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Collection and consumption of echinoderms and crustaceans at the Mesolithic shell midden site of El Mazo (northern Iberia): Opportunistic behaviour or social strategy?

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ABSTRACT

Recent studies in Atlantic Europe on crab remains, goose barnacles and sea urchins have revealed that these species can be of great help in determining patterns of shellfish collection and providing new information on subsistence strategies of hunter-fisher-gatherers. Current excavations at the Mesolithic shell midden site of El Mazo cave (Asturias, northern Iberia) have produced a sizeable amount of crustacean and echinoderm remains from a long stratigraphic sequence that covers an important part of the Mesolithic chronological range, providing the opportunity to investigate long-term exploitation patterns. Results show that echinoderms (sea urchins) and crustaceans (goose barnacles and crabs) were present throughout all of the stratigraphic units (from 8.9 to 7.6 cal ka), suggesting that they were a persistently exploited food source. However, these resources were not intensively exploited, save perhaps sea urchins at the base of the sequence. From a quantitative perspective, these resources have been traditionally interpreted as minor resources exploited opportunistically to help group survival. However, given the pattern of continuous exploitation exhibited by these resources in northern Iberia and other areas of Atlantic Europe, we suggest that they can be interpreted from a qualitative perspective as stable resources with a significant social value.

1. Introduction

Shellfish exploitation was a common activity among coastal hunter-fisher-gatherers worldwide. As a reflection of that, the formation of large shell mounds, composed mainly of molluscs but also of echinoderms, crustaceans, fish, etc., is evidence of the intense exploitation of coastal areas and marine resources during prehistory. Thus, literature concerning the study of some marine species such as molluscs is abundant (e.g. Claassen, 1998; Bar-Yosef Mayer, 2005; Bailey et al., 2013; Szabo et al., 2014 and references therein), but this is not the case for other shellfish organisms. Until recently, very little attention has been paid to the study and analysis of the less visible marine species found within prehistoric midden deposits, such as crustaceans, barnacles and echinoderms (see Moss and Erlandson, 2010, and Jerardino, 2014 for examples from the Northwest Coast of North America and South Africa respectively). Recent studies in Atlantic Europe of crab remains (Gruet and Laporte, 1996; Gruet, 2002; Dupont and Gruet, 2005; Pickard and Bonsall, 2009; Milner, 2009a; Dupont et al., 2010; Gutiérrez-Zugasti, 2011a), goose barnacles (Dupont et al., 2008; Dean, 2010; Álvarez-Fernández et al., 2010, 2013; Gutiérrez-Zugasti, 2011a) and sea urchins (Dupont et al., 2003; Campbell, 2008; Gutiérrez-Zugasti, 2011a, 2014; Bejega et al., 2014) have revealed that these species can be highly informative about general patterns of shellfish collection and subsistence strategies.

Crustacean and echinoderm remains are commonly found in Mesolithic shell middens from the Atlantic Façade but usually in limited numbers (e.g. Schulting et al., 2004; Dupont et al., 2009; Gutiérrez-Zugasti et al., 2011; Gutiérrez-Zugasti, 2011a). The importance given to the quantitative perspective when analysing food procurement and consumption patterns, together with the limited amount of available data, can easily give rise to the idea of

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occasional consumption of these organisms in time and space, associated with an opportunistic and casual pattern of exploitation (see for example Álvarez-Fernández et al., 2010; Gutiérrez-Zugasti, 2011a). However, some ethnographic (Moss and Erlandson, 2010; Moss, 2013) and archaeological studies (Milner, 2009b) have emphasised that a qualitative perspective should be taken into account when assessing the role of these resources. Sea urchins, crabs and barnacles can be used for different purposes, not only for food, but also, for example, as fishing bait (Claassen, 2013). They can also be valued in different ways in different societies or by different members of the same society, being highly valued as food in some cases or surrounded by taboos in others (Moss, 1993, 2013) They can also play an important role in social organisation acting as a delicacy or special food consumed during social encounters.

Recent excavations at the Mesolithic shell midden site of El Mazo cave in northern Iberia (Gutiérrez-Zugasti et al., 2013, 2014; Gutiérrez-Zugasti and González-Morales, 2014) have produced a sizeable amount of crustacean and echinoderm remains from a stratified sequence that covers an important part of the Mesolithic period. The assemblages recovered from each stratigraphic unit represent an opportunity to study the evolution in the exploitation of these species through time, with the potential to provide interesting new data, to reassess previous hypotheses, and in particular to shed light on the qualitative and social role of these resources.

In this paper we analyse the crustacean and echinoderm remains recovered from El Mazo cave. We use a number of methods, including quantitative and biometric analyses, to provide new information regarding shellfish collection and subsistence strategies. Discussion of the results focuses on the exploitation of these resources through time, shellfish collection patterns and the role of echinoderms and crustaceans both as food and as a social resource. The approach undertaken is intended to reveal more about the social organisation of hunter-fisher-gatherers and the way that these human groups interacted with the surrounding environment during the Mesolithic.

