-25 C: The distribution of cattle remains form Troy III.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	1	0,49	5,10	0,21
skull	12	5,83	154,40	6,49
face fragments	8	3,88	49,00	2,06
mandible	4	1,94	30,20	1,27
loose teeth	21	10,19	267,60	11,24
head total	**46**	**22,33**	**506,30**	**21,27**
vertebra	19	9,22	168,00	7,06
ribs	62	30,10	300,50	12,63
rump total	**81**	**39,32**	**468,50**	**19,69**
scapula	11	5,35	158,00	6,64
humerus	10	4,85	265,50	11,16
radius and ulna	10	4,85	151,00	6,34
carpals	3	1,46	34,00	1,43
metacarpal	1	0,49	6,00	0,25
ant. phalanges	3	1,46	27,00	1,13
front leg total	**38**	**18,45**	**641,50**	**26,95**
pelvis	3	1,46	27,00	1,13
femur	8	3,88	171,00	7,19
tibia	5	2,43	195,00	8,19
malleolare	1	0,49	4,00	0,17
astragalus	1	0,49	1,00	0,04
tarsals	5	2,43	77,00	3,24
metatarsal	4	1,94	129,90	5,46
post. phalanges	3	1,46	50,70	2,13
hind leg total	**30**	**14,57**	**655,60**	**27,55**
indet. metapodial	2	0,97	15,00	0,63
sesamoids	1	0,49	2,00	0,08
indet. phalanges	8	3,88	91,00	3,82
TOTAL	**206**	**100,00**	**2379,90**	**100,00**

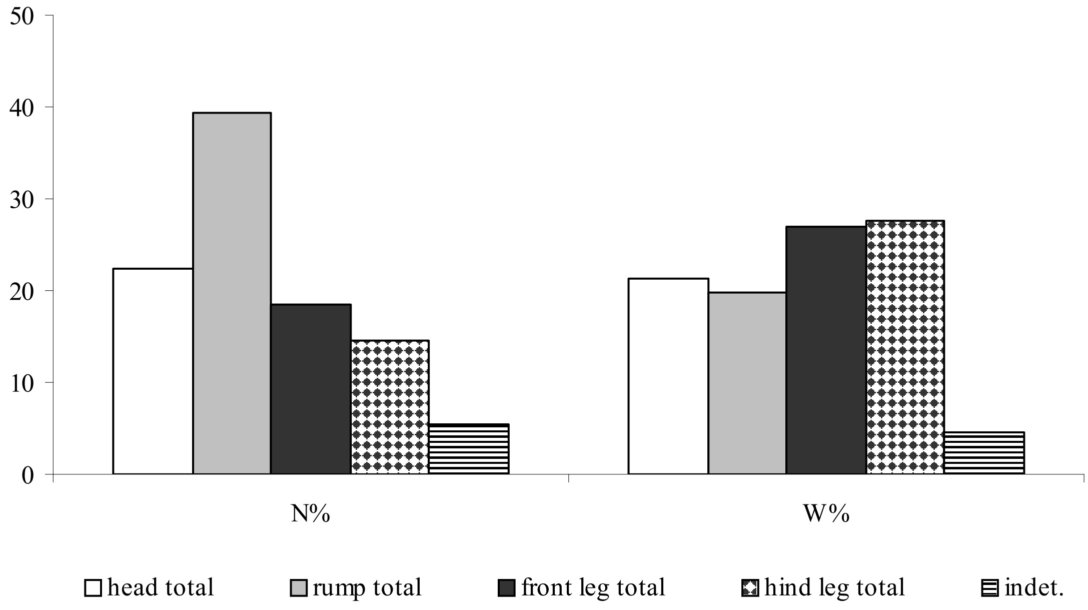

Fig. 5-28 C: Distribution of skeletal parts and weight of the cattle remains in Troai III.

Tab. 5-25 D: The distribution of cattle remains form the Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
horn core	12	0,30	93,40	0,16
skull with horn core	1	0,02	9,00	0,02
skull	205	5,06	1413,50	2,49
face fragments	134	3,30	1300,80	2,29
mandible	170	4,19	3617,40	6,37
loose teeth	207	5,10	2385,20	4,20
hyoid	8	0,20	28,10	0,05
head total	**737**	**18,16**	**8847,40**	**15,58**
vertebra	501	12,36	6078,40	10,70
ribs	1372	33,83	7271,80	12,81
rump total	**1873**	**46,19**	**13350,20**	**23,51**
scapula	222	5,47	3658,10	6,44
humerus	119	2,93	4428,80	7,80
radius and ulna	179	4,41	4392,80	7,74
carpals	61	1,50	736,00	1,30
metacarpal	49	1,21	2470,00	4,35
ant. phalanges	42	1,04	756,10	1,33
front leg total	**672**	**16,57**	**16441,80**	**28,96**
pelvis	145	3,58	3349,30	5,90
femur	140	3,45	3868,80	6,81
patella	7	0,17	162,70	0,29
tibia	145	3,58	3542,90	6,24
malleolare	10	0,25	99,30	0,17
astragalus	34	0,84	1155,80	2,04
calcaneus	29	0,72	1039,00	1,83
tarsals	34	0,84	914,90	1,61
metatarsal	51	1,26	1641,50	2,89
post. phalanges	29	0,72	507,70	0,89
hind leg total	**624**	**15,40**	**16281,90**	**28,67**
indet. metapodial	31	0,76	404,10	0,71
sesamoids	12	0,30	28,00	0,05
indet. phalanges	106	2,63	1428,40	2,52
TOTAL	**4055**	**100,00**	**56781,80**	**100,00**

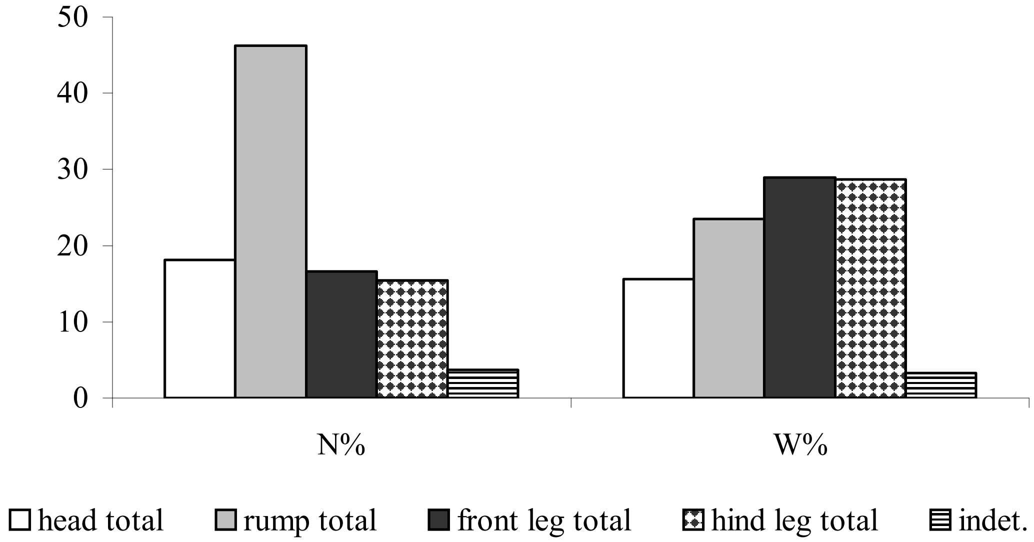

Fig. 5-28 D: Distribution of skeletal parts and weight of the cattle remains during the Maritime Troy Culture.

Tab.5-26: The distribution of the comparative skeletal of cattle BO30.

Skeletal element:	**N**	**N%**	**W**	**W%**
Skull	1	**0,52**	1909	**11,13**
Face	1	**0,52**		**0,00**
Jaws	2	**1,04**	896	**5,23**
Teeth	32	**16,67**		**0,00**
Zungenbein	2	**1,04**	19	**0,11**
head total	**38**	**19,79**	**2824**	**16,47**
Vertebra	36	**18,75**	3370	**19,65**
Rips and sternum	26	**13,54**	2505	**14,61**
rump total	**62**	**32,29**	**5875**	**34,26**
Scapula	2	**1,04**	824	**4,81**
Humerus	2	**1,04**	1086	**6,33**
Radius/Ulna	4	**2,08**	928	**5,41**
Metacarpus	2	**1,04**	376	**2,19**
Phalangen 1-2-3 anterior	12	**6,25**	252	**1,47**
Basispodium/Sesamknochen	24	**12,50**	135	**0,79**
front leg	**46**	**23,96**	**3601**	**21,00**
Pelvis	2	**1,04**	1220	**7,11**
Femur	2	**1,04**	1356	**7,91**
Tibia	2	**1,04**	1010	**5,89**
Patella	2	**1,04**	84	**0,49**
Talus	2	**1,04**	136	**0,79**
Calcaneus	2	**1,04**	204	**1,19**
Metatarsus	2	**1,04**	446	**2,60**
Phalanges 1-2-3 posterior	12	**6,25**	256	**1,49**
Basipodium/Sesamknochen	20	**10,42**	135	**0,79**
hind leg	**46**	**23,96**	**4847**	**28,27**
SUM	**193**	**100,00**	**17147**	**100,00**

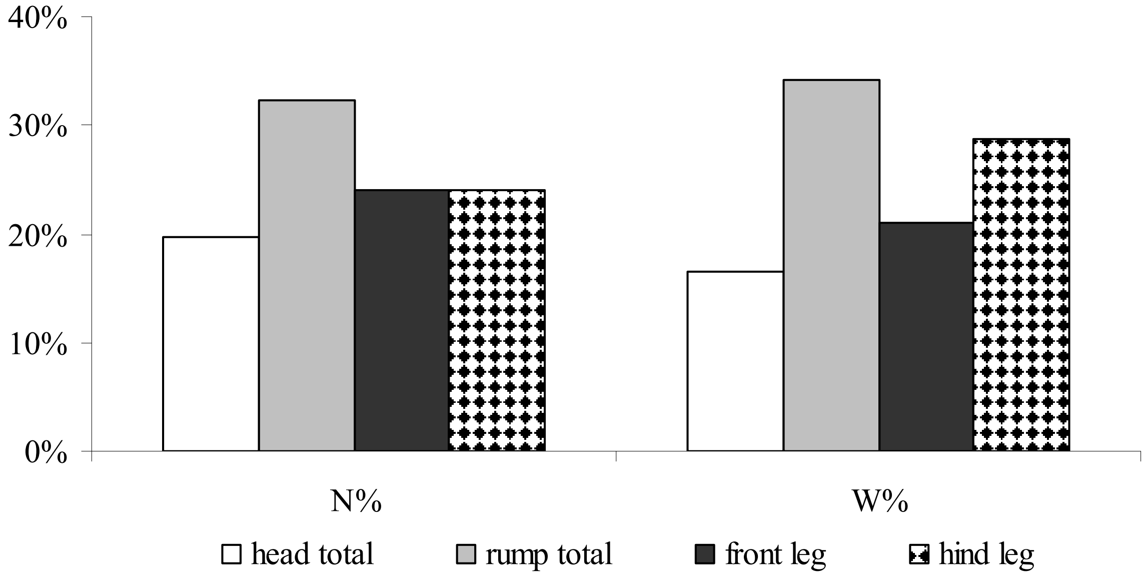

Fig. 5-29: Distribution of skeletal parts and their weights of BO30 from the U.A.E.

5.2.3. The Gender of the Cattle

Tab. 5-27: Identified pelvis remains from cattle and their probable gender.

	Cow	**Cow ?**	**Oxen/Bull**	**Bull ?**	**Bull**
TROY I	4 Pelvis	2 Pelvis	1 Pelvis	1 Pelvis	/
TROY II	3 Pelvis	/	1 Pelvis	/	1 MC
TROY III	/	/	/	1 Pelvis	2 Pelvis

Tab. 5-28: Measured pelvis remains from cattle and their probable gender.

Pelvis	**LA**	G
TROI0705 / 26 TR I	60	♀
TROI0762/ 1 TR I	66	♀
TROI0766/ 2 TR I	63	**m/c**
Mean val.	**63**	
std. dev.	**3,3**	
coeff. var.	**5,2**	
N =	**3**	

5.2.4. Killing pattern of Cattle

5.2.4.1. The Dental Aging of Cattle

Tab. 5-29: Dental aging of cattle in Troy I.

Dental Aging	~ Age	N
Premolar slightly worn	**> 2 - < 3 J**	**4**
Premolar moderately worn	**> 3 - < 8 J**	**8**
Premolar heavily worn	**> 8 J**	**3**
M 2 moderately worn	**> 2 - ~ 8 J**	**3**
M 3 moderately worn	**> 3 - ~ 9**	**5**
	SUM:	**23**

Tab. 5-30: Dental aging of cattle in Troy II.

Dental Aging	~ Age	N
Milk premolar slightly worn	**10 M**	**3**
Premolar before changing	**> 1 - < 2**	**2**
Premolar in line but not wear	**~ 2 J**	**1**
Premolar slightly worn	**> 2 - < 3 J**	**1**
Premolar moderately worn	**> 3 - < 8 J**	**3**
Premolar heavily worn	**> 8 J**	**1**
M 2 slightly worn	**> 1 1/2 - < 2 J**	**1**
M 3 moderately worn	**> 3 - ~ 9**	**5**
	SUM:	**17**

Tab. 5-31: Dental aging of cattle during the Maritime Troy Culture.

Dental Aging	~ Age	N
Milk premolar slightly worn	**10 M**	**3**
Premolar before changing	**> 1 - < 2**	**2**
Premolar in line but not wear	**~ 2 J**	**1**
Premolar slightly worn	**> 2 - < 3 J**	**5**
Premolar moderately worn	**> 3 - < 8 J**	**11**
Premolar heavily worn	**> 8 J**	**4**
M 2 slightly worn	**> 1 1/2 - < 2 J**	**1**
M 2 moderately worn	**> 2 - ~ 8 J**	**3**
M 3 moderately worn	**> 3 - ~ 9**	**10**
	SUM:	**40**

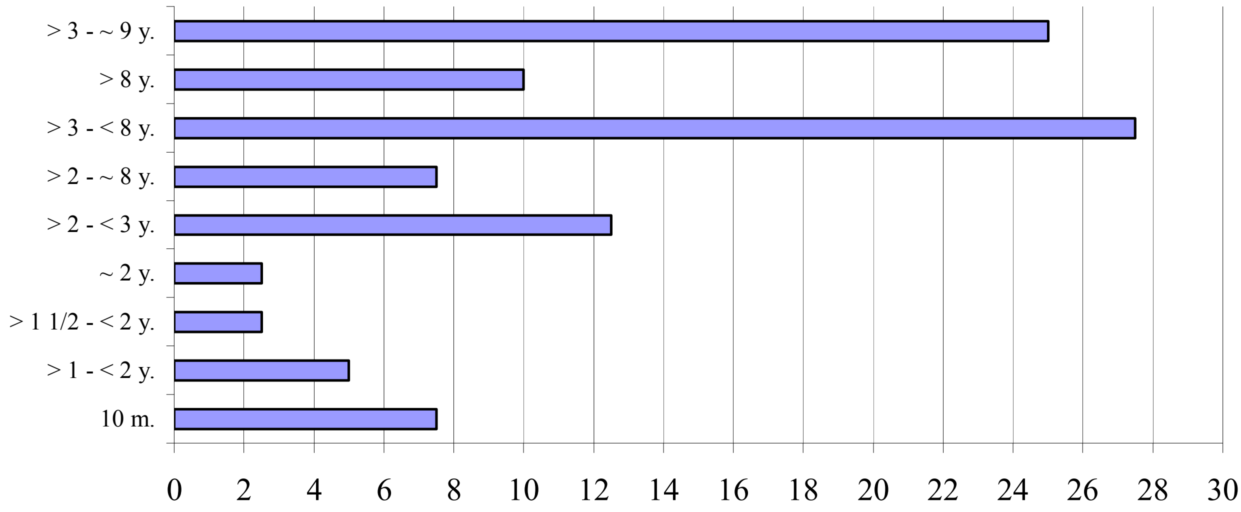

Fig. 5-30: The Dental aging of cattle during the entire Maritime Troy Culture in percentages (n=40).

5.2.4.2. Epiphysis fusion of Cattle in the Maritime Troy Culture

Tab. 5-32: The epiphyseal fusing periods of cattle in Troy I.

TROY I Cattle (BOS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	16	1	0		
Ilium-ischium	14	0	3	**91,17**	**10**
Humerus dist.	15	0	0		
Radius prox.	23	0	1		
Phal.2 prox.	30	0	0		
Phal.1 prox.	30	0	1	**98,00**	**18**
Tibia dist.	14	0	3		
Metapods. dist.	23	0	6		
Calcaneus prox.	2	0	6	**72,22**	**24-30**
Femur prox.	4	0	6		
Humerus prox.	4	1	4		
Ulma prox.	7	0	2		
Radius dist.	11	1	7		
Femur dist.	2	0	9		
Tibia prox.	5	0	9	**48,61**	**54**
Pelvis caud.	3	0	1		
Wirbel	11	0	50	**21,53**	**60**

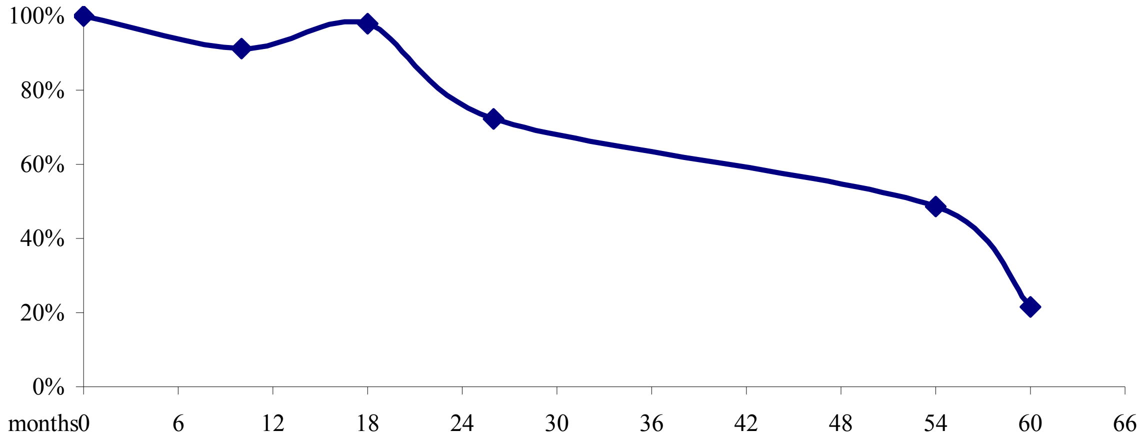

Fig. 5-31: The survival curve of the cattle in Troy I.

Tab5-33: The epiphyseal fusing periods of cattle in Troy II.

TROY II Cattle (BOS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	2	0	1		
Ilium-ischium	6	0	1	**80,00**	**10**
Humerus dist.	3	1	3		
Radius prox.	7	0	0		
Phal.2 prox.	12	0	1		
Phal.1 prox.	11	1	3	**83,33**	**18**
Tibia dist.	1	0	4		
Metapods. dist.	4	0	7		
Calcaneus prox.	2	0	1	**36,84**	**24-30**
Femur prox.	3	0	3		**ca. 36**
Humerus prox.	1	1	1		
Ulma prox.	0	0	2		42
Radius dist.	1	0	2		
Femur dist.	2	0	1		
Tibia prox.	1	0	6	**37,50**	**54**
Wirbel	19	1	28	**41,66**	**60**

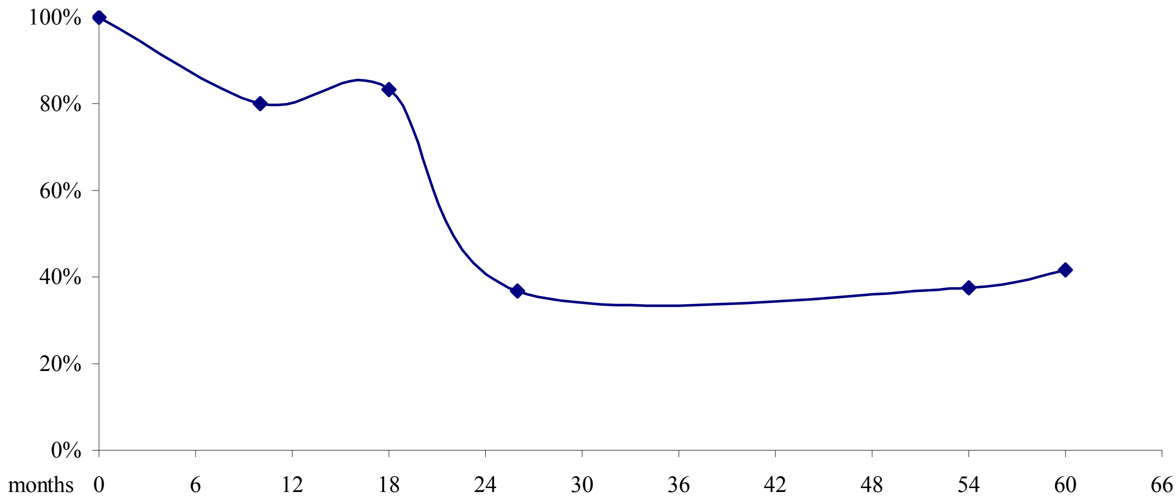

Fig. 5-32: The survival curve of the cattle in Troy II.

Tab. 5-34: The epiphyseal fusing periods of cattle during the Maritime Troy Culture.

TROY Maritime Cattle (BOS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	19	1	1		
Ilium-ischium	20	0	5	**86,95**	**10**
Humerus dist.	20	2	3		
Radius prox.	31	0	1		
Phal.2 prox.	45	0	2		
Phal.1 prox.	43	2	6	**92,25**	**18**
Tibia dist.	16	0	7		
Metapods. dist.	28	0	14		
Calcaneus prox.	4	0	7	**63,15**	**24-30**
Femur prox.	7	0	11		**ca. 36**
Humerus prox.	5	2	5		
Ulma prox.	8	0	4		42
Radius dist.	12	1	9		
Femur dist.	4	0	10		
Tibia prox.	6	0	15	**45,45**	**54**
Pelvis caud.	3	0	1		
Wirbel	30	1	82	**29,05**	**60**

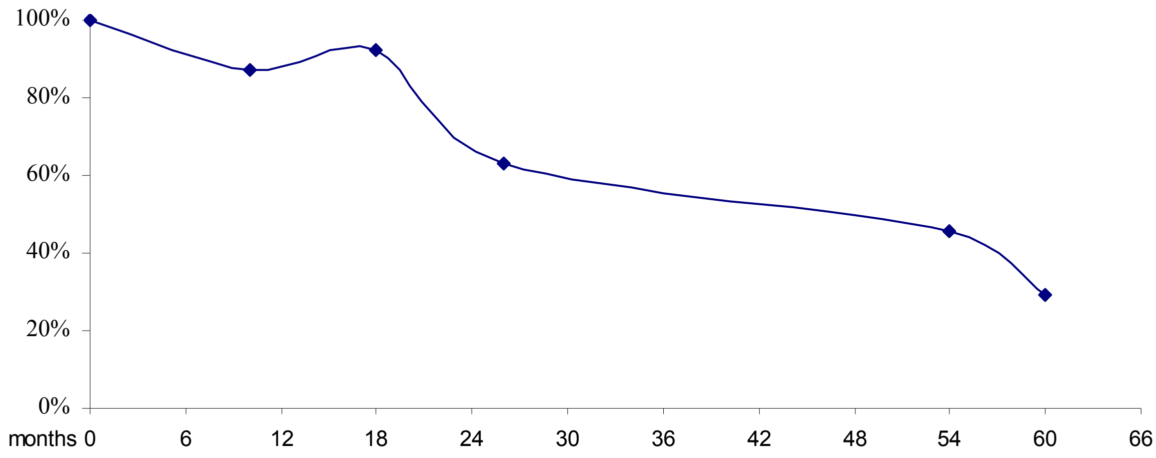

Fig. 5-33: The survival curve of the cattle during the Maritime Troy Culture.

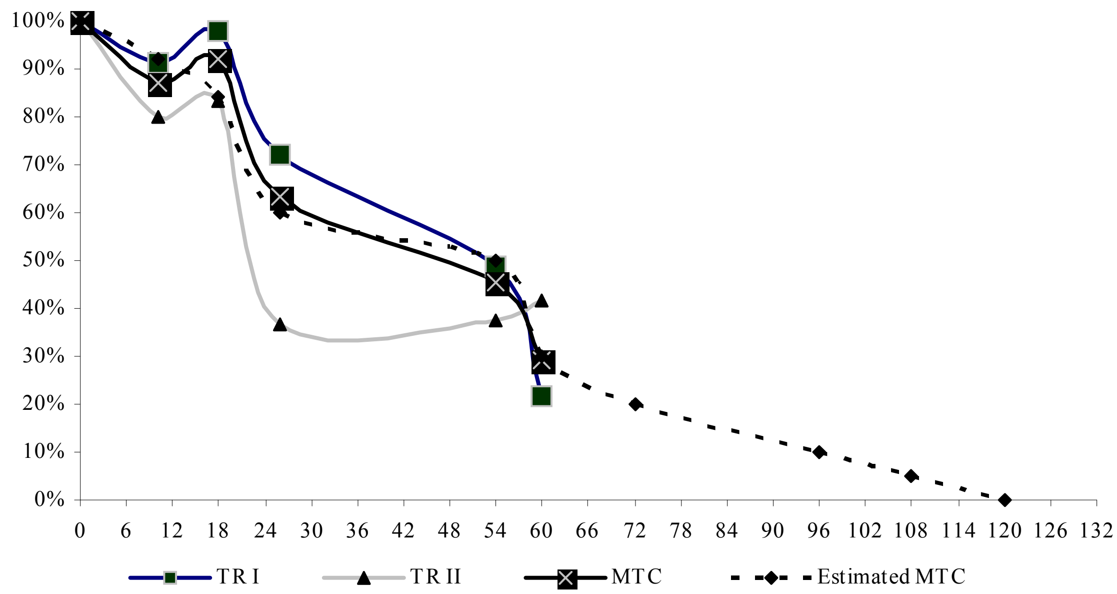

Fig. 5-34: The survival curve of the cattle in Troy I-II after the epiphysis fusion data and the estimated survival curve of cattle population after the calculation of dental and epiphysis data from the whole Maritime Troy Culture.

5.2.5. Size of the Cattle

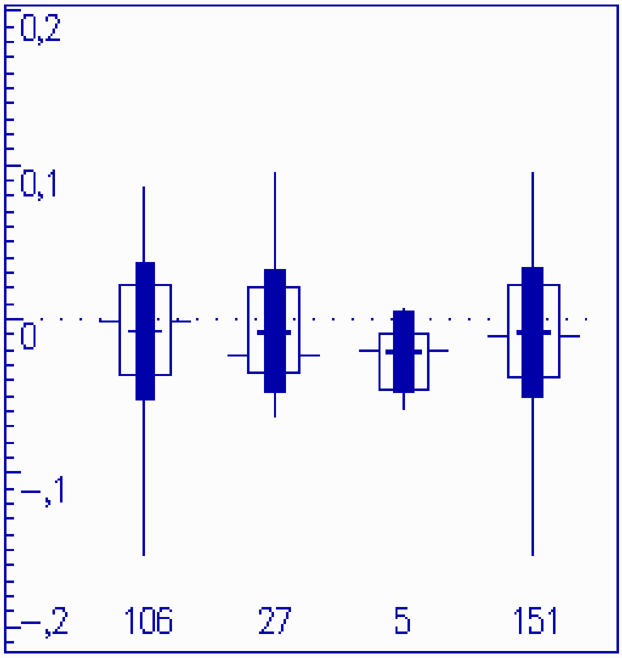

Fig. 5-35: The LSI calculation of cattle remains from Troy I, Troy II, Troy III and the whole Maritime Troy Culture.

5.3. Pig, SUS

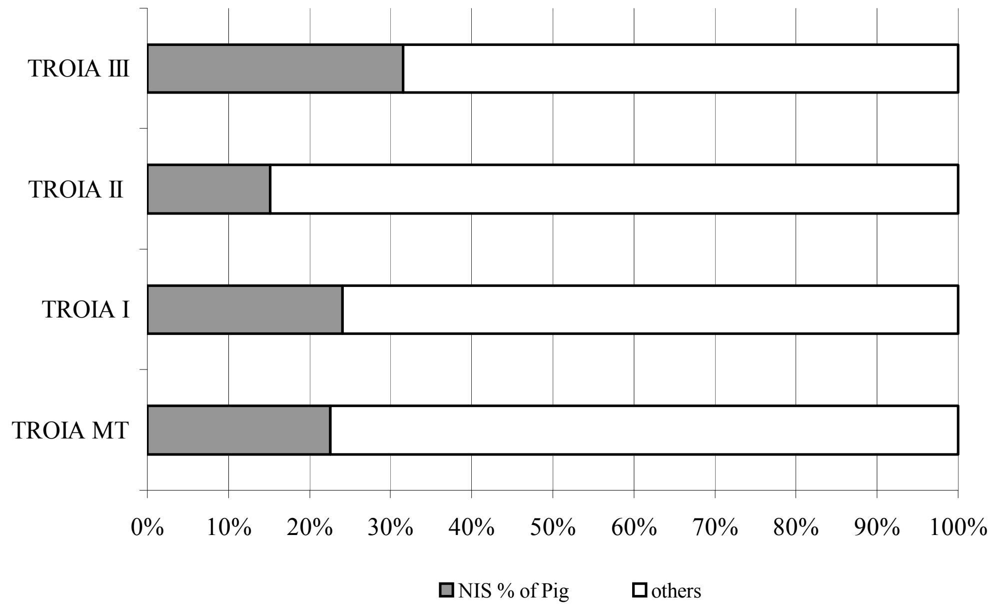

Fig. 5-36: NIS-% of the pig remains among the domestic animals for the Maritime Troy Culture and its phases.

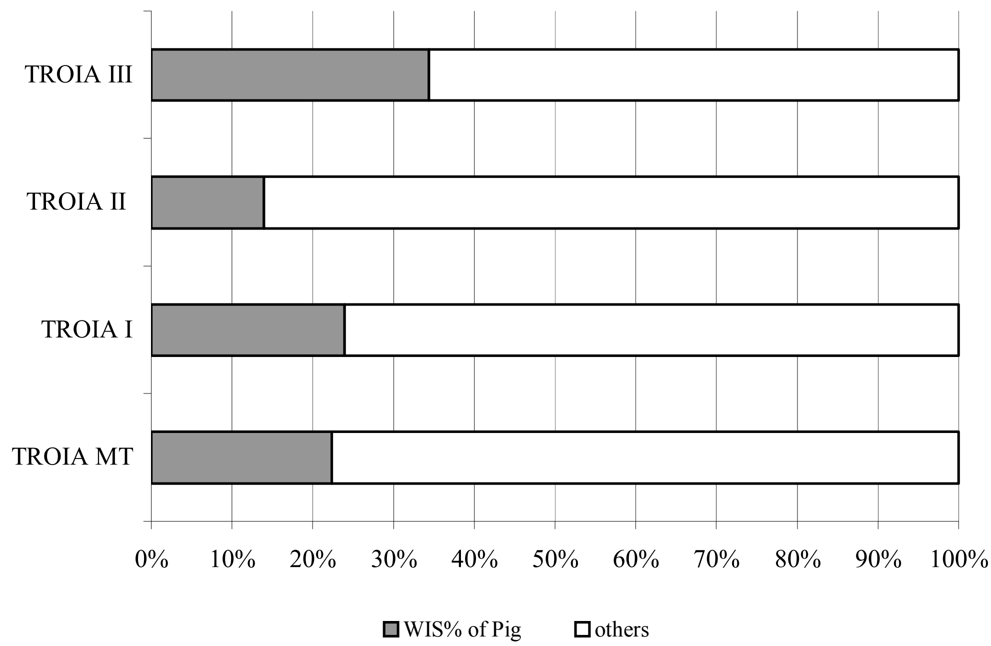

Fig. 5-37: WIS-% of the pig remains among the domestic animals for the Maritime Troy Culture and its phases.

5.3.1. The bone distribution of pig

Tab. 5-35 A: The distribution of pig remains form Troy I.

skeletal elements:	**NIS**	**NIS-%**	**WIS-(g)**	**WIS-%**
skull	217	8,51	2507,30	12,67
face fragments	170	6,67	1695,60	8,57
mandible	219	8,59	2919,40	14,75
loose teeth	177	6,94	488,60	2,47
head total	**783**	**30,71**	**7610,90**	**38,46**
vertebra	162	6,35	1194,00	6,03
ribs	730	28,63	1537,20	7,77
rump total	**892**	**34,98**	**2731,20**	**13,80**
scapula	118	4,63	979,30	4,95
humerus	81	3,18	1308,80	6,61
radius and ulna	97	3,80	1044,30	5,28
carpals	8	0,31	17,90	0,09
metacarpal	61	2,39	382,50	1,93
front leg total	**365**	**14,30**	**3732,80**	**18,86**
pelvis	88	3,45	2353,20	11,89
femur	81	3,18	963,20	4,87
patella	3	0,12	21,00	0,11
tibia	98	3,84	1141,70	5,77
fibula	23	0,90	54,30	0,27
astragalus	15	0,59	145,40	0,73
calcaneus	43	1,69	423,20	2,14
tarsals	7	0,27	27,80	0,14
metatarsal	32	1,25	219,10	1,11
hind leg total	**390**	**15,28**	**5348,90**	**27,03**
indet. metapodial	55	2,16	159,60	0,81
indet. phalanges	65	2,55	206,60	1,04
TOTAL	**2550**	**100,00**	**19790,00**	**100,00**

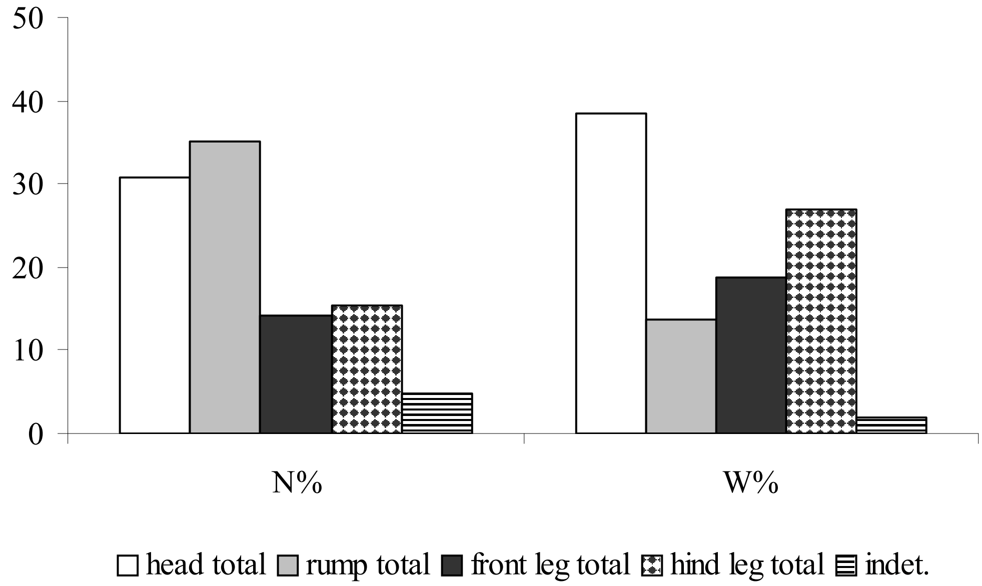

Fig. 5-38 A: Distribution of skeletal parts and weight of the pig remains in Troy I.

Tab. 5-35 B: The distribution of pig remains form Troy II.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
skull	59	12,32	510,80	17,06
Face fragments	35	7,31	158,20	5,28
mandible	36	7,52	369,60	12,35
loose teeth	33	6,89	59,50	1,99
head total	**163**	**34,04**	**1098,10**	**36,68**
vertebra	59	12,32	218,70	7,31
ribs	72	15,03	186,40	6,23
rump total	**131**	**27,35**	**405,10**	**13,54**
scapula	16	3,34	138,90	4,64
humerus	24	5,01	268,50	8,97
radius and ulna	21	4,38	193,20	6,45
metacarpal	12	2,51	56,50	1,89
front leg total	**73**	**15,24**	**657,10**	**21,95**
pelvis	15	3,13	159,30	5,32
femur	15	3,13	212,40	7,10
patella	2	0,42	12,00	0,40
tibia	23	4,80	244,60	8,17
fibula	7	1,46	8,30	0,28
astragalus	3	0,63	22,40	0,75
calcaneus	5	1,04	64,30	2,15
tarsals	3	0,63	10,50	0,35
metatarsal	8	1,67	34,90	1,17
hind leg total	**81**	**16,91**	**768,70**	**25,68**
indet. metapodial	11	2,30	22,00	0,73
indet. phalanges	20	4,18	42,40	1,42
TOTAL	**479**	**100,00**	**2993,40**	**100,00**

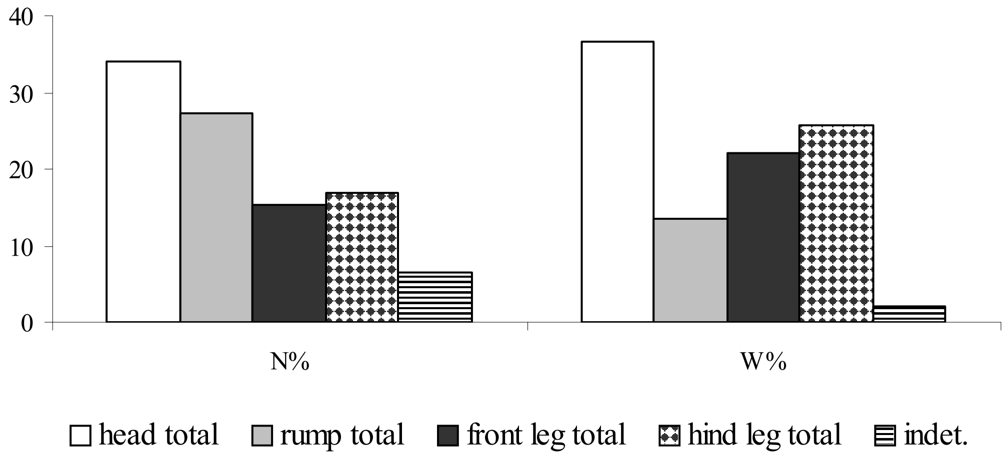

Fig. 5-38 B: Distribution of skeletal parts and weight of the pig remains in Troy II.

Tab. 5-35 C: The distribution of pig remains form Troy III.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
skull	27	6,18	242,00	8,33
face fragments	31	7,09	233,70	8,04
mandible	39	8,92	504,10	17,35
loose teeth	31	7,09	81,20	2,79
head total	**128**	**29,28**	**1061,00**	**36,51**
vertebra	61	13,96	260,00	8,95
ribs	80	18,31	237,00	8,16
rump total	**141**	**32,27**	**497,00**	**17,11**
scapula	13	2,97	145,60	5,01
humerus	20	4,58	298,80	10,28
radius and ulna	12	2,75	72,60	2,50
carpals	1	0,23	6,00	0,21
metacarpal	13	2,97	61,20	2,11
front leg total	**59**	**13,50**	**584,20**	**20,11**
pelvis	17	3,89	192,10	6,61
femur	16	3,66	151,00	5,20
tibia	21	4,81	230,30	7,92
fibula	7	1,60	11,50	0,40
astragalus	2	0,46	19,80	0,68
calcaneus	5	1,14	30,20	1,04
tarsals	1	0,23	2,00	0,07
metatarsal	9	2,06	45,00	1,55
hind leg total	**78**	**17,85**	**681,90**	**23,47**
indet. metapodial	9	2,06	17,50	0,60
indet. phalanges	22	5,04	64,50	2,22
TOTAL	**437**	**100,00**	**2906,10**	**100,00**

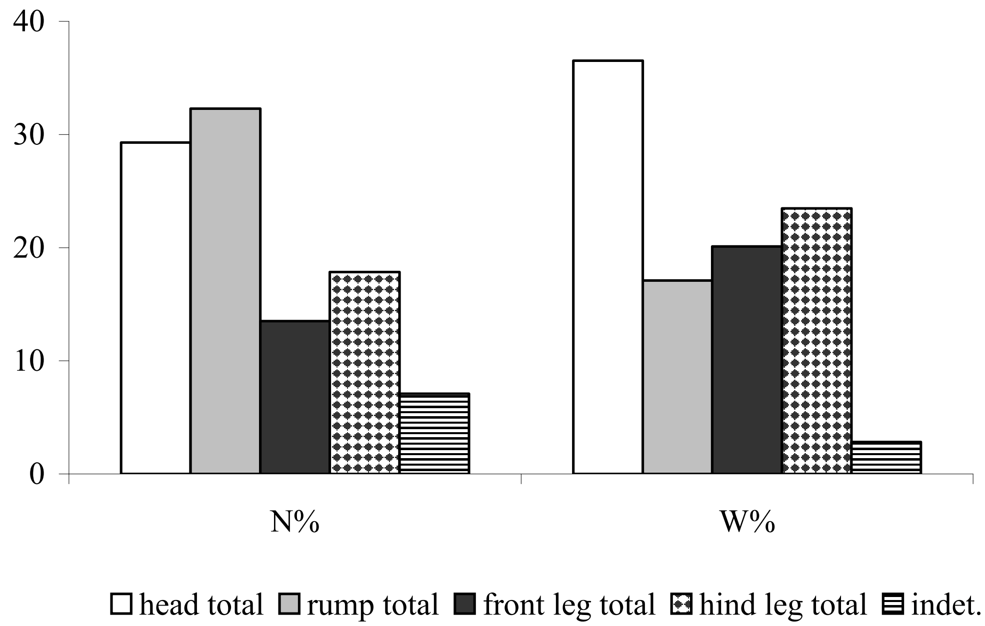

Fig. 5-38 C: Distribution of skeletal parts and weight of the pig remains in Troy III.

