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Faunal Remains from an Almohad (Ad XII/XIII) Silo at the Castle of Aljezur (Portugal)

DIOGO MOTA[1] & J. L. CARDOSO[2]
[1] MSc (Paleontology). Universidade Nova de Lisboa, Faculdade de Ciências e Tecnologia.
mota.d.m.m@gmail.com
[2] Universidade Aberta. Centro de Arqueologia da Universidade de Lisboa.
cardoso18@netvisao.pt

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ABSTRACT: The analysis of a faunal collection from a storage silo found in the castle of Aljezur, dating from the Almohad period (XII/XIIIth centuries AD), is presented. It appears that the community occupying the castle concentrated on hunting species such as the rabbit, wild boar, red deer and Iberian lynx, while evidences of stockbreeding were scarce and centered upon caprines with horses and chicken playing minor role. The presence of a large dog has been assumed to be an aid for hunting but possibly also in herd keeping. With the exception of the lynx, all large mammals evidenced traces of consumption. The domestic cat is taken to represent a pet whereas the lynx had probably a role as a fur provider. It should be noted that equids and the pond turtle were probably food items. Rodents are taken to represent commensals whereas the toad of the Genus *Bufo* probably represented an intrusive element.

KEYWORDS: ZOOARCHAEOLOGY, ISLAMIC, ALMOHAD, ALJEZUR, ALGARVE, PORTUGAL

RESUMEN: Se presenta el estudio de un conjunto faunístico recogido en un silo del castillo de Aljezur en época Almohade (siglos XII/XIII d.C.). Se atestigua una notable actividad cinegética centrada sobre el conejo con aportes secundarios de ciervos, jabalíes y lince ibérico. Las evidencias pecuarias, centradas sobre caprinos y con équidos y gallinas como grupos secundarios, son marginales. Se asume que el perro actuó como auxiliar de caza y no tanto en la vigilancia de rebaños. En el caso de los macromamíferos, con excepción hecha del lince, las evidencias apuntan al consumo de la carne. El gato probablemente representó un animal de compañía en tanto que la presencia de lince se justificaría por su interés peletero. Tanto los équidos como el galápago parecen representar elementos de consumo. Frente a ellos, los restos de roedores representan animales comensales en tanto que los de sapo del género *Bufo* representan intrusivos

PALABRAS CLAVE: ZOOARQUEOLOGÍA, ÉPOCA ISLÁMICA, ALMOHADES, ALJEZUR, ALGARVE, PORTUGAL

INTRODUCTION. CONTEXTS, STRUCTURES AND CRONOLOGY

The fortification of Aljezur (Figure 1) integratedthe defensive system of the Silves territory during the XII^th^ and XIII^th^ centuries A.D. (Silva & Gomes, 2002: 347, Figure 2). Archaeological excavations carried in the interior of this fortification between 1990 and 1997 under the direction of Carlos Tavares da Silva, allowed the excavation of contexts from moments that date from Late Bronze Age, the Iron and Medieval ages to the XVI^th^ century A.D.

The materials studied in this paper date from Medieval times of occupation and derive from one of the 2 negative structures (i.e. “silos”, labelled A and B) excavated on the geological substratum, on the inner quarters of a series of housing spaces dating from Muslim times. Both were covered by late Medieval structures, attributed to the cantonment of that time, that were abandoned by the early XVIth century A.D. (Figure).

The infilling of these structures represents the last stage of Muslim the occupation of the *Alcazaba*, correlated with layer 3 of the general stratigraphic sequence of the excavated area (Silva & Gomes, 2002). According to the characteristics and typology of the ceramics therein recovered this stage has been attributed to XII/XIII^th^ centuries A.D. The faunal assemblage comes exclusively from structure A, that corresponded to a storage area for cereals or possibly dry fruits filled with domestic refuse. From a stratigraphic perspective, the filling of the silo revealed a sequence that, from top to bottom, incorporated the following layers (Figure 4):

Layer 3 A – (thickness ≈ 0.15m). It corresponds to a level of lime mortar and sand of soil leveling.

Layer 3 B – (thickness ≈ 0,30m). Corresponds to a yellowish-brown sand-clay sediments, incorporating disperse coal, shale blocks, ceramics and abundant faunal remains.

Layer 3 C – (thickness ≈ 1,10m), formed by dark-brown sand-clay sediments, featured dispersed coal, numerous shale blocks, abundant faunal remains and ceramics;

Layer 3 D – (thickness ≈0.05m to 0.10m) featuring light-brown sand-clay sediments lying on the bottom of the structure, incorparated faunal remains and ceramics.

FIGURE 1

The Castle of Aljezur (photo C. M. Aljezur).

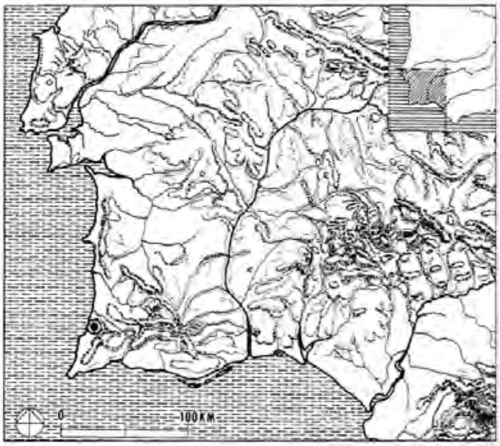

FIGURE 2
Location of the castle of Aljezur (Silva & Gomes, 2002, Figure 1).

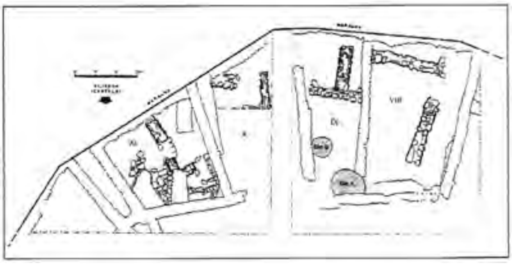

FIGURE 3
Location of structure A (silo) in the excavated area. Structures from Muslim times are represented with their respective stone elements drawn. Compartments VIII to XI (schematically represented) are late-medieval and should belong to a cantonment (Silva & Gomes, 2002: fig. 3).

The filling of this structure represent a rapid episode given that no levels of interrupted sedimentation were reported (i.e. films of fine-grained deposits), and the bone remains were found throughout the whole deposit.

MATERIALS AND METHODS

All specimens were retrieved by hand as no sieving operations were carried out during the excavations. Identifications were carried out with the help of the reference collection housed at the *Laboratório de Arqueociências* (LARC) of the DGPC in Lisbon, Portugal. These were additionally assessed with the help of the pertinent literature (e.g. Ellenberger, 1901; Schmid, 1972; Popesko, 1986; Cohen & Serjeantson, 1996; Goldfinger, 2004).

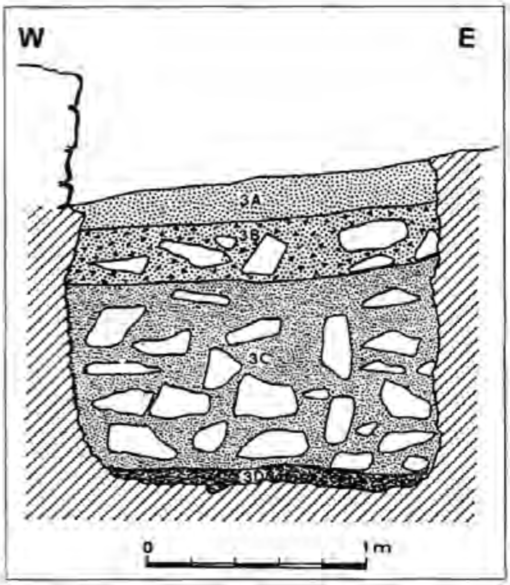

FIGURE 4
Stratigraphy of structure A (Silva & Gomes, 2002: fig. 5).

To estimate abundances, the number of specimens (NSP), number of identified specimens (NISP), minimal number of elements (MNE) and minimal number of individuals (MNI) were calculated following the protocols and limitations discussed by Valente (1997) and Lyman (2008). The number of unidentified specimens has been referred to as NUSP. Other symbols used in the text and tables appear in Table 1.

Butchery marks were grouped into 10 categories (i.e. hacked/chopped; cut; sawed; percussion/blow; torsion; flexion; scrape; puncture: polish; pathology; see Reitz & Wing, 2008:127). Fractures were grouped into 6 categories (i.e. transverse; oblique; spiral; columnar/stepped; splintered; regular; irregular; see Reitz & Wing, 2008: 169).

Taxa were allocated to four size classes, namely: very small (e.g. Muridae); small [e.g. Leporidae and Felidae]; medium (e.g. Canidae, Suidae and Caprini), and large (e.g. Cervidae and Equidae).

RESULTS AND DISCUSSION

The faunal assemblage from structure A offered an NSP = 1478, for an NISP = 811 (i.e. ≈55% of the NSP). Almost 90% of the NISP (i.e. 724 re-

	Symbol	REFERS TO
General	Indet.	Indeterminate
	N/a	Not applicable
Side	R	Right
	L	Left
	Up	Upper
	Low	Lower
	A	Anterior
	P	Posterior
Gender	M	Male
	F	Female
Bone Portions	+	Present
	(+)	Present but incomplete
	–	Absent
Quantification	NSP	Number of specimens
	%NSP total	% relative to the total NSP of the assemblage
	NISP	Number of Identified Specimens
	%NISP total	% relative to the total NISP of the assemblage
	MNE	Minimal number of elements
	MNI	Minimal number of individuals
	%MNI total	% relative to the total MNI of the assemblage

TABLE 1

Codes used in this paper.

mains) derived from mammals (Table 2). The only non-mammalian taxa were the chicken (*Gallus gallus domesticus*), the Iberian pond turtle, *Mauremys leprosa*, and an undetermined species of the Genus *Bufo* in the case of amphibians. The rabbit (*Oryctolagus cuniculus*), representing ca. 70% of the NISP, was the dominant taxon (MNI= 55 for a combined total of 81) (Figure 5). Red deer (*Cervus elaphus*) represented an additional 10% of the NISP and the pond turtle a further 6%. The remaining 14% of the NISP was represented by marginal taxa none of which exhibited MNIs above 4 (Figure). The NUSP (45%) was mainly represented by splinters from two size categories (i.e. small/medium-size and medium/large-size) that apparently represented remains of ungulates and lagomorphs for the most part.

