ANIMALS AT BURGAZ IN THE CLASICAL and HELLENISTIC PERIOD FROM THE EVIDENCE OF FAUNAL REMAINS[1]

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Abstract

In this study animal bones collected from the archaeological excavations at the ancient site of Burgaz have been analyzed for the study of animal exploitation, human diet, social differentiation and the environment of Burgaz and Datça during the Classical and Hellenistic Period. Comparison of the results with evidence from other sites to determine the extent to which there might have been local trends in animal husbandry. Because this kind of a research is not common among the classical archaeologists. Burgaz/Datça is a coastal settlement but sea products do not have an important place in the human diet of the Datça Burgaz inhabitants. After analysis of the Burgaz bones it was determined that domestic cattle, sheep/goat, pig, horse, donkey and dog were present alongside wild goat, wild pig, fallow deer, red deer, roe deer, badger and birds as well as fish and shellfish from the sea.

Keywords: Animal bones, Animal exploitation, Classical and Hellenistic Period, Animal species, Human diet, Burgaz, Datça

HAYVAN KALINTILARINDAN KLASİK ve HELENİSTİK DÖNEM BURGAZ HAYVAN TÜRLERİNE

Özet

Bu çalışmada antik Burgaz yerleşkesinden arkeolojik kazılar sonucunda ele geçen kemikler incelenmiştir. Kemiklerin incelenmesi sonucunda hayvan kullanımı, insanların beslenmesi, sosyal farklılaşma, Burgaz ve Datça'nın Klasik Helenistik Dönem çevre ve bitki örtüsü hakkında bilgi edinildi. Bunun yanı sıra diğer merkezlerden farklı olarak hayvan kullanımının bölgesel bir özellik gösterip göstermediği tartışılmıştır. Bu tür araştırmalar klasik arkeoloji eğitimi alan arkeologlar arasında pek yaygın değildir bundan dolayı kemik araştırma metodolojisi ve laboratuar çalışmasının her safhasını yazdım. Burgaz bir deniz kıyı yerleşmesi olmasına rağmen deniz ürünleri Burgaz sakinlerinin diyetlerinde önemli bir yer tutmamaktadır. Burgaz kemiklerinin analiz sonuçlarına göre şu hayvan türleri tespit edilmiştir: sığır, koyun/keçi, domuz, at, eşek, kopek, yabani keçi, yabani domuz, kızıl geyik, kuş deniz ürünlerinde ise balık ve deniz hayvanı kabuğudur.

Anahtar Kelimeler: Hayvan kemikleri, Hayvan kullanımı, Klasik Dönem hayvan türleri, İnsan beslenmesi, Burgaz, Datça,

[1] This study gathered from Master Thesis that prepared by Mahmut AYDIN in Middle East Technical University in 2004 (http://etd.lib.metu.edu.tr/upload/12605502/index.pdf)

INTRODUCTION

The study of animal remains from archaeological sites is commonly known as archaeozoology. The goal of archaeozoology is to gain better understanding of the relationship between humans and animal lived in the past and their environment, especially between humans and other animal populations (Reitz, 1999, pp 1-5); (Klein, 1984, pp 1-10).

The term "archaeozoology", which is commonly used by researchers working in Eurasia and Africa, emphasises the biological nature of animal remains (animal bones, sculls, textiles made of from wool etc). "Archaeozoology" here is interpreted as "old zoology" or palaeontology. Archaeozoology as a discipline in its own right has only become established during the last 20-30 years. Most archaeozoologists trained either as zoologist or as archaeologist. They have worked in different parts of the world which has led to the development of different methods, especially on the ways of counting and measuring bones. In its early days, zoologists called upon to analyse archaeofaunal remains were merely expected to provide a list of identified species.

Today it is known that much more than a list of species can be obtained. Quantitative data like age distribution and sex ratio of each species present may tell us how they were exploited in a particular period: for example, whether were they hunted or husbanded, or if they were kept primarily for power, meat, wool or milk (Reitz, 1999, pp 1-5); (Davis, 1987, pp 19-31). In addition, from traces left on the bones we can get information about butchery techniques as well as the kinds of tools that were used. Moreover, since every animal species has special requirements for food, water and temperature, reconstruction of ancient environments can also be attempted on the basis of archaeozoological remains.

The archaeolozoologist's job is to extract as much zoological information as possible from skeletal remains that often amount to little more than a pile of bones.

In this article archaeofaunal materials of Burgaz ancient city which located in Datça-Muğla-Turkey were studied.

MATERIAL AND METHOD

The Burgaz/Datça[2] site yielded large amount animal remains. Archaeofaunal materials came from both the Classical and Hellenistic periods. The materials that examined in this study were brought to light during the course of the excavations in 1996-2002 and 2003. The bones have been selected from 22 different trenches and 112 levels or loci of the Datça - Burgaz settlement in order to identify differences between houses or districts of the settlement (Tuna 1981, 1995, 1998, 2002 and 2003).