Tab. 5-35 D: The distribution of pig remains form Maritime Troy Culture.

skeletal elements:	**NIS**	**NIS-%**	**WIS-(g)**	**WIS-%**
skull	333	8,49	3546,80	12,33
face fragments	264	6,73	2368,50	8,24
mandible	322	8,21	4229,10	14,70
loose teeth	259	6,61	648,30	2,25
head total	**1178**	**30,04**	**10792,70**	**37,52**
vertebra	312	7,96	1842,70	6,41
ribs	993	25,33	2211,60	7,69
rump total	**1305**	**33,29**	**4054,30**	**14,10**
scapula	176	4,49	1529,80	5,32
humerus	146	3,72	2206,10	7,67
radius and ulna	162	4,13	1504,10	5,23
carpals	9	0,23	23,90	0,08
metacarpal	98	2,50	546,20	1,90
front leg total	**591**	**15,07**	**5810,10**	**20,20**
pelvis	149	3,80	2992,60	10,41
femur	130	3,32	1470,60	5,11
patella	5	0,13	33,00	0,11
tibia	158	4,03	1699,60	5,91
fibula	39	0,99	76,10	0,26
astragalus	26	0,66	254,60	0,89
calcaneus	62	1,58	589,70	2,05
tarsals	11	0,28	40,30	0,14
metatarsal	57	1,45	335,00	1,16
hind leg total	**637**	**16,24**	**7491,50**	**26,05**
indet. metapodial	87	2,22	256,10	0,89
indet. phalanges	123	3,14	355,50	1,24
TOTAL	**3921**	**100,00**	**28760,20**	**100,00**

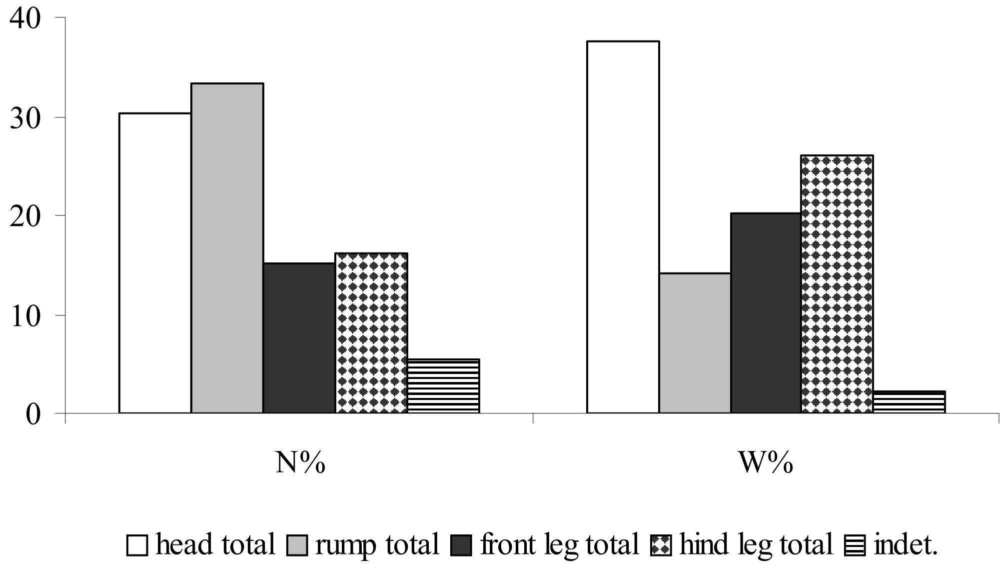

Fig. 5-38 D: Distribution of skeletal parts and weight of the pig remains during Maritime Troy Culture.

Tab. 5-36: Bone weight of the comparative skeletal from pig (SUS 12).

SUS 12		
Gewichtsvergleich	**W-(g)**	**%**
Cranium und Zungenbein	773	17,81
Mandibula	460	10,60
head total	**1233**	**28,41**
Wirbel	696	16,04
Rippen	450	10,37
rump total	**1146**	**26,41**
Scapula	187	4,31
Humerus	287	6,61
Radius	113	2,60
Ulna	102	2,35
Handwurzel	42	0,97
Metacarpus	73	1,68
Phalanx	135	3,11
front leg	**939**	**21,64**
Pelvis	185	4,26
Femur	260	5,99
Patella	20	0,46
Tibia	215	4,95
Fibula	20	0,46
Talus	35	0,81
Calcaneus	47	1,08
Fußwurzelrest	30	0,69
Metatarsus	75	1,73
Phalanx	135	3,11
hind leg	**1022**	**23,55**
Summe	**4340**	**100,00**

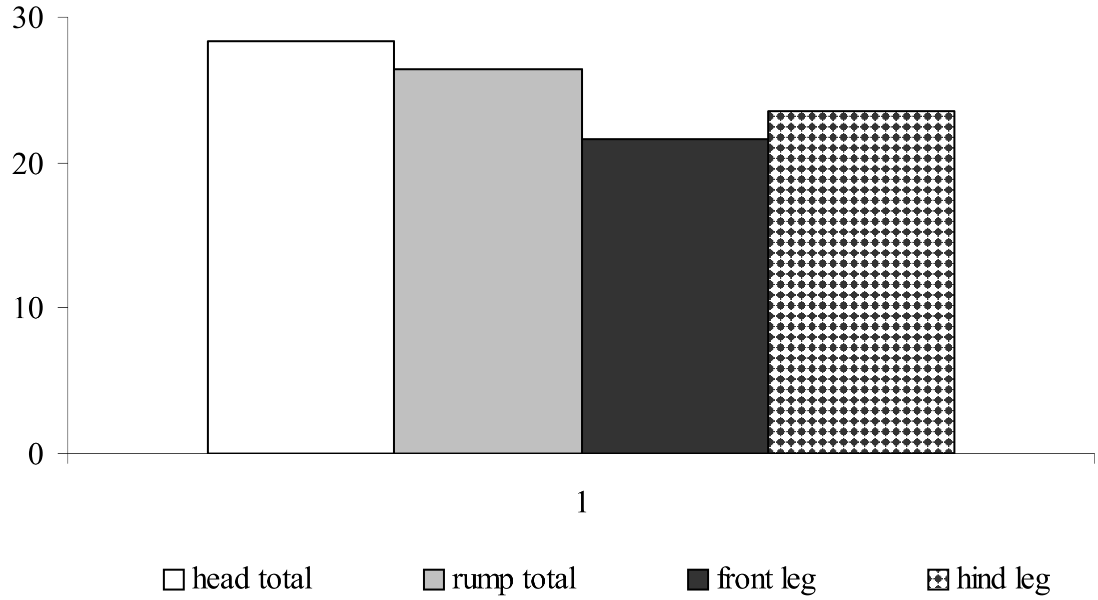

Fig. 5-39: Distribution of skeletal weight of the standard pig.

5.3.2. The Gender of the Pig

Tab. 5-37: Pig bones with sexual characteristics per phase and Maritime Troy Culture.

Phase	Troy I	Troy II	Troy Maritime
Canines/Root hole	11♀ / 33 ♂	1 ♀ / 1 ♂	12 ♀ / 34 ♂

5.3.3. Killing pattern of Pig

5.3.3.1. Epiphysis fusion of Pig

Tab. 5-38: The epiphyseal fusing periods of pig in Troy I.

TROY I Pig (SUS)	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Scap.-corac.	21	0	3		
Ilium-ischium	9	1	9		
Phal.2 prox.	10	1	9		
Phal.1 prox.	15	0	14		
Radius prox.	16	0	8		
Humerus dist.	11	4	18	**59,06**	**12**
Metapods. dist.	29	2	44		
Tibia dist.	15	3	12	**46,66**	**24**
Calcaneus prox.	3	0	35	**7,89**	**30**
Ulna dist.	1	0	2	**33,33**	**36**
Femur prox.	1	0	16		
Femur dist.	2	0	25		
Tibia prox.	3	0	11		
Humerus prox.	1	0	9		
Ulna prox.	1	0	22		
Radius dist.	1	0	5	**9,27**	**42**
Pelvis caud.	2	1	2		
Wirbel	19	0	87	**19,81**	**60**

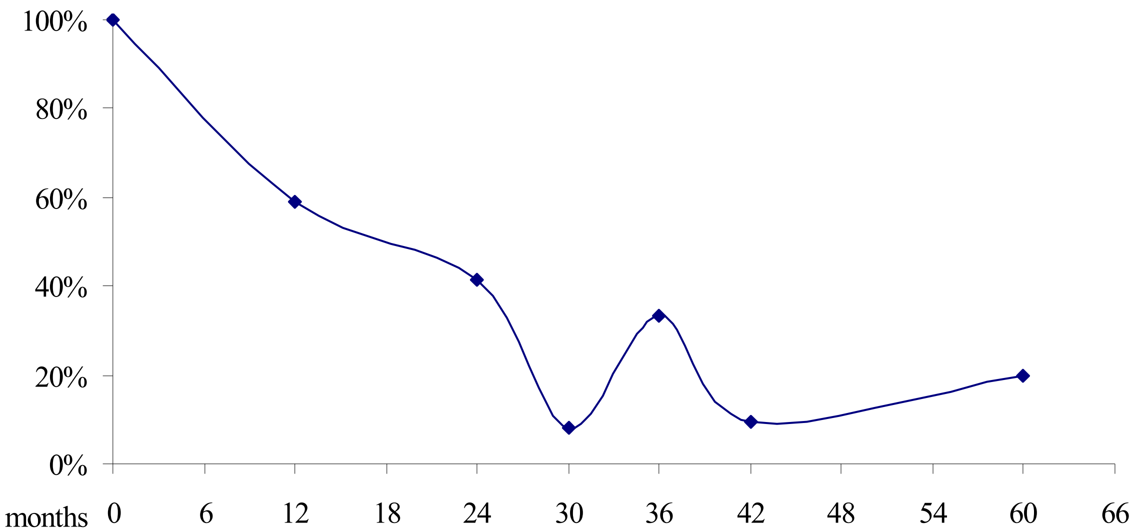

Fig. 5-40: The survival curve of pig in Troy I.

Tab. 5-39: The epiphyseal fusing periods of pig in Troy II.

TROY II Pig, (SUS)	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Scap.-corac.	2	0	1		
Ilium-ischium	2	0	2		
Phal.2 prox.	1	0	4		
Phal.1 prox.	3	0	5		
Radius prox.	4	0	4		
Humerus dist.	1	0	5	**38,23**	**12**
Metapods. dist.	4	0	22		
Tibia dist.	3	0	6	**20,00**	**24**
Calcaneus prox.	1	0	5	**16,66**	**30**
Ulna dist.	0	0	4	**0**	**36**
Femur prox.	0	0	1		
Femur dist.	1	0	2		
Tibia prox.	0	0	3		
Humerus prox.	1	0	5		
Ulna prox.	0	0	2		
Radius dist.	1	0	4	**15,00**	**42**
Pelvis caud.	0	0	2		
Wirbel	1	0	43	**2,17**	**60**

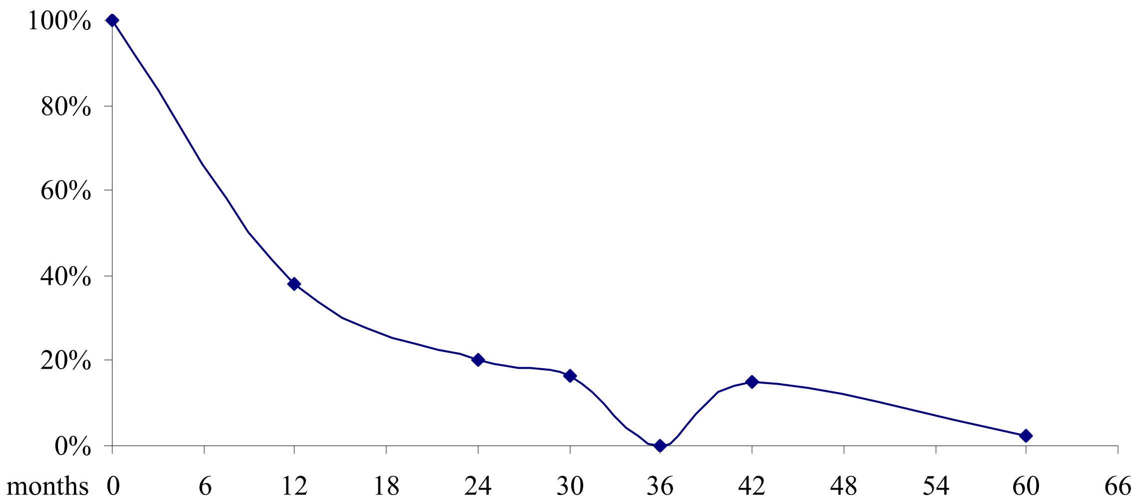

Fig. 5-41: The survival curve of pig in Troy II.

Tab. 5-40: The epiphyseal fusing periods of pig in Troy III.

TROY III Pig (SUS)	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Scap.-corac.	0	0	1		
Phal.2 prox.	2	1	1		
Phal.1 prox.	3	1	3	**58,33**	**12**
Metapods. dist.	2	0	9		
Tibia dist.	0	0	2	**15,38**	**24**
Femur prox.	0	0	1		
Femur dist.	0	0	1		
Tibia prox.	0	0	1	**0**	**42**
Wirbel	0	0	50	**0**	**60**

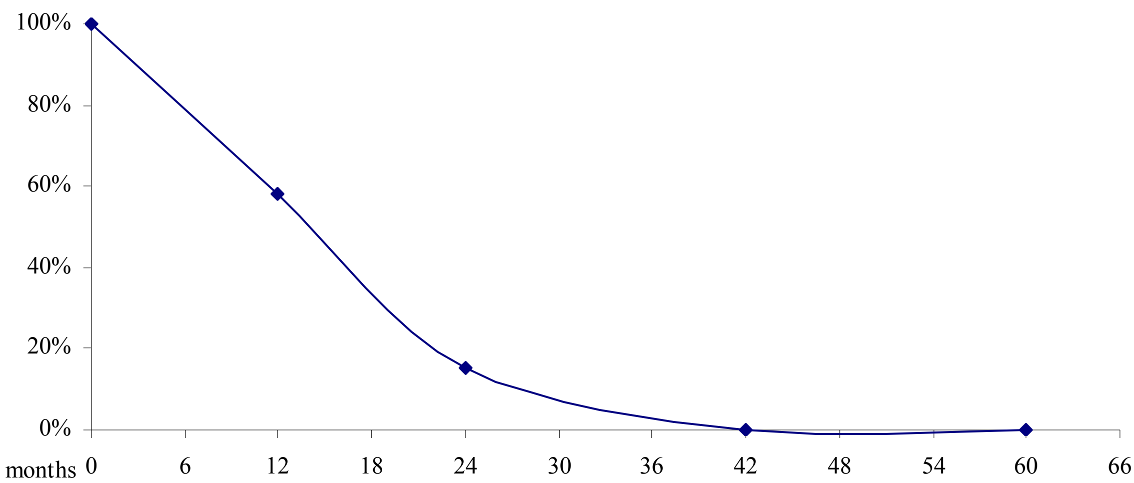

Fig. 5-42: The survival curve of pig in Troy III.

Tab. 5-41: The epiphyseal fusing periods of pig during Maritime Troy Culture.

MARITIME Pig (SUS)	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Scap.-corac.	23	0	5		
Ilium-ischium	11	1	11		
Phal.2 prox.	13	2	14		
Phal.1 prox.	21	1	22		
Radius prox.	20	0	12		
Humerus dist.	12	4	23	**55,38**	**12**
Metapods. dist.	35	23	75		
Tibia dist.	18	0	20	**37,90**	**24**
Calcaneus prox.	4	0	40	**9,09**	**30**
Ulna dist.	1	0	6	**14,28**	**36**
Femur prox.	1	0	18		
Femur dist.	3	0	28		
Tibia prox.	3	0	15		
Humerus prox.	2	0	14		
Ulna prox.	1	0	24		
Radius dist.	2	0	19	**9,23**	**42**
Pelvis caud.	2	1	4		
Wirbel	20	0	180	**11,11**	**60**

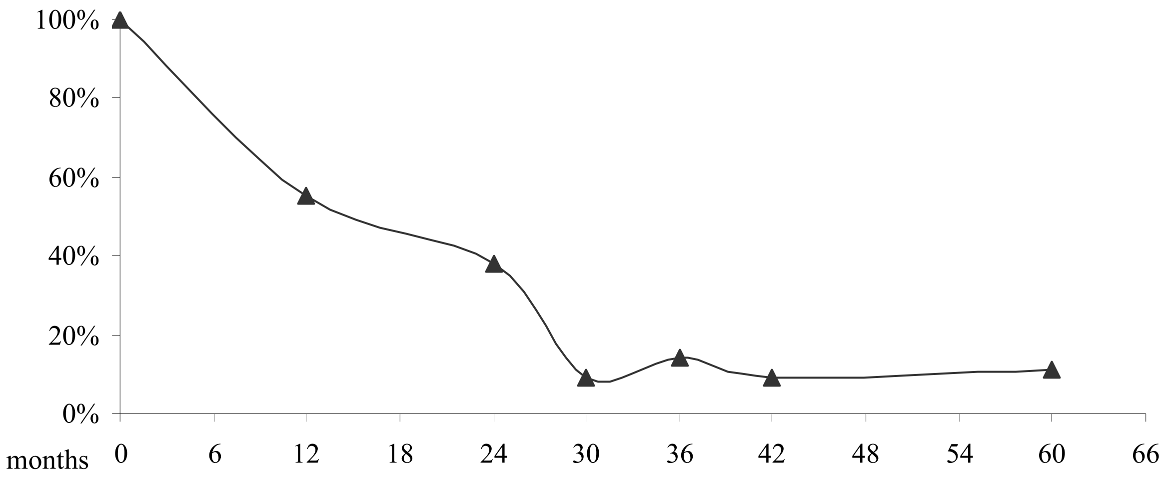

Fig. 5-43: The survival curve of pig during the Maritime Troy Culture.

5.3.3.2. The Dental Aging of pig

Tab. 5-42: Dental aging of pig in Troy I.

	Month	N
Premolar before changing	> 10	2
Premolar changing	> 12	2
Premolar in line but not wear	> 14	1
Premolar slightly worn	> 15	9
Premolar moderately worn	> 24	2
M 1 erupting	> 5	1
M 1 slightly worn	> 10	8
M 1 moderately worn	> 18	8
M 1 heavily worn	> 24	3
M 2 before erupting	> 10	2
M 2 erupting	> 10	2
M 2 slightly worn	> 12	1
M 2 moderately worn	> 24	2
M 2 heavily worn	> 30	1
M 3 before erupting	> 16	4
M 3 erupting	> 16	8
M 3 not worn	> 18	2
M 3 slightly worn	> 18	9
M 3 moderately worn	> 30	4
M 3 heavily worn	> 42	1
I 1 not/slightly worn	> 6	2
I 1 moderately worn	> 12	2
I 2 changing	> 10	1
I 2 not/slightly worn	> 12	1
C (I4) not changed	> 6	1
C (I4) not/slightly worn	> 10	1
C (I4) moderately worn	> 12	2
Milk premolar erupting	> 4	2
Milk premolar not worn	> 5	2
Milk premolar slightly worn	> 6	4
Milk premolar heavily worn	> 10	2
Milk Teeth slightly worn	> 10	1
Milk Teeth heavily worn	> 10	1
SUM		**94**

Tab. 5-43: Dental aging of pig in Troy II.

	Month	N
Premolar before changing	> 10	1
Premolar in line but not wear	> 14	1
Premolar slightly worn	> 15	3
M 1 erupting	> 5	4
M 1 not worn	> 6	2
M 1 slightly worn	> 10	1
M 2 erupting	> 10	1
M 3 erupting	> 16	3
Milk premolar heavily worn	> 10	1
Milk Teeth slightly worn	> 10	1
Milk Teeth heavily worn	> 10	1
SUM		**19**

Tab. 5-44: Specific dental aging groups for pig during the Maritime Troy Culture.

Aging group in months	**N**
~ 4 – 6/10	18
~ 10 – 12/14	41
~ 14 – 16/18	29
~18 – 24	20
~ 24 – 30	7
> 30	6
Total	**121**

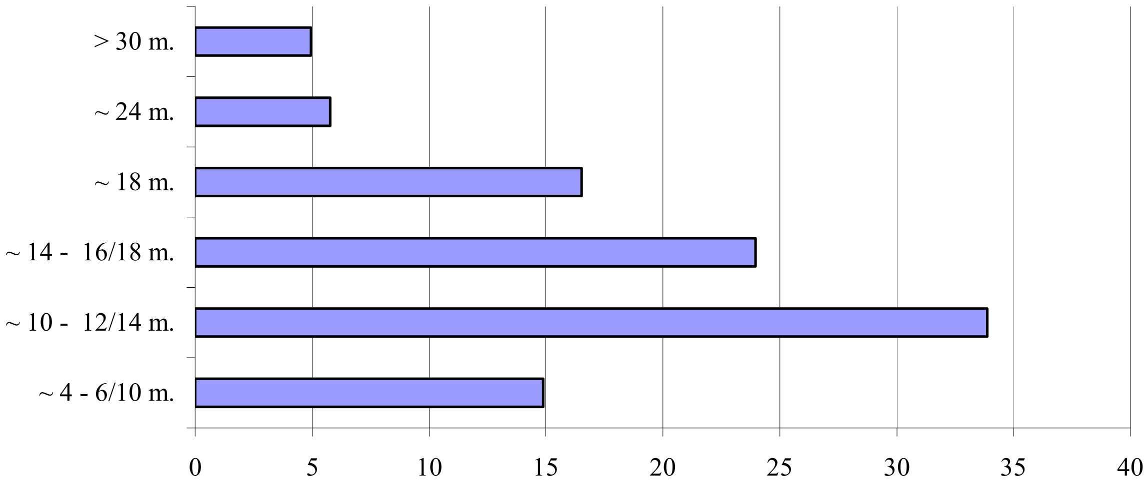

Fig. 5-44: Specific dental aging groups for pig showed in percentages for the Maritime Troy Culture (n=121).

5.3.4. Size of the Pig

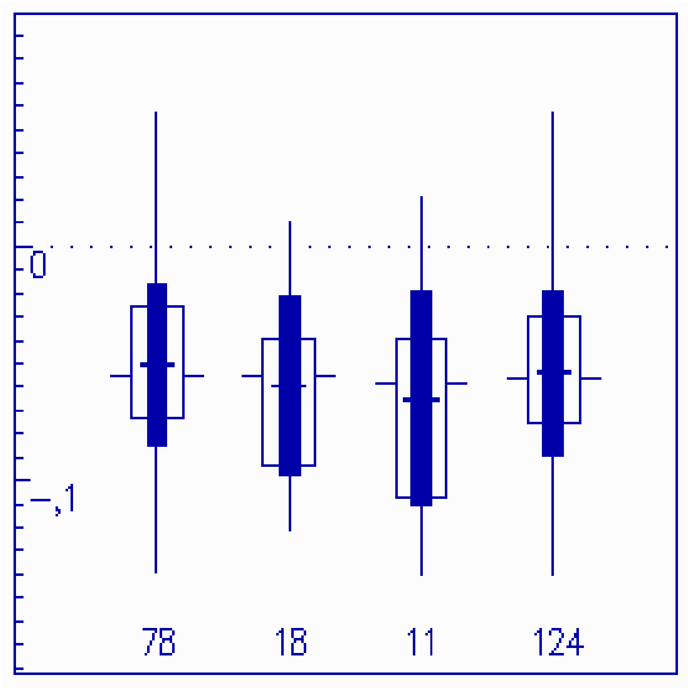

Fig. 5-45: The LSI calculation of pig remains from Troy I, Troy II, Troy III and the whole Maritime Troy Culture.

5.4. Dog, CANIS

Tab. 5-45: The distribution of dog remains form the Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
skull	10	10,90	22,10	5,60
mandible	5	5,40	64,90	16,40
loose teeth	4	4,30	2,60	0,70
head total	**19**	**20,60**	**89,60**	**22,70**
vertebra	19	20,60	58,50	14,80
rip	6	6,50	5,20	1,30
rump total	**25**	**27,10**	**63,70**	**16,10**
scapula	2	2,20	8,00	2,00
humerus	5	5,40	51,20	12,90
radius	3	3,20	11,20	2,80
ulna	4	4,30	18,70	4,70
metacarpal	1	1,10	2,40	0,60
ant. phalanges	3	3,20	2,40	0,60
front leg total	**18**	**19,40**	**93,90**	**23,60**
pelvis	5	5,40	41,60	10,50
femur	4	4,30	22,40	5,70
tibia	7	7,50	57,60	14,50
fibula	1	1,10	1,80	0,50
astragalus	1	1,10	2,40	0,60
calcaneus	1	1,10	5,30	1,30
metatarsal	6	6,60	13,10	3,30
hind leg total	**25**	**27,10**	**144,20**	**36,40**
indet. metapodial	4	4,40	3,90	1,00
indet. phalanges	2	2,20	1,00	0,30
TOTAL	**93**	**100**	**396,30**	**100**

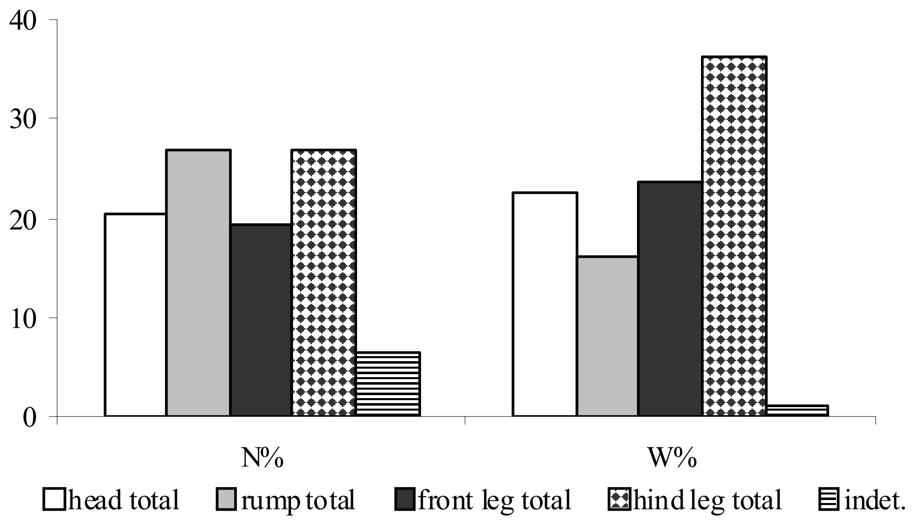

Fig. 5-46: Distribution of skeletal parts and weight of the dog remains from the Maritime Troy Culture.

Tab. 5-46: The epiphyseal fusing periods of dog in Troy I.

TROY I Dog (CANIS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	1	0	0		
Ilium-ischium	1	0	1		
Phal.1 prox.	5	0	0	**87,5**	**6**
Humerus dist.	3	0	0		
Metapods. dist.	6	0	0	**100**	**8**
Humerus prox.	1	0	0		
Calcaneus prox.	1	0	0	**100**	**16**
Femur prox.	2	0	0	**100**	**18**
Pelvis caud.	0	0	1	**0**	**24**
Wirbel	3	0	8	**27,5**	**ab 36**

Tab. 5-47: The epiphyseal fusing periods of dog in Troy II.

TROY II Dog (CANIS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	0	0	0		
Metapods. dist.	2	0	0	**100**	**8**
Ulna prox.	1	0	0	**100**	**12**
Femur dist.	0	0	1	**0**	**18**

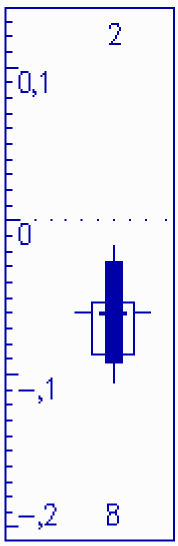

Fig. 5-47: The LSI calculation of dog remains from Maritime Troy Culture.

5.5. Domestic Animal Management in the Troas and at Yenibagdemli between 5000 – 3000 BC.

5.5.1. Overview of the earlier Domestic Animal Management in the Troas and at Yenibagdemli

Tab. 5-48: The epiphyseal fusing periods of cattle in Yenibademli.

Yenibağdemli Cattle (*BOS*)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	2	0	0		
Ilium-ischium	1	0	1	**75,00**	**10**
Humerus dist.	13	1	1		
Radius prox.	9	1	2		
Phal.2 prox.	28	1	1		
Phal.1 prox.	39	0	6	**90,19**	**18**
Tibia dist.	3	1	3		
Metapods. dist.	18	0	14		
Calcaneus prox.	6	1	10	**51,78**	**24-30**
Femur prox.	8	0	4		
Humerus prox.	2	0	2		
Ulma prox.	1	0	0		
Radius dist.	0	1	3		
Femur dist.	4	1	10		
Tibia prox.	6	3	4	**53,06**	**54**
Pelvis caud.	1	0	1		
Wirbel	1	2	7	**33,33**	**60**

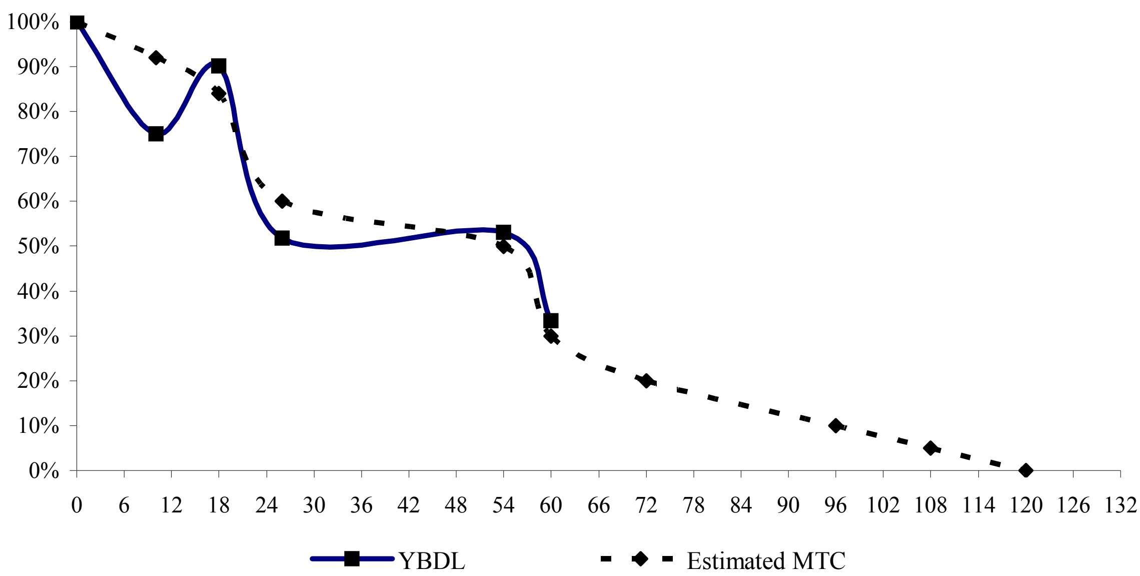

Fig. 5-48: The survival curve of the cattle in Yenibademli and the estimated survival curve of the cattle herd according to calculations of dental and epiphsis data from the entire Maritime Troy Culture.

5.5.1.1.1. Size of the Cattle

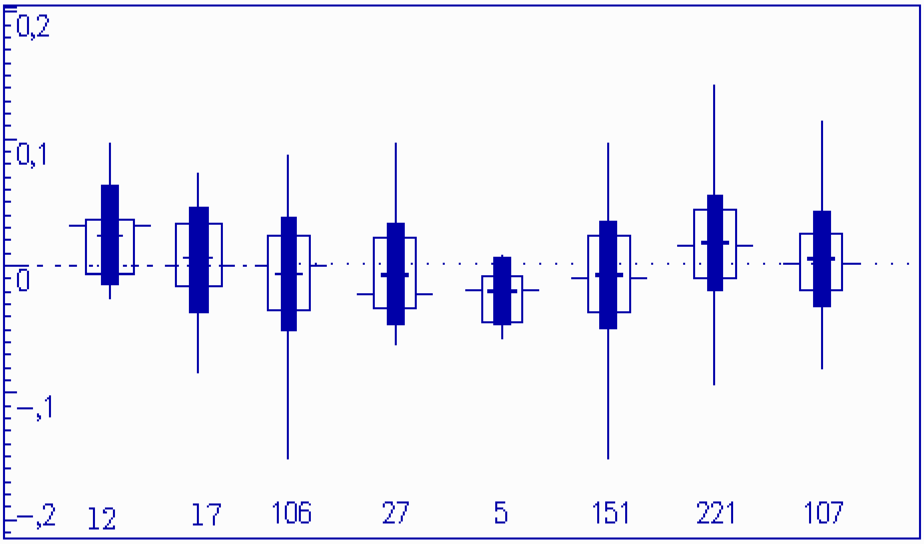

Fig. 5-49: Size of the cattle in the Troas and Yenibademli during the Early Bronze Age (Kumtepe A, Kumtepe B/C, Troy I, Troy II, Troy III, the entire Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

5.5.1.2. Small Ruminants Management

Tab. 5-49: The epiphyseal fusing periods of small ruminants in Yenibademli

Yenibademli (small ruminants)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	48	2	12		
Radius prox.	35	0	4	**84,15**	**5**
Scap.-corac.	16	1	3		
Ilium-ischium	1	0	1		
Phal.2 prox.	4	0	0		
Phal.1 prox.	48	2	6	**87,80**	**10**
Tibia dist.	50	5	12	**82,08**	**18**
Metapods. dist.	36	1	14	**72,54**	**24**
Calcaneus prox.	15	2	21		
Femur prox.	9	2	6	**52,83**	**30**
Humerus prox.	5	0	2		
Ulma prox.	5	0	3		
Radius dist.	10	0	8		
Femur dist.	4	0	5		
Tibia prox.	8	1	4	**60,00**	**42**
Pelvis caud.	0	0	1		
Wirbel	17	3	20	**48,78**	**60**

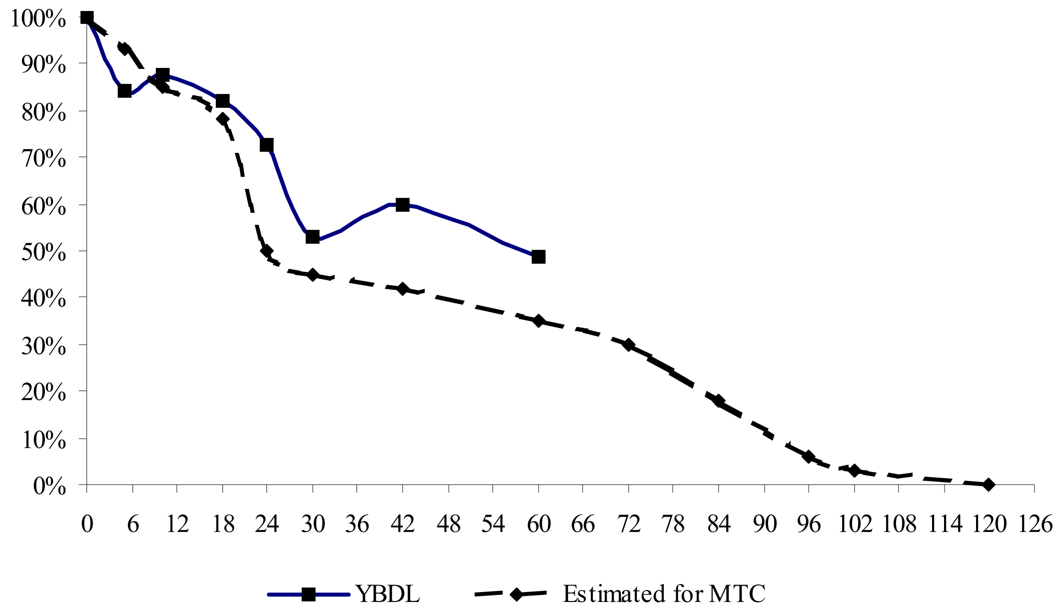

Fig. 5-50: Survival curve of small ruminants in Yenibademli, illustrated with the estimated survival curve of small ruminants for the entire Maritime Troy Culture.

5.5.1.2.1. Size of the Small Ruminants

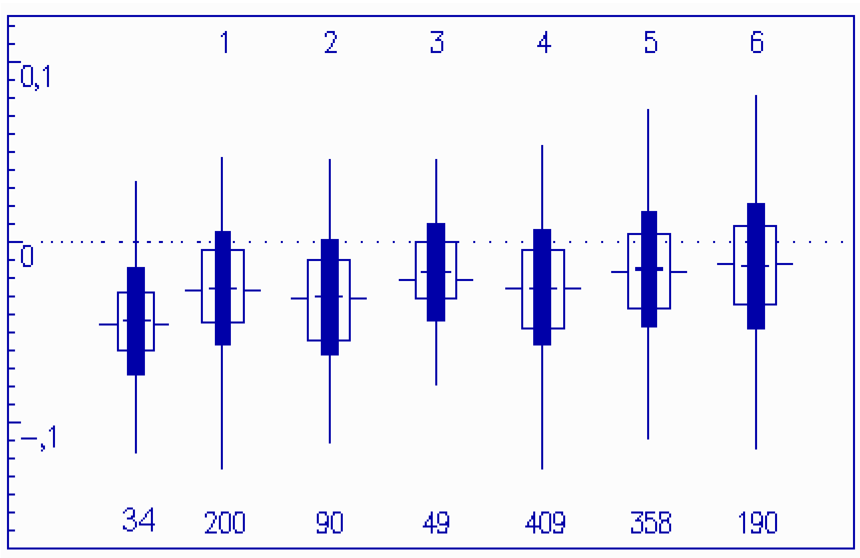

Fig. 5-51 Sheep size in the Troas and Yenibademli during the Early Bronze Age (Kumtepe A, Troy I, Troy II, Troy III, the entire Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

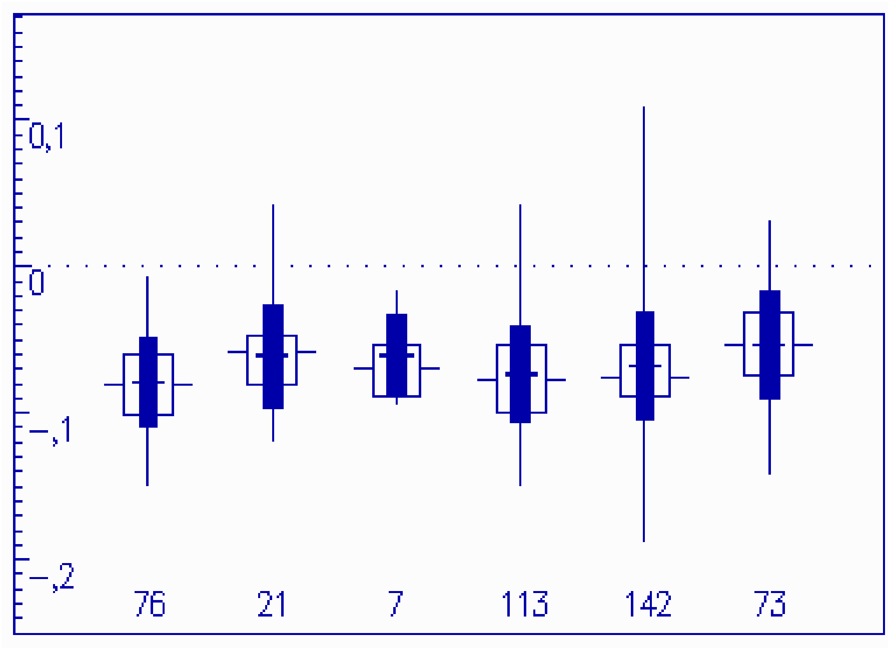

Fig. 5-52: Goat size in the Troas and Yenibademli during the Early Bronze Age
(Troy I, Troy II, Troy III, the entire Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

5.5.1.2.2. Development of "Small Ruminants" Management in the Troas from the 5th to 3rd millennium BC.

Tab. 5-50: The aim of small ruminant breeding for different age groups and the probable killing age, including the likely gender of slaughtered animals.

