

## Los Peces de Cova Fosca (Castellón, España): ¿Signos perdidos de una tradición?

### *The fishes from Cova Fosca (Castellón, Spain): ¿Lost signatures of a hunter gatherer tradition?*

Eufrasia Roselló-Izquierdo<sup>1</sup>,

Laura Llorente-Rodríguez<sup>1,2</sup>,

Arturo Morales-Muñiz<sup>1\*</sup>

Recibido 01/06/2015

Aceptado 26/07/2015

#### Abstract

The small collection of marine fish remains retrieved at the Epipaleolithic-Neolithic site of Cova Fosca is presented. The relevance of these presumably food items is not quantitative but qualitatively, as it reveals a movement of people between the mountains and the shore taking place for at least 6 millennia rather than a movement of objects, a phenomenon that is discussed from the standpoint of the characteristics of the fish remains themselves but also their ecology and taphonomy, in the context of the archaeological sequence.

**Keywords:** Fishes, Fishing, Transport, Palaeolithic, Mesolithic, Neolithic, Iberian Peninsula.

#### Resumen

En este trabajo se detalla la minúscula colección de peces recuperados en el yacimiento Epipaleolítico-Neolítico de Cova Fosca. La importancia de estos presumibles restos de comida no es tanto cuantitativa como cualitativa dado que creamos evidencia un movimiento regular de gente, y no sólo de restos animales, entre la costa y la montaña que se prolongó durante, cuando menos, seis milenios. El fenómeno se valora desde la perspectiva de las características de los restos ícticos, así como de la ecología de los peces, su tafonomía y el contexto de la secuencia arqueológica.

**Palabras clave:** Peces, Pesca, Transporte, Paleolítico, Mesolítico, Neolítico, Península Ibérica.

#### 1. INTRODUCTION

Animal translocations provide some of the most informative zooarchaeological data when it comes to refer human behavior in the archaeological record (Hesse & Wapnish, 1984). Indeed, it is the import of species alien to an area, as are the domestic sheep and goat in Europe during the Neolithic, what informs one about the onset of the production economies at that

particular place and time. Likewise, a long-attested presence of dromedaries at places such as *Augusta Raurica* bear witness to the caravans that, during Roman times, covered the routes from Italy into northern Europe through the Swiss alps (e.g. Schmid 1972), and remains of cod in Seville, or polar bear in Tolosa, inform about the Medieval commerce of fish and pelts as well as on exotic gifts exchanged between kings and noblemen that eventually led to the creation of the

<sup>1</sup> Laboratorio de Arqueozoología, Universidad Autónoma de Madrid, E-28049 Madrid, Spain

<sup>2</sup> BioArCh, Department of Archaeology, University of York, York, United Kingdom

\*Corresponding author ([arturo.morales@uam.es](mailto:arturo.morales@uam.es))

medieval menageries in Iberia and elsewhere (Morales et al. 1991, 1994; Morales-Muñiz 2000; Delort, 1975).

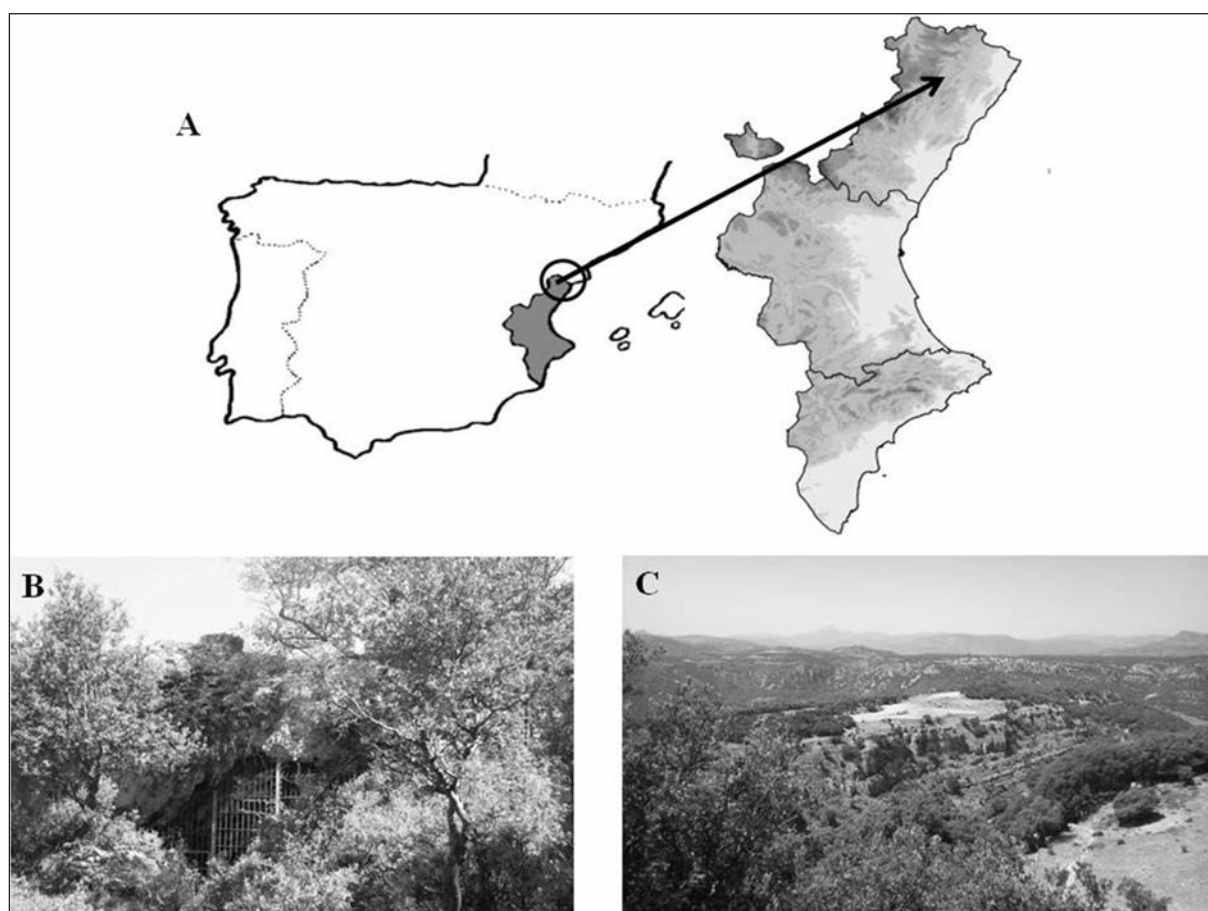
Contrary to what many conservationists today believe and certain scholars seem willing to accept, human-provoked animal translocations are far from either a recent or a post-Neolithic phenomenon. Indeed, transport of Atlantic species of ornamental molluscs into the Mediterranean lands and viceversa, for example, has revealed the existence of hunter-gatherer exchange networks since Upper Palaeolithic times, and this same antiquity has been shown in the case of the dog, that travelled from continent to continent starting with the Upper Palaeolithic (Álvarez Fernández 2009; Shipman 2015). For such reason, one would do well to concede that the phenomenon of animal translocation probably constitutes an integral part of the behavioural repertoire of what some presently fancy to label “moderns” (i.e. *Homo sapiens sapiens*) (Finlayson, 2014). Still, as it so often happens in science, and archaeology is not an exception to the rule, matters might not be that simple to address. Thus, for one thing, as new data emerge, the conceptual range of potentially addressable issues expands. A second source of concern has to do with “crypto-invaders”, species long considered as native to a zone that are evidenced to be

