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Husbandry practices and livestock dung at the Numidian site of Althiburos (el Médéina, Kef Governorate, northern Tunisia): the phytolith and spherulite evidence

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ABSTRACT

Recent excavations at Althiburos, northern Tunisia, have shown the existence of permanent pre-roman occupations in the central area of the urban settlement. Significantly, the site has been found to contain one of the most complete Numidian sequences, spanning from the Early Numidian (at least from the 10th–9th century BC) to its final stage. Research at the site addresses questions related to the identification of settlement patterns at this time.

The combined study of phytoliths and spherulites recovered from well defined archeological contexts at the site have provided new data for identifying husbandry activities carried out by the ancient Numidian populations. The results show that there is abundant evidence for both cooking and processing cereals, primarily from common or bread wheat (*Triticum aestivum*). Also significantly, was the abundance of faecal spherulites in certain areas of the site, indicative of dung accumulation. The correlation between large amounts of spherulites and rich phytolith sediments in specific contexts, suggested that grasses were brought to the site or consumed offsite and deposited onsite as livestock dung or dung-products. The identification of dung accumulations in the site raises questions about the diversity of economic practices developed by Protohistoric communities in northern Africa. Future research questions regarding such dung rich layers will also be examined.

1. Introduction

The site of Althiburos (modern el Médéina) is located in northern Tunisia, approximately 45 km south of Le Kef, the ancient Numidian town and later Roman colony *Sicca Veneria*, near the eastern border of modern Algeria (Fig. 1). The Numidian settlement was built on a plateau limited to the north by the Oued el Médéina and the Oued Sidi Baraket in the south. The ancient *municipium Althiburitanum* enjoyed considerable prosperity in Roman times due to a privileged location on the road between Carthage and Theveste and a successful agriculture regime and trade. Although it is well known that intensive Roman land use included water retaining techniques, irrigation, terracing and hedge plantings (Faust et al. 2004), there is little evidence for the poorly investigated Numidian culture.

Historically, cereal production has always been an important component of the economy of the region. Situated within the continental Mediterranean climate belt, the area is characterized by dry summer and wet winter seasonality of precipitation. Average winter temperatures are 7.3 °C while average temperatures in summer are 26.5 °C (Le Kef rainfall station, Kallala and Sanmartí, 2011). Annual precipitation is about 400–600 mm with high annual rainfall variability. Hard wheat is the major crop and the most widely cultivated cereal in most of the rain-fed farms of the region in the present-day. Crop yields are subject to high year-to-year variation (Kallala and Sanmartí, 2011; Latiri et al., 2010).

The urban settlement, whose Roman buildings have been repeatedly excavated since the late 19th century, has been found to contain a complete sequence of occupation spanning from the 10th century BC to the Middle Ages (Kallala et al., 2008b). Recent excavations have been carried out at the monumental area of the *capitolium* (Fig. 2) by a team from the National Heritage Institute of Tunisia– INP and the University of Barcelona. This research is part of a large project intended to provide solid data on the origins and historical development of Numidian civilization (probably the most

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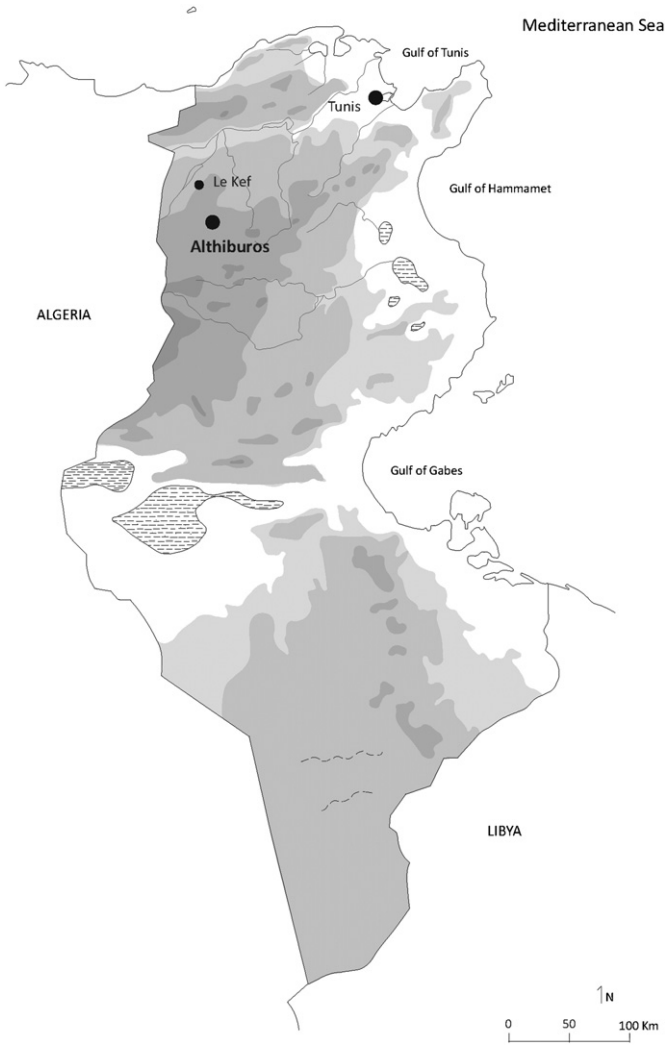