Killing Age	Breeding Aims	Mainly Killed Gender
<4 M	Milk production of mothers, hides, balance in flock, very little for meat	Male
~6 M	Hides, balance in flock, little for meat	Male
~12 M	Meat, hides, balance in flock	Male
1 1/2 -2 Y	Little wool/mohair production, meat, little help in enlarging the flock, hides, milk	Castrated
2-3 1/2 Y	Wool/Mohair, milk, help in enlarging the flock, meat, hides	Castrated
3 1/2-6 Y	Mainly wool/mohair production, help in enlarging the flock, milk, meat, hides	Female ?/ Castrated
6-8 Y	Maximize the wool/mohair production, meat, hides, very little help in enlarging the flock	Female / Castrated
>8 Y	Leader animals	Female and Castrated

5.5.1.3. Pig Breeding

Tab. 5-51: The epiphyseal fusing periods of pigs in Yenibagdemli

Yenibademli Pig, (SUS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	4	0	4		
Ilium-ischium	9	0	0		
Phal.2 prox.	1	2	2		
Phal.1 prox.	7	0	1		
Radius prox.	8	1	5		
Humerus dist.	9	6	13	**65,27**	**12**
Metapods. dist.	8	1	21		
Tibia dist.	6	1	13	**32,00**	**24**
Calcaneus prox.	2	1	10	**23,07**	**30**
Ulna dist.	0	0	1	**0**	**36**
Femur prox.	1	1	10		
Femur dist.	0	0	14		
Tibia prox.	3	1	11		
Humerus prox.	0	1	5		
Ulna prox.	1	1	8		
Radius dist.	2	0	8	**17,91**	**42**
Pelvis caud.	3	0	0		
Wirbel	5	0	16	**33,33**	**60**

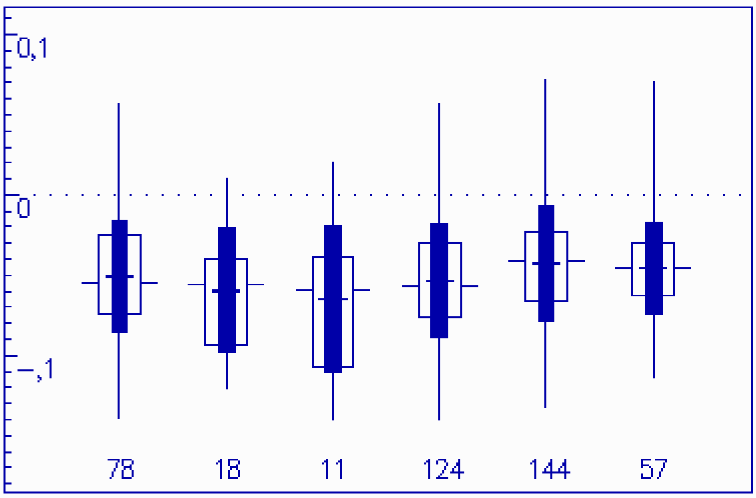

Fig. 5-53: Size of the pig in the Troas during the Early Bronze Age.
(Troy I, Troy II, Troy III,the whole Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli)

6. The Wild Mammal Fauna

6.1. The modern/current environment in the vicinity of Troy

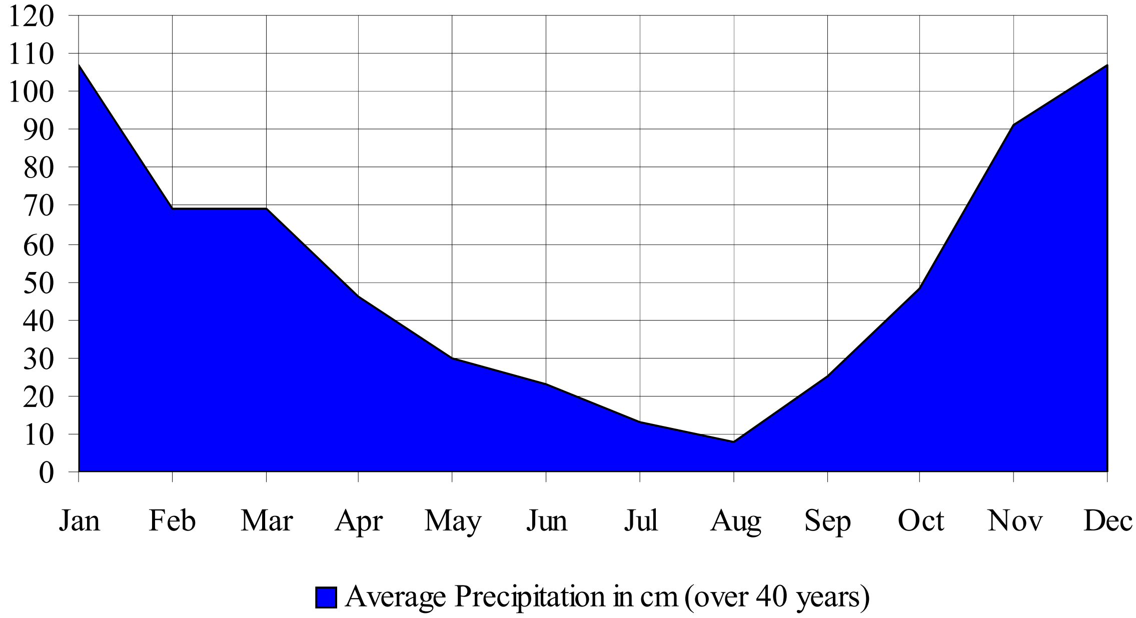

Fig. 6-1: The average precipitation in the region.

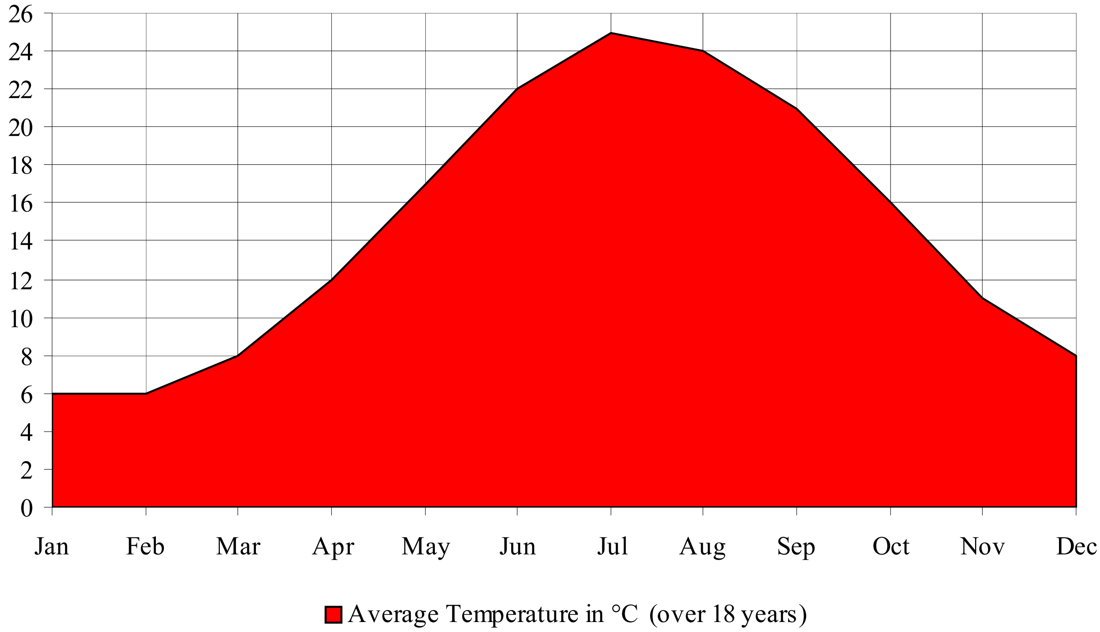

Fig. 6-2: The average temperature in the region.

6.2. The identified wild mammal remains from the Maritime Troy Culture

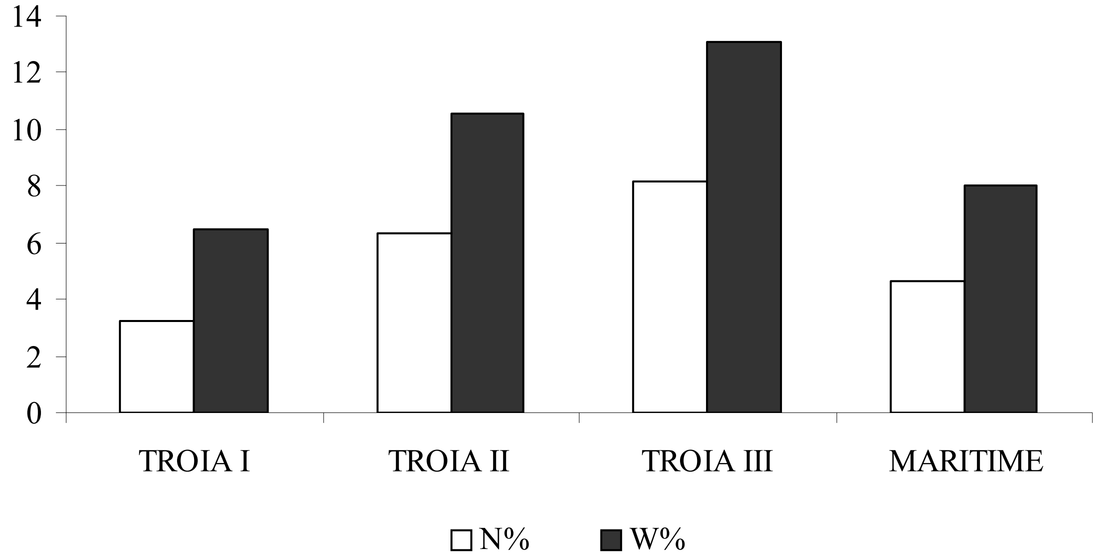

Fig. 6-3:Number of identified wild mammal remains and their weight distribution in the Maritime Troy Culture per phase as percentage among the identified mammal remains.

6.2.1. Hare, *Lepus europaeus*

Tab. 6-1: The distribution of hare, *Lepus ceuropaeus* remains form the Maritime Troy Culture.

skeletal elements:	**NIS**	**NIS-%**	**WIS-(g)**	**WIS-%**
skull	2	1,80	3,50	1,80
mandible	6	6,20	10,30	5,20
loose teeth	1	0,90	0,20	0,10
head total	**9**	**8,90**	**14,00**	**7,10**
vertebra	8	7,10	13,70	7,00
rippen	13	14,90	3,50	1,80
rump total	**21**	**22,00**	**17,20**	**8,80**
scapula	7	6,20	12,20	6,30
humerus	3	2,70	5,40	2,80
radius	9	8,00	14,60	7,50
ulna	8	7,10	14,80	7,60
metacarpal	1	0,90	0,30	0,20
front leg total	**28**	**24,90**	**47,30**	**24,40**
pelvis	8	7,10	23,60	12,10
femur	7	6,20	22,60	11,60
tibia	13	12,30	50,60	25,90
calcaneus	4	3,50	5,80	3,00
metatarsal	10	9,90	9,40	4,80
indet. metatarsus	2	2,70	3,00	1,50
post. phalanges	1	0,90	0,40	0,20
hind leg total	**45**	**42,60**	**115,40**	**59,10**
indet. metapodial	1	0,80	1,00	0,50
indet. phanges	1	0,80	0,20	0,10
TOTAL	113	100	195,10	100

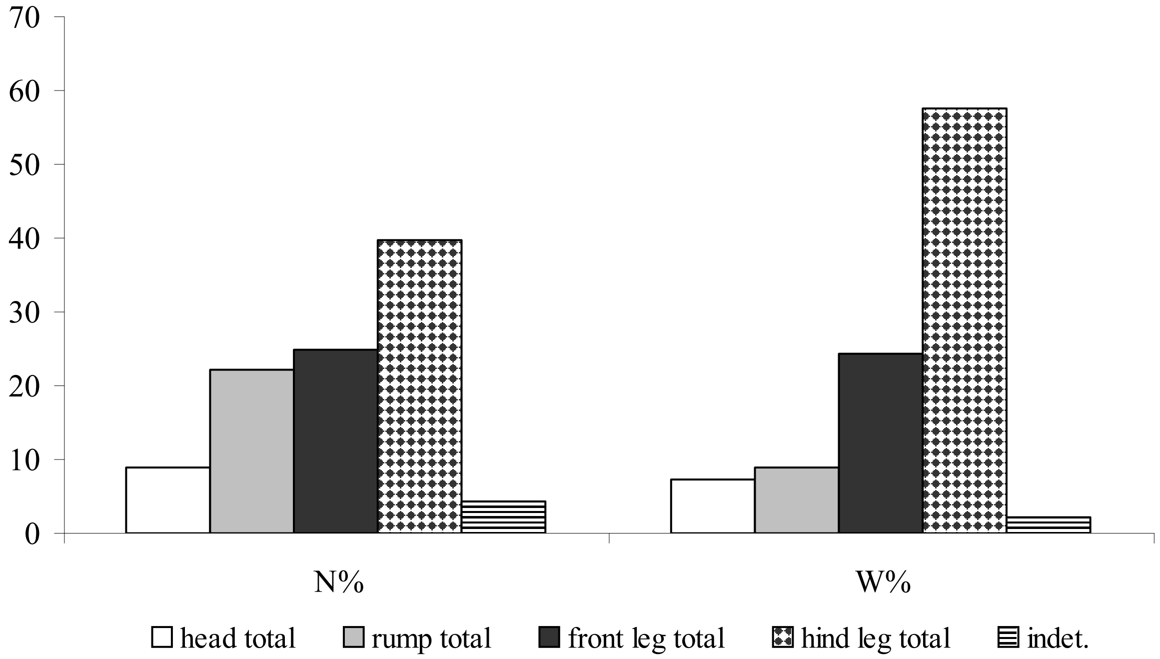

Fig. 6-4: Distribution of skeletal parts and weight of the hare remains from the Maritime Troy Culture.

6.2.3. Red Fox, *Vulpes vulpes*

Tab. 6-2: The distribution of fox, *Vulpes vulpes* remains form the Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
mandible	2	33,20	8,40	47,60
loose teeth	2	33,40	2,00	11,20
scapula	1	16,70	1,30	7,30
femur	1	16,70	6,00	33,90
TOTAL	**6**	**100,00**	**17,70**	**100,00**

6.2.9. Wild Boar, *Sus scrofa*

Tab. 6-3: The distribution of wild boar, *Sus scrofa* remains form the Maritime Troy Culture.

skeletal elements:	**NIS**	**NIS-%**	**WIS-(g)**	**WIS-%**
skull	6	7,32	240,00	12,55
face	7	8,54	176,00	9,21
mandible	12	14,63	366,00	19,14
loose teeth	10	12,20	60,70	3,17
head total	**35**	**42,68**	**842,70**	**44,08**
vertebra	6	7,32	30,30	1,58
rip	2	2,44	10,00	0,52
rump total	**8**	**9,76**	**40,30**	**2,11**
humerus	4	4,88	180,00	9,41
radius	2	2,44	47,00	2,46
ulna	1	1,22	10,00	0,52
metacarpal	1	1,22	14,00	0,73
front leg total	**8**	**9,76**	**251,00**	**13,13**
pelvis	5	6,10	212,00	11,09
femur	5	6,10	137,00	7,17
patella	2	2,44	35,00	1,83
tibia	5	6,10	143,00	7,48
fibula	3	3,66	20,00	1,05
astragalus	1	1,22	22,00	1,15
calcaneus	8	9,76	192,70	10,08
metatarsal	1	1,22	6,00	0,31
hind leg total	**30**	**33,30**	**767,70**	**40,00**
indet. phalanges	1	1,22	10,20	0,53
TOTAL	82	100,00	1911,9	100,00

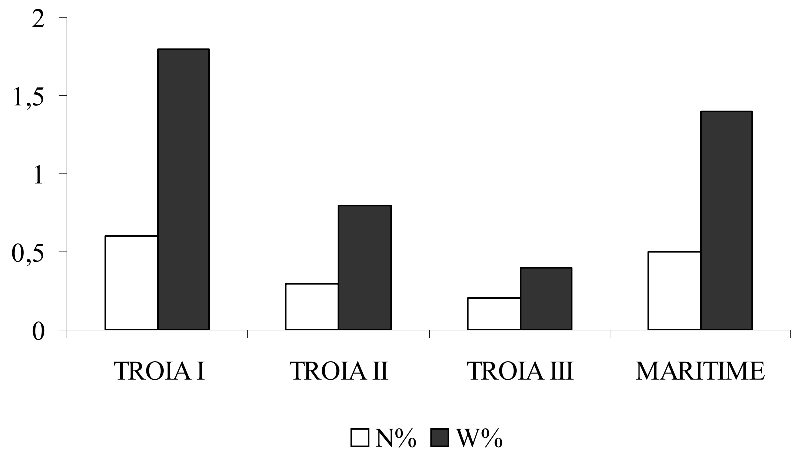

Fig. 6-5: The proportion of wild boar, *Sus scrofa*, remains and weight among the identified mammal remains.

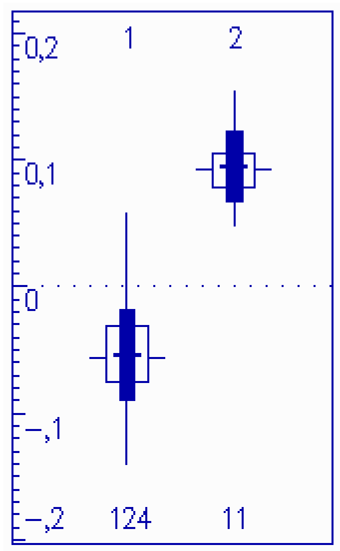

Fig. 6-6: The LSI calculation of pig and wild boar**,** *Sus scrofa* remains from the Maritime Troy Culture to show the size difference.

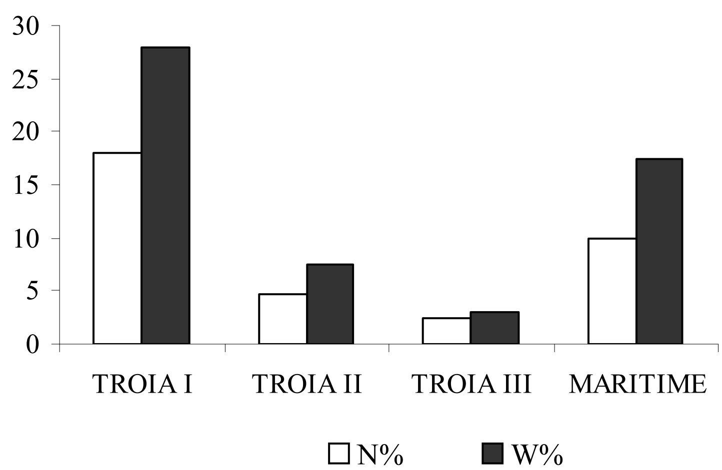

Fig. 6-7: The portion of wild boar remains and weight among the wild mammal remains.

6.2.10. Roe deer, *Capreolus capreolus*

Tab. 6-4: The distribution of roe deer, *Capreolus capreolus* remains form the Maritime Troy Culture.

skeletal elements:	**NIS**	**NIS-%**	**WIS-(g)**	**WIS-%**
antler	1	8,30	11,00	12,40
loose teeth	1	8,30	1,00	1,10
mandible	1	8,30	2,60	2,90
scapula	2	16,70	6,00	6,70
radius	1	8,30	12,00	13,50
tibia	3	25,00	44,30	49,80
Os centrotarsale	1	8,30	3,00	3,40
metatarsal	2	16,70	9,00	10,10
TOTAL	**12**	**99,90**	**88,90**	**99,90**

6.2.11. Fallow Deer, *Dama dama*

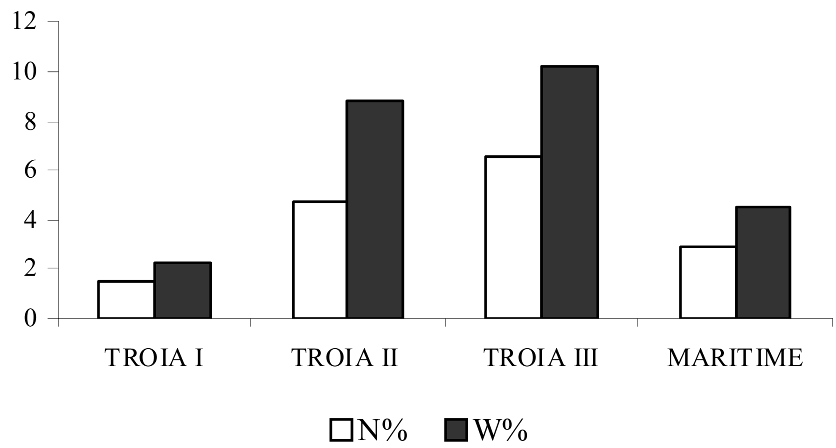

Fig. 6-8: The proportion of fallow deer, *Dama dama*, remains and weight among all identified mammal remains.

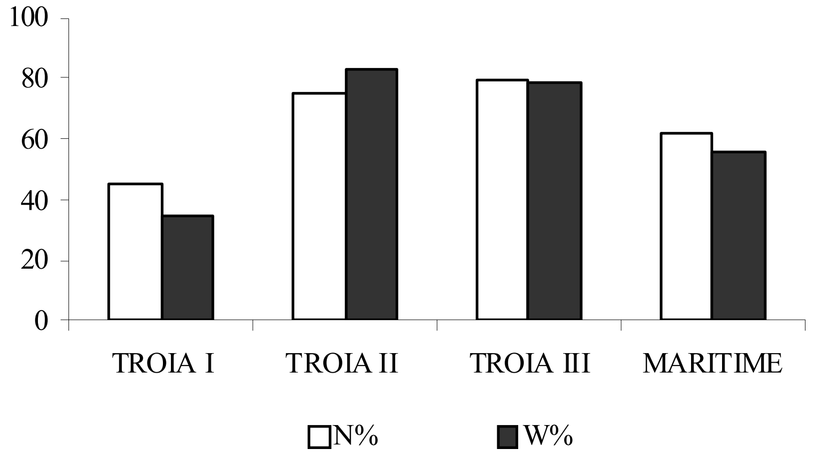

Fig. 6-9: The proportion of fallow deer, *Dama dama,* remains and bone weight in comparison to all wild mammal remains.

Tab. 6-5 A: The distribution of fallow deer, *Dama dama* remains form Troy I.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
antler	8	4,97	38,70	1,96
skull	8	4,97	58,10	2,95
face fragments	2	1,24	28,90	1,46
mandible	2	1,24	35,80	1,81
loose teeth	1	0,62	1,00	0,05
head total	**21**	**13,04**	**162,50**	**8,24**
vertebra	7	4,35	76,00	3,85
ribs	12	7,45	65,20	3,31
rump total	**19**	**11,80**	**141,20**	**7,16**
scapula	6	3,73	60,00	3,04
humerus	10	6,21	210,90	10,69
radius and ulna	15	9,32	185,80	9,42
metacarpal	8	4,97	134,20	6,80
front leg total	**39**	**24,23**	**590,90**	**29,96**
pelvis	8	4,97	83,30	4,22
femur	11	6,83	185,60	9,41
tibia	21	13,04	335,40	17,00
astragalus	6	3,73	97,00	4,92
calcaneus	10	6,21	194,30	9,85
tarsals	2	1,24	13,20	0,67
metatarsal	14	8,70	119,10	6,04
post. phalanges	1	0,62	4,70	0,24
hind leg total	**73**	**45,34**	**1032,60**	**52,35**
indet. metapodial	2	1,24	5,20	0,26
indet. phalanges	7	4,35	40,30	2,04
TOTAL	**161**	**100,00**	**1972,70**	**100,00**

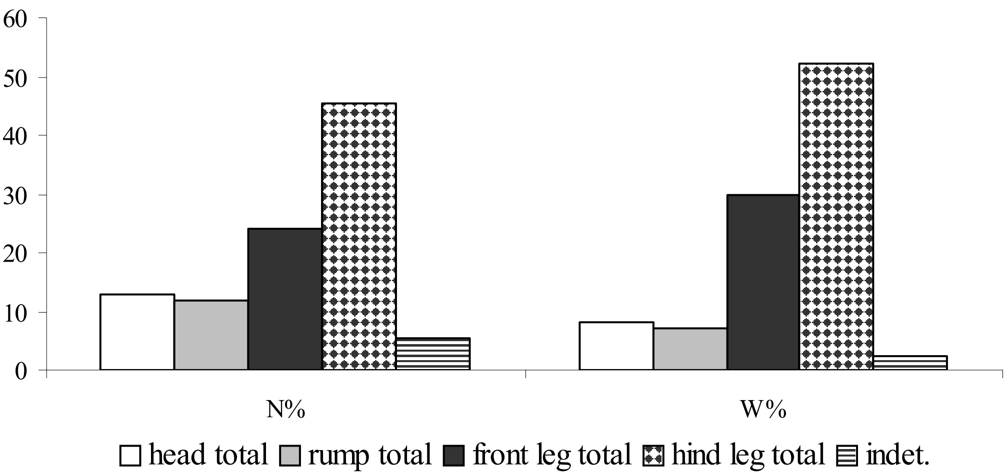

Fig. 6-10 A: Distribution of skeletal parts and weight of fallow deer, *Dama dama* remains for Troy I.

Tab. 6-5 B: The distribution of fallow deer, *Dama dama* remains form Troy II.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
antler	3	1,86	73,20	3,43
skull with antler	1	0,62	84,00	3,94
skull	7	4,35	64,60	3,03
mandible	6	3,73	88,60	4,15
loose teeth	6	3,73	21,30	1,00
head total	**23**	**14,29**	**331,70**	**15,55**
vertebra	29	18,01	386,60	18,12
ribs	14	8,70	71,80	3,36
rump total	**43**	**26,71**	**458,40**	**21,48**
scapula	5	3,11	150,00	7,03
humerus	5	3,11	99,00	4,64
radius and ulna	12	7,45	145,20	6,80
carpals	2	1,24	5,00	0,23
metacarpal	3	1,86	37,20	1,74
ant. phalanges	1	0,62	10,00	0,47
front leg total	**28**	**17,39**	**446,40**	**20,91**
pelvis	13	8,07	173,00	8,11
femur	12	7,45	171,00	8,01
patella	2	1,24	20,50	0,96
tibia	14	8,70	270,10	12,66
malleolare	1	0,62	2,50	0,12
astragalus	6	3,73	105,00	4,92
calcaneus	2	1,24	30,90	1,45
tarsals	1	0,62	8,00	0,37
metatarsal	6	3,73	69,30	3,25
hind leg total	**57**	**35,40**	**850,30**	**39,85**
indet. metapodial	2	1,24	8,60	0,40
indet. phalanges	8	4,97	38,40	1,80
TOTAL	**161**	**100,00**	**2133,80**	**100,00**

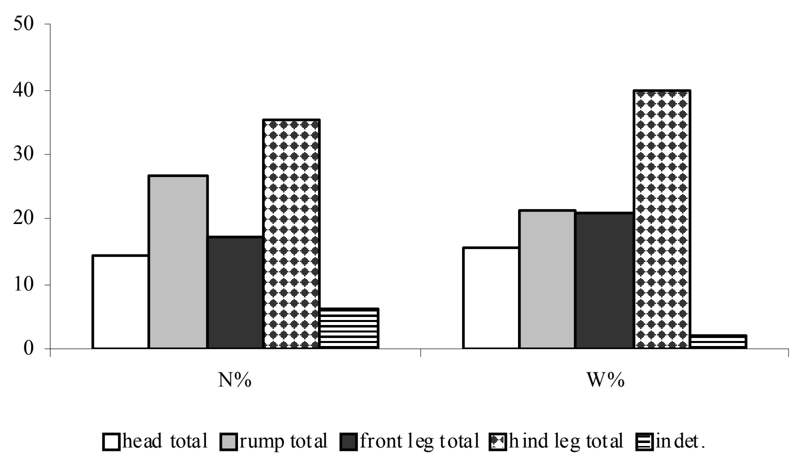

Fig. 6-10 B: Distribution of skeletal parts and weight of fallow deer, *Dama dama* remains for Troy II.

Tab. 6-5 C: The distribution of fallow deer, *Dama dama* remains form Troy III.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
antler	10	10,10	159,40	15,93
skull with antler	1	1,01	5,00	0,50
skull	1	1,01	28,00	2,80
face fragments	5	5,05	19,10	1,91
mandible	1	1,01	9,20	0,92
loose teeth	1	1,01	0,30	0,03
head total	**19**	**19,19**	**221,00**	**22,09**
vertebra	13	13,13	80,20	8,02
ribs	16	16,16	69,90	6,99
rump total	**29**	**29,29**	**150,10**	**15,01**
scapula	2	2,02	36,00	3,60
humerus	1	1,01	42,00	4,20
radius and ulna	8	8,08	158,30	15,82
metacarpal	5	5,05	69,70	6,97
front leg total	**16**	**16,16**	**306,00**	**30,58**
pelvis	8	8,08	72,70	7,27
femur	4	4,04	66,00	6,60
patella	1	1,01	11,00	1,10
tibia	2	2,02	23,00	2,30
astragalus	1	1,01	14,00	1,40
calcaneus	1	1,01	6,00	0,60
metatarsal	6	6,06	68,60	6,86
hind leg total	**23**	**23,23**	**261,30**	**26,12**
indet. metapodial	3	3,03	10,40	1,04
indet. phalanges	9	9,09	51,60	5,15
TOTAL	**99**	**100,00**	**1000,40**	**100,00**

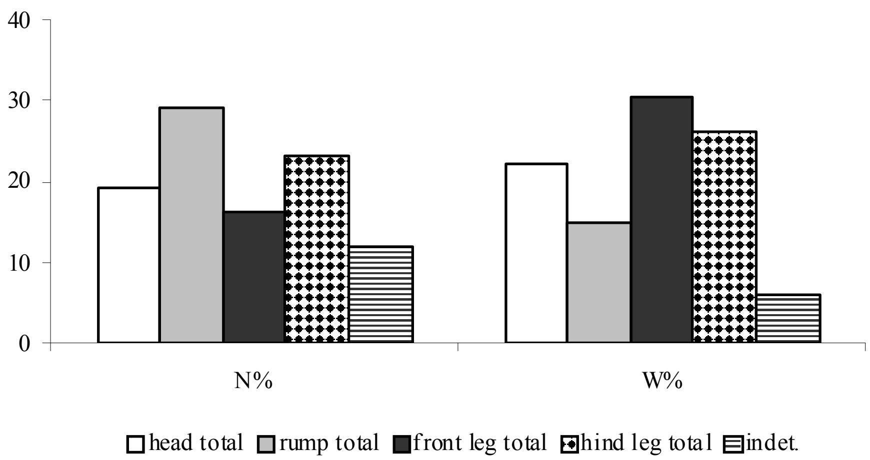

Fig. 6-10 C: Distribution of skeletal parts and weight of fallow deer, *Dama dama* remains for Troy III.

Tab. 6-5 D: The distribution of fallow deer, *Dama dama,* remains form the Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
antler	27	5,29	324,30	5,27
skull with antler	2	0,39	89,00	1,45
skull	16	3,14	150,70	2,45
face fragments	7	1,37	48,00	0,78
mandible	10	1,96	145,60	2,37
loose teeth	8	1,57	22,60	0,37
head total	**70**	**13,73**	**780,20**	**12,68**
vertebra	56	10,98	611,80	9,94
ribs	55	10,78	259,90	4,22
rump total	**111**	**21,76**	**871,70**	**14,16**
scapula	15	2,94	296,00	4,81
humerus	22	4,31	453,90	7,38
radius and ulna	42	8,24	555,30	9,02
carpals	2	0,39	5,00	0,08
metacarpal	20	3,92	328,10	5,33
ant. phalanges	1	0,20	10,00	0,16
front leg total	**102**	**20,00**	**1648,30**	**26,78**
pelvis	33	6,47	395,00	6,42
femur	30	5,88	442,60	7,19
patella	5	0,98	50,50	0,82
tibia	56	10,98	974,50	15,84
malleolare	1	0,20	2,50	0,04
astragalus	14	2,75	233,00	3,79
calcaneus	14	2,75	242,20	3,94
tarsals	3	0,59	21,20	0,34
metatarsal	32	6,27	307,00	4,99
post. phalanges	1	0,20	4,70	0,08
hind leg total	**189**	**37,06**	**2673,20**	**43,44**
indet. metapodial	7	1,37	24,20	0,39
sesamoids	1	0,20	1,00	0,02
indet. phanges	30	5,88	155,30	2,54
TOTAL	**510**	**100,00**	**6153,90**	**100,00**

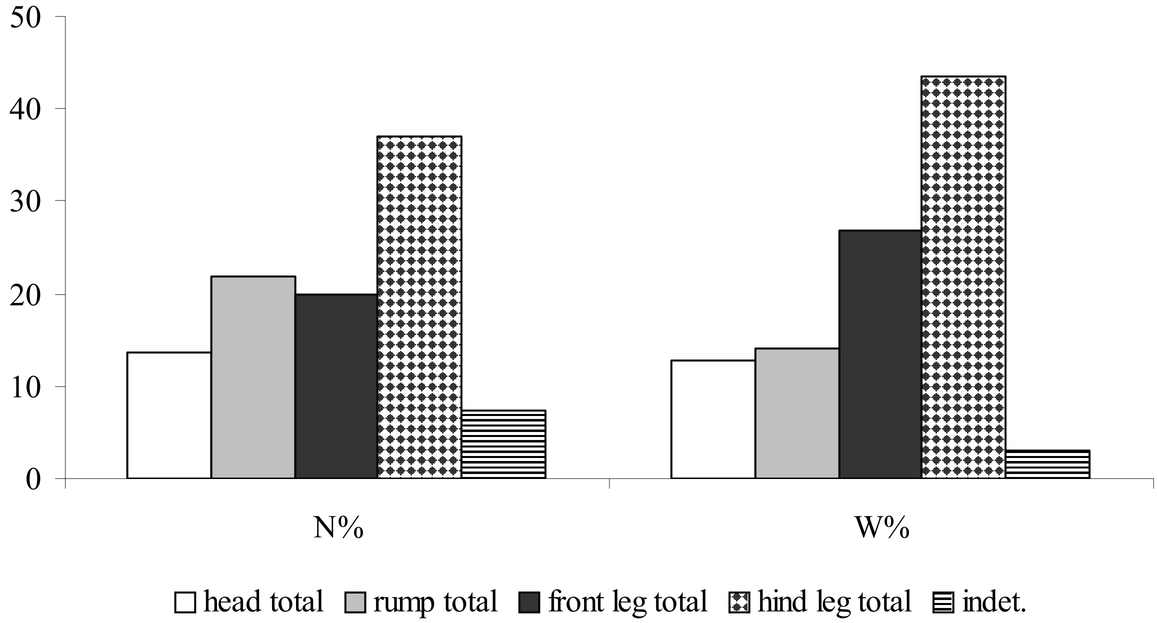

Fig. 6-10 D: Distribution of skeletal parts and weight of the fallow deer remains for the Maritime Troy Culture.

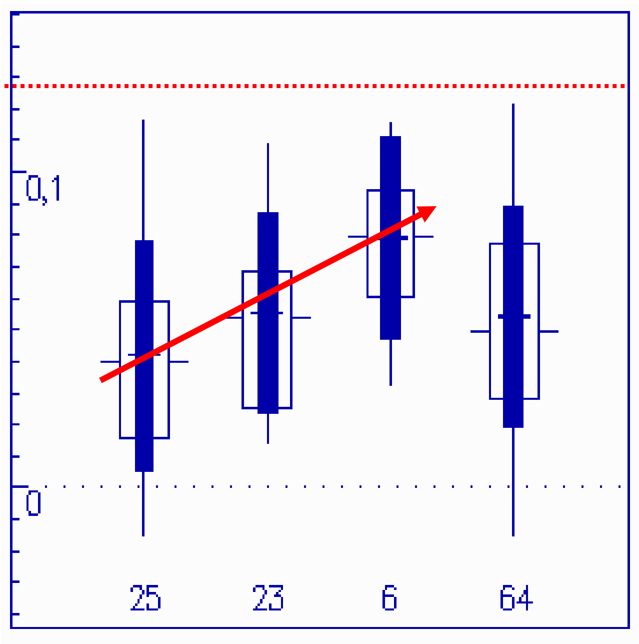

Fig. 6-11: The LSI calculation of fallow deer, *Dama dama*, remains from Troy I, Troy II, Troy III and the whole Maritime Troy Culture.

6.2.12 Red Deer, *Cervus elaphus*

Tab. 6-6: The distribution of red deer, *Cervus elaphus* remains form the Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
antler	6	43,00	235,00	62,00
skull	1	7,10	9,40	2,50
mandible	1	7,10	39,00	10,30
pelvis	1	7,10	49,00	12,80
astragalus	1	7,10	6,70	1,80
Os centrotarsale	1	7,10	27,00	7,10
metatarsal	1	7,10	5,40	1,40
vertebra	2	14,40	7,80	2,10
TOTAL	**14**	**100,00**	**379,30**	**100,00**

6.2.13. Aurochs, *Bos primigenius*

Tab. 6-7: The distribution of aurochs**,** *Bos primigenius* remains form the Maritime Troy Culture.

skeletal elements:	NIS	NIS-%	WIS-(g)	WIS-%
loose tooth	1	5,90	33,00	1,90
scapula	2	11,80	75,00	4,30
humerus	3	17,40	845,00	48,50
radius	1	5,90	168,00	9,60
pelvis	2	11,80	120,00	6,90
femur	1	5,90	68,00	3,90
calcaneus	2	11,80	275,00	15,80
post. Phalanges	1	5,90	28,00	1,60
vertebra	1	5,90	14,00	0,80
rip	2	11,80	89,00	5,10
indet. phanges	1	5,90	28,00	1,60
TOTAL	**17**	**100,00**	**1743,00**	**100,00**

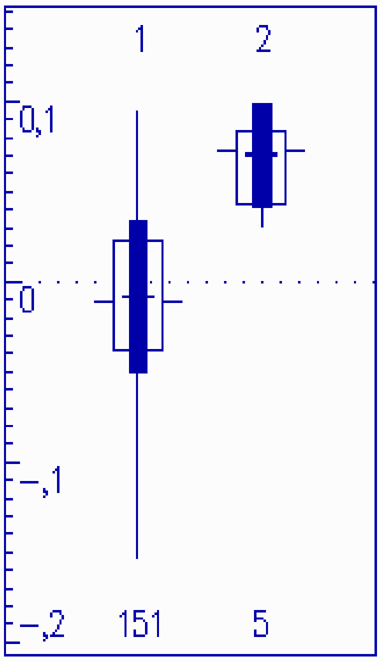

Fig. 6-12: The LSI calculation of cattle and aurochs, *Bos primigenius*, remains from the Maritime Troy Culture showing size difference.

