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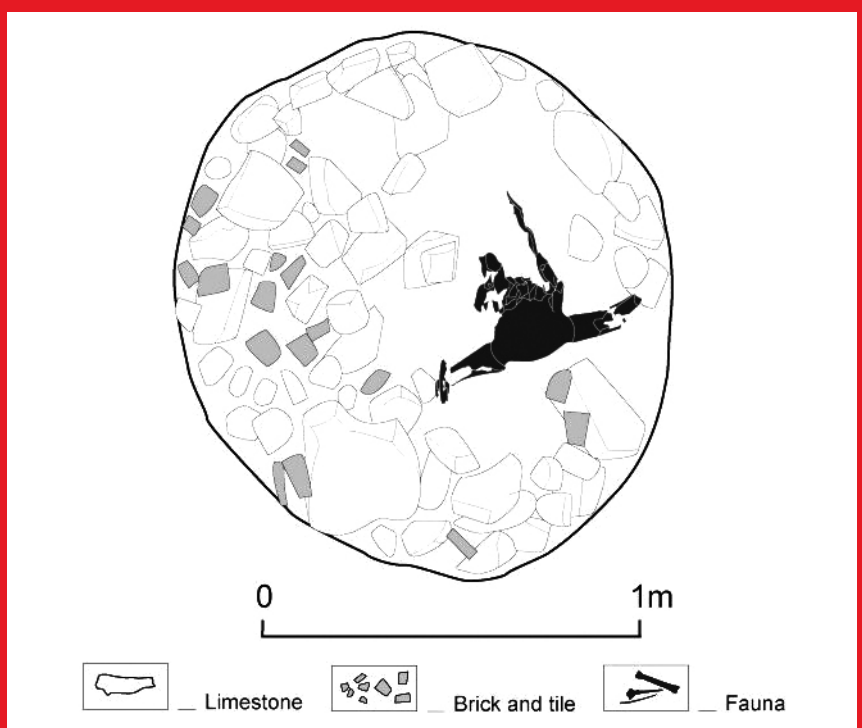

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What did the Romans and Moslems eat in Conimbriga (Portugal)? The animal bones from the 1990's excavations

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Abstract
The 1992 and 1993 excavations of Roman to Medieval layers of Conimbriga, in central Portugal, uncovered a Roman amphitheatre that pre-dated the Late Roman wall. Layers dated to the late Roman (3rd - 4th Cent. AD), late Antiquity (6th-7th Cent. AD) and Islamic (7th-11th Cent. AD) periods were also exposed. Almost 3000 animal bones were recovered. Because faunal assemblages are scarce in central Portuguese Roman to Medieval sites, particularly for the Moslem period, these bones presented a unique opportunity to compare Roman and Moslem dietary preferences, the non-food uses of animals, and livestock breeding practices. Mammal bones, particularly cattle, dominated the assemblage, followed by pig and sheep. The presence of wild boar within Moslem contexts suggests that the religious dietary rules were not strictly applied. The presence of wild boar as well as rabbit and red deer, further provide evidence for hunting.

Keywords: Zooarchaeology; Roman; Islamic period; Faunal remains; Conimbriga.

Introduction

Roman and Moslem contexts of Conimbriga (Condeixa-a-Velha, Portugal) were excavated in 1992 and 1993 under the direction of Virgílio H. Correia. The excavated area, of three squares (4x4m), was aligned along a Late Roman city wall to extend over an area where the southern limits of the Roman amphitheatre were thought to be located. The amphitheatre was known to have been demolished during the Late Roman occupation to facilitate the construction of a city wall (Fig. 1).

We (CD and JLC) recently studied the assemblage of c. 3000 animal bones from Correia's excavations. Animal bones are rarely found in great abundance in sites from Roman to Medieval periods in central Portugal, particularly from Moslem contexts. Therefore the recovery of such a large faunal assemblage from Conimbriga presented an exceptional opportunity to study Roman and early Medieval animal uses in the more northerly regions of the Iberian peninsula. It also provided an opportunity to investigate the degree of influence that the Romans and Muslims had upon local dietary and husbandry practices, to confirm the presence of expected domesticated livestock such as sheep, goat, and pig and identify hunting of wild taxa such as red deer and rabbit.

Archaeological context and chronology

The Conimbriga faunal assemblage was first described by Cardoso (1995) who also studied a number of individual taxa, e.g. the camelid (Cardoso 1992).The excavations themselves were first described by Correia (1994b), followed by the publication of an analysis of the finds by Adriaan De Man (2006) and the publication of radiocarbon dates for these and other samples from other parts of the site by De Man & Soares (2007).

Because our analysis was initiated so many years after the excavation, we relied heavily on Correia's (1994b) excavation report for our interpretations of the stratigraphic and spatial distributions of the faunal remains.

