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Holocene environment and subsistence patterns from Capsian and Neolithic sites in Tunisia

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ABSTRACT

Faunal analysis was carried out on four Holocene Tunisian prehistoric sites from both Capsian and Neolithic cultures. Capsian hunting strategies from the examination of prey selection and carcass exploitation were investigated from two sites: Bir Hmairiya and SHM-1. Capsian populations showed great adaptability to their physical environment. At SHM-1 and Bir Hmairiya, prehistoric populations developed subsistence strategies focused on hunting of a wide range of local wild prey with more exploitation of medium and small mammals, especially hartebeest and gazelle with additional exploitation of food resources from other terrestrial mammals and land snails. Cultural and economic patterns indicate that these hunters-gatherers populations were using long-term occupation sites, a mode of sedentary lifestyle during the Capsian. The Neolithic economy is documented through archaeozoological studies of faunal remains from two sites: Kef el Agab and Doukanet el Khoutifa. Neolithic populations kept the same lifestyle as the Capsian tradition but with gradual investment in meat, milk, and wool production. Comparing Kef el Agab and Doukanet el Khoutifa, patterns of mammal exploitation do not display great differences. The occupants practiced hunting and gathered land snails. The main change lies in the increase in Ovicaprid remains at Doukanet el Khoutifa, which would suggest a greater control of breeding activity. Pastoralism was already established at Doukanet el Khoutifa by the first half of the 7th millennium cal BP. This pastoralism involved more sheep and goat than bovines, but without dog or pig.

1. Introduction

In this paper, we present the results of detailed archaeozoological analyses of all excavated faunal remains from four prehistoric *rammadiyet* in Tunisia. A *rammadiya* is a specific name given to an enormous accumulation of ash, land snail shells, burned stones, lithic artifacts and faunal remains (Gobert, 1937). Two sites belong to the Capsian (Camps, 1974; Rahmani and Lubell, 2012), Bir Hmairiya, attributed to Typical Capsian and the Upper Capsian site SHM-1, while Kef el Agab and Doukanet el Khoutifa belong to the Neolithic. In eastern Maghreb, Capsian culture is one of the most studied Epipalaeolithic culture and is inherent to Tunisia and eastern Algeria. Capsian is subdivided in two phases: Typical Capsian (*ca* 10,000–8000 cal BP) and Upper Capsian (*ca* 9000–7500 cal BP). The Capsian groups are considered as the last hunters-gatherers in the Maghreb. The mode of subsistence of those humans groups was gathering land snails, hunting wild animals, and picking fruits.

Taphonomic and archaeozoological research are required to recognize the post-depositional processes that affected faunal remains. We first present taphonomic and archaeozoological aspects of the four sites. We then consider subsistence patterns of Capsian and Neolithic groups and discuss the palaeoenvironmental data. Bone and tooth remains were determined to the most specific level possible. We used ungulate size classes (modified from Brain, 1981) for unidentified faunal remains. We studied the faunal remains from different kinds of cultural sites in order to gain further insight into the economy of these societies. The earliest stages of animal domestication in North Africa and especially in Tunisia are of great interest in particular when we compare them to human behavioral patterns during the Capsian, just prior to domestication. During the last two decades, archaeozoological investigations in the Maghreb have tried to understand the economic strategies of Capsian populations; summaries of research into the subsistence strategies of Capsian and Neolithic populations is provided elsewhere (Merzoug, 2012; Ouchaou, 2012).

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In the present study, detailed analysis of the faunal remains from SHM-1 permits new insights into the way the Capsian inhabitants of the site exploited animals. The analyses from all four samples of Holocene ungulate assemblages presented here is mostly aimed at the reconstruction of animal exploitation and site function along with the deduction of the paleoclimatic patterns that affected Capsian and Neolithic societies.

2. Site locations and cultural context

Bir Hmairiya is located in southern Tunisia in the mineral basin of Gafsa, next to the Metlaoui area which is now quite dry (Fig. 1). This *rammadiya* is composed of two open-air loci: one Typical Capsian and the other Upper Capsian (Marty, 1966; Ben-Dhia, 2002). Teste excavated these in 1936 and 1949 (Marty, 1966), but unfortunately there is no documentation of his excavation procedure. Two arbitrary loci were excavated, and deposits at both were composed of ash, burned stones, land snails and very scarce mammal remains. Today, the site is in a very badly preserved state, perturbed and attacked by weathering, trampling and erosion. For this study, we analyzed the Typical Capsian faunal assemblage recovered from sector SE2.

The open-air site of SHM-1 is situated on the eastern Tunisian coast, north of Sousse between two physiographic units: the northwestern highlands, and the eastern and southern Mediterranean coast. The *rammadiya* was first explored by Harbi-Riahi and Zoughlami (1971). Between 2002 and 2007, the site was excavated by an Italian–Tunisian research program (Mulazzani, 2013). Seven main Upper Capsian occupational layers have been detected; all radiocarbon dated between the 9th (7880 ± 30 BP, 8587–8968 cal BP) and the second half of the 8th millennium (6840 ± 30 BP, 7136–7478 cal BP; Saliège et al., 2013).