6.3. Hunted fauna in the Troas from 5th millennium till the end of 3rd millennium BC.

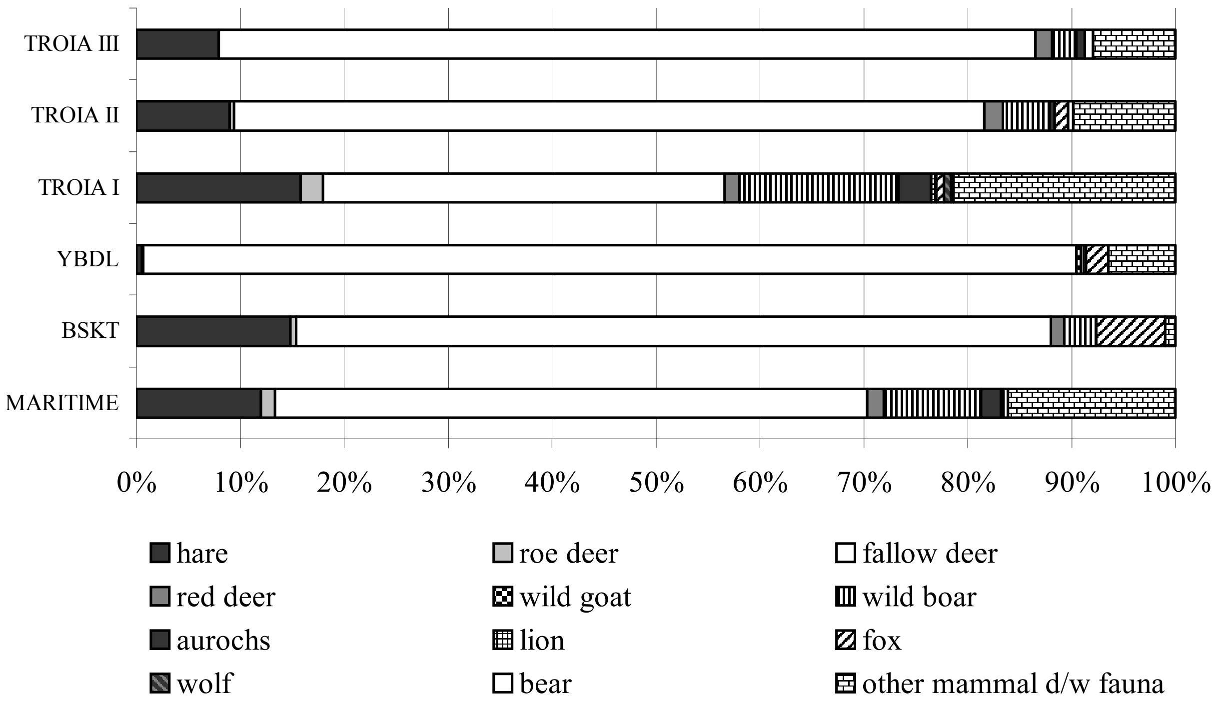

Fig. 6-13: Distribution of the wild animal remains in percentages among the wild fauna.

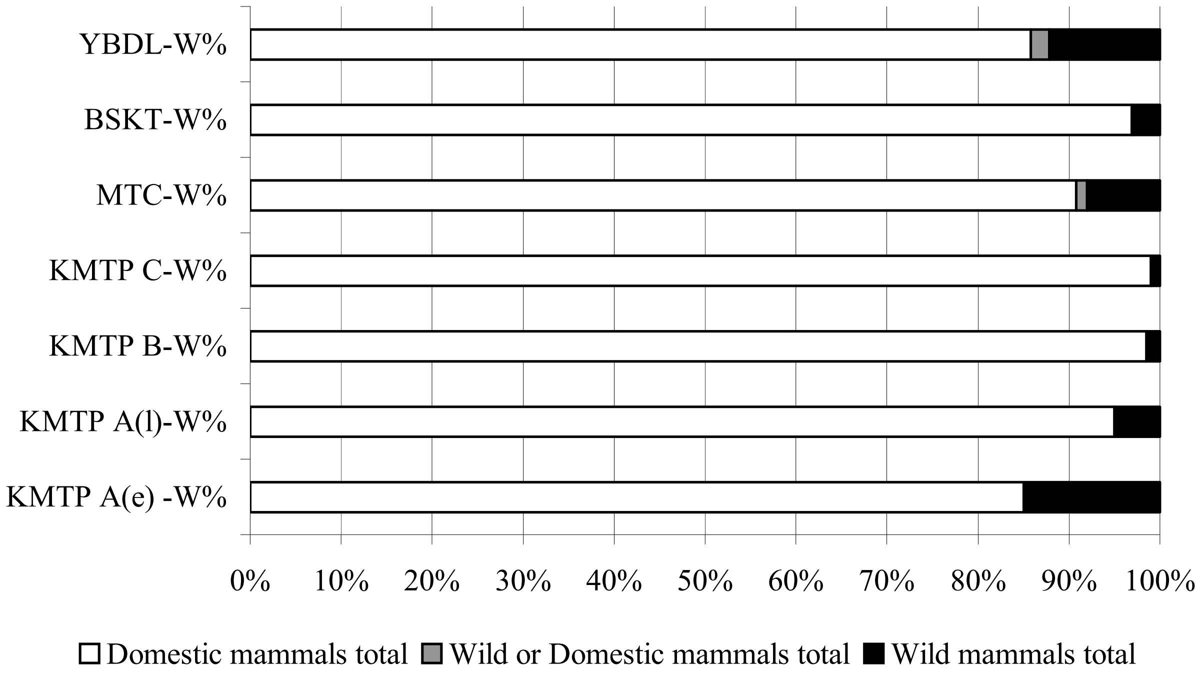

Fig. 6-14: The distribution of weight for bone remains per domestic, wild or domestic and wild mammals from Yenibademli, Beşik-Yassıtepe, the Maritime Troy Culture and Kumtepe, given in percentages.

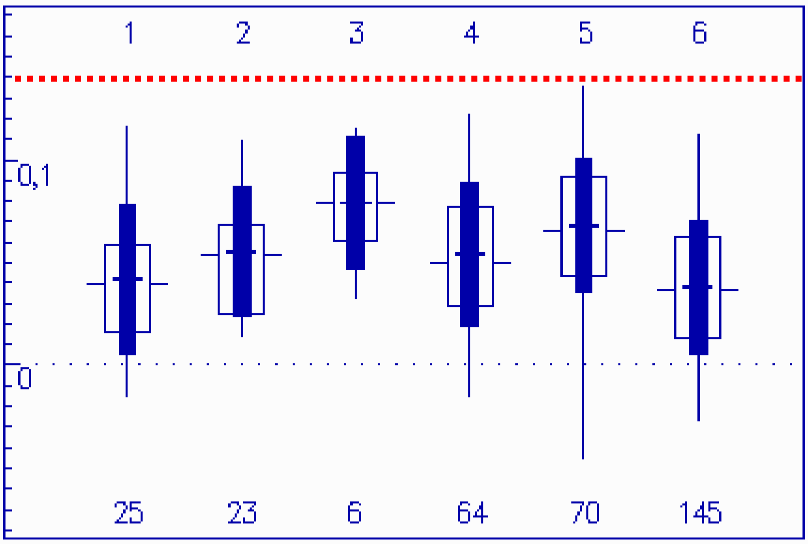

Fig. 6-15: Size of the fallow deer, *Dama dama*, in the Troas during the Early Bronze Age (Troy I, Troy II, Troy III, the whole Maritime Troy Culture, Beşik-Yassıtepe, Yenibademli).

8. The mammalian fauna and its relation to humans and the environment in West Anatolia during the 3rd millennium BC.

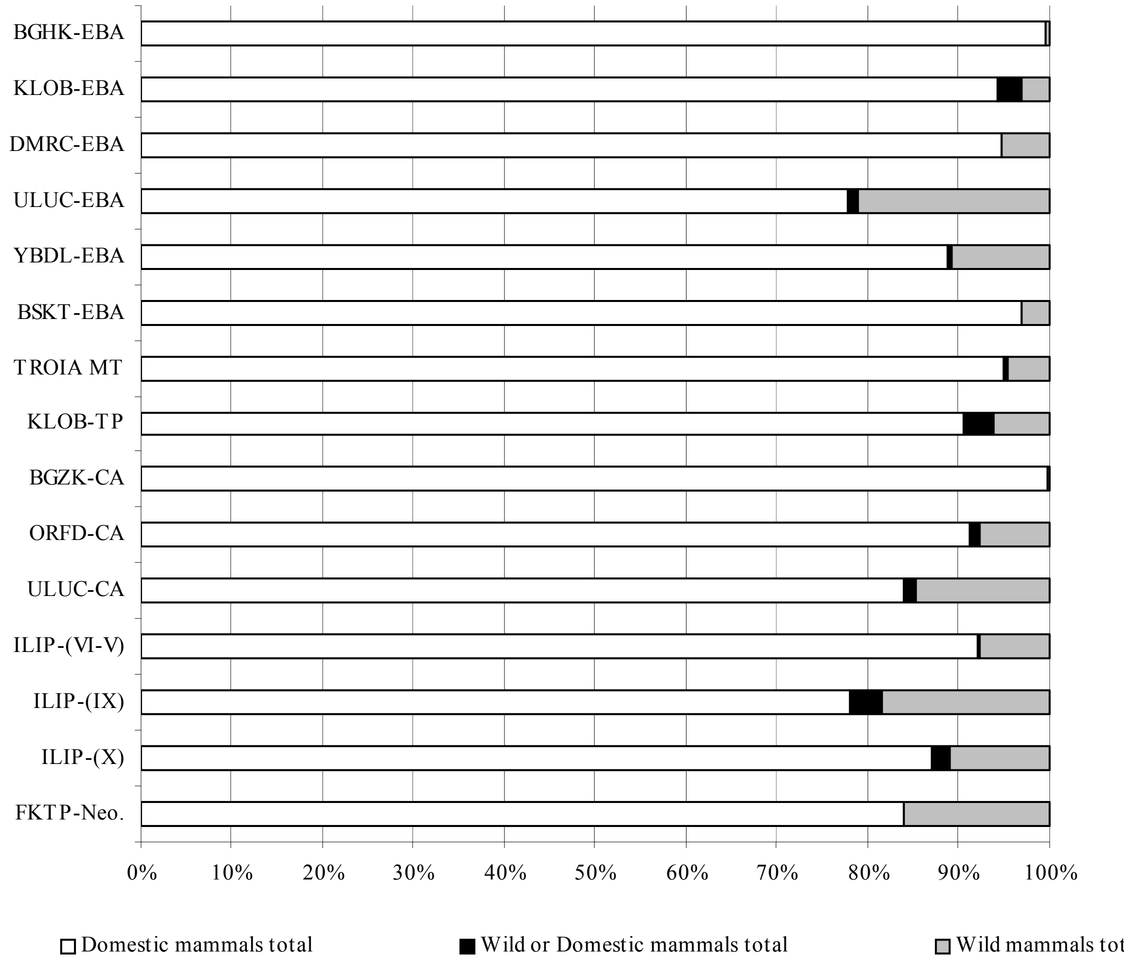

Fig. 8-1: The distribution of bone material among domestic and wild animals from the Neolithic to the Early Bronze Age periods at settlements in West Anatolia.

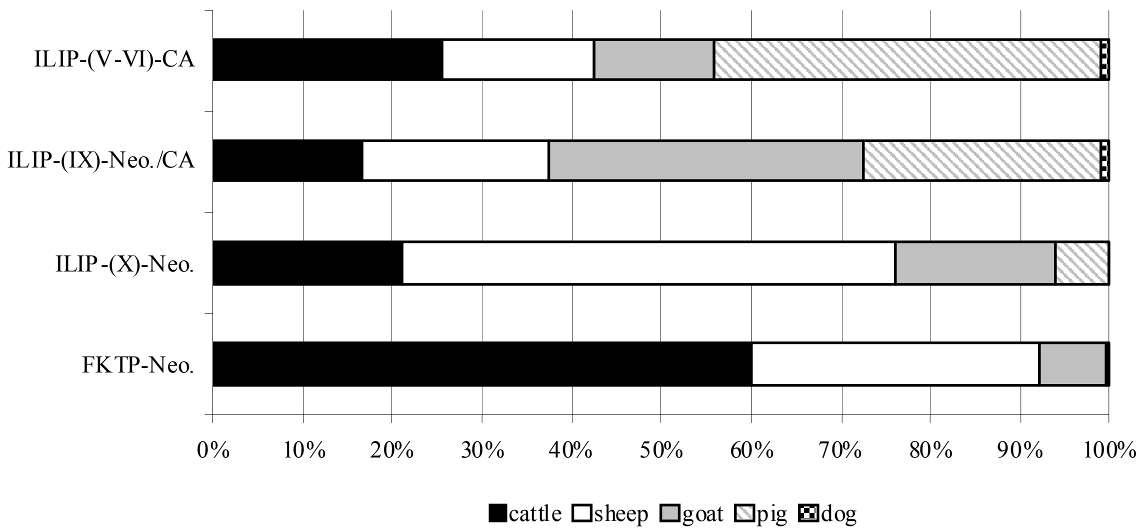

Fig. 8-2: Number of identified mammal remains from Fikirtepe-Neo., Ilıpınar-(X)-Neo., Ilıpınar –(IX)-Neo. to CA and Ilıpınar- (V-VI)-CA.

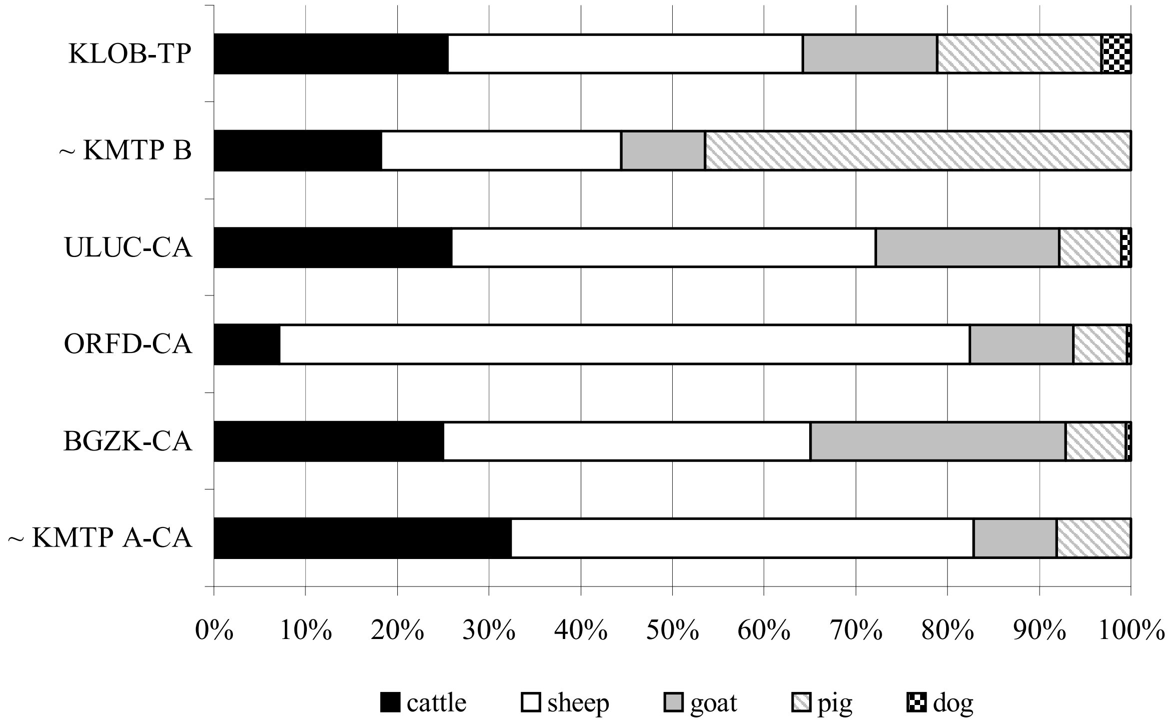

Fig. 8-3: Number of identified mammal remains from Kumtepe A-CA, Boğazköy-CA, Orman Fidanlığı-CA, Ulucak-CA, Kumtepe B and Küllüoba-TP.

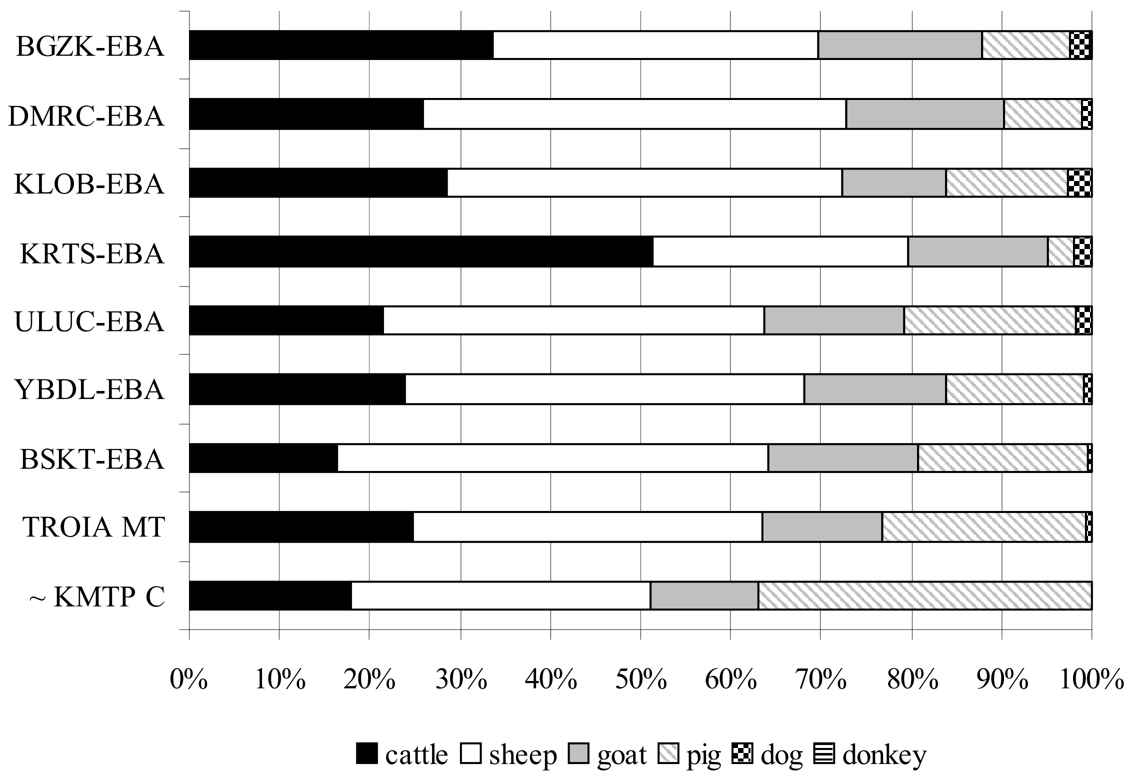

Fig. 8-4: Number of identified mammal remains from Boğazköy-EBA, Demircihüyük-EBA, Küllüoba-EBA, Karataş-Semayük-EBA, Ulucak-EBA, Yenibademli-EBA, Beşik-Yassıtepe-EBA, the Maritime Troy Culture and Kumtepe C-EBA.

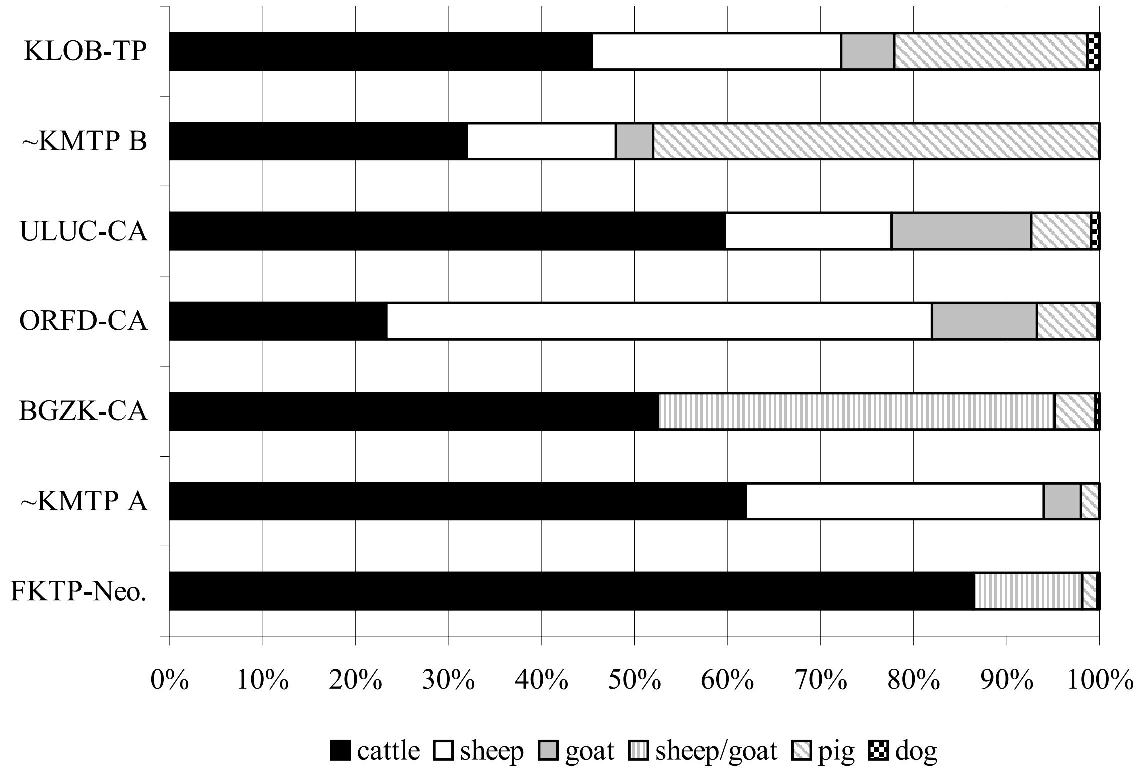

Fig. 8-5: Weight distribution of identified mammal remains from Küllüoba-TP (from the Copper Age to the EBA), Kumtepe B, Ulucak-CA, Boğazköy-CA., Kumtepe A-CA and Fikirtepe-Neo.

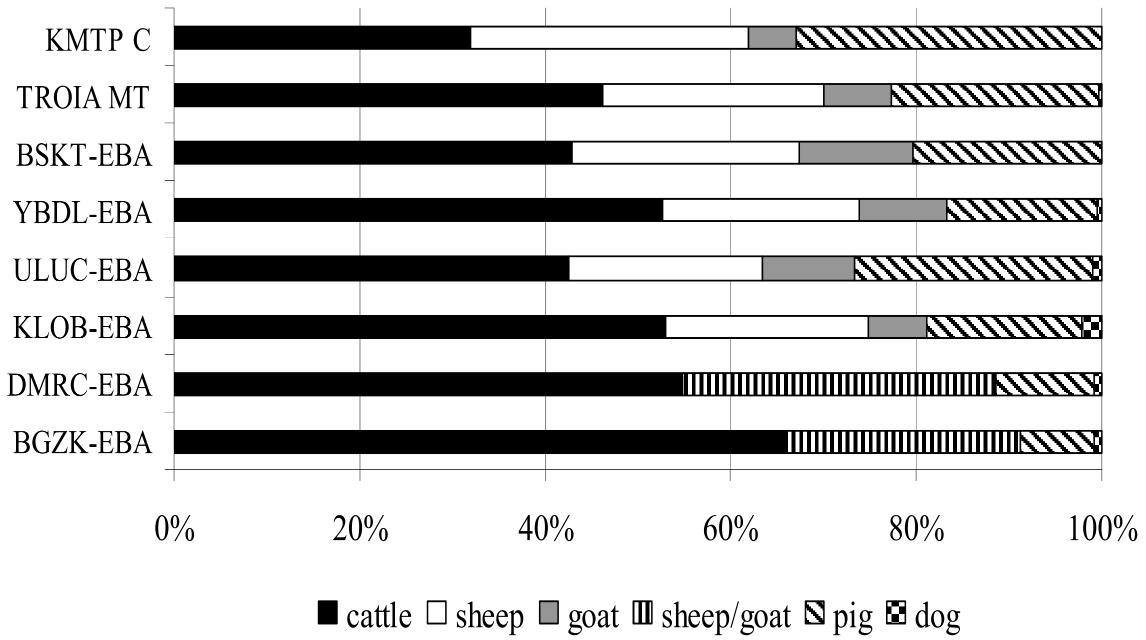

Fig. 8-6: Weight distribution of identified mammal remains from Kumtepe C, the Maritime Troy Culture, Beşik-Yassıtepe-EBA, Yenibademli-EBA, Ulucak-EBA, Küllüoba-EBA, Demircihüyük-EBA and Boğazköy-EBA.

8.1.2. Kill-off pattern of Domestic Animals in West Anatolia

8.1.2.1. Kill-off pattern of Cattle

Tab. 8-1: The epiphyseal fusing periods of cattle in Ulucak during the Copper Age.

ULUCAK-CA Cattle (BOS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	1	0	0		
Ilium-ischium	1	0	0	**100**	**10**
Humerus dist.	2	0	0		
Radius prox.	3	0	2		
Phal.2 prox.	9	0	0		
Phal.1 prox.	9	0	0	**92**	**18**
Tibia dist.	2	0	3		
Metapods. dist.	1	0	6		
Calcaneus prox.	2	0	1	**33**	**24-30**
Femur prox.	2	0	0		**ca. 36**
Ulma prox.	0	0	1		
Radius dist.	1	0	3		
Femur dist.	0	1	0	**50**	**54**
Pelvis caud.	1	0	0		
Wirbel	1	0	2	**50**	**60**

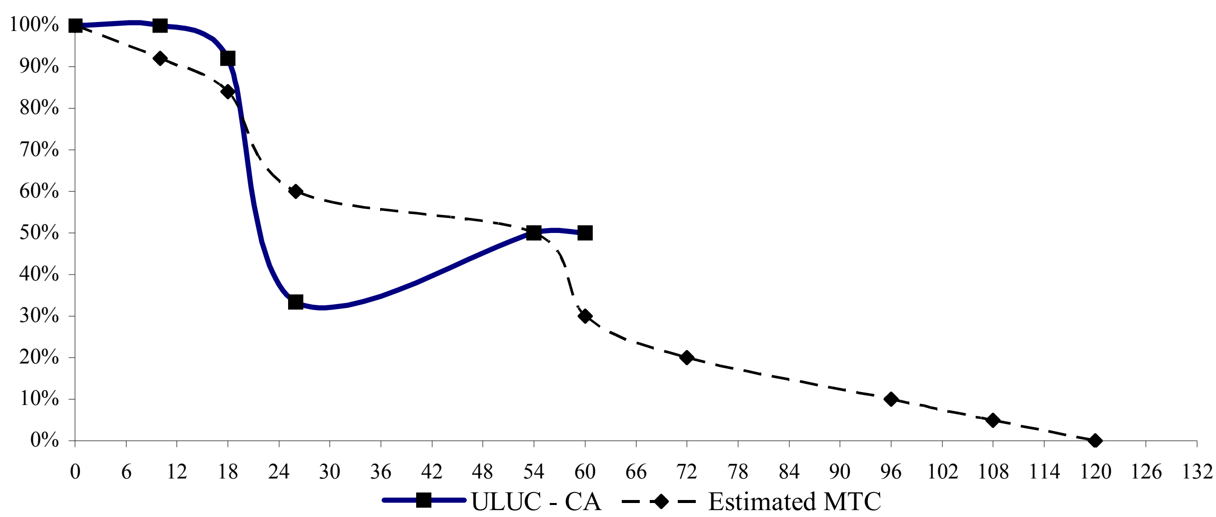

Fig. 8-7: The survival curve of the cattle in Ulucak during the Copper Age according to the epiphysis fusion data and the estimated survival curve of cattle population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

Tab. 8-2: The epiphyseal fusing periods of cattle in Ulucak during the Early Bronze Age.

ULUCAK-EBA Cattle (BOS)	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Scap.-corac.	0	0	0		
Ilium-ischium	0	0	0	**100**	**10**
Humerus dist.	0	0	0		
Radius prox.	0	0	0		
Phal.2 prox.	4	0	0		
Phal.1 prox.	5	0	1	**90**	**18**
Tibia dist.	2	2	1		
Metapods. dist.	6	0	2		
Calcaneus prox.	0	0	0	**76**	**24-30**
Femur prox.	1	1	0		**ca. 36**
Ulma prox.	0	0	1		
Radius dist.	0	1	1		
Femur dist.	1	0	2	**50**	**54**
Pelvis caud.	1	0	0		
Wirbel	1	0	0	**100**	**60**

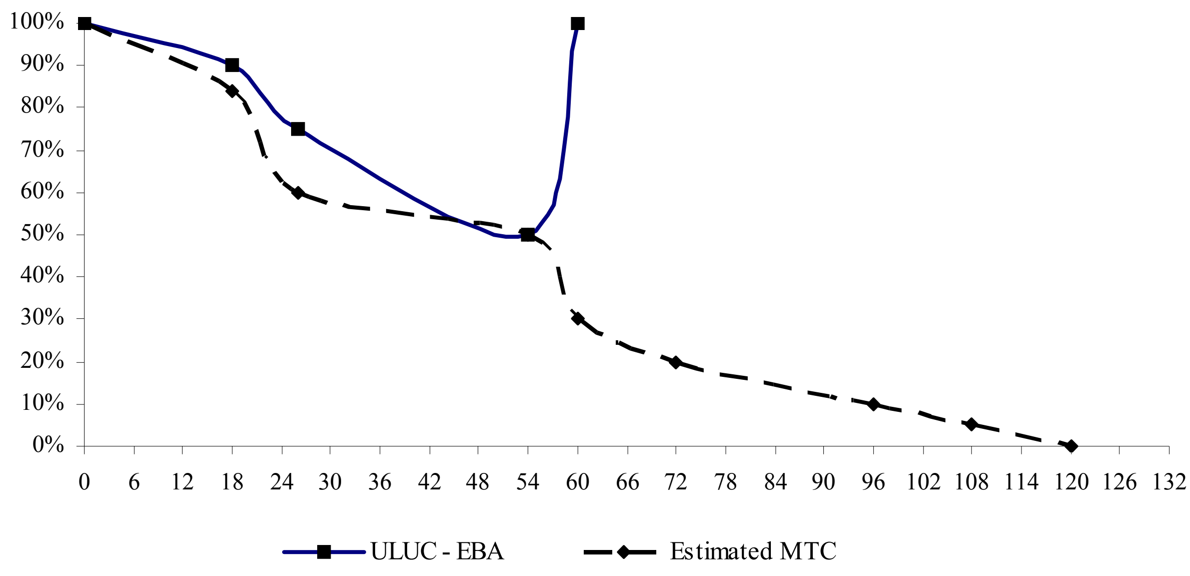

Fig. 8-8: The survival curve of the cattle in Ulucak during the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of cattle population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

Tab. 8-3: The epiphyseal fusing periods of cattle in Küllüoba during the Transition Period and the Early Bronze Age.

KÜLLÜOBA TP/EBA Cattle (BOS)	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Scap.-corac.	3	0	0		
Ilium-ischium	5	0	1	**88,88**	**10**
Humerus dist.	11	3	2		
Radius prox.	11	0	1		
Phal.2 prox.	22	0	1		
Phal.1 prox.	51	0	2	**94,23**	**18**
Tibia dist.	12	0	2		
Metapods. dist.	23	0	5		
Calcaneus prox.	1	2	3	**76,16**	**24-30**
Femur prox.	2	0	3		**ca. 36**
Ulma prox.	1	0	0		
Radius dist.	6	2	6		
Femur dist.	1	0	0		
Tibia prox.	5	0	5	**54,83**	**54**
Pelvis caud.	1	0	0		
Wirbel	7	0	2	**80,00**	**60**

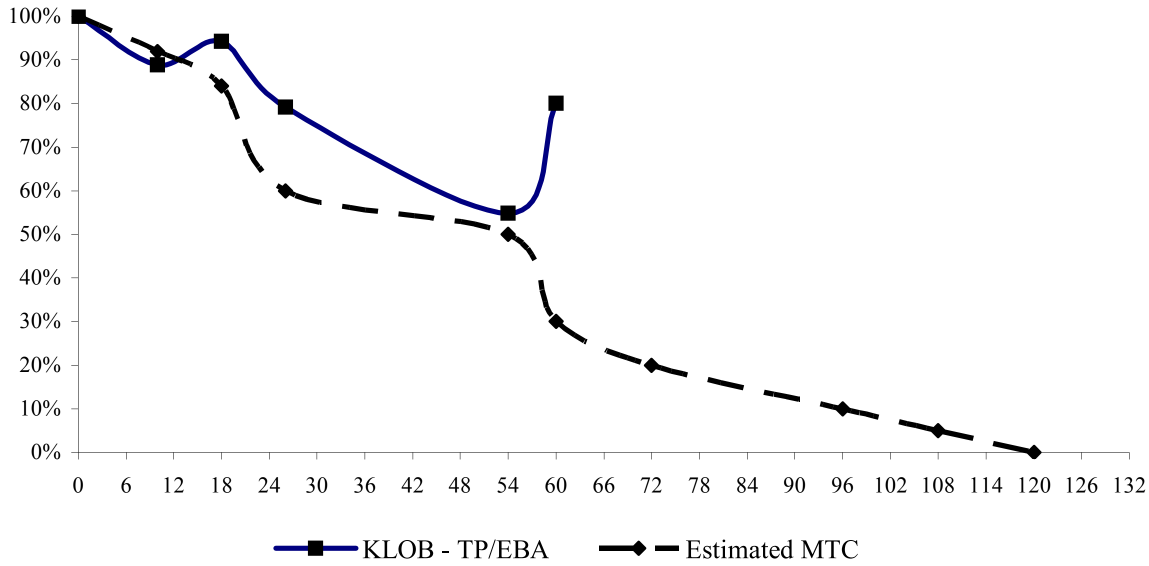

Fig. 8-9: The survival curve of the cattle in Küllüoba during the Transition Period and the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of cattle population according to calculations of dental and epiphysis data from the entire Maritime Troy Culture.

8.1.2.2. Kill-off pattern of Small ruminants

Tab. 8-4: The epiphyseal fusing periods of small ruminants in Ulucak during the Copper Age.

ULUCAK -CA small ruminants	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.					
Radius prox.	3	0	0	**92,30**	**5**
Scap.-corac.	9	0	1		
Ilium-ischium	2	0	2		
Phal.1 prox.	1	0	1	**55,55**	**10**
Tibia dist.	7	0	5	**61,11**	**18**
Metapods. dist.	11	0	7	**50,00**	**24**
Calcaneus prox.	5	0	5		
Femur prox.	1	0	5	**50,00**	**30**
Humerus prox.	4	0	0		
Ulma prox.	0	0	1		
Radius dist.	0	0	1		
Femur dist.	3	0	4		
Tibia prox.	5	0	2	**53,53**	**42**
Pelvis caud.	0	0	1	**0**	**60**

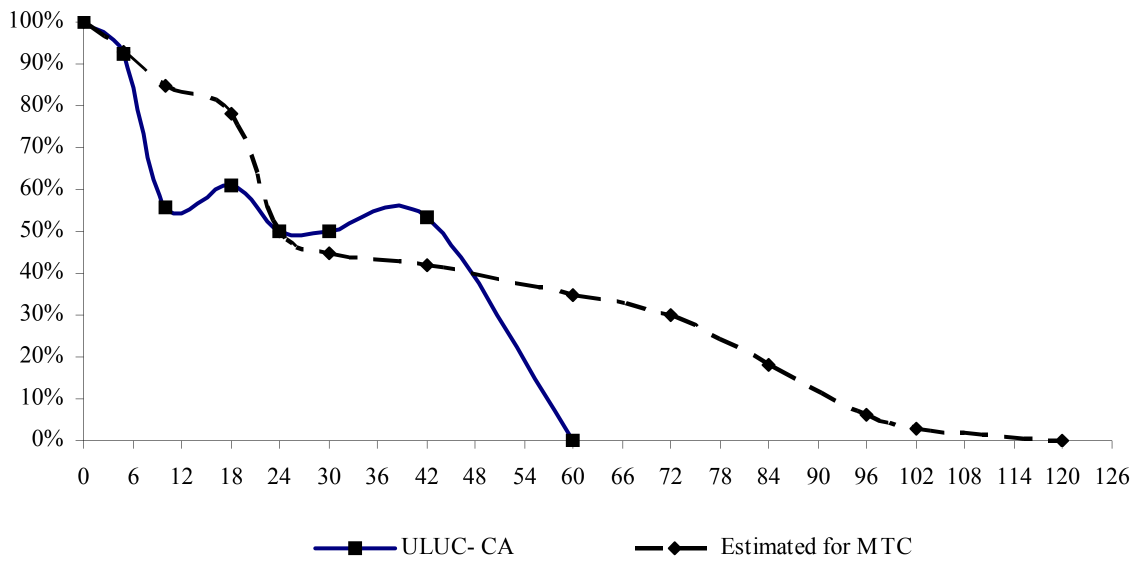

Fig. 8-10: The survival curve for small ruminants in Ulucak during the Copper Age according to the epiphysis fusion data and the estimated survival curve of small ruminants population according to calculations on dental and epiphsis data from the entire Maritime Troy Culture.

Tab. 8-5: The epiphyseal fusing periods of small ruminants in Ulucak during the Early Bronze Age.

ULUCAK-EBA small ruminants	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	13	0	1		
Radius prox.	8	0	1	**91,30**	**5**
Scap.-corac.	3	0	0		
Ilium-ischium	1	0	0		
Phal.1 prox.	7	0	0	**100**	**10**
Tibia dist.	14	0	3	**82,35**	**18**
Metapods. dist.	6	0	8	**42,85**	**24**
Calcaneus prox.	3	0	0		
Femur prox.	1	0	3	**57,14**	**30**
Ulma prox.	2	0	3		
Radius dist.	4	0	3		
Femur dist.	3	0	0		
Tibia prox.	2	0	1	**61,11**	**42**
Wirbel	1	0	1	**50,00**	**60**

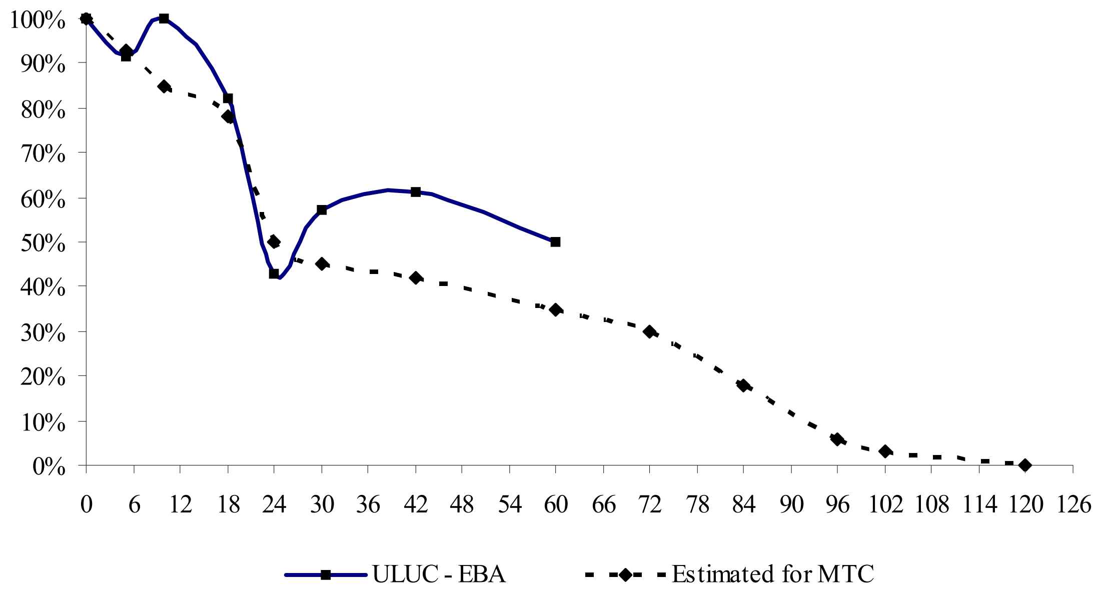

Fig. 8-11: The survival curve of the small ruminants in Ulucak during the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of small ruminants population according to calculations of dental and epiphsis data from the entire Maritime Troy Culture.

Tab. 8-6: The epiphyseal fusing periods of small ruminants in Küllüoba during the Transition Period and the Early Bronze Age.