The presence of both Roman Late Antiquity and Medieval levels was significant for understanding the history of occupation of the site. Its abandonment had traditionally, and perhaps incorrectly, been assigned to

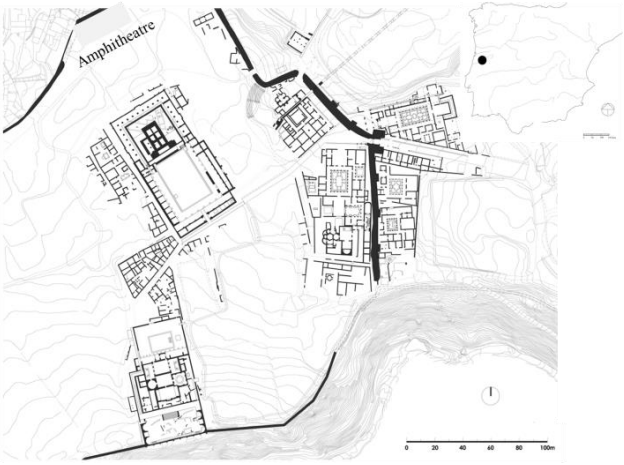

Figure 1. In the superior left part of the map, the squares excavated at the roman amphitheatre beside the late roman wall of Conimbriga. Adapted from Reis, De Mann & Correia (2011).

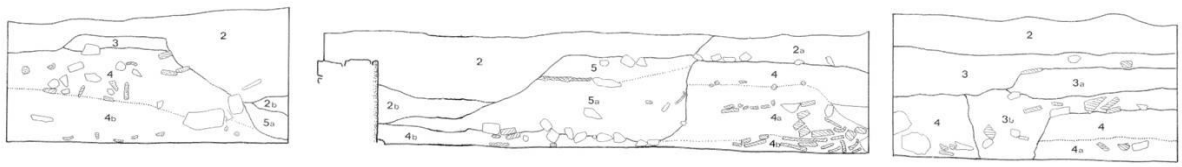

Figure 2. Profile one to three of the excavation of the Conimbriga roman amphitheatre. From Correia (1994b).

early post-barbarian invasions dates (cf. Alarcão 2004). Correia's excavation was the first to consider post-Roman remains since the Luso-French excavations undertaken some 40 years ago.

Correia partially and superficially excavated three squares (4 by 4 m each) in 1992 (Layer 1 was not included in the stratigraphic profile in fig. 2). The stratigraphic layers of the Late Roman and Medieval Periods were recorded in arbitrary levels in 1993 as well as the stratigraphy of the south profile (see fig.2).

Following the removal of the superficial layer (Layer 1), Layer 2, was found to comprise of broken blocks of mortar and large stones in which cracks and spaces were filled with soil. This layer represents the period of destruction of the wall and land-clearance for agricultural purposes.

Profiles one to three (fig.2), show the following stratigraphic horizons:

1 – Surface (soil) and other layers acquired in recent times.

2 – Second occupation in the south area, following the construction of the Late Roman Wall. The calibrated radiocarbon dates (Sac 1995, 1996, 1999 and 2003) span 895 - 1160 cal AD (1σ) and 785 - 1210 cal AD (2σ).

3 – Silo 1. Two 14C dates were obtained (Sac 1997 and 2000) which calibrated at 1σ are between 775 - 1020 cal AD, and at 2σ between 710 - 1025 cal AD.

4 and 5 – Silos 4 and 5were linked with the second occupation. One C14 date of 905 and 1160 cal AD. (2σ) was obtained (Sac 1998).

6 – This horizon overlays the amphitheatre demolition; it is the first occupation after the demolition of the amphitheatre and construction of the city wall in Late Antiquity.

7 – Period in which the amphitheatre demolition and corresponding city wall construction took place, dating from the last years of the 3rd century to the first quarter

	Roman period 3rd-4th cent.		**Late antiquity 6th-7th cent.**		**Islamic period 7th-11th cent.**		**Omiads period 8th-9th cent.**		**Almoravids period 9th-11th cent.**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
***Bos* sp.**	36	15%	4	2%	33	8%	41	9%	84	5%
Ovis/Capra	19	8%	10	6%	24	6%	17	4%	48	3%
***Sus* sp.**	19	8%	4	2%	30	7%	21	4%	42	3%
C. elaphus	2	1%	1	1%	5	1%	9	2%	32	2%
C. capreolus	0	0%	0	0%	11	3%	0	0%	0	0%
Artiodactyla	4	2%	5	3%	5	1%	7	1%	18	1%
***Equus* sp.**	1	0%	0	0%	0	0%	0	0%	2	0%
O. cuniculus	5	2%	7	4%	8	2%	31	7%	41	3%
Macrofauna	98	40%	30	17%	119	29%	113	24%	325	20%
Mesofauna	58	24%	17	10%	70	17%	64	14%	292	18%
Undetermined	0	0%	100	56%	100	25%	165	35%	741	46%
TOTAL	**242**		**178**		**405**		**468**		**1625**	

Table 1. Number of indentified specimens, by taxonomic species and undetermined size groups from the Conimbriga Amphitheatre.