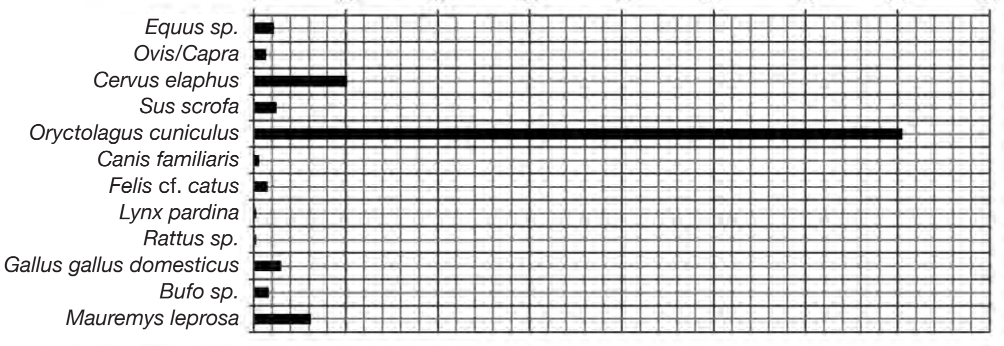

FIGURE 5

NISPs of the identified taxa expressed as percentage of the total NISP.

Taxon/Skeletal portion		Structure A										
		NSP				NISP				MNI		
		#		%NSP total		#		%NISP total		#	% NSP	%MNI total
Mammals	*Equus sp.*	18	799	1.2	54.1	18	724	2.2	89.3	4	22.2	4.9
	Ovis/Capra	11		0.7		11		1.4		2	18.2	2.5
	Cervus elaphus	82		5.5		82		10.1		3	3.7	3.7
	Sus scrofa	20		1.4		20		2.5		2	10.0	2.5
	Oryctolagus cuniculus	572		38.7		572		70.5		55	9.6	67.9
	Canis familiaris	5		0.3		5		0.6		1	20.0	1.2
	Felis cf. *catus*	12		0.8		12		1.5		1	8.3	1.2
	Lynx pardina.	2		0.1		2		0.2		1	50.0	1.2
	Rattus sp.	2		0.1		2		0.2		1	50.0	1.2
	Vertebrae *(medium)*	12		0.8		N/a		N/a		N/a	N/a	N/a
	Ribs *(medium or large)*	63		4.3		N/a		N/a		N/a	N/a	N/a
Birds	Gallus gallus domesticus	24		1.6		24		3.0		3	12.5	3.7
Anphibians	*Bufo sp.*	13		0.9		13		1.6		4	30.8	4.9
Reptiles	*Mauremys leprosa*	50		3.4		50		6.2		2	4.0	2.5
Medium or large sized vertebrates		234		15.8		N/a		N/a		N/a	N/a	N/a
Small or medium sized vertebrates		213		14.4		N/a		N/a		N/a	N/a	N/a
Anatomical remains	Mammal scapula	1		0.1		N/a		N/a		1	100.0	1.2
	Bird sternum	1		0.1		N/a		N/a		1	100.0	1.2
Unidentified specimens		143		9.7		N/a		N/a		N/a	N/a	N/a
Total		1478		100.0		811		100.0		81	5.5	100.0

TABLE 2

Castle of Aljezur: Overview of remains.

The Aljezur assemblage was intensively fragmented and this contributed to raise the number of unidentified specimens. Within the identified fraction, anthropic activities revealed butchery, cooking and consumption. Butchery marks with cleavers and knives, aimed at disarticulating carcasses and remove the meat, were abundant and particularly visible on the larger mammal remains. These activities to no small extent explain the degree of fragmentation that the sample exhibited. Activities reflecting hunting or secondary uses of animals, on the other hand, did not leave clear evidences. On the unidentified specimens no modifications that differed from those already mentioned were evident but the extent of a fragmentation that generated oblique fractures in fresh bone to reach to the medullar cavity again testified to an intensive use of the carcasses (Heinrich, 2014). No carbonization on the surface of any bone was recorded. In general, it can be said that these traces and the activities one may infer from them are similar to those proposed by Antunes (1996), Cardoso (1995), Gomes & Cardoso (1996) and Cardoso & Fernandes (2012) where first of all meat was stripped of bones, then boiled. Such interpretation requires culinary artifacts to be confirmed (Gomes & Cardoso,1996).

Modifications due to biological agents (e.g. bite marks, etc.) were present but infrequent and no mark of abiotic origin, as would be the case of diagenesis, appeared to have been relevant.

DESCRIPTIVE BY GROUP

Equids (*Equus* Linnaeus, 1758)

It is possible to distinguish between horse and donkey by the size and morphology of the pattern of wear of the flexids between the enamel and the dentine, but the state of preservation of the molar/premolar teeth from Aljezur precluded a clear-cut species identification. This distinction is also possible through the metapodials and the 1st phalange, which tend to be more robust in horse (Davis *et*

Ref.	Description				Quantification		
	Anatomy	Side	Cohort	Gender	NISP	MNE	MNI
1	Milk incisor (i_1/i^1?)	Indet.	Infant-juvenile	Indet.	1	1	4
2-3	Premolar/molar	Indet.	Indet.	Indet.	2	1	
4	Scapula	L	Infant-juvenile	Indet.	1	1	
5	Metacarpal	R	Infant-juvenile	Indet.	1	1	
6-8	Femur	R	Infant-juvenile	Indet.	3	3	
9		Indet.	Indet.	Indet.	1		
10	Tibia	R	Subadult-adult	Indet.	1	1	
11		L	Subadult-adult	Indet.	1	2	
12		L	Infant-juvenile	Indet.	1		
13	Metatarsal	R	Subadult-adult	Indet.	1	1	
14	Knee-cap	L	Indet.	Indet.	1	1	
15-16	Calcaneum	L	Infant-juvenile	Indet.	2	2	
17	1st phalanx	L	Subadult-adult	Indet.	1	2	
18		Indet.	Indet.	Indet.	1		
Total					18	16	

TABLE 3

Equids (*Equus* sp.): Overview of remains.

al., 2008: 198). In the phalanges, biometry can be particularly useful when one combines measure GL (greatest length), SD (smallest breadth of the diaphysis) and BFd (breadth of the distal diaphysis) (Driesch, 1976). In our study, the preservation and number of specimens precluded a conclusive answer on the determination issue. Lastly, according to Davis *et al.* (2008: 198), to separate equid species one calculates the BFd/GL x 100 value and plots this index vs. SD. Horse should have an SD > 30 mm thus a BFd/GL x 100 < 49. The value of SD = 33 for specimen 17 in our collection, could thus represent a horse (*vide* Mota, 2014). Although overall this assemblage could not be identified to species level due to the absence of the pertinent elements, the size and shape of the phalanges and metatarsals suggest that the species present might have been *E. caballus.*

The equids (*Equus* sp.) were represented by 18 specimens (*ca.* 2% of the NISP) and an MNI=4 (3 infantile/juvenile, on account of the three right femora, and an adult) (Table 3). In terms of age estimations, specimens were allocated into broad age classes (i.e. cohorts). Infantile and juvenile were broadly determined through the presence of a scapula, a metacarpal, 3 femora, one tibia and two calcanei exhibiting porous surfaces, absence of epiphyseal fusions (tibia), lack of the distal tuberosity (calcanei). The presence of a milk incisor (less elongated morphology and underdeveloped root) completed the assemblage of non-adult specimens.

In terms of bone modifications, those associated with carcass butchery were the most prevalent, with some cases of intense manipulation of the specimens (e.g. metatarsal, femur), leaving a significantly striated surface (Table). Some fractures suggested torsion and flexion of the bones after impact, while others simple percussion without butchery marks (e.g. scapula). One of the femora featured a groove and prominence that have been interpreted as a healed wound. The abundance of certain limb bones, mostly represented by 1-2 specimens per element and of butchery marks on these and certain vertebrae, suggest hypophagy thus also

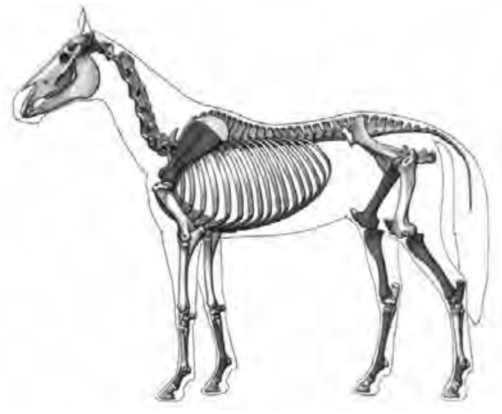

FIGURE 6

Horse skeleton highlighting the elements identified at Aljezur (taken from Goldfinger, 2004).

Element	Butchery Marks				Other
	Chop	Cut	Torsion	Flexion	Pathology
Mandible	2/4	-	-	-	-
Atlas	-	1/1	-	-	-
Axis	-	1/1	-	-	-
Cervical V.	-	2/2	-	-	-
Ulna	2/2	-	-	2/2	-
Radius	1/1	-	-	1/1	-
Metatarsal	3/6	-	2/6?	2/6?	1/6

TABLE 4
Butchery marks recorded on the equid bones.

that these elements were probably selected for their food value (Figure 6; Table 4). Elements of lower meat value, such as metacarpals and phalanges, were also dismantled, as the chop marks and fragmentation patterns (flexion, torsion, percussion) suggest (Figure 26 on the Appendix). Cut marks and scrape marks, on the other hand, are most likely due to skinning and flesh stripping operations.

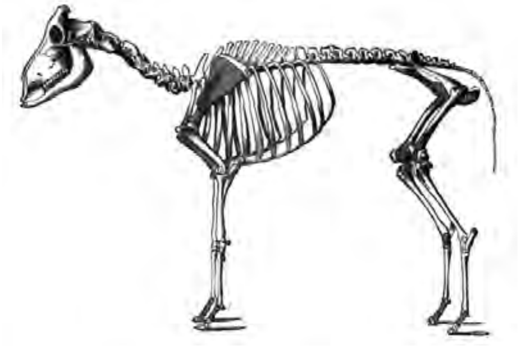

FIGURE 7
Sheep skeleton highlighting the elements identified at Aljezur (taken from Chauveau, 1857).

In connection with hypophagy, the study by Ramalho *et al*. (2001) mentions the importance given to juvenile horse meat for consumption in the Islamic world and this coincides with the cohort structure of this assemblage. Davis (2006: 41) also mentions that, in Islamic culture, whereas mule and ass meat was only consumed in times of famine, consumption of horse meat was not taboo. He also stresses the fact that horse meat was also given to hounds and dog packs during their days of rest, probably in the belief that, by virtue of it being considered a vigorous food, it would make the dogs stronger. This might explain the marks observed in the metatarsal and in one of the femora, where the dense groove/striated pattern appears coincident with biting made by a carnivore (dog?).

Sheep (*Ovis aries* Linnaeus, 1758) and Goat (*Capra hircus* Linnaeus, 1758)

Caprines were represented by 11 specimens (1,4% of NISP) (Table 5; Figure 7). The MNI and age determination were estimated via two isolated molars (Figure) and revealed two specimens aged 1-2 and 4-8 years, respectively (Payne 1973; Grant 1982).

