



Contents lists available at ScienceDirect

Quaternary International

journal homepage: www.elsevier.com/locate/quaint

Herders in the mountains and farmers in the plains? A comparative evaluation of the archaeobiological record from Neolithic sites in the eastern Iberian Pyrenees and the southern lower lands

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ARTICLE INFO

Article history:

Available online xxx

Keywords:

Interdisciplinary analysis
Crop husbandry
Animal husbandry
Neolithic farming
Iberian Peninsula

ABSTRACT

Mountain sites are usually seen as sites connected to pastoral or transhumant activities. This paper proposes an alternative interpretation for Neolithic mountain sites found in the southern Pyrenean slopes. The archaeobotanical and archaeozoological record of highland and lowland sites from this region is compared in order to observe any differences in crop and animal husbandry. Available data indicate that mountain sites present a similar record to the one observed in the lowlands. Most sites show clear evidence of permanent activity, including agriculture, as well as other practices connected to medium- to long-term strategies like storage of plant products. We propose that more integrated analyses are needed in this and other regions to fully characterize mountain economy during the Neolithic, since no clear evidence of pastoralism or transhumance has been found.

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1. Introduction

Until recently, archaeological research in the eastern Iberian Pyrenees had been rather scarce (Oms et al., 2012). Since the beginning of the 21st century, significant advances have been made. Systematic archaeological prospection has increased, which has allowed the recording of plenty of structures that could be connected to different uses of mountain environments in the past. This work has occasionally been complemented with the excavation of archaeological sites (e.g. Díaz Bonilla et al., 2016; Gassiot et al., 2015a, 2014, 2016; Orengo et al., 2014; Rodríguez-Antón, 2011), while other times indirect proxies for human activities (such as pollen or microcharcoal) from fens, peat bogs or other natural environments located mostly above 2000 m a.s.l. were studied (see Cunill et al., 2012; Cunill et al., 2013; Miras et al., 2007, 2010). Off-site approaches provided detailed information of the changes taking place at these altitudes, but not always enough evidence of their anthropogenic origin or of the nature of the activities that were carried out, as reported by other researchers (Cunill et al., 2013). On the other hand, the available archaeobotanical and archaeozoological data from upland Neolithic sites

had been scarce until recently, which led to a number of theories on settlement economy in these areas that lacked of the appropriate on-site information.

There is a persisting idea in the archaeological literature dealing with the Neolithic of the NE of the Iberian Peninsula that connects anthropogenic presence in the Pyrenees from the onset of the Neolithic onwards to pastoral or transhumant activities (Lancelotti et al., 2014; Martín et al., 2010; Rojo Guerra et al., 2013; Rojo Guerra et al., 2014; Tornero et al., 2016). One of the problems that we encounter in using terms like pastoralism or transhumance for periods like the Neolithic is that these labels are usually never defined in the literature and therefore can be interpreted in many ways: there is not one kind of pastoralism or one kind of transhumance (see e.g. Bates and Lee, 1977; Chang and Tourtellotte, 1993; Halstead, 1996; Gassiot and Garcia, 2014; Khazanov, 1984; Moreno García, 1999). This preconception that links pastoral activities to mountain areas is partly due to our current perception of farming, usually dichotomized into crop husbandry and animal herding, leading some researchers to exclude any possibility of high mountain agriculture and sedentary life. Animal herding or pastoralism seems to be an “easier” way to make a life in difficult environments. Authors focusing on mountain economy emphasized that there exist indeed many complex mixed farming models in mountain regions where plant and animal herding interact

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(Ebersbach, 2010; Vincze, 1980).

It is also common to find publications where human presence in middle mountain ranges is linked to hunting, wild plant gathering or some sort of what is considered to be incipient/primitive agriculture, usually non-permanent plots linked to slash-and-burn practices (Galop et al., 2003; Llovera, 1986; Orengo et al., 2014; Yáñez, 2005; Yáñez et al., 2002). Some authors interpret minor environmental impact during the early Neolithic together with evidence of fire in pollen profiles (in the form of peaks in micro-charcoal records) as supporting data for the existence of shifting agriculture in the northern slopes of the Pyrenees (Galop et al., 2013; Rius et al., 2009). There is actually no reason to exclude other possibilities like for instance low-scale intensive agriculture (*sensu* Bogaard, 2004b) combined with a low-scale strategy of landscape management, as proposed for other areas of Europe with similar debates between on-site and off-site data (Jacomet et al., 2016).

Critiques to these views have already been done by several authors who defend that the Mediterranean farming system is characterized by the intrinsic relation between agriculture, animal herding and woodland management (Antolín, 2015; Díaz-del-Río, 1995; Halstead, 1987, 1990). Halstead states that there is little empirical support for transhumant pastoralism or specialized pastoralism during Prehistory in the Mediterranean (e.g. Halstead, 1990). Nevertheless, there are researchers who argue that the Mediterranean lowlands would not provide enough pastures for herds and that these would be forced to be moved to higher lands during the summer months (Arnold and Greenfield, 2004). Concerning the role of hunting in mountain sites, warnings were cast by one of us after observing that the archaeozoological data also does not indicate that hunting activities were more important in mountain areas (Saña, 1998).