recent colonizers at best (Llorente et al. 2011; Thompson 2014). For both reasons, the best qualifiers as alloctonous (i.e. out-of-place) elements in archaeological deposits are those animals whose presence cannot possibly be explained in ways that exclude human intervention. The value as indicators of human activity for these elements is such that one single occurrence, provided it is not intrusive, is enough in itself for the analyst.

With such provisos in mind, in the present paper, in addition to reporting the humble fish collection from the emblematic and contentious site of Cova Fosca bridging the gap between the Mesolithic and Neolithic, we will entertain some of the reasons lying behind such findings. These reasons will touch upon several theoretical questions of interest in the context of hunter-gatherer movements in prehistoric Iberia.

## 2. THE SITE OF COVA FOSCA

The site of Cova Fosca (Ares del Maestre, Castellón), is located at 900 m.a.s.l on a steep ravine of the Maestrazgo Mountains (Iberian Range) in Eastern Spain that lies *ca.* 40 km away from the Mediterranean coast (Olària, 1988; Llorente et al., 2014) (Figure 1). The site saw campaigns in the 1970s



**Fig. 1.** Location of the site of Cova Fosca (A) , (B) view of the entrance, and (C) partial view of the landscape around the site (Photos: L. Llorente).

and 1980s (Olària, 1988) but our study concerns the excavations that took place between 1999 and 2003 at the entrance of the rock shelter (i.e. Sector C). This is a terrace whose pronounced slope occasionally provoked an irregular layering of the deposits where a few levels exhibited tilting and non-homogeneous development (i.e. varying depths at different points) (Llorente, 2007; Morales Muñoz, *et al.*, 2008; Olària and Jener, 2008; Llorente *et al.*, 2014). It was for this reason that an exhaustive program of radiocarbon dates was carried out to clear any potential disconformities existing in the chronostratigraphic column (Llorente, in preparation).

Cova Fosca's Sector C (CFSC, from here onwards) incorporates 34 levels that range from the Late Magdalenian (13360 cal BC) to the Middle Neolithic (4850-4522 cal BC) (Olària, 2000; López and Olària, 2008; Llorente, 2010; Llorente *et al.*, 2011, 2014) in what appeared to constitute an intermittent sequence of human occupation of a small rock shelter (i.e. 20 m deep x 27 m wide), whose roof reaches from 5 m to 2 m in height (Olària, 1988). Remarkable also was the fact that a wide range of faunal evidences, from the presence of migratory taxa to the age profiles of the wild and domestic ungulates, revealed that the human occupations of herders and hunter-gatherers alike exhibited marked seasonal signatures (Llorente, in prep.).

All sediments from the 1999-2003 campaigns were sieved through a 0.5 mm and 0.3 mm meshes. Such meticulous screening explains the richness and diversity of the faunal collections. Indeed, with close to 95,000 remains retrieved and *ca.*130 species of vertebrates and molluscs identified, the faunas from CFSC constitute the largest faunal assemblage thus far retrieved in the Iberian Holocene (Llorente *et al.*, 2014). Given that ungulates made up approximately 60% of the NISP (i.e. Number of Identified

Specimens), their remains exhibited high frequencies of anthropic marks, and the unidentified fraction were also ungulates for the most part with human manipulation traces also, one can safely consider that the vast majority of the deposits were anthropic in nature though both raptors and natural deaths regularly contributed to the accumulation of micromammals, birds and reptiles, as well as some of the lagomorphs (Aura *et al.*, 2002; Llorente, 2010; Llorente *et al.*, 2014).

