

## Archaeological data on the exploitation of the goose barnacle *Pollicipes pollicipes* (Gmelin, 1790) in Europe

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### ABSTRACT

Barnacles of the species *Pollicipes pollicipes* are crustaceans that nowadays live on wave-beaten rocky substrates in the intertidal and low-shore zones on the coasts of Atlantic Europe and North Africa. At the present time, the exploitation of this species is profitable, especially in northern Spain where this seafood is highly valued, as well as expensive. However, the gathering of this resource, which is carried out manually by the *percebeiros* or “goose barnacle fishers” entails great risks.

The exploitation of goose barnacles is, however, not a recent activity, as evidence of it has been seen in southwest Europe in the Mesolithic (about 8000 BP), and above all from the early Neolithic (about 6000 BP). This paper analyses the archaeological evidence of barnacles (*tergum*, *scutum* and *carina*, calcareous plates located in the *capitulum*) that have been found at one Spanish Neolithic site located in the north of the Iberian Peninsula (Los Gitanos Cave, in Cantabrian Spain).

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### RESUMEN

Los percebes de la especie *Pollicipes pollicipes* son crustáceos que actualmente habitan sobre las rocas batidas por el oleaje en la zona intermareal e infralitoral en las costas europeas atlánticas y del Norte de África. En la actualidad su explotación es muy rentable, sobre todo en el Norte de España, donde es considerada un alimento muy apreciado, a la vez que caro. Su recolección, realizada manualmente por los “percebeiros”, es muy arriesgada.

Sin embargo, la explotación de los percebes no es ni mucho menos actual, puesto que hay indicios de ella en el SW de Europa desde el Mesolítico (ca. 8000 BP), pero sobretudo a partir de comienzos del Neolítico (ca. 6000 BP). En este artículo se analizan las evidencias arqueológicas neolíticas conservadas de los percebes (*tergum*, *scutum* y *carina*, placas calcáreas localizadas en el capítulo) en un yacimiento español de época neolítica, la cueva de Los Gitanos de Montealegre (Cantabria).

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### 1. Introduction

In Europe, the earliest evidence for the presence of marine resources is found in the Middle Palaeolithic, but the anthropogenic origin of some of these instances may be questionable (Erdlandson, 2001). It is at the end of this period, in the Late Mousterian when clear evidence is seen of the exploitation of marine resources, gathered as food or as curiosities (shells found with signs of marine erosion) (Álvarez-Fernández and Carvajal-Contreras, 2008).

Although the remains of molluscs gathered as food predominate at sites like Vanguard Cave and Gorham's Cave in Gibraltar (Fernández-Jalvo and Andrews, 2000; Stringer et al., 2008; Fa, 2008), in some places the shells were made into artefacts (e.g. into side-scrapers at Moscerini, in Italy) (Stiner, 1994). The exploitation of marine molluscs continued throughout Prehistory, and their remains are found in large quantities particularly in the Mesolithic and Neolithic periods (Álvarez-Fernández, in press; Fano, 2007; Fano et al., in press). In addition to the molluscs, evidence of the exploitation of other kinds of marine resources has also been documented since the Mousterian: mammals at Vanguard Cave (*Monachus monachus*, *Delphinus delphis*, *Tursiops truncatus* and *Diplodus* sp.) (Stringer et al., 2008) and fish (vertebrae of *Dentax vulgaris*) in Level G at Romanelli (Cleyet-Merle, 1990).

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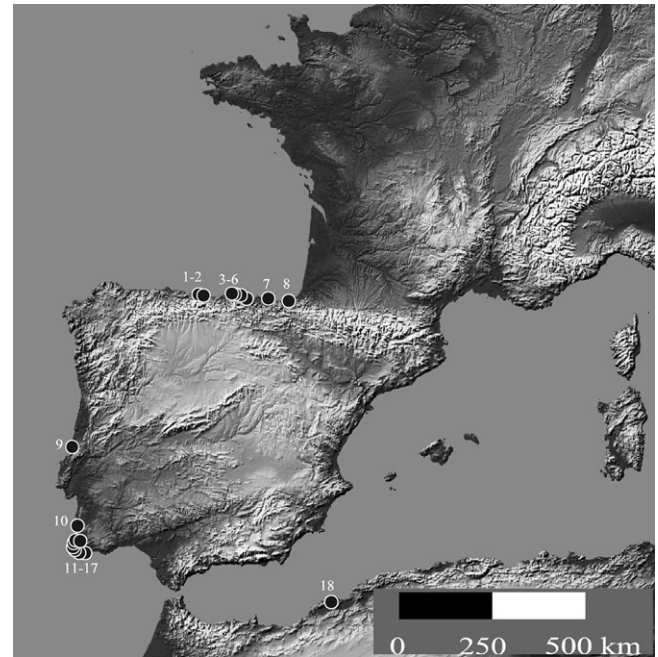
At prehistoric sites in the Cantabrian region (Northern Spain), the most abundant marine resources found in Upper Palaeolithic deposits are the molluscs (Álvarez-Fernández, 2005–2006; Álvarez-Fernández and Carvajal-Contreras, 2008) and, to a lesser extent, fish (Fernández-García, 2002), crustaceans (crabs and balanidae), echinoderms (sea urchins) (Álvarez-Fernández, in press; Álvarez-Fernández et al., 2009a,b) and sea mammals (Corchón et al., 2008; Corchón and Álvarez-Fernández, 2008). Although evidence of these had already been recognized at sites excavated in the late 19th century, their documentation only became possible in the course of excavations undertaken in the 1960s, when all the small fraction was systematically collected from archaeological material by sieving the sediment through fine-meshed screens (Álvarez-Fernández, in press; Fano 2007).

