* Institute of
Archaeology
– University College
London (UCL). London
Arts and Humanities
Partnership (LAHP).
mariananabais@gmail.com

** UNIARQ – Centro
de Arqueologia da
Universidade
de Lisboa. Fundação
para a Ciência
e Tecnologia (FCT).
ruigusmao@hotmail.com

Zooarchaeological evidence from the Iron Age site of Castro da Azougada (Moura, Portugal)

Mariana Nabais*
Rui Soares**

Resumo   Neste estudo apresentam-se os resultados da análise dos restos faunísticos recuperados em 2016 na escavação arqueológica do Castro da Azougada (Moura, Portugal). O sítio apresenta uma cronologia que aponta para os séculos V–IV a.C. e que, pelo seu grau de conservação, consiste num elemento importante para a compreensão da Idade do Ferro no Baixo Alentejo. Inicialmente escavado na década de 1940 por Fragoso Lima e Manuel Heleno, o Castro da Azougada voltou a ser intervencionado em setembro de 2016 recuperando-se um conjunto de materiais arqueológicos, nos quais se incluem cerâmicas, metais, líticos e um conjunto de faunas da Idade do Ferro.

O conjunto faunístico é constituído por 632 restos de fauna mamalógica, malacológica e ictiológica. A coleção mamalógica é a mais representativa, mas o elevado grau de fragmentação possibilitou apenas a identificação de alguns restos. Estes indicam a exploração de uma economia local bastante ruralizada, onde se incluem espécies domésticas, como o gado bovino e ovicaprino. A presença de espécies selvagens está também confirmada pelas evidências de veado, embora o seu modo de aquisição seja ainda desconhecido, se por atividades de caça locais ou por trocas comerciais. Foram também recuperados restos de conchas fluviais (*Unio delphinus* e *Potomida littoralis*), que apontam para uma exploração dos recursos dos rios Guadiana e Ardila. A presença de fragmentos de malacofauna marinha (cf. *Ruditapes* sp.) e de fragmentos de espinhas de peixe de espécies também marinhas (possivelmente da família dos tubarões) é reveladora de relações comerciais com o litoral.

Os dados faunísticos apontam assim para um sítio de características rurais, pelo menos em parte dedicado à exploração dos recursos agropecuários e fluviais do território em que se implanta, revelando alguns indícios de ligações comerciais com o litoral.

Abstract   This paper presents the zooarchaeological results from the 2016 excavation in Castro da Azougada (Moura, Portugal). The latter is a well preserved site dated from the 5th and 4th centuries BC, and it is a key element for the understanding of the Iron Age occupation of Baixo Alentejo. Castro da Azougada was first excavated in the 1940s by Fragoso de Lima and Manuel Heleno, and only revisited in September 2016 when it was recovered an assemblage of archaeological materials including pottery, metals, lithics, bones and shells from Iron Age levels.

The faunal assemblage is composed by 632 remains of mammals, shells and fish. Mammals are the best represented but the high fragmentation of the remains allows species identification of only a

few fragments. They reveal a local rural economy including domesticated species, such as cattle and caprids. Red deer is also present, even though it is hard to determine if it was hunted by local people or acquired by commercial exchanges. The exploitation of the local rivers Guadiana and Ardila is confirmed by the presence of freshwater shells (*Unio delphinus* and *Potomida littoralis*); whereas trading activity with the country's littoral is revealed by the identification of saltwater shells (cf. *Ruditapes* sp.) and fragments of marine fish bones (probably from the shark family).

To sum up, zooarchaeological evidence shows an inland Iron Age site characterised by herding and local fishing activities, with diets including wild game and complemented by coastal resources obtained by trading.

1. Introduction

Castro da Azougada is an Iron Age site from the county of Moura (Portugal), located in a prominent hill facing the river Ardila's estuary in the left margin of river Guadiana (Fig. 1). The site was found and excavated by Fragoso de Lima and Manuel Heleno in the 1940s revealing an assemblage of material culture (pottery, metals, glass, lithics, bones and shells) dated from the 5th century and the first half of the 4th century BC. The structures identified reveal an orthogonal architecture with compartments of varied dimensions all over the hilltop and surrounding a central area. The foundations are made of stone slabs supporting walls of brick and mortar that could have had up to 1 metre of thickness (Soares, 2012, pp. 11–29).