### 3. METHODS

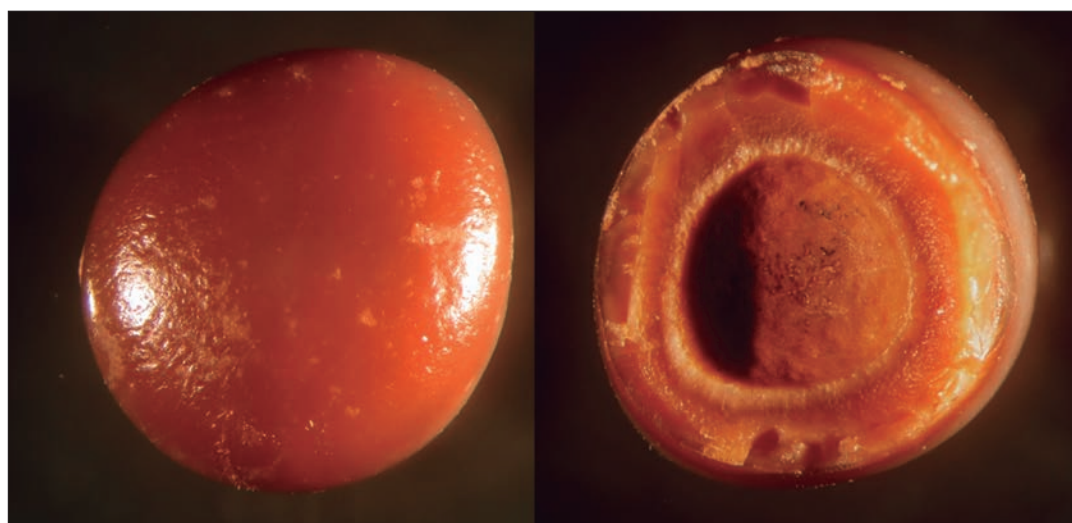
The identification of the remains was carried out with the help of the reference collection of one of the authors (AMM) housed at the Laboratorio de Arqueozoología of the Universidad Autónoma de Madrid. Given the scarcity of the finds, only the NISP (i.e. number of identified remains) (Reitz & Wing, 1999) has been considered as an estimator of abundance. The study of traces on the surfaces of these bones was carried out both through ocular inspection and with the help of a binocular WILD Z5(X30) stereoscope.

### 4. RESULTS

In contrast with what has been documented in groups such as mammals or molluscs, the fish assemblages from Cova Fosca represent a ludicrously low figure (0.1%) within the fauna. A total of 11 fish specimens were recorded in the earliest and second most recent stages of the occupation sequence. Their details are as follows:

#### 4.1. Epipaleolithic

Level -500/-675: loose molar tooth (probably from the dentary bone) from an unspecified sea bream (family Sparidae) (Figure 2).



**Fig. 2.** Apical (left) and basal (right) views of a (lower?) molar tooth (X25) from the undetermined sea bream (Sparidae) retrieved in level -500/-675 (Epipaleolithic). (Photo: C. Gutiérrez).



Level -304/-319: spiny ray from the dorsal fin of an unspecified percomorph (Sparidae?).

#### 4.2. Early Neolithic

- 220/-224: sixth (truncal) vertebra from a +20 cm standard length (SL) White sea bream (*Diplodus cf. sargus* Linnaeus, 1758).
- 196/-211: left dentary bone from a 24-28 cm standard length (SL) Gilt-head (*Sparus aurata* Linnaeus, 1758) (see Figure 3).
- 177/-196: third (truncal) vertebra from a 31-32 cm standard length (SL) Sea bass, *Dicentrarchus labrax*, and a left premaxillar bone from a 34-40 cm standard length (SL) Pandora (*Pagellus erythrinus* Linnaeus, 1758) (see Figure 4 ).
- 170/-177: Neural apophysis from a sixth (truncal) vertebra from an undetermined tuna

fish (*Thunnus* sp.), most likely a Bluefin, (*T. thynnus* Linnaeus, 1758) of unspecified size though well above 150 cm standard length (SL) (Figure 5).

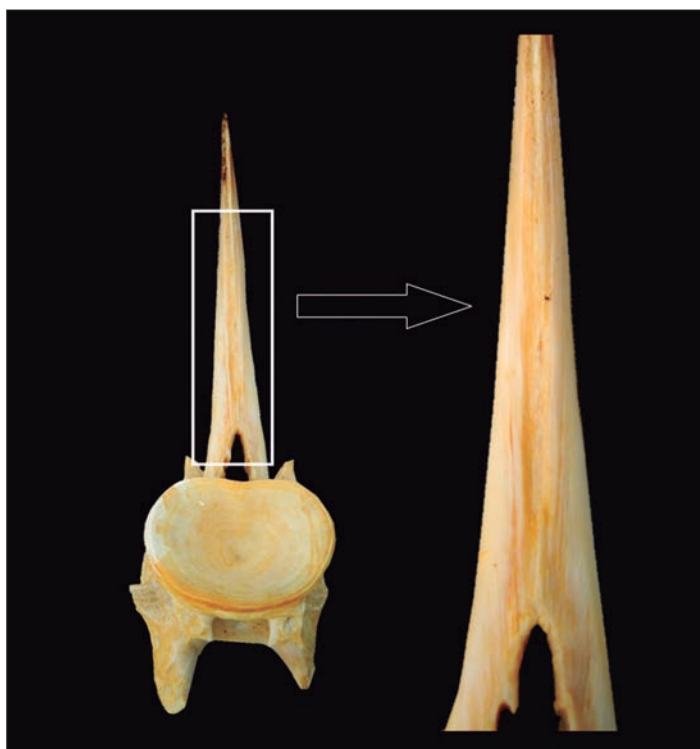
- 150/-170: dorsal pterigyophore (ray) from an unspecified size gurnard of the family Triglidae, being impossible to know whether this was the Grey gurnard (*Chelidonichthys lucerna* Linnaeus, 1758) or the Piper (*Trygla lyra* Linnaeus, 1758) (Figure 6) and two spiny rays from the anal fin of an unspecified percomorph.
- 143/-150: Lower anterior left tooth from a Sand tiger shark *Carcharias (Odontaspis) taurus* of unspecified size though well above 150 cm standard length (SL) (Figure 7).