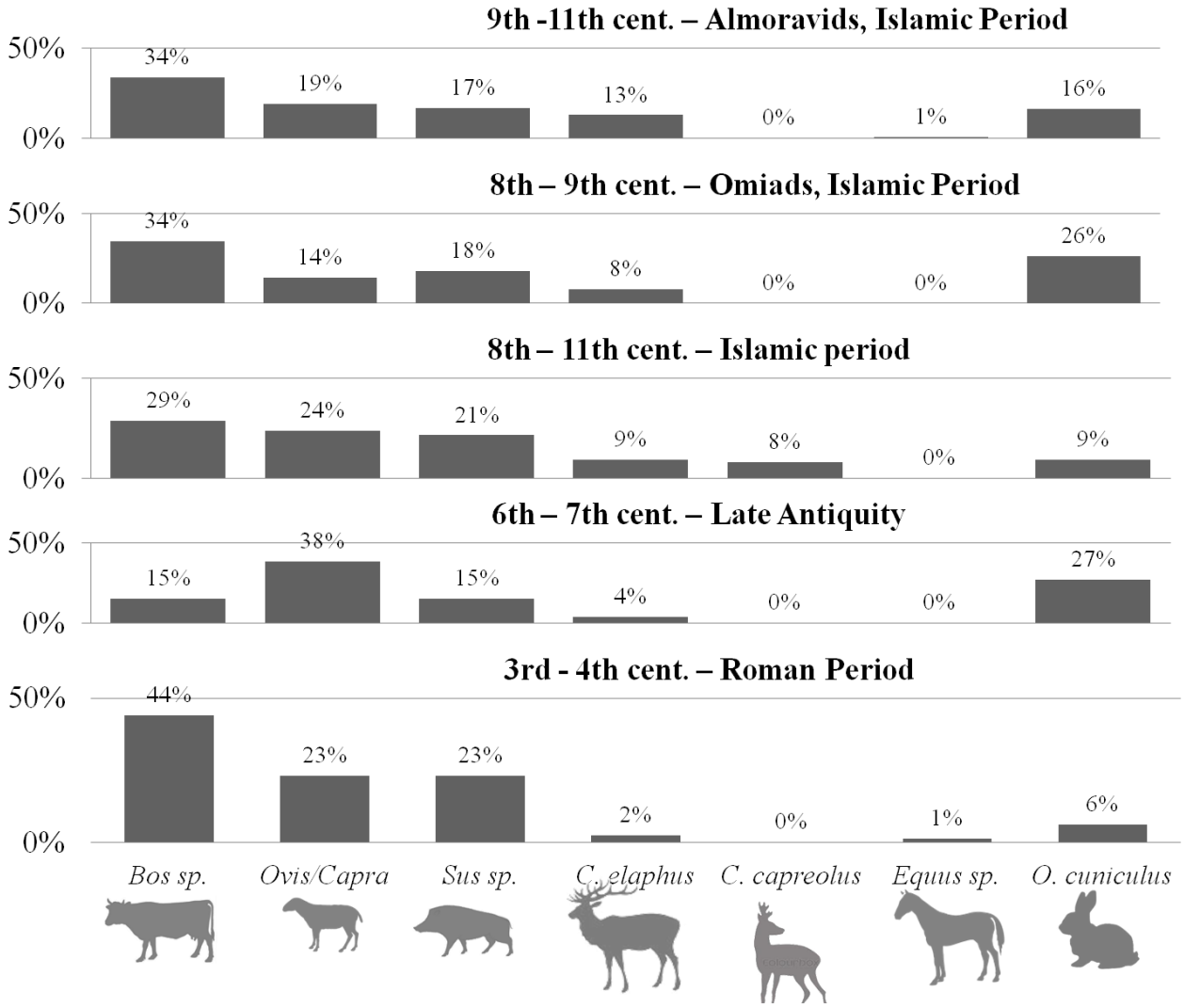

Figure 3. Comparison of the Number of Identified Specimens of the mammals in the several periods, since the the 3rd century to the 11th century.

of the 4th century AD.

8 – Amphitheatre construction. Dated to the time of Nero (1st century AD).

Based on Correia's (1994b) excavation report, as well as the site profiles and previous analyses of the materials (De Man 2006) , and ^{14}C dates De Man & Soares (2007).we grouped the occupations into 4 phases: Roman (3^{rd}-4^{th} cent.), Late Antiquity (6^{th}-7^{th} cent.), Omayyad (8^{th}-9^{th} cent.), Almoravid 9^{th}-11^{th} century), and included a larger Islamic period (8^{th}-11^{th} cent.) where it was not possible to refine the chronology further. The first and eighth stratigraphic horizons did not contain fauna.

Results and Discussion

The assemblage studied here comprises domesticated and wild animals commonly found in domestic environments of the periods under study: cattle, caprines, pigs, red deer, rabbits, a few carnivores, and birds. We observed and counted all bones. Those that could not be identified to species were classified into two size groups: macro (cow and horse size) and mesofauna (sheep, goat, pig size). In cases where it was not possible to classify bones by their size, they were classified as "undetermined". Most of the macrofaunal remains probably belonged to cattle, although a few may be of equids, since most of the identified macrofauna remains belonged to cattle (see table 1 and figure 3).

The largest numbers of animal bones are from the Islamic period layers. The fact that animal bones are less frequent in Roman and Late Antiquity layers suggests a less intense occupation of this part of the site during Roman times. However, since faunal remains generally represent waste, it is likely that they were removed from time to time from the inhabited areas during the Roman period, practice that decreased with the decline of the Roman city in Late Antiquity and subsequent periods.

The final period (9^{th}-11^{th} cent. AD) also has higher frequencies of animal bones, a pattern that may support

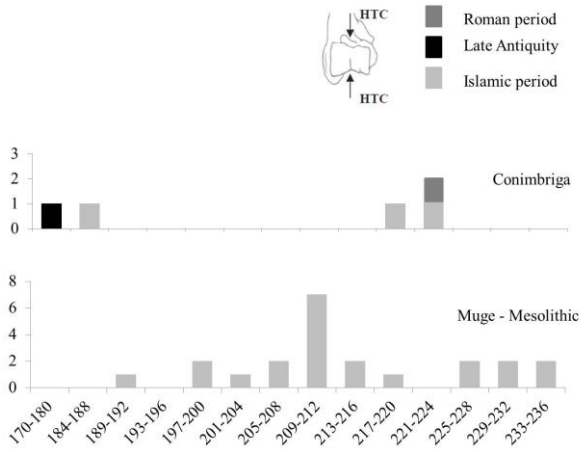

Figure 4. Histograms showing the height of throclea of the distal humerus of Sus sp., from Conimbriga in the different periods and from Mesolithic Muge shellmiddens (Detry, 2007) to compare with wild boar measurements.

the argument that the area was cleaned prior to the Moslem occupation.