The site's location in the confluence of two rivers makes it part of the commercial routes that favoured trading with inland and littoral communities, which can explain the significant importance of the site within its local territory during the 5th century BC. The appearance of another local Iron Age site in the current area of Moura's Castle, during the first half of the 4th century BC, might explain the longer duration of Castro da Azougada. Otherwise, the latter would have probably disappeared by the end of the 5th century BC, such as the case of many other rural Iron Age sites in the area (Antunes, 2009, pp. 437–452; Soares, 2012, pp. 11–29).

Apart from scant faunal assemblages studied by Cardoso & Soares (2013, p. 87) and Albergaria & Melro (2013, pp. 330–331), little is known of the dietary strategies, herding and hunting practices during the Iron Age in the area. The excavation conducted in Castro da Azougada, in September 2016, under the direction of Rui Soares, recovered the largest faunal assemblage known for the county of Moura and is composed by mammals, shells and fish. Such assemblage will enlarge with further seasons of excavation. Thus, the results here presented are preliminary and any emergent patterns are prone to change. The present report aims to characterise the mammal, shell and fish populations found at Castro da Azougada and to:

1) evaluate the state of preservation of the faunal assemblage;

2) identify and describe the taxa present on site;

3) determine the agent of the faunal accumulation;

4) understand animal use strategies;

5) recognise any possible butchery patterns.

2. Methods

The faunal analysis from the 2016 excavation conducted in Castro da Azougada followed the standard procedures in zooarchaeological methods (Lyman, 1994, p. 36; Reitz & Wing, 2008, pp. 153–250). Mammal identifications were done by using the DGPC Archaeosciences Laboratory (LARC) osteological reference collection (Lisbon, Portugal) and several osteological atlases, such as Schmid (1972, p. 70-153). Fish bones were identified by the fish specialist Dr. Sónia Gabriel using the same laboratorial facilities in Lisbon. Freshwater shells were identified based on criteria defined by Araujo & *alii* (2009, pp. 45–49), Ellis (1978, pp. 14–89), Morais & *alii* (2014, p. 17), Reis (2006, pp. 51–121) and confirmed by Dr. Joaquim Reis, researcher from the Faculty of Science from the University of Lisbon, Portugal. Land snails were identified based on Kerney & Cameron (1979), Callapez (2002,

Fig. 1 – Location of the Iron Age site of Castro da Azougada, Moura (Portugal).

Castro da Azougada

p. 5) and Winter & van Nieuland (2011, p. 11). Bone and shell biometry followed the measurements defined by Davis (1992, p. 1), Gutiérrez (2009, pp. 123–127) and von den Driesch (1976, pp. 20–129).

Taxonomical, anatomical information and surface modifications were recorded, and the NISP (Number of Identified Specimens) was calculated. Further quantification, such as the MNI (Minimum Number of Individuals) and MAU (Minimal Animal Units) will be computed once the excavations of the site are concluded and the study of the whole faunal assemblage is completed. Mammal age at death was based on the assessment of long bone epiphyses fusion state, tooth replacement and dental wear stages (Brown & Chapman, 1991, p. 519; Grant, 1982, p. 91; Payne, 1973, p. 281, 1987, p. 609). All bone and shell fragments were assigned to a one-centimetre interval (eg. 0–1 cm, 1–2 cm) and every remain was allocated to an animal size category: Large Macrofauna (horse, cow size), Medium Macrofauna (all cervids), Small Macrofauna (pig, sheep/goat, dog), >Very Small Macrofauna (animals clearly larger than rabbit size, but impossible to allocate to one of the Large to Small categories), Very Small Macrofauna (rabbits, cats, foxes), Shell and Fish.