**Fig. 3.** Gilthead (*Sparus aurata*) (Photo: José Heredia León)



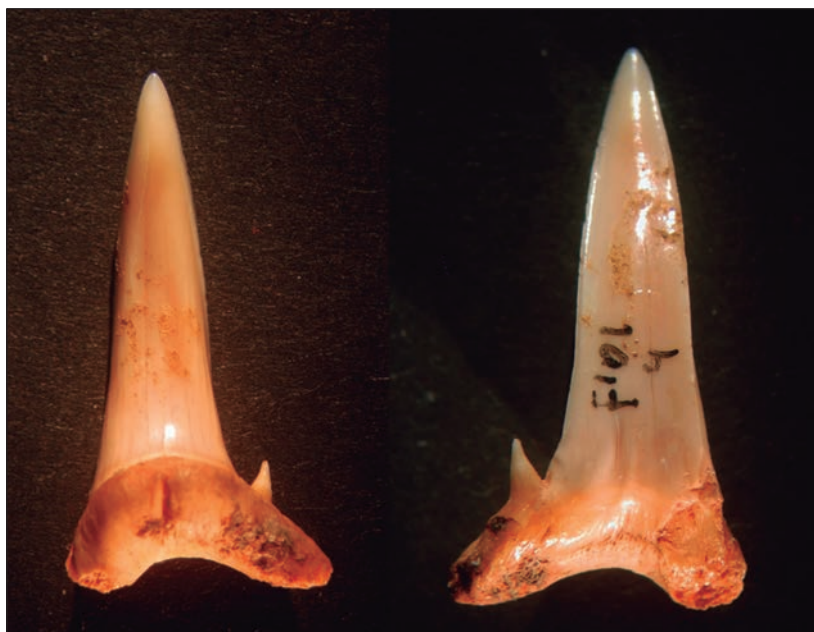
**Fig. 4.** Pandora (*Pagellus erythrinus*) (Photo: José Heredia León)



**Fig. 5.** Sixth vertebra from a bluefin (*Thunnus thynnus*) with inset showing the portion that corresponds to the fragment retrieved at Cova Fosca level -170/-177. (Photo: L. Llorente)



**Fig. 6.** Piper (*Trygla lyra* L. 1758) (Photo: José Heredia León)



**Fig. 7.** Aboral (left) and oral (right) views of the lower anterior left tooth (X4) of a Sand tiger shark (*Carcharias (Odontaspis) taurus*) found in level -143/-150 (Early Neolithic). (Photo: C. Gutiérrez).

Given the scarcity of the fish finds, this distribution of remains is informative from a temporal standpoint but also in terms of sample size. Thus, the concentration during the Early Neolithic seems consistent with this stage incorporating *ca.* 70% of the faunal remains (68,056). Likewise, the absence of fishes from the Mesolithic levels may simply reflect a stochastic phenomenon, since, with a mere 3% of the finds (3,271), these were the smallest assemblages from the CFSC sequence. But the presence of fishes during the Epipalaeolithic (9,838 remains) and their absence from the similar-sized Middle Neolithic assemblages (14,252 remains) reveals not only the pattern to be previous to the onset of the Neolithic, but also that, probably, the practice did, in fact, stop at some point. This phenomenon would merit further exploration.

## 5. DISCUSSION

One first issue that seems worth remarking at this point is the total absence of freshwater fishes at Cova Fosca. The only river likely to have been a permanent water body around this site would be the *Riu de les Coves*, since all of its tributaries, including the one descending from the ravine *Barranc de la Gasulla* where Cova Fosca is located, are torrential (i.e. non-permanent) in character (Fernández López de Pablo, 2006). Fishes do not normally enter torrential rivers, even during those times of the year when water is available, due to the often unpredictable and strong currents that the steepness of the terrain generates. Still, in the *Riu de les Coves*, 2-3 km kilometers away from the site, there exists a couple of species of potentially sizable cyprinids (i.e. above 30 cm total length) of the Genus *Barbus*. This would be the case of *Luciobarbus graellsii* (Steindachner, 1866; up to 80 cm standard length and to 4 kg) and of *Luciobarbus guiraonis* (Steindachner, 1866; up to 60 cm standard length and to 3 kg) (Doadrio *et al.*, 2011) that must have represented attractive foodstuffs for people. The systematic failure to retrieve remains of freshwater fishes indicates that fishing proper did not leave any traces in the huge archaeozoological collections of Cova Fosca. If, by any chance, fishing was carried out at a certain time around the site one cannot decide. But this absence of evidence might still be in itself informative of a time of the year when water levels in the area at large and the *Riu de les Coves* in particular, were not at their highest. In torrential rivers of the Mediterranean region, the peak of water availability is set between the end of the winter and early spring (i.e. March-May), which is the time when fishes swim upstream to spawn. This would be thus the time most feasible for any fishing to have taken place (Doadrio *et al.*, 2011). If this was indeed the case 8-10 millennia ago, then the absence of local fishes could be providing us with yet another seasonal signature meriting exploration. This is an issue that needs indeed to be probed

further in terms of freshwater bodies, as the landscape around the area must have had changed dramatically during these past centuries, when many lagoons, of which the emblematic *laguna d'Albocàsser*, were dried (Madoz, 1987).