For all parts of the skeleton by period and species see tables 2 to 6.

Bone recovery

Overall the bones are well preserved. However, those of larger animals may be over-represented in relation to smaller animals, e.g. rabbit and birds, due to a recovery bias (no screening was carried out; the bones were hand-recovered). Sixty-four to 84% of the bone assemblage was not identifiable to species. Macrofaunal remains were more abundant than Mesofauna, a pattern that is consistent with the list of species identified. The high number of unidentifiable remains due to bone fragmentation, which is normal for bone assemblages due to natural factors such as erosion and the effects of soil, weather and anthropic action over time.

Species present

a) Cattle *(Bos taurus)*

Cattle were the most common bones throughout the various periods of occupation, except in Late Antiquity. According to Castaños (1991) aurochs became extinct in Iberia during the Bronze Age. This is consistent with the zooarchaeological patterning in Portuguese sites, including Conimbriga, in which none of the *Bos* bones were of a size identifiable as aurochs, therefore all the *Bos* remains most probably belong to domestic cattle.

Bearing in mind a potential recovery bias, cattle appear to have been of great importance in the Conimbriga diet and local economy. In most contexts, all parts of the skeleton of cattle were present. The Late Antiquity levels are an exception; only the meat-bearing parts were present. This

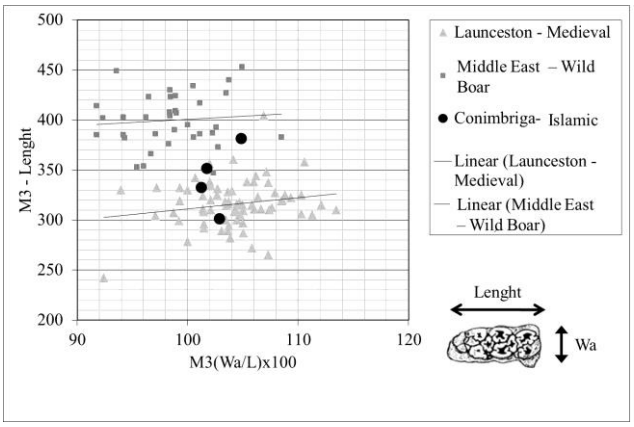

Figure 5. Graphic with measurements of the third inferior molar of Sus sp. Comparing elements from wild boar and domesticated form (pig).

pattern might be explained by the small sample size or else prior human selection, for example, if the carcass was butchered elsewhere in the city and only the meat-bearing parts taken to the site.

There is no evidence for the consumption of animals younger than 3-4 years as few unfused bones were recovered. Animals may have been kept into maturity for their secondary products, e.g. milk and power for transport of goods and/or ploughing, and only subsequently killed for their meat. Indeed, some bones exhibit pathological conditions associated with traction.

b) Sheep/Goat *(Ovis aries/Capra hircus)*

Caprines are the second most frequent group in most of the periods except Late Antiquity, in which they are the most frequent group. Distal parts of the limbs are absent in the Roman Period; likewise, distal parts of the limbs are absent in Late Antiquity levels as well as the bones of the head. These patterns support the argument that the animals were butchered elsewhere and that the faunal assemblage represents food refuse, i.e., carcasses were brought into the settlement already butchered and/or otherwise prepared. The age at death indicates the consumption of young animals, although in later contexts some animals were kept to an older age, presumably to exploit their milk and wool. However, the sample of fused bones is too small to draw firm conclusions.

c) Suids *(Sus scrofa)*

Suids are relatively abundant, particularly in the Islamic levels. The consumption of wild boar during the Islamic period is suggested by two humeri of wild boar size (see fig. 4) and a single lower third molar that is shaped like that of the wild species (fig. 5). This suggests that although the consumption of domestic pig is generally banned in Islam, wild boar consumption was sometimes permitted (Simmoons, 1961).