Bone and shell surface modification and intentional damage were studied macroscopically and microscopically when relevant. Cut marks were distinguished between incisions, scrapes and chops, based on the criteria defined by Binford (1981, pp. 44–47) and Potts & Shipman (1981, p. 577). Burning was also recorded, being easily identified through the alteration of the bone natural colour progressing from a non-burnt stage to brown, black, grey and white. These colours are closely related to bone damage and to an increase in fire temperature and/or duration of burning (Nicholson, 1993, p. 411; Shipman, Foster & Schoeninger, 1984, p. 307; Stiner & *alii*, 1995, p. 223). Carnivore marks were mainly assessed following Binford (1981, pp. 44–47), Blumenschine (1995, p. 21) and Fisher (1995, p. 29), distinguishing between pits, punctures, scores, crenulated edges and digestion. Post-depositional effects were also recorded, mainly on shell surface, following the criteria defined by Claassen (1998, pp. 53–98) and Gutiérrez (2009, pp. 89–106) on abrasion, dissolution, encrustation, and perforation.

3. Preliminary results

3.1. Recovery and taphonomy

A total of 632 faunal remains were recovered from Castro da Azougada 2016 excavation. All remains were handpicked during excavation or collected during dry sieving on a 0,5 cm mesh. Most remains are from macro mammals (80,7% or n = 510) with a much larger representation of bones (94,1% or n = 480) than teeth (6,3% or n = 32). Shells are the second best represented animal group corresponding to 20% (n = 120) of the faunal assemblage. Fish are scarce but two vertebra fragments were recovered. The contexts providing more faunal remains were the UE [0] (n = 147), UE [3] (n = 156) and UE [4] (n = 141); whereas remains from UE [2] (n = 2) were scant (Table 1).

The faunal assemblage is highly fragmented, which is evident by the presence of only 10 complete bones and two complete mollusc valves. Most bones and teeth remains are smaller than 3 cm (n = 353), which has a strong impact on anatomical and taxonomical identifications. Therefore, only 9,2% (n = 47) of mammal remains are anatomically and/or taxonomically determined. Most bone and tooth fractures are old (n = 367), and they are mainly longitudinal
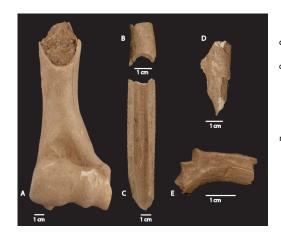
fractures (n = 181), which is a good indicator of bone marrow extraction (Fig. 2C). Transversal old fractures are the less represented (n = 55) but they tend to be clean straight fractures associated with intentional actions to chop the bone (Fig. 2A, B). Butchering activity is also represented by the presence of impact flakes (n = 4) due to chopping attempts (Fig. 2D), and cut marks (n = 2) related with meat consumption (Fig. 2E). No burning evidence was detected and rodent gnawing is absent. The two fish bones recorded are both incomplete fragments no larger than 2 cm showing old transversal fractures, which makes it difficult to identify to species level.

Shells are highly fragmented, but their fractures are predominantly recent (56,7% or n = 68) and longitudinal (47,5% or n = 57) for both old and recent fractures. Such type of fracture is most probably related with a natural tendency of breakage following the shell growing rings. Remains smaller than 3 cm predominate in the shell assemblage (81,7% or n = 98) but anatomical and taxonomical identifications are facilitated by the relatively simple shell morphology and exterior sculpture. Therefore, only three shell remains were recorded as indeterminate. All shells are disarticulated, no butchery or burning evidence was detected, nor carnivore or rodent gnawing. The sole surface modification identified was the post-deposition of calcareous concretions on dorsal (n = 13) or ventral (n = 6) valve sides, depending on the position the shell was deposited (Fig. 4B).

3.2. Mammal evidence

Castro da Azougada faunal assemblage is mainly composed by macro mammals, from which the size group >Very Small Macrofauna is the best represented. This is due to large fragmentation and low species identification. Small Macrofauna is the second best represented size group, whereas Large Macrofauna is the least predominant (Table 1).

Cattle (*Bos taurus*) and horse (*Equus* sp.) were both identified amongst the Large Macrofauna. The latter species was identified based on a single remain of a left proximal ulna from UE [7]; whereas cattle was mainly determined based on isolated molars and one third premolar, as well as one left distal humerus that was intentionally butchered (Fig. 2A). All cattle remains seem to correspond to adult indi-

Fig. 2 – Mammal remains from Castro da Azougada showing bone surface modification. A) Left humerus of *Bos taurus* with an intentional transversal fracture, recovered from UE [9]. B) Long bone of a small mammal with an intentional transversal fracture, recovered from UE [3]. C) Metapodial of *Cervus elaphus* with a straight longitudinal fracture, most certainly related with marrow extraction, recovered from UE [9]. D) Long bone of a small macro mammal with a chop mark and associated impact flake, recovered from UE [3]. E) Rib of a small mammal with a cut mark on its proximal shaft, recovered from UE [4].

viduals considering the complete fusion of the long bone and the worn teeth ranging between Grant (1982, p. 92) stages G and K.

