

Interpreting fire structure use through mammal remains: preliminary results from the Cabeço da Amoreira shell midden

Leonor Filipe¹, Anna Rufà^{1,2}, Joana Belmiro¹, João Cascalheira¹, Célia Gonçalves¹

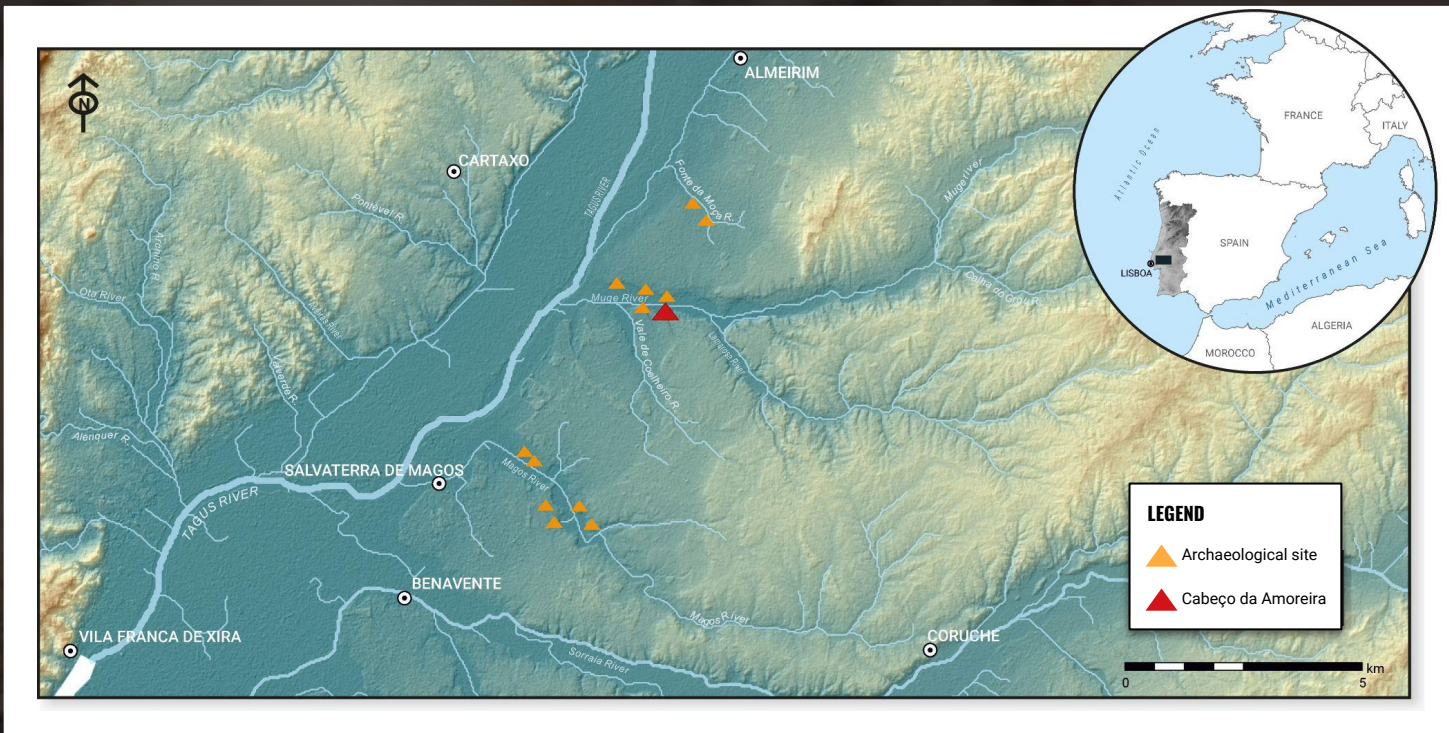
¹ Interdisciplinary Center of Archaeology and the Evolution of Human Behavior (ICArEHB), Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal

² Univ. Bordeaux, CNRS, MCC, PACEA, UMR 5199, F-33600 Pessac, France

Introduction

The climatic changes of the Holocene altered the landscape in a way that provided new ecological niches that could be exploited. In Europe, a growing number of shell middens appear in coastal and river area, such as the Muge shell middens of Central Portugal. These are a shining example of the complex relationship the last hunter-gatherer communities of the Tagus basin had with their landscapes and available resources (Bicho *et al.*, 2010; Bicho *et al.*, 2013).