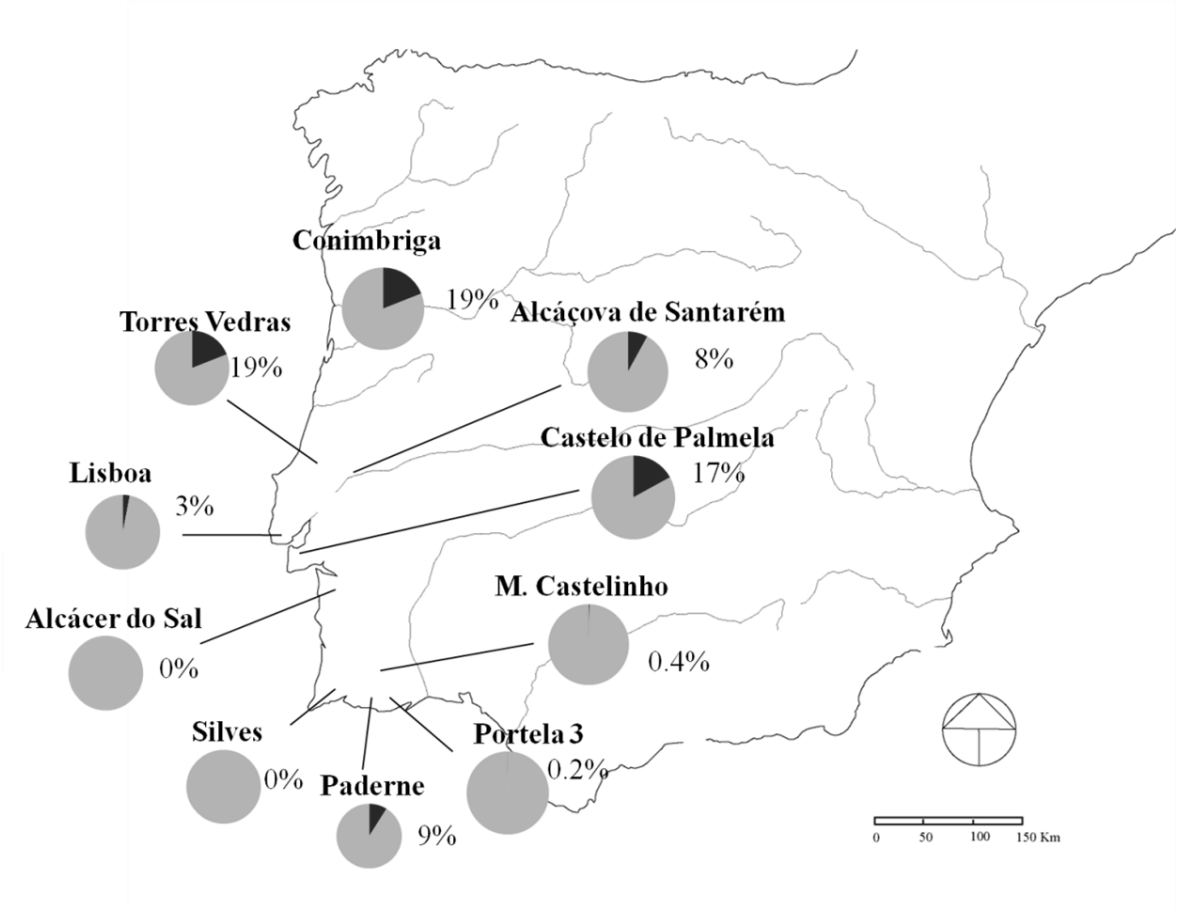

Figure 6. Percentages of pig in several sites with Islamic occupation in Portugal. Data from: Paderne e Portela 3 - Pereira, 2010; Mesas do Castelinho – Cardoso (1994); Silves – Davis et al., 2008; Álcácer do Sal – Valente, 1996; Lisboa – Moreno-Garcia & Gabriel, 2001; Torres Vedras – Gabriel, 2003; Alcáçova de Santarém – Davis, 2006; Conimbriga – this work).

The presence of pig also suggests that the eating habits of local people were not significantly altered by the Moslem practices of their occupiers. It can be inferred that Moslem practices were not strictly imposed in this region, possibly because the Islamic occupation was both shorter and had less influence on the indigenous social and economic practices of central Portugal.

Fig. 6 summarises the percentage of suids found in various other archaeological bone assemblages in Portugal. Suids are more frequent in the north, which corroborates the hypothesis that Islamic culture had less influence or was less strict in the higher latitudes of the Iberian Peninsula.

d) Red deer *(Cervus elaphus)*

This species is consistently present throughout the sequence at Conimbriga, although in small numbers. The pattern suggests that big game hunting continued but was uncommon. Possibly hunting was associated with higher status (see Mackinon 1999-2000 regarding the link between hunting and status). Complex hunting methods, using horses and dogs, may have been used as such scenes are prominent in illustrations on late 3rd cent. mosaics found in Conimbriga (Oleiro 1992, 104-109).

At some archaeological sites from the medieval period onwards, red deer is less frequent, probably due to overhunting and habitat destruction (Cardoso, 2002; Davis, 2006). Curiously, at Conimbriga the pattern is reversed: deer occur in higher frequencies in the Medieval Period, especially during the Almoravid occupation. Again, this pattern may indicate that the site was occupied by groups of high social or military status at this time. High-status hunting related objects are also known from the archaeological record of Late-Roman/Early-Medieval times in Conimbriga (Correia 2003, 39). In fact, Cardoso's (1994) faunal analysis of samples from the Almohad castle of Mesas do Castelinho (Almodovar, in southern Portugal) found he bones of red deer to be remarkably abundant, which was attributed to the hunting activity by military garrison. In the Almohad castle example, the high number of wild species was explained by the population being military rather than agriculturalist or pastoralist.

