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Animal remains from Iron Age and Roman Odemira, Portugal

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Veni, vidi, vici (Caesar, J. 46 BC)

ABSTRACT: Animal remains from excavations of the Iron Age II (end IVth century - early IIIrd century BC) and Roman Republican (Ist century BC) part of a defensive ditch of Odemira hillfort in SW Portugal are described. Most derive from domesticated animals like cattle, goats and pigs, and a hunted animal, red deer. There are two substantial changes between Iron Age and Roman times. The first is a huge increase in the frequency of red deer. This may reflect a rise in the status of the inhabitants. The second is a change in the age-at-slaughter of the cattle: most Iron Age cattle were slaughtered quite young while those in Roman times were not slaughtered until old. This probably reflects a change in the management strategy of cattle. In the Iron Age the emphasis in cattle production was for meat while the Romans kept cattle more for their power and milk. Other animals present include birds, dog, fox, horse, rabbit, and in the Roman period, some marine shells.

KEYWORDS: IRON AGE, ROMANISATION, ANIMAL SECONDARY PRODUCTS

RESUMEN: Se describen los restos animales recuperados en una parte del foso defensivo del Castillo de Odemira (Portugal sudoccidental). Estos se agrupan en una fase correspondiente a la II Edad del Hierro (finales s. IV-principios s. III a.C.) y romana-republicana (I a.C.). La mayoría proceden de especies domésticas tales como la cabra, el cerdo y el ganado vacuno, así como de una especie cinegética (el ciervo). Se constatan dos grandes cambios entre ambas épocas, el primero supone el enorme aumento del ciervo en época romana lo que podría reflejar un más alto estatus social de la población. El segundo cambio refiere distintos momentos de sacrificio del ganado vacuno. En la Edad del Hierro se sacrificaban reses jóvenes, mientras que en época romana el sacrificio lo era preferentemente de individuos viejos. Ello refleja un cambio en la gestión del vacuno que estaría centrado en la producción cárnica en época del Hierro mientras que los romanos habrían preferido la leche y la selección de animales para tracción. Otros animales identificados incluyen al perro, zorro, caballo, conejo y algunas aves, así como conchas marinas en época romana.

PALABRAS CLAVE: EDAD DEL HIERRO, ROMANIZACIÓN, PRODUCTOS SECUNDARIOS DE ORIGEN ANIMAL

INTRODUCTION

Odemira is situated on the river Mira, in the district of Beja, Alentejo Litoral in southern Portugal. This town is 20 km east of the present-day Atlantic coastline, from where it could be directly reached by large vessels navigating the deeper waters of the lower section of that river. Sea water - subject to tidal variations - entered the Mira as far as Odemira. Here, on the right bank, the Iron Age hillfort is located in the centre of the old town, some 27 metres above sea level, at latitude 37º35'49'' N and longitude 8º38'35'' W. Excavations directed by Jorge Vilhena, in the northern slope of the hill, were carried out between 2002 and 2003, prior to reconstruction of the local cinema/theatre (see Vilhena & Grangè, 2011; Vilhena & Rodrigues, 2009). These revealed a 12 m long segment of the defensive ditch of the hillfort, which began to be filled in the late 4th century BC. It had filled completely and hence became inoperative by the end of the Roman Republican Period (late 1st century BC) with increasing quantities of human debris thrown from the residential area nearby. This debris comprised pottery (including massive quantities of amphorae and campanian ware), iron slag, ashes, building material, clay and a small but interesting collection of Iron Age and Roman faunal remains. Most belonged to mammals and their description forms the subject of this brief article.

The layers excavated derive from the Iron Age II period (end IVth – end IIIrd century BC), a chronologically intermediate period termed "Iron Age – Roman transition" (IInd century BC) and the Roman Republican (Ist century BC):

Roman Republican	Ist century BC
Roman – Iron Age transition	IInd century BC
Iron Age	end IVth – end IIIrd century BC

The Odemira faunal remains are important for several reasons. First, there is a dearth of reported Iron Age and Roman animal bones from Portuguese archaeological sites; second, the remains bridge the Iron Age to Roman transition which should help to elucidate to what extent, if any, the arrival of Roman rule in this part of the Iberian Peninsula influenced animal husbandry, and third they are rather tightly dated to periods extending a mere one or two centuries. The animal bones, as we shall see, also help in the interpretation of the site's occupation and are stored in the Reserva Arqueológica da Câmara Municipal de Odemira – the Odemira Town Hall.

MATERIAL AND METHODS

Most of the bones are poorly preserved and many near-complete or complete long bones and mandibles had to be reinforced during excavation with an acetone soluble glue and cotton gauze. Approximately 150 bones, mandibles and isolated teeth as well as 8 marine mollusc shells were recorded (see Tables 1 – 4). For a full description of the methods used to record and count the animal bones see Davis (1992, 2002). In brief, all mandibular teeth and a restricted suite of «*parts of the skeleton always recorded*» (*i.e.,* a predetermined set of articular ends/epiphyses and metaphyses of girdle, limb and foot bones) were recorded. [These are also termed PoSACs.] In order to avoid multiple counting of very fragmented bones, at least 50% of a given part had to be present for it to be included.

A mammal-bone epiphysis is described as either «unfused» or «fused»; «unfused» when there are no spicules of bone connecting epiphysis to shaft so that the two separate easily, and «fused» when it cannot be detached from the metaphysis. Caprine teeth were assigned to the eruption and wear stages of Payne (1973, 1987) and cattle and pig teeth were assigned to the eruption and wear stages of Grant (1982). Measurements taken on the humerus and metapodials are illustrated in Davis (1996: figure 1). In general, other measurements taken are those recommended by Driesch (1976).

The presence of cut marks observed on some of the bones indicates that they are mainly derived from meals eaten by the ancient inhabitants of Odemira.

THE TAXA FOUND

The assemblage is dominated by cattle and red deer remains while those of caprines (sheep/goat), pig/wild boar, equid, dog, fox and possibly roe deer are also present.

Caprines – sheep and goat. Sheep and goat teeth and bones are generally difficult to distinguish.

Some, such as the milk teeth (dP_3 and dP_4), humerus, astragalus and metapodials (Boessneck, 1969; Payne, 1969, 1985), are easier to identify. Most of the caprines were indistinguishable sheep or goat. Of the few that could be identified, there are three mandibles with milk teeth that are definitely goat and an astragalus that is also definitely goat. No caprine bones or teeth could be identified as sheep, though it is likely that with a larger sample some sheep would be found.

Bos - cattle. Several bones of a large bovid are identified as cattle. The cattle bones and teeth are not large and far too small to represent the wild ancestral species *Bos primigenius* or aurochs – which probably became extinct in the Iberian Peninsula during or soon after the Chalcolithic (Castaños Ugarte, 1991; Estévez & Saña, 1999).

Cervids – red deer and roe deer. A number of large cervid bones and teeth are identified as *Cervus elaphus*, the red deer, once an important component of the Iberian large mammal fauna. Since it is an animal that cannot be domesticated its presence indicates hunting by the inhabitants of Odemira. It was the principal prey of the nobility in medieval Portugal and Europe (Costa, 1963; II, 69) and, for example, red deer remains constituted between 4% and 17% of the fauna from the Iron Age, Roman and Moslem levels at Alcáçova de Santarém (Davis, 2006). The identity of a poorly preserved distal part of a small humerus is probably but not certainly roe deer.