In this study animal bones of ancient Burgaz were analysed. By applying the methods described below I try to obtain information about animal exploitation, animal species, animal killing patterns, human diet and the environment of Burgaz during the Classical period. Since every animal species has special requirements for food, water and temperature. Moreover, if there are local trends in animal husbandry that are different from those at other sites, that will also be discussed. In addition, it might be possible to determine local sources of nutrition, i.e. wild animals.

In order to provide answers to the questions of human diet, animal husbandry, animal species and animal relative percentage, animal sex and age, Classical Age environment and social hierarchy at the Burgaz settlement the following methods were applied.

Number of Identified Specimens (NISP)

In the Number of Identified Specimens (NISP) the identification stage can be equated with collecting primary data and the analytical stage with deriving secondary data. Primary data are facts that can be analysed in further ways, such as element representation and taxonomic identification, by subsequent investigators.

Using NISP has some advantages and disadvantages. The advantage of NISP is that values are additive that is, it is easy to add new species or bone fragments to the data. The

[2] I express my special thanks to Prof.Dr. Numan Tuna, Burgaz Excavation director, who invited me and let me to work on his excavation materials and supported me during my thesis process

disadvantage of NISP is that it is very sensitive to fragmentation because a bone can be broken into different pieces, thus the same bone may be counted more than once.

Secondary Data

Secondary data includes age classes, sex ratios and relative frequencies of taxa, butchering patterns, dietary contributions and procurement strategies. They are derived from primary data by means of index and other quantification techniques. Primary data may be viewed as more descriptive and objective than secondary data. Primary data based on observational units secondary data are analytical products (Reitz, 1999, pp 1-5).

Mortality profile

In order to determine the animal products used (for example, meat, milk, wool, power) it is necessary to determine at what age the animal was slaughtered. Many age determination methods are based on growth of the skeleton and teeth.

The sex composition of a flock changes according to what product(s) are the most important provided by a species. For example, in an economy aiming at milk production, most females are kept whilst males are slaughtered early in their life. Sex ratio is very also informative, so it is necessary to determine the animals' sex which can be done by the following methods:

In the jaws of some species that contain large canines the females usually lack these teeth or contain very small ones (Klein, 1984, pp 41-50).

Because the bones were very fragmented and the sample was small, it was not possible to reconstruct the sex composition of the flocks, but the measurements are presented here as zoological documentation of the animals from Burgaz.

Teeth usually give clear distinction between adult and senile animals. The most applicable and traditional method applied to domestic animals in order to establish their age is

based on dental eruption and wear. One dental dimension that varies strongly with age is the crown height of a tooth.

From the state of epiphyseal fusion for each skeletal part it is possible to form two age classes, adult and immature. The proximal and distal parts of a bone fuse at different ages and since epiphyseal fusion time is known, epiphyseal age classes can be transformed into chronological ones. For example, like proximal epiphysis of tibia of domestic sheep fuse at 3-3.5 years (Table 1).

Table 1: Fusion Age of Bones, first number: unfused age, second number: fused age.

Element		**Species**			
		O/C	**Sheep**	**Pig**	**Horse**
Scapula	Distal	7-8mo	6-8mo	42mo	20mo
Humerus	Proximal	42-48mo	36-42mo	42mo	36-42mo
	Distal	15-18mo	10mo	12mo	15-18mo
Radius	Proximal	15-18mo	10mo	12mo	15-18mo
	Distal	42mo	36mo	42mo	42mo
Ulna	Proximal	42mo	30mo	36-42mo	42mo
Metacarpal	Proximal	Before birth	Before birth	Before birth	Before birth
	Distal	15-18mo	18-24mo	24mo	15-18mo
Femur	Proximal	42mo	30-36mo	42mo	36-42mo
	Distal	42-48mo	36-42mo	42mo	36-42mo
Tibia	Proximal	42-48mo	36-42mo	42mo	36-42mo
	Distal	24-30mo	18-24mo	24mo	20-24m
Calcaneum	Proximal	36-42mo	30-36mo	24-30mo	36mo
Metatarsal	Proximal	Before birth	Before birth	Before birth	Before birth
	Distal	27-36mo	20-28mo	27mo	16-20mo
1st Phalange	Proximal	13-15mo	13-16mo	24mo	13-15mo
2nd Phalange	Proximal	18mo	13-16mo	12mo	9-12mo

Butchering Marks

A prey animal may have been killed, skinned, disjointed with the aid of various tools, including hand-axe, iron or copper- alloy knife or steal cleaver than eaten. Each of them can

leave traces on the bones, which constitute one form of evidence for past butchery practices (O'Connor, 2000, p 45).

By examining traces that have been left by butchery on bones it can be determined if the animal was cut by a butcher or by people who were not experts. A butcher usually will have a technique, repeated for all the animals he/she process whilst non-professionals will have no method and cuts will be randomly located on bones in a haphazard fashion. Butchering techniques and tools used also can be determined by examining butchery marks.

Domestic versus wild animals

The ratio of domestic to wild animals calculated to estimate the role of hunting in the diet and economy.