Given that all the fishes retrieved at Cova Fosca represent marine taxa, they not only reflect human activity in terms of accumulation but, above all, long-distance (i.e. +40 km minimum) travel. In contrast with other (local) faunas from Cova Fosca, no possibility thus exists here of (a) contamination due to mixing of the deposits, or (b) an additional accumulating agent as responsible for their appearance. The human signature, thus, would be here as clear as it could ever be. From the ecological standpoint, it should be further remarked that, except for the gilthead and possibly also the white sea bream, none of the reported species penetrate into brackish waters, their fishing necessarily taking place in the marine environment.

The next question one should try to answer is whether these fish remains represented food or ornaments. The question is sensible in that fossil shark teeth, for example, have been formally acknowledged as ornamental items in prehistoric sites since the seminal work of Oakley (1975), a function that had, in fact, been already recorded in the case of southeastern Iberia by the equally seminal monograph of the Siret brothers (Siret & Siret, 1890). Such functionality raised obvious concern that the Sand tiger shark tooth retrieved at Cova Fosca represented a fossil specimen. Such hypothesis was discarded on account of three facts: (a) the enamel of the tooth was whitish (Figure 7), not brown or black, as happens to be the case with fossil shark teeth specimens, (b) the enamel was partly tainted with the same reddish colour that dotted the enamel of many mammal teeth due to the iron lying in the sediment (Figure 2), but the argument that definitively rules out such possibility is that (c) *Carcharias* is a Tertiary Genus, first documented during the Oligocene period. The marine deposits from the *El Maestrazgo* Mountains are Cretaceous, thus no *Carcharias* shark could have existed then, and the fossil deposits from the Tertiary in this area are all continental, never marine, in origin. The nearest marine Tertiary outcrops, in fact, appear on the delta of the Ebro River, lying some 100 km north-eastwards from Cova Fosca. Given the +40 km that people at Cova Fosca covered to transport the other marine fishes, bringing fossil teeth from a distance of *ca.* 100 km does not seem too far-fetched a proposal. Acknowledging a recent origin, though, we still are left with the issue of what was the use given to this tooth. Although no macroscopic or microscopic traces could be found upon inspection, and the surface damage it exhibited could be more plausibly attributed to taphonomical (i.e. fossil-diagenetic) agents, the possibility that the item was an ornament remains likely, though still open to question. If this was the case, it would be

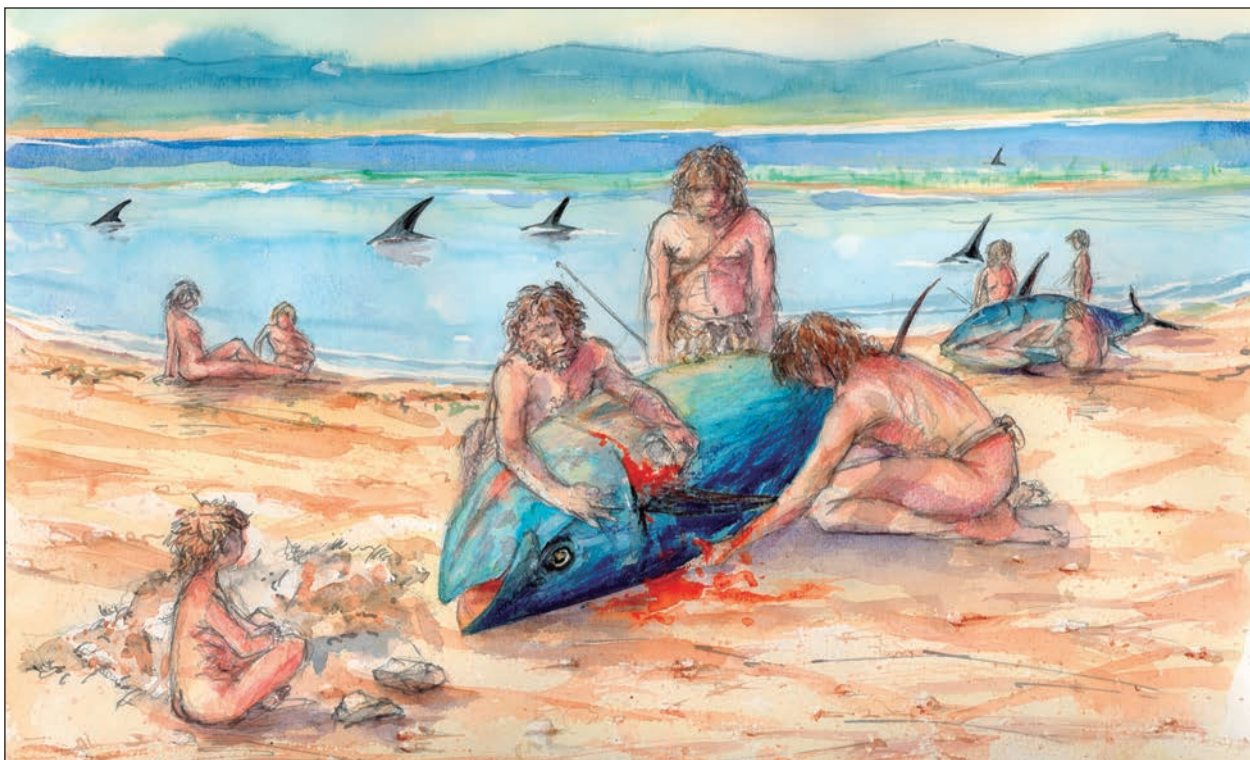


the only fish ornament represented in the fish assemblage since, for all we know, the other fish remains do seem to be more suggestive of food.