KÜLLÜOBA TP/-EBA small ruminants	Fused	Fusing	Not fused	% from closed fusion	Approximate age of fusing in month
Humerus dist.	26	4	16		
Radius prox.	44	0	2	**80,43**	**5**
Scap.-corac.	9	1	13		
Ilium-ischium	17	2	6		
Phal.2 prox.	10	0	1		
Phal.1 prox.	33	1	11	**70,19**	**10**
Tibia dist.	48	3	16	**76,11**	**18**
Metapods. dist.	21	0	19	**52,5**	**24**
Calcaneus prox.	10	0	9		
Femur prox.	5	1	15	**40,00**	**30**
Humerus prox.	5	1	4		
Ulma prox.	1	0	4		
Radius dist.	4	0	7		
Femur dist.	2	1	5		
Tibia prox.	3	1	17	**32,72**	**42**
Pelvis caud.	11	2	5		
Wirbel	12	0	5	**71,42**	**60**

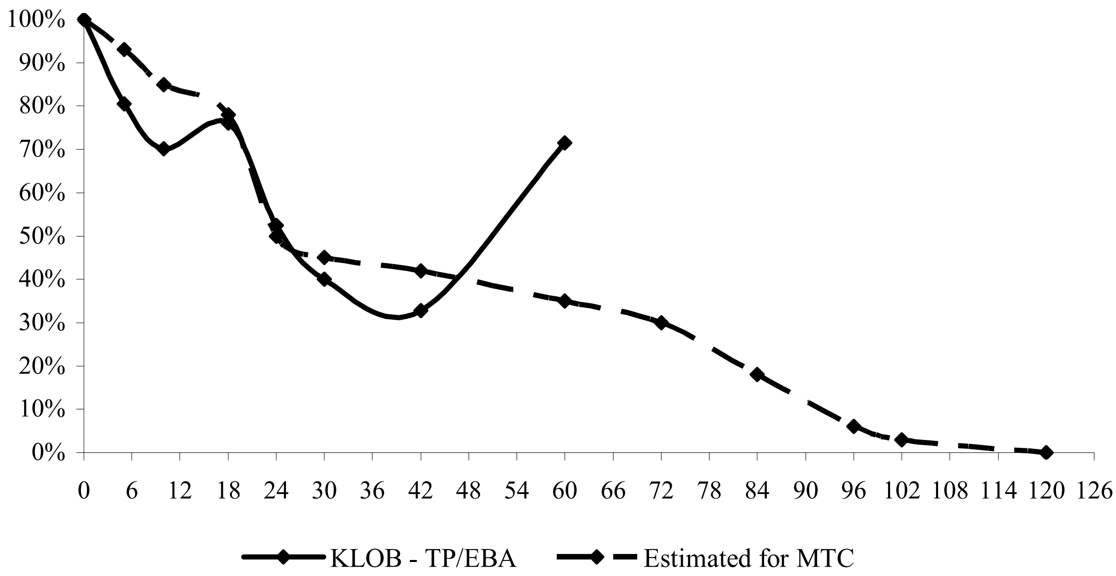

Fig. 8-12: The survival curve of the small ruminants in Küllüoba during the Transition Period and the Early Bronze Age according to the epiphysis fusion data and the estimated survival curve of small ruminants population according to the calculation of dental and epiphysis data from the entire Maritime Troy Culture.

8.1.2.3. Kill-off pattern of Pig

Tab. 8-7: The epiphyseal fusing periods of pigs in Ulucak during the Copper Age.

ULUCAK-CA *Pig (SUS)*	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Scap.-corac.	0	0	1		
Ilium-ischium	1	0	0		
Phal.1 prox.	0	0	1		
Radius prox.	2	0	1		
Humerus dist.	2	0	1	**55,55**	**12**
Metapods. dist.	2	0	0		
Tibia dist.	1	0	1	**75,00**	**24**
Calcaneus prox.	0	0	1	**0**	**30**
Tibia prox.	0	0	1		
Humerus prox.	0	0	1		
Radius dist.	0	0	2	**0**	**42**
Pelvis caud.	1	0	0	**100**	**60**

Tab. 8-8: The epiphyseal fusing periods of pigs in Ulucak during the Early Bronze Age.

ULUCAK - EBA *Pig (SUS)*	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Ilium-ischium	3	0	0		
Phal.1 prox.	1	0	1		
Radius prox.	2	0	1		
Humerus dist.	3	0	4	**60,00**	**12**
Metapods. dist.	1	0	3		
Tibia dist.	3	0	1	**50,00**	**24**
Calcaneus prox.	1	0	2	**33,33**	**30**
Ulna dist.	1	0	0	**100**	**36**
Femur prox.	0	0	2		
Femur dist.	0	0	1		
Tibia prox.	1	0	0		
Humerus prox.	0	1	1		
Ulna prox.	0	0	1		
Radius dist.	0	1	1	**33,33**	**42**

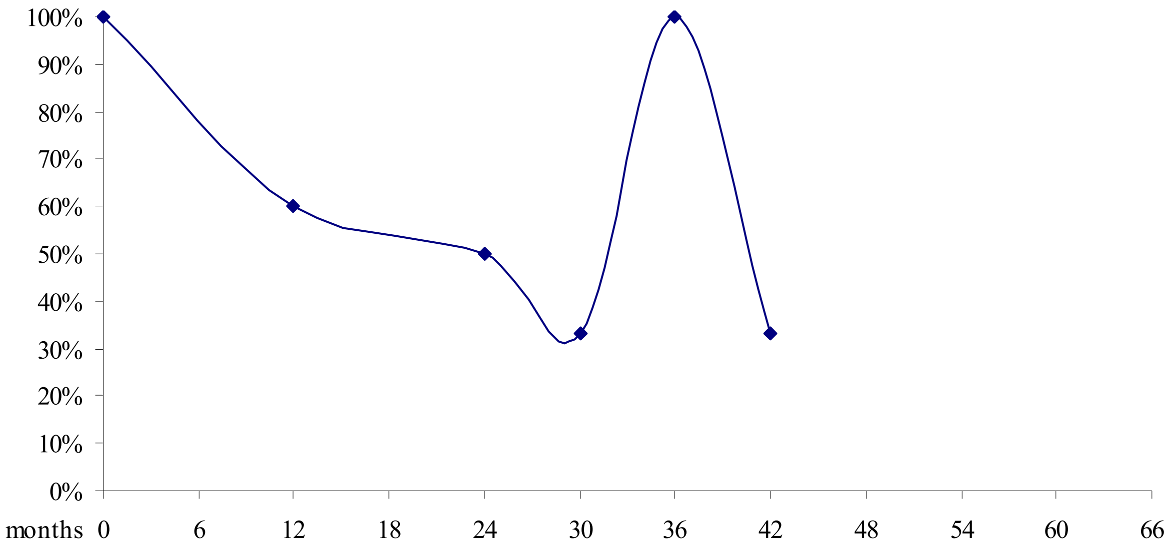

Fig. 8-13: The survival curve of pig in Ulucak during the Early Bronze Age.

Tab. 8-9: The epiphyseal fusing periods of pig in Küllüoba during the Transition Period and the Early Bronze Age.

KÜLLÜOBA TP/EBA *Pig, (*SUS)	**Fused**	**Fusing**	**Not fused**	**% from closed fusion**	**Approximate age of fusing in month**
Scap.-corac.	2	0	9		
Ilium-ischium	10	0	0		
Phal.2 prox.	1	0	6		
Phal.1 prox.	2	0	1		
Radius prox.	18	0	6		
Humerus dist.	15	0	9	**60,75**	**12**
Metapods. dist.	2	0	13		
Tibia dist.	13	1	12	**39,02**	**24**
Calcaneus prox.	3	0	15	**16,16**	**30**
Ulna dist.	0	0	2	**0**	**36**
Femur prox.	1	0	15		
Femur dist.	1	0	15		
Tibia prox.	1	0	9		
Humerus prox.	0	0	7		
Ulna prox.	0	0	7		
Radius dist.	0	0	10	**4,5**	**42**
Pelvis caud.	7	0	0		
Wirbel	2	0	4	**69,23**	**60**

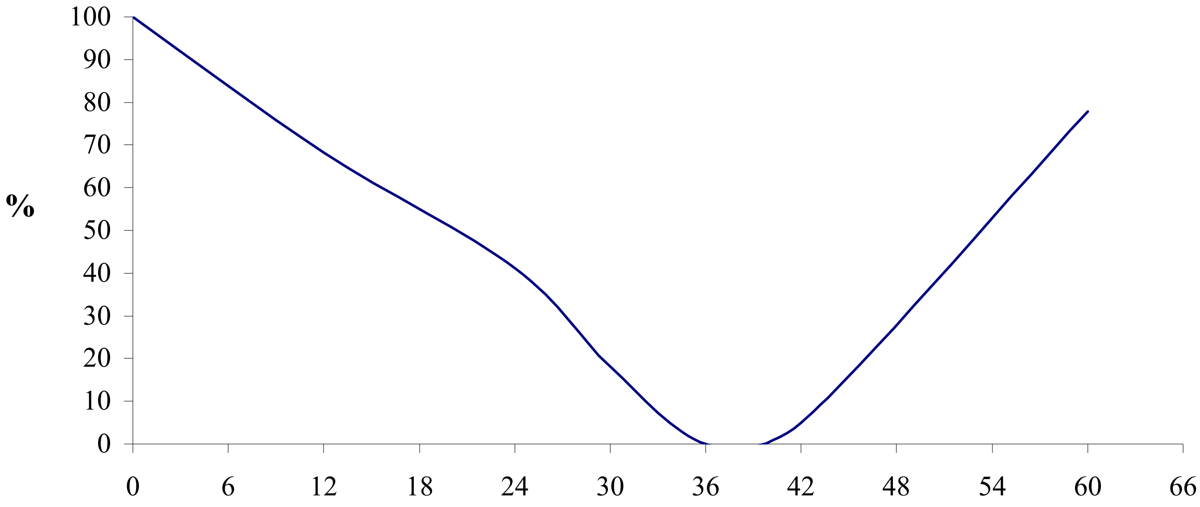

Fig. 8-14: The survival curve of pig in Küllüoba – TP/EBA.

8.1.3. Size of the Domestic Animals in West Anatolia

8.1.3.1. Size of the Cattle

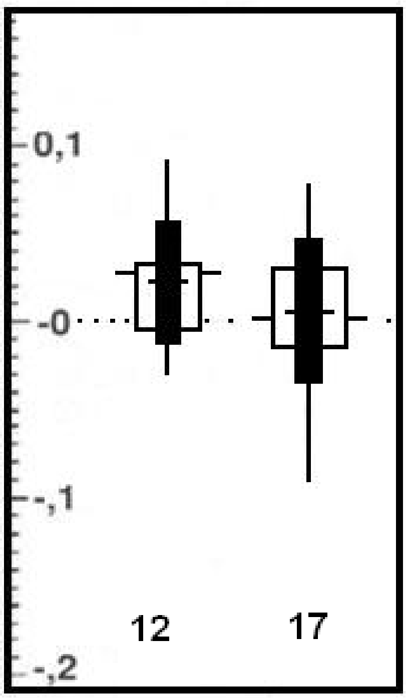

Fig. 8-15: Size of the cattle during Kumtepe A (UERPMANN 2001: Fig 1) and Kumtepe B/C (M. UERPMANN 2006: Fig.7) (modified by the author).

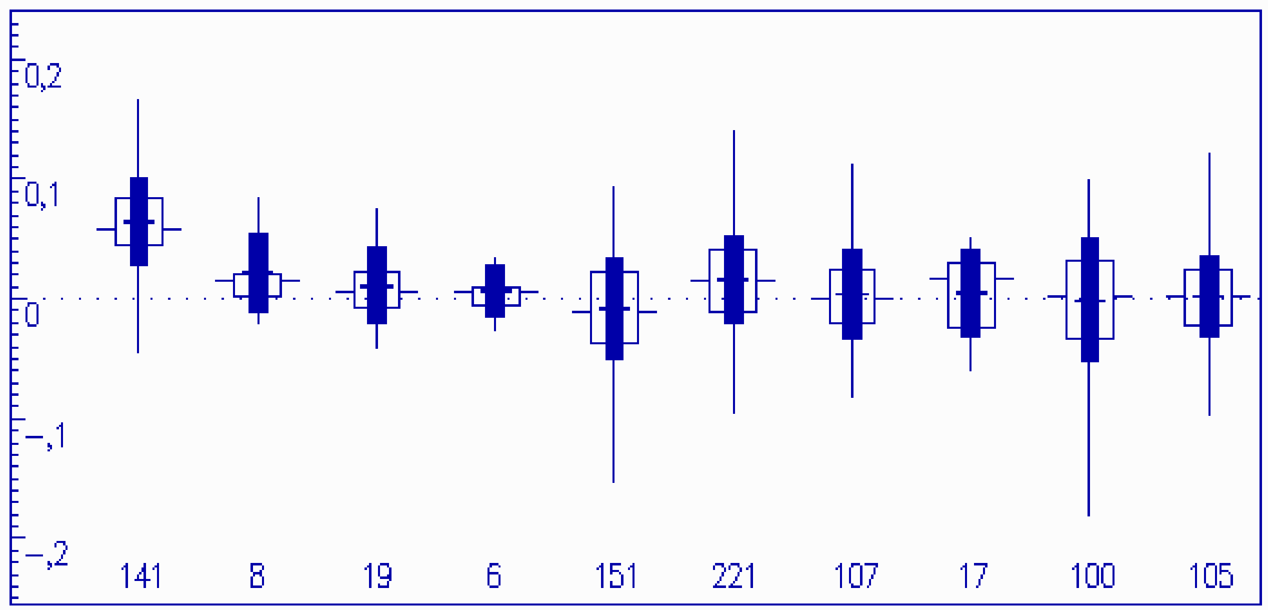

Fig. 8-16: The LSI-distribution of cattle remains from Fikirtepe-N, Orman Fidanlığı-CA, Ulucak-CA, Küllüoba-TP, Troy MT, Beşik-Yassıtepe-EBA, Yenibademli-EBA, Ulucak-EBA, Karataş-Semayük-EBA and Küllüoba-EBA.

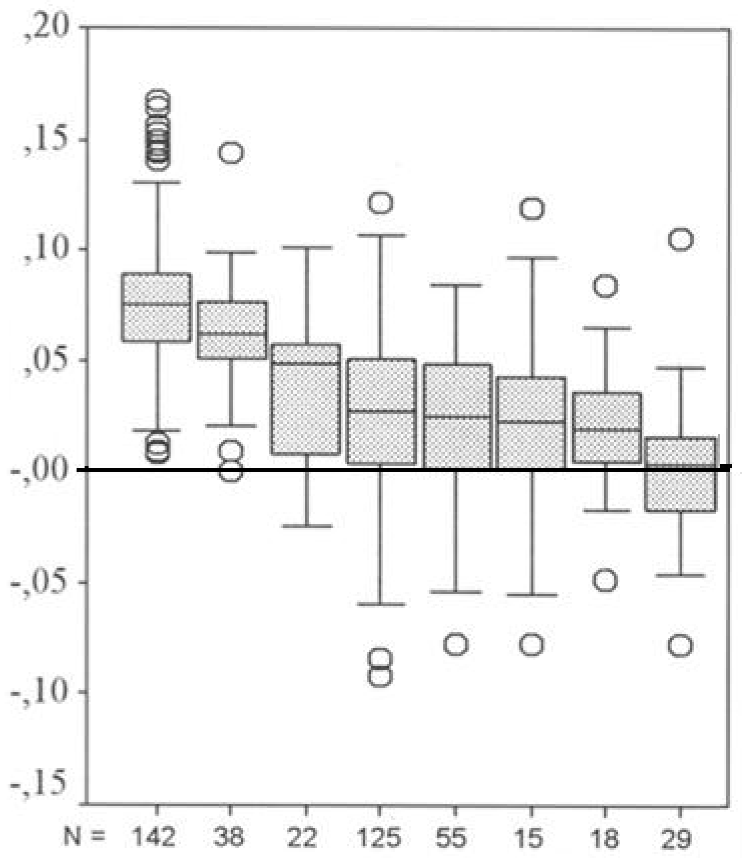

Fig. 8-17: The LSI-distribution of cattle remains from Fikirtepe-N, Pendik-N, Demircihüyük-EBA/1, Beşik-Yassıtepe-EBA, Demircihüyük-EBA/2, Boğazköy-EBA, Demircihüyük-MBA and Kaman Höyük-Assyria period (VON DEN DRIESCH and PÖLLATH 2004:Fig. 4) (modified by the author).

8.1.3.2. Size of the Sheep

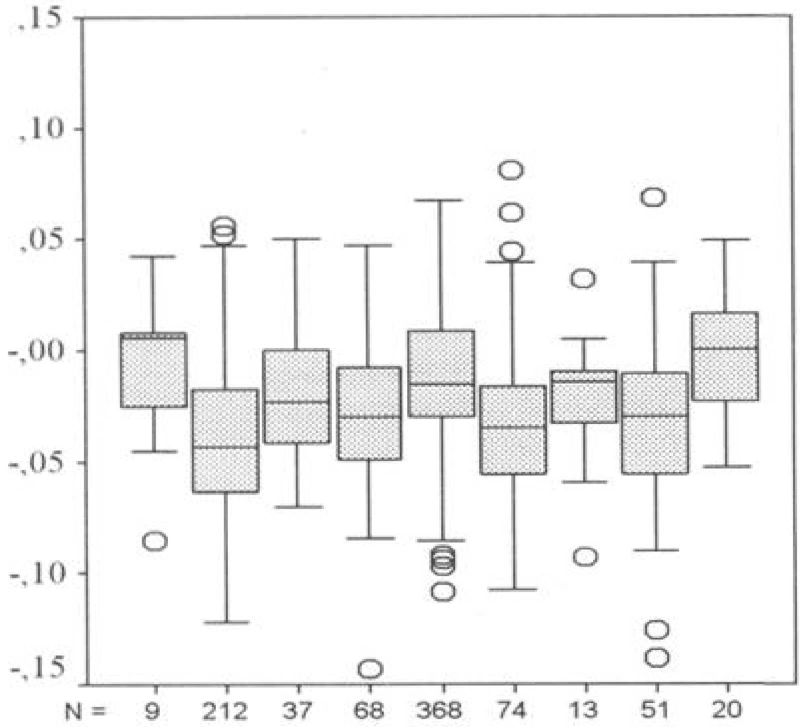

Fig. 8-18: The LSI-distribution of sheep remains from Bogazkoy-CA, Fikirtepe-N, Pendik-N, Demircihüyük-EBA/1, Beşik-Yassıtepe-EBA, Demircihüyük-EBA/2, Boğazköy-EBA, Demircihüyük-MBA and Kaman Höyük-Assyria (VON DEN DRIESCH and PÖLLATH 2004:Fig. 6) (modified by the author).

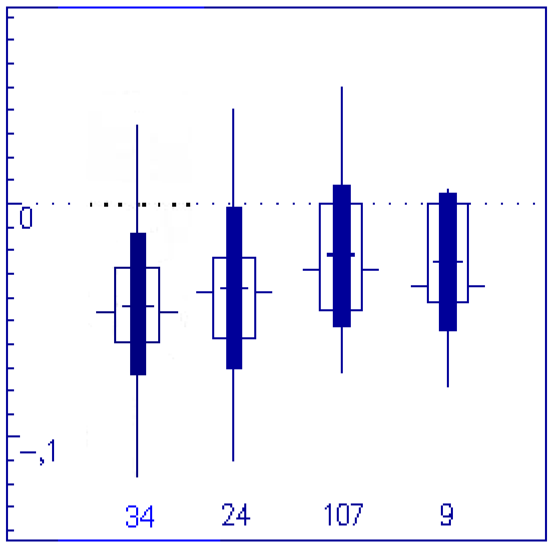

Fig. 8-19: The LSI-distribution of sheep remains from Kumtepe A (UERPMANN 2001: Fig 1) (modified by the author), Ulucak-CA, Orman Fidanlığı-CA and Küllüoba-TP.

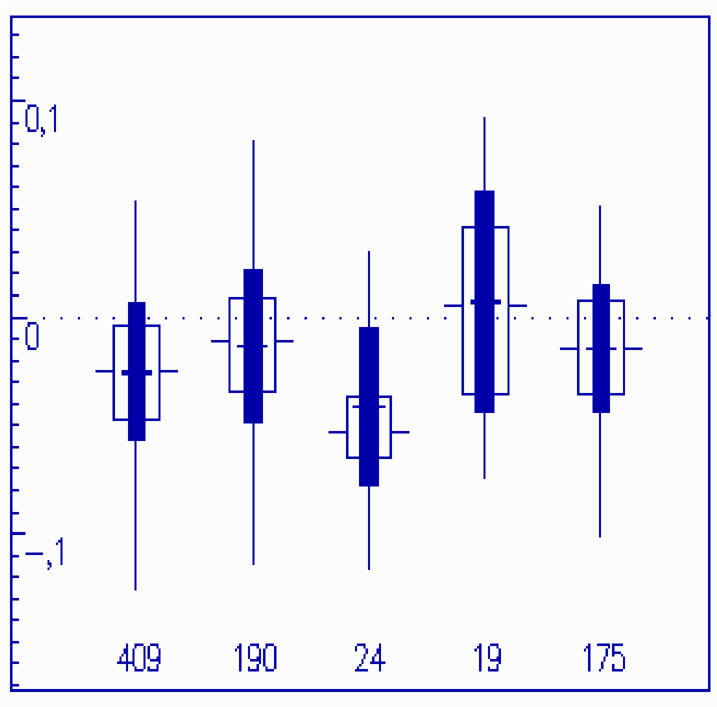

Fig. 8-20: The LSI-distribution of sheep remains from the Maritime Troy Culture-EBA, Yenibağdemli-EBA, Ulucak-EBA, Karataş-Semayük-EBA and Küllüoba-EBA.

8.1.3.3. Size of the Goat

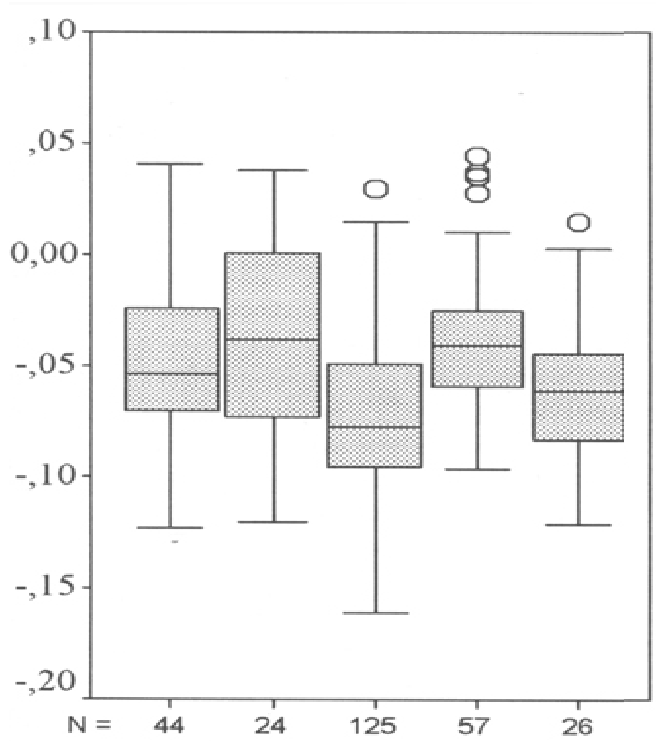

Fig. 8-21: The LSI-distribution of goat remains from Fikirtepe-N, Demircihüyük-EBA/1, Beşik-Yassıtepe-EBA, Demircihüyük-EBA/2 and Boğazköy-CA/EBA.
(VON DEN DRIESCH and PÖLLATH 2004:Fig. 7) (modified by the author).

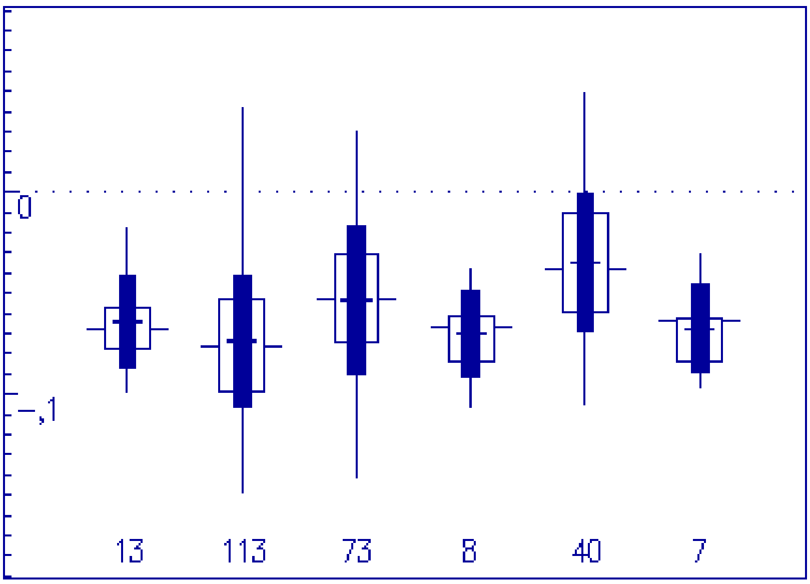

Fig. 8-22: The LSI-distribution of goat remains from Orman Fidanligi-CA, the Maritime Troy Culture-EBA, Yenibademli -EBA, Ulucak-EBA, Küllüoba-EBA and Karatas-Semayük-EBA.

8.1.3.4. Size of the pig

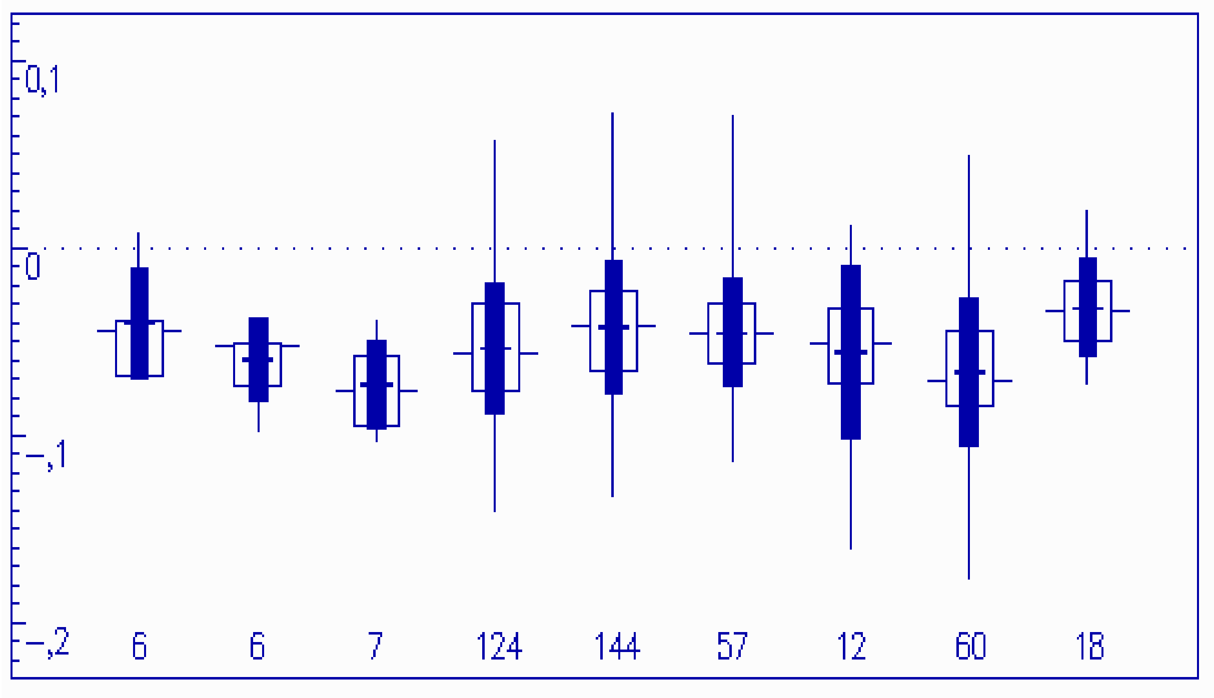

Fig. 8-23: The LSI-distribution of pig remains from Ulucak-CA, Orman Fidanlığı-CA, Küllüoba –TP, the Maritime Troy Culture, Beşik-Yassıtepe-EBA, Yenibademli-EBA, Ulucak-EBA, Küllüoba-EBA and Karataş-Semayük-EBA.

8.1.3.5. Size of the dog

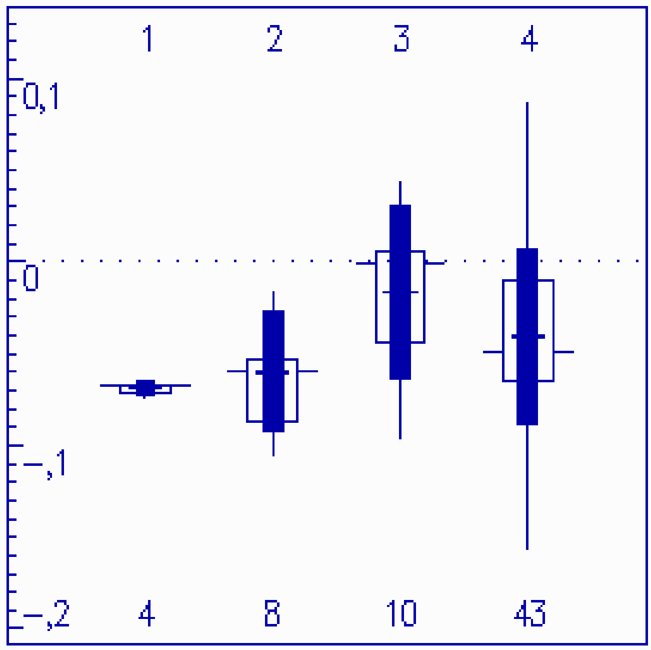

Fig. 8-24: The LSI-distribution of dog remains from Ulucak – CA/EBA, the Maritime Troy Culture, Yenibademli-EBA and Küllüoba-TP/EBA.

9.5.2. Domestic Animals and their Role in the Internal and External Economy

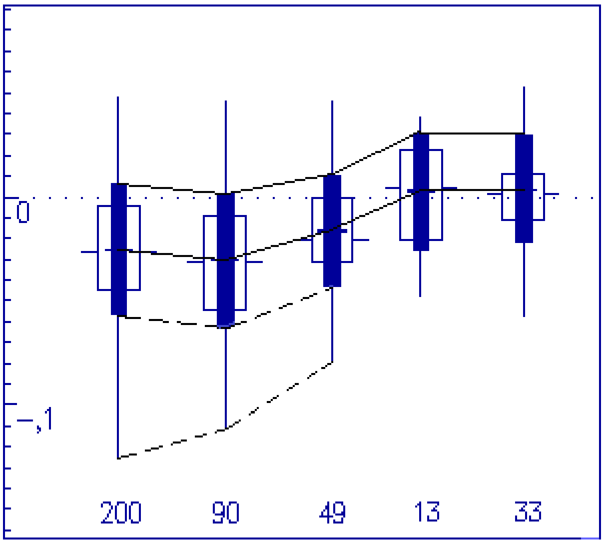

Fig. 9-1: The LSI-calculations of sheep remains from Troy I, Troy II, Troy III, Emar-Early Bronze Age IV and Emar-Middle Bronze Age.

9.6. Environmental changes in the Troas during the Maritime Troy Culture

Tab. 9-1:The possible living habitat of the wild fowl that are identified from the settlements of Troas[6].

Wild fowl remains	TR I	TR I/II	TR II/III	TR III	Habitat
Grey geese, *Anser sp*	√	-	√	√	11-10
Shelducks, *Tadorna*	√	-	-	-	11-10-13
Shoveler, *Anas clypeata*	√	-	-	-	11-10-13
Mallard, *Anas plathyrhynchos*	√	-	-	-	11-10-13
Pintail, *Anas acuta*	-	-	-	√	11-10-13
Vultures	-	-	-	√	4-3-12
Eagles, *Aquila sp.*	-	√	-	-	12-8-13
Buzzards, *Buteo sp.*	√	-	-	-	8-9-3
Coot, *Fulica atra*	-	√	-	-	11-10-13
Great bustard, *Otis tarda*	√	-	-	-	3-4
Stock dove, *Columba oenas*	-	-	√	-	12-8-9
Eared owls, *Asio sp.*	-	-	-	-	8-13-3

1-Pasture/high grass
2-Pasture/short grass
3-Open land
4-Steppe
5-Savanna
6-Woods/deciduous forest
7-Woods/coniferous forest
8-Woods/mixed
9-Open woods
10-Meadows
11-Water
12-Cliff areas
13-Swamp
14-Almost everywhere

[6] These species were identified from Troy and Beşik-Yassıtepe.

Measurements

A - Measurements of Domestic Animals

I - Measurements of Sheep (OVIS) Remains

1-Mandible - Sheep (OVIS)

Mandible (a)	**LTR**	**LMR**	**LPR**			**SHDia**	**HofM1**	
0114/ 2 TR I	--	--	29	--	--	--	--	--
0130/ 93	--	--	23	--	--	--	--	--
0130/ 95	--	--	23	--	--	--	--	--
0219/ 63	--	--	31,7	--	--	--	--	--
TROI/ 81	--	--	28,5	--	--	--	--	--
TROI/ 24	--	--	25	--	--	--	--	--
1857/ 1 TR II	--	52,5	--	--	--	--	--	--
1863/ 61	73,5	49,5	23,5	--	--	--	--	--
6603/ 13	77,5	51	25,5	--	--	--	22,5	--
6536/ 34 TR III	81,5	57	25,5	--	--	15	22	--
0082/ 19 MIX	83	60	25	--	--	--	--	--
0082/ 25	--	--	27,5	--	--	--	--	--
0082/ 26	79,5	51,5	27,5	--	--	--	--	--
1202/ 2	--	--	25	--	--	15	--	--
6654/ 91	77	50,5	23	--	--	--	--	--
mean val.	**78,7**	**53,1**	**25,9**	**--**	**--**	**--**	**--**	**--**
std.dev.	**3,42**	**3,87**	**2,61**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**4,3**	**7,3**	**10,1**	**--**	**--**	**--**	**--**	**--**
n=	**6**	**7**	**14**	**-**	**-**	**2**	**2**	**-**

2- Mandibular Teeth - Sheep (OVIS)

Mandibular teeth						**LM_3**	**BM_3**	**HM_3**
0078/ 38 TR I	--	--	--	--	--	24	8,5	39
0078/ 39	--	--	--	--	--	22,5	9	43
0078/ 40	--	--	--	--	--	24	9	44
0091/ 3	--	--	--	--	--	25,5	9,5	38,5
0093/ 56	--	--	--	--	--	--	--	14
0100/ 2	--	--	--	--	--	--	--	13,5
0120/ 26	--	--	--	--	--	--	--	11,0
TROI/ 82	--	--	--	--	--	--	--	14
0300/ 6	--	--	--	--	--	24	8,9	--
0300/ 11	--	--	--	--	--	--	--	19,6
TROI/ 25	--	--	--	--	--	--	--	12,5
0699/ 6	--	--	--	--	--	24	8,9	--
0699/ 11	--	--	--	--	--	--	--	19,6
0705/ 103	--	--	--	--	--	23,5	9	24,0
0741/ 59	--	--	--	--	--	26,5	10	27,0
0743/ 18	--	--	--	--	--	21,5	8,5	
0747/ 45	--	--	--	--	--	23,5	8,5	33,5
TROI/ 33	--	--	--	--	--	25,5	8	
0782/ 5	--	--	--	--	--	--	--	18,5
0795/ 13	--	--	--	--	--	--	--	17
1243/ 0	--	--	--	--	--	23,5	--	27,0

2- (continue) Mandibular Teeth - Sheep (OVIS)

Mandibular teeth						**LM_3**	**BM_3**	**HM_3**
1854/ 15 TR II	--	--	--	--	--	--	--	18
1857/ 2	--	--	--	--	--	27	9	--
1863/ 62	--	--	--	--	--	21,5	8	--
1878/ 3	--	--	--	--	--	--	--	13,3
6571/ 52	--	--	--	--	--	24	9,5	--
6603/ 14	--	--	--	--	--	21,5	8	--
6603/ 16	--	--	--	--	--	(23,5)	7,5	--
6611/ 2	--	--	--	--	--	--	--	14,5
6634/ 26	--	--	--	--	--	--	--	14,5
6644/ 16	--	--	--	--	--	--	--	14,5
6665/ 37	--	--	--	--	--	--	--	14,5
9032/ 17	--	--	--	--	--	--	--	17,4
1446/ 71 TR III	--	--	--	--	--	--	--	15,5
1446/ 73	--	--	--	--	--	20,5	8	--
1450/ 3	--	--	--	--	--	22	8,5	--
6534/ 73	--	--	--	--	--	22,5	8,5	--
6536/ 35	--	--	--	--	--	24,5	8,8	--
6536/ 38	--	--	--	--	--	--	--	18,5
6538/ 6	--	--	--	--	--	23	9	--
0082/ 20 MIX	--	--	--	--	--	24	9,5	33,0
0082/ 21	--	--	--	--	--	21,5	8,5	28,5
0082/ 22	--	--	--	--	--	26,5	9,5	40,0
0082/ 23	--	--	--	--	--	24,5	8,5	43,5
0082/ 24	--	--	--	--	--	22,5	8	23,0
0082/ 27	--	--	--	--	--	24	9,5	37,5
0082/ 28	--	--	--	--	--	--	--	14,5
0082/ 29	--	--	--	--	--	--	--	13,5
0082/ 30	--	--	--	--	--	--	--	14,5
0082/ 31	--	--	--	--	--	--	--	13,5
6630/ 166	--	--	--	--	--	--	--	14,5
6631/ 56	--	--	--	--	--	--	--	17,0
6646/ 16	--	--	--	--	--	23,5	8	--
6654/ 60	--	--	--	--	--	--	--	14,5
6654/ 92	--	--	--	--	--	20,5	7	--
mean val.	**--**	**--**	**--**	**--**	**--**	**23,5**	**8,7**	**15,3**
std.dev.	**--**	**--**	**--**	**--**	**--**	**1,68**	**0,68**	**2,27**
coeff.var.	**--**	**--**	**--**	**--**	**--**	**7,1**	**7,8**	**14,8**
n=	**--**	**--**	**--**	**--**	**--**	**30**	**29**	**25**

3- Scapula - Sheep (OVIS)

Scapula	**SLC**	**GLP**	**LG**	**BG**				
0091/ 2 TR I	--	33	27	22	--	--	--	--
0112/ 2	--	33	26,5	20,5	--	--	--	--
0118/ 32	--	29	23	20	--	--	--	--
0118/ 33	--	--	25,5	21,5	--	--	--	--
0128/ 41	20	35	26	23,5	--	--	--	--
0130/ 94	19	31	24	--	--	--	--	--
0133/ 1	20	31	--	19	--	--	--	--
TROI/ 233	21,3	39,5	27	23,9	--	--	--	--
TROI/ 234	--	38,4	27	18	--	--	--	--
TROI/ 56	20	--	--	18,9	--	--	--	--
TROI/ 43	18,5	30,1	25	--	--	--	--	--
0698/ 180	19,8	31,5	23	20	--	--	--	--
0701/ 13	22,5	35	29,5	20	--	--	--	--
0727/ 96	21,5	--	--	22	--	--	--	--
0727/ 97	17,5	29,5	22,5	17,5	--	--	--	--
0727/ 98	--	30	22	19,5	--	--	--	--
0744/ 2	18,5	30,5	24	19,5	--	--	--	--
0758/ 159	--	31,5	25	--	--	--	--	--
0758/ 160	18	31	24	--	--	--	--	--
0760/ 50	18	--	20,5	18,5	--	--	--	--
0760/ 60	--	--	27,5	23,5	--	--	--	--
0762/ 2	20	33	26	21,5	--	--	--	--
0791/ 8	21,5	35,5	28	23	--	--	--	--
0791/ 12	20,5	35	26	22	--	--	--	--
0792/ 49	19,5	32	--	20	--	--	--	--
1858/ 9 TR II	21,5	34	26,5	22	--	--	--	--
1862/ 48	22	36	27,5	21	--	--	--	--
1874/ 63	19,5	32	27,5	20	--	--	--	--
6645/ 16	19,5	--	--	20,5	--	--	--	--
6661/ 21	--	--	--	19	--	--	--	--
6678/ 2	17	30,5	25,5	18	--	--	--	--
1475/ 10 TR III	--	32,5	24,5	--	--	--	--	--
6533/ 10	19,5	--	--	--	--	--	--	--
6558/ 1	20,5	34	24,5	21,5		--	--	--
0082/ 32 MIX	20,5	30,5	23	--	--	--	--	--
0106/ 5	19,5	--	--	--	--	--	--	--
6629/ 64	18,5	31,5	24,5	19,5	--	--	--	--
6630/ 55	18,5	--	--	18	--	--	--	--
6630/ 59	20,5	--	--	22	--	--	--	--
mean val.	**19,8**	**32,7**	**25,3**	**20,5**	**--**	**--**	**--**	**--**
std.dev.	**1,37**	**2,61**	**2,05**	**1,76**	**--**	**--**	**--**	**--**
coeff.var.	**6,9**	**8**	**8,1**	**8,6**	**--**	**--**	**--**	**--**
n=	**29**	**28**	**29**	**31**	**--**	**-**	**-**	**-**