Deer is one of the best represented taxa on site. Red deer (*Cervus elaphus*) was identified based on a single left first incisor and several long bone remains. Skeletal part representation shows a predominance of fused distal leg bones, such as metapodials (n = 4), phalanges (n = 4), carpals (n = 1) and tarsals (n = 1). One left radius and one left femur belonging to juvenile individuals with unfused epiphyses were also identified. The femur, one first phalanx and one of the metapodials also present intentional straight fractures related with butchering activities (Fig. 2C). Such evidence is complemented by an impact flake found on a red deer right metacarpus.

Caprines are also one of the predominant taxa on site. Identifications were mainly based on teeth remains, and separation between sheep (*Ovis* sp.) and goat (*Capra* sp.) was possible for three ele-

Fig. 3 – Right astragalus of goat (*Capra* sp.) on its lateral, dorsal, medial and ventral views, from left to right. Bone recovered from UE [0].

ments. Sheep was determined based on one right phalanx 2 and a mandibular right molar; whereas goat was identified based on a complete right astragalus (Fig. 3). At this stage, it is difficult to assess age-at-death due to the scarce evidence of long bones (n = 3) and the lack of mandibles. Even though, most loose teeth seem to show some use wear with three of them presenting Grant (1982, p. 93) stages ranging between F and G.

Fig. 4 – Shells from Castro da Azougada. A) First row: *Unio delphinus* left valve on its dorsal side, ventral side and a detail of the hinge area. Lower row: *Unio delphinus* right valve on its dorsal side, ventral side and a detail of the hinge area. Shells recovered from UE [9]. B) *Potomida littoralis* right valve from UE [0] on its dorsal side (with calcareous concretions attached), and on its ventral side, from left to right. C) *Testacella* cf. *haliotidae* recovered from UE [3] on its dorsal and ventral sides, from left to right. D) *Potomida littoralis* left valve recovered from UE [3] on its dorsal and ventral sides, from left to right. E-F) Fragments of shell, probably from the marine family of Veneridae (cf. *Ruditapes* sp.) due to the sculpture of the shell's dorsal side. Fragments recovered from UE [2] and UE [4], from left to right.

Amongst the Small Macrofauna there is also evidence of pig (*Sus* sp.), being impossible to distinguish between domestic pig and wild boar. The identified loose teeth are all incisors (n = 3) and the bone remains consist of one fused left phalanx 1, one right pyramidal and one right distal ulna. The latter shows an unfused epiphysis, indicating the presence of a juvenile.

Indeterminate long bones are predominant amongst the Very Small Macrofauna. They are all rabbit size and, most probably, can be assigned to such species. This suggestion is supported by the identification of two fused pelvis fragments and one fusing right femur of rabbit (*Oryctolagus cuniculus*). The right tibia shaft attributed to Leporidae may also belong to rabbit, as well as two mandible fragments. The sole possible carnivore identified on site is a badger (*Meles meles*), even though species identification of a first phalanx is not yet certain. No other carnivores or carnivore marks were detected in the assemblage.

3.3. Fish evidence

Only two fish bone fragments were recovered from Castro da Azougada. They correspond to the centrum and the hemal/neural spine of vertebrae recovered from UE [3] and [4], respectively. None of the bone fragments show any type of surface modification, but species identifi-

cation is difficult to assess due to bone fragmentation. Even though, the vertebral centrum suggests a close relationship to marine fishes, in particular the ones related with the shark family.