In connection with the last comment, one most remarkable feature of these “assemblages” is the sheer diversity they exhibit, as no less than seven taxa seem to be confirmed for a sample of a mere eleven items where the sheer variety of elements, including head bones, vertebrae and spiny rays, bear witness to the transport of whole specimens. Such diversity not only hints at the huge taphonomic loss that might have taken place in the sediments despite meticulous retrieval techniques, but also at a wide range of fishes being captured on the coast as no single taxon has been ever recorded twice. The reasons for such taphonomic losses remain obscure at this point, as in addition to dogs and carnivores such as the badger documented on the deposits, many other animals from the Cova Fosca assemblages –from rodents to terrestrial molluscs– could have munched on the leftovers of those carcasses (García-Díaz, 2010). One way or the other, and given that, except for tuna and shark, all of the fishes would have been in a weight range of 300-500g, one cannot forcefully argue that bulk provisioning of meat could have been the reason for such transport. Instead, as a working hypothesis, we would like to propose that these fishes were most likely transported after being dried (in which case weights for the smaller specimens would be below 100 g) and might have provided convenient food packages (i.e. high-protein low-weight

rations) for people that travelled from the shore to the shelter. If this was the case, their value should not be judged in quantitative terms but qualitative, as key foodstuffs meant to supply very specific needs at key specific times of the year. Within such scenario, it makes perfect sense that animals that could have been easily chewed upon would have left not only preciously little traces in terms of recognizable bones in the archaeological deposits, but also a wide variety of skeletal elements depending on what was easier to chew depending on the species (i.e. sea bream heads, bearing very robust bones, are rarely chewed, yet this would not be the case of gurnards (*Tryglidae*) whose head bones are easier to chew but not some of their armour-like scales and spiny rays such as the one found at Cova Fosca).

One last issue that would merit discussion at this point would be the ways through which people accessed these fishes. Although this is a matter well beyond the scope of our paper, one is baffled by how could have people captured two of the largest Mediterranean species as are the tuna and Sand Tiger shark. Scavenging stranded animals could have been a possibility. Indeed, stranded tunas, called “*cimarrones*” in Andalusia, are still occasionally found in the Atlantic shores of the Strait of Gibraltar. Such strandings may occur for a variety of reasons, killer whales (*Orcinus orca* Linnaeus, 1758) being repeatedly reported as triggers (J.L. Cort, verb. com.; Figure 8). Although in the now heavily overfished Mediterranean waters such



**Fig. 8.** Artistic interpretation of people accessing tunas purportedly stranded when trying to escape the killer whales shown in the background (Picture courtesy of José Luis Cort).

happenings would be unheard of, in a former Mediterranean Sea filled with fishes that scenario appears far more plausible than active fishing to obtain those large animals. But such hypothesis would not exhaust the list of alternatives. Indeed, and although normally one assumes that an active fishing of tunas would have required a labour force unlikely to be gathered by bands of hunter-gatherers, ample ethnographic evidence from the Pacific testifies that large tunas are regularly taken by single fishermen operating from a small boat and with rather unsophisticated tackle (Leach, 2006). And we stress hunter-gatherers here because, even though most of the fish at CFSC concentrate in the Early Neolithic stage, where both pre-neolithic people and neolithics apparently co-existed, the presence of marine fishes in the deposits has been confirmed since the beginning of the occupation in the Late Magdalenian/Epipaleolithic (i.e. level -500/-675). If it was only hunter and gatherers the ones transporting fishes to Cova Fosca, that signature would add to the ever enlarging list of indicators evidencing the resilience of the hunter gatherer traditions after the onset of the Neolithic in the area (Llorente et al, 2014). One way or the other, the long-term signal of this fish transport seems beyond question.

As it so happens, the presence of marine fishes in inland settlements of hunter and gatherers from the Spanish Levant has been already mentioned at two sites from the province of Alicante. In this way, Cacho et al (1995) were the first to report marine fishes from the Late Magdalenian and Epipaleolithic levels at El Tossal de la Roca, and, more recently, Aura et al (2006, 2015) did the same for the Mesolithic levels at the caves of Santa Maira, the latter lying some 30 km away from the present-day coastline. The interesting thing about these finds is that they not only incorporate local species of freshwater fishes (e.g. trout, *Salmo trutta* L., 1758, and the barb species *Luciobarbus guiraonis*) but also that most of the marine fishes reported represent amphidromous taxa (i.e. fishes that travel regularly between fresh and marines waters). This is the case of the eel (*Anguilla anguilla* L., 1758), shad (*Alosa alosa* L., 1758), the grey mullets, including *Liza aurata* Risso, 1827, *Chelon labrosus* R., 1810, and *Mugil cephalus* L., 1758, and of certain taxa able to thrive in brackish waters as are the Bass (*Dicentrarchus labrax* L., 1758) and certain seabreams such as the Gilthead (*Sparus aurata* L., 1758). For that reason, the idea that comes to mind first when considering these assemblages is that they reflect local fishing, not transport. Still, the presence of strictly marine taxa, such as the Spotted bass (*Dicentrarchus punctata* Bloch, 1792) at the Tossal de la Roca and of the Jack (*Caranx rhonchus* Geoffroy Saint-Hilaire, 1817), Porgy (*Pagrus pagrus* Cuvier, 1816) and Pandora (*Pagellus erythrinus* L. 1758) at Santa Maira, does not fit a scenario of local fishing but instead one involving inten-

tional transport as has been proposed here for Cova Fosca. Considered from such standpoint, marine fishes may therefore represent a yet unrecognized signal of hunter gatherer mobility patterns during pre-historic times in the Spanish Levant meriting further exploration.