4- Humerus - Sheep (OVIS)

Humerus	**Bd**	**BT**	**SD**		**Dp**			
0078/ 14 TR I	27	26,5	--	--	--	--	--	--
0085/ 17	29	28	--	--	--	--	--	--
0099/ 28	32,5	29,5	--	--	--	--	--	--
0105/ 30	32	30	--	--	--	--	--	--
0129/ 238	36	33,5	--	--	--	--	--	--
0129/ 251	30,5	27,5	--	--	--	--	--	--
0133/ 5	31,5	30,5	--	--	--	--	--	--
0133/ 18	31	29	--	--	--	--	--	--
0258/ 8	30,5	28,7	--	--	--	--	--	--
0259/ 67	29,3	29,6	--	--	--	--	--	--
TROI/ 32	28,9	28,1	--	--	--	--	--	--
TROI/ 40	32	31	--	--	--	--	--	--
TROI/ 50	30	29	--	--	--	--	--	--
TROI/ 83	25	23,8	--	--	--	--	--	--
TROI/231	30,5	30,4	--	--	--	--	--	--
0695/ 19	29,5	29	--	--	--	--	--	--
0698/ 186	30,5	28	--	--	--	--	--	--
0698/ 437	31,5	30,5	--	--	--	--	--	--
0702/ 11	29	27	--	--	--	--	--	--
0705/ 81	31	29	--	--	--	--	--	--
0705/ 82	31	29	--	--	--	--	--	--
0712/ 8	31	30	--	--	--	--	--	--
0715/ 12	30	28,5	13	--	--	--	--	--
0720/ 99	23	--	13,5	--	--	--	--	--
0720/ 100	30	27,5	--	--	--	--	--	--
0727/ 100	31	30	--	--	--	--	--	--
0742/ 18	30,5	29	--	--	--	--	--	--
0760/ 54	31	29	--	--	--	--	--	--
0761/ 12	--	29	--	--	--	--	--	--
0762/ 3	32	24	--	--	--	--	--	--
0793/ 2	28	26	--	--	--	--	--	--
9033/ 28	31,5	27,8	--	--	--	--	--	--
1203/ 29	28,8	26,9	--	--	--	--	--	--
1205/ 1 TR II	27,5	27	13,5	--	--	--	--	--
1845/ 45	33	31,5	--	--	--	--	--	--
1851/ 10	33	31,5	--	--	--	--	--	--
1855/ 1	26,5	26	--	--	--	--	--	--
1858/ 8	30	28,5	--	--	--	--	--	--
1862/ 46	29	25	--	--	--	--	--	--
1862/ 47	29,5	28	--	--	--	--	--	--
6529/ 95	28,9	--	--	--	--	--	--	--
6601/ 24	28	26,5	--	--	--	--	--	--
6611/ 9	29,5	28	12,5	--	--	--	--	--
6613/ 9	29,5	28,5	--	--	--	--	--	--
6628/ 48	28,5	27,5	--	--	--	--	--	--
6636/ 12	30,5	28,5	15	--	--	--	--	--

4- *cont*. Humerus - Sheep (OVIS)

Humerus	**Bd**	**BT**	**SD**		**Dp**			
1444/ 5 TR III	--	28	--	--	--	--	--	--
1446/ 103	32	31	--	--	--	--	--	--
1446/ 104	33	32	--	--	--	--	--	--
1446/ 106	--	--	--	--	49	--	--	--
6540/ 16	36	31,5	--	--	--	--	--	--
6572/ 1	31	30,5	--	--	--	--	--	--
6572/ 2	33	31	--	--	--	--	--	--
0082/ 33 MIX	31,5	30,5	--	--	--	--	--	--
0082/ 34	29,5	--	14,5	--	--	--	--	--
0082/ 35	--	--	16,5	--	--	--	--	--
0082/ 36	29,5	28,5	16,5	--	--	--	--	--
0082/ 37	33,5	32,5	--	--	--	--	--	--
0082/ 38	29	27,5	--	--	--	--	--	--
6539/ 1	34	32	--	--	--	--	--	--
6638/ 8	27	26,5	--	--	--	--	--	--
6639/ 12	26,5	26	--	--	--	--	--	--
mean val.	**30,2**	**28,8**	**14,4**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,35**	**2,05**	**1,53**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**7,8**	**7,1**	**10,6**	**--**	**--**	**--**	**--**	**--**
n=	**58**	**57**	**8**	**-**	**1**	**-**	**-**	**-**

5- Radius - Sheep (OVIS)

Radius	**Bp**	**SD**	**Bd**	**GL**			**BFp**	**BFd**
0078/ 21 TR I	31,5	18,5	--	--	--	--	--	--
0078/ 23	32,5	17,5	--	--	--	--	--	--
0078/ 24	--	--	29	--	--	--	--	23,5
0078/ 25	--	--	28,5	--	--	--	--	24,5
0099/ 27	29	15,5	--	--	--	--	25	--
0103/ 2	31	15	--	--	--	--	--	--
0129/ 240	30,5	--	--	--	--	--	--	--
0129/ 242	35	17	--	--	--	--	--	--
0129/ 249	34	--	--	--	--	--	--	--
0129/ 250	32	--	--	--	--	--	--	--
0132/ 1	34,5	17,5	--	--	--	--	--	--
0132/ 2	30,5	--	--	--	--	--	27,5	--
0132/ 3	28	14	--	--	--	--	25	--
0209/ 4	31,5	--	--	--	--	--	28,5	--
0290/ 104	--	--	30,7	--	--	--	--	25,1
TROI/ 42	30	--	--	--	--	--	--	--
0300/ 53	--	--	25	--	--	--	--	--
0698/ 434	--	--	26	--	--	--	--	23
0699/ 53	--	--	25	--	--	--	--	--
0711/ 1	--	--	26,5	--	--	--	--	--
0720/ 41	32,5	--	--	--	--	--	--	--
0759/ 27	--	--	30	--	--	--	--	--
0759/ 28	--	--	29	--	--	--	--	--
9033/ 122	31,2	16,4	27,4	144,2	--	--	26,9	22,2

5- *cont*. Radius - Sheep (OVIS)

Radius	**Bp**	**SD**	**Bd**	**GL**			**BFp**	**BFd**
1851/ 11 TR II	27	--	--	--	--	--	26,3	--
1854/ 13	31,5	16	--	--	--	--	28,5	--
1862/ 66	--	--	31	--	--	--	--	24
6601/ 7	30,5	15,5	26	140,5	--	--	27,5	23,5
6628/ 73	(29,0)	--	--	--	--	--	(26,5)	
6641/ 34	--	--	30,5	--	--	--	--	--
6659/ 47	29	--	--	--	--	--	28,5	--
6678/ 12	--	--	24	--	--	--	--	--
1446/ 105 TR III	34	--	--	--	--	--	30	--
6540/ 15	33,5	17	--	--	--	--	30	--
6563/ 3	32,5	--	--	--	--	--	29,5	--
0082/ 54 MIX	--	--	33,5	--	--	--	--	28,5
0082/ 55	--	--	28,5	--	--	--	--	25,5
0082/ 56	--	--	25,5	--	--	--	--	22,5
0082/ 57	31,5	18	--	--	--	--	--	--
0082/ 58	33	--	--	--	--	--	30	--
0082/ 59	29,5	--	--	--	--	--	26,5	--
6629/ 92	(26,5)			--	--	--		
6629/ 93	--	--	27	--	--	--	--	23
6629/ 143	27,5	--	--	--	--	--	26	--
6629/ 146	--	--	26,5	--	--	--	--	23,5
6630/ 58	31	--	--	--	--	--	29	--
6664/ 44	28	15	--	--	--	--	25,5	--
6675/ 7	29	--	--	--	--	--	27	--
mean val.	**30,9**	**16,4**	**27,9**	**--**	**--**	**--**	**27,6**	**24,1**
std.dev.	**2,24**	**1,34**	**2,51**	**--**	**--**	**--**	**1,68**	**1,71**
coeff.var.	**7,3**	**8,2**	**9**	**--**	**--**	**--**	**6,1**	**7,1**
n=	**31**	**13**	**19**		**-**	**-**	**19**	**12**

6- Ulna - Sheep (OVIS)

Ulna	**BPC**	**DPA**	**SDO**					
0078/ 19 TR I	19	27,5	--	--	--	--	--	--
0078/ 20	17,5	--	--	--	--	--	--	--
0098/ 2	21	29	26	--	--	--	--	--
0101/ 16	18	--	--	--	--	--	--	--
0219/ 61	15,5	(18,9)	--	--	--	--	--	--
1226/ 1	17,5	24,5	--	--	--	--	--	--
1865/ 52 TR II	17,2	25	--	--	--	--	--	--
1883/ 17	19	26	--	--	--	--	--	--
6601/ 32	18	--	--	--	--	--	--	--
6634/ 20	17	24	21	--	--	--	--	--
6678/ 17	17	22	20,5	--	--	--	--	--
0082/ 39 MIX	--	29,5	--	--	--	--	--	--
0082/ 40	17,5	27,5	23	--	--	--	--	--
0082/ 52	21	29,5	25,5	--	--	--	--	--
6629/ 144	21,5	--	--	--	--	--	--	--
mean val.	**18,3**	**25,8**	**23,2**	**--**	**--**	**--**	**--**	--
std.dev.	**1,76**	**3,33**	**2,51**	**--**	**--**	**--**	**--**	--
coeff.var.	**9,6**	**12,9**	**10,8**	**--**	**--**	**--**	**--**	**--**
n=	**14**	**11**	**5**	**-**	**-**	**-**	**-**	**-**

7 – Metacarpus - Sheep (OVIS)

Metacarpus III+IV	**Bp**	**Dp**	**SD**	**Bd**	**Dd**	**GL**		
0078/ 30 TR I	23,5	17	13	--	--	--	--	--
0078/ 60	--	--	--	25	16,5	--	--	--
0093/ 54	24	17,5	--	--	--	--	--	--
0132/ 4	--	--	--	24	14,5	--	--	--
0290/ 105	23,3	17,7	--	--	--	--	--	--
0290/ 106	22,5	16,5	--	--	--	--	--	--
0249/ 34	--	--	--	24	16,1	--	--	--
0249/ 35	24,3	17,3	--	--	--	--	--	--
TROI/ 64	--	--	--	23,5	16,5	--	--	--
0698/ 442	--	--	--	22,5	22	--	--	--
0705/ 83	23,5	17,5	13,5	--	--	--	--	--
0717/ 5	22	15,5	--	--	--	--	--	--
0727/ 92	24,5	18,5	--	--	--	--	--	--
0728/ 1	21	15,5	--	--	--	--	--	--
0761/ 18	24,5	17	--	--	--	--	--	--
0761/ 24	20	15,5	--	--	--	--	--	--
0792/ 34	23	16	--	--	--	--	--	--
1228/ 1	21,5	16	13	--	--	--	--	--
1233/ 3	23	16,5	--	--	--	--	--	--
9033/ 38	21,3	14,8	--	--	--	--	--	--
1851/ 8 TR II	25,5	18	14	--	--	--	--	--
1851/ 9	21,5	15,5	14	--	--	--	--	--
1854/ 14	--	--	13	25	16,5	--	--	--
1862/ 45	22	16	13	--	--	--	--	--
1874/ 64	25	18	--	--	--	--	--	--
1880/ 30	22	16,5	14	--	--	--	--	--
6601/ 23	(22,5)	15,0	12,0	--	--	--	--	--
6601/ 55	23,5	--	--	28	17,5	--	--	--
6628/ 59	22,5	16,5	--	--	--	--	--	--
6636/ 13	22	15,5	12	24,5	--	122,5	--	--
6644/ 23	23	22,5	--	--	--	--	--	--
3206/ 25 TR III	22	16,5	12	--	--	--	--	--
6534/ 69	23,5	17,5	--	--	--	--	--	--
6574/ 13	--	--	--	23,5	15,5	--	--	--
6576/ 27	--	--	--	26	16,5	--	--	--
0082/ 61 MIX	22,5	16	--	--	--	--	--	--
0082/ 62	24,5	17,5	13,5	--	--	--	--	--
0082/ 64	--	--	--	25	15,5	--	--	--
0082/ 65	--	--	--	22,5	13,5	--	--	--
6604/ 143	--	16,5	--	--	--	--	--	--
6654/ 35	22,5	16	14	25,5	16	119,5	--	--
mean val.	**22,9**	**16,7**	**13,2**	**24,5**	**16,4**	**--**	**--**	**--**
std.dev.	**1,27**	**1,45**	**0,77**	**1,49**	**2,06**	**--**	**--**	**--**
coeff.var.	**5,6**	**8,6**	**5,9**	**6,1**	**12,5**	**--**	**--**	**--**
n=	**30**	**30**	**13**	**13**	**12**	**2**	**-**	**-**

8- Pelvis - Sheep (OVIS)

Pelvis (Acetabula)	**LA**							
0101/ 17 TR I	31	--	--	--	--	--	--	--
0129/ 253	22	--	--	--	--	--	--	--
0705/ 96	28,5	--	--	--	--	--	--	--
0705/ 97	27	--	--	--	--	--	--	--
0717/ 17	25	--	--	--	--	--	--	--
0727/ 101	27	--	--	--	--	--	--	--
1252/ 2	28	--	--	--	--	--	--	--
1874/ 61 TR II	28	--	--	--	--	--	--	--
9032/ 22	27	--	--	--	--	--	--	--
6561/ 2 TR III	24,5	--	--	--	--	--	--	--
0082/ 51 MIX	28,5	--	--	--	--	--	--	--
mean val.	**27**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,4**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**8,9**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**11**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

9- Femur - Sheep (OVIS)

Femur	**Bp**	**DC**		**Bd**	**BTP**			
0702/ 20 TR I	48	21	--	--	--	--	--	--
0741/ 58	--	19,5	--	--	--	--	--	--
0760/ 46	--	--	--	36	--	--	--	--
1210/ 1 TR II	--	--	--	34	16	--	--	--
6611/ 11	--	--	--	36	19	--	--	--
0082/ 53 MIX	46	21	--	--	--	--	--	--
mean val.	**--**	**20,5**	**--**	**35,3**	**--**	**--**	**--**	**--**
std.dev.	**--**	**0,87**	**--**	**1,15**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**4,2**	**--**	**3,3**	**--**	**--**	**--**	**--**
n=	**2**	**3**	**-**	**3**	**2**	**-**	**-**	**-**

10- Tibia - Sheep (OVIS)

Tibia	Bp	SD	Bd	Dd				
0078/ 15 TR I	--	13,5	24,5	17,5	--	--	--	--
0078/ 16	--	14,5	--	--	--	--	--	--
0078/ 17	--	14	25	20,5	--	--	--	--
0078/ 18	--	--	--	22,5	--	--	--	--
0117/ 15	--	13	25,5	19,5	--	--	--	--
0129/ 245	--	--	27,5	21,5	--	--	--	--
0209/ 3	40	--	--	--	--	--	--	--
0209/ 5	--	--	28	21	--	--	--	--
0209/ 6	--	--	21,5	--	--	--	--	--
TROI/ 58	--	--	25,7	20	--	--	--	--
0300/ 49	--	--	27	20,2	--	--	--	--
0698/ 169	--	--	26	20,5	--	--	--	--
0698/ 170	--	--	20,8	19,3	--	--	--	--
0699/ 49	--	--	27	20,2	--	--	--	--
0705/ 80	--	--	28	19,5	--	--	--	--
0725/ 8	--	--	--	18,5	--	--	--	--
0744/ 5	--	--	23,5	18,5	--	--	--	--
0759/ 25	--	--	26	20	--	--	--	--
0759/ 29	--	--	25	19	--	--	--	--
0759/ 30	--	--	26,5	20	--	--	--	--
0760/ 49	--	--	27	20,5	--	--	--	--
0760/ 51	--	--	25,5	19,5	--	--	--	--
0761/ 19	--	--	25	20	--	--	--	--
0795/ 24	--	--	27	21	--	--	--	--
1205/ 2 TR II	--	13,5	26	20,5	--	--	--	--
1845/ 46	--	--	26,5	21	--	--	--	--
1857/ 25	--	--	26	22	--	--	--	--
1860/ 19	--	--	23,5	18,5	--	--	--	--
1862/ 54	--	--	26	21	--	--	--	--
1863/ 66	--	--	26	20	--	--	--	--
1863/ 68	39,5	--	--	--	--	--	--	--
1864/ 29	--	--	22,5	18	--	--	--	--
1865/ 49	--	--	25,5	20,5	--	--	--	--
1865/ 50	--	--	26	19,5	--	--	--	--
1875/ 1	40	--	--	--	--	--	--	--
6605/ 4	--	--	24,5	19,5	--	--	--	--
6607/ 11	--	--	27,5	21	--	--	--	--
6611/ 10	41	--	--	--	--	--	--	--
6628/ 74	38,5	--	--	--	--	--	--	--
6644/ 12	--	--	27	22	--	--	--	--
6645/ 15	(36,5)	--	--	--	--	--	--	--
6649/ 5	--	--	22	18	--	--	--	--
6655/ 48	--	--	26	20,5	--	--	--	--
6667/ 28	--	--	26	19,5	--	--	--	--
9032/ 10	--	--	26,4	20,3	--	--	--	--

10 – *cont.* Tibia - Sheep (OVIS)

Tibia	**Bp**	**SD**	**Bd**	**Dd**				
1440/ 1 TR III	--	--	26	20,5	--	--	--	--
1452/ 12	--	14	24	19,5	--	--	--	--
6540/ 14	--	16,5	27	22	--	--	--	--
6555/ 10	--	14,5	25,5	20	--	--	--	--
6555/ 11	--	15,5	27,5	21,5	--	--	--	--
6558/ 2	--	--	27,5	22,5	--	--	--	--
6558/ 3	--	--	23	18,5	--	--	--	--
6572/ 3	--	14	25,5	20,5	--	--	--	--
6575/ 33	--	13,5	26,5	21	--	--	--	--
0082/ 46 MIX	--	14,5	26,5	20,5	--	--	--	--
0082/ 47	--	15,5	27,5	--	--	--	--	--
0082/ 48	--	16	26	20	--	--	--	--
0082/ 49	--	--	26,5	21	--	--	--	--
0082/ 50	--	15,5	25,5	20	--	--	--	--
6609/ 52	--	--	26	21	--	--	--	--
6625/ 6	--	--	24	18,5	--	--	--	--
6629/ 76	--	--	23	17	--	--	--	--
6630/ 57	--	--	26	19,5	--	--	--	--
6631/ 60	--	--	24,5	20	--	--	--	--
6654/ 89	--	--	27,5	--	--	--	--	--
6656/ 96	--	--	28,5	23,5	--	--	--	--
mean val.	**39,3**	**14,5**	**25,7**	**20,1**	**--**	**--**	**--**	**--**
std.dev.	**1,57**	**1,04**	**1,66**	**1,27**	**--**	**--**	**--**	**--**
coeff.var.	**4**	**7,2**	**6,5**	**6,3**	**--**	**--**	**--**	**--**
n=	**6**	**15**	**57**	**56**	**-**	**-**	**-**	**-**

11- Astragalus - Sheep (OVIS)

Astragalus	**GLl**	**GLm**	**Dl**	**Dm**	**BC**			
0078/ 28 TR I	30	28	16,5	--	18	--	--	--
0084/ 7	30	29	16,5	17	19	--	--	--
TROI/ 68	25,9	24,5	14,9	15,6	16,9	--	--	--
TROI/ 17	28,2	27,5	16,2	16,1	18,6	--	--	--
0698/ 444	29,1	28	16	16	19,5	--	--	--
0715/ 40	29,5	27,5	16,5	18,5	19,5	--	--	--
0715/ 41	28	26,5	15,5	16	18,5	--	--	--
0717/ 7	(28,5)	26,0	15,5	16,5	17,5	--	--	--
0717/ 8	27,5	26	15	17	17,5	--	--	--
0720/ 44	27	26	15,5	17	18	--	--	--
0741/ 56	30	--	16,6	--	--	--	--	--
0744/ 1	28,5	27	15	16,5	18,5	--	--	--
0760/ 48	27,5	26,5	15	16,5	18,5	--	--	--
0791/ 10	31,5	30	18	18	21	--	--	--
9033/ 120	25,9	24,7	14,1	15,6	17,6	--	--	--

11 – *cont.* Astragalus - Sheep (OVIS)

Astragalus	**GLl**	**GLm**	**Dl**	**Dm**	**BC**			
1863/ 67 TR II	32,5	30	18	18,5	20,5	--	--	--
6601/ 8	29,5	27,5	16,5	17	18	--	--	--
6628/ 49	27,5	26	15,5	16	17,5	--	--	--
6642/ 16	28	26	15,5	16,5	18,5	--	--	--
6657/ 6	27,5	25,5	15,5	16	17,5	--	--	--
6657/ 16	27,5	26	--	--	--	--	--	--
1444/ 3 TR III	30	27,5	17,2	--	19	--	--	--
1446/ 99	29	26,5	16	--	18,5	--	--	--
1446/ 100	28	26,5	16,5	--	18,5	--	--	--
1452/ 13	--	26,2	--	--	18	--	--	--
1852/ 3	29	27,5	16,5	16,7	18,5	--	--	--
6534/ 64	34,5	33	19	--	22	--	--	--
6534/ 65	29	27,5	16,5	18	13,5	--	--	--
6536/ 29	31,7	30,5	17,1	--	19,5	--	--	--
6553/ 29	27	26	15	--	16,5	--	--	--
6555/ 12	30	28	16,5	--	20	--	--	--
6575/ 34	28,5	26,8	15,5	--	17,8	--	--	--
0082/ 44 MIX	30	29	17	18,5	19,5	--	--	--
0082/ 45	26,5	25,5	15,5	15	17,5	--	--	--
6604/ 158	28,5	27,5	16	17,5	18	--	--	--
6609/ 2	29,5	29	16	16,5	19	--	--	--
6631/ 59	29,5	27	17	17,5	19	--	--	--
6654/ 37	28,5	27	15,5	17	18,5	--	--	--
6656/ 97	27	25	15	15,5	17,5	--	--	--
mean val.	**28,8**	**27,2**	**16,1**	**16,8**	**18,4**	**--**	**--**	**--**
std.dev.	**1,77**	**1,72**	**1**	**0,96**	**1,39**	**--**	**--**	**--**
coeff.var.	**6,1**	**6,3**	**6,2**	**5,7**	**7,6**	**--**	**--**	**--**
n=	**38**	**38**	**37**	**27**	**37**	**-**	**-**	**-**

12- Calcenaus - Sheep (OVIS)

Calcaneus	**GL**	**BB**	**GD**					
0078/ 29 TR I	55	19	22,5	--	--	--	--	--
0103/ 3	61	22,5	25,5	--	--	--	--	--
0129/ 259	54	18	21,5	--	--	--	--	--
0130/ 96	62	21,5	23,5	--	--	--	--	--
0133/ 6	60	22	23,5	--	--	--	--	--
0290/ 75	59,7	25,5	21,7	--	--	--	--	--
TROI/ 60	50,3	21,1	17	--	--	--	--	--
0300/ 128	58	23	20	--	--	--	--	--
0698/ 178	53	20,5	--	--	--	--	--	--
0698/ 446	53,1	22,1	19	--	--	--	--	--
0699/ 128	58	23	20	--	--	--	--	--
0705/ 86	55	18,5	22,5	--	--	--	--	--
0705/ 87	--	--	--	--	--	--	--	--
0715/ 44	59,5	--	23,5	--	--	--	--	--
0742/ 19	54,5	17,5	26	--	--	--	--	--
0744/ 3	55	19,5	23,5	--	--	--	--	--

12 – *cont.* Calcenaus - Sheep (OVIS)

1862/ 51 TR II	57	19	23	--	--	--	--	--
1870/ 8	55	18,5	22,5	--	--	--	--	--
1882/ 8	57	20	23	--	--	--	--	--
6601/ 26	55	18,5	22,5	--	--	--	--	--
6617/ 11	58	21	23	--	--	--	--	--
6618/ 21	--	--	--	--	--	--	--	--
6659/ 61	54	19,5	22,5	--	--	--	--	--
6663/ 52	49	17,5	20	--	--	--	--	--
6671/ 16	53,5	18	21	--	--	--	--	--
1449/ 11 TR III	50,5	18	20,5	--	--	--	--	--
6534/ 66	56	17	22	--	--	--	--	--
0082/ 41 MIX	55	18	21,5	--	--	--	--	--
0082/ 42	57,5	21	22,5	--	--	--	--	--
0082/ 43	62	20,5	24	--	--	--	--	--
6604/ 25	55,5	20,5	23,5	--	--	--	--	--
6604/ 111	58,5	19,5	24,5	--	--	--	--	--
6604/ 157	50,5	17	21	--	--	--	--	--
mean val.	**55,9**	**19,9**	**22,2**	--	**--**	**--**	**--**	**--**
std.dev.	**3,38**	**2,07**	**1,89**	--	**--**	**--**	**--**	**--**
coeff.var.	**6,1**	**10,4**	**8,5**	--	**--**	**--**	**--**	**--**
n=	**31**	**30**	**30**	--	**-**	**-**	**-**	**-**

13 – Metatarsus - Sheep (OVIS)

Metatarsus III+IV	**Bp**	**Dp**	**SD**	**Bd**	**Dd**		**GL**	**DD**
0095/ 1 TR I	19	20	--	--	--	--	--	--
0132/ 5	--	--	--	21,5	15	--	--	--
0259/ 68	--	--	--	25,1	16,6	--	--	--
0249/ 48	--	--	--	25	16	--	--	--
TROI/ 32	19,1	19,1	11	--	--	--	--	9
0697/ 16	20	--	--	--	--	--	--	--
0698/ 171	21	21	--	--	--	--	--	--
0711/ 3	17	18,5	--	--	--	--	--	--
0760/ 47	--	--	--	24	17	--	--	--
1848/ 20 TR II	20	20	12,5	--	--	--	--	--
1879/ 4	20	18	--	--	--	--	--	--
6556/ 45	21	22	13	--	--	--	--	--
6601/ 25	20	19,5	11,5	24	15	--	130,5	--
6637/ 24	20	19,5	--	--	--	--	--	--
1475/ 1 TR III	21	21,5	--	--	--	--	--	--
1852/ 1	20	19,5	12,8	--	--	--	--	--
6555/ 9	20,5	21,5	11,5	--	--	--	--	--
6561/ 1	--	--	--	26,5	18	--	--	--
0082/ 60 MIX	19	20,5	11,5	--	--	--	--	--
0082/ 63	--	--	--	24,5	16,5	--	--	--
6568/ 13	--	--	--	23	16	--	--	--
6609/ 55	19	18,5	--	--	--	--	--	--
6609/ 56	19,5	18,5	--	--	--	--	--	--
6629/ 65	18,5	18	11,5	22	14,5	--	128,5	--
mean val.	**19,7**	**19,7**	**11,9**	**24**	**16,1**	**--**	**--**	**--**
std.dev.	**1,03**	**1,29**	**0,74**	**1,58**	**1,11**	**--**	**--**	**--**
coeff.var.	**5,2**	**6,5**	**6,2**	**6,6**	**6,9**	**--**	**--**	**--**
n=	**17**	**16**	**8**	**9**	**9**	**-**	**2**	**1**

14- Phalanx 1 ant. or post. - Sheep (OVIS)

Phalanx 1 ant. or post.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	**Lphys**
0078/ 26 TR I	13,5	10	12,5	37,5	--	--	--	37
0078/ 27	13	9,5	12,5	34	--	--	--	35
0078/ 61	10,5	8,5	10	33	13	8	9	32,5
0093/ 55	11,5	9,5	10,5	33	14	7,5	8,5	32
0098/ 3	12	9	10,5	33,5	14,5	7,5	9	32,5
0117/ 14	11	9	10,5	32,5	14,5	8	9	32,5
0120/ 28	11	9	10,5	34	13,5	8,5	9	34
0128/ 39	--	--	12,5	--	10,5	--	--	--
0130/ 112	13,5	10,5	12,5	34	15	9,5	11,5	33
0133/ 2	12	9	11	33	14,5	8	9	32
0209/ 1	11	9,5	10,5	36	14	7	9	34
0209/ 2	11,5	10	11	33	14	8	10,5	32
0219/ 64	15	9,6	13	32,9	8,8	7,1	8,8	31,2
0219/ 65	--	9,7	10,6	--	10,5	8	9	--
0290/ 76	12,4	10,2	12	37,4	14,9	8,3	9,8	35,3
0249/ 36	17,1	9,8	16	34,2	14,4	8,5	9,1	32,1
TROI/186	12	10	10,2	36	11,3	6,7	9	39
0300/ 136	12	10,5	11,5	37	14,9	9	10	35
0698/ 184	13	9,8	11,5	40,1	15,5	8,7	--	37,5
0698/ 440	13	9	9,4	33,5	13	7	--	31,5
0699/ 136	12	10,5	11,5	37	14,9	9	10	35
0699/ 269	14,5	11	12,8	41,5	17,5	9	--	37
0705/ 84	12	9,5	11,5	37,5	15	8	10,5	35
0744/ 6	13	9	13,5	--	15	--	--	--
0782/ 50	12,1	9,5	11	32	15	7,9	9,8	34,5
0782/ 52	13	11,5	12,5	35,5	15,5	9	--	34
9033/ 4	11,1	--	9,9	31,5	--	--	--	--
1858/ 10 TR II	13	11	12,5	34,5	--	--	--	33
1862/ 50	12	10	11	33	--	--	--	32
1863/ 69	14	11,5	12,5	34	--	--	--	33,5
1874/ 65	11	9	10	34,5	--	--	--	33,5
9032/ 18	13,8	12	12,2	34,5	--	--	--	--
1446/ 101 TR III	12	9,5	11	35	--	--	--	34,2
1446/ 102	11,7	9	11,5	38,5	--	--	--	38
1852/ 2	12	9,5	11,2	34	--	--	--	33
6538/ 2	12	9,5	11	34	--	--	--	--
6572/ 8	12	9,5	11	35,5	--	--	--	--
6575/ 36	12	10	12	36,5	--	--	--	--
0082/ 66 MIX	13,5	10,5	--	34,5	16	8,5	11,5	34,5
mean val.	**12,5**	**9,8**	**11,5**	**34,9**	**14**	**8,1**	**9,6**	**34**
std.dev.	**1,3**	**0,81**	**1,24**	**2,24**	**1,93**	**0,75**	**0,89**	**2,01**
coeff.var.	**10,4**	**8,2**	**10,8**	**6,4**	**13,8**	**9,2**	**9,3**	**5,9**
n=	**37**	**37**	**38**	**36**	**25**	**23**	**19**	**31**

15- Phalanx 2 ant. or post. - Sheep (OVIS)

Phalanx 2 ant. or post.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	**Lphys**
0084/ 11 TR I	10,5	7,5	7,5	19,5	11	7,5	9,5	--
0125/ 10	10,5	7	8	20,5	11	6	8,5	20
0780/ 33	12	10	10	23	13,8	9,5	12	21
0780/ 34	12,5	9,9	9,8	22,5	13	9,5	11,5	21
6557/ 24 TR III	12	9	9,5	20,5	--	--	--	--
mean val.	**11,5**	**8,7**	**9**	**21,2**	**12,2**	**8,1**	**10,4**	**20,7**
std.dev.	**0,94**	**1,37**	**1,13**	**1,48**	**1,42**	**1,7**	**1,65**	**0,58**
coeff.var.	**8,1**	**15,8**	**12,6**	**7**	**11,7**	**20,9**	**15,9**	**2,8**
n=	**5**	**5**	**5**	**5**	**4**	**4**	**4**	**3**

16 - Phalanx 3 ant. or post. - Sheep (OVIS)

Phalanx 3 ant. or post.	**GL**	**Ld**	**HP**	**GB**	**BF**			
TROI/ 40 TR I	--	--	--	--	8,5	--	--	--
1853/ 24 TR II	33	26,5	17,5	9,5	--	--	--	--
1441/ 24 TR III	25,5	--	--	--	--	--	--	--
6553/ 33	33	26,5	--	--	--	--	--	--
6572/ 6	28,5	--	--	--	--	--	--	--
mean val.	**30**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**3,67**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**12,2**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**4**	**2**	**1**	**1**	**1**	**-**	**-**	**-**

II- Measurements of Goat (CAPRA) Remains

1-Mandible - Goat (CAPRA)

Mandible (a)			**LPR**			**SHDia**		
1202/ 3 MIX	--	--	23	--	--	14	--	--

2- Mandibular teeth - Goat (CAPRA)

Mandibular teeth						**LM_3**	**BM_3**	**HM_3**
0078/ 41 TR I	--	--	--	--	--	22,5	9	19,5
0078/ 42	--	--	--	--	--	29,5	9	26,5
0078/ 43	--	--	--	--	--	22	8,5	21
0105/ 32	--	--	--	--	--	22	8	19
0130/ 109	--	--	--	--	--	--	--	13,0
0219/ 57	--	--	--	--	--	--	--	13,1
0290/ 71	--	--	--	--	--	--	--	12,9
0249/ 10	--	--	--	--	--	22,9	8,9	--
TROI/ 8	--	--	--	--	--	25,2	7	--
TROI/ 9	--	--	--	--	--	22,4	9,8	--
TROI/ 31	--	--	--	--	--	25	18	--
0300/ 8	--	--	--	--	--	26,2	9,5	--
0688/ 12	--	--	--	--	--	24,5	9,9	--
0688/ 16	--	--	--	--	--	22,7	9	--
0699/ 8	--	--	--	--	--	26,2	9,5	--
0715/ 88	--	--	--	--	--	22,5	8	--
0720/ 182	--	--	--	--	--	22,5	8,5	--
0747/ 44	--	--	--	--	--	24	9,5	18
0790/ 6	--	--	--	--	--	23	10	--
1863/ 1 TR II	--	--	--	--	--	22,5	8,5	16
1866/ 37	--	--	--	--	--	--	--	12,0
1867/ 22	--	--	--	--	--	--	--	15,5
0082/ 18 MIX	--	--	--	--	--	21,5	8,5	19
0106/ 3	--	--	--	--	--	21	8	20
6629/ 78	--	--	--	--	--	21,5	9	--
6635/ 35	--	--	--	--	--	22,5	8,5	--
mean val.	**--**	**--**	**--**	**--**	**--**	**23,4**	**9,3**	**13,3**
std.dev.	**--**	**--**	**--**	**--**	**--**	**2,04**	**2,13**	**1,31**
coeff.var.	**--**	**--**	**--**	**--**	**--**	**8,7**	**23**	**9,8**
n=	**-**	**-**	**-**	**-**	**-**	**21**	**21**	**13**

3- Scapula - Goat (CAPRA)

Scapula	**SLC**	**GLP**	**LG**	**BG**				
0258/ 64 TR I	19,8	32,1	22,7	22,2	--	--	--	--
0747/ 17	21	31,5	24	22		--	--	--
0760/ 56	18	29	23	20	--	--	--	--
0760/ 57	--	--	22,5	20	--	--	--	--
0789/ 15	19,8	31	25,8	22	--	--	--	--
1865/ 51 TR II	19	32,5	26	20,5	--	--	--	--
1866/ 38	20	30,5	--	21	--	--	--	--
6671/ 13	16,5	--	--	18	--	--	--	--
9031/ 61	19	35,5	--	21,6	--	--	--	--
6562/ 1 TR III	19,5	--	--	22		--	--	--
6654/ 47 MIX	18,5	--	--	19,5	--	--	--	--
mean val.	**19,1**	**31,7**	**24**	**20,8**	**--**	**--**	**--**	**--**
std.dev.	**1,24**	**2,02**	**1,56**	**1,34**	**--**	**--**	**--**	**--**
coeff.var.	**6,5**	**6,4**	**6,5**	**6,4**	**--**	**--**	**--**	**--**
n=	**10**	**7**	**6**	**11**		**-**	**-**	**-**

4- Humerus - Goat (CAPRA)

Humerus	**Bd**	**BT**	**SD**					
0078/ 31 TR I	28,5	27,5	--	--	--	--	--	--
0078/ 32	30,5	29,5	--	--	--	--	--	--
0290/ 113	30	28,1	--	--	--	--	--	--
TROI/232	28	26	--	--	--	--	--	--
0698/ 438	27,5	26	--	--	--	--	--	--
0705/ 88	27,5	--	--	--	--	--	--	--
0717/ 3	28,5	--	--	--	--	--	--	--
0717/ 4	26,5	--	--	--	--	--	--	--
0720/ 47	28,5	27	--	--	--	--	--	--
0727/ 121	26,5	26	--	--	--	--	--	--
0727/ 122	26,5	26	--	--	--	--	--	--
0761/ 20	28,5	26	--	--	--	--	--	--
TROI/ 78	28	--	--	--	--	--	--	--
0795/ 55	27	26,5	--	--	--	--	--	--
1845/ 47 TR II	29,5	28	--	--	--	--	--	--
6634/ 17	28,5	28	14,5	--	--	--	--	--
6657/ 5	31	29,5	--	--	--	--	--	--
0082/ 11 MIX	27,5	--	--	--	--	--	--	--
0082/ 12	27	--	--	--	--	--	--	--
0082/ 13	30	29	--	--	--	--	--	--
mean val.	**28,3**	**27,4**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**1,35**	**1,34**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**4,8**	**4,9**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**20**	**14**	**1**	**-**	**-**	**-**	**-**	**-**

5- Radius - Goat (CAPRA)

Radius	**Bp**	**SD**	**Bd**				**BFp**	**BFd**
0078/ 22 TR I	32,5	18,5	--	--	--	--	--	--
0078/ 35	--	15	--	--	--	--	--	24,5
0129/ 239	--	--	26	--	--	--	--	--
0133/ 14	--	--	29	--	--	--	--	--
TROI/ 43	32,5	--	--	--	--	--	--	--
TROI/ 22	37	--	--	--	--	--	29	--
0739/ 41	27	--	--	--	--	--	--	--
0758/ 161	30,5	--	--	--	--	--	29	--
0759/ 26	30	--	--	--	--	--	28	--
0761/ 3	28,5	--	--	--	--	--	--	--
0766/ 5	30	--	--	--	--	--	29	--
9033/ 10	25,2	--	--	--	--	--	--	--
1847/ 35 TR II	--	--	28,5	--	--	--	--	24
mean val.	**30,4**	**--**	**27,8**	**--**	**--**	**--**	**28,8**	**--**
std.dev.	**3,44**	**--**	**1,61**	**--**	**--**	**--**	**0,5**	**--**
coeff.var.	**11,3**	**--**	**5,8**	**--**	**--**	**--**	**1,7**	**--**
n=	**9**	**2**	**3**	**-**	**-**	**-**	**4**	**2**

6- Ulna - Goat (CAPRA)

Ulna	**BPC**	**DPA**	**SDO**					
0133/ 17 TR I	21,5	26	22,5	--	--	--	--	--
0758/ 163	20	--	--	--	--	--	--	--
0761/ 2	21	--	21	--	--	--	--	--
6534/ 76 TR III	20	24,5	19,5	--	--	--	--	--
mean val.	**20,6**	**--**	**21**	**--**	**--**	**--**	**--**	**--**
std.dev.	**0,75**	**--**	**1,5**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**3,6**	**--**	**7,1**	**--**	**--**	**--**	**--**	**--**
n=	**4**	**2**	**3**	**-**	**-**	**-**	**-**	**-**

7- Metacarpus - Goat (CAPRA)

Metacarpus III+IV	**Bp**	**Dp**	**SD**	**Bd**	**Dd**			
0300/ 132 TR I	--	--	--	23,5	16	--	--	--
0699/ 132	--	--	--	23,5	16	--	--	--
0705/ 91	23	16	14,5	--	--	--	--	--
0741/ 63	--	--	--	25	14	--	--	--
0758/ 162	--	--	--	24	14	--	--	--
9033/ 37	21,4	15	--	--	--	--	--	--
1858/ 26 TR II	25	17,5	--	--	--	--	--	--
1863/ 63	--	--	--	27,5	17,5	--	--	--
6659/ 41	22	15,5	--	--	--	--	--	--
mean val.	**22,9**	**16**	**--**	**24,7**	**15,5**	**--**	**--**	**--**
std.dev.	**1,58**	**1,08**	**--**	**1,68**	**1,5**	**--**	**--**	**--**
coeff.var.	**6,9**	**6,8**	**--**	**6,8**	**9,7**	**--**	**--**	**--**
n=	**4**	**4**	**1**	**5**	**5**	**-**	**-**	**-**