RESULTS and DISCUSSION

The total number of bone samples from the area under examination was 789. The number of bones identified by species and anatomical part totalled 430. Whereas, those unidentified by species and anatomical part totalled 359. The reason for the high number of unidentified bones is that most of the bones were fragmented into small pieces which can not be identified because they were derived from food debris which smashed into small pieces to could be eaten. Moreover, further fragmentation occurred during the excavation. Beside this, I think the smallest parts of broken bones were collected by the excavater without regard to their size and preservation, or whether or not they can be identified. This, of course, is the best way to collect bones from an archaeological site.

The overall bone assemblage is clearly dominated by domestic animals: NISP = 376 which make 88.8%. Among these eight species were identified (Figure 1). Sheep / Goat (S/G) accounted for the highest percentage NISP, 138 and cattle ranked below in the NISP, 112=26.4%, pig followed the order in NISP, 90=21.2% (Figure 1).

The percentage of bones belonging to wild animals is much smaller than that belonging to domestic animals. Wild animals remains accounted for NISP 31 = 7.3% and MNI 21%. Among these, seven species were identified (Figure 1). Most numerous were the finds from elements of red deer: NISP, 12=2.8%. Other species are represented in smaller frequencies.

Marine species remains are few. Among products of the sea the remains of two categories, fish and shell, were identified (Figure 1).

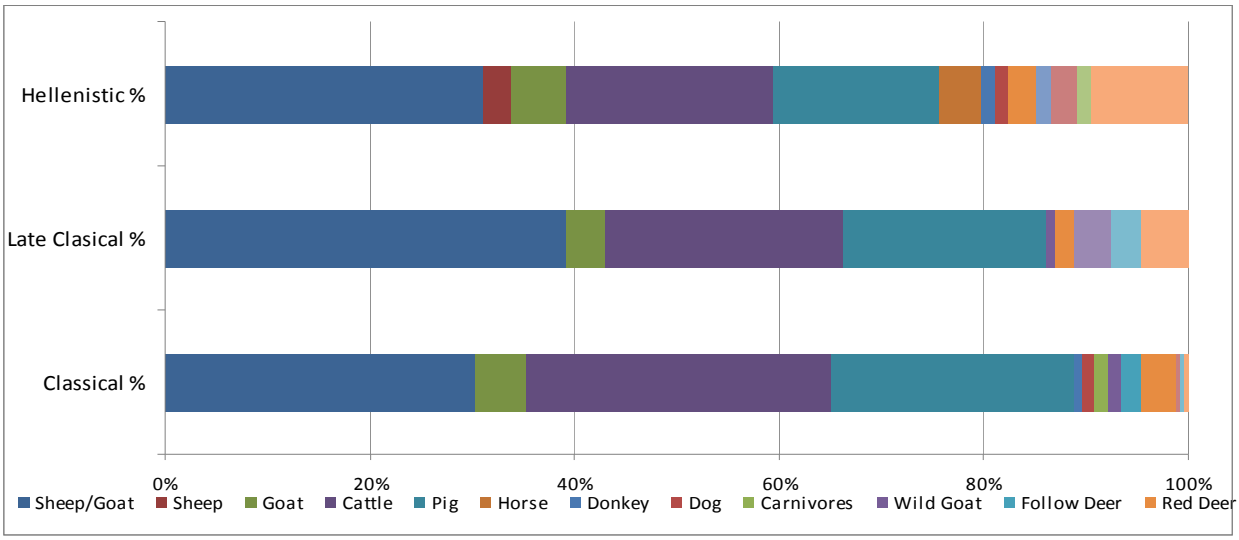

Figure 1: Animal Species of Burgaz in Classical, Late Clasical and Hellenistic Period

NISP results suggest that domestic animals formed the most sources of meat in the Classical, Late Classical and Hellenistic periods (Figure 1). The most common group is sheep/goat (s/g) followed by the cattle group. Sheep and goat provide not only meat but also milk, wool and hair, while cattle provide labour in addition to meat and dairy products. Age analysis suggests that these animals were used for all of these purposes at Burgaz. Amongst the most numerous skeletal remains of ruminants, i.e. cattle, sheep, goat, which make up more than 64 % of the total bones (Figure 1).

Species

Analysis of the Burgaz bone assemblage has led to the identification of a minimum of 12 different animal species as well as unidentified bird, fish, shellfish and carnivores (cat ?,

dog ?) . Sheep, goat, cattle, pig, donkey, horse, dog, , wild goat, wild pig, fallow deer, red deer, roe deer, badger, and have all been identified.

Domestic Animals

Pig: The pig remains indicate that these animals were used to supplement the regular diet. These animals were kept almost exclusively for meat production, since they do not provide labour, wool, or milk, but are very efficient in terms of reproductive capabilities. Pig percentage slightly decreased from the Early Classical to the Hellenistic periods.