Sus - pig/wild boar. A few teeth and foot bones belonged to pig/wild boar (the two are difficult to distinguish). Measurements of the two *Sus* distal humeri indicate a small and a large animal. Comparison with the *Sus* humeri from the Chalcolithic sites of Leceia and Zambujal (see Albarella *et al*., 2005) indicates that the small specimen probably belonged to a domestic pig and the large one may have belonged to a wild boar. However the wild-domestic distinction is difficult in the Iberian peninsula due to the considerable overlap in size between the larger wild boar and smaller pig, and so these are uncertain identifications.

Equus. Measurements of the equid proximal phalanx when plotted on figure 7 in Davis *et al*. (2008) indicate that this bone quite clearly belonged to a horse rather than a donkey.

Other animals. The rabbit was probably eaten by the human inhabitants of the settlement (although only a single bone was identified and it lacks any butchery marks), and this animal – ubiquitous in archaeological sites in the Iberian Peninsula – was probably more common at Odemira. [Generally rabbit bones from Holocene archaeological sites here show signs of butchery.] Its scarcity here may reflect the difficulty during excavation of seeing the small bones of this animal in the thick clay soil of Odemira. This may also explain the apparent scarcity of small animal remains in the assemblage. At least two species of bird are represented: a tibiotarsus of a raven (*Corvus corax*) and a femur, probably of a chicken. A fish vertebra, six oyster valves, a carpet shell, and a murex were found in the Roman Republican period as well as a fragment of the central spire of a large marine gastropod (similar in size to *Charonia*). The absence of these marine molluscs from the Iron Age levels may be significant. However with such small samples it is not possible to draw more definite conclusions.

FREQUENCIES OF TAXA (Figure 1)

Despite their small sizes, the samples of bones show a very marked shift in the frequencies of taxa from Iron Age to Roman Republican period. Particularly striking is the enormous increase of red deer in the Roman layer – with some 43% of the mammal bones belonging to this taxon in this period compared to a mere 5% and 3% in the preceding Iron Age and Roman-Iron Age transition periods respectively. Similarly pig/wild boar is scarce in the Iron Age (2%) but more common (15%) in the Roman period. The increased frequencies of red deer and pig in the Roman period appear to occur at the expense of the caprines (sheep/goat) and cattle whose frequencies are lower in Roman times. Another difference worth noting is the slightly higher number of mammal taxa in the Roman (n = 8) than in the Iron Age (n = 6). The Roman-Iron transition period's faunal sample is too small to attach much significance to the even smaller spectrum of taxa (n = 3) in this intermediate period. The number of recorded bones in the Roman Republican period is 71½ which is slightly greater than the 61½ bones recoded in the Iron Age. This, admittedly small, incremental increase of recorded bones could explain the extra two taxa in the Roman period at Odemira.

Bone/tooth	F/U	Bos	O	(CAH)	(OVA)	S	CEE	ORC	EQ	Canis	VUV	Birds	Others
dP_4		-				-	1	-	-	-	-		
P_4		2	-			-	1	-	-	1	-		
$P_{3/4}$		-	-			-	-	-	-	-			
M_1		3	-			-	-	-	-	1	-		
$M_{1/2}$		1	2			1	1	-	-	-			
M_2		4	-			1	2	-	-	1	-		
M_3		3	-			2	3	-	-	-	-		
Mandible							-	-	-				
Scapula	U	-	-			-	-	-	-	-	-		
“	F	-	-			-	2	1	-	-	-		
“	?	-	-			1	2	-	-	-	-		
Humerus	UM	-	-			-	-	-	-	-	1		
“	UE	-	-			-	-	-	-	-	-		
“	F	1	1			1	4	-	-	-	-		
“	?						1				-		
Radius	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	1	-			-	2	-	-	-	-		
M’Carpal	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	-	-			-	½	-	-	-	-		
Ischium		-	-			2	-	-	2	-	-		
Femur	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	-	-			-	1	-	-	-	-	GNP-1	
Tíbia	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	-	-			-	2	-	-	-	-	COC-1	
Calcaneum	U	-	-			-	-	-	-	-	-		
“	F	-	-			-	-	-	-	-	-		
“	?	-	-			-	1	-	-	-	-		
Astragalus		1	-			-	5	-	-	-	-		
M’Tarsal	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	1	-			-	½	-	-	-	-		
Phalanx I	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	1	-			1	2	-	1	-	-		
Phalanx III		-	-			1	-	-	1	-	-		
M’Podial	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	-	-			½	-	-	-	-	-		
Others		-	-			-	-	-	-	-			
Totals		18	3			10½	31	1	4	3	1		

Other finds: Fish vertebra – 1;
Oyster valves – 6;
Cf *Venerupis decussata* shell - 1
?Murex shell - 1
Amphibian long -bone – 1.

TABLE 1

Counts of different parts of the skeleton and other faunal remains from the Roman Republican layers at *Odemira CinéTeatro* excavations. Taxa are as follows: B cattle, O sheep or goat, CAH goat, OVA sheep, S pig/wild boar, CEE red deer, ORC rabbit, EQ equid, Canis dog, VUV fox, GNP probable chicken, COC raven, CAC roe deer.

Bone/tooth	F/U	Bos	O	(CAH)	(OVA)	S	CEE	ORC	EQ	Canis	VUV	Birds	Others
dP_4		-				-	-	-	-	-	-		
P_4		-	2			-	-	-	-	-	-		
$P_{3/4}$		-	-			-	-	-	-	-	-		
M_1		1	2			-	-	-	-	-	-		
$M_{1/2}$		2	-			-	-	-	-	-	-		
M_2		1	2			-	-	-	-	-	-		
M_3		1	3			-	-	-	-	-	-		
Mandible							-	-	-				
Scapula	U	-	-			-	-	-	-	-	-		
“	F	-	-			-	-	-	-	-	-		
“	?	1	-			-	-	-	-	-	-		
Humerus	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	-	1			-	-	-	-	-	-		
“	?	-	-			-	-	-	-	-	-		
Radius	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	-	-			-	-	-	-	-	-		
M’Carpal	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	1	-			-	-	-	-	-	-		
Ischium		1	-			-	-	-	-	-	-		
Femur	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	1	-			-	-	-	-	-	-		
Tibia	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	1	1			-	-	-	-	-	-		
Calcaneum	U	-	-			-	-	-	-	-	-		
“	F	2	-			-	1	-	-	-	-		
“	?	3	-			-	-	-	-	-	-		
Astragalus		4	1	1		-	-	-	-	-	-		
M’Tarsal	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	2	-			-	-	-	-	-	-		
Phalanx I	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	3	-			-	-	-	-	-	-		
Phalanx III		1	-			-	-	-	-	-	-		
M’Podial	UM	-	-			-	-	-	-	-	-		
“	UE	-	-			-	-	-	-	-	-		
“	F	-	-			-	-	-	-	-	-		
Totals		25	12			-	1	-	-	-	-		

TABLE 2

Counts of different parts of the skeleton and other faunal remains from the Roman – Iron Age transition layers at *Odemira CinéTeatro* excavations. Taxa are as follows: B cattle, O sheep or goat, CAH goat, OVA sheep, S pig/wild boar, CEE red deer, ORC rabbit, EQ equid, Canis dog, VUV fox, GNP probable chicken, COC raven, CAC roe deer.