Although pioneer studies on the identification of caprines, such as those of Boessneck (1969) and Payne (1973), are based on non-iberian materials

Ref.	Description								Quantification	
	Anatomy		Side	Cohort				Gender	NISP	MNI
-	Cranial skeleton	M3	-	Payne (1973)	Grant (1982)	#	General	-	-	2
19			Low. L	G-H	g	4-8 years	Adult	Indet.	1	
20			Upp. L	n/a	n/a	ind.	Adult	Indet.	1	
21		M2	Low. R	D	d-e	1-2 years	Subadult	Indet.	1	
22-23	Apendicular skeleton	Scapula	R	Subadult - adult				Indet.	2	
24-25			L	Subadult - adult				Indet.	2	
26		Astragalus	R	Subadult - adult				Indet.	1	
27		1st phalanx	L	Subadult - adult				Indet.	1	
28			R	Subadult - adult				Indet.	1	
29		2nd phalanx	R	Subadult - adult				Indet.	1	
Total									11	

TABLE 5
Sheep/goat *(Ovis/Capra)* Overview of remains

FIGURE 8

Caprine mandibular teeth: Right M2 (left); Left M3 (middle); Left M3 (right).

and studies in Portugal by have revealed important morphological variation in sheep and goat during Islamic times Davis (2008), at Aljezur, sheep/goat remains were of poor quality thus the distinction between species was essentially based on the method of Boessneck (1969), regarding the morphology of the astragalus (Figure), which is not always conclusive. The absence of horns and metapodials, and the small size of the assemblage did not contribute to raise the level of certainty. Thus, although the morphology and biometry of an astragalus (GLm=30,1 mm; GLi=31,6 mm) was coincident with a sheep, it is possible that also goat was present in these deposits.

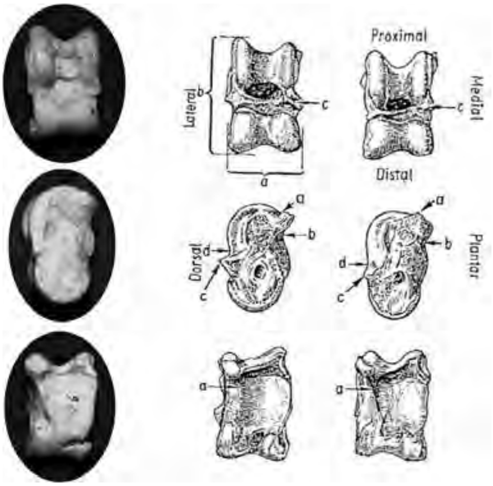

FIGURE 9

Caprine astragalus compared with specimens from goat (left) and sheep (right) (taken from Boessneck, 1969).

In the context of Aljezur, as expected for a fortification, the importance of caprines seems to be related with the consumption of meat (specimen aged 1-2 years), also considering the butchered bones of high food value, such as the scapulae. Indeed, in terms of bone modifications, only the scapulae exhibited meaningful marks. The butchering process here left regular fragmentation surfaces related to deep cuts (i.e. chop marks) made by some kind of cleaver, as well as superficial cut marks near the glenoid fossa and along the cranial and caudal edges of the blade. These seem to be related to skinning and/or defleshing operations. But the older specimen, above 4 years of age, speaks of a secondary use of caprines of a yet undetermined nature (milk, wool? cheese?).

Red deer **(***Cervus elaphus* Linnaeus, 1758)

Red-deer is represented by 82 specimens (10% of the NISP) (Table 6). The most numerous remains were those from antlers, that allowed for a straightforward identification (Lister, 1996) (Figure 10; see also Figure 27 on the Appendix). At least 3 individuals were represented, namely two adult males (2 right burrs) and one infantile. The infant was aged from a mandible and the eruption stage of its milk teeth. The *in situ* teeth were p_2 and p_3, but the crypt of the permanent M_1, the first perma-

FIGURE 10

Red deer skeleton highlighting the elements identified at Aljezur (taken from Lydekker, 1894).

Ref.	Description						Quantification		
	Anatomy		Side	Cohort		Gender	NISP	MNE	
30-32	Cranial skeleton	Antler	R	Subadult - adult		M	3	2	3
33-39		Antler (tine)	Indet.	Subadult - adult		M	7		
-		Antler splinters	Indet.	Subadult - adult		M	61	Indet.	
-		Mandible		Azorit et al. (2002)	General	-	-	-	
40			L	4 - 5 months	Infantile	Indet.	1	2	
41				Indet.	Subadult - adult	Indet.	1		
42	Apendicular skeleton	Pelvis	R	Subadult - adult		Indet.	1	1	
43-44			L	Subadult - adult		Indet.	2	2	
45		Femur	R	Subadult - adult		Indet.	1	1	
46		Tibia	R	Infantile-juvenile		Indet.	1	1	
47-48		Metacarpal	L	Subadult - adult		Indet.	2	2	
49		Metatarsal	L	Subadult - adult		Indet.	1	1	
50		1st phalanx	AL	Subadult - adult		Indet.	1	1	
Total							83	13	

TABLE 6

Red deer *(Cervus elaphus)*: Overview of remains.

nent tooth to erupt, was also evident (Azorit *et al*., 2002). According to these authors, this individual should have been 4 to 5 months old. The state of preservation of a second mandible doesn't allow for a precise determination of age.

The two specimens that could be measured were the metatarsal (Bd = 41.8 mm; Dd = 26.7 mm) and the first phalanx (GLpe = 55.3 mm; Bp = 20.2 mm; Bd = 18.6 mm; Bm = 16,2 mm; Dp = 25.2 mm; Dd = 15.7 mm).

In terms of bone modifications, butchery marks done with a cleaver are the most frequent category, particularly evident on both the articulations and diaphyses of the major limb bones (esp. metapodials), where they left regular and irregular fragmentation surfaces. Superficial cut marks were occasionally observed (Table). Antlers show considerable fragmentation and seem to have been involved in an intense dismantling (chop marks), percussion and flexion process aimed at removing the tines. Superficial cutmarks and scrape marks again reflected skinning and meat removal operations.

The presence of an infantile individual in this assemblage is worth remarking as the stage of the milk teeth indicated that this foal had been hunted intentionally. Could it be that, as was the case with horses at Aljezur, the tender meat of deer young was a sought after commodity? Since this was a 4-5 months old individual, in this species the rut ranges from the end of August until early November, and the gestation period of Red deer lasts for 210-250 days, this animal must have been born in the Spring or early Summer and killed around either late Summer or Autumn (Hutchins & Olendorf, 2004). As for adults, one of the antlers should have at least 4 tines on each side, indicating more than 3 years of age, which suggests an adult in its prime and a significant amount of meat. Beyond representing a food source, the hunting of red deer in this castle, as was the norm throughout medieval Iberia both for Christians and Muslims alike, may reflect a hunting not just related to meat procurement but also as training for the warriors stationed on the castle (Cardoso, 1995). One way or the other, this community had no particular interest in antlers as trophies, as suggested by the intensive butchery marks left on them and their discard in an offal deposit.

Element	Butchery Marks				
	Chop	Cut	Blow	Flex.	Scrap.
Antler	6/71	-	Indet.	Indet.	-
Mandible	-	-	1/2?	-	-
Pelvis (ilium)	1/3	1/3	-	-	-
Femur	-	1/1	-	-	-
Tibia	1/1?	-	-	1/1?	-
Metacarpal	1/2	1/2	-	2/2	1/2
Metatarsal	1//1	1/1	-	1/1	-
1st phalanx	-	-	-	-	-

TABLE 7

Butchery marks recorded on the red deer bones.

Suids (*Sus scrofa* Linnaeus, 1758 and *Sus* sp.)

Suids were represented by 20 specimens (2,5% of the NISP) (Table 8). The MNI=2 was obtained through the presence of left specimens from the 3rd metatarsal and the ulna. Based on size differences in the ulnae and canines these two were adult animals, probably a male and a female.

Although the size of the canines (Figure 28 on the Appendix) confirmed the presence of wild boar, most remains appeared to represent the agriotype and no domestic pig remain could be positively identified, the presence of the domestic variety should not be excluded despite the context being exclusively Islamic. The osteometric and odontometric distinction made by Payne & Bull (1988) between wild boar and domestic pig cannot be reliably applied in our case as suids from the Iberian Peninsula, wild and domestic alike, show a distinct morphology. Likewise, the specimens from Aljezur didn't allow for a comparison with the data of Albarella *et al*. (2005) as the scarce measurable specimens did not provide a clear distinction between domestic and wild (Table).

FIGURE 11
Wild boar skeleton highlighting the elements identified at Aljezur (taken from Lydekker, 1894).

The distinction between wild and domestic is important here as the presence of boar evidenced

Ref.	Description					Quantification		
	Anatomy		Side	Cohort	Gender	NISP	MNE	MNI
51	Cranial skeleton	Mandible	R	Adult	Indet.	1	1	2
52					M	1		
53			L	Adult	F	1	1	
54					Indet.	1		
55		Canine	Upper	Adult	M	1	1	
56			Indet.	Subadult - adult	F	1	1	
57		Incisor	Indet.	Subadult - adult	Indet.	1	1	
58	Axial skeleton	Atlas	N/a	Subadult - adult	Indet.	1	1	
59		Axis	N/a	Subadult - adult	Indet.	1	1	
60		3rd cervical v.	N/a	Subadult - adult	Indet.	1	1	
61		4th cervical v.	N/a	Subadult - adult	Indet.	1	1	
62	Apendicular skeleton	Ulna	L	Subadult - adult	Indet.	1	1	
63				Adult	Indet.	1	1	
64		Radius	L	Adult	Indet.	1	1	
65-66		metatarsal III	R	Subadult - adult	Indet.	2	2	
67			L	Subadult - adult	Indet.	1	1	
68		Metatarsal IV	R	Subadult - adult	Indet.	1	1	
69			L	Subadult - adult	Indet.	1	1	
70		Metatarsal V	R	Subadult - adult	Indet.	1	1	
Total						20	18	

TABLE 8
Wild boar: Overview of remains.

Ref.	Element	Measurement						
		H	BFcr	GL	LeP	Bp	B	Bd
58	Atlas	64.9	67.2	N/a	N/a	N/a	N/a	N/a
65	Metatarsal III	N/a	N/a	94.9	91.5	17.1	15	19.9
66		N/a	N/a	-	-	18.4	16.5	-
67		N/a	N/a	-	-	18.7	-	22
68	Metatarsal IV	N/a	N/a	103.8	98.7	18.4	15	19.2
69		N/a	N/a	104.1	101.7	18.9	14.8	19.7

TABLE 9

Biometry of the atlas and metatarsals of wild boar (measurements taken from Driesch, 1976).