In the Iberian Peninsula, the remains of crustaceans (crabs and balanidae) are often cited in archaeological monographs on sites located in Cantabrian Spain (see for example the works of Clark, 1976; González-Morales, 1982; González Sainz, 1989; Fano, 2007), in Portugal (Ferreira, 1956; Roche, 1960; Lentacker, 1986; Detry, 2007) or on the Mediterranean (e.g. at Nerja; Jordá et al., 2003). However, no systematic study has been made of these kinds of remains. For the rest of Atlantic Europe, research has been carried out (almost exclusively about crabs) at a few archaeological sites, above all in Brittany (Béniguet-3, Pontheziers, Beg-er-Vil, Beg-an-Dorhenn, etc.), where systematic research has made it possible to classify the remains at species level, quantify them, calculate their mass, etc. (Gruet and Laporte, 1995; Gruet, 2002, 2003; Gruet et al., in press; Carvalho et al., 2005; Dupont and Gruet, 2005). However, there has been hardly any speculation about the role that these resources might have played in the diet of prehistoric groups (Gruet and Laporte, 1995; Erdlandson, 2001; Ontañón, 2000, 2004; Gruet, 2002; Carvalho et al., 2005; Fano, 2007; Bicho and Haws, 2008; Álvarez-Fernández, in preparation; Álvarez-Fernández et al., 2009a,b).

At European archaeological sites, the consumption of goose barnacles (*Pollicipes pollicipes*) has been cited for the early Holocene onwards and is mainly associated with Mesolithic and Neolithic shell-middens, in both the Atlantic and the Mediterranean areas (Fig. 1). However, their systematic study has only commenced recently, in connection with archaeozoological analysis at certain prehistoric sites, such as the Neolithic deposits of Cueva de los Gitanos at Montealegre (Cantabria, Northern Spain) (Álvarez-Fernández, in preparation); and at Port Blanc (Hoëdic Island, Morbihan, France) in an Iron Age context (Dupont et al., 2008).

## 2. Taxonomy and biology of goose barnacles

*Pollicipes pollicipes* (“percebes” in Spanish, “pouce pieds” in French) (Phylum: Arthropoda, Subphylum: Crustacea; Infraclass: Cirripedia; Order: Pedunculata; Family: Pollicipedidae; Genus: *Pollicipes*; Species: *Pollicipes pollicipes*, Gmelin, 1790) are pedunculate cirripedes in which two parts can be distinguished. First, the peduncle or stalk (lower part) which is covered by a hard dark brown skin, and which attaches to the rocks by cementing glands. This is the edible part of the animal, to be exact, the orangeish cylinder inside it, which is considered a delicacy. Second, the capitulum (upper part) formed by a kind of carapace that is protected by some forty calcareous plates of varying thickness and size, whose colour varies from nacre-white to grey, and which are of different sizes. This part is commonly known as the barnacle’s nail. These plates protect the animal’s prosoma, where most of its vital organs are contained, from the attacks of predators and desiccation at times of low tide (Rainbow, 1984; Relini, 1987; Barnes, 1996; Southward, 2008). The goose barnacle is mainly made up of water (almost 90%), followed by protein (4%), fats (5%) and mineral salts (>3%) (Kameya and Zeballos, 1988). They supply large amounts of



**Fig. 1.** Sites where goose barnacles have been recorded in contexts clearly assigned to the Mesolithic and Neolithic, cited in the text. 1. La Llana; 2. Mazaculos II; 3. Cueva del Mar; 4. La Fragua; 5. La Trecha; 6. Los Gitanos; 7. Kobeaga II; 8. Jaizkibel 3; 9. Vidigal; 10. Samouqueira I; 11. Medo Tojeiro; 12. Castelejo; 13. Armação Nova; 14. Vale Santo 1; 15. Barranco das Quebradas 3; 16. Rocha das Gaviotas; 17. Vale Boi; 18. Coralès.

the vitamins B1 and B2, potassium and other minerals, while possessing a low fat content. They contain about 66 calories per 100 g meat weight.

Goose barnacles grow in colonies, forming groups or bunches. These bunches are gathered by hand at low tide, when the animals are emerged. Specimens of different sizes are found in any bunch, and the youngest animals usually attach themselves to the stalks of the adult individuals. They grow on the wave-beaten rocks of the intertidal zone (the zone that is covered at high tide and uncovered at low tide) and the low-shore zone (the area permanently under water). In these areas they share their habitat with molluscs (like mussels) and other encrusting organisms (e.g. balanidae) and therefore come into competition with them for living space and food. These cirripedes feed by filtering the zooplankton from the wave-beaten water; the more beaten and colder it is, the more oxygen it contains and the better the barnacles are (Barnes and Reese, 1960; Rainbow, 1984; Cardoso and Yule, 1995; Molaes, 1998; Novo Loureiro, 2000).

The reproductive period for goose barnacles commences in May and finishes in September. They are estimated to take nearly a year to reach a commercial size (40 mm long) (Molaes, 1998).

Goose barnacles vary in size depending on their location, and may reach a length of 120 mm. Specialists distinguish between two types of barnacles: those in the sun and those in the shade or watery ones. The former grow in sunny areas and tend to have a short thick stalk, whereas the latter, which are less highly valued, possess a longer, thinner body and larger water content.

*Pollicipes pollicipes* vary are found in different locations of the world. *P. pollicipes* is distributed on the Atlantic coast of Europe and North Africa, between 48°N (UK, France) and 15°N (Senegal); *Pollicipes polymerus* on the North American west coast (from 64 to 27°N), and *Pollicipes elegans* on the west coast of South America (from Mexico to Peru). *P. pollicipes* is found both on Atlantic coasts (Cantabrian Spain, the Portuguese coast, Belle Île in France) (Fig. 2) and North Africa shores (Morocco, Mauritania, Senegal). In both

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