Bone/tooth	F/U	Bos	O	(CAH)	(OVA)	S	CEE	ORC	EQ	Canis	VUV	Birds	Others
dP_4		4	3	(3)	(-)	-	-	-	-	-			
P_4		1	4			-	-	-	-	-			
$P_{3/4}$		-	-			-	-	-	-	-			
M_1		4	8			-	-	-	-	-			
$M_{1/2}$		-	2			-	-	-	-	-			
M_2		3	7			-	-	-	-	-			
M_3		3	6			1	-	-	-	-			
Mandible							-	-	-				
Scapula	U	-	-			-	-	-	-	-			
“	F	1	-			-	-	-	-	-			
“	?	-	-			-	-	-	-	-			
Humerus	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	1	-			-	2	-	-	-			CAC-1
“	?												
Radius	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	-	-			-	-	-	-	-			
M’Carpal	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	2½	-			-	-	-	-	-			
Ischium		1	-			-	-	-	1	-			
Femur	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	-	-			-	-	-	-	-			
Tibia	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	-	-			-	-	-	-	-			
Calcaneum	U	-	-			-	-	-	-	-			
“	F	-	-			-	-	-	-	-			
“	?	-	-			-	-	-	1	-			
Astragalus		1	1			-	1	-	-	-			
M’Tarsal	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	-	-			-	-	-	-	-			
Phalanx I	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	1	-			-	-	-	-	-			
Phalanx III		1	-			-	-	-	-	-			
M’Podial	UM	-	-			-	-	-	-	-			
“	UE	-	-			-	-	-	-	-			
“	F	-	-			-	-	-	-	-			
Totals		23½	31			1	3	-	2	-			1

TABLE 3

Counts of different parts of the skeleton and other faunal remains from the Iron Age layers at *Odemira CinéTeatro* excavations. Taxa are as follows: B cattle, O sheep or goat, CAH goat, OVA sheep, S pig/wild boar, CEE red deer, ORC rabbit, EQ equid, Canis dog, VUV fox, GNP probable chicken, COC raven, CAC roe deer.

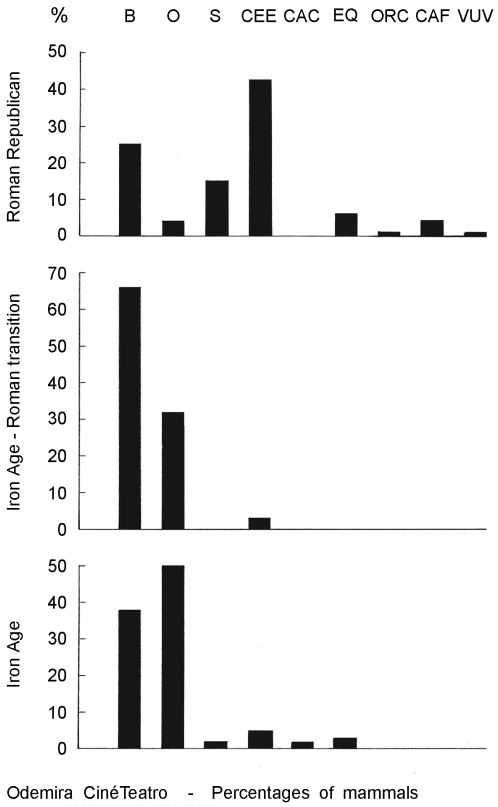

FIGURA 1

Odemira CinéTeatro – the frequencies of mammals in the course of time. Percentages are calculated from the counts of bones and teeth given in Tables 1 – 3. Taxa are coded as follows: B cattle, O sheep/goat, S pig/wild boar, CEE red deer, CAC roe deer, EQ equid, ORC rabbit, CAF dog, VUV fox. Note the considerable difference between on the one hand the Iron Age and Iron Age – Roman transition period faunas and on the other hand the Roman Republican period fauna. The last includes a much higher percentage of red deer and pig/wild boar at the expense of cattle and sheep/goat.

AGE-AT-DEATH (Table 5)

Cattle. Although there are not many cattle teeth that could be assigned eruption and wear stages, when viewed together (Tables 6 and 7) there is some evidence for a change in the slaughter strategy of the cattle. Note for example that in the Iron Age there are four milk fourth pre-molars (dP_4) and only one permanent fourth pre-molar (P_4) which means that most cattle were slaughtered before the dP_4 is replaced by its permanent tooth (in the animal's third year; Simonds, 1854) while in the Roman period there are no dP_4 teeth and two P_4s. Moreover the wear stages of the molar teeth indicate that on average the molars of the Roman cattle are more worn than those of the Iron Age. For example one of the three Iron Age cattle M_2 teeth are in wear stage 'a' (i.e., just erupted with no wear), and the other two are in stage 'f' (moderate wear but the dentine on the posterior cusp is still not continuous). The Roman period M_2 teeth, however, are in wear stages 'g' (dentine now continuous), j (bovine pillar now in wear too) and 'k' (dentine of the bovine pillar is now continuous with the dentine of the main part of the tooth). The wear stages of M_1 and M_3 show a similar shift towards older cattle from Iron Age to Roman times. It is unfortunate that there are too few cattle limb-bones to be able to corroborate the age-at-death estimates based on the dentition with epiphysial fusion counts.

Sheep/goat. Unfortunately there are too few caprine teeth from the Roman levels to enable a comparison with caprines from the Iron Age.

Red deer. One red deer mandible belonged to a juvenile animal with its milk teeth, the other red deer teeth belonged to adults. None of the limb-bones of this animal derive from juveniles with unfused epiphyses.

		B	O	S	CEE	CAC	ORC	EQ	CAF	VUV	N
Roman Republican	N	18	3	10½	31	0	1	4	3	1	71½
	%	**25**	**4**	**15**	**43**	**0**	**1**	**6**	**4**	**1**	
Roman-Iron transition	N	25	12	0	1	0	0	0	0	0	38
	%	**66**	**32**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	
Iron Age	N	23½	31	1	3	1	0	2	0	0	61½
	%	**38**	**50**	**2**	**5**	**2**	**0**	**3**	**0**	**0**	

TABLE 4

Odemira – CinéTeatro. Counts of teeth and bones of the mammals and their percentages by level – Roman Republic, Iron Age – Roman transition and Iron Age. Taxa are abbreviated as follows: B cattle, O sheep/goat, S pig/wild boar, CEE red deer, CAC roe deer, ORC rabbit, EQ equid, CAF dog, VUV fox. Note the increase of red deer in the Roman period.