Element	Butchery Marks						
	Chop	Cut	Saw	Blow	Tors.	Flex.	Scrap.
Mandible	2/4	-	-	-	-	-	-
Atlas	-	1/1	-	-	-	-	-
Axis	-	1/1	-	-	-	-	-
Cervical v.	-	2/2	-	-	-	-	-
Ulna	2/2	-	-	-	-	2/2	-
Radius	1/1	-	-	-	-	1/1	-
Metatarsal	3/6	-	-	-	2/6?	2/6?	-

TABLE 10

Butchery marks on wild boar bones.

hunting, not stockbreeding. Hunting would not only indicate training of warriors as previously postulated for red deer, but also consumption. Indeed, the butchery marks left on several of these bones (see below) suggested meat consumption, and whereas pork is forbidden to Muslims by their religion, wild boar is consumed under certain circumstances (Cardoso, 1995). At Aljezur the impression conveyed is that the Quran prohibition of pork consumption might have been taken more flexibly than at places such as Mértola (Antunes, 1996) and Almodôvar (Cardoso, 1995), and this might simply imply different interpretations of the rule. But other alternatives might exist. Since the remains of suids are scarce, it seems clear that, if at all consumed, this may not reflect Muslims who didn't abide Quranic rules, as Almohads in particular were good observers of the rules, but that, at some point, the community, in the face of starvation, could have consumed wild boar. One also needs to contend with the possibility of a culturally mixed deposit with Christian influence (Pereira, 2014). In the castle from Palmela it was possible to set apart the differences between the Christian and Muslim food patterns through the presence and absence of suids remains (Cardoso & Fernandes, 2012). But taking suid remains as proxies of cultural food patterns may not always work. This was the case of roman city of Conimbriga in Central Portugal, where the differences between the late roman and the Muslim levels were not evident probably due to the presence of an important Mozarabic community at the time the Muslims ruled the city (Detry *et al*., 2014).

As said, bone modifications (Table 10) exhibited a predominance of butchery marks with cleavers. These marks were most often recognized as deep cuts or impact zones close to the articulations (e.g. metatarsals) and by regular fragmentation surfaces (e.g. ulnae). They also suggested flexion of the bones on the cut zone that generated either stepped or irregular fragmentation surfaces. The cervical vertebrae featured very superficial marks of difficult interpretation, that may be due to damage done during excavation. In terms of pathologies only specimen 67 featured a bone thickening of the diaphysis probably reflecting inflammation.

Dog **(***Canis familiaris* Linnaeus, 1758)

The dog (*Canis familiaris*) was represented by 5 specimens (0,6% of the NISP) that could have belonged to one individual (Figure 12; Table 11). The intense wear of the mandibular teeth revealed an individual of considerable age, possibly a senile (Figure 13). This appears to be a more likely condition in a domestic animal than in an animal living in the wild. In fact, keeping animals to an old age is often taken as evidence of a strong bond existing between a beast and its owner.

The distinction between wolf and dog was carried out with the biometric data on the M_1 pro-

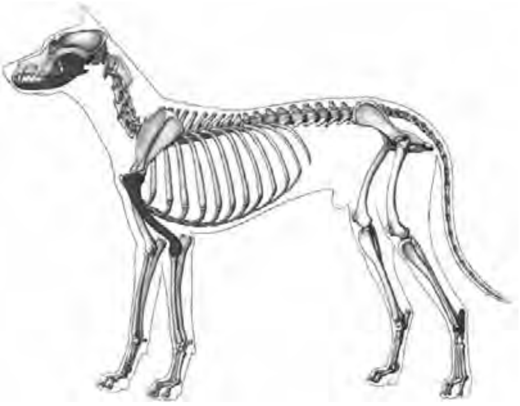

FIGURE 12

Dog skeleton highlighting the elements identified at Aljezur (taken from Goldfinger, 2004).

Ref.	Description				Quantif.	
	Element	Side	Cohort	Gender	NISP	MNI
643	Mandible	R	Senile	Indet.	1	1
644	Canine	R	Indet.	Indet.	1	
645	Humerus	L	Indet.	Indet.	1	
646	Astragalus	L	Indet.	Indet.	1	
647	Calcaneum	L	Indet.	Indet.	1	

TABLE 11
Dog *(Canis familiaris)*: Overview of remains.

vided by Detry & Cardoso (2010). This dataset shows that the M_1 of Portuguese wolves exhibit lengths at the crown ranging between 24-30 mm, the width ranging between 9,5-13,5 mm (Figure). The M_1 on the mandible specimen from Aljezur (Table 12) had a length of 24 mm and a width of 10 mm. Although both values fall within the lowermost boundary for wolf, the archaeological context and old age of the specimen make it more likely that this individual represented a large breed of dog of the kind that were normally used to hunt large animals (a molosser, such as the mastiff). Indeed, in view of the scarce representation of caprines at Aljezur, one may consider that a sheepdog would be a far less likely alternative.

FIGURE 13
Right mandible of *Canis familiaris*.

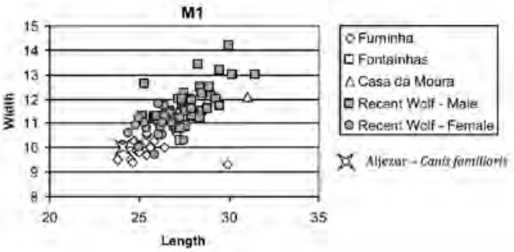

FIGURE 14
Length and width of the lower carnassial (M_1) from the canid mandible at Aljezur plotted against values of female and male Portuguese wolves, *Canis lupus* (Adapted from Detry & Cardoso, 2010).

Domestic Cat (*Felis* cf. *catus* Linnaeus, 1758)

Small felids were represented by 12 specimens (1,5% of the NISP) for an MNI = 1 that, on account of the archaeological context and age of most specimens, have been parsimoniously attributed to the domestic cat with reservations (Table 13).

The distinction between wild and domestic cat at Aljezur was complicated because of the comparatively large number of infantile/juvenile specimens that lacked the epiphyseal fusion in bones such as the humeri and femur (Table 13). This fact precluded clear cut comparisons with adults and also through biometrical means.

Measurements, in particular the height behind the carnassial (M_1; measurement 9), were taken on the mandibles (Table xx). These evidenced a developing mandible with teeth still growing. Compared with the data from Davis *et al.* (2008), measurements taken on M_1 (i.e. measurements 6a and 6b), with values of 8,8 mm (length) and 4,2 mm (width) were placed in the area of *F. silvestris* (*vide* Mota, 2014). The length measurements of the P_3-M_1 toothrow, with values of 21,9 mm and 20,6 mm, plotted closer to the overlapping zone between *F. catus* and *F. silvestris*, (*vide* Mota, 2014). The Pleistocene data from Portugal (Cardoso, 1993:

Canis familiaris	Measurement (mm)																			
	1	2	3	4	5	6	7	8	9	10	11	12	13a(L)	13b(W)	14	15	16	17	18	19	20
Driesch (1976)	-	-	-	-	-	-	-	82.2	75.8	39.2	41.9	36.7	24.0	10.0	-	-	-	-	-	29.6	24.6
Detry & Cardoso (2010)	-	-	-	-	30.1	23.9	-	26.4	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 12
Biometry of the dog mandible from Aljezur [measurements taken from Driesch (1976) and Detry & Cardoso (2010)].

Ref.	Description						Quantification	
	Element		Side	Epiphysal fusion	Cohort	Gender	NISP	MNI
602	Cranial skeleton	Mandible	R	N/a	Infantile-juvenile	Indet.	1	1
603			L		Infantile-juvenile	Indet.	1	
604	Apendicular skeleton	Scapula	R	Complete	Infantile-juvenile	Indet.	1	
606		Humerus	R	Absent	Infantile-juvenile	Indet.	1	
607			L	Absent	Infantile-juvenile	Indet.	1	
608		Ulna	R	Complete	Infantile-juvenile	Indet.	1	
609		Radius	R	Complete	Infantile-juvenile	Indet.	1	
610			L	Complete	Infantile-juvenile	Indet.	1	
611		Femur	Indet.	Absent	Infantile-juvenile	Indet.	1	
614		Calcaneum	R	Complete	Indet.	Indet.	1	
615		Metatarsal IV	L	Indet.	Indet.	Indet.	1	
616		Metatarsal V	L	Indet.	Indet.	Indet.	1	
-	Total						12	

TABLE 13
Cat *(Felis sp.)*: Overview of remains.

Ref.	Element	Side	Measurement (mm)										
			1	2	3	4	5	6a (L)	6b (B)	7	8	9	10
602	Mandible	Right	-	-	46.8	44.6	21.9	8.8	4.2	9.8	-	10.2	11.1
603		Left	54.2	52	47	44.7	20.6	8.8	4.2	8.9	21.5	10.5	-

TABLE 14
Biometry of the mandibles of *Felis* sp. from Aljezur (measurements taken from Driesch, 1976).

429) for the maximum length of the mandible (measurement 1), P_3-M_1 toothrow (measurement 5) and height behind M_1 (measurement 9) are, in average, above those from the specimens of Aljezur evidencing that adult *F. silvestris* were larger in the Pleistocene. To sum up, although we are dealing with a non-adult specimen, it was a large individual thus the possibility exists that this animal might have been a wildcat, not a domestic cat.

But such conclusion does not gain weight when the general context is taken into consideration. In this way Pereira (2014: 5) comments on the fondness of Muslims for cats as pets by comparison to dogs, that would have had always more utilitarian uses. The presence of the wildcat (*F. silvestris*), of which hunting is documented in Muslim sites, on the other hand, may instead have reflected some kind of commensalism that seems unlikely on account of the nature of this species. What one cannot rule out is the hybridization of local wildcats

FIGURE 15
Domestic cat skeleton highlighting the elements identified at Aljezur (taken from Goldfinger, 2004).

FIGURE 16
Left and right mandibles of a cat.

with the domestic variety, in places where domestic animals were allowed to roam free outside of the urban environment. This fact alone is known to compromise the distinction between the two populations (Driscol & Nowell, 2010), as documented for domestic and wildfowl in Asia.

Iberian lynx (cf. *Lynx pardinus* Temminck, 1824)

The identification of a larger felid, represented by 2 specimens (0,2% of the NISP) for an MNI = 1, has been taken to represent the Iberian lynx but remains open given the number and preservation state of bones that didn't allow for any conclusive biometry to be carried out (Table 15). Particularly distressful was the lack of teeth that precluded a comparison with the data from Cardoso (1993: 436). The preserved portion of the mandible could still be measured at the cheek teeth alveolar zone, but it was poorly preserved, offering values of small significance (Figure 17).

