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Domestic activities and pottery use in the Iron Age Corsican settlement of Cuciurpula revealed by organic residue analysis

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ABSTRACT

The excavation of the protohistoric site of Cuciurpula (South Corsica, France) revealed a significant amount of potsherds, often bearing visible surface crusts, sometimes very thick. This exceptional case in the Mediterranean region, suggesting a good preservation of organic substances, provided a unique opportunity to address questions related to pottery function and natural organic substances exploited in Corsica during the first half of the 1st millennium BC. The molecular analysis (GC and GC/MS) of organic residues from three houses of the site, preserved in both pottery walls and charred surface crusts, highlighted the wide diversity and the various roles of substances contained and processed in ceramic vessels: animal fats, plant oils and waxes, beeswax, and conifer resin. These molecular data, considered together with the shapes of the vessels and their location into the habitation units, revealed the diversity of pottery function (culinary and technical) and spatial organisation of domestic activities between houses or in a house (distinction between storage and cooking areas).

1. Introduction

For more than thirty years, organic residue analysis mainly focused on the study of the first pottery and the spread of Neolithic economy (e.g. Craig et al., 2011; Debono Spiteri et al., 2016; Evershed et al., 2008; Salque et al., 2013). Unlike the Neolithic period, largely studied in Europe and the Near East, Protohistoric sites attracted much less attention. For this period, organic residue analysis has been mainly performed on ceramic or wooden containers from sites located in the Alps (Carrer et al., 2016; Colonese et al., 2017; Evershed et al., 1995; Hayek et al., 1991; Raven et al., 1997), the British Islands (Copley et al., 2005a, 2005b; Craig et al., 2005; Cramp et al., 2014b, 2015; Dudd, 1999; Hayek et al., 1991), and Scandinavia (Cramp et al., 2014a; Hayek et al., 1991; Isaksson et al., 2010; McGovern et al., 2013). Only few data from other regions are available: Russia (Kostyukevich et al., 2016), Poland (Heron et al., 2016), France (for hafting residues analysis; Regert et al., 2003; Regert and Rolando, 2002) and Eastern Mediterranean (Decavallas, 2011; Roumpou et al., 2003; Steele and Stern, 2017). In particular, organic residue analysis data on protohistoric pottery content from north-western Mediterranean are very scarce (Faraco et al., 2016; Manzano et al., 2015), due to the lack of studies in this region or to the generally poor preservation of organic substances in Mediterranean contexts.

The protohistoric site of Cuciurpula is settled on the hillside of la Punta di Cuciurpula in south central Corsica (Fig. 1). The excavations carried out between 2010 and 2015 revealed a large settlement of about 40 well-preserved structures occupied from the 12th to the 6th century BC (Late Bronze Age to the beginning of the Second Iron Age; Peche-Quilichini et al., 2015). Based on exhaustive excavation data of seven of the structures and further analysis of various artefacts, these structures have been interpreted as habitation units. The presence of grinding stones together with scarce cereals and domestic animal remains attests for agriculture and herding activities (Peche-Quilichini et al., 2014a). The surrounding forest was also exploited as acorn and pine nuts were discovered at the site (Peche-Quilichini et al., 2014a). This very limited picture of the exploitation of biological substances by protohistoric societies at Cuciurpula has been partially completed thanks to organic residue analysis focusing on adhesive and waterproofing substances (Rageot et al., 2016). In a complementary approach, the present paper enlarges the scope of natural substances by studying the various fatty substances contained and processed in ceramic vessels, in order to explore the whole diversity of products exploited during Protohistory in Corsica. Secondly, by relating the content of pottery with the shapes of the vessels and their location inside the habitation units, we aim at