Davis (2006) when analysing the remains from "Alcáçova de Santarém" proposed that deer populations began to decrease during the Roman period of Santarém, which can be explained by the gradual deforestation of Portugal, as indicated by the palaeobotanical evidence (Mateus 1992). In Conimbriga the reverse pattern is

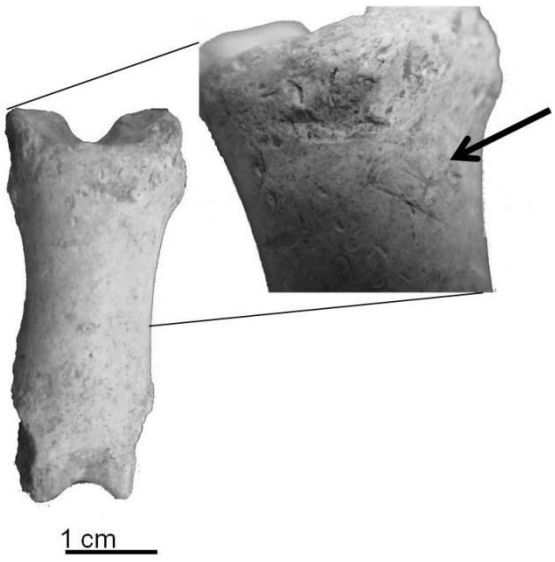

Figure 7. Proximal phalanx of a bear (Ursus arctos) found in the roman amphitheatre of Conimbriga.

evident, red deer increases during the medieval occupation, although its proportion is always under 10%. In the Islamic period in Silves, in southern Portugal, red deer is also scarce (Davis, 2008; Antunes, 1997).

e) Roe deer *(Capreolus capreolus)*

At Conimbriga roe deer is represented by only 11 bone fragments which probably belong to a single individual. The fact that several parts of the skeleton (cranium, posterior and anterior members) are present might mean the animal was brought complete to the site, rather than having been butchered elsewhere.

Roe deer is rare in Portugal today and now inhabits exclusively the mountainous areas of the north, most likely due to human predation. The comparatively low numbers of roe deer found in archaeological sites, compared to red deer, may be explained by the fact that it is more difficult to hunt, than red deer, due to its speed. Its density could also be rare at this time or take refuge in areas of difficult access, such as the mountain range near Conimbriga.

f) Rabbit *(Oryctolagus cuniculus)*

Although rabbit is probably underrepresented, due to the lack of sieving during excavation, its presence indicates that small game hunting was a part of this economy. There was no signs of intrusions of this species such as burrows.

g) Bear *(Ursus arctos)*

Only one proximal phalanx of bear was found (see fig. 7). It exhibited cutmarks, a feature that usually indicates fur removal, particularly on this meatless part of the skeleton. Bear is commonly valued for its fur. Until the end of the middle ages, bear-hunting in Portugal was an activity reserved for the aristocracy and the king (Cardoso, 2001). Similar examples of bear hunting occurred in the Medieval Palmela castle (13^{th}-14^{th} cent.) (Cardoso & Fernandes, 2012) and Santarém (Davis, 2006).Various parts of bear skeleton were found in the Late Medieval levels of Leiria castle (Cardoso, 2001) and Roman levels of Monte Molião (Lagos, Algarve) (Detry & Arruda, 2013).

h) Other Carnivores

Domestic dog (*Canis familiaris*) is represented by a single metatarsal, recovered from the Islamic period. The dog is notably underrepresented given that it is commonly kept by humans. However, its absence from the contexts examined here is understandable because dogs are rarely used as food and the contexts examined here appear to contain primarily food refuse.

Otter (*Luttra lutra*) is represented by a single proximal ulna. Badger (*Meles meles*) is represented by two pelvis fragments, one proximal radius and one proximal femur. Both otter and badger were found in Silo 2 (Almoravid period). These remains are probably intrusive since both animals commonly burrow into archaeological sites.

i) Birds

Bird bones are commonly underrepresented in archaeological assemblages because their bones are fragile and rarely survive deposition. In addition, their small size can influence their representation in the sample, particularly in cases, such as the present study, where the archaeological sediments were not sieved.

Six bird bones were identified – all are Galliformes (land fowl) and Anatidae (water fowl). One complete femur of red partridge (*Alectoris rufa*) was found in Islamic period contexts, confirming the hunting of small game during this period.

Three of the bones were identified as *Gallus domesticus*: one distal ulna at the Silo 1 (8^{th}-9^{th} cent.), one complete tibiotarsus from the same period, and one distal tibiotarsus from Late Antiquity. This species has been found at several Portuguese Roman sites including, among others, Castro Marim, Quinta das Longas and Alcáçova de Santarém. Anatidae, were represented by two distal humeri, one from the Islamic period and the other, probably duck, from the Roman layers.

A musical instrument made with a griffon vulture (*Gyps fulvus*) ulna, probably Roman, with unknown provenance in Conimbriga (published by Moreno-García & Pimenta

2008) provided an example of the use of an animal for purposes other than food.

The economy of Conimbriga compared to other sites

In the majority of Portuguese Roman and Iron Age sites, the most common species of medium-large mammals represented are sheep and goats (4th-5th cent. AD Torre de Palma, Mackinon, 1999-2000; 2nd – 4th cent. Quinta do Marim, Antunes & Chauviré, 1992; 4th cent. BC Quinta das Longas, - Cardoso & Detry, 2005; Castro Marim 1st cent. BC - 1st cent. AD – Davis, 2007). The Conimbriga sheep and goat assemblages are small compared with these other sites, suggesting that beef was probably of higher importance in this economy (see Cardoso & Detry, 2005, for calculations on amount of meat).

In Conimbriga, wild animals represent approximately 30% of the number of identified specimens (NISP). Rabbit appears to be the main hunted species, assuming that rabbits were hunted and not tamed or kept in pens.