Tax	Period	Complement	Square	Surface	Complex	dP_4	P_4	M_1	M_2	M_3	$M_{1/2}$	PAYNE STAGE
Sus	Roman-Republican	M_2-M_3	III	3/4	19				d	b		
Sus	Roman-Republican	M_3	III	4/5	29/30					a		
Sus	Roman-Republican	$M_{1/2}$	III	3/4	21						d	
Sus	Iron Age	M_3	IV	7-8	152					e		
O/C	Roman-Republican	$M_{1/2}$	II	8/9	141						9	
O/C	Roman-Republican	$M_{1/2}$	III	3/4	20						8-9	
O/C	Roman-Iron Age transition	P_4-M_3	II	12-13	163		4	9	8?	0?		D
O/C	Roman-Iron Age transition	P_3-M_3	II	12-13	163		14	15	9	11		G
O/C	Roman-Iron Age transition	M_3	I	8/9	67					11		
O/C	Iron Age	P_3-M_3	II	14/15	186		9	11	9	8		F
O/C	Iron Age	P_4-M_1	IV	7-8	152		12	9				
O/C	Iron Age	P_2-M_3	II	14/15	186		11	11	9	9		F
O/C	Iron Age	P_4-M_3	II	14/15	186		0	9	5	0		D
O/C	Iron Age	M_1-M_2	II	14/15	186			9?	4-7			
O/C	Iron Age	M_3	IV	7-8	152					P		
O/C	Iron Age	M_3	III	7/8	38					11		
O/C	Iron Age	$M_{1/2}$	III	7/8	38						P	
O/C	Iron Age	$M_{1/2}$	II	13/14	185						9	
Capra	Iron Age	dP_4-M_2	II	14/15	186	17?		9	4			
Capra	Iron Age	dP_2-M_2	II	14/15	186	17		8-9	4			
Capra	Iron Age	dP_2-M_3	II	14/15	186	17		8	4	U		D
Cervus	Roman-Republican	dP_4	II	8/9	139	P						
Cervus	Roman-Republican	P_3-P_4	II	8/9	141		P					
Cervus	Roman-Republican	M_2-M_3	III	3/4	21				P	P		
Cervus	Roman-Republican	M_2-M_3	III	2-3	17				P	P		
Cervus	Roman-Republican	M_3	III	3/4	21					P		
Cervus	Roman-Republican	$M_{1/2}$	II	8/9	141						P	
Bos	Roman-Republican	P_4-M_3	II	8-9	141		P	k	g	c?		
Bos	Roman-Republican	P_3-M_3	III	9-10	175		g	m	k	k		
Bos	Roman-Republican	M_1-M_2	II	7/8	135			l	k			
Bos	Roman-Republican	M_2-M_3	III	3/4	53				j	g		
Bos	Roman-Republican	$M_{1/2}$	III	2/3	17						f	
Bos	Roman-Iron Age transition	M_1-M_3	III	9-10	75			l	k	k		
Bos	Roman-Iron Age transition	$M_{1/2}$	II	12-13	163						P	
Bos	Roman-Iron Age transition	$M_{1/2}$	II	12-13	163						g	
Bos	Med-Mod	M_3	I	1-2	3					j		
Bos	Iron Age	dP_4-M_3	II	14/15	186	j		g	f	b		
Bos	Iron Age	dP_3-M_3	II	14/15	186	j		g	f	b		
Bos	Iron Age	dP_4-M_2	IV	7-8	150	h		f	a			
Bos	Iron Age	dP_4	IV	7-8	150	g						
Bos	Iron Age	P_3-M_1	II	12-13	165		a	j				
Bos	Iron Age	M_3	II	12-13	165					e		
Bos	?	P_3-M_3	II	12-13	163/165		a	j	g	e		
Tax	**Period**	**Complement**	**Square**	**Surface**	**Complex**	**dP_4**	**P_4**	**M_1**	**M_2**	**M_3**	**$M_{1/2}$**	**PAYNE STAGE**

TABLE 5

Odemira - CinéTeatro. Wear stages of mandibular teeth. Cattle (*Bos*) and pig/wild boar (*Sus*) follow Grant (1982) and sheep/goat (*O/C)* and goat *(Capra)* follow Payne (1987). 'P' denotes the presence of a tooth and 'U' denotes an unerupted tooth. Note that red deer teeth were not assigned to a wear stage. Complement refers to the isolated or series of teeth present.

Period	dP_4	P_4	M_1	M_2	M_3	$M_{1/2}$	Complement
Roman Republican		P	k	g	c?		P_4-M_3
Roman Republican		g	m	k	k		P_3-M_3
Roman Republican			l	k			M_1-M_2
Roman Republican				j	g		M_2-M_3
Roman Republican						f	$M_{1/2}$
Roman-Iron Age transition			l	k	k		M_1-M_3
Roman-Iron Age transition						P	$M_{1/2}$
Roman-Iron Age transition						g	$M_{1/2}$
Iron Age	j		g	f	b		dP_3-M_3
Iron Age	j		g	f	b		dP_4-M_3
Iron Age	h		f	a			dP_4-M_2
Iron Age	g						dP_4
Iron Age		a	j				P_3-M_1
Iron Age					e		M_3

TABLE 6

Odemira – CinéTeatro. The eruption and wear stages (after Grant, 1982) of cattle mandibles and mandibular teeth. Note the Roman period teeth and mandibles tend to derive from older animals than those in the Iron Age. 'P' denotes the presence of a tooth whose wear stage could not be ascertained.

	dP_4	P_4	M_1	M_2	$M_{1/2}$	M_3
Roman Republican	-	g, P	k, l, m	g, j, k, k	f	c, g, k, k
Roman-Iron Age transition	-	-	l	k	g, P	g, P
Iron Age	g, h, j, j	a	f, g, g, j	a, f ,f	-	b, b, e

TABLE 7

Odemira - CinéTeatro. Cattle tooth eruption and wear stages – Iron Age *versus* Roman Republican. Note the overall older age-at-slaughter of the Roman period cattle. For example in the Iron Age there are four dP_4 teeth and one P_4 but in the Roman period there are no dP_4s and two P_4s. The wear stages for each tooth are on average older in the Roman than Iron Age.

Period	dP_4	P_4	M_1	M_2	M_3	$M_{1/2}$	Payne stage	Complement	Tax
Roman Republican						9		$M_{1/2}$	O/C
Roman Republican						8-9		$M_{1/2}$	O/C
Roman-Iron Age transition		4	9	8?	0?		D	P_4-M_3	O/C
Roman-Iron Age transition		14	15	9	11		G	P_3-M_3	O/C
Roman-Iron Age transition					11			M_3	O/C
Iron Age	17 or 18		9	4				dP_4-M_2	CAH
Iron Age	17		8-9	4				dP_2-M_2	CAH
Iron Age	17		8	4	U		D	dP_2-M_3	CAH
Iron Age		9	11	9	8		F	P_3-M_3	O/C
Iron Age		12	9					P_4-M_1	O/C
Iron Age		11	11	9	9		F	P_2-M_3	O/C
Iron Age		0	9	5	0		D	P_4-M_3	O/C
Iron Age			9?	4-7				M_1-M_2	O/C
Iron Age					P			M_3	O/C
Iron Age					11			M_3	O/C
Iron Age						P		$M_{1/2}$	O/C
Iron Age						9		$M_{1/2}$	O/C

TABLE 8

Odemira – CinéTeatro. The eruption and wear stages (after Payne, 1973, 1987) of caprine mandibles and mandibular teeth. 'O/C' are sheep or goat, 'CAH' are goat. 'P' denotes the presence of a tooth whose wear stage could not be ascertained.

Period	Tax	Bone	Square	Surface	Complex	Nº
Roman - Iron Age transition	Bos	Scapula	II	12-13	163	
Roman - Iron Age transition	Bos	Metacarpal	II	11-12	160	160.1
Roman - Iron Age transition	Bos	Tibia	II	12-13	164	
Roman - Iron Age transition	Bos	Metatarsal	II	12-13	163	
Roman - Iron Age transition	O/C	Tibia	II	12-13	164	
Iron Age	Bos	Mandible	II	14/15	186	186.20
Iron Age	Bos	Scapula	II	14/15	186	186.21
Iron Age	Bos	Humerus	II	14/15	186	186.6
Iron Age	Bos	Metacarpal	II	14/15	186	186.31
Iron Age	Bos	Metacarpal	II	14/15	186	186.29
Iron Age	Bos	Metacarpal	IV	6-7	143	
Iron Age	Bos	Pelvis	II	14/15	186	186.19

TABLE 9

Odemira - CinéTeatro. List of complete or near-complete long-bones and mandible found during excavation. Note that there were probably more that were originally complete but these became fragmented during or after excavation. Did some of these derive from the same animal and therefore denote the burial of a complete animal?