Ref.	Description				Quantification	
	Element	Side	Age	Gender	NISP	MNI
617	Mandible	L	Adult	Indet.	1	1
618	Metacarpal IV	R	Adult	Indet.	1	
-	Total				2	

TABLE 15
Cat *(Felis sp.)*: Overview of remains.

Extinct in Portugal in very recent times and in opposition to the wild cat, lynx has been greatly affected by human presence. Absence of traces does not allow one to state if it was meat, rather than the fur what people were looking for when they hunted this individual.

FIGURE 17
Cranium of European lynx (Lynx lynx) highlighting the portion retrieved at Aljezur (taken from Heptner, 1992).

Rabbit (*Oryctolagus cuniculus* Linnaeus, 1758)

With 572 specimens rabbit represented *ca.* 70% of the NISP. Even in terms of NSP, it represented 40% of the whole assemblage, which is a high figure considering that rabbit bones were far less fragmented than those from other mammals. In terms of MNI this is also the largest assemblage (i.e. 55 individuals).

Despite the idea of complete individuals being present in the deposits, the anatomical spectra evidenced partial skeletons devoid of the smallest elements as would be the case of carpals, tarsals and phalanges (Figure 18; Table 16). This bias is undoubtedly due to the defective method of retrieval by hand. For such reason, the absence of these smaller elements cannot be taken at face value to indicate an anthropic selection of bones with a higher meat content as would be the case of the major limb bones (19). Vertebrae were very abundant but less so than mandibles that provided the minimum number of 55 individuals. The high frequency of mandibles may have been due to a combination of hardness and easy detection in the sediment. The specimens from the zonal skeleton (i.e. scapula and pelvis) tended to be slightly more frequent and the smaller elements tend to be completely absent.

The majority of these specimens represented adults, but some without epiphyseal fusion belonged to younger cohorts (subadult and juvenile). The absence of infantile specimens and the sealed nature of the deposit allow us to postulate that all

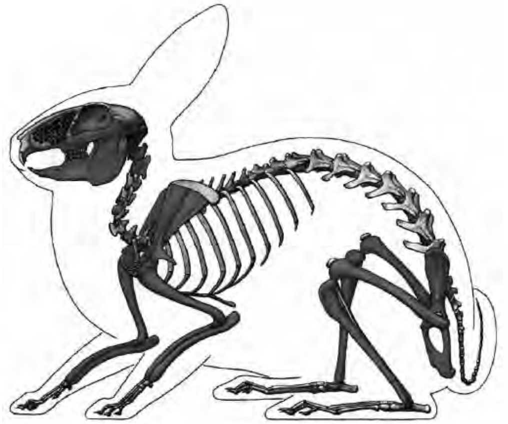

FIGURE 18
Rabbit skeleton highlighting the elements identified at Aljezur (taken from Goldfinger, 2004).

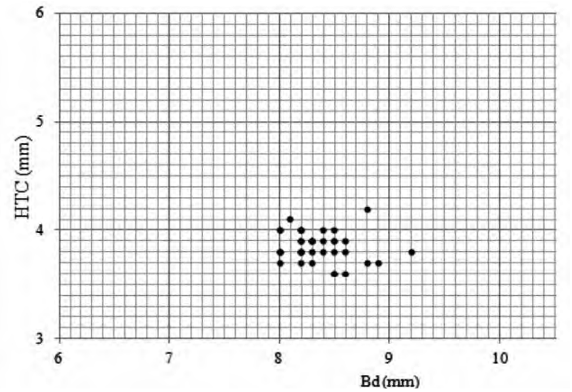

FIGURE 19

Humerus: Minimum diameter of the distal trochlea (HTC) plotted against the maximum breadth of the distal articulation (Bd) in rabbits from Aljezur.

these rabbits were accumulated as the result of human activity (i.e. hunting and consumption).

Given the number of specimens per element, the recognition of the portions from each element proved useful to estimate the MNE. In some cases, the NME did not equal the NISP because opposing portions of the same element might have belonged to the same specimen before it fragmented.

Most of the rabbit remains derived from adult/ subadult individuals, thus it was easy to set them apart from remains of the Iberian hare (*Lepus granatensis*). To check further on this issue we compared two measurements taken on the distal humerus namely the minimum diameter of the distal trochlea (HTC) and the maximum breadth of the distal articulation (Bd) (see Davis *et al*., 2008). The analysis of the biometric data from 46 humeri revealed the sole species present in the samples to be *O. cuniculus* (Table 17; Figure 20). Although the obtained values were fully within the boundaries developed in Davis *et al.* (2008), the Bd were slightly higher (i.e. 8-9 mm *vs.* 7-8 mm). Such fact might be due to the measuring technique.

The abundance of rabbits is here taken to reflect the abundance of the species in the region.

Ref.	Description					Bone portion			Quantification		
	Element		Side	Gender	Cohort	-			NISP	MNE	MNI
71-82	Cranial skeleton	Cranium (Braincase)	R	Indet.	Subadult - adult	N/a			12	12	55
83-90			L	Indet.	Subadult - adult	N/a			8	8	
91-102		Upper jaw	R	Indet.	Subadult - adult	N/a			12	12	
103-117			L	Indet.	Subadult - adult	N/a			15	15	
-		Mandible				Articulation	Alveolar (molars/ premolars)	Alveolar (incisiors)	-	-	
118-119			R	Indet.	Subadult - adult	(+)	-	-	2	55	
120-127						(+)	+	-	8		
128-174						(+)	+	+	47		
175						-	-	+	1		
176			L	Indet.	Subadult - adult	(+)	-	-	1	38	
177-178						(+)	(+)	-	2		
179-212						(+)	+	(+)	34		
213-214						-	(+)	+	2		
-		Premolar	Indet.	Indet.	Subadult - adult	N/a			36	36	
-		Incisor	Indet.	Indet.	Subadult - adult	N/a			4	4	
215-217	Axial skeleton	Atlas	N/a	Indet.	Subadult - adult	N/a			3	3	
218		Axis	N/a	Indet.	Subadult - adult	N/a			1	1	
219-289		Vertebra	N/a	Indet.	Subadult - adult	N/a			71	71	
290-294		Sacrum	N/a	Indet.	Subadult - adult	N/a			5	5	

Tabla 16 (continuación)

Ref.	Description					Element				Quantification		
		Element	Side	Ep. fusion	Cohort					NISP	MNE	MNI
295-324	Apendicular skeleton	Scapula	R	Total	Subadult - adult	N/a				30	30	55
325-346			L	Total	Subadult - adult	N/a				22	22	
-		Humerus				Prox. Art.	Proximal diaphysis	Distal diaphysis	Distal articulation	-		
347-351			R	Total	Subadult - adult	Complete				5	21	
352-361				Total	Subadult - adult	-	(+)	+	+	10		
362-364				Parcial	Juvenile/ subadult	Complete				3		
365-366				Ausente	Juvenile	Complete				2		
367				Ausente	Juvenile	+	+	+	-	1		
368-370			L	Total	Subadult - adult	+	+	(+)	-	3	25	
371-378				Total	Subadult - adult	Complete				8		
379-391				Indet.	Subadult - adult	-	(+)	+	+	13		
392				Ausente	Juvenile	Complete				1		
393-405		Ulna	R	Total	Subadult - adult	Complete				13	13	
406-418			L	Total	Subadult - adult	Complete				13	13	
419-426		Radius	R	Total	Subadult - adult	Complete				8	8	
427-431			L	Total	Subadult - adult	Complete				5	5	
-		Pelvis				Ílium	Articulation		Ísquium	-		
432-433			R	N/a	Subadult - adult	+	(+)		-	2	29	
434-460						(+)	+		(+)	27		
461-462						-	(+)		+	2		
463-464			L	N/a	Subadult - adult	+	(+)		-	2	22	
465-483						(+)	+		(+)	19		
484-486						-	(+)		+	3		
-		Femur				Prox. Art.	Diáfase proximal	Diáfase distal	Articulation o distal	-		
488-496			R	Total	Subadult - adult	+	(+)	-	-	9	17	
497						+	+	(+)	-	1		
498-502						Completo				5		
503						-	(+)	+	+	1		
504-507						-	-	(+)	+	4		
612				Ausente	Infantile/ juvenile	-	-	(+)	+	1		
508-515			L	Total	Subadult - adult	+	(+)	-	-	8	23	
516-522						Completo				7		
523						-	+	+	-	1		
524							(+)	+	+	1		
525-530						-	-	(+)	+	6		
531-533				Ausente	Infantile/ juvenile	+	(+)	-	-	3		
534						Completo				1		
613						-	(+)	+	+	1		
-		Tibia				Articulação proximal	Diáfise proximal	Diáfise distal	Articulação distal	-	-	
535-550			R	Total	Subadult – adult	+	+	(+)	-	16	21	
551-553						+	(+)	-	-	3		
554-557				Ausente	Infant-juvenile	+	+	(+)	-	4		
558-560						+	(+)	-	-	3		
561-569				Indet.	Indet.	-	(+)	(+)	-	9		
570-578			L	Total	Subadult - adult	+	+	(+)	-	9	25	
579-581						+	(+)	-	-	3		
582-587				Parcial	Juvenile	+	+	(+)	-	6		
588-590				Ausente	Infantile/juvenile	+	+	(+)	-	3		
591-600				Indet.	Indet.	-	(+)	(+)	-	10		
601		Metat. II	R	Total	Subadult - adult	Completo				1	1	
-		Total								572	535	

TABLA 16.

Rabbit *(Oryctolagus cuniculus)*: Overview of remains.

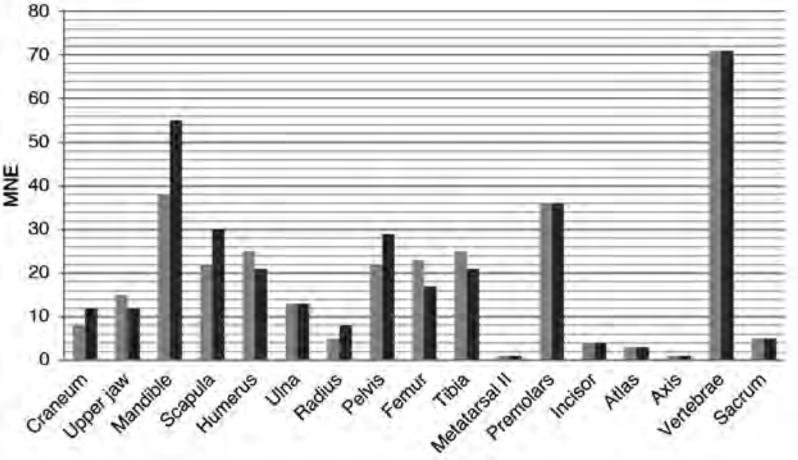

FIGURE 20

Anatomical distribution of O. *cuniculus* remains identified. The 2 columns for each element represent the left and right sides/portions of the element, respectively.