The question addressed in this paper is whether upland Neolithic sites in the study region relied for subsistence on herding, hunting and gathering to a significant extent, being locally grown crops not an important supply to their diets, and hence were inhabited by people with large numbers of livestock that would justify long- or medium-distance seasonal movement to different habitation sites at lower altitude. Our position is that during the first half of the Neolithic (roughly, the first 2 millennia, 5500–3500 cal. BC), herding was based on a local and household scale, in permanent settlements and short-distance movements of the herds, and therefore, that most mountain sites respond to more or less permanent mixed-farming communities. This is based on our previous interdisciplinary research on farming methods in some sites in the lowlands like La Draga (Antolín et al., 2014) and Can Sadurní Cave (Saña et al., 2015). We consider that the exchange mechanisms that make specialization (such as pastoralism or transhumance) possible were not available during the earliest phases of the Neolithic and that living from such specialized economic activities would not have been possible on the long term.

By comparing plant macroremains and archaeozoological remains found in sites in altitude and in the lowlands of our study region we consider that it should be possible to distinguish different types of economic specialization if that was the case. If an economic specialization based on seasonality existed in upland sites one should expect low amounts of chaff and weeds, as typically found in clean stored products (see Jones, 1990). When present, the weeds should resemble those found in clean products from sites found in the lowlands. In addition to this, more gathered plants belonging to the summer/early autumn might be present. Regarding livestock, one would expect differences between upland and lowland livestock ages and seasons of death, as well as, most likely, a smaller diversity of species in upland sites. If, in the opposite case, these communities were sedentary in the uplands,

one might expect adaptations to a different environment such as different crops, different livestock species or sizes, as well as different weeds connected to agricultural plots. Similar amounts of weeds and chaff to those found in the lowlands would be expected. Likewise, higher amounts of gathered plants typical of these environments (gathered all year round) could be expected.

Previous multidisciplinary approaches to mountain economy are known from the Alpine region (Delhon et al., 2008; Martin et al., 2012; Martin, 2014; Nicod et al., 2010), which would be among the closest parallels for our study region, but similar upland-lowland comparisons are not known to us. Comparisons of the archaeozoological record between cave sites (not necessarily in altitude) and open-air sites were performed in the Rhone Valley, but archaeobotanical data were not available for comparison (Bréhard et al., 2010; Helmer et al., 2005).

2. Materials and methods

2.1. The study region

The NE of the Iberian Peninsula (Fig. 1) is topographically and climatically a very diverse area (Folch, 1990; Folch et al., 1984). The Pyrenean region to the North, with an alpine, subalpine and sub-mediterranean climate (following an altitude gradient), run in east-west direction becoming higher and wider towards the west (reaching over 3000 m a.s.l.). In alpine and subalpine regions, the highest precipitation is expected (900–1200 mm), especially during spring. The Ebro River roughly defines the southern border of the area under study (Fig. 1). The coastal area has a typical Mediterranean, or mountainous Mediterranean, climate, mostly dry all year round, with mild winters and very hot summers. Further inland, the Central Depression, a large plain with a continental climate. Continental and coastal Mediterranean precipitation levels stay very low (below 500 mm). In general, the lack of water is a limiting factor in agricultural production in large areas of the lowlands at present.

Both palynological analyses and stable isotope analyses show a climatic change in the lowlands of this region starting around the beginning of the 4th millennium cal. BC. Until then, evidence for more humid conditions than at present was found. Between 4000–3000 BCE scarce autumn precipitation was observed in isotopic analyses (Aguilera et al., 2011, 2012), while an increase in Mediterranean taxa took place in most regions of the area under study (Pérez-Obiol et al., 2011). Palaeoclimatic research in the Pyrenees has been attempted by studying chrysophyte cysts and diatom records (Catalan et al., 2013; Pla and Catalan, 2005). A more continental climate than nowadays was observed for the first half of the Holocene (approximately until the end of the 6th millennium cal. BC), with warmer summers and colder winters than at present (Pla and Catalan, 2005). Other palaeoenvironmental records indicate phases of climatic ameliorations (with recession of the glaciers, drier conditions and warmer temperatures) during the first half of the 5th millennium cal. BC and during the change from the 5th to the 4th millennium and from the 4th to the 3rd millennium cal. BC (Galop, 2005). Particularly during the latter episode an aridification phase would be observed south of the Pyrenees (Jalut et al., 2000).

2.2. Archaeological sites

Material from 7 sites in the Pyrenean highlands was included in the analysis: Puyascada Cave, Coro Trasito, Els Trocs Cave, Sardo Cave, Balma Margineda, Camp del Colomer and Portes Cave. Fully quantified data for both plant and animal remains were only available for Coro Trasito and Sardo Cave. Their location is shown in Fig. 1. The complete number of sites included in this study, as well

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