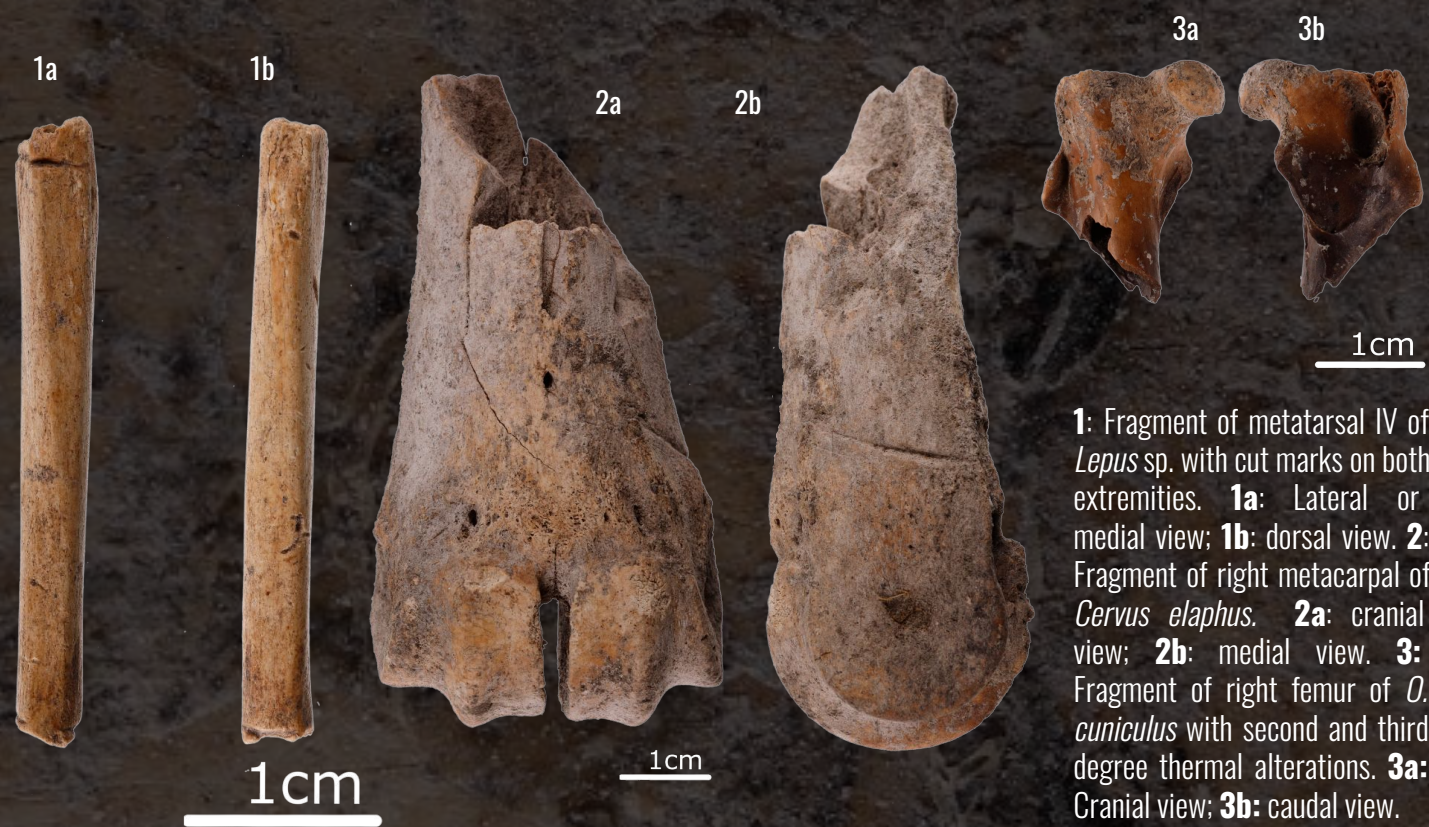
This study presents the preliminary data regarding the analysis of the mammal assemblage from a possible fire structure, named Feature C, and it's surrounding areas (level 9, 9A, 9B, 9C) of the Cabeço da Amoreira shell midden. This feature was identified on the mesolithic levels of the site by what appeared to be a high concentration of charcoals, fire cracked rocks and faunal remains.