3.4. Shell evidence

A total of 120 remains form the malacofauna assemblage from Castro da Azougada 2016 (Table 1). The majority of the collection (91,7% or n = 110) is composed by *Unio delphinus*. Fragments of this species do not exceed 8 cm but only five remains were found complete or nearly complete. Even though identification to species was possible for 41 shell fragments, the remaining 69 fragments listed to genus *Unio* sp. are most certainly *Unio delphinus* (Fig. 4A). Such species extrapolation is possible due to 1) the low mollusc species diversity in the two rivers close to Castro da Azougada — the Guadiana and the Ardila; 2) the large abundance of *Unio delphinus* in the area; and 3) the relative easy separation between *Unio delphinus* and *Potomida littoralis* (Reis, 2006, pp. 63–76).

Potomida littoralis is a much thicker and square-like shell than *Unio delphinus*, with extremely well developed teeth (Fig. 4B, D). Mainly due to shell's thickness, even small fragments can be identified. *Potomida littoralis* has a preference for rivers with significantly large water flow so, considering the location of Castro da Azougada, it was most probably collected from river Guadiana. Conversely, *Unio delphinus* has a preference for lower water flow and it is commonly found today in river Ardila (Reis, 2006, pp. 71–75). Although *Potomida littoralis* is present in the assemblage its representation is low with only four remains identified (Table 1). Due to shell robustness, all remains range between 4 and 6 cm, and half the remains consist on nearly complete valves.

Most shells are from freshwater environments, with the exception of three remains. Two small fragments from which the dorsal sculpture is visible suggest the presence of a marine species. Although species identification is impossible, they seem to belong to the Veneridae family, with the reticulate pattern pointing towards some sort of clam, maybe *Ruditapes* sp. (Fig. 4E, F). The third non-fluvial shell belongs to a terrestrial slug identified as *Testacella* cf. *haliotidae* (Fig. 4C). This is a worm-eating land slug that is most probably intrusive.

Mariana Nabais | Rui Soares

Table 1 – Castro da Azougada faunal remains by animal group, taxon and UE: B = bone; T = tooth; Tot = total

Taxon	UE[0] B	UE[0] T	UE[0] Tot	UE[1] B	UE[1] T	UE[1] Tot	UE[2] B	UE[2] T	UE[2] Tot	UE[3] B	UE[3] T	UE[3] Tot	UE[4] B	UE[4] T	UE[4] Tot	UE[7] B	UE[7] T	UE[7] Tot	UE[8] B	UE[8] T	UE[8] Tot	UE[9] B	UE[9] T	UE[9] Tot	UE[10] B	UE[10] T	UE[10] Tot	UE[11] B	UE[11] T	UE[11] Tot	UE[12] B	UE[12] T	UE[12] Tot	TOTAL B	TOTAL T	TOTAL Tot
Large Macrofauna																																				
Equus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Bos Taurus	0	0	0	0	0	0	0	0	0	0	2	2	0	1	1	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	1	4	5
Herbivore	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Indeterminate	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	3	0	3
Medium Macrofauna																																				
Cervus elaphus	5	0	5	0	0	0	0	0	0	4	0	4	1	0	1	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	1	12	1	13
Cervidae	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Small Macrofauna																																				
Ovis sp.	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Capra sp.	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Capridae	1	4	5	0	0	0	0	0	0	0	2	2	0	1	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	10
Herbivore	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1
Sus sp.	1	0	1	0	0	0	0	0	0	1	0	1	1	0	1	0	1	1	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	3	3	6
Indeterminate	44	0	44	3	0	3	1	0	1	19	2	21	24	0	24	18	0	18	3	0	3	3	0	3	4	0	4	6	0	6	0	0	0	125	2	127
>Very Small Macrofauna																																				
Herbivore	0	1	1	0	0	0	0	0	0	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Indeterminate	46	0	46	5	0	5	0	0	0	29	0	29	50	0	50	14	0	14	6	0	6	11	0	11	12	0	12	9	0	9	9	0	9	191	0	191
Very Small Macrofauna																																				
Oryctolagus cuniculus	3	0	3	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
Leporidae	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
cf. Meles meles	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Indeterminate	7	0	7	0	0	0	0	0	0	13	0	13	8	0	8	3	0	3	0	0	0	2	0	2	8	0	8	3	0	3	0	0	0	44	0	44
Indeterminate Macrofauna																																				
Indeterminate	10	0	10	3	0	3	0	0	0	30	0	30	20	1	21	7	0	7	1	0	1	0	0	0	13	1	14	4	0	4	0	0	0	88	2	90
Fish																																				
Indeterminate	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Shell																																				
Unio delphinus	0	0	6	0	0	0	0	0	0	0	0	18	0	0	7	0	0	2	0	0	1	0	0	7	0	0	0	0	0	0	0	0	0	0	0	41
Unio sp.	0	0	12	0	0	0	0	0	0	0	0	25	0	0	20	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	69
Potomida litoralis	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
cf. Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Testacella cf. haliotidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Indeterminate	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
TOTAL	121	7	146	11	0	11	1	0	1	98	10	154	106	5	138	43	4	49	11	0	12	20	3	42	37	3	40	22	0	22	10	0	10	480	32	625