Table 2: Fusion Percentage of Pigs

Pig fusion tables	**Fused**	**Unfused**	**Fusion Age**
Metatarsal Proximal	3	0	Before birth
Metacarpal Proximal	5	0	Before birth
Total	8 = 21%	0	
Humerus Distal	6	0	12 month
Radius Proximal	1	0	12 month
Total	7 = 18%	0	
Metacarpal Distal	1	3	24 month
Tibia Distal	3	2	24 month
Metatarsal Distal	3	2	27 month
Total	7 = 18%	7=20%	
Calceneum	2	2	30 month
Radius Distal	2	0	42 month
	4 = 11%	4=11%	
TOTAL	**26=70%**	**11=30%**	

In the Classical Age pig comprised 21.2 % of the bones. Among the identified pig bones, 26 = 70% were fused while 11= 30% were unfused (Table 2). When compared with S/G and O/C, in numerical terms the biggest percentage of unfused bones belong to pigs (Tables 2, 3 and 4). Only 4 pigs were slaughtered at less than 2 years old.

The other bones show that the pigs were more than 2 years old when slaughtered. It is therefore highly probable that these animals were primarily kept for maximum meat use. In general pigs are known to have been pastured in oak, beech and chestnut groves and additionally fed with beans and grain (Cupere 2001).

Sheep / Goat /Oviscaprids: Like cattle, sheep and goat remains should be considered as food remains. Sheep/Goat bones remains in numerical terms comprise the highest percentage, 37.7 %, of identified bones. There are no significant differences in sheep and goat percentages from the Classical to the Hellenistic period. The weight of cattle is some 15-20 times that of sheep or goat, so the amount of meat represented by a single cow is considerable. Just a few bones of sheep/goat, only 4 out of 31, are unfused, 11 = 31% bones of sheep/goat indicate slaughter at 10-16 months. 13 = 37% bones of sheep/goat indicate slaughter up to 24-28 months. Only 4=11% of the sheep/goat bones indicate slaughter at less than 28 months (Table 3). The overall impression is that very few animals were killed less than 2 years old whilst most seem to have been kept in the herd for longer than that bones slaughtered under 28 months (Table 3).

This means that the great majority of sheep and goat were over 2 years old when slaughtered. It is therefore highly probable that these animals were primarily kept for their secondary products; milk, hair and wool. The textile workshop found in the SE sector also supports this idea. Worked bones of sheep/goat as raw material are absent among the material studied.

Cattle/Bos Taurus: The cattle remains found at Burgaz are considered to be food refuse. Cattle bones comprise 26.4% of total number of identified bones. The percentage of cattle remains decreased from the Classical to the Hellenistic age (Tables 6 and 7). Fusion of the bones indicated that the animals were consumed at maturity; among the 49 bones of Ox/Cattle (O/C) on which fusion could be determined, only 6 = 12% was unfused, while 4 = 21%, of them were slaughtered under 36 months, 2 = 9% of them were slaughtered under 18 months (Table 4).

Table 3: Fusion Percentage of Sheep/Goat

Sheep/Goat Skeletal	**Fused**	**Unfused**	**Fusion Age**
Elements			
Metatarsal Proximal	2	0	Before birth
Metacarpal Proximal	3	0	Before birth
Total	**5 = 14 %**	**0**	
Radius Proximal	6	0	10 month
PH1 Proximal	4	0	16 month
PH2 Proximal	1	0	16 month
Total	**11 =31 %**	**0**	
Metacarpal Distal	2	2	24 month
Tibia Distal	6	0	24 month
Metatarsal Distal	5	2	28 month
Total	**13 = 37%**	**4 =11%**	
Radius Distal	1	0	36 month
Femur	1	0	36 month
TOTAL	**31=88%**	**4 = 11%**	

Table 4 Fusion Percentage of Cattle

(O/C) Skeletal	**Fused**	**Unfused**	**Fusion Age**
Element			
Metatarsal Proximal	7	0	Before birth
Metacarpal Proximal	7	0	Before birth
Total	14 = 100%	0	
PH1 Proximal	10	0	15 month
Metacarpal Distal	6	2	18 month
Radius Proximal	5	0	18 month
Total	**21 = 91%**	**2 = 9%**	
Tibia Distal	2	0	30 month
Metatarsal Distal	9	4	36 month
Calcaneum	4	0	42 month
Total	**15 = 79 %**	**4 = 21%**	

Therefore age analysis indicated that these animals were not generally kept only for the production of meat. The high number of old cattle was probably to get maximum benefit from their milk, meat and power.

O/C bones were quite commonly used as raw material for the production of objects or tools; 13 out of a total of 18 worked bones came from O/C. This may have increased economic importance of cattle. Supplying raw material for bone working can be another reason for slaughtering cattle at old age.

Horse/Equus cabalus and Donkey/Equus asinus**:** Donkey and horse together make up 1.6 % of the identified bones (Figure 1). The bones came from the Hellenistic periods, no such bones being found from the Classical period. It is probable that the majority of the donkey and horse remains found at Burgaz do not constitute food debris. This is because the remains of 3 out of 7 were collected from filling levels while the other 3 came from levels which are close to surface. Science there is that no butchery marks observed on the horse and donkey remains. It is highly probable that the filling materials from beneath floor levels were brought from dump area(s).

Wild Mammals, Birds, Fish and Shell

Birds, Fish and Shell: **B**irds and fish remains are represented by 4 NISP, and make up 0.9%, identified bones. Birds remains came from the Late Classical period.