PARTS OF THE SKELETON PRESENT AND COMPLETENESS OF THE BONES

The quantities of bone are too small to show any kind of biased selection of particular parts of the carcass, although there seem to be relatively more teeth than bones – a probable indicator of poor preservation conditions in the soil. I noticed something similar in a considerably larger assemblage of bones at Iron Age Wardy Hill in England (Davis, 2003) where, in the case of the sheep, the teeth indicated the presence of more than five times the number of animals indicated by the limb-bones. Variations between the different parts of the skeleton undoubtedly reflect differential preservation (Brain, 1967) and recovery (Payne, 1975).

In general animal long-bones from Iron Age and Roman archaeological sites in Portugal are chopped and butchered (personal observation). It is rare to find complete tibiae and metapodials for example. A considerable quantity of long bones and a mandible (Table 9) were found in a complete state during the excavation suggesting that rather than the left-overs of meals, these may be derived from whole carcasses or parts of carcasses. These complete bones are almost all cattle and all are from the Iron Age and Iron Age – Roman transition. Given their anatomical representation many may have belonged to the same carcass. If this is so, then one might consider that they either derive from the dumping of a diseased animal or, perhaps more likely, the ritual interment of whole animals.

OSTEOMETRY (Tables 10 and 11)

There are sufficient measurements of the cattle M_3s (Figure 2) and certain limb-bones (Figures 3 – 5) to enable a comparison with measurements of cattle remains from other archaeological sites in the southern half of Portugal. Thus the widths of the anterior lobe of the lower third molars, the three metacarpal distal widths, and the four astragalus widths all indicate that the Iron Age and Roman cattle at Odemira are little different in terms of size to those from southern Portuguese Iron Age to Moslem period sites and are smaller than those from 15th century AD Beja.

However a closer look at the Odemira cattle bone measurements does reveal that many lie towards the larger end of the range in the Iron Age – Moslem periods. One possible explanation for this has to do with the fact that bull bones tend to be wider than those of cows. One bone which often reveals some sexual size dimorphism with its wider shaft is the metacarpal (see for example Fock, 1966; Guintard, 1998; Davis *et al*., 2012). Note the two Iron Age cattle metacarpals do indeed have wide shafts suggesting they belonged to bulls. Their plots of the indexes

Tax	Period	Square	Surface	Complex	Complement	M_1length	M_1wa	M_1wb	M_2length	M_2wa	M_2wb	M_3length	M_3wa	M_3wb
Sus	Roman-Republican	III	3/4	19	M_2-M_3					129	142	342	160	154
Sus	Roman-Republican	III	4/5	29/30	M_3								152	146
Sus	Iron Age	IV	7-8	152	M_3							333		148
Cervus elaphus	Roman-Republican	III	3/4	21	M_3							320	154	
Cervus elaphus	Roman-Republican	III	3/4	21	M_2-M_3							286	135	
Cervus elaphus	Roman-Republican	III	2-3	17	M_2-M_3							285	136	
Canis	Roman-Republican	V	6/7	73	P_4-M_2	260	103							
Bos	Roman-Republican	III	9-10	175	P_3-M_3							356	166	
Bos	Roman-Republican	III	3/4	53	M_2-M_3							383	161	
Bos	Roman-Iron Age transition	III	9-10	75	M_1-M_3							380	164	
Bos	Med-Mod	I	1-2	3	M_3							378	168	
Bos	Iron Age	II	14/15	186	dP_3-M_3							352	159	
Bos	Iron Age	II	14/15	186	dP_4-M_3							363	161	
Bos	Iron Age	II	12-13	165	M_3							346	146	
Bos	?	II	12-13	163/165	P_3-M_3							344	152	

TABLE 10

Odemira - CinéTeatro – measurements in tenths of a millimeter of the animal teeth. The taxa are: *Bos* cattle, *Cervus elaphus* red deer, S*us* pig/wild boar. Measurements follow Driesch (1976) and Payne & Bull (1988).

Tax	Os	fus	Square	Surface	Complex	Period	GL	Bd	Dd	BT	HTC	WCM	DEM	WCL	DEL	SD	notes
Bos	AS		I	1-2	3	Med-Mod	728	469									
Bos	AS		II	12-13	163	Iron Age - Roman transition	624	404	351								Dd = approx
Bos	AS		III	3/4	52	Roman Republican	692	462	383								
Bos	AS		III	9-10	75	Iron Age - Roman transition		477									
Bos	AS		III	9-10	75	Iron Age - Roman transition	684	414									Bd = approx
Bos	HU	F	II	14/15	186	Iron	2310			777	335					340	GL = GLC, HTC = approx
Bos	HU	F	IV	3/4	130	Roman Republican				780	338						
Bos	MC	F	II	11-12	160	Iron Age - Roman transition		577				275	247	273	232		v. fragmented but complete
Bos	MC	F	II	14/15	186	Iron	1877	624				302	237	292	217	353	?Male DEL = approx
Bos	MC	F	IV	6-7	143	Iron	2010	615								450	?Male GL = est+/-4mm SD = approx
Bos	MC	F	II	14/15	186	Iron	1845									347	GL = very approx
Bos	MT	F	II	12-13	163	Iron Age - Roman transition	2247	633				281	238	281	233	310	DEM & DEL = approx
Bos	MT	F	III	9-10	75	Iron Age - Roman transition		586				289	230	271	232	284	BFd, WCM & DEM = approx
Bos	TI	F	II	12-13	164	Iron Age - Roman transition		688									Bd = approx
Capra hircus	AS		II	12-13	163	Iron Age - Roman transition			141								GLl = c.25-26mm Bd = c.17mm
Capra hircus	HU	F	I	1-2	3	Med-Mod				317	148						
Capreolus?	HU	F	IV	8/9	167	Iron					146						
Cervus elaphus	AS		I	3/4	23	Med-Mod	541	342	294								Dd = estimate
Cervus elaphus	AS		II	8-9	140	Roman Republican	509	320	278								
Cervus elaphus	AS		III	3/4	53	Roman Republican	531	360	290								
Cervus elaphus	AS		IV	2/3	128	Roman Republican	526	357	297								definite CEE
Cervus elaphus	AS		IV	3/4	130	Roman Republican	549	354	285								
Cervus elaphus	AS		V	6/7	66	Iron	536	336	294								Dd = approx
Cervus elaphus	HU	F	I	6/7	40	Roman Republican				505	275						
Cervus elaphus	HU	F	II	3/4	127	Med-Mod				463	250						
Cervus elaphus	HU	F	II	8/9	139	Roman Republican				513	270						
Cervus elaphus	HU	F	III	3/4	53	Roman Republican					264						
Cervus elaphus	HU	F	III	3/4	53	Roman Republican					274						
Cervus elaphus	HU	F	IV	7-8	152	Iron					278						BT = 48 - 50 mm
Cervus elaphus	HU	F	IV	8/9	167	Iron				542	292						BT = approx
Cervus elaphus	MC1	F	II	3/4	127	Med-Mod	2483	359				160	191	162	189	213	Bd, WCM = approx
Cervus elaphus	RA	F	II	3/4	127	Med-Mod	2631										
Cervus elaphus	TI	F	III	3-4	21	Roman Republican		437									
Corvus corax	TI		III	4/5	30	Roman Republican		115	108								Dd = approx
Equus caballus	P1	F	III	4/5	30	Roman Republican	762	401	225							305	Proximal Depth = 350 Bp = 500
Sus	HU	F	I	1-2	3	Med-Mod				330	209						BT = approx
Sus	HU	F	II	8/9	139	Roman Republican					231						

TABLE 11

Odemira - CinéTeatro – measurements in tenths of a millimeter of the animal bones. Key: fus = state of epiphysial fusion (F fused), Os = bone (AS astragalus, HU humerus, MC metacarpal, MT metatarsal, TI tibia, P1 proximal phalanx). The taxa are: *Bos* cattle, *Capra hircus* goat, *Cervus elaphus* red deer, *Corvus corax* raven, *Equus caballus* horse, S*us* pig/wild boar. Measurements follow Driesch (1976) and Davis (1996). Approximate measurements are noted in the "notes" column. For astragali, Dd = Dl.