4. Preliminary discussion and conclusions

4.1. Agent of bone accumulation

Zooarchaeological assemblages can be accumulated due to three main factors: (1) natural agents; (2) predators (such as, dogs and foxes) and raptors activity (like falcons and owls); and (3) anthropogenic behaviour. Natural depositions can be caused by the animals' natural death or due to catastrophic events that kill several individuals at the same time. Bones tend to be articulated and if exposed to the elements for a long time, they should present marks of weathering, root etching and parasites. Carnivore accumulations can whether be caused by mammal predators or raptors, showing digestion marks and preferential areas of bone consumption. Lastly, anthropogenic accumulations are mainly characterised by butchery marks and burning evidence.

Castro da Azougada has a proven anthropogenic occupation evident by the presence of building structures and varied utilitarian materials (Soares, 2012, pp. 11–21). Therefore, an accumulation due to natural factors, such as accidental and/or catastrophic deaths, is highly improbable. Moreover, no articulated skeletons were recovered, nor were they found in close association. Considering the lack of evidence of carnivore bones and carnivore marks, the possibility of a carnivore accumulation is, so far, excluded. Conversely, evidence of meat consumption and butchering activities are extensive on bone surfaces. Even though the lack of burnt bones, the meals would have been cooked, which is the common practice in Iron Age sites. Shells and fish show no anthropogenic or carnivore marks, but their presence on a high altitude site and away from their catchment areas excludes natural or accidental transportation. Their presence on site is considered to be anthropic and most likely related with dietary practices.

4.2. Animal use

The faunal assemblage from Castro da Azougada suggests that most bones and shells were accumulated by humans. Most mammal species are domesticated and preferential for consumption, such as cattle and caprines. These animals could have been easily kept locally and slaughtered according to daily needs. However, the evidence is so sparse that it is not yet clear if whole animals were kept due to the scattered skeletal part representation. Similarly, it is still difficult to understand the role of pigs and deer. The status of the pig is not yet clear — whether it is wild or domestic. The red deer is surely wild and its consumption was certainly done on site. However, hunting activities cannot be inferred. The whole skeleton is not well represented and there is a predominance of distal legs and feet. This could indicate some sort of commercial activity on site that would only provide deer feet. However, such suggestion is highly preliminary and based on very little evidence. Therefore, it is fundamental to enlarge the zooarchaeological assemblage in the next excavation seasons.

Rabbits were wild during the Iron Age. Once again, it is not possible to determine if they were being hunted and if they were part of the diet of the Castro da Azougada inhabitants. There are no butchering or burning marks, and the fact that most remains were recovered from the superficial context UE [0] can indicate a potential natural accumulation that cannot be confirmed at the moment. Badgers are also intrusive, which is clear by the current presence of several large burrows on site.

Due to the small assemblage and the lack of surface modification and/or association with culinary structures (such as cooking pots and hearths) it is hard to confirm that freshwater shells were part of the diet of Castro da Azougada. However, their presence on site at a much higher altitude than their native environment and the presence of complete valves are definitely due to human action. Moreover, ethnography confirms that Native Americans and people from Manipur (a state in North-Eastern India) use freshwater mussels as a supplementary food resource (Rajeshwari Devi & *alii*, 2015, p. 174; New Hampshire Department of Environmental Services, 2005, p. 1). The potential consumption of freshwater mussels is also attested in archaeological sites from different chronologies in the Baixo Alentejo. That is the case of the Chalcolithic site of Perdigões, in Reguengos de Monsaraz (Coelho, 2008, p. 35), the Iron Age site of Cabeço Redondo, in Moura (Soares, 2012, p. 93), or even the most recent occupations of Castelo de Moura (Moura) where one of the authors (Rui Soares) had observed the presence of *Unio* sp. amongst the recovered

faunal assemblage. Even though freshwater mussels must not be as tasty as their saltwater relatives, they are edible and, thus, they were probably consumed at Castro da Azougada.