8- Pelvis (Acetabula) - Goat (CAPRA)

Pelvis (Acetabula)	**LA**	**LAR**						
0078/ 36 TR I	22,5	--	--	--	--	--	--	--
0698/ 462	24	20,5	--	--	--	--	--	--
0780/ 3	24	20	--	--	--	--	--	--
mean val.	**23,5**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**0,87**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**3,7**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**

9- Femur - Goat (CAPRA)

Femur	**Bp**	**DC**						
0741/ 61 TR I	39	20	--	--	--	--	--	--
0761/ 6	37,5	19,5	--	--	--	--	--	--

10- Tibia - Goat (CAPRA)

Tibia		**SD**	**Bd**	**Td**				
0078/ 33 TR I	--	13,5	(22,5)	--	--	--	--	--
0219/ 55	--	--	24	19	--	--	--	--
TROI/ 59	--	--	22,5	16,5	--	--	--	--
0720 / 45	--	13	22	17,5	--	--	--	--
0727/ 123	--	--	27	21,5	--	--	--	--
9033/ 8	--	--	24	18,9	--	--	--	--
1862/ 55 TR II	--	--	22,5	18,5	--	--	--	--
1863/ 65	--	--	23,5	20	--	--	--	--
1881/ 1	--	--	23,5	--	--	--	--	--
1441/ 1 TR III	--	12	24,5	17,5	--	--	--	--
6540/ 12	--	16	26	21	--	--	--	--
0082/ 14 MIX	--	16,5	28,5	22,5	--	--	--	--
0082/ 15	--	12,5	22	17,5	--	--	--	--
mean val.	**--**	**13,9**	**24**	**19,1**	**--**	**--**	**--**	**--**
std.dev.	**--**	**1,88**	**2,02**	**1,91**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**13,5**	**8,4**	**10**	**--**	**--**	**--**	**--**
n=	**-**	**6**	**13**	**11**	**-**	**-**	**-**	**-**

11- Astragalus - Goat (CAPRA)

Astragalus	**GLl**	**GLm**	**Dl**	**Dm**	**BC**			
0129/ 257 TR I	30	28	16	17,5	--	--	--	--
0300/ 134	26	25	15	15,5	17,5	--	--	--
0698/ 185	28	26,5	15,5	17	17,9	--	--	--
0698/ 443	28	26,5	15,3	15,1	18,2	--	--	--
0699/ 134	26	25	15	15,5	17,5	--	--	--
0739/ 43	26,5	25	15	15,5	18	--	--	--
0741/ 62	27	25,5	14	15	18,5	--	--	--
0744/ 10	29	26	15	16,5	18	--	--	--
1241/ 3	25,8	24,1	13,8	14,1	16,3	--	--	--
6641/ 35 TR II	25,5	23,5	13,5	14	16	--	--	--
6663/ 38	29	27	15	15,5	19	--	--	--
6665/ 23	25,5	23	13	14	15,5	--	--	--
6563/ 2 TR III	28,2	26,4	15,8	--	18,4	--	--	--
6568/ 12 MIX	28,5	28	15,5	--	20	--	--	--
mean val.	**27,4**	**25,7**	**14,8**	**15,4**	**17,8**	**--**	**--**	**--**
std.dev.	**1,5**	**1,53**	**0,9**	**1,13**	**1,24**	**--**	**--**	**--**
coeff.var.	**5,5**	**5,9**	**6**	**7,3**	**7**	**--**	**--**	**--**
n=	**14**	**14**	**14**	**12**	**13**	**-**	**-**	**-**

12- Calcaneus - Goat (CAPRA)

Calcaneus	**GL**	**GB**	**GD**					
0219/ 59 TR I	59,1	18,4	21,2	--	--	--	--	--
TROI/ 61	50,5	19,5	18,5	--	--	--	--	--
TROI/ 11	54	22	17	--	--	--	--	--
0741/ 65	51	18	22,5	--	--	--	--	--
0759/ 21	50,5	--	19		--	--	--	--
1867/ 6 TR II	57	18	21,5	--	--	--	--	--
6535/ 16	55	18	20,5	--	--	--	--	--
6576/ 75 TR III	53	18	20,5	--	--	--	--	--
0082/ 16 MIX	52	17,5	19,5		--	--	--	--
mean val.	**53,6**	**18,7**	**20**	**--**	**--**	**--**	**--**	**--**
std.dev.	**3,02**	**1,46**	**1,69**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**5,6**	**7,8**	**8,5**	**--**	**--**	**--**	**--**	**--**
n=	**9**	**8**	**9**	**-**	**-**	**-**	**-**	**-**

13- Metatarsus - Goat (CAPRA)

Metatarsus III+IV	**Bp**	**Tp**		**Bd**	**Dd**			
TROI/ 11 TR I	20	20,6	--	--	--	--	--	--
0300/ 131	20	20,5	--	--	--	--	--	--
0698/ 181	--	--	--	22,5	15,1	--	--	--
0699/ 131	20	20,5	--	--	--	--	--	--
0720/ 103	18	16,5	--	--	--	--	--	--
mean val.	**19,5**	**19,5**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**1**	**2,02**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**5,1**	**10,3**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**4**	**4**	**-**	**1**	**1**	**-**	**-**	**-**

14- Phalanx 1, post. - Goat (CAPRA)

Phalanx 1, post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
6534/ 77 TR III	11,5	9,5	10,5	32,5	14,5	13,5	9	31

15- Phalanx 1 ant. or post. - Goat (CAPRA)

Phalanx 1 ant. or post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0078/ 34 TR I	12	10,5	11,5	34,5	--	--	--	33,5
0130/ 106	13,5	11	13	34	15	8,5	11,5	33,5
TROI/227	13,4	12	12,9	42,1	16,6	9,8	10,5	38
0300/ 130	11,5	9	11	33,4	13,2	6,8	9	37,2
0698/ 183	11	8,5	10,1	34,5	13,5	9	9	32
0699/ 130	11,5	9	11	33,4	13,2	6,8	9	37,2
0705/ 85	10,5	9,5	10	34	13	7	9,5	31
0739/ 42	13,5	11	13,5	39	15	9	12,5	--
0741/ 60	13	10,5	12	33,5	--	--	--	--
6541/ 13 TR II	12,5	10,5	13	--	13	--	--	--
6559/ 48	16,5	12,5	15,5	43	--	--	--	--
0082/ 17 MIX	12	10,5	11,5	33	14	8,5	9,5	32
mean val.	**12,6**	**10,4**	**12,1**	**35,9**	**14,1**	**8,2**	**10,1**	**34,3**
std.dev.	**1,59**	**1,21**	**1,58**	**3,69**	**1,24**	**1,16**	**1,32**	**2,76**
coeff.var.	**12,6**	**11,6**	**13**	**10,3**	**8,8**	**14,2**	**13,1**	**8**
n=	**12**	**12**	**12**	**11**	**9**	**8**	**8**	**8**

16- Phalanx 2 ant. or post. - Goat (CAPRA)

Phalanx 2 ant. or post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0101/ 20 TR I	10	7	8	21,5	11	7	10	--
0725/ 13	16	11	12	28	14,5	10,5	13,5	23
TROI/ 89	11,5	8,5	9	22,5	13	9,2	11,5	19
0779/ 14	11,8	8,5	9	21,8	12	--	8,2	19,5
mean val.	**12,3**	**8,8**	**9,5**	**23,5**	**12,6**	**8,9**	**10,8**	**20,5**
std.dev.	**2,57**	**1,66**	**1,73**	**3,06**	**1,49**	**1,77**	**2,25**	**2,18**
coeff.var.	**20,9**	**19**	**18,2**	**13,1**	**11,8**	**19,9**	**20,8**	**10,6**
n=	**4**	**4**	**4**	**4**	**4**	**3**	**4**	**3**

III- Measurements of Cattle (BOS) Remains

1-Mandible – Cattle (BOS)

Mandible (a)	LZR	LMR	LPR			SHDia		
0078/ 45 TR I	134,5	86	48,5	--	--	--	--	--
0720/ 25	--	--	--	--	--	24,5	--	--
6529/ 3 TR II	--	--	49,8	--	--	--	--	--

2- Mandibular teeth – Cattle (BOS)

Mandibular teeth						LM_3	BM_3	HM_3
0078/ 46 TR I	--	--	--	--	--	36,5	15,5	32,5
0300/ 86	--	--	--	--	--	37	17	--
0699/ 86	--	--	--	--	--	37	17	--
9033/ 11	--	--	--	--	--	41,9	17,4	--
1857/ 5 TR II	--	--	--	--	--	--	--	26
1863/ 70	--	--	--	--	--	34,5	16,5	--
6529/ 2	--	--	--	--	--	36	14	--
6606/ 4	--	--	--	--	--	40,5	17,5	--
6612/ 40	--	--	--	--	--	41	16	--
6634/ 14	--	--	--	--	--	38,5	16,5	--
mean val.	**--**	**--**	**--**	**--**	**--**	**38,1**	**16,4**	**--**
std.dev.	**--**	**--**	**--**	**--**	**--**	**2,53**	**1,1**	**--**
coeff.var.	**--**	**--**	**--**	**--**	**--**	**6,6**	**6,7**	**--**
n=	**-**	**-**	**-**	**-**	**-**	**9**	**9**	**2**

3- Scapula – Cattle (BOS)

Scapula	SLC	GLP	LG	BG				
0078/ 44 TR I	--	--	51,5	39,5	--	--	--	--
0103/ 50	--	55	46	41,5	--	--	--	--
0219/ 2	42	56,5	50,7	41,3	--	--	--	--
0698/ 4	--	69,5	59	52	--	--	--	--
0720/ 16	--	67,5	55,5	45,5	--	--	--	--
0766/ 1	--	73	63,5	52	--	--	--	--
mean val.	**--**	**64,3**	**54,4**	**45,3**	**--**	**--**	**--**	**--**
std.dev.	**--**	**8,07**	**6,29**	**5,55**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**12,5**	**11,6**	**12,2**	**--**	**--**	**--**	**--**
n=	**1**	**5**	**6**	**6**	**-**	**-**	**-**	**-**

4- Humerus – Cattle (BOS)

Humerus	Bd	BT						
0121/ 33 TR I	83,5	72,5	--	--	--	--	--	--
0258/ 52	80,5	70,8	--	--	--	--	--	--
0298/ 26	55	54,5	--	--	--	--	--	--
0698/ 413	73,2	66	--	--	--	--	--	--
0702/ 4	87,5	81	--	--	--	--	--	--
0705/ 22	83	--	--	--	--	--	--	--
6630/ 104 MIX	--	80,5	--	--	--	--	--	--
mean val.	**77,1**	**70,9**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**11,8**	**9,9**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**15,3**	**14**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**6**	**6**	**-**	**-**	**-**	**-**	**-**	**-**

5- Radius – Cattle (BOS)

Radius	Bp		Bd				BFp	BFd
0698/ 3 TR I	80	--	--	--	--	--	78	--
0698/ 412	74,2	--	--	--	--	--	69	--
0702/ 5	83	--	--	--	--	--	76	--
0702/ 6	--	--	--	--	--	--	--	72
0705/ 23	--	--	83	--	--	--	--	--
0722/ 89	79	--	--	--	--	--	71,5	--
0727/ 23	78,5	--	--	--	--	--	--	--
0727/ 24	71	--	--	--	--	--	--	--
1238/ 3	76,5	--	--	--	--	--	--	--
6535/ 1 TR II	75,5	--	--	--	--	--	69	--
6629/ 23 MIX	--	--	68,5	--	--	--	--	--
mean val.	**77,2**	**--**	**--**	**--**	**--**	**--**	**72,7**	**--**
std.dev.	**3,73**	**--**	**--**	**--**	**--**	**--**	**4,12**	**--**
coeff.var.	**4,8**	**--**	**--**	**--**	**--**	**--**	**5,7**	**--**
n=	**8**	**-**	**2**	**-**	**-**	**-**	**5**	**1**

6- Ulna – Cattle (BOS)

Ulna	BPC	DPA						
6535/ 2 TR II	45	56,5	--	--	--	--	--	--
6613/ 7	48	--	--	--	--	--	--	--

7- Os(sa) carpi (prox.) – Cattle (BOS)

Os(sa) carpi (prox.)	**B**	**D**	**L**					
0758/ 81 TR I	31	--	--	--	--	--	--	--
0759/ 13	23	38,5	--	--	--	--	--	--
0760/ 246	28,5	--	--	--	--	--	--	--
0760/ 247	26	44,5	29	--	--	--	--	--
0760/ 248	23	36,5	--	--	--	--	--	--
0760/ 251	22,5	--	--	--	--	--	--	--
6637/ 22 TR I	25,5	--	--	--	--	--	--	--
6629/ 35 MIX	23,5	40	--	--	--	--	--	--
6633/ 25	27	44	--	--	--	--	--	--
mean val.	**25,6**	**40,7**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,9**	**3,47**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**11,3**	**8,5**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**9**	**5**	**1**	**-**	**-**	**-**	**-**	**-**

8- Os(sa) carpale(ia) (dist.) – Cattle (BOS)

Os(sa) carpale(ia) (dist.)	**B**	**T**						
0759/ 12 TR I	24	36,5	--	--	--	--	--	--

9- Metacarpus – Cattle (BOS)

Metacarpus III+IV	**Bp**	**Dp**	**SD**	**Bd**	**Dd**	**GL**		
0078/ 47 TR I	--	--	--	(54,0)	27,5	--	--	--
0105/ 1	58	36,5	--	--	--	--	--	--
0107/ 24	65	38	--	--	--	--	--	--
0121/ 34	--	--	--	58	30	--	--	--
0209/ 13	--	--	--	51,5	28	--	--	--
0219/ 3	59,5	34,7	--	--	--	--	--	--
0300/ 87	--	--	--	49,1	26	--	--	--
0695/ 1	--	--	--	63,2	34	--	--	--
0699/ 87	--	--	--	49,1	26	--	--	--
0702/ 7	--	--	--	(63,0)	34,0	--	--	--
0717/ 1	(63,0)	37,5	--	--	--	--	--	--
0722/ 91	--	--	--	52	--	--	--	--
0727/ 8	--	--	--	63	33	--	--	--
0727/ 9	--	--	--	52,5	29	--	--	--
0760/ 242	54	30,5	--	--	--	--	--	--
6632/ 1 TR II	69	42	39,5	68,5	37,5	199,5	--	
6662/ 35	54,5	32	--	--	--	--	--	--
6663/ 16	--	--	--	63,5	34	--	--	--
mean val.	**60,4**	**35,9**	**--**	**57,3**	**30,8**	**--**	**--**	**--**
std.dev.	**5,54**	**3,88**	**--**	**6,7**	**3,86**	**--**	**--**	**--**
coeff.var.	**9,2**	**10,8**	**--**	**11,7**	**12,5**	**--**	**--**	**--**
n=	**7**	**7**	**1**	**12**	**11**	**1**	**-**	**-**

10- Phalanx 1, ant. – Cattle (BOS)

Phalanx 1, ant.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	**Lphys**
0219/ 1 TR I	(31,3)	28,5	29	58,7	--	--	--	54,5
TROI/ 76	30	26,5	29	63,5	31	17,5	21	56,5
TROI/ 77	28	24,1	26,4	58	--	19	--	--
TROI/ 78	--	26	30	--	--	18,1	--	--
0702/ 22	32,5	25,5	--	--	--	19	--	--
0739/ 207	--	--	29,5	--	36,5	18,5	23	--
0739/ 208	--	24,5	27,5	--	--	18	20	--
1233/ 1	28,5	23	27,5	54,5	--	--	--	--
1241/ 2	29	24,5	27	54	--	--	--	--
1856/ 16 TR II	--	--	--	--	--	--	--	55,5
6629/ 18 MIX	28,5	24	26,5	60	31	18	21,5	56,5
mean val.	**29,7**	**25,2**	**28**	**58,1**	**32,8**	**18,3**	**21,4**	**55,8**
std.dev.	**1,67**	**1,65**	**1,35**	**3,55**	**3,18**	**0,56**	**1,25**	**0,96**
coeff.var.	**5,6**	**6,6**	**4,8**	**6,1**	**9,7**	**3,1**	**5,8**	**1,7**
n=	**7**	**9**	**9**	**6**	**3**	**7**	**4**	**4**

11- Phalanx 2, ant. – Cattle (BOS)

Phalanx 2, ant.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	**Lphys**
0101/ 54 TR I	27,5	22	23,5	35	--	--	--	--
0103/ 49	27	21	22,5	35	--	--	--	--
0132/ 49	26,5	21,5	22,5	35	28	22	26	--
0295/ 71	25,5	20	21	40	29	22,2	28	31
TROI/ 75	31	25	27	44	31,5	24	(27,0)	36,2
0739/ 209	29	22,5	24	41,5	29,5	23	29,5	--
0739/ 210	--	25	23,5	--	--	27	32	--
0741/ 44	--	26,6	--	--	--	--	--	--
0742/ 14	34	27,5	29,5	35	32,5	25,5	33	--
0759/ 15	25,5	20	22	34	25,5	20,5	26,5	--
0761/ 165	32,5	26,5	29	41	33	24,5	31	--
TROI/ 70	33	27,5	29,5	46	36,8	--	--	--
1233/ 2	27,5	21,5	24,5	35,5	--	--	--	--
1858/ 7 TR II	28	21,5	22,5	34	--	--	--	31,3
1867/ 20	25,5	20	22,5	33	--	--	--	28,5
6573/ 18	27	22	--	35	--	--	--	--
6601/ 21	28	24	--	(37,0)	28,0	21,5	--	--
6601/ 22	27,5	21,5	--	35	26,5	21	27	--
6605/ 8	32,5	26,5	29	38,5	--	25,5	--	--
6668/ 17	26	20,5	21,5	34	26	21	26	--
6604/ 46 MIX	26	20	21	34,5	25,5	19	23,5	--
6629/ 19	25,5	20,5	21,5	35	26	21,5	26,5	--
mean val.	**28,3**	**22,9**	**24,3**	**36,9**	**29,1**	**22,7**	**28**	**31,8**
std.dev.	**2,79**	**2,68**	**3,09**	**3,68**	**3,49**	**2,27**	**2,81**	**3,22**
coeff.var.	**9,9**	**11,7**	**12,8**	**10**	**12**	**10**	**10**	**10,1**
n=	**20**	**22**	**18**	**20**	**13**	**14**	**12**	**4**

12- Phalanx 3, ant. – Cattle (BOS)

Phalanx 3, ant.	**GL**	**Ld**						
6601/ 33 TR II	65	51,5	--	--	--	--	--	--

13- Pelvis (Acetabula) – Cattle (BOS)

Pelvis (Acetabula)	**LA**							
0705/ 26 TR I	59,5	--	--	--	--	--	--	--
0762/ 1	66	--	--	--	--	--	--	--
0766/ 2	63	--	--	--	--	--	--	--
mean val.	**62,8**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**3,25**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**5,2**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

14- Femur – Cattle (BOS)

Femur		**DC**						
0078/ 52 TR I	--	40,5	--	--	--	--	--	--
6657/ 7 TR II	--	44	--	--	--	--	--	--

15- Patella – Cattle (BOS)

Patella	**GL**	**GB**	**BT**					
0119/ 20 TR I	62,5	(49,0)	37,0	--	--	--	--	--
0719/ 8	--	--	37,5	--	--	--	--	--
0722/ 79	57	44,5	35,5	--	--	--	--	--
mean val.	**--**	**--**	**36,7**	**--**	**--**	**--**	**--**	**--**
std.dev.	**--**	**--**	**1,04**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**2,8**	**--**	**--**	**--**	**--**	**--**
n=	**2**	**2**	**3**	**-**	**-**	**-**	**-**	**-**

16- Tibia – Cattle (BOS)

Tibia			**Bd**	**Td**				
0705/ 24 TR I	--	--	58	42,5	--	--	--	--
0739/ 233	--	--	55	39	--	--	--	--
0739/ 234	--	--	60,5	46,5	--	--	--	--
0739/ 235	--	--	--	41,5	--	--	--	--
0739/ 236	--	--	--	42	--	--	--	--
0739/ 237	--	--	67	50,5	--	--	--	--
0758/ 79	--	--	62	45	--	--	--	--
TROI/ 61	--	--	55	38	--	--	--	--
6534/ 78 TR III	--	--	59	47,5	--	--	--	--
6630/ 27 MIX	--	--	68,5	54	--	--	--	--
mean val.	**--**	**--**	**60,6**	**44,7**	**--**	**--**	**--**	**--**
std.dev.	**--**	**--**	**5,03**	**5,07**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**8,3**	**11,3**	**--**	**--**	**--**	**--**
n=	**-**	**-**	**8**	**10**	**-**	**-**	**-**	**-**

17- Astragalus – Cattle (BOS)

Astragalus	GLl	GLm	Dl	Dm	BC			
0078/ 49 TR I	64,5	59,5	35,5	33,5	44,5	--	--	--
0078/ 50	55,5	52,5	32	29,5	36	--	--	--
0078/ 51	63,5	59	34,5	31,5	39	--	--	--
0078/ 57	67,5	65,5	36,5	37,5	46	--	--	--
0078/ 58	72	67	39,5	--	47	--	--	--
0128/ 42	67	61,5	37	32	40	--	--	--
0129/ 144	67	61	37	37	41	--	--	--
0129/ 145	61,5	58	34,5	--	--	--	--	--
0133/ 101	65	60,5	38	36,5	--	--	--	--
0702/ 8	60	56	34	(33,5)	37,0	--	--	--
0736/ 1	69	--	38	38,5	--	--	--	--
0739/ 213	65,5	--	36,5	--	--	--	--	--
0741/ 38	57	52,5	31,2	30	36,8	--	--	--
0794/ 23	67	61,5	37	39,2	40,1	--	--	--
6641/ 21 TR II	69,5	--	38,5	--	--	--	--	--
6661/ 15	61,5	--	34,5	--	(41,0)	--	--	--
6630/ 24 TR III	61	58	35	35,5	39	--	--	--
6638/ 12	--	--	--	36,5	--	--	--	--
mean val.	**64,4**	**59,4**	**35,8**	**34,7**	**40,6**	**--**	**--**	**--**
std.dev.	**4,46**	**4,27**	**2,24**	**3,22**	**3,57**	**--**	**--**	**--**
coeff.var.	**6,9**	**7,2**	**6,3**	**9,3**	**8,8**	**--**	**--**	**--**
n=	**17**	**13**	**17**	**13**	**12**	**-**	**-**	**-**

18- Calcaneus – Cattle (BOS)

Calcaneus	GL	GB	GD					
0707/ 3 TR I	--	31	33,5	--	--	--	--	--
0760/ 241	--	--	55,5	--	--	--	--	--
6663/ 18 TR II	119,5	37	48	27,5	--	--	--	--
6638/ 11 MIX	--	--	54	32	--	--	--	--
mean val.	**--**	**--**	**47,8**	**--**	**--**	**--**	**--**	**--**
std.dev.	**--**	**--**	**10**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**21**	**--**	**--**	**--**	**--**	**--**
n=	**1**	**2**	**4**	**2**	**-**	**-**	**-**	**-**

19- Metatarsus – Cattle (BOS)

Metatarsus III+IV	Bp	Dp		Bd	Dd			
0078/ 48 TR I	--	--	--	47,5	26,5	--	--	--
0211/ 1	--	--	--	51	30,5	--	--	--
0219/ 4	48,4	46,8	--	--	--	--	--	--
0259 / 23	--	--	--	57,2	32,1	--	--	--
TROI/ 38	--	--	--	56,5	32,3	--	--	--
0705 / 43	--	--	--	56,5	35,4	--	--	--
0722/ 90	--	--	--	56,5	31,5	--	--	--
0758/ 78	49	--	--	--	--	--	--	--
mean val.	**--**	**--**	**--**	**54,2**	**31,4**	**--**	**--**	**--**
std.dev.	**--**	**--**	**--**	**4**	**2,9**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**--**	**7,4**	**9,2**	**--**	**--**	**--**
n=	**2**	**1**	**-**	**6**	**6**	**-**	**-**	**-**

20- Phalanx 1, post. – Cattle (BOS)

Phalanx 1, post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0715/ 39 TR I	23,5	19,5	23	54,5	30	15,5	18,5	51,5
0743/ 10	22	21,5	23,5	60,5	33	16	20	54,5
TROI/ 80	34,1	25,8	31,5	67,9	37,5	19	22,1	58,8
1226/ 0	(25,5)	22,5	25	57	--	--	--	--
1858/ 6 TR II	26	21,5	25	52	--	--	--	49
6628/ 36	27,5	20,5	25	57,5	31,5	17,5	21,5	55,5
6645/ 4	27,5	22	24	53	30	16,5	19	--
6666/ 18	25	20	22,5	53,5	29	15,5	18	51
9031/ 27	30,4	25	28,5	56,5	--	--	--	51,9
1446/ 31 TR III	29	23,5	--	59,5	--	--	--	55
6631/ 23 MIX	24,5	21,5	24,5	(51,5)	26,5	16,5	18,5	47,5
6654/ 13	24,5	21,5	24	53	28,5	14,5	18	50
mean val.	**26,6**	**22,1**	**25,1**	**56,4**	**30,8**	**16,4**	**19,5**	**52,5**
std.dev.	**3,33**	**1,89**	**2,63**	**4,66**	**3,35**	**1,38**	**1,59**	**3,43**
coeff.var.	**12,5**	**8,6**	**10,5**	**8,3**	**10,9**	**8,4**	**8,2**	**6,5**
n=	**12**	**12**	**11**	**12**	**8**	**8**	**8**	**10**

21- Phalanx 2, post. – Cattle (BOS)

Phalanx 2, post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0104/ 49 TR I	30	25,5	24,5	40	31,5	22	--	--
0715/ 38	29,5	22,5	24	40	28,5	21	27	--
0722/ 88	--	21,5	21	37,5	26	22	--	35,5
0741/ 42	31,8	26	25,2	30,6	--	--	--	--
0741/ 43	29,1	24,3	24,2	36,4	--	--	--	--
0761/ 164	25	20	--	--	25,5	--	--	--
1847/ 37 TR II	26,5	21	21	36	--	--	--	33
1864/ 14	--	23,5	--	--	--	--	--	37,5
6636/ 22	25	--	--	36,5	25,5	--	--	--
9031/ 28	30,3	25,6	26,6	35,6	--	--	--	--
1446/ 30 TR III	25,5	21	22	35,5	--	--	--	33
6609/ 57 MIX	28	23	25	33	27	22	26,5	--
mean val.	**28,1**	**23,1**	**23,7**	**36,1**	**27,3**	**21,8**	**--**	**34,8**
std.dev.	**2,44**	**2,08**	**1,96**	**2,85**	**2,34**	**0,5**	**--**	**2,18**
coeff.var.	**8,7**	**9**	**8,3**	**7,9**	**8,6**	**2,3**	**--**	**6,3**
n=	**10**	**11**	**9**	**10**	**6**	**4**	**2**	**4**

22- Phalanx 3, post. – Cattle (BOS)

Phalanx 3, post.	GL	Ld	HP					
9031/ 29 TR II	57,8	45	35	--	--	--	--	--

23- Phalanx 1 ant. or post. – Cattle (BOS)

Phalanx 1 ant. or post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0078/ 53 TR I	--	--	--	61	--	--	--	--
0098/ 64	24,5	20,5	24	52,5	28,5	16,5	18,5	49,5
0130/ 148	28	--	--	--	31,5	--	--	--
0209/ 14	31	25,5	30	60	34,5	20	23,5	55,5
TROI/ 8	24	25,5	25	55	--	--	--	50,1
0300/ 97	--	--	31,5	--	--	--	23,5	--
0698/ 453	--	25,1	27,5	59	--	19	22	54
0699/ 97	--	--	31,5	--	--	--	23,5	--
0744/ 20	29,5	--	26	58,5	--	--	--	--
0759/ 14	25	20	23	51,5	28,5	14,5	18	48,5
6534/ 82 TR III	27	23	24,5	59	32	18	20	55
6534/ 83	26,5	23	25	59	32	19	20	55
6629/ 20 MIX	--	--	--	56,5	--	--	--	--
mean val.	**26,9**	**23,2**	**26,8**	**57,2**	**31,2**	**17,8**	**21,1**	**52,5**
std.dev.	**2,47**	**2,3**	**3,16**	**3,22**	**2,32**	**2,02**	**2,3**	**3,01**
coeff.var.	**9,2**	**9,9**	**11,8**	**5,6**	**7,4**	**11,3**	**10,9**	**5,7**
n=	**8**	**7**	**10**	**10**	**6**	**6**	**8**	**77**

24- Phalanx 2 ant. or post. – Cattle (BOS)

Phalanx 2 ant. or post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0209/ 15 TR I	25	19	21	--	--	20	25	--
0300/ 125	28,5	23,5	24,5	42,5	--	24	29	34
0699/ 125	28,5	23,5	24,5	42,5	--	24	29	34
mean val.	**27,3**	**22**	**23,3**	**--**	**--**	**22,7**	**27,7**	**--**
std.dev.	**2,02**	**2,6**	**2,02**	**--**	**--**	**2,31**	**2,31**	**--**
coeff.var.	**7,4**	**11,8**	**8,7**	**--**	**--**	**10,2**	**8,3**	**--**
n=	**3**	**3**	**3**	**2**	**-**	**3**	**3**	**2**

25- Phalanx 3 ant. or post. – Cattle (BOS)

Phalanx 3 ant. or post.	**GL**	**Ld**	**HP**	**GB**	**BF**			
0211/ 2 TR I	63,5	53,5	34	--	22	--	--	--
0258/ 36	66,6	--	--	21,9	21,5	--	--	--
0259/ 22	72	--	--	30,8	24,5	--	--	--
TROI/ 73	31	25	27	44	31,5	--	--	--
0300/ 102	72,5	54,9	38,9	26	24	--	--	--
0698/ 9	78	--	--	25	22	--	--	--
0699/ 102	72,5	54,9	38,9	26	24	--	--	--
0759/ 11	63,5	50,5	20	--	--	--	--	--
0793/ 36	63	51	31,5	22,5	22,2	--	--	--
1250/ 2 TR II	62	50,5	35	21,5	--	--	--	--
1848/ 1	48	40	28	16,5	--	--	--	--
1853/ 16	58,5	--	--	19	--	--	--	--
1862/ 42	69	53	35,5	24,5	--	--	--	--
6626/ 9	57	46,5	--	--	--	--	--	--
1446/ 29 TR III	65	49,5	34	23,5	--	--	--	--
1234/ 2 MIX	78	61	35,5	26	--	--	--	--
6654/ 14	--	--	--	(20,0)	--	--	--	--
mean val.	**63,8**	**49,2**	**32,6**	**24,8**	**24**	**--**	**--**	**--**
std.dev.	**11,7**	**9,15**	**5,64**	**6,57**	**3,25**	**--**	**--**	**--**
coeff.var.	**18,4**	**18,6**	**17,3**	**26,5**	**13,6**	**--**	**--**	**--**
n=	**16**	**12**	**11**	**14**	**8**	**--**	**--**	**--**

IV- Measurements of Pig (SUS) Remains

1-Face fragment – Pig (SUS)

Face fragment (b)		LMR	LPR					
0078/ 3 TR I	--	66,5	--	--	--	--	--	--
0259 / 17	--	--	41,6	--	--	--	--	--
6629/ 56 MIX	--	(58,5)	--	--	--	--	--	--

2-Maxillary teeth – Pig (SUS)

Maxillary teeth						LM^3	BM^3	
0078/ 4 TRI	--	--	--	--	--	33,8	20,5	--
0727/ 65	--	--	--	--	--	27	17	--
1225/ 1	--	--	--	--	--	25,5	17	--
6608/ 16 TR II	--	--	--	--	--	30,5	19	--
6572/ 51 TR III	--	--	--	--	--	31	18,5	--
mean val.	**--**	**--**	**--**	**--**	**--**	**29,6**	**18,1**	**--**
std.dev.	**--**	**--**	**--**	**--**	**--**	**2,97**	**1,53**	**--**
coeff.var.	**--**	**--**	**--**	**--**	**--**	**10**	**8,5**	**--**
n=	**-**	**-**	**-**	**-**	**-**	**5**	**5**	**-**

3-Mandible – Pig (SUS)

Mandible (a)			LPR					
6541/ 1 TR II	--	--	48,5	--	--	--	--	--

4-Mandibular teeth – Pig (SUS)

Mandibular teeth						LM_3	BM_3	HM_3
0078/ 5 TR I	--	--	--	--	--	--	--	15,5
0078/ 6	--	--	--	--	--	--	--	16
0078/ 7	--	--	--	--	--	--	--	16,5
0078/ 62	--	--	--	--	--	--	--	15,5
0219/ 38	--	--	--	--	--	30	14,2	--
0292/ 19	--	--	--	--	--	--	--	14
0724/ 43	--	--	--	--	--	--	--	19,5
0727/ 63	--	--	--	--	--	29	16,5	--
9033/ 16	--	--	--	--	--	29	14,5	--
6535/ 128 TR II	--	--	--	--	--	--	--	18,0
6535/ 129	--	--	--	--	--	--	--	18,4
6535/ 134	--	--	--	--	--	--	--	19,0
6559/ 64	--	--	--	--	--	--	--	18,7
6613/ 11	--	--	--	--	--	--	--	18,0

4—*cont*. Mandibular teeth – Pig (SUS)

Mandibular teeth						**LM_3**	**BM_3**	**HM_3**
1446/ 14 TR III	--	--	--	--	--	--	--	16,5
6534/ 284	--	--	--	--	--	25	16	--
6534/ 286	--	--	--	--	--	--	--	--
6534/ 288	--	--	--	--	--	--	--	15,5
6534/ 290	--	--	--	--	--	--	--	17,0
6534/ 292	--	--	--	--	--	--	--	17,2
6534/ 304	--	--	--	--	--	--	--	16
6536/ 8	--	--	--	--	--	--	--	18,9
6537/ 21	--	--	--	--	--	--	--	18,8
6538/ 19	--	--	--	--	--	--	--	18,4
6576/ 61	--	--	--	--	--	32	15	--
0082/ 7 MIX	--	--	--	--	--	--	--	16,5
6630/ 41	--	--	--	--	--	--	--	19,5
6630/ 96	--	--	--	--	--	(32,5)	14,5	--
mean val.	**--**	**--**	**--**	**--**	**--**	**29,6**	**15,1**	**17,3**
std.dev.	**--**	**--**	**--**	**--**	**--**	**2,69**	**0,93**	**1,56**
coeff.var.	**--**	**--**	**--**	**--**	**--**	**9,1**	**6,1**	**9**
n=	**-**	**--**	**--**	**-**	**-**	**6**	**6**	**21**

5-Scapula – Pig (SUS)

Scapula	**SLC**	**GLP**	**LG**	**BG**				
0114/ 78 TR I	--	32	--	22,5	--	--	--	--
0219/ 33	22,3	30,7	--	20,2	--	--	--	--
0300/ 77	20	30	--	19,5	--	--	--	--
TROI/ 7	19,5	32	--	17,5	--	--	--	--
0699/ 77	20	30	--	19,5	--	--	--	--
0739/ 127	22	36	--	25,5	--	--	--	--
0747/ 51	--	36	26,5	27	--	--	--	--
TROI/ 46	--	33,5	--	22,5	--	--	--	--
0790/ 16	21,5	35	--	22,8	--	--	--	--
0795/ 36	23	35	--	23	--	--	--	--
1874/ 4 TR II	23	35,5	--	22	--	--	--	--
6535/ 46	20	30,5	--	20	--	--	--	--
6534/ 212 TR III	20	30,5	--	18,5	--	--	--	--
6631/ 70 MIX	22	--	--	--	--	--	--	--
mean val.	**21,3**	**32,9**	**--**	**21,6**	**--**	**--**	**--**	**--**
std.dev.	**1,29**	**2,34**	**--**	**2,62**	**--**	**--**	**--**	**--**
coeff.var.	**6,1**	**7,1**	**--**	**12,2**	**--**	**--**	**--**	**--**
n=	**12**	**14**	**1**	**14**	**-**	**-**	**-**	**-**

6-Humerus – Pig (SUS)

Humerus	Bd	BT	SD					
0209/ 9 TR I	36	--	--	--	--	--	--	--
0209/ 10	41	--	--	--	--	--	--	--
0292/ 20	36	30,8	--	--	--	--	--	--
0295/ 29	33	31,5	--	--	--	--	--	--
0695/ 7	38	32,5	--	--	--	--	--	--
0705/ 140	37,5	29	17	--	--	--	--	--
0705/ 141	37	28	14,5	--	--	--	--	--
0720/ 165	34,5	26,5	--	--	--	--	--	--
0741/ 6	38	30	--	--	--	--	--	--
TROI/ 47	39	32	--	--	--	--	--	--
6571/ 9 TR II	37,5	30,5	15	--	--	--	--	--
6534/ 219 TR III	41	34,5	--	--	--	--	--	--
6609/ 1 MIX	(37,0)	--	15	--	--	--	--	--
mean val.	**37,3**	**30,5**	**15,4**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,26**	**2,31**	**1,11**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**6**	**7,6**	**7,2**	**--**	**--**	**--**	**--**	**--**
n=	**13**	**10**	**4**	**-**	**-**	**-**	**-**	**-**

7-Radius – Pig (SUS)

Radius	Bp	SD					BFp	
0078/ 63 TR I	27,5	--	--	--	--	--	--	--
0117/ 1	25,5	14,5	--	--	--	--	--	--
0129/ 4	27	--	--	--	--	--	--	--
0130/ 116	26,5	--	--	--	--	--	--	--
0219/ 36	24,8	--	--	--	--	--	--	--
0290/ 34	30,6	--	--	--	--	--	--	--
TROI/ 26	24	--	--	--	--	--	--	--
TROI/ 28	29,5	--	--	--	--	--	--	--
0725/ 25	27,5	--	--	--	--	--	27,5	--
0792/ 6	22,8	--	--	--	--	--	--	--
6617/ 10 TR II	25,5	15	--	--	--	--	--	--
6663/ 31	26,5	--	--	--	--	--	--	--
1234/ 1 MIX	25	--	--	--	--	--	--	--
6631/ 72	26	--	--	--	--	--	--	--
mean val.	**26,3**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,06**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**7,8**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**14**	**2**	**-**	**-**	**-**	**-**	**1**	**-**

8-Ulna – Pig (SUS)

Ulna	BPC	DPA						
0720/ 149 TR I	18,5	28,5	--	--	--	--	--	--
0730/ 10	22	34,5	--	--	--	--	--	--
6636/ 28 TR II	17,5	--	--	--	--	--	--	--
0106/ 13 MIX	20,5	31,5	--	--	--	--	--	--
mean val.	**19,6**	**31,5**	--	--	--	--	--	--
std.dev.	**2,02**	**3**	--	--	--	--	--	--
coeff.var.	**10,3**	**9,5**	--	--	--	--	--	--
n=	**4**	**3**	-	-	-	-	-	-

9-Metacarpus III – Pig (SUS)

Metacarpus III	Bp	Dp	SD	Bd	Dd	GL	DD	
0078/ 9 TR I	--	--	12	15	16,5	73,5	--	--
0128/ 4	--	--	13	16	15	64	--	--
0211/ 3	16	--	12,5	--	--	66	--	--
0300/ 80	20,5	16,4	--	15	--	65,9	10	--
0698/ 48	22,5	18	--	--	--	--	--	--
0698/ 398	20	--	13	17	20,5	75,5	10	--
0699/ 80	20,5	16,4	17,9	15	--	65,9	10	--
0715/ 66	--	--	13,5	15	15	65	--	--
0727/ 38	--	--	10	14,5	15	76,5	--	--
0727/ 39	15,5	--	11	14,5	16	75,5	--	--
0795/ 32	21,1	15	--	--	--	--	--	--
6535/ 66 TR II	16,5	17,5	12	15	15	64	--	--
6534/ 271 TR III	16	17	13,5	15	14,5	64,5	--	--
6534/ 275	15	15	--	--	--	--	--	--
6609/ 127 MIX	--	17	--	--	--	--	--	--
mean val.	**18,4**	**16,5**	**12,8**	**15,2**	**15,9**	**68,8**	**10**	**--**
std.dev.	**2,8**	**1,09**	**2,1**	**0,75**	**1,95**	**5,24**	**0**	**--**
coeff.var.	**15,3**	**6,6**	**16,3**	**5**	**12,3**	**7,6**	**0**	**--**
n=	**10**	**8**	**10**	**10**	**8**	**11**	**3**	**-**