Ref.	Measurement (mm)		Ref.	Measurement (mm)	
	HTC	Bd		HTC	Bd
347	3.6	8.3	370	-	-
348	3.9	8.2	371	4.0	8.6
349	-	-	372	3.8	8.3
350	3.8	8.3	373	3.9	9.2
351	3.8	8.2	374	3.8	8.2
352	3.6	8.0	375	3.8	8.5
353	3.9	8.1	376	3.9	8.3
354	3.7	8.0	377	4.0	8.9
355	3.9	8.6	378	3.7	8.2
356	3.7	8.2	379	4.0	8.8
357	3.7	8.0	380	3.9	8.3
358	3.8	8.2	381	3.8	8.0
359	-	-	382	3.9	8.8
360	4.2	8.6	383	3.8	8.2
361	-	-	384	3.8	8.2
362	3.8	8.4	385	4.1	8.5
363	3.9	8.0	386	3.7	8.2
364	3.9	8.2	387	3.9	8.5
365	4.0	8.4	388	4.0	8.5
366	3.6	8.3	389	4.0	8.5
367	-	-	390	4.0	8.5
368	-	-	391	3.8	8.4
369	-	-	392	3.8	8.0

TABLA 17

Biometry of the rabbit humeri from Aljezur [measurements taken from Driesch (1976) and Davis *et al.* (2008)].

Rat (*Rattus* sp. G. Fischer, 1803)

This was one the less abundant taxa in this study with only 2 specimens (0,2% of the NISP) for an MNI of one (Table 18; Figure 21). The femur and pelvis could not be identified either as black rat (*Rattus rattus*) or brown rat (*Rattus norvegicus*), a far later intrusive species. Black rats were identified on the Almohad levels from Mertola (Morales & Rodriguez, 1997) so it is possible that this is also the species at Aljezur.

The complete epiphyseal fusion of the femur evidenced an adult individual (i.e. above 18 months).

FIGURE 21

Rat *(Rattus norvegicus)* skeleton highlighting the elements identified at Aljezur (taken, with modifications, from Van de Graaf *et al.*, 2012).

Ref.	Description				Quantification	
	Element	Side	Age	Gender	NISP	MNI
712	Femur	R	Adult	Indet.	1	1
487	Pelvis	L	Adult	Indet.	1	
-					2	

TABLE 18
Rat *(Rattus sp.)*: Overview of remains.

Chicken *Gallus gallus domesticus* Linnaeus, 1758

The domestic chicken was represented by 24 specimens (3% of the NISP) that the metatarsals indicated belonged to a minimum of 3 individuals (Figure 22; see also Figure 29 in the Appendix). These were all adults, and probably females as the metatarsals were devoid of spurs. The presence of hens suggests a primary emphasis on eggs, yet the cut marks documented on the coracoid evidence that use of the meat was also done.

The anatomical distribution, except for some major wing bones as is the case of the humerus, was restricted to the larger elements of the skeleton (Table 19). Although most of these bones have a high meat content the fact that most specimens were complete may simply reflect a retrieval bias of no further cultural connotation. As such, one cannot specify how the disarticulation of the carcasses took place.

FIGURE 21
Chicken skeleton highlighting the elements identified at Aljezur (taken, with modifications, from Coutureau, 2004).

Pond turtle (*Mauremys leprosa* Schwieegger, 1812)

The Pond turtle was represented by 50 specimens (6% of the NISP) most of which were plates (Table 20, Figure 23). A tentative MNI = 2 has been recorded on account of two almost complete plastrons that could be reconstructed (Figure 24; only a reconstruction of the upper carapace plates could confirm the validity of such MNI). This is still a substantial number of remains for an Iberian

Ref.	Description					Quantif.	
	Element		Side	Age	Gen.	NISP	MNI
619	Esqueleto axial	Clavicle	N/a	Adult	Indet.	1	3
620-622		Sternum	N/a	Adult	Indet.	3	
623		Thoracic vertebra	N/a	Adult	Indet.	1	
624-625		Lumbo-sacral vertebra	N/a	Adult	Indet.	2	
626	Esqueleto apendicular	Coracoid	E	Adult	Indet.	1	
627-629		Ulna	E	Adult	Indet.	3	
630		Metacarpal II + III	E	Adult	Indet.	1	
631-632		Pelvis	D	Adult	Indet.	2	
633			E	Adult	Indet.	1	
634		Femur	E	Adult	Indet.	1	
635-637		Tibia	D	Adult	Indet.	3	
638			E	Adult	Indet.	1	
639		Metatarsal	D	Adult	F	1	
640-642			E	Adult	F	3	
-	Total					24	

TABLE 19
Chicken *(G. gallus domesticus)*: Overview of remains.

Ref.	Description				Quantif.	
	Element	Side	Age	Gend.	NISP	NMI
661-662	Plastron	N/a	Adult	Indet.	2	2
663-707	Isolated plates	Indet.	Adult	Indet.	45	
708	Femur	L	Adult	Indet.	1	
709	Humerus	L	Adult	Indet.	1	
710		R	Adult	Indet.	1	
-	Total				50	

TABLE 20

Pond turtle *(Mauremys leprosa)*: Overview of remains.

archaeological site and, on account on the location of the castle, it would seem that these animals had been transported by people from the nearby "*ribeira de Aljezur*" which flows through the town below, rather than being intrusive or caught by people within the castle enclosure. There exist historical evidences for the consumption of pond turtles in late medieval contexts, the species being mentioned as a delicacy in Silves (Algarve, Portugal) (Cardoso & Gomes, 1996: 262). Muslims also seem to have appreciated this species.

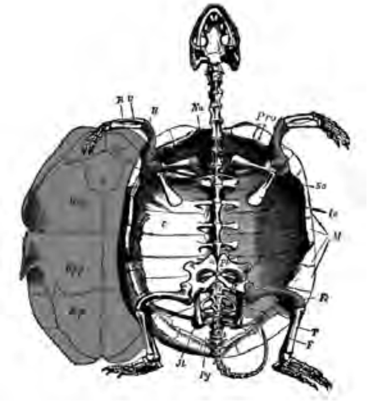

FIGURE 23

European pond turtle *(Emys orbicularis)* skeleton highlighting the elements identified at Aljezur (taken from Parker & Haswell, 1900).

FIGURE 24

Plastrons of Pond turtle *(Mauremys leprosa).*

Toad (*Bufo* sp. Laurenti, 1768)

The toad was represented by 13 appendicular bones (1,6% of the NISP) representing no less than 4 individuals on account of the number of pelves (Table 21; Figure 25). The identification of the genus *Bufo* is easy to carry out with the limb bones found at Aljezur due to the diagnostic traits that bones such as the tibio-fibula and radius-ulna feature. However, to determine the species (in this case either *B.bufo* or *B. calamita*) is far more difficult to accomplish.

Ref.	Description			Quantif.	
	Element	Side	Age	NISP	MNI
648	Urostyle	N/a	Adult	1	4
649-650	Pelvis (Ilium)	R	Adult	2	
651-654		L	Adult	4	
655	Femur	Indet.	Adult	1	
656	Tibio-fíbula	Indet.	Adult	1	
657-658	Humerus	R	Adult	2	
659		L	Adult	1	
660	Radio-ulna	Indet.	Adult	1	
	Total			13	

TABLE 21

Toad (*Bufo* sp.): Overview of remains.

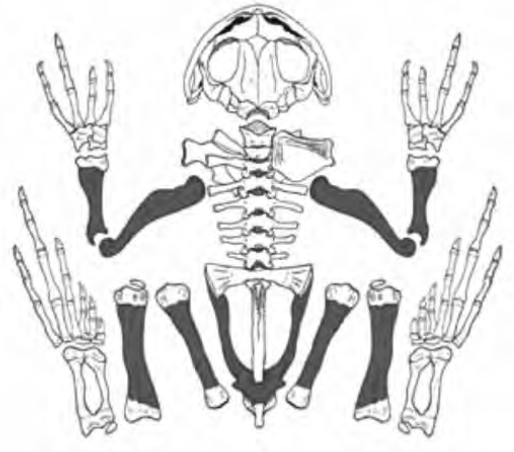

FIGURE 25

Frog (*Rana* sp.) skeleton highlighting the elements identified at Aljezur (taken from Kellogg, 1901).

Although the consumption of a toad debatable, one would think that the rocky hill where the castle rests does not appear to be a suitable environment for toads, thus one might feel prone to argue for human intervention of some kind to explain the presence of these animals in the assemblage. In fact, toads of the Genus *Bufo* are quite terrestrial outside their breeding season and also fond of occupying crevices in rocks. The castle would thus have been a perfectly acceptable environment for them and their nature as intrusives, as mentioned for the rat, seems as the most plausible hypothesis with the data at hand.

PALEOECOLOGY

Studies on faunas from Almohad sites in the Algarve region, as are the cases of Silves (Davis *et al.*, 2008), Mesas do Castelinho, Almodôvar (Cardoso, 1995) and the eastern Algarve (Catarino, 1997/98; Pereira, 2014) refer a woodland and scrubland that, on account of the presence of the same game species, in particular wild boar and red deer, seems to apply in general terms to the region of Aljezur but not quite. Indeed, both the presence of caprines and, to a smaller extent, of rabbits suggests the presence of more open lands including grasslands around the castle.

The Early Holocene (10-8 kya BP), was characterized in this region by a relatively wet climate that fostered a maximum development of woodlands (Pais, 2013). Pine forests of *Pinus pinaster* (cluster pine) and *P. pinea* (stone pine) covered most of the coastal and continental areas where, nowadays, evergreen oaklands (*Quercus* sp.) flourish (Pais, 2013). Probably most of these Mediterranean communities of pine forests managed to resist the advance of the oak forests until the onset of pastoral practices, in combination with the use of fire and a reduction of rainfall with its concomitant increase in seasonality, did away with many of them (Pais, 2013). Mining and naval construction from AD XV onwards also played their role in the demise of this woodland ecosystem, making the present day vegetation an unreliable proxy to interpret faunas from former times (Cardoso, 1995).

Barbosa (2000: 12) mentions that phyto-toponyms of places from southern Portugal help one to track down these changes, pointing out species typical of pastoral ecosystems since post-Reconquest (i.e. medieval) times. These would be the Portuguese terms that point out the presence of "carrasco" (*Quercus coccifera*), "sobreiro" (*Quercus suber*) and "zambujeiro" (*Olea europea*). But one does not know whether these names already existed in this region in the XII/XIII centuries.