Wild mammals are represented by red deer, fallow deer, roe deer, wild pig, wild goat and badger. The percentages of mammal remains are: red deer 2.8 %, fallow deer 1.1 %, roe deer 0.2%, wild goat 0.9%, wild pig 0.7% and badger 0.2%. At a total of only 7 % it is clear that wild animals did not play a significant role in the diet. The equivalent figure at Troy, in the Hellenistic period, was 7.4%, and only 0.8% for the Roman period at Sagalassos. The number of species at Late Classical period Troy and Burgaz are nearly the same. It can be concluded that the supply of animal proteins was mainly provided by the typical domestic animals, namely cattle, pig, sheep and goat.

Remains from Levels Under Floors

Filling levels from beneath floors, especially in the NE sector, provided half of the total number of bones. Trenches BZ.03.NE.4.8.A (levels 6, 7, 8, 9, 10 and 11), BZ.03.NE.3.8.A (levels 12 and 14), BZ.02.SE.2.7.B (level 8), Lower Sector BZ.03.SE.6.4.B (levels 19 and 20) (Table 5). The levels beneath floors also contain very much pottery. The reason why filling levels below floors in BZ.03.NE.4.8.A (levels 6, 7, 8, 9, 10 and 11) and BZ.03.NE.3.8.A (levels 12 and 14) are so rich must be that material in these levels must have been brought from areas of dump which contained a great variety of rubbish (206 identified bones came from these two trenches).

Table 5: NISP Percentage from Levels Below Floors

Levels Under Floors	**Age**	**Identified**
Area		NISP
House II	Classical	209
House II	Late Classical	7
Workshop (BZ.02.SE.2.7.B)	Late Classical	2
Lower Sector (BZ.03.SE.6.4.B)	Late Classical	2
Total		**220**

Moreover, 8 out of 10 elements which originate from dog, donkey, horse and carnivore came from filling levels under floors and refuse material on the street. This shows that these animals, which are not normally eaten, had been thrown into a dump area and that later they were brought to the houses for under floor filling.

Other levels beneath the floor, in Lower Sector BZ.03.SE.6.4.B (levels 19 and 20) and BZ.02.SE.2.7.B (level 8), did not include so much pottery and other kinds of rubbish.

Peristasis

Bones from levels 6, 7 and 8, of trench BZ.96.NE.4.7.D, collected from the peristasis, out side the houses.

The total of 26 bones came from the peristasis entirely comprise food debris. These bones are belong to the main meat suppliers, cattle (NISP 8), sheep and goat (NISP 12), pig (NISP 5) and shell (NISP 1).

Remains from Levels on the Road

The filling levels of the roads in the SE Lower Sector did not contain many bones. Only 9 bones were collected from these levels. Like those from the peristasis, the bones of these levels belong to the main meat suppliers: cattle, sheep and goat, and pig. In addition, roe deer bone was also identified from these levels.

Bone Artefacts

Bone has been used since very early prehistoric times for the manufacture of tools and ornamental objects. Both the physical and aesthetic properties of bone must have played a major role in the choice for this material. About 18 pieces of worked bone could be identified to animal species, i.e. cattle (*Bos taurus)*, red deer (*Cervus elaphus*), donkey (*Equus asinus*). All the worked bone fragments except two come from filling levels under floors. It might be assumed that these fragments of worked bone were dumped in a refuse area and that later they were incorporated in the filling materials.

Worked Bones Remains From Burgaz and Sagalassos

The worked bones of Sagalassos (dated to Roman Period) and Burgaz are very similar in terms of what species and in what percentages were chosen, as well as in both the techniques

used to cut the bone and the exact location where the cut was made, but among Sagalassos worked bones beside metatarsals there are metacarpals too. This might suggest that bone-working traditions did not change significantly between the Classic and Roman periods. The skeletal element of red deer and donkey were rarely used. Only one worked metatarsal was identified as donkey. Reed deer is represented by three worked metatarsals whilst cattle are represented by fourteen metatarsals. Size, shape and density must have affected the selection of certain skeletal elements as raw material. All worked bones have their mid-shaft removed after cutting the distal and proximal shaft and epiphyses. The remaining part, the middle shaft, was used for tool making.

Traces of Butchery and Gnawing Marks on the Bones

Some bones bear traces of intentional activities, such as butchery marks, and some were entirely or partially burnt. Some bones also bear gnawing marks made by carnivores.

Only fourteen bones bear traces of intentional activities, i.e. butchery cut marks. From this small number of bones bearing traces of intentional activities, it can be said that animals were mostly slaughtered by people who were practiced at butchery.

Four bones bear traces of chewing marks while one astragalus shows traces of attack by acid which is thought to have occurred in the stomach of dog during digestion.

Burnt Bones

Traces of burning were observed on 48 bones. While 40 of the bones came from levels beneath the floor, 6 of them from inside houses, one from the peristasis and one from filling level of the road. The bones are from sheep/goat, cattle, pig and red deer, animals which are main meat suppliers. Every kind of bone element is represented among the burnt bones. The burnt bones from the under the floor filling levels may have been burnt while at the rubbish dump, perhaps accidentally or from fires that were lit to reduce the bulk of rubbish. The sparse burnt bones found in the “living surfaces” perhaps were burnt during intense cookery

(roasting on the spit?) or accidentally, if they have been dropped or thrown in to the hearth or some other domestic fire.