10-Metacarpus IV – Pig (SUS)

Metacarpus IV	Bp	Dp	SD	Bd	Dd	GL		
0078/ 2 TR I	--	--	11,5	15	16	69,5	--	--
0078/ 8	--	--	11	14,5	14,5	68,5	--	--
0129/ 43	--	--	9	15	15,5	67,5	--	--
0259/ 19	13,7	13,5	--	--	--	--	--	--
0693/ 4	16,1	16	13	17	--	72	--	--
TROI/ 51	15	16	--	--	--	--	--	--
6535/ 67 TR II	15	14	11,5	14,5	15,5	66,5	--	--
6606/ 18	14	13,5	--	--	--	--	--	--
6534/ 272 TR III	15,5	14,5	12	15	15,5	66	--	--
mean val.	**14,9**	**14,6**	**11,3**	**15,2**	**15,4**	**68,3**	**--**	**--**
std.dev.	**0,9**	**1,16**	**1,33**	**0,93**	**0,55**	**2,21**	**--**	**--**
coeff.var.	**6,1**	**7,9**	**11,7**	**6,1**	**3,6**	**3,2**	**--**	**--**
n=	**6**	**6**	**6**	**6**	**5**	**6**	**-**	**-**

11- Pelvis – Pig (SUS)

Pelvis (Acetabula)	**LA**	**LAR**					
0294/ 18 TR I	31	24	--	--	--	--	--	--
0720/ 119	29	26	--	--	--	--	--	--
0739/ 137	30,5	29,5	--	--	--	--	--	--
6535/ 42 TR II	26	--	--	--	--	--	--	--
6534/ 221 TR III	31,5	--	--	--	--	--	--	--
0082/ 4 MIX	28	--	--	--	--	--	--	--
mean val.	**29,3**	**26,5**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,09**	**2,78**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**7,1**	**10,5**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**6**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

12-Femur – Pig (SUS)

Femur		**DC**	**SD**	**Bd**	**BTP**			
0078/ 12 TR I	--	26	--	--	--	--	--	--
0300/ 147	--	--	--	41	--	--	--	--
0699/ 147	--	--	--	41	--	--	--	--
6535/ 48 MIX	--	--	17,5	42,5	21,5	--	--	--
mean val.	**--**	**--**	**--**	**41,5**	**--**	**--**	**--**	**--**
std.dev.	**--**	**--**	**--**	**0,87**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**--**	**2,1**	**--**	**--**	**--**	**--**
n=	**-**	**1**	**1**	**3**	**1**	**-**	**-**	**-**

13- Patella – Pig (SUS)

Patella	**GL**	**GB**	**GD**					
0705/ 142 TR I	32	20	21,5	--	--	--	--	--

14-Tibia – Pig (SUS)

Tibia		**SD**	**Bd**	**Dd**				
0259/ 16 TR I	--	--	26,8	21	--	--	--	--
TROI/ 27	--	--	34	--	--	--	--	--
0696/ 4	--	--	28	22,1	--	--	--	--
0698/ 35	--	--	28,5	25,1	--	--	--	--
0705/ 144	--	20	28	25	--	--	--	--
0722/ 33	--	--	29,5	25,5	--	--	--	--
0727/ 46	--	--	29,5	24	--	--	--	--
0792/ 5	--	--	27	22,5	--	--	--	--
6606/ 7 TR II	--	--	26,5	21,5	--	--	--	--
6663/ 29	--	--	29,5	26	--	--	--	--
6663/ 30	--	--	(30,5)	--	--	--	--	--
mean val.	**--**	**--**	**28,9**	**23,6**	**--**	**--**	**--**	**--**
std.dev.	**--**	**--**	**2,13**	**1,88**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**7,4**	**8**	**--**	**--**	**--**	**--**
n=	**-**	**1**	**11**	**9**	**-**	**-**	**-**	**-**

15- Astragalus – Pig (SUS)

Astragalus	GLl	GLm	Dl	Dm	BC			
0104/ 42 TR I	36	32	18	19,5	21,5	--	--	--
0123/ 15	36,5	34	18,5	20,5	22,5	--	--	--
0130/ 117	35,5	33,5	18	19	22	--	--	--
0705/ 146	36	34	19	21,5	24	--	--	--
0715/ 42	35,5	34	18	22	24,5	--	--	--
0720/ 174	36,5	34	19	21,5	23	--	--	--
0739/ 156	35,5	34,5	19	21,5	22	--	--	--
1864/ 32 TR II	33,5	--	17,5	--	20	--	--	--
6529/ 23	35,4	--	18,7	--	--	--	--	--
6534/ 237 TR III	37	35,5	19,5	21	22	--	--	--
0082/ 5 MIX	36,5	32	19	20	22	--	--	--
0082/ 6	42	36	21,5	23	26,5	--	--	--
6630/ 164	41	36,5	21	23	22,5	--	--	--
6635/ 43	37	34	19,5	--	23	--	--	--
6664/ 31	39	34	20	--	25	--	--	--
mean val.	**36,9**	**34,2**	**19,1**	**21,1**	**22,9**	**--**	**--**	**--**
std.dev.	**2,22**	**1,31**	**1,11**	**1,31**	**1,64**	**--**	**--**	**--**
coeff.var.	**6**	**3,8**	**5,8**	**6,2**	**7,2**	**--**	**--**	**--**
n=	**15**	**13**	**15**	**11**	**14**	**-**	**-**	**-**

16- Calcaneus – Pig (SUS)

Calcaneus	GL	GB	GD					
0698/ 45 TR I	--	28,3	22	--	--	--	--	--
0722/ 46	73,5	20	26,5	--	--	--	--	--
0729/ 1	79,5	21,5	28	--	--	--	--	--
6606/ 8 TR II	80	25	30,5	18,5	--	--	--	--
6572/ 25 TR III	64,5	19,5	24,5	--	--	--	--	--
mean val.	**74,4**	**22,9**	**26,3**	**--**	--	--	--	--
std.dev.	**7,22**	**3,72**	**3,25**	**--**	--	--	--	--
coeff.var.	**9,7**	**16,3**	**12,4**	**--**	--	--	--	--
n=	**4**	**5**	**5**	**1**	-	-	-	-

17-Metatarsus III – Pig (SUS)

Metatarsus III	Bp	Dp	SD	Bd	Dd	GLl	GL	DD
0209/ 8 TR I	15,5	21,5	12,5	17	16,5	71	78,5	10
TROI/ 10	15	18	--	--	--	--	--	--
1873/ 7 TR II	13,5	19	10,5	13	14,5	70,5	72,5	--
6534/ 276 TR III	15	20,5	12,5	14,5	15,5	--	71,5	--
0082/ 3 MIX	--	--	14	15,5	16,5	--	83,5	--
mean val.	**14,8**	**19,8**	**12,4**	**15**	**15,8**	**--**	**76,5**	**--**
std.dev.	**0,87**	**1,55**	**1,44**	**1,68**	**0,96**	**--**	**5,6**	**--**
coeff.var.	**5,9**	**7,9**	**11,6**	**11,2**	**6,1**	**--**	**7,3**	**--**
n=	**4**	**4**	**4**	**4**	**4**	**2**	**4**	**1**

18-Metatarsus IV – Pig (SUS)

Metatarsus IV	Bp	Dp	SD	Bd	Dd	GLl	GL	DD
0114/ 84 TR I	15	22,5	11	--	--	--	--	--
0294/ 37	19,1	20	12	--	--	--	--	10
1254/ 1	15	23,5	12	16,5	17	75,5	82	--
6534/ 277 TR III	13,5	21,5	--	--	--	--	--	--
6536/ 7	15,5	22	12	15	16,5	76	--	--
6654/ 78 MIX	14	21,5	--	--	--	--	--	--
6664/ 43	16	24	--	--	--	--	--	--
6675/ 9	15	20,5	--	--	--	--	--	--
mean val.	**15,4**	**21,9**	**11,8**	**--**	**--**	**--**	**--**	**--**
std.dev.	**1,69**	**1,37**	**0,5**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**11**	**6,3**	**4,3**	**--**	**--**	**--**	**--**	**--**
n=	**8**	**8**	**4**	**2**	**2**	**2**	**1**	**1**

19-Phalanx 1 ant. or post. – Pig (SUS)

Phalanx 1 ant. or post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0078/ 10 TR I	16,5	13,5	14	36	--	--	--	--
0114/ 74	18	14	15,5	30,5	17	10,5	12	--
0129/ 41	15,5	12,5	--	--	17,5	--	--	--
0290/ 77	16,9	13,2	14,8	35,8	15,8	10,3	9,8	34,2
0290/ 78	16	12,5	14,3	31,3	14,5	9,6	10,2	29,5
TROI/ 25	14,5	11	12,5	29,5	14	9,8	12,5	27,5
0697/ 2	17	14,2	15	36,5	17,5	10	10,5	35
0698/ 403	14,5	13	13,5	31	15	8	9,2	29,9
0727/ 37	15,5	11,5	14	33	15	8,5	9,5	--
0744/ 35	16	13	15	27,5	--	--	--	--
0760/ 67	18	13	16,5	37	19	10	11	36
0789/ 6	15,5	11,3	15	33,2	--	9,5	9,5	30,2
6535/ 58 TR II	15,5	12	14,5	30	--	--	--	--
6559/ 53	15	11	13,5	33	--	--	--	--
6607/ 50	--	10,5	12,5	30	--	7,5	8	--
0326/ 5 TR III	15,5	12,5	14,5	33,5	--	--	--	--
6534/ 228	16	12,5	14,5	32	17	9,5	9,5	31
6550/ 4	16	12,5	14,5	34,5	--	--	--	--
6572/ 4	14,5	11,5	13	37,5	--	--	--	--
6572/ 5	13,5	11	12	37	--	--	--	--
0106/ 11 MIX	14,5	12,5	13	28	13,5	7,5	8,5	26,5
6609/ 64	16	11,5	13,5	29	15,5	8	9,5	28
6630/ 47	16	13	15	31	15,5	9,5	11,5	29,5
6631/ 79	16	12	--	30	15	8,5	--	--
mean val.	**15,8**	**12,3**	**14,1**	**32,5**	**15,8**	**9,1**	**10,1**	**30,7**
std.dev.	**1,09**	**0,99**	**1,09**	**3,06**	**1,55**	**1,02**	**1,29**	**3,13**
coeff.var.	**6,9**	**8**	**7,8**	**9,4**	**9,8**	**11,2**	**12,8**	**10,2**
n=	**23**	**24**	**22**	**23**	**14**	**15**	**14**	**11**

20-Phalanx 2 ant. or post. – Pig (SUS)

Phalanx 2 ant. or post.	Bp	SD	Bd	GL	Dp	DD	Dd	Lphys
0078/ 11 TR I	17	14,5	14,5	20	--	--	--	--
0085/ 4	14	11	12	20	14	11,5	12	--
0698/ 56	15,5	13,5	13,7	21,8	14,5	10,3	12	18,1
0720/ 176	16,5	12	15,5	23	16,5	9,5	--	--
0720/ 177	17	12,5	14	29	14,5	8,5	11	--
0722/ 58	15,5	12	13,5	23,5	15	10	15,5	19,5
0782/ 29	15	12,1	12	21	13,8	9,5	12,3	17,4
1446/ 32 TR III	17,5	15	16	24	--	--	--	21,5
6534/ 233	14,5	12,5	13	--	14	9	--	--
6543/ 22	17	14,5	15,5	20,5	--	--	--	--
0106/ 10 MIX	13	9,5	11	22,5	14	10,5	12	--
mean val.	**15,7**	**12,6**	**13,7**	**22,5**	**14,5**	**9,9**	**12,5**	**19,1**
std.dev.	**1,45**	**1,64**	**1,62**	**2,69**	**0,88**	**0,94**	**1,55**	**1,81**
coeff.var.	**9,3**	**13**	**11,8**	**11,9**	**6,1**	**9,5**	**12,4**	**9,5**
n=	**11**	**11**	**11**	**10**	**8**	**8**	**6**	**4**

21-Phalanx 3 ant. or post. – Pig (SUS)

Phalanx 3 ant. or post.	GL	Ld	HP	GB	BF			
0120/ 37 TR I	29,5	28	--	13	--	--	--	--
0129/ 45	28,5	26,5	--	--	--	--	--	--
0760/ 61	33	31	14	--	--	--	--	--
0782/ 30	26	26	15	13,2	14	--	--	--
0787/ 10	32	31,5	19,5	14,1	12,6	--	--	--
6535/ 65 TR II	28	27	--	--	--	--	--	--
6626/ 13	30	27,5	--	--	--	--	--	--
6534/ 235 TR III	25,5	25	--	--	--	--	--	--
6534/ 236	24,8	22,5	--	--	--	--	--	--
6572/ 102	26,5	25,5	--	--	--	--	--	--
mean val.	**28,4**	**27**	**16,2**	**13,4**	**--**	**--**	**--**	**--**
std.dev.	**2,76**	**2,69**	**2,93**	**0,59**	**--**	**--**	**--**	**--**
coeff.var.	**9,7**	**10**	**18,1**	**4,4**	**--**	**--**	**--**	**--**
n=	**10**	**10**	**3**	**3**	**2**	**-**	**-**	**-**

22-Atlas – Pig (SUS)

Atlas	GB	BFcr	BFcd	GL	GLF	Hcan		
0078/ 1 TR I	--	--	--	--	--	23	--	--
0101/ 48	68	47	39,5	36,5	33,5	--	--	--
0702/ 38	--	53	44,5	--	36,5	23,5	--	--
6536/ 6 TR III	67	51,5	44	37	--	22,5	--	--
6575/ 41	--	54	47,5	--	38,5	23,5	--	--
6654/ 71 MIX	--	(55,0)	--	--	--	21	--	--
mean val.	**--**	**52,1**	**43,9**	**--**	**36,2**	**22,7**	--	--
std.dev.	**--**	**3,13**	**3,3**	**--**	**2,52**	**1,04**	--	--
coeff.var.	**--**	**6**	**7,5**	**--**	**7**	**4,6**	--	--
n=	**2**	**5**	**4**	**2**	**3**	**5**	**-**	**-**

23-Epistropheus – Pig (SUS)

Epistropheus	BFcr							
0112/ 3 TR I	46,5	--	--	--	--	--	--	--

IV- Measurements of Dog (CANIS) Remains

1-Mandible – Dog (CANIS)

Mandible (a)		**LMR**						
1243/ 1 TR I	--	30	--	--	--	--	--	--

2- Mandibular teeth– Dog (CANIS)

Mandibular teeth						**LM1**	**BM1**	
1243/ 1 TR I	--	--	--	--	--	17,5	8	--

3- Scapula– Dog (CANIS)

Scapula	**SLC**	**GLP**	**LG**	**BG**				
0760/ 263 TR I	19	24	21	15	--	--	--	--

4- Humerus– Dog (CANIS)

Humerus	**Bd**							
0698/ 200 TR I	28,7	--	--	--	--	--	--	--
0760/ 271	25,5	--	--	--	--	--	--	--

5- Radius– Dog (CANIS)

Radius			**Bd**					
6630/ 37 MIX	--	--	19,5	--	--	--	--	--

6- Ulna– Dog (CANIS)

Ulna	**BPC**	**DPA**						
1250/ 1 TR II	15,5	20	--	--	--	--	--	--

7- Phalanx 1, ant. – Dog (CANIS)

Phalanx 1, ant.	**Bp**	**KD**	**Bd**	**GL**				
0760/ 268 TR I	7,5	5	6,5	24,5	--	--	--	
0760/ 269	7,5	4,5	6	24,5	--	--	--	
0760/ 270	7,5	4,5	6	20,5	--	--	--	
mean val.	**7,5**	**4,7**	**6,2**	**23,2**	**--**	--	--	--
std.dev.	**0**	**0,29**	**0,29**	**2,31**	**--**	--	--	--
coeff.var.	**0**	**6,2**	**4,7**	**10**	**--**	--	--	--
n=	**3**	**3**	**3**	**3**	**-**	-	-	-

8- Pelvis– Dog (CANIS)

Pelvis (Acetabula)	**LA**							
0082/ 71 MIX	22,5	--	--	--	--	--	--	--

9- Tibia– Dog (CANIS)

Tibia			Bd	Td				
1855/ 21 TR II	--	--	18,5	14	--	--	--	--

10- Astragalus– Dog (CANIS)

Astragalus	GLl							
0292/ 12 TR I	25,8	--	--	--	--	--	--	--

11- Calcaneus– Dog (CANIS)

Calcaneus	GL		GT	LFd				
0766/ 3 TR I	42	--	18	11,5	--	--	--	--

12- Metatarsus– Dog (CANIS)

Metatarsus II*		Tp					GL	
0760/ 264 TR I	--	6,5	--	--	--	--	63	--
Metatarsus III*		**Tp**					**GL**	
0760/ 265 TR I	--	7,5	--	--	--	--	71	--
Metatarsus IV*		**Tp**					**GL**	
0760/ 266 TR I	--	8	--	--	--	--	69	--
Metatarsus V*		**Tp**					**GL**	
0760/ 267 TR I	--	8	--	--	--	--	61	--

*same individual

13- Phalanx 1 ant. or post. – Dog (CANIS)

Phalanx 1 ant. or post.	Bp	KD	Bd	GL				
0098/ 80 TR I	8,7	5,8	7,3	25,8	--	--	--	--
0114/ 106	8,6	5	7,6	23,4	--	--	--	--

B - Measurements of Wild Animals

I - Measurements of Hare, *Lepus europaeus* Remains

1-Mandible - Hare, *Lepus europaeus*

Mandible (b)	**L**							
0759/ 116 TR I	20	--	--	--	--	--	--	--

2- Scapula - Hare, *Lepus europaeus*

Scapula	**SLC**	**GLP**		**BG**				
0078/ 55 TR I	7	--	--	--	--	--	--	--
0078/ 56	7,5	12,5	--	11,5	--	--	--	--
0761/ 241	7	14,5	--	11,5	--	--	--	--
1862/ 40 TR II	8	14	--	11,5	--	--	--	--
mean val.	**7,4**	**13,7**	**--**	**11,5**	**--**	**--**	**--**	**--**
std.dev.	**0,48**	**1,04**	**--**	**0**	**--**	**--**	**--**	**--**
coeff.var.	**6,5**	**7,6**	**--**	**0**	**--**	**--**	**--**	**--**
n=	**4**	**3**	**-**	**3**	**-**	**-**	**-**	**-**

3- Humerus - Hare, *Lepus europaeus*

Humerus	**Bd**							
0760/ 272 TR I	12	--	--	--	--	--	--	--
6660/ 25 TR II	11,5	--	--	--	--	--	--	--
1446/ 55 TR III	11,5	--	--	--	--	--	--	--
mean val.	**11,7**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**0,29**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**2,5**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

4- Radius - Hare, *Lepus europaeus*

Radius	**Bp**	**SD**	**Bd**					
TROI/144 TR I	--	--	10,2	--	--	--	--	--
0760/ 273	10	6	--	--	--	--	--	--
0785/ 20	9,5	--	--	--	--	--	--	--
0082/ 68 MIX	9	5	--	--	--	--	--	--
0082/ 69	9,5	5,5	--	--	--	--	--	--
mean val.	**9,5**	**5,5**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**0,41**	**0,5**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**4,3**	**9,1**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**4**	**3**	**1**	**-**	**-**	**-**	**-**	**-**

5- Ulna - Hare, *Lepus europaeus*

Ulna	BPC	DPA	SDO					
TROI/ 145 TR I	9,2	12,5	12,5	--	--	--	--	--
0747/ 83	8,5	13	--	--	--	--	--	--
1846/ 31 TR II	7,5	11,8	--	--	--	--	--	--
6613/ 1	9	11,5	12	--	--	--	--	--
mean val.	**8,6**	**12,2**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**0,76**	**0,68**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**8,9**	**5,6**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**4**	**4**	**2**	**-**	**-**	**1**	**-**	**-**

6- Metacarpus - Hare, *Lepus europaeus*

Metacarpus IV	Bp	Dp	SD	Bd	Dd	GL	DD	
0745/ 2 TR I	4	5	3	5	4	27	2	--

7- Pelvis - Hare, *Lepus europaeus*

Pelvis (Acetabula)	LA	LAR						
1874/ 67 TR II	11,5	--	--	--	--	--	--	--
6678/ 18	12	12	--	--	--	--	--	--
1446/ 54 TR III	11,5	--	--	--	--	--	--	--
6664/ 38 MIX	13	12,5	--	--	--	--	--	--
mean val.	**12**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**0,71**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**5,9**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**

8- Femur - Hare, *Lepus europaeus*

Femur				Bd	BTP			
0259/ 54 TR I	--	--	--	20,4	--	--	--	--
0300/ 146	--	--	--	20,5	--	--	--	--
0699/ 146	--	--	--	20,5	--	--	--	--
2246/ 1	--	--	--	19,7	--	--	--	--
6564/ 111 MIX	--	--	--	20,5	7,5	--	--	--
mean val.	**--**	**--**	**--**	**20,3**	**--**	**--**	**--**	**--**
std.dev.	**--**	**--**	**--**	**0,35**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**--**	**1,7**	**--**	**--**	**--**	**--**
n=	**-**	**-**	**-**	**5**	**1**	**-**	**-**	**-**

9- Tibia - Hare, *Lepus europaeus*

Tibia	**Bp**	**SD**	**Bd**	**Dd**	**GL**			
0259/ 40 TR I	20,4	7,9	15,9	(10,2)	137,8	--	--	--
0741/ 80	--	--	16	9,5	--	--	--	--
1860/ 17 TR II	(21,0)	8,0	15,5	10	147	--	--	--
6601/ 5	--	--	14,5	9,5	--	--	--	--
0082/ 67 MIX	21,5	--	--	--	--	--	--	--
mean val.	**21**	**--**	**15,5**	**9,8**	**--**	**--**	**--**	**--**
std.dev.	**0,55**	**--**	**0,68**	**0,36**	**--**	**--**	**--**	**--**
coeff.var.	**2,6**	**--**	**4,4**	**3,6**	**--**	**--**	**--**	**--**
n=	**3**	**2**	**4**	**4**	**2**	**-**	**-**	**-**

10- Calcaneus - Hare, *Lepus europaeus*

Calcaneus	**GL**	**GB**	**GD**					
0082/ 70 MIX	33	13	12,5	--	--	--	--	--

11- Metatarsus - Hare, *Lepus europaeus*

Metatarsus III*			**SD**				**GL**	
0759/ 19 TR I	--	--	6	--	--	--	56	
Metatarsus IV*			**SD**				**GL**	
0759/ 20 TR I	--	--	6	--	--	--	54	-
Metatarsus V*			**SD**				**GL**	
0759/ 18 TR I	--	--	5	--	--	--	48,5	-

*same individual

II- Measurements of Fox, *Vulpes vulpes* Remains

1-Mandibular teeth - Fox, *Vulpes vulpes*

Mandibular teeth						**LM_1**	**BM_1**	
2246/ 3 TR I	--	--	--	--	--	15,6	5,7	--

2-Scapula - Fox, *Vulpes vulpes*

Scapula		**GLP**		**BG**				
1871/ 7 TR II	--	18	--	11	--	--	--	--

3-Femur - Fox, *Vulpes vulpes*

Femur				**Bd**	**BTP**			
6644/ 21 TR II	--	--	--	20	10,5	--	--	--

III- Measurements of Roe Deer, *Capreolus capreolus* Remains

1-Radius - Roe Deer, *Capreolus capreolus*

Radius	**Bp**							
TROI/ 102 TR I	25	--	--	--	--	--	--	--

2-Tibia - Roe Deer, *Capreolus capreolus*

Tibia	**Bp**		**Dd**	**DD**				
0078/ 37 TR I	39,5	--	--	--	--	--	--	--
9033/ 7	--	--	27,6	19,5	--	--	--	--

IV- Measurements of Fallow Deer, *Dama dama* Remains

1-Face fragment - Fallow Deer, *Dama dama*

Face fragment (b)		**LMR**						
0717/ 13 TR I	--	53,5	--	--	--	--	--	--

2-Mandible - Fallow Deer, *Dama dama*

Mandible (a)	**LZR**	**LMR**	**LPR**				**HM_1**	
1873/ 36 TR II	--	--	37,2	--	--	--	--	--
6634/ 21	84,5	52	48	--	--	--	23,5	--

3-Mandibular teeth - Fallow Deer, *Dama dama*

Mandibular teeth						**LM_3**	**BM_3**	**HM_3**
6634/ 22 TR II	--	--	--	--	--	22,5	11	--

4- Scapula - Fallow Deer, *Dama dama*

Scapula	**SLC**	**GLP**	**LG**	**BG**				
1873/ 26 TR II	23	45	34,5	31,5	--	--	--	--
6571/ 54	--	--	--	28,5	--	--	--	--
6562/ 28 TR III	--	--	37	31,5	--	--	--	--
0106/ 6	25	--	--	--	--	--	--	--
mean val.	**--**	**--**	**--**	**30,5**	**--**	**--**	**--**	**--**
std.dev.	**--**	**--**	**--**	**1,73**	**--**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**--**	**5,7**	**--**	**--**	**--**	**--**
n=	**2**	**1**	**2**	**3**	**-**	**-**	**-**	**-**

5-Humerus - Fallow Deer, *Dama dama*

Humerus	**Bd**	**BT**						
0078/ 59 TR I	31	30	--	--	--	--	--	--
0259/ 14	43,2	39,3	--	--	--	--	--	--
0698/ 194	40	--	--	--	--	--	--	--
0739/ 184	39	32,5	--	--	--	--	--	--
1453/ 3 TR III	--	38,5	--	--	--	--	--	--
mean val.	**38,3**	**35,1**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**5,19**	**4,54**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**13,5**	**13**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**4**	**4**	**-**	**-**	**-**	**-**	**-**	**-**

6-Radius - Fallow Deer, *Dama dama*

Radius	**Bp**	**SD**	**Bd**				**BFp**	
0698/ 207 TR I	35,2	--	--	--	--	--	--	--
0739/ 185	44	--	--	--	--	--	--	--
0758/ 181	--	--	32	--	--	--	--	--
1873/ 33 TR II	43	--	--	--	--	--	40	--
6643/ 13	42,5	--	--	--	--	--	38,5	--
6553/ 1 TR III	40	22	--	--	--	--	35	--
6631/ 43 MIX	42	--	--	--	--	--	39,5	--
mean val.	**41,1**	**--**	**--**	**--**	**--**	**--**	**38,3**	**--**
std.dev.	**3,19**	**--**	**--**	**--**	**--**	**--**	**2,25**	**--**
coeff.var.	**7,8**	**--**	**--**	**--**	**--**	**--**	**5,9**	**--**
n=	**6**	**1**	**1**	**-**	**-**	**-**	**4**	**-**

7-Ulna - Fallow Deer, *Dama dama*

Ulna	**BPC**	**DPA**	**SDO**					
1880/ 22 TR II	20	32,5	--	--	--	--	--	--
6608/ 4	19,5	--	--	--	--	--	--	--
6643/ 14	--	39,5	36,5	--	--	--	--	--

8-Os(sa) carpale(ia) (dist.) - Fallow Deer, *Dama dama*

Os(sa) carpale(ia) (dist.)	**B**	**D**						
6601/ 34 TR II	16,5	19,5	--	--	--	--	--	--

9-Metacarpus - Fallow Deer, *Dama dama*

Metacarpus III+IV	**Bp**	**Dp**	**SD**	**Bd**	**Dd**	**GL**		
0739/ 180 TR I	--	--	--	32	18,5	--	--	--
0741/ 22	28	20,2	--	--	--	--	--	--
1443/ 1 TR II	--	--	19	31	20	--	--	--
1477/ 1	28	20	18	--	--	--	--	--
0082/ 8 MIX	27,5	19	16	28	19	191,5	--	--
0082/ 9	--	--	--	32	20	--	--	--
mean val.	**27,8**	**19,7**	**17,7**	**30,8**	**19,4**	**--**	**--**	**--**
std.dev.	**0,29**	**0,64**	**1,53**	**1,89**	**0,75**	**--**	**--**	**--**
coeff.var.	**1**	**3,3**	**8,6**	**6,2**	**3,9**	**--**	**--**	**--**
n=	**3**	**3**	**3**	**4**	**4**	**1**	**-**	**-**

10-Phalanx 1, ant. - Fallow Deer, *Dama dama*

Phalanx 1, ant.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	**L**
6529/ 19 TR II	17,4	12,1	14,8	47,5	22,4	12	13,2	46,5

11-Pelvis - Fallow Deer, *Dama dama*

Pelvis (Acetabula)	**LA**							
1873/ 28 TR II	41	--	--	--	--	--	--	--
6535/ 12	42	--	--	--	--	--	--	--

12- Femur - Fallow Deer, *Dama dama*

Femur	Bp	DC		**Bd**				
0129/ 1 TR I	55	25	--	--	--	--	--	--
0702/ 21	--	25,5	--	--	--	--	--	--
6541/ 2 TR II	--	--	--	54,5	--	--	--	--

13-Patella - Fallow Deer, *Dama dama*

Patella	**GL**		**GD**					
1883/ 18 TR II	38	--	--	--	--	--	--	--
6664/ 30 MIX	41,5	--	24,5	--	--	--	--	--

14-Tibia - Fallow Deer, *Dama dama*

Tibia	**Bp**	**SD**	**Bd**	**Dd**				
0091/ 1 TR I	48	--	--	--	--	--	--	--
0219/ 39	62	--	--	--	--	--	--	--
0698/ 59	--	--	36,2	28,2	--	--	--	--
0739/ 181	--	--	31,5	24,5	--	--	--	--
0739/ 182	--	--	32	27,5	--	--	--	--
1877/ 12 TR II	--	--	(34,0)	--	--	--	--	--
1880/ 29	--	--	35	--	--	--	--	--
6617/ 3	--	--	32	(25,5)	--	--	--	--
6641/ 22	--	--	(32,0	--	--	--	--	--
0082/ 10 MIX	--	--	36,5	31	--	--	--	--
3204/ 23	--	--	35	27	--	--	--	--
6564/ 103	--	20,5	33,5	27,5	--	--	--	--
6630/ 38	58,5	--	--	--	--	--	--	--
6664/ 29	--	--	35	28,5	--	--	--	--
mean val.	**56,2**	**--**	**33,9**	**27,5**	**--**	**--**	**--**	**--**
std.dev.	**7,29**	**--**	**1,8**	**1,96**	**--**	**--**	**--**	**--**
coeff.var.	**13**	**--**	**5,3**	**7,1**	**--**	**--**	**--**	**--**
n=	**3**	**1**	**11**	**8**	**-**	**-**	**-**	**-**

15-Astragalus - Fallow Deer, *Dama dama*

Astragalus	GLl	GLm	Dl	Dm	BC			
0219/ 40 TR I	(39,7)	33,8	22,8	23,5	25,7	--	--	--
0695/ 26	38,5	36	21	22	24	--	--	--
0739/ 193	42	40	23	24	27,5	--	--	--
0741/ 28	35,4	34	19,2	20,5	21,4	--	--	--
TROI/ 90	37	35,1	20,5	21,8	22,5	--	--	--
1847/ 34 TR II	38,5	37	22	23,5	25	--	--	--
6601/ 6	37,5	35,5	20,5	21,5	23,5	--	--	--
6642/ 14	42	40	23	24,5	26	--	--	--
6644/ 4	38,5	36,5	21,5	22	23,5	--	--	--
6649/ 4	--	39	--	24	26,5	--	--	--
6660/ 22	37,5	36,5	20,5	21,5	24,0	--	--	--
6576/ 63 TR III	38,6	36,4	20,8	--	24,7	--	--	--
6604/ 16 MIX	39,5	36	21,5	21	23,5	--	--	--
mean val.	**38,7**	**36,6**	**21,4**	**22,5**	**24,4**	**--**	**--**	**--**
std.dev.	**1,91**	**2**	**1,18**	**1,34**	**1,68**	**--**	**--**	**--**
coeff.var.	**4,9**	**5,5**	**5,5**	**6**	**6,9**	**--**	**--**	**--**
n=	**12**	**13**	**12**	**12**	**13**	**-**	**-**	**-**

16-Calcaneus - Fallow Deer, *Dama dama*

Calcaneus	GL	BB	GD					
0698/ 57 TR I	80,1	30	25	--	--	--	--	--
0698/ 429	88,2	28	28,1	--	--	--	--	--
TROI/ 86	90	30,7	28	--	--	--	--	--
mean val.	**86,1**	**29,6**	**27**	**--**	**--**	**--**	**--**	**--**
std.dev.	**5,27**	**1,4**	**1,76**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**6,1**	**4,7**	**6,5**	**--**	**--**	**--**	**--**	**--**
n=	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**

17-Metatarsus - Fallow Deer, *Dama dama*

Metatarsus III+IV				Bd	Dd			
0739/ 179 TR I	--	--	--	27	18,5	--	--	--
1873/ 32 TR II	--	--	--	33,5	20,5	--	--	--
6571/ 55	--	--	--	31	19,5	--	--	--
mean val.	**--**	**--**	**--**	**30,5**	**19,5**	**--**	**--**	**--**
std.dev.	**--**	**--**	**--**	**3,28**	**1**	**--**	**--**	**--**
coeff.var.	**--**	**--**	**--**	**10,7**	**5,1**	**--**	**--**	**--**
n=	**-**	**-**	**-**	**3**	**3**	**-**	**-**	**-**

18-Phalanx 1 ant. or post. - Fallow Deer, *Dama dama*

Phalanx 1 ant. or post.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	**L**
0219/ 41 TR I	15,8	11,5	12,5	31,5	--	--	--	--
0698/ 479	19,2	11,5	13,5	45,1	20	12	12,1	41,8
0761/ 9	16,5	10,5	14,5	46	20,5	11	12,5	44
0761/ 10	15	10	13	41,5	19	10,5	11,5	40,5
6617/ 4 TR II	15,5	--	13,5	46	19,5	11	12	44,5
6621/ 13	--	--	14	--	--	11,5	13	--
6636/ 31	15	12,5	13,5	44	19	12	12,5	42,5
6534/ 108 TR III	14,5	10	12	41	18,5	11	11	39,5
6534/ 109	16	11,5	14	48,5	20	11,5	12	44
6542/ 14	16,5	11,5	14	44,5	--	--	--	--
6553/ 4	15,5	11,5	14	44	--	--	--	--
6561/ 3	14,5	9,5	12,5	39,5	--	--	--	--
6564/ 108 MIX	14	10,5	13,5	40,5	--	--	--	--
mean val.	**15,7**	**11**	**13,4**	**42,7**	**19,5**	**11,3**	**12,1**	**42,4**
std.dev.	**1,36**	**0,91**	**0,73**	**4,4**	**0,71**	**0,53**	**0,62**	**1,91**
coeff.var.	**8,7**	**8,3**	**5,5**	**10,3**	**3,6**	**4,7**	**5,2**	**4,5**
n=	**12**	**11**	**13**	**12**	**7**	**8**	**8**	**7**

19-Phalanx 2 ant. or post. - Fallow Deer, *Dama dama*

Phalanx 2 ant. or post.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	
6571/ 56 TR II	14	10,5	11,5	30	--	--	--	--
6636/ 32	15	11,5	12,5	30	17,5	13,5	17,5	--
1444/ 2 TR III	14,5	10,5	13	31	--	--	--	--
6564/ 109 MIX	14	10,5	11,5	28	--	--	--	--
6631/ 45	13,5	10	11	28	16,5	12	16	--
6631/ 46	--	--	11,5	--	--	11,5	15,5	--
6633/ 12	--	--	12	--	--	13	16,5	--
mean val.	**14,2**	**10,6**	**11,9**	**29,4**	**--**	**12,5**	**16,4**	**--**
std.dev.	**0,57**	**0,55**	**0,69**	**1,34**	**--**	**0,91**	**0,85**	**--**
coeff.var.	**4**	**5,2**	**5,8**	**4,6**	**--**	**7,3**	**5,2**	**--**
n=	**5**	**5**	**7**	**5**	**2**	**4**	**4**	**-**

20- Phalanx 3 ant. or post. - Fallow Deer, *Dama dama*

Phalanx 3 ant. or post.	**GL**	**Ld**	**HP**	**GB**	**BF**			
0795/ 56 TR I	35,1	34	22,5	12,8	13,8	--	--	--
1874/ 3 TR II	--	--	21,5	12,5	--	--	--	--
1440/ 17 TR III	35,5	31,5	--	--	--	--	--	--
mean val.	**34**	**32,2**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,2**	**1,61**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**6,5**	**5**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**3**	**3**	**2**	**2**	**1**	**-**	**-**	**-**

V - Measurements of Aurochs, *Bos primigenius* Remains

1-Radius - Aurochs, *Bos primigenius*

Radius	Bp						BFp	
0698/ 406 TR I	99	--	--	--	--	--	90,3	--

2- Femur - Aurochs, *Bos primigenius*

Femur		DC						
6630/ 167 MIX	--	54,5	--	--	--	--	--	--

3- Calcaneus - Aurochs, *Bos primigenius*

Calcaneus	GL	BB	GD	LFd				
0715/ 33 TR I	152,5	53	57,5	37,5	--	--	--	--
0758/ 80	145	--	--	40	--	--	--	--

4- Phalanx 2, post. - Aurochs, *Bos primigenius*

Phalanx 2, post.	Bp	SD	Bd	GL				L
0078/ 54 TR I	33,5	28,5	27,5	45,5	--	--	--	43

5- Phalanx 3 ant. or post. - Aurochs, *Bos primigenius*

Phalanx 3 ant. or post.	GL		HP	GB				
1846/ 30 TR II	(90,0)	--	45	30	--	--	--	--

VI - Measurements of Wild Boar, *Sus scrofa* Remains

1-Mandible - Wild Boar, *Sus scrofa*

Mandible (a)			**LPR**					
0766/ 33 TR I	--	--	52	--	--	--	--	--

2- Mandibular teeth - Wild Boar, *Sus scrofa*

Mandibular teeth						**LM_3**	**BM_3**	
0727/ 30 TR I	--	--	--	--	--	35,5	15	--

3- Humerus - Wild Boar, *Sus scrofa*

Humerus	**Bd**	**BT**						
0698/ 433 TR I	57	46	--	--	--	--	--	--

4- Radius - Wild Boar, *Sus scrofa*

Radius			**Bd**					
0258 / 1 TR I	--	--	42	--	--	--	--	--

5- Pelvis - Wild Boar, *Sus scrofa*

Pelvis (Acetabula)	**LA**	**LAR**						
0300/ 156 TR I	41,5	35	--	--	--	--	--	--
0699/ 156	41,5	35	--	--	--	--	--	--
0758/ 72	45	--	--	--	--	--	--	--
mean val.	**42,7**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**2,02**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**4,7**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**

6- Patella - Wild Boar, *Sus scrofa*

Patella	**GL**	**GB**	**BT**					
0739/ 170 TR I	43,5	27,5	27	--	--	--	--	--

7- Tibia - Wild Boar, *Sus scrofa*

Tibia			**Bd**	**DD**				
0082/ 1 MIX	--	--	37	34,5	--	--	--	--
0082/ 2	--	--	35	31,5	--	--	--	--

8- Astragalus - Wild Boar, *Sus scrofa*

Astragalus	**GLl**	**GLm**	**Dl**		**BC**			
6572/ 67 TR III	48,5	41,5	24,5	--	28,5	--	--	--

9- Calcaneus - Wild Boar, *Sus scrofa*

Calcaneus	**GL**	**GB**	**GD**					
0702/ 9 TR I	105	30	--	--	--	--	--	--
0722/ 47	106,5	27,5	40,5	--	--	--	--	--
1880/ 5 TR II	90,5	36	41	--	--	--	--	--
mean val.	**101**	**31,2**	**--**	**--**	**--**	**--**	**--**	**--**
std.dev.	**8,84**	**4,37**	**--**	**--**	**--**	**--**	**--**	**--**
coeff.var.	**8,8**	**14**	**--**	**--**	**--**	**--**	**--**	**--**
n=	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**

10- Phalanx 1 ant. or post. - Wild Boar, *Sus scrofa*

Phalanx 1 ant. or post.	**Bp**	**SD**	**Bd**	**GL**	**Dp**	**DD**	**Dd**	
6675/ 4 MIX	22	17	19	48,5	23,5	12,5	13,5	--

11- Phalanx 3 ant. or post. - Wild Boar, *Sus scrofa*

Phalanx 3 ant. or post.	**GL**							
1238/ 1 TR I	38,3	--	--	--	--	--	--	--