SOCIOECONOMIC INFERENCES

For any reliable comparisons to be established among these Islamic sites, one first needs to assess the nature of the deposits themselves. At Aljezur castle, remains date from a short time window set between AD XII/XIII that probably reflects an essentially continuous deposition yet other Islamic sites from the Algarve not only date to far earlier times (e.g. AD VIII) but also feature wide temporal windows (centuries) with intervals between the archaeological deposits. Likewise, islamic peasants undoubtedly experienced different socio-economic pressures, depending on the time and region, from the ruling classes. The Reconquest fight between Muslims and Christians, for example, aggravated after the fall of Lisbon (1147), shortly before the Almohads invaded Iberia, and the fall of Aljezur itself, around 1249, that signalled the end of Islamic rule in Portugal, shortly after the Almohads left the Peninsula (Silvério, 2001: 22). Also relevant for comparative purposes is the fact that the bone accumulation at Aljezur suggests a more focalized provenience, restricted to a presumably upper class community, that would in principle not allow one to establish general qualifications of certain socioeconomic aspects, as could be done on deposits reflecting the activities of a larger sectors of society.

Be it as it may, the Aljezur faunal assemblage suggests the importance that hunting had in the lives of the castle inhabitants during Almohad times, with the hunting of red deer, wild boar and, in particular, rabbit complemented with secondary resources ranging from lynxes to pond turtles. We believe that, notwithstanding meat procurement, hunting was important here to train soldiers and noblemen alike. Taken as a whole, this faunal assemblage seems to reflect the presence of a dominant social class, in contrast with the situation in other Islamic sites (Antunes, 1996; Cardoso, 1995), seemingly in times of economical crisis. The hunting activity itself may have been carried only by those social strata capable of investing in such activity, which requires appropriate means. Such phenomenon is recorded since Roman times when hunting, as a leisure or social activity, became linked to the manorial status of the proprietors of hunting zones (Cardoso & Detry, 2005).

In the Islamic levels from Almodôvar hunting of red deer was particularly important as a means of subsistence, not leisure. At Mértola and Silves, urban contexts par excellence, an opposed tendency was recorded, with scarce hunting and stressing husbandry and pastoralism.

As mentioned by Antunes (1991), and was corroborated by Silvério (2001), it is possible that the absence of hunting at Silves is due to urban development coupled with an intensive farming in the region, that shunned game animals to peripheral forested areas, like those of Monchique and Aljezur though a study by Davis *et al*., (2008) on the suburbs of Silves at the AD XII/XIII boundary, revealed hunted species. This shows that it was the socio-economic contrivances of those communities, coupled with the availability of wild fauna in adjacent areas, what determined the characteristics of the faunal spectrum in each case,.

Noteworthy at Aljezur is the total absence of cattle (*Bos taurus*). This contrasts with the situation recorded on other Islamic assemblages as are those from Almodôvar (Cardoso, 1995), Mértola (Antunes, 1996), Silves (Antunes, 1991), and those evidenced by Pereira (2014). The contrast is revealing as cattle were a major item of the farmland economies in those times. Given the social status of the castle inhabitants, as also suggested by Catarino (1997/98: 748), it may be that the domestic animal component in this site is probably connected to tributes paid by the town of Aljezur to the ruling class.

CONCLUSIONS

There exist several constraints that render it questionable to draw definitive conclusions from the faunal assemblages from structure A at Aljezur. The first one is that this collection is not only rather small but also exhibiting an intensive fragmentation that dictated that almost half of the remains could not be identified. Likewise, with the exception of the rabbit, both the number of identified remains and the MNI were so small that one remains unsure on whether comparing abundances among taxa is a reliable or even methodologically sound exercise (e.g. the "large" sample of the pond tortoise is due to the presence of loose plates from the carapace that are not strictly comparable to the conventional skeletal elements of the vertebrate skeleton; Table 20). Lastly, although the deposit appeared to be closed and of a primary nature and no infantile rabbits were found that would question those characters, the retrieval of potentially intrusive taxa, as would be case of the rat and, possibly also, of toads warn us that contamination cannot be ruled out completely.

Such restraints notwithstanding, and despite their apparently conventional nature, the faunas from structure A are atypical for the region and time for several reasons. The first one was the relevance of hunting, not so much in the case of the rabbit as for the presence of large and (in the case of adult wild boars) dangerous animals. Coupled with it, and equally revealing, was the marginal character of the domestic species of which one needs to stress the total absence of cattle. This peculiar combination suggests that whereas hunted items might have been actively and routinely brought to the castle by the people inhabiting it, domesticates may reflect an indirect and more erratic route of arrival that one, at this point, can only speculate about (i.e. payment of tributes/taxes?).

Complementary data add to this scenario of a non-peasant society. In this way, the presence of infantile horses and red deer not only reveals a targeting on tender meat but also –in the case of colts- a deliberate choice to consume a meat that was highly esteemed in the Islamic world. The same goes for the pond turtle and chicken. Add to it the presence of pets, such as the cat, and that of a large, molossid-like, dog that was allowed to live until very old age (i.e. was probably protected by its owner until death) and one cannot escape the idea of an affluent sector of society that, on account of the cultural identity (Almohad) and occupation of a castle, one can postulate to be the ruling sector of that society.

If this was the case, then one must strive to find parallels of the structure A faunas in order to attempt meaningful interpretations, and none apparently exist. Indeed, most Islamic faunal deposits from the Iberian peninsula not only reflect the doings of the lower sectors of society but are often mixed and the faunal elements accumulated by Muslims, Christians, or Jews, next to impossible to set apart as of this writing (Morales *et al*. 2011).

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APPENDIX

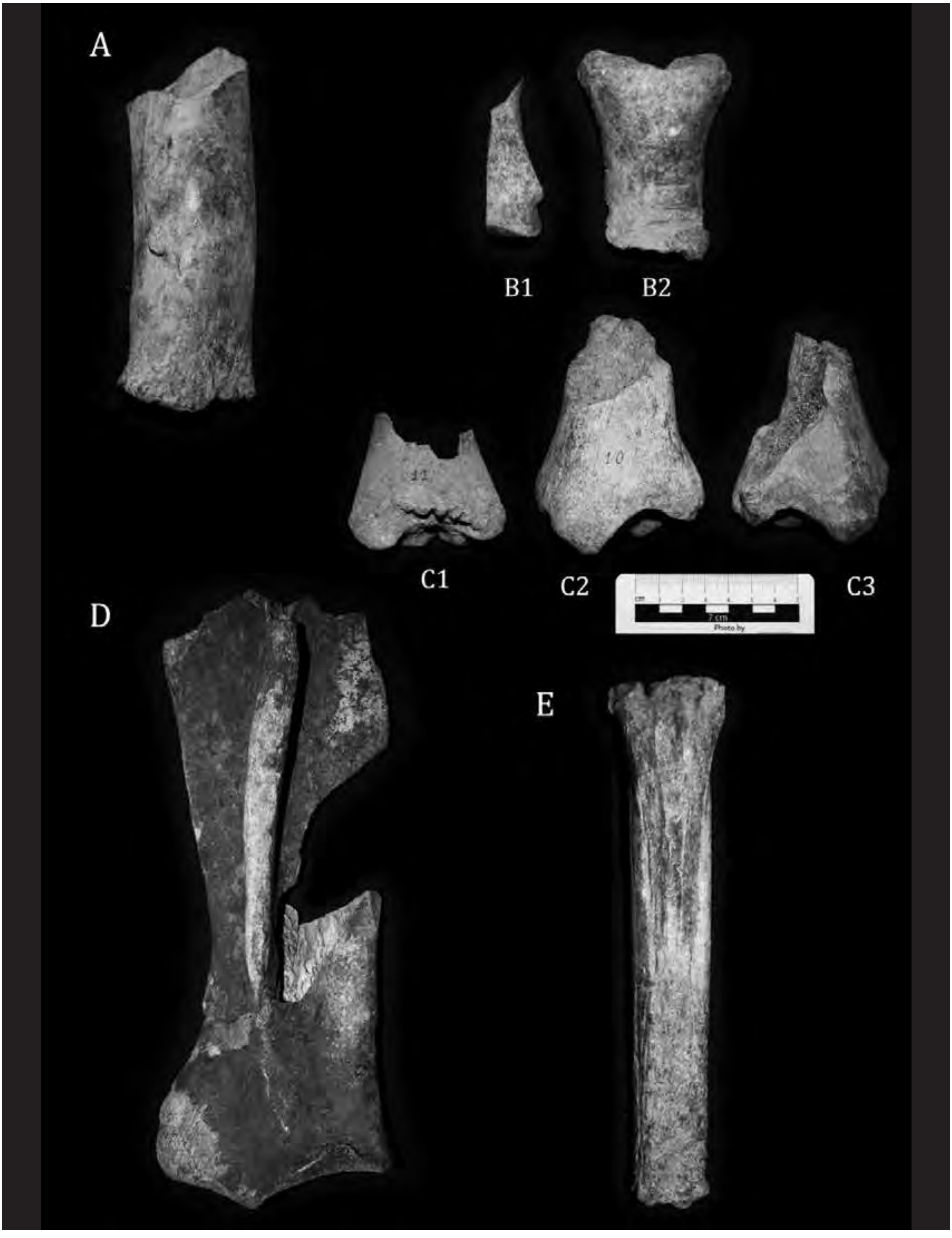

FIGURE 26

Equid remains. A – Right femur; B – 1st phalanges (B2 – right); C1 – Left tibia; C2 – Left tibia; C3 – Right tibia; D – Left scapula; E – Right metatarsal.