Classical Age in Burgaz

Classical period bones were analyzed after dividing them into two parts: pre 4th century B.C. or Classical and post 4th century B.C. or Late Classical.

Most, 242 of 430 identified bones, as well as 221 unidentified bones, were recovered from Classical age levels at Burgaz. Most of Classical period bones (209 out of 242) came from levels under floors. It is clear that bones contexts other than under floors are too few to make any meaningful analysis.

16 out of a total of 18 worked bones can be dated to the Classical period. Thus bone working appears to have been more common than in the Late Classical and Hellenistic period, although it could be remains of the bone manufacture were not found since rubbish levels of the Late Classical and Hellenistic periods have not been excavated.

0.8 % of the total number of identified bones from the Classical age. The smallest percentage of sea products came from the Classical age, increasing in Late Classical and Hellenistic periods (Tables 6, 7 and 8).

Table 6: Spatial Distribution of Classical Age Bones

Animals	**Workshop**	**%**	**Peristasis**	**%**	**House II, Levels Under the Floors**	**%**	**Total**	**%**
Sheep/Goat	2	**2**	11	**15**	60	**82**	73	**30.1**
Sheep	0		0		0		0	
Goat	0		2	**16**	10	**84**	12	**4.9**
Cattle	0		8	**11**	64	**89**	72	**29.7**
Pig	2	**3**	5	**8**	50	**87**	57	**23.5**
Horse	0		0		1	**100**	1	**0.4**
Donkey	0		0		2	**100**	2	**0.8**
Dog	0		0		3	**100**	3	**7.2**
Carnivores	0		0		3	**100**	3	**1.2**
Domestic Animals							**223**	**92.1**
Wild Goat	0		0		3	**100**	3	**1.2**
Fallow Deer	2	**40**	0		3	**60**	5	**2.0**
Red Deer	0		0		8		8	**3.3**
Roe Deer	0		0		0		0	
Wild Pig	0		0		1	**100**	1	**0.4**
Badger	0		0		0		0	
Bird	0		0		0		0	
Wild Animals							**17**	**7**
Fish	0		0		1	**100**	1	**0.4**
Shell	0		1		0	**100**	1	**0.4**
Sea Product							**2**	**0.8**
Total	**6**	**2**	**27**	**11**	**209**	**86**	**242**	**100**

Late Classical Age

107 identified and 70 unidentified bones came from Late Classical age levels. As in the Classical and Hellenistic ages, the Late Classical bone assemblage is clearly dominated by domestic animals. When comparing with Hellenistic and Early Classical period it should be noted that the in the Late Classical Period the settlement spread over a larger area. Hence the Late Classical period bones came from different areas to those of the Classical.

The percentage of domestic to wild animals did not change significantly between the Classical, Late Classical and Hellenistic ages. Domestic animals constitute 86 %, wild

animals 6.5% and sea products 7.4 % of the animal bones in the Classical period (Tables 6, 7 and 8).

Table7: Spatial Distribution of Late Classical bones

SPECIES	**S/G**	**%**	**O/C**	**%**	**P**	**%**	**WM**	**%**	**Bird**	**%**	**FS**	**%**	**SH**	**%**	**Total**	**%**
AREA																
House 1	10	**40**	7	**28**	6	**24**	0		0		2	**8**	0		25	**23**
House 2	4	**44**	2	**22**	2	**22**	1	**11**	0		0		0		9	**8.4**
House 3	0		2	**100**	0		0		0		0		0		2	**1.8**
House 4	0		1	**50**	0		0		0		1	**50**	0		2	**1.8**
Under Floor	4	**36**	3	**27**	3	**27**	0		1	**9**	0		0		11	**10.2**
Workshoop	20	**45**	7	**15**	8	**18**	1	**2**	3	**6**	0		5	**11**	44	**41.2**
Lower sector	8	**57**	3	**21**	2	**14**	1	**7**	0		0		0		14	**13**
Total	46	**42.9**	25	**23.3**	21	**19.6**	3	**2.8**	4	**3.7**	3	**2.8**	5		**107**	**100**

(S/G = sheep/goat, G = goat, O/C = ox/cattle, P = pig, WM= wild mammals, wild goat, RD = red deer, FS = fish and SH = shell).

The main meat suppliers sheep/goat, cattle and pig are found in nearly every context. Among the domestic animals sheep/goat constitute the biggest percentage of the bones while cattle remains can be observed in each context.

Hellenistic Age

In the Hellenistic period more than 90% of the bones came from the SE sector. According to this result, after the transplanting of the city in the Hellenistic Period, the SE sector was the preferred area. This can be because of the proximity of the SE sector to the harbour because in the Hellenistic period Burgaz mostly was an industrial place. In NE sector the Hellenistic period bones came from only from House II (Tuna 1981, 1995, 1998, 2002 and 2003).