## 6. CONCLUSIONS

Starting with the second half of the sixth millennium cal BC, the hunter-gatherer communities from large areas of Iberia (i.e. so called Phase B Mesolithics, featuring, among other diagnostic items of their tool kit, Cocina-type Geometric triangles) suddenly vanished from sight. Rather than a catastrophic collapse in their demography, in the case of the Levantine populations some authors have postulated a displacement of people towards the shore as a response to the 8.2 ky BP climatic event that, throughout large portions of the Mediterranean, took the form of an aridity pulse (Cacho et al., 2010; Fernández López de Pablo & Puche, 2009; Fernández López de Pablo & Jochim, 2010). If this was the case, it would be highly unlikely to retrieve evidences of these settlements, for the Mediterranean coast at that time lied 10-40 m below the present day one, and was inundated during the peak of the Flandrian transgression. This peak was reached around the time of the Holocene's Climatic Optimum, coinciding with the appearance of the Neolithic in the Spanish Levant (Cacho et al. 2010). Even under the conditioning of such putative scenario, there might still exist ways to track down this "coastal stage" of Phase B Mesolithics on inland sites. In our case marine fishes may turn out to be the thread of Ariadna to lead us out of the labyrinth. Only time and further finds along the lines reported here will tell.

## ACKNOWLEDGEMENTS

The authors want to thank Carme Olària for granting permission to study these materials and also to Luis Berrocal for his invitation to submit this paper to honour Concepción Blasco, a long and dear friend. Carmen Gutiérrez is thanked for her invaluable help when evaluating surface marks and counsel. José Luis Cort and José Heredia León are thanked for allowing us to use their illustration and photographs, respectively. This research benefited from Grant HAR 2014-55722-P ("*Actioarqueología de la Prehistoria cantábrica: Modelos para la caracterización de las primeras pesquerías europeas*") from the Spanish *Ministerio de Economía y Competitividad* (Head Researchers: Eufasia Roselló Izquierdo and Arturo Morales Muñiz) and Grant 19438/PI/14 ("*Proyecto Gavilanes: Explotación de recursos naturales en el litoral de Mazarrón (Sureste Ibérico) de fines del III milenio a.C. al cambio de Era. Formas, modelos de explotación y derivaciones paleoecológicas*") from the



PROGRAMA SÉNECA 2014. L. Llorente work is supported by the European Commission under a Marie Curie-Sklodowska-If Fellowship for Career Development FISHARC-IF 658072. The authors are grateful to the anonymous reviewers for their constructive comments and positive hindsight.

## REFERENCES

- Álvarez-Fernández, E. (2009). "Magdalenian personal ornaments on the move: a review of the current evidence in central Europe". *Zephyrus* LXIII, 45-59.
- Aura, J.E., Villaverde, V., Pérez, M., Martínez, R., Guillem, P. (2002). "Big game and small prey: Paleolithic and Epipaleolithic economy from Valencia (Spain)". *Journal of Archaeological Method and Theory* 9, 215-268.
- Aura Tortosa, J. E., Carrión Marco, Y., García Puchol, O., Jardón Giner, P., Jordá Pardo, J.F., Molina Balaguer, L.I., Morales Pérez, J.V., Pascual Benito, J. L.I., Pérez Jordá, G., Pérez Ripoll, M., Rodreigo García, M.J & Verdasco Cebrián, C. (2006). "Epipaleolítico-Mesolítico en las comarcas centrales valenciana"s. In: Alday, A. (ed.): *El mesolítico de muescas y denticulados en la cuenca del Ebro y el litoral mediterráneo peninsular*. Memorias de yacimientos alaveses 11, Diputación Foral de Álava, Vitoria-Gasteiz.: 65-120.
- Aura, J.E., Marlasca, R., Rodrigo, M.J. Jordá, J.F., Salazar-García, D.C., Morales, J.V., Pérez, M. (2015). "Llisses, orades i alguna anguila. l'ictiofauna mesolítica de les coves de Santa Maira (Castell de Castells, La Marina Alta, Alacant)". In: Sanchis, A., Pascual, J.L.I. (ed.): *Preses petites i grups humans en el passat. II Jornades d'arqueozoologia del Museu de Prehistòria de València*. Museu de Prehistòria de València-Diputació de València: 139-154.
- Cacho, C., Fumanal, M.P., López .P., López, J.A., Pérez, M., Martínez, R., Uzquiano, P., Arnanz, A., Sánchez, A., Sevilla, P., Morales, A., Roselló, E., Garralda, M.D. & García-Carrillo, M. (1995). "El Tossal de la Roca (Vall D'Alcalà, Alicante). Reconstrucción paleoambiental y cultural de la transición del Tardiglaciario al Holoceno inicial". *Recerques del Museu D'Alcoi* IV: 11-102.
- Cacho I., Valero Garcés B., González Sampériz P. (2010). "Revisión de las reconstrucciones paleoclimáticas en la Península Ibérica desde el último periodo glacial". In: Pérez F. Fiz and Boscolo Roberta (eds.): *Clima en España: pasado, presente y futuro*, Ministerio de Ciencia e Innovación, Madrid: 9-24.
- Delort, R. (1975). "*Le Commerce des Fourrures en Occident à la fin du Moyen-Age*". Ecole Française de Rome, Rome.
- Doadrio, I.; Perea, S.; Garzón-Heydt; González, J.L. (2011). "*Ictiofauna Continental Española. Bases para su seguimiento*". Ministerio de Medio Ambiente y Medio Rural y Marino, Madrid.
- Fernández López de Pablo, J. (2006). "Contribución al conocimiento de la secuencia arqueológica y el hábitat del Holoceno Inicial en el Maestrazgo a partir de los análisis de los yacimientos del Riu de les Coves". *Saguntum-PLAV* 38:23-47.
- Fernández López de Pablo, J.; Gómez Puche, M. (2009). "Climate change and population dynamics during the Late Mesolithic and the Neolithic transition in Iberia". *Documenta Praehistorica*, XXXVI, 36: 67-96.
- Fernández López de Pablo, J.; Jochim, M. A. (2010). "The impact of the 8,200 cal BP climatic event on human mobility strategies during the Iberian Late Mesolithic". *Journal of Anthropological Research*, 66: 39-68.
- Finlayson, C. (2014). *The Improbable Primate*. Oxford University Press, Oxford.
- García Díaz, P. (2010). "Consumo de una carpa *Cyprinus carpio* L., 1758 por el tejón *Meles meles* L., (1758)". *Galemys*, 22 (2): 55-57.
- Hesse, B., Wapnish, P. (1984). *Animal Bone Archaeology*. Taraxacum, Washington D.C.
- Leach, F. (2006). "Fishing in Pre-european New Zealand". *Archaeofauna*, 15: 1-266.
- Llorente, L. (2007). "Cova Fosca (Castellón): "Análisis arqueofaunístico preliminar de los niveles neolíticos". Interim report LAZ-UAM 2007/3. Universidad Autónoma de Madrid, Madrid, 30pp.
- Llorente, L. (2010). "The hares (*Lepus granatensis*, Rosenhauer 1856) from Cova Fosca (Castellón, Spain)". *Archaeofauna* 19: 59-97.
- Llorente, L. (2015). "Nuevas actividades de explotación de fauna en Cova Fosca (Ares del Maestrazgo, Castellón): Usos peleteros y consumo de carnívoros". In: Sanchis, A. and Pascual, J.L. (eds.): *Preses petites i grups humans en el passat. II Jornades d'arqueozoologia del Museu de Prehistòria de València*. Museu de Prehistòria de València-Diputació de València: 7-21.
- Llorente, L. (in prep). "*Cova Fosca (Ares del Maestrazgo, Castellón): Arqueozoologia de la Revolució Neolítica en la fachada levantina de Iberia*". PhD, Universidad Autónoma de Madrid, Madrid.
- Llorente, L., Montero, C., Morales, A. (2011). "Earliest occurrence of the beech marten (*Martes foina* Erxleben, 1777) in the Iberian Peninsula". In: Brugal, J., Gardeisen, A., Zucker, A. (eds.): *Actes de les XXXI<sup>e</sup> Rencontres Internationales*