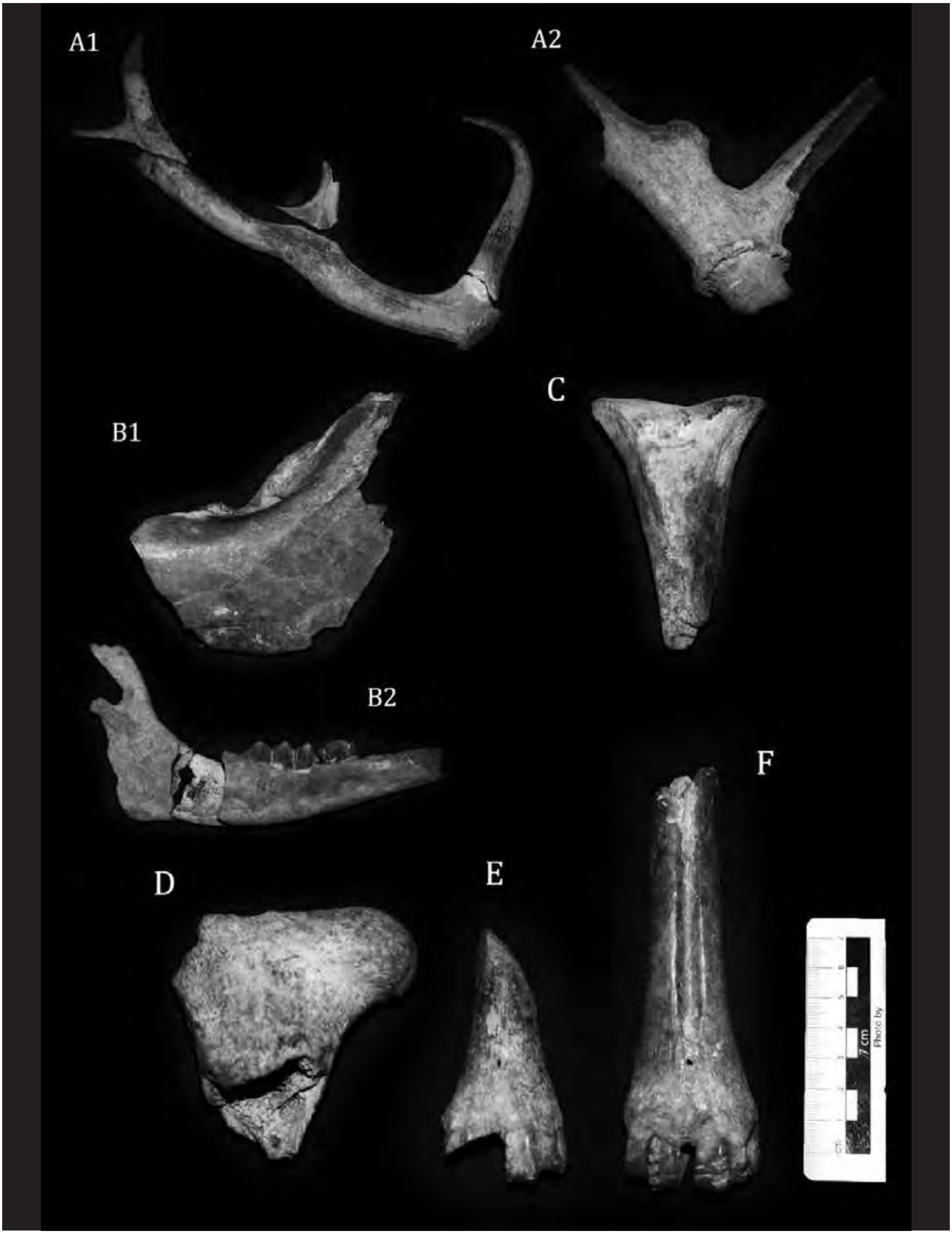

FIGURE 27

Red deer remains. A(1-2) – Right antlers; B – (1) Left mandible of an adult, (2) right mandible of an infant; C – Right tibia of a juvenile; D – Right femur; E – Metacarpal; F – Metatarsal.

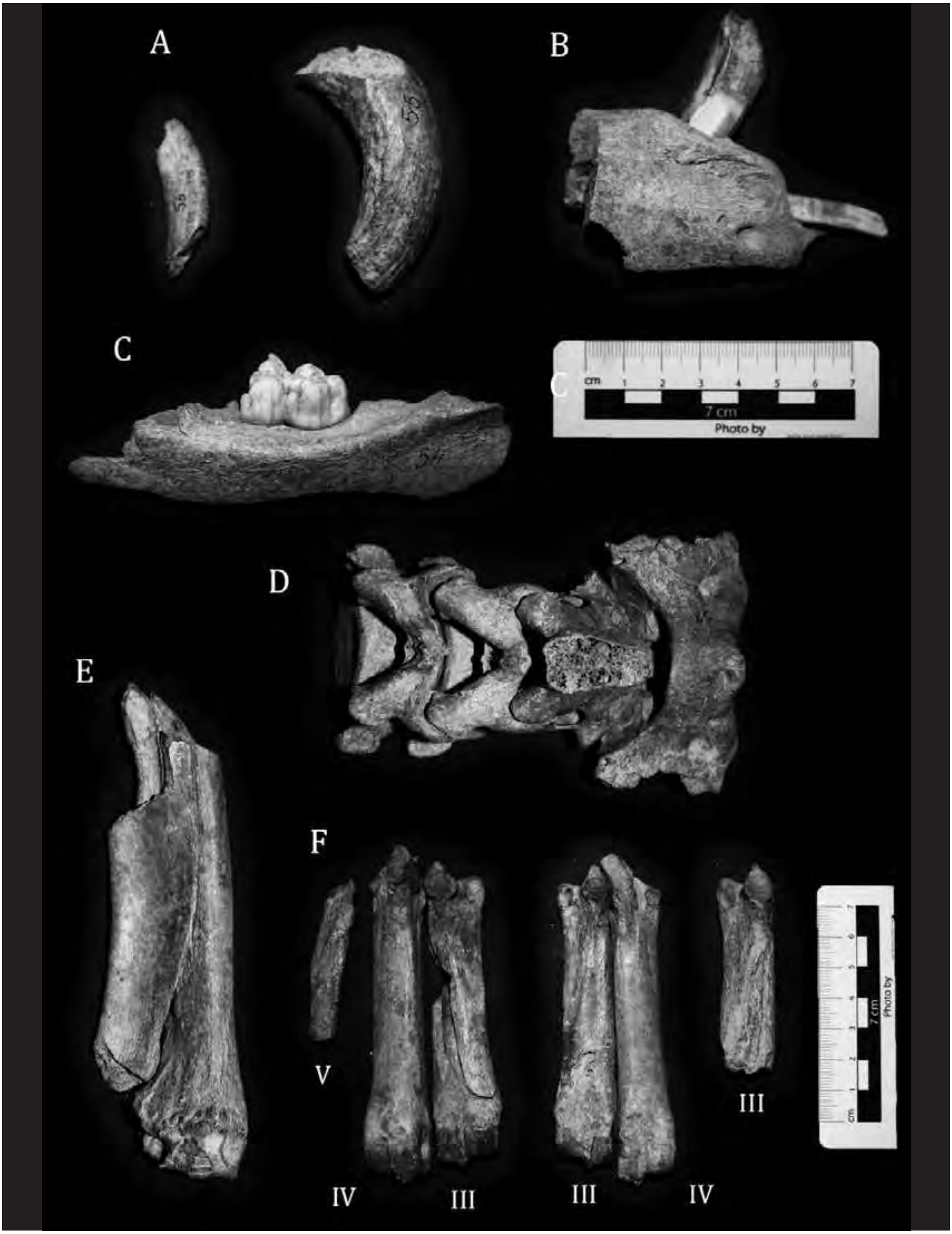

FIGURE 28

Suid remains. A – Canines; B – Alveolar zone of the incisors and of the canine of the right mandible; C – Alveolar zone of M_3 of the left mandible; D – Cervical vertebrae; E – Left radius and ulna; F – Metatarsals.

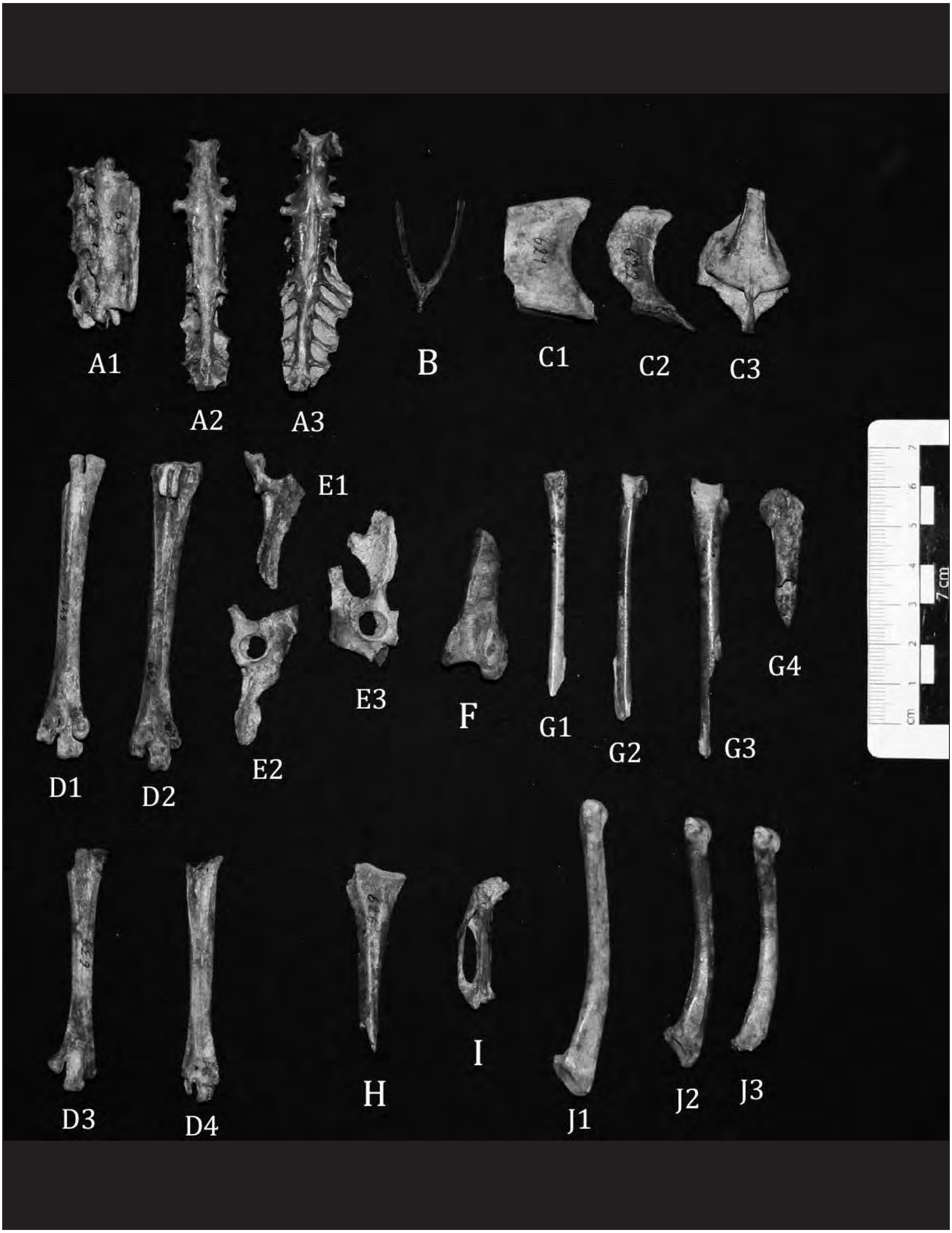

FIGURE 29

Chicken remains. A – Lombossacral; B – Clavicule; C – Sternum; D – Metatarsal, (1-2) left, (3-4) right; E – Pelvis, (1-2) right, (3) left; F – Left femur; G – Tibia, (1) left, (2-4) right; H – Left coracoid; I – Left metacarpals II and III; J – Right ulna.