Table 8: Spatial Distribution of Hellenistic Age Bones

SPECIES	**S/G**	**%**	**O/C**	**%**	**P**	**%**	**E**	**%**	**Dog**	**%**	**WM**	**%**	**SH**	**%**	**Total**
AREA															
House 2	3	**60**	0		0		1	**20**	0		1	**20**	0		5=6.7%
Road Filling	1	**14**	2	**28**	3	**42**	0		0		1	**14**	0		7=9.4%
Workshop	20	**40**	10	**20**	8	**16**	1	**2**	1	**2**	4	**8**	6	**12**	50=67.6%
Lower sector	5	**38**	3	**23**	1	**7**	2	**15**	0		0		2	**15**	13=17.5%
Total	29	**39.1**	15	**20.2**	12	**16.2**	4	**5.4**	1	**1.3**	6	**8.1**	7	**9.4**	**74=100%**

(S/G = sheep/goat, S = sheep, G = goat, O/C = ox/cattle, P = pig, E = Equids, donkey and horse, WM = wild mammals wild pig, R. deer, roe deer, badger) SH = shell).

In the Classical, Late Classical and Hellenistic periods the percentage of domestic animal is 82%, among which sheep/goat - at 31% - are the most common group. In the Hellenistic Period, while wild animals constitute 8.1% and sea products constitute 9.4%. Thus sea products appear to play a higher role in the Hellenistic period than in earlier times. While no context shows a regular distribution in terms of wild animal species, domestic animals remains can be seen in each context. The Workshop is the richest context of the Hellenistic Period.

Of the 18 worked bones only two are dated to the Hellenistic and Late Classical period, so it can be said that in the Hellenistic period bone manufacturing was not as common as in the Classical period, although the excavated sample is very small and probably biased.

Environment Reconstruction

Reconstruction of ancient environments can be attempted from the evidence of wild animals.

Wild Pig *(Sus scrofa)*

Wild pigs eat a many different things and live in a wide range of conditions, but they have a preference for large leafed trees and forests with mixed trees. Moreover, they like places full of bulrushes and scrub areas (Demirsoy, 1997,pp 250 –267).

Red Deer *(Cervus elaphus)*

Red Deer, like wild pig, prefer large leafed trees and mixed forest. They can live in coniferous forest where there are many open areas and meadowlands. They also like swampy forests which are rich in terms of leaf and grass (Demirsoy, 1997,pp 250 –267).

Fallow Deer *(Dama dama)*

Dama dama (Fallow Deer) prefer scrub areas (Demirsoy, 1997,pp 250 –267).

Wild Goat

In the summer wild goats prefer highlands with sparse vegetation, but they also like wooded valleys with and rich grassy areas. In the winter wild goats prefer isolated and inaccessible forested valleys (Demirsoy, 1997,pp 250 –267).

CONCLUSION

In conclusion, analysis of the animal bones from Burgaz has shed light on the human diet, animal species, animal exploitation, the environment around Burgaz in the Classical period and bone working traditions. The results could be compared with the published evidence from Halicarnassos in the Classical period, Hellenistic Troy, and Roman period Sagalassos.