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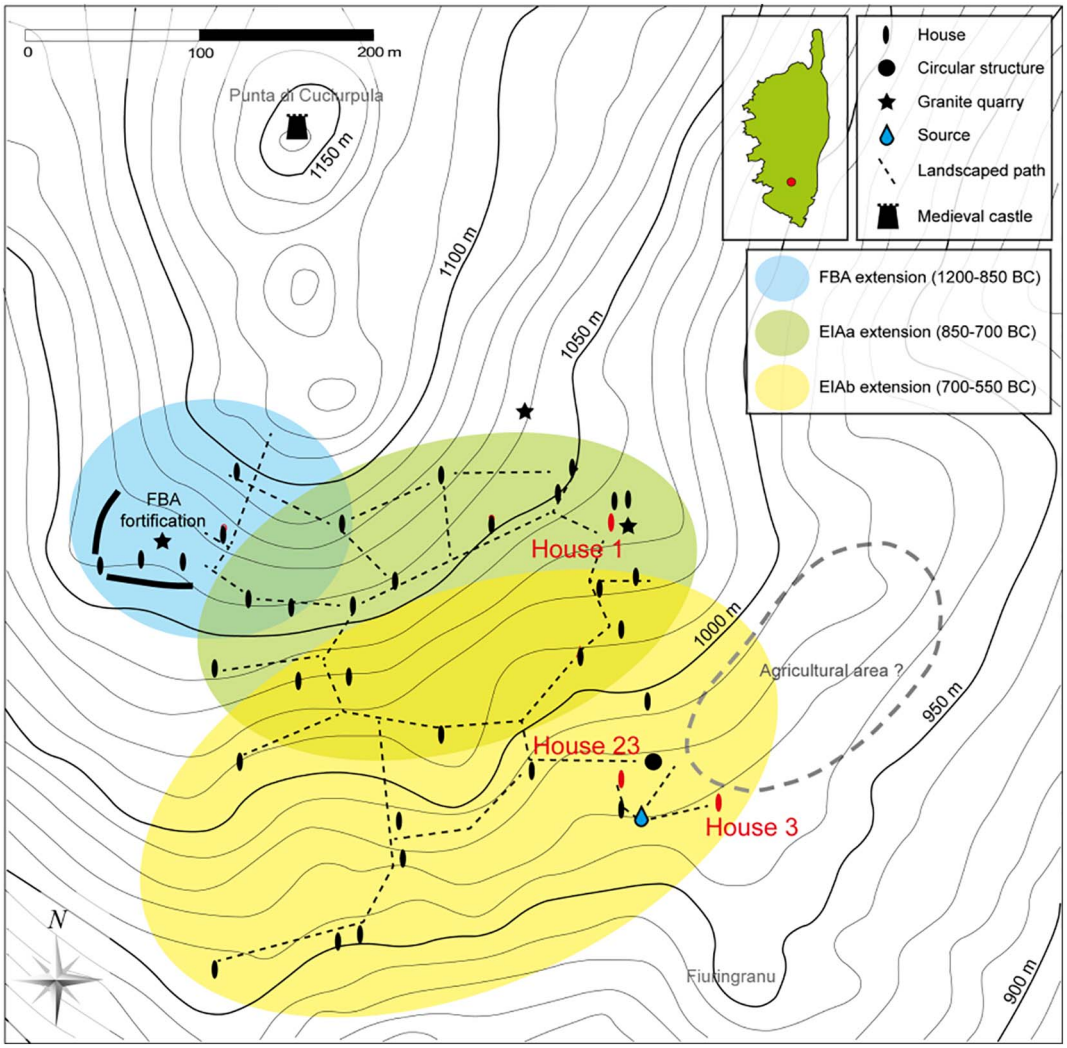

Fig. 1. Location and map of the site. In red are the three habitation units considered in the present study. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

understanding how these products were transformed, stored and consumed at the site. This will highlight the largely unknown daily domestic activities of Corsican communities during the beginning of the 1st millennium BC. With these aims, ceramic vessels from three different Iron Age houses of Cuciurpula were selected. The lipids preserved in their walls were extracted and studied by gas chromatography and mass spectrometry (GC and GC/MS).

2. Materials and methods

2.1. Samples

For organic residues analysis, three different types of sample can be considered: free lumps recovered in sediment, organic molecules trapped inside the pottery walls, and visible surface residues (Regert, 2007, 2011). Among the latter, different categories could also be distinguished, based on their location on the vessel, their adherence to ceramic surface, and their aspect (colour, brightness, transparency, etc.). As described by Rageot et al. (2016), five classes of residues have been identified based on simple observation at Cuciurpula: reparation residue along the edges of ancient cracks (class A); thin residues on the inner surface interpreted as ceramic internal treatment, maybe for waterproofing (class B); black residues on the external surface, maybe for decoration or treatment of the exterior of the vessels (class C); free lumps, possibly adhesive storage before use or manufacturing waste (class D); and thick visible remains on the interior surface, probably residues related to the ceramic content (class E). The present study focuses on class E residues and on an additional class, comprising organic molecules preserved in the porous ceramic matrix but invisible to the naked eyes (class F) in order to investigate pottery use.

Three habitation units were selected for sampling. House 1 (850–600 BCE) was chosen to complete the data obtained during the adhesive substances study (Rageot et al., 2016). Two supplementary habitation units, House 3 and House 23 (700–550 BCE), were selected to compare two contemporaneous houses located close to each other. Two vessels from an additional house (house 38) were sampled because of their perforated walls suggesting a particular function. Due to the high fragmentation of ceramics, only part of the sampled potsherds originated from ceramic vessels of known shapes (deep vases, small pots, goblets, bowls and perforated shallow containers). A total of 39 potsherds and 20 visible residues was analysed (Table 1).

Surrounding sediments were also sampled at two different locations at the site to compare their lipid composition with pottery sherds and surface visible residues. In order to study the effect of the environmental context on lipid preservation, the acidity of these soil samples was also measured.

2.2. Lipid analysis

Sample treatment and analysis were carried out following Evershed