The presence of marine species was described in the field notes from the 1940s excavations, revealing a perforated cockle (probably *Cerastoderma edule*) and a *Pecten* cf. *maximus*, with probable symbolic meaning (Madeira, 1946). The 2016 evidence of marine shells and fish needs to be enlarged with further excavations, hopefully recovering larger and better preserved fragments that would allow better understanding of the use of such resources. Nevertheless, it is clear that Castro da Azougada did not live in complete isolation and its position in the confluence of two rivers, with one of them — the Guadiana — in connection with the sea, supports the idea of commercial exchanges with the littoral. Coastal products could be transported upstream, maybe in a salted fashion if they were to be consumed, so they could survive the trip. Such suggestion, however, has to be supported by pottery analysis and the identification of the presence of such fish-product containers on site.

References

ALBERGARIA, João; MELRO, Samuel (2013) – *Ocupação proto-histórica da margem esquerda do Guadiana*. Beja: EDIA.

ANTUNES, Ana Sofia (2009) – *Um conjunto cerâmico da Azougada. Em torno da Idade do Ferro pós-orientalizante da margem esquerda do Baixo Guadiana*. Lisboa: Museu Nacional de Arqueologia.

ARAUJO ARMERO, Rafael; REIS, Joaquim; MACHORDOM BARBÉ, Annie; TOLEDO, Carlos; MADEIRA GARCÍA, María José; GÓMEZ PELLICER, Ignacio; VELASCO MARCOS, Juan Carlos; MORALES MARTÍN, Javier; BAREA NAVARRO, José Miguel; ONDINA NAVARRET, María Paz; AYALA PUELLES, Iker (2009) – The naiads of the Iberian Peninsula. *Iberus*. 27:2, pp. 7–72.

BINFORD, Lewis (1981) – *Bones: ancient men and modern myths*. New York, NY: Academic Press.

BLUMENSCHINE, Robert (1995) – Percussion marks, tooth marks, and experimental determinations of the timing of hominid and carnivore access to long bones at FLK *Zinjanthropus*, Olduvai Gorge, Tanzania. *Journal of Human Evolution*. 29, pp. 21–51.

BROWN, W. A. Barry; CHAPMAN, Norma (1991) – The dentition of red deer (*Cervus elaphus*): a scoring scheme to assess age from wear of the permanent molariform teeth. *Journal of Zoology*. 224, pp. 519–536.

CALLAPEZ, Pedro (2002) – A malacofauna críptica da Gruta do Caldeirão (Tomar, Portugal) e as faunas de gastrópodes terrestres do Plistocénico superior e Holocénico da Estremadura portuguesa. *Revista Portuguesa de Arqueologia*. 5:2, pp. 5–28.

CARDOSO, João Luís; SOARES, Rui (2013) – Faunas mamalógicas do sítio pós-orientalizante do Cabeço Redondo (Sobral da Adiça, Moura). Escavações de 2011. *Al-Madan*. II Série. 18, pp. 87–92.

CLAASSEN, Cheryl (1998) – *Shells*. Cambridge: Cambridge University Press.

COELHO, Maria Manuela (2008) – A fauna malacológica proveniente do Sector I do recinto Calcolítico dos Perdigões. *Apontamentos de Arqueologia e Património*. 3, pp. 35–40.

DAVIS, Simon (1992) – *A rapid method for recording information about mammal bones from archaeological sites*. Report 19/92. London: Ancient Monuments Laboratory.

ELLIS, Arthur (1978) – *British freshwater bivalve mollusca*. London: Academic Press.

FISHER, John (1995) – Bone surface modifications in zooarchaeology. *Journal of Archaeological Method and Theory*. 2:1, pp. 7–68.