Map contextualizing the Cabeço da Amoreira and other shell middens within the Tagus basin and the Iberian Peninsula. Authorship by Célia Gonçalves.

Methods

The faunal assemblage (442 specimens) from Feature C and surrounding layers was first examined anatomically and taxonomically, followed by taphonomic analysis using a stereomicroscope up to 45x – all taphonomic traits whether they be of anthropic or natural origins were taken into consideration. This preliminary data does not include Minimum Number of Individuals or Elements– instead only the total Number of Remains (NR) are presented. Cut marks were described using the traditional standards, as well as intentional bone breakage (Fernández-Jalvo & Andrews, 2016). The thermal-alterations were categorized solely based on the degree of coloration: (1) unsubstantial alteration on the bone's coloration; (2) reddish hue; (3) blackened hue; (4) grey; (5) white. Digestions have been characterized based on the degradation of bone surface on a spectrum of light, moderate, severe or extreme.



1: Fragment of metatarsal IV of *Lepus* sp. with cut marks on both extremities. **1a:** Lateral or medial view; **1b:** dorsal view. **2:** Fragment of right metacarpal of *Cervus elaphus*. **2a:** cranial view; **2b:** medial view. **3:** Fragment of right femur of *O. cuniculus* with second and third degree thermal alterations. **3a:** Cranial view; **3b:** caudal view.

Results and Conclusions

The preliminary results of the assemblage show that the most common taxon is the European rabbit (*Oryctolagus cuniculus*) comprising ~32% of assemblage and ~67% of identified taxa, followed by the red deer (*Cervus elaphus*) which consists of ~6% of the assemblage and ~11% of identified taxa.

Taxon		NR
Lagomorphs		
	<i>Oryctolagus cuniculus</i>	142
	<i>Lepus</i> sp.	2
	Leporidae	22
Artiodactyla		
	<i>Bos primigenius</i>	1
	<i>Capra</i> sp.	4
	<i>Cervus elaphus</i>	24
	<i>Capreolus capreolus</i>	1
	<i>Sus scrofa</i>	6
	Undetermined	8
Carnivora		
	<i>Canis lupus</i>	1
	<i>Felis silvestris</i>	1
Undetermined Mammal		230

A high variety of taphonomic modifications have been observed. Cut marks (16 NR; 4%) and thermal alterations (76 NR; 17%) - mainly of second and third degree - are recorded. Carnivore modifications are present in form of pits/punctures/notches (13 NR; 3%) and digestive damage (86 NR; 19%). Over 80% of the digested fragments are characterized with light digestion. Root etching (119 NR; 27%) and calcium carbonate (55 NR; 12%) are among the most recurrent postdepositional modifications

The presence of both human and carnivore behaviors in Feature C suggest two separate moments of activity – the first of which consists of the use of this feature by the mesolithic community as portrayed by the burnt faunal remains, the cut marks, and the residual presence of percussion impacts. After the abandonment of the structure, the archaeological record depicts the exploitation of the remaining resources by scavenging animals as characterized by the digested osteological remains, as well as some pits and punctures found in association with Feature C. The presence of carnivores is also characterized by the residual remains of both wildcat (*Felis silvestris*) and dog (*Canis lupus*).



4: Fragment of right ulna of *O. cuniculus* with digestion marks. **4a:** Lateral view; **4b:** medial view. **5:** Fragment of right ulna of *O. cuniculus* with digestion marks. **5a:** lateral view; **5b:** Medial view. **6:** Fragment of vertebra of medium sized undetermined taxon with pit (augmented for detail) on the spinal process.

Acknowledgements:

This research is funded by the Research Grant 020/2022 within project UIDP/04211/2020 IHC provided by ICArEHB and the University of Algarve. This research is also a part of the project ALG-01-0145-FEDER-029680 funded by the Portuguese Foundation for Science and Technology (FCT), with the support from Casa Cadaval and the Câmara Municipal de Salvaterra de Magos. C.G, J.B. and J.C. are funded by FCT, contracts references DL57/2016/CP1361/CT0029, 2020.08722.BD, and DL 57/2016/CP1361/CT0026. A.R. is a beneficiary a CEEC - FCT contract (reference: 2020.00877.CEECIND).

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