Fig. 1. Map showing the general location of the site of Althiburos.

poorly known among the great pre-Roman cultures in the central and western Mediterranean area). First results have already been published (Kallala and Sanmartí, 2011; Kallala et al., 2008a,b; see also at http://www.inp.rnrt.tn/ and http://www.ub.edu/gracpe/protohistoria/intervencions_00001.php). The research performed to date at the central area of the site reveals a detailed and continuous sequence of permanent pre-Roman occupations datable to at least to the 10th–9th century BC. The depositional sequence has been divided into six different phases, based on the ceramic assemblages and radiocarbon dating: Ancient Numidian, sub-divided into three NA phases (NA1: 10th–9th century BC, NA2: 9th century, and NA3: 8th–early 7th century BC), Middle Numidian (NM: late 7th–late 5th/early 4th century BC) and Recent Numidian, sub-divided in two NR phases (NR1: 4th century–146 BC, and NR2: 146–27 BC) (Kallala and Sanmartí, 2011).

The inhabitants of the Numidian settlement (about 4–7 ha), followed mixed farming strategies based on cereal agriculture and herding (Kallala and Sanmartí, 2011; Kallala et al., 2008b; Valenzuela et al., 2009). The macro-botanical record is dominated from the earliest Numidian occupation by winter-grown cereals, especially free-threshing wheat (*Triticum aestivum/durum*) and barley (*Hordeum vulgare*). Legumes such as lentils (*Lens culinaris*), peas (*Pisum sativum*) and beans (*Vicia faba*), as well as fruits including figs (*Ficus carica*), vine (*Vitis vinifera*) and olive (*Olea europaea*) were also well represented in most of the phases of the Numidian sequence. Herding is evidenced by domestic mammals, primary from ovicaprins, cattle and pig, which are predominant in the faunal assemblages. Faunal remains, including micro-fauna, ostrich eggs and fish were also well preserved in the site.

This paper focuses on the results obtained from the combined study of phytoliths and dung spherulites identified in selected contexts dating from the early Numidian occupation to the last centuries BC at the central area of the site. Phytoliths are microscopic remains composed of pure amorphous silica derived from plant cells (Pearsall, 1989; Piperno, 1988, 2006), and occur in many types of plant species. Moreover, phytoliths offer a consistent dataset for distinguishing certain particular plant species and their different parts, which may be better preserved when macro-remains are unavailable or partially uninformative. In addition, the ability to consistently distinguish specific cereal varieties through morphometric analysis of phytoliths is an efficient tool to delineating plant uses in the archaeological record (Albert et al., 2008; Berlin et al., 2003; Portillo and Albert, accepted for publication; Portillo et al., 2009, 2010a). Morphometric analyses were conducted in this study for tracing crop-processing patterns in the site.

Dung spherulites are crystallized calcitic particles produced in the digestive tract of many animal species, but especially in ruminants, and can be found in varying proportions in their faeces (Brochier et al., 1992; Canti, 1997, 1998, 1999; Shahack-Gross et al., 2003, 2004). The analysis of phytoliths, spherulites and other micro and macro-remains from fresh decayed or burnt livestock dung provide us with information on foddering and grazing activities of herd animals. Dung remains have been identified in enclosures, middens and combustion structures including hearths and ovens, in several near-eastern sites through phytolith and spherulite studies (Albert and Henry, 2004; Albert et al., 2008; Matthews, 2005, 2010; Portillo et al., 2009, 2010b; Rosen, 2005; Shahack-Gross, 2011; Shahack-Gross and Finkelstein, 2008; Shahack-Gross et al., 2005). In agro-pastoral societies, and even in traditional modern villages, ethnographic studies have shown that livestock dung is widely used as fuel, construction material, fertilizer and temper (Anderson and Ertug-Yaras, 1998; Miller, 1984; Reddy, 1998; Sillar, 2000). These studies thus offer an approach to delineating herding and agricultural practices and their spatial distributions at the sites. In this light the aim of the research is to obtain a better understanding of domestic practices being carried out at Althiburos, and more specifically the manner in which plant resources and animal dung were exploited by ancient Numidians.

2. Materials and methods

Twenty-eight samples from different locations were selected in total for this study. Phytolith extraction was carried out at the Phytolith Laboratory at the Institute of Archaeology– University College London. Sediments were collected from two different excavation areas located on the northwestern and the southern edge of the *capitolium* (zones 1 and 2) (Fig. 2). Tables 1 and 2 lists the provenience and description of the samples analyzed, as well as the main results obtained. Samples were selected from different contexts designated by the excavators as floors, filling deposits, as well as other well-defined domestic features and grinding stones, belonging to different phases of the Numidian occupation (from the 10th–9th to the 2nd century BC). The unit numbers and their descriptions are summarized in Tables 1 and 2 as recorded in the field. Note that these designations are used throughout the text. Samples were taken during the 2007–2008 excavation seasons.