- d'Archéologie et d'Histoire d'Antibes. Prédateurs dans tous les états*. Éditions APDCA, Antibes: 189-209.
- Llorente, L., García, J.J., Morales, A. (2014). "Herders or hunters? Discriminating butchery practices through phalanx breakage patterns at Cova Fosca (Castellón, Spain)". *Quaternary International*, 330: 61-71.
- Madoz, P. (1987). "*Diccionario estadístico histórico de Alicante, Castellón y Valencia*". Facsimil. Editorial Alfonsel Magnànim, Valencia (2 vols).
- Morales, A., D.C. Morales, Roselló, E. (1991). "Sobre la presencia del bacalao (*Gadus morhua*) en La Cartuja sevillana de Santa María de las Cuevas (Siglos XV-XVI)". *Archivo Hispalense* T. LXXIV 74 (226): 17-26.
- Morales, A., Roselló, E., Lentacker, A., Morales D.C. (1994). "Archaeozoological Research on Medieval Iberia: Fishing and Fish Trade on Almohad sites". *Trabalhos de Antropologia e Etnologia* 34 (1-2): 453-475.
- Morales, A., Cachorro, M., Hadjikoumis, A., López, D., Ruiz, J.J., Spry, V., Vega, R., Llorente, L. (2008). "Cova Fosca (Castellón): Análisis arqueofaunístico preliminar de los niveles neolíticos". Interim report LAZ-UAM 2008/6, Universidad Autónoma de Madrid, Madrid, 86pp.
- Morales Muñoz, D.C. (2000). "La Fauna Exótica en la Península Ibérica: apuntes para el estudio del coleccionismo animal en el medievo hispánico". *Espacio, Tiempo, y Forma. Serie III*, 13: 233-270.
- Oakley, K. (1975) *Decorative and Symbolic Uses of Vertebrate Fossils*. Pitt Rivers Museum, University of Oxford. Oxford.
- Olària, C. (1988). "Cova Fosca. Un asentamiento meso-neolítico de cazadores y pastores en la seranía del Alto Maestrazgo". *Monografies de Prehistoria i Arqueologia Castellonenques* 3. Castellón.
- Olària, C. (2000). "Nuevas dataciones de C-14 para el Neolítico Mediterráneo Peninsular". *Quaderns de Prehistòria i Arqueologia de Castelló* 21: 27-34.
- Olària, C., Jener, F.G. (2008). "Cazadores y pastores en la fase Neolítica de Cova Fosca (Ares del Maestre, Castellón)". In: Hernández, M. S., Soler, J. A., López, J. A. (eds.): *Actas del IV Congreso del Neolítico Peninsular: 27-30 de noviembre de 2006*. Museo Arqueológico de Alicante-MARQ, Alicante: 331-337.
- Shipman, P. (2015). *The invaders: How Humans and their dogs drove Neanderthals to extinction*. Harvard University Press, Cambridge.
- Reitz, E.J., Wing, E.S. (1999). *Zooarchaeology*. Cambridge Manuals in Archaeology, Cambridge University Press, Cambridge.
- Schmid, E. (1972). *Atlas of Animal bones/Tierknochenatlas*. Elsevier, Amsterdam.
- Siret, L. & Siret, E. (1890). *Las primeras edades del metal en el sudeste de España*. Barcelona
- Thompson, K. (2014). *Where do camels belong? The Story and Science of Invasive Species*. Profile Books, London.