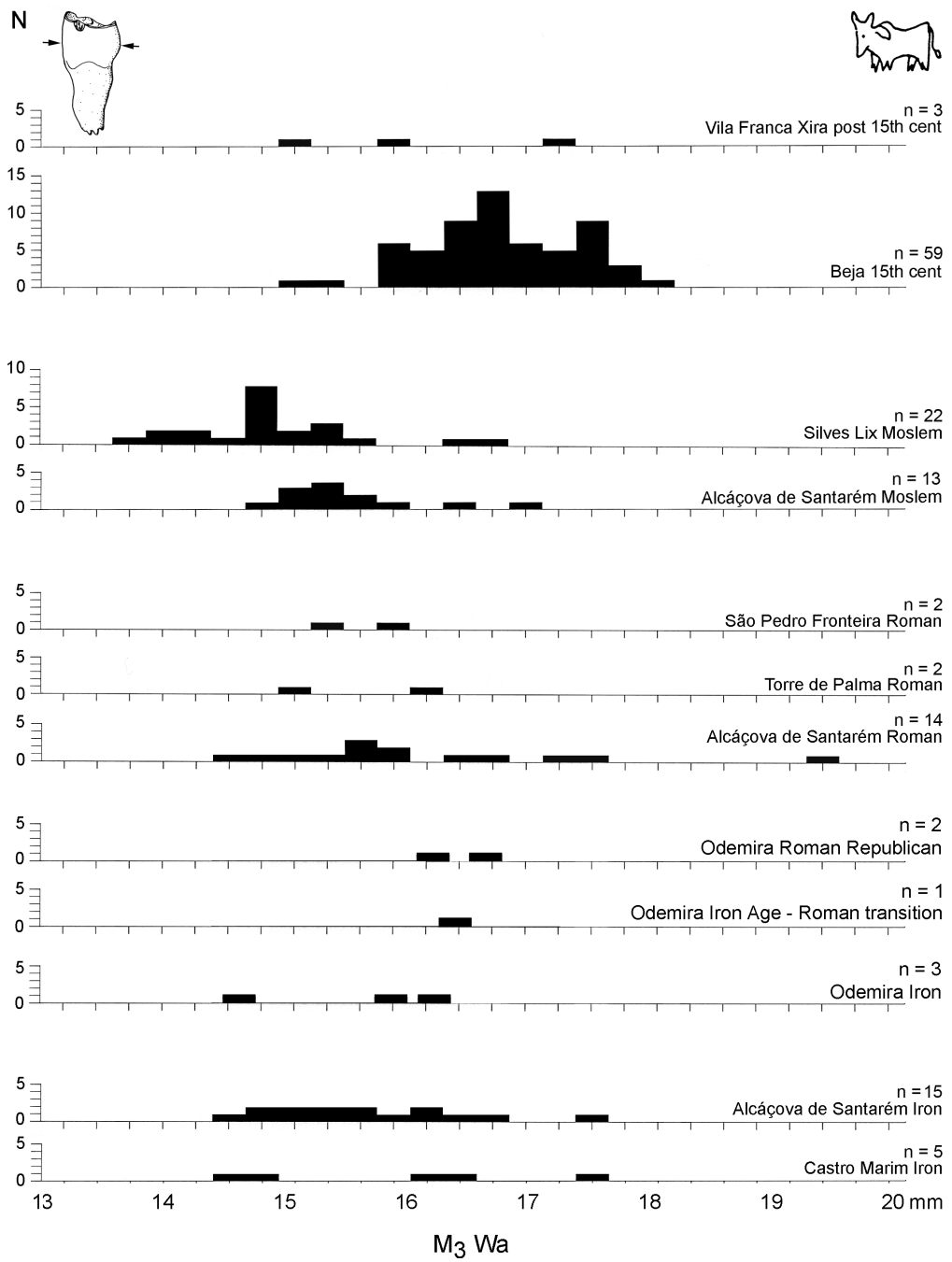

FIGURA 2

Cattle size variation in southern Portugal from Iron Age to post-Medieval times – a comparison with the Odemira cattle. These are stacked histograms of plots of the maximum crown width (Wa) of the anterior lobe of the lower third molar tooth, M_3. Note the absence of any significant size increase between Iron Age and Moslem times and the subsequent increase by the 15th century AD. The Odemira cattle were relatively small. Artiodactyl molars are not considered to show much sexual dimorphism so that the size increase between the Moslem period and the 15th century must represent a real size change of cattle in southern Portugal and not a shift in the sex ratio.