2. El Mazo cave: location, description and archaeological features

El Mazo cave is located in the village of Andrín, very close to the town of Llanes (Asturias, northern Spain) (Fig. 1). The eastern region of Asturias contains a characteristic topography represented by a coastal platform bounded towards the south by mountainous terrain. These mountains can be crossed relatively easily along rivers that flow in a south-north direction. The mountainous and coastal landscapes are dominated by karstic forms that include numerous caves and rockshelters. The current distance from El Mazo to the coastline is around 1 km. During the Mesolithic, this distance would have varied due to the rise in sea level. However, in the last 9000 years, this distance was no greater than 2.5 km.

The site is situated in a hillside depression near a large doline. The archaeological deposit is located in the rockshelter, which is approximately 18 m long and 7 m deep (Fig. 2A). Two square metres were excavated (squares V15 and V16) in the area close to the walls of the rockshelter (inner test pit) during the 2009 and 2010 campaigns (Gutiérrez-Zugasti et al., 2013, 2014) (Fig. 2B). Eight major stratigraphic units (SUs) were identified corresponding to shell midden deposits: SUs 100/101, 102, 103, 103.1, 104, 105, 106 and 107. Some of these units included other units or depositional events that were identified on the profiles during the 2010 and 2012 campaigns (Fig. 2C). Unit 100/101 is a thick shell matrix formed by two different units of very similar characteristics. Units 102 and 106 are composed of shells mixed with carbonate (forming a crust), while unit 104 is a fire structure (hearth) mixed with shells. Unit 103 includes also unit 112 and 101.1, and they are defined as shell matrix alternating with charcoal layers; unit 103.1 is a shell matrix remnant only present in the eastern part of square V15; and unit 105 (characterized by a higher amount of sediment relative to shell) includes two additional units: 113 and 120 (both shell matrix). Finally, unit 107 (a thick shell matrix) is composed of additional units: 110, 111, 114 and 115. Below, unit 108 represents the base of the shell midden. In the outer area, in front of the rockshelter two square metres were excavated (outer test pit, squares S9 and S10) (Fig. 2B and D). A subsurface stratigraphic unit (SU 1) characterised by compact orange clay was identified in both squares. In square S10, below SU 1, there is a shell midden stratigraphic unit containing lithics, mammal bones and teeth, and charcoal (SU 3). The bottom of the test pit (SU 5) contains archaeologically sterile compact orange clay (see Gutiérrez-Zugasti et al., 2013, 2014; Gutiérrez-Zugasti and González-Morales, 2014 for a detailed explanation of the stratigraphy). All the shell midden units were dated to the Mesolithic (Table 1).

Table 1
Radiocarbon dates from Mesolithic units at El Mazo. Calibration was performed using Oxcal 4.2 (Calibration Curve: Intcal13; Bronk Ramsey, 2009; Reimer et al., 2013).

Unit	Lab ref	Date BP	Interval cal BP		Median cal BP	Material	Method
3	UGAMS-5407	6790 ± 30	7676	7587	7634	Bone	C14 AMS
100	OxA-28397	6772 ± 37	7674	7576	7624	Bone	C14 AMS
101	OxA-28389	7230 ± 36	8160	7971	8039	Bone	C14 AMS
112	OxA-28401	7294 ± 37	8176	8021	8102	Bone	C14 AMS
105	UGAMS-5408	7640 ± 30	8517	8384	8423	Charcoal	C14 AMS
114	OxA-27969	7990 ± 38	9006	8662	8869	Bone	C14 AMS

3. Material and methods

The material used in this study comes from the inner test pit carried out in squares V15 and V16 and from the outer test pit dug in square S10. Remains of echinoderms and crustaceans from SUs 100/101 to 107 (in the latter only materials from square V16 were used) and from SU 3 were analysed. The whole sequence covers a duration of ~1300 cal years of the Mesolithic in northern Iberia.

For the analysis of the archaeological remains we used the methodology proposed by Gutiérrez-Zugasti (2009, 2011a) for echinoderms and crustaceans. The anatomical and taxonomic identification was carried out from specialized guides (Ingle, 1997) and comparative collections (personal and also the collection at the Museo Nacional de Ciencias Naturales, Madrid). For terminology, the nomenclature proposed by WoRMS (World Register of Marine Species, http://www.marinespecies.org/index.php) was used. Regarding abundance estimators, NISP (Number of Identified Specimens) and MNI (Minimum Number of Individuals) were calculated, together with their relative frequencies and their corresponding weights. Also we calculated the density of material (MNI) per dm^3 (10 cm × 10 cm × 10 cm) of sediment excavated.

For quantification we used a method based on the creation of categories of fragmentation based on disarticulation patterns of echinoderms and crustaceans. The remains of echinoderms were divided into the following categories of fragments: semi-pyramids (complete, COMSP; apical, AFSP; and basal, BFSP – separated into right and left); *rotulae* (COMR); tooth (complete, COMT; apical, AFT; and basal, BFT); epiphysis (COME, separated into right and left); compasses (COMC); buccal and shell fragments (BSF); and spines (SPF). For crustaceans, barnacle remains were separated into the following categories of fragmentation: Carina (complete, CC; apical,