GRANT, Annie (1982) – The use of tooth wear as a guide to the age of domestic ungulates. In WILSON, Bob; GRIGSON, Caroline; PAYNE, Sebastian, eds. – *Ageing and sexing animal bones from archaeological sites*. Oxford: British Archaeological Reports, pp. 91–108.

GUTIÉRREZ ZUGASTI, Igor (2009) – *La explotación de moluscos y otros recursos litorales en la región cantábrica durante el Pleistoceno Final*. Santander: Universidad de Cantabria.

LYMAN, R. Lee (1994) – Quantitative units and terminology in zooarchaeology. *American Antiquity*. 59:1, pp. 36–71.

MADEIRA, Manuel Pedro (1946) – Diário da escavação no Castro da Azougada – 4.ª campanha (Moura). Ano

de 1946 – 1.º semestre. 26 do 8 a 28 do 10/46. [Manuscrito]. Acessível na Biblioteca do Museu Nacional de Arqueologia, Lisboa, Portugal. Arquivo Manuel Heleno.

MORAIS, Pedro; RUFINO, Marta; REIS, Joaquim; DIAS, Ester; SOUSA, Ronaldo (2014) – Assessing the morphological variability of *Unio delphinus* Spengler, 1783 (Bivalvia: Unionidae) using geometric morphometry. *Journal of Molluscan Studies*. 80, pp. 17–23.

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (2005) – Freshwater mussels in New Hampshire: hidden treasures of our lakes. *Environmental Fact Sheet*. BB-55, pp. 1–2.

NICHOLSON, Rebecca (1993) – A morphological investigation of burnt animal bone and an evaluation of its utility in archaeology. *Journal of Archaeological Science*. 20, pp. 411–428.

PAYNE, Sebastian (1973) – Kill-off patterns in sheep and goats: the mandibles from Asuan Kale. *Anatolian Studies*. 23, pp. 281–303.

PAYNE, Sebastian (1987) – Reference codes for wear states in the mandibular cheek teeth of sheep and goats. *Journal of Archaeological Science*. 14, pp. 609–614.

POTTS, Richard; SHIPMAN, Pat (1981) – Cutmarks made by stone tools on bones from Olduvai Gorge, Tanzania. *Nature*. 291, pp. 577–580.

RAJESHWARI DEVI, R. K.; KHURAIJAM, Bonny; BROJENDRO SINGH, T.; KAVITA DEVI, M. (2015) – Trace elements analysis of edible freshwater molluscs in Manipur. *International Journal of Current Research and Academic Review*. 3:6, pp. 174–178.

REIS, Joaquim (2006) – *Atlas dos bivalves de água doce em Portugal continental*. Lisboa: Instituto da Conservação da Natureza.

REITZ, Elizabeth; WING, Elizabeth (2008) – *Zooarchaeology*. Cambridge: Cambridge University Press.

SCHMID, Elisabeth (1972) – *Atlas of animal bones*. London: Elsevier.

SHIPMAN, Pat; FOSTER, Giraud; SCHOENINGER, Margaret (1984) – Burnt bones and teeth: an experimental study of color, morphology, crystal structure and shrinkage. *Journal of Archaeological Science*. 11, pp. 307–325.

SOARES, Rui (2012) – *O Cabeço Redondo. Um edifício da Idade do Ferro Pós-Orientalizante na Herdade do Metum (Moura)*. Lisboa: Faculdade de Letras da Universidade de Lisboa. Tese de Mestrado.

STINER, Mary; KUHN, Steven; WEINER, Stephen; BAR-YOSEF, Ofer (1995) – Differential burning, recrystallization, and fragmentation of archaeological bone. *Journal of Archaeological Science*. 22, pp. 223–237.

VON DEN DRIESCH, Angela (1976) – A *guide to the measurement of animal bones from archaeological sites*. Harvard: Peabody Museum of Archaeology and Ethnology, Harvard University.

WINTER, Anton J. de; VAN NIEULANDE, Freddy (2011) – *Testacella haliotidea* Draparnaud, 1801 in the Netherlands (Gastropoda Pulmonata, Testacellidae). *Basteria*. 75, pp. 11–22.