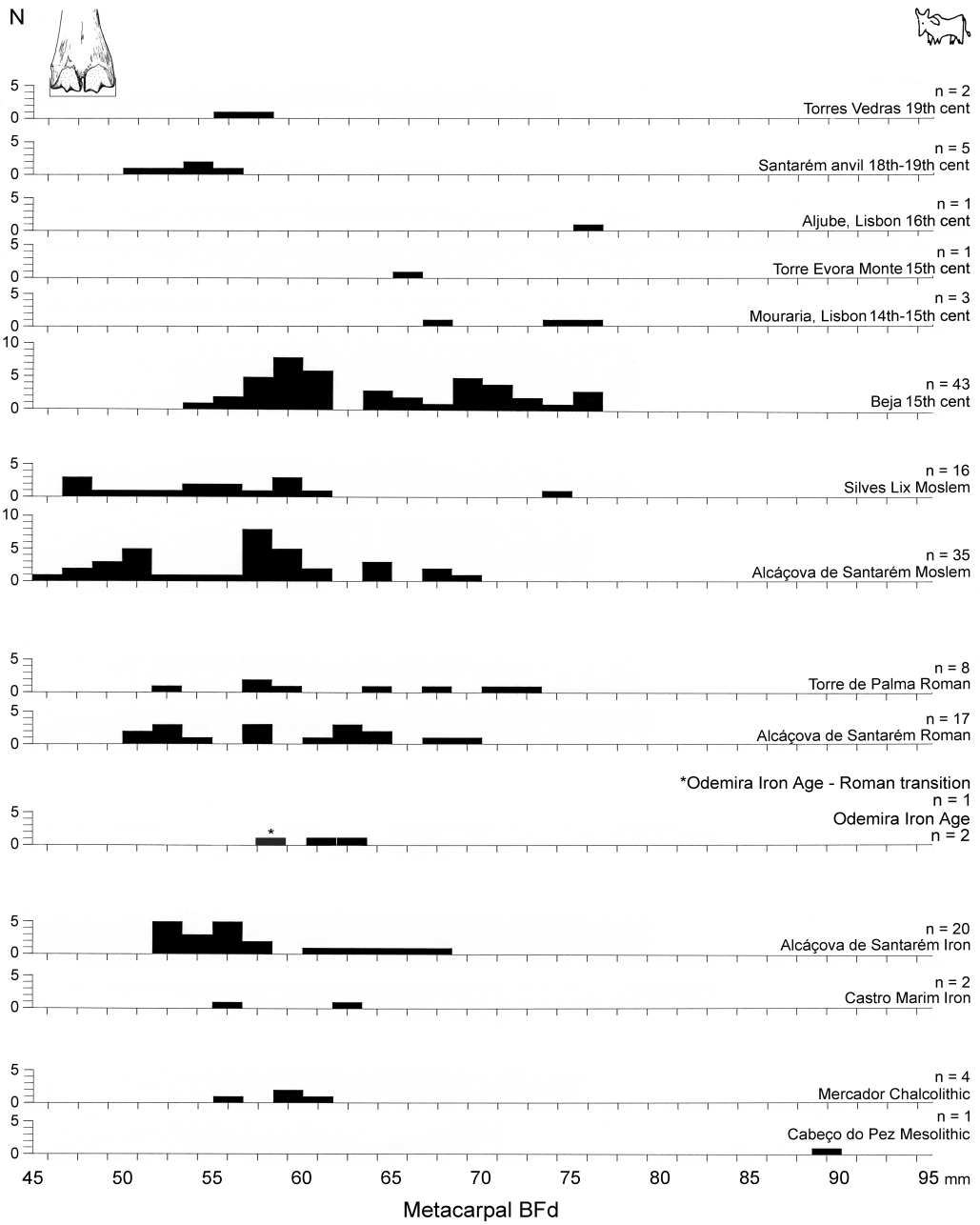

FIGURA 3

Cattle size variation in southern Portugal from the Mesolithic to post-Medieval – a comparison with the Odemira cattle. Stacked histograms of measurements of the distal width (BFd) of the metacarpal of aurochsen (wild cattle) and cattle. Note the very large size of a specimen from the Mesolithic site at Cabeço de Pez, Sado estuary – presumed to have belonged to an aurochs. The bulk of the specimens being of smaller size are presumed to be domestic cattle. Note too the absence of any significant size change between Iron Age and Moslem times of these presumed domestic cattle and the subsequent increase by the 15th century AD, although these did not attain the great size of the aurochs. The Odemira cattle are small, and the two larger specimens (the Iron Age ones, with robust shafts) may have belonged to bulls. Note too that all three specimens compare in size with the larger of the two peaks at Moslem Alcáçova de Santarém – the probable male peak.

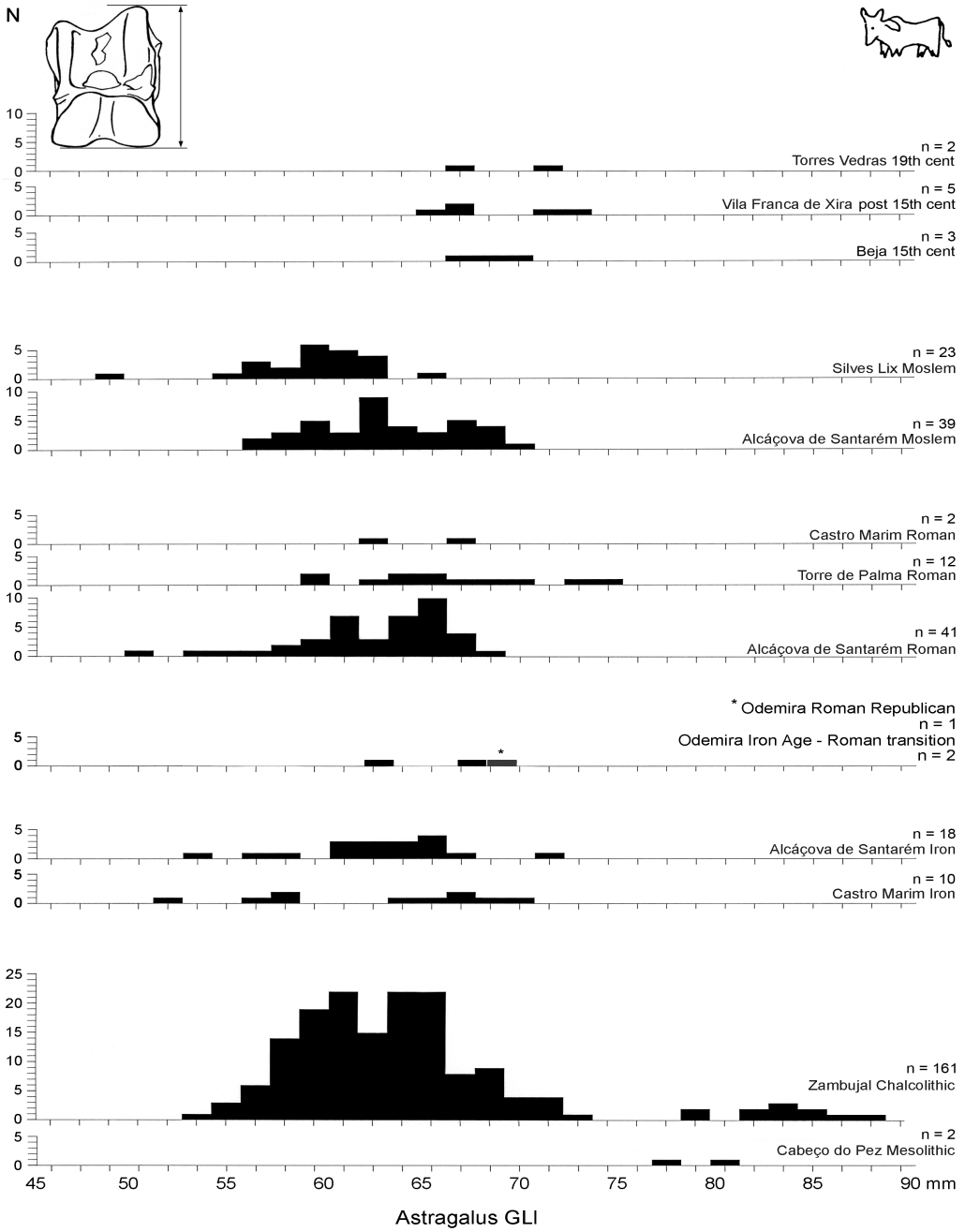

FIGURA 4

Cattle size variation in southern Portugal from the Mesolithic to post-Medieval – a comparison with the Odemira cattle. Stacked histograms of measurements of the greatest lateral length (GLl) of the astragalus of aurochsen (wild cattle) and cattle. The Zambujal data are from Driesch & Boessneck (1976). Note the very large size of two specimens from the Mesolithic site at Cabeço de Pez, Sado estuary and a small number of the specimens in the Chalcolithic – presumed to have belonged to aurochsen. The bulk of the specimens being of smaller size are presumed to be domestic cattle. Note too the absence of any significant size change between Iron Age and Moslem times of these presumed domestic cattle and the subsequent increase by the 15th century AD, although these did not attain the great size of the aurochs. The Odemira cattle are little different from the presumed domestic cattle from Chalcolithic to Moslem periods.