Red deer and wild boar probably provided the people of Conimbriga with about 5% of their meat intake. This small percentage suggests low levels of big game hunting, an activity probably reserved for the privileged classes, as Mackinon (1999-2000) suggested at Torre de Palma.

At Castanheira do Ribatejo, near Lisbon, there is also residual hunting of red deer and rabbits (Cardoso, 2009). In the other opposite Red deer constituted c. 28% of the bones found at the 1st to 4th c. Roman occupation of Pessegueiro (Cardoso, 1993), a pattern that is thought to be evidence of hunting by visiting sailors.

At Mesas do Castelinho (southern Portugal) which was adjacent to dense forests containing abundant game, big game is also very abundant in the remains recovered (Cardoso, 1994).

Castro Marim (Davis, 2007) and Monte Molião (Detry & Arruda, 2013) red deer bones are less common than those of domesticated species, but very close to *Bos taurus* in numbers which appears to represent an intermediate situation.

Quinta das Longas also has abundant red deer and rabbit, although most (63%) of the faunal remains are domesticated species (Cardoso & Detry, 2005).

The faunal patterning suggests that, at Roman sites located in the more rural areas (*e.g.* Mesas do Castelinho), people depended more on hunting and less on pastoralism. And in more urban sites such as Conimbriga and Castanheira do Ribatejo, domesticated species were the main source of meat and secondary products.

Another aspect is that until the beginning of the Middle Ages, the south of Portugal was densely forested providing the perfect environment for species like red deer and wild boar (Cardoso, 1994). Perhaps central Portugal was less densely forested and the larger towns, such as Conimbriga, depended to a greater extent upon domesticated livestock for their meat supply.
Zooarchaeological studies of urban sites like Conimbriga are still all too scarce.

Conclusions

The faunal assemblage from Conimbriga is little different from those found in most Portuguese Roman and Medieval faunal assemblages. It is dominated by four main species of domesticated livestock – cattle, pig, sheep and goat (as reported by Cardoso 1995 report on Conimbriga). These animals undoubtedly provided both primary food products (meat, fat, skin, bones etc) as well as secondary products including as milk, wool, dung and in the case of cattle, muscle power.

Cattle dominate the fauna throughout the occupation until Late Antiquity when smaller animals like the caprines and rabbit become more important.

The presence of pig in the Moslem period suggests that the Koranic prohibition on the consumption of this animal was not strictly enforced here. It is also quite likely that many of the inhabitants of Conimbriga were Christian. We concluded that Islam had less influence on the food and husbandry practises of the indigenous people of central Portugal than indigenous communities in the south of Portugal. We also concluded that big game hunting was only of minor importance at Conimbriga.

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	Bos sp.	*Ovis/Capra*	*Sus* sp.	*C. elap.*	Artiod.	Equid	*O. cunicu.*	Macro	Meso	Und.
Cranium										
Cranium		2						10	2	
Maxillary	1						1			
Mandible	1	1						8		
Teeth	2	5	3							
Axial										
Atlas	1		1							
Axis	1									
Ribs								12	10	
Vertebrae								20	8	
Anterior										
Scapula	2	4	4		2		2	1	1	
Humerus		1	3		2					
Radius	2		1	1			1			
Ulna		1	3							
Metacarpal	5									
Posterior										
Pelvis	1	1						3		
Femur	6							1		
Patela	1									
Tibia	4	4		1			1			
Os maleolus	1									
Calcaneum			1			1				
Astragalus	3									
Metatarsal	2		3							
Metapodial										
Phalanx I	3									
Phalanx II										
Phalanx III										
Long Bones								23	35	
Undetermined								20	2	
TOTAL	**36**	**19**	**19**	**2**	**4**	**1**	**5**	**98**	**58**	**0**

Table 2. Number of indentified specimens by parts of the skeleton in the Roman period -3rd-4th century from the Conimbriga Amphitheatre.

	Bos sp.	*Ovis/Capra*	*Sus* sp.	*C. elap.*	Artiod.	*O. cunicu.*	Macro	Meso	Und.
Cranium									
Cranium								1	
Maxillary									
Mandible							1	3	
Teeth									
Axial									
Atlas	1								
Axis									
Ribs							4	13	
Vertebrae						1	6		
Sacrum									
Anterior									
Scapula						2	3		
Humerus		2	1		1				
Radius		2	1		1				
Ulna		1	1		1				
Metacarpal		1							
Posterior									
Pelvis						1			
Femur		1			1	3			
Patela									
Tibia	1			1					
Fibula			1						
Os maleolus									
Calcaneum	1				1				
Astragalus									
Metatarsal	1	2							
Metapodial									
Phalanx I		1							
Phalanx II									
Phalanx III									
Long Bones							11		14
Undetermined							5		86
TOTAL	**4**	**10**	**4**	**1**	**5**	**7**	**30**	**17**	**100**

Table 3. Number of indentified specimens by parts of the skeleton in the Late antiquity - 6th-7th century from the Conimbriga Amphitheatre.