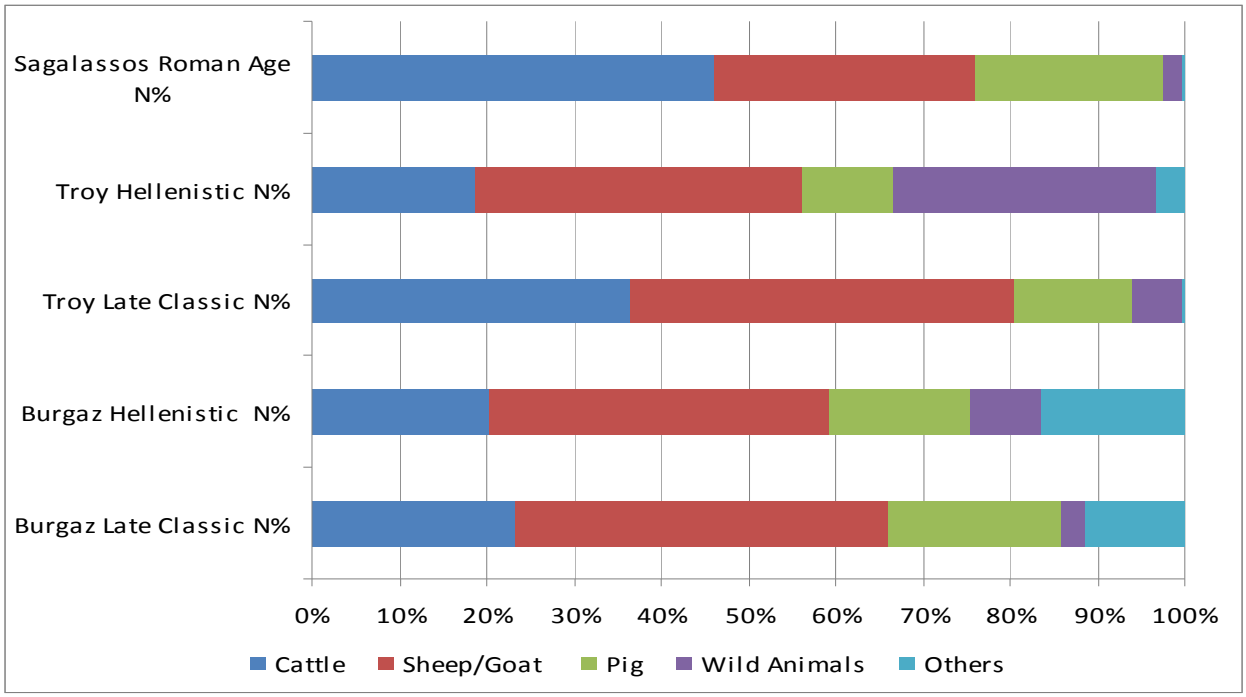

Figure 2: NISP of Animal of Burgaz, Troy and Sagalassos

Comparing traditions of human diet at Burgaz with those at other cities, such as Troy on the western coast of Turkey, it can be seen that in the Late Classical period percentages of the main meat suppliers, from maximum to minimum, is as following; sheep/goat, cattle, pig and wild animals. The order does not differ from Burgaz to Troy. While at Troy the percentage of pig is higher than at Burgaz, the percentage of cattle at Troy is higher than at Burgaz (Figure 2) (Fabis, M. 1999).

Another study on the level VIII of Troy has yielded faunal remains dating to 700-85 BC Greek Dönemi (http://www.tayproject.org). The results show that the relative abundances of animals from Troy differ from Classic and Hellenistic periods at Burgaz and Sagalassos in percentage of wild and domestic animals. While wild animals make up a small portion of the assemblage (3-8%), they comprise 30.3% of the assemblages of VIII level, Troy. The domestic animals are more abundant at Burgaz (94-97%) in contrast to level VIII of Troy (66.5%). It is clear that hunting was integral part of the economic activities and contributed more to the diet of settlers in Tory compared to people at Burgaz, Sagalassos and Troy 16 during the Classic and Hellenistic period (Fabis, M. 2003).

In the Hellenistic Period the order of animal percentages at Burgaz is no different from those of the Late Classical period.

At Sagalassos in the Roman Period the order and percentages of animals differs significantly from the Hellenistic and Classical periods at Burgaz (Figure 2).

In order to explain social hierarchy within a settlement from a study of the remains of animal bones it is necessary to look at the spatial distribution of the bones (good expensive parts of animal versus cheap parts) and what they may mean for the status of the people who used them. 51% of identified and 60% of unidentified bones were collected from filling levels under floors which were derived from refuse areas where rubbish from unknown sources was mixed. According to the evidence of other bones, which were recovered in situ in the internal areas of houses, there is no regular distribution of bones from choice cuts of meat, but because of the low number of bones it is difficult to say that there was no strict hierarchy amongst the inhabitants of Burgaz.

From study of the wild animal species it can be said that the forests of the Datça Peninsula in the Classical and Hellenistic period were rich in terms of large leafed trees, coniferous trees, scrub areas, meadowland and grassland, and that it also contained swampy areas full of bulrushes.

The examined bones were collected from different areas of the NE and SE sectors at Burgaz. Therefore the bones are thought to be representative of the entire settlement. The number of bones is insufficient for the application of valid statistical analysis. In addition, varying numbers of bones have been retrieved from each period, with the result that the distribution of bones by period might be skewed. Further, the types of contexts also are different, most of bones coming from beneath floors, peristasis, roads, inside houses etc. These might be factors that affect the interpretation because we do not have the same type of context and the same number of bones from all the periods.

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ABBREVATIONS

PE	Proximal Epiphysis	RB	Rib
PS	Proximal Shaft	T	Tooth
DE	Distal Epiphysis	INS	Incisor
DS	Distal Shaft	V	Vertebra
PSE	Proximal Shaft Epiphysis	CRV	Cervical Vertebra
DSE	Distal Shaft Epiphysis	CV	Caudal Vertebra
MS	Middle Shaft	LV	Lumbar Vertebra
S/G	Sheep/Goat	TV	Thoracik Vertebra
P	Pig	AST	Astragalus
WP	Wild Pig	A	Atlas
H	Horse	CAN	Canine
D	Donkey	PRM	Premolar
O/C	Ox/Cattle	MOL	Molar
RD	Reed Deer	HR	Horn
ROE. D	Roe Deer	OX	Oxis
FD	Fallow Deer	MX	Maxila
BAD	Badger	BCM	Butchery Cut Marks
BAD	Bear	BZ	Burgaz
CAR	Carnivores	SE	South East
SH	Shell	NE	North East
FS	Fish	C	Classical
HMR	Humerus	L C	Late Classical
R	Radius	TR	Tarsus
U	Ulna	MT	Metatarsus
CRP	Carpus	TMT	Tarsometatarsus
MC	Metacarpus	SCP	Scapula
PH 1	First Phalange	PL	Pelvis
PH 2	Second Phalange	M	Mandible
F	Femur	SK	Skull
PT	Patella	CLC	Calcaneus
TB	Tibia		
FB	Fibula		
MTP	Metopodia		