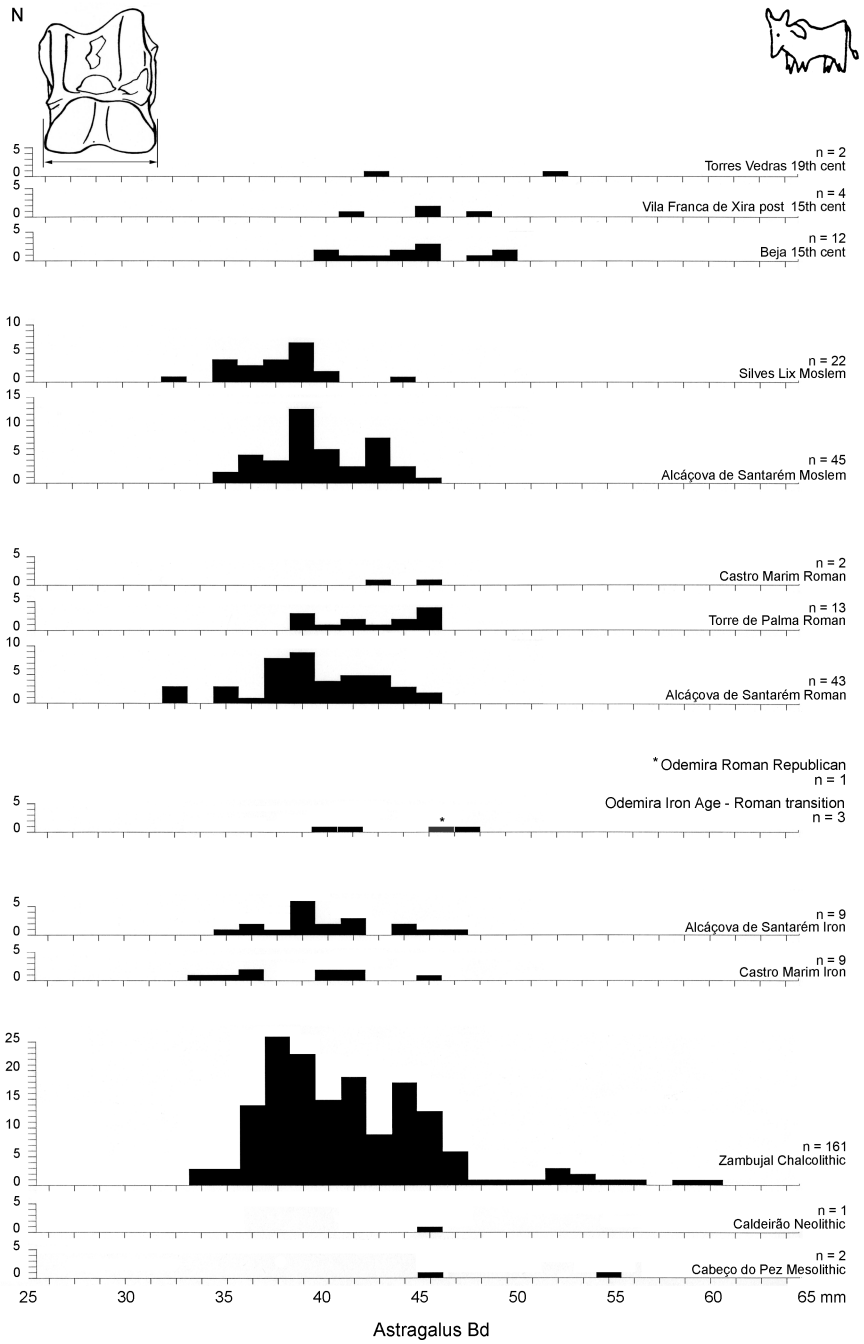

FIGURA 5

Cattle size variation in southern Portugal from the Mesolithic to post-Medieval – a comparison with the Odemira cattle. Stacked histograms of measurements of the distal width (Bd) of the astragalus of aurochsen (wild cattle) and cattle. The Zambujal data are from Driesch & Boessneck (1976). Note the very large size of one specimen from the Mesolithic site at Cabeço de Pez, Sado estuary and a small number of the specimens in the Chalcolithic – presumed to have belonged to aurochsen. The bulk of the specimens being of smaller size are presumed to be domestic cattle. Note too the absence of any significant size change between Iron Age and Moslem times of these presumed domestic cattle and the subsequent increase by the 15th century AD, although these did not attain the great size of the aurochs. The Odemira cattle are little different from the presumed domestic cattle from Chalcolithic to Moslem periods.

- SD/GL against BFd/GL – as in figure 16 of Davis (2008) both fall in the upper part of the dispersion of points – the male area (see Davis *et al*., 2012) which corroborates the suggestion that they belonged to bulls and hence could explain why the Odemira cattle fall towards the larger end of the other plots of Portuguese cattle from Iron Age to Moslem periods.

CONCLUSIONS AND SUMMARY

The animal remains recovered from excavations in Iron Age and Roman Odemira show that two shifts occurred between the Iron Age – Roman transition and the Roman Republican period (that is between the second and first centuries BC). The first shift is a massive increase of red deer and pig/wild boar between the Iron Age and the Roman period. The second shift is a change in the age-at-death pattern of the cattle culled: those in the Iron Age are, on the whole, somewhat younger than those from the Roman period. These shifts are, in this author's experience, quite unlike the kinds of changes sometimes found in multi-period archaeological sites. Indeed they appear to represent a very radical change, or break, in the behaviour patterns of the people of Odemira. One possible explanation could be that the human occupants in the Roman Republican period were in fact new-comers or even perhaps invaders – following the so-called Iron Age-Roman transition period. This is in harmony both with the stratigraphic record of the site's excavation and the preliminary results of studies of other archaeological finds - namely the pottery assemblage (by Joel Rodrigues) and metallurgical production (J. Vilhena, see Vilhena & Grangè, 2011). These other studies still in progress, suggest that by the end of the 2nd century BC a shift in importance and activities occurred in the hill-fort. This shift may have resulted from the establishment of a roman military installation, possibly intended to control the area, the river navigation or the rich iron and silver mines around Odemira. However, direct proof of occupation by Roman soldiers is weak. Remains of campanian ware, fish and wine amphora, a possible gaming piece and a forge could be interpreted as indicating the presence of the Roman military. An occupying contingent of soldiers would have had access to luxuries such as wine, olive oil and fine pottery ware in much higher quantities than before as well as more game animals. This installation of roman military personnel may also be linked to political events such as the Great Roman Civil War of 49–45 BC in which the armies of Julius Caesar and Pompeius Magnus were active in the Hispanic war. Another possibility is the previous Sertorius Hispanic revolt with the Lusitanians (83-72 BC). This was the final conflict in the roman conquest of the territory which corresponds to modern southern Portugal (see Vilhena & Rodrigues, 2009). Yet another possible explanation is that the hillfort of ancient Odemira was, in the 1st century BC (Late Roman Republic Period), a regional emporium providing commodities coming up-river by boat from areas such as the Gulf of Cadiz and Italy, a trade centre connecting a network of navigable rivers as well as north-south roads connecting such roman cities as Mirobriga (Santiago do Cacém) and Lacobriga, (modern Lagos) and west-east roads connecting the hinterland with such important sites like the *oppidum* of Garvão (Ourique), 30 km inland. It is also interesting to note that river navigation could have been controlled by a small roman *castellum* also dating to the 2nd half of the 1st century BC, which was recently identified at the site of Gama 1, on the northern shore of the Mira estuary, just 1 km from the sea and 18 km from Odemira (Vilhena & Rodrigues, 2009).

These new-comers - perhaps Roman soldiers or *Romanized* colonists/merchants - had a completely different way of life, practising more hunting of red deer. They also had a more extensive trading network, or at the very least had connections with the coast. This may explain the presence of marine shells and a fish (as well as the recovery in the same level of the ditch-filling of a bronze needle for repairing fishing nets) in Roman times. The Romans may have used their cattle for power and dairying. While the previous Iron Age inhabitants relied on caprines and cattle for meat, the Romans clearly exploited more pig/wild boar and hunted red deer. The Odemira cattle from both Iron Age and Roman periods, while on average a little larger than other remains of this animal from Iron Age – Moslem period southern Portugal, were still relatively small when compared to those from the Christian period.

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