	Bos sp.	*Ovis/Capra*	*Sus* sp.	*C. elap.*	Artiod.	*O. cunicu.*	Macro	Meso	Und.
Cranium									
Cranium	1	2					9	6	
Maxillary			2				1		
Mandible	2						9	5	
Teeth	6	9	6	2					
Axial									
Atlas	2			1					
Axis	1				1				
Ribs							19	14	
Vertebrae						2	27	15	
Sacrum								1	
Anterior									
Scapula	1	1	2			3	2		
Humerus	3				1	8			
Radius	1	1	1	1	2	1			
Ulna	1	1	4		1	2			
Scaphoid	2								
Metacarpal	1								
Posterior									
Pelvis		1				4	5	2	
Femur	4		1			4			
Tibia	1		1		1	7			
Calcaneum	3								
Astragalus	4								
Metatarsal	2	1	2	1					
Metapodial				1	1				
Phalanx I	4	1	1						
Phalanx II	1		1	2					
Phalanx III	1			1					
Long Bones							15	20	
Undetermined							26	1	165
TOTAL	**41**	**17**	**21**	**9**	**7**	**31**	**113**	**64**	**165**

Table 4. Number of indentified specimens by parts of the skeleton in the Omiads period – 8th – 9th century from the Conimbriga Amphitheatre.

	Bos sp.	*Ovis/Capra*	*Sus* sp.	*C. elap.*	Artiod.	Equid	*O. cunicu.*	Macro	Meso	Und.
Cranium										
Cranium	1	4						16	7	23
Maxillary			1				1	1		
Mandible	4	2	4				5	18	13	
Teeth	11	14	15	3						
Axial										
Atlas	2	1		1						
Axis	2	1			1					
Ribs								55	74	
Vertebrae							2	54	39	
Sacrum									5	
Anterior										
Scapula	1	2	2	1			2	3	4	
Humerus	3	2	1	1	2					
Radius	6	2	1	1	2	1	4			
Ulna	1		1		1		3			
Scaphoid	2									
Piramidal	1									
Metacarpal	5	4	1		1					
Posterior										
Pelvis	4	2	3				9	8	5	
Femur	4						2			
Patela							5			
Tibia	2		3	1			3			
Calcaneum	7	2	3		4					
Astragalus	5				1	1				
Metatarsal	2	1		2						
Metapodial			2	4	1					
Phalanx I	6	2	1	4						
Phalanx II	5		4	4						
Phalanx III	3			2						
Long Bones								97	103	
Undetermined								55	12	539
TOTAL	**77**	**39**	**42**	**24**	**13**	2	**36**	**307**	**262**	**562**

Table 5. Number of indentified specimens by parts of the skeleton in the Almoravids period 9th-11th century from the Conimbriga Amphitheatre.

	Bos sp.	*Ovis/Capra*	*Sus* sp.	*C. elap.*	*C. cap.*	Artiod.	Equid	*O. cunicu.*	Macro	Meso	Und.
Cranium											
Cranium		1	1		2				7	6	17
Maxillary			1						1		
Mandible	2		1					1	7	11	
Teeth	9	8	11								
Axial											
Atlas	3	6	2								
Axis		3									
Ribs									43	37	
Vertebrae									40	17	
Sacrum										2	
Anterior											
Scapula	4	8	8	1		2			5	2	
Humerus	2	3	5	2		1		4	1	1	
Radius	4	5	7	3	1	2		1	2	1	
Ulna	1	1	2			1			1		
Metacarpal	5	3	3	2							
Posterior											
Pelvis	4	4	4				1	5	5	4	
Femur	1	2	3	1	1	2		4	3	1	
Patela								1			
Tibia	3		4		1	6	1	3			
Calcaneum	5	1			1		1				
Astragalus	3	1	2		1		1				
Cuneiforme	1										
Metatarsal	4	5	1	1	1						
Metapodial			2	1		2					
Phalanx I	4	2	1	1	3						
Phalanx II	4			1							
Phalanx III	2			1							
Long Bones									36	54	
Undetermined									70	1	241
TOTAL	**61**	**54**	**58**	14	**11**	**11**		**16**	**221**	**137**	**258**

Table 6. Number of indentified specimens by parts of the skeleton in the Islamic period 7th-11th century from the Conimbriga Amphitheatre.

	Firemarks	Cutmarks	Chopped	Rodents	Carnivores
3rd /4th cent. – Roman period					
Bos	0	11	1	4	1
Ovis/Capra	0	2	0	1	0
***Sus* sp.**	0	5	0	2	1
C. elaphus	0	0	0	0	0
Equus sp.	0	0	0	1	0
O. cuniculus	0	0	0	0	0
Artiodactyla	0	0	0	1	0
Macrofauna	0	3	1	2	1
Mesofauna	0	2	0	2	0
Undetermined	1	0	0	0	0
6th/7th cent. - Late Antiquity					
Bos	0	2	0	1	1
Ovis/Capra	0	1	0	0	0
***Sus* sp.**	0	1	0	0	0
C. elaphus	0	0	0	0	0
3rd /4th cent. – Roman period					
Bos	0	11	1	4	1
Ovis/Capra	0	2	0	1	0
***Sus* sp.**	0	5	0	2	1
C. elaphus	0	0	0	0	0
Equus sp.	0	0	0	1	0
O. cuniculus	0	0	0	0	0
Artiodactyla	0	0	0	1	0
Macrofauna	0	3	1	2	1
Mesofauna	0	2	0	2	0
Undetermined	1	0	0	0	0
6th/7th cent. - Late Antiquity					
Bos	0	2	0	1	1
Ovis/Capra	0	1	0	0	0
***Sus* sp.**	0	1	0	0	0
C. elaphus	0	0	0	0	0

Table 7. Taphonomic information of anthropic and animal origin in the elements observed for this study.