The Kef el Agab site consists of a huge cave and a sub-circular slope in front, both of which compose the *rammadiyat*. The site is located in northern Tunisia near Jendouba and was first excavated by Bardin in 1947–1948 (Bardin, 1953). In November 2010, a new trench was opened on the slope. A radiocarbon date, obtained on a human bone fragment from Bardin's excavation, is 5984 ± 24 BP (6747–6887 cal BP) (M. Mannino 2010, personal communication). The stratigraphic provenance of the sample is unknown, as the excavation was not conducted following the stratigraphy of the sediment.

Finally, the site of Doukanet el Khoutifa in the Siliana region, is composed of a shelter with a vast terrace of 2200 m^2 and was excavated by Zoughlami between 1973 and 1976 in Sectors 1 and 2 (Zoughlami, 2009). Two main levels are distinguished from bottom to top: a Yellow level (thickness 0.4 m) and a Dark one (thickness 1.6 m), both belonging to the Neolithic and dating between the 8th (6750 ± 200 BP, 7266–7970 cal BP) and the first half of the 7th millennium cal BP (6000 ± 100 BP, 6638–7158 cal BP) (Zoughlami, 2009). We analyzed faunal remains from both levels. Radiocarbon dates for the four sites studied are given in Table 1.

Table 1
Selected radiocarbon dates of Holocene sites from Tunisia (OES: Ostrich egg-shell; CG: *Cerastoderma glaucum*; Ch: Charcoal; H: Human bone). All calibrations use CALIB 6.1.0 and Intcal09.14c for terrestrial samples or Marine09.14c for marine samples taking in to account a ΔR correction factor for Mediterranean waters of 58 ± 85 (Reimer and McCormac, 2002; Reimer et al., 2009).

Site	Culture	Layer	Sample	Lab. code	Age BP	Cal BP 2σ	Ref.
SHM-1	Upper Capsian	1	OES	SacA 23655	7880 ± 35	8587–8968	Saliège et al., 2013
		7	CG	ENEA-866	6840 ± 30	7136–7478	Saliège et al., 2013
Kef el Agab	Neolithic	Unknown	H	Hd-28982	5984 ± 24	6747–6887	M. A. Mannino, pers. comm.
Doukanet el Khoutifa	Neolithic	Yellow	Ch	MC 828	6750 ± 200	7266–7970	Zoughlami 2009
		Dark	Ch	MC 835	6000 ± 100	6638–7158	Zoughlami 2009

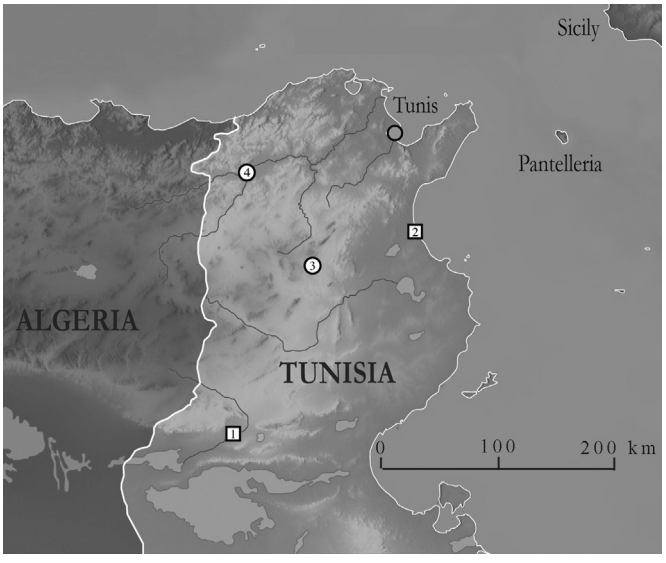

Fig. 1. Map of the studied Capsian and Neolithic sites. 1: Bir Hmairiya, 2: SHM-1, 3: Doukanet el Khoutifa, 4: Kef el Agab.

3. Methods of analyses

This study included detailed taphonomic and archaeozoological analyses of faunal remains from all four sites. We first cleaned and marked all specimens and listed them in an Excel database. Sorting and identification followed the methodology of Klein and Cruz-Uribe (1984) and Barone (1986). Taxonomic identifications of faunal remains were done first by direct observations and comparisons with fossil and modern specimens from Tunisia (stored at the Archaeozoological Laboratory in Kairouan) and more generally from Africa by consulting the literature (Gabler, 1985; Peters, 1986; Peters et al., 1997; Jousse, 2003). In rare cases, we could determine sex for some remains (on pelvis, size and shape of horn, differences in bone size). To age remains, we used species-specific eruption sequences and wear patterns on teeth. We used mortality profiles of ungulates (wild and domestic) to understand the origin of vertebrate remains and thus human behavioral patterns. Bones were assigned to one of three age classes: young, prime, and old. Stiner (1990) indicates that recent humans typically focus on prime-age adults when they select prey.

Faunal analysis was carried out following standard taphonomic and archeozoological methods (Reitz and Wing, 1999). All bones were subjected to analyses of weathering features (macroscopic