

## LIBYA

### **Taming Barbary sheep: wild animal management by Early Holocene hunter-gatherers at Uan Afuda (Libyan Sahara)**

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### **Definition of the problem**

Marginal and arid environments, particularly those of North Africa, represent stimulating places to analyse past human adaptive strategies. One of the problems mostly hotly debated is the emergence of domestication. The antiquity of domestic cattle in some sites, like at Uan Muhuggiag in the Tadrart Acacus (Mori 1961) has been often used to invoke a process of autonomous domestication in the Sahara, independent of the Near East. In this paper we wish to discuss the relationships between human groups and animal resources in the Tadrart Acacus mountain range during the Early Holocene (Figure 1), independently of the general problem of domestication (Gautier 1990; Smith 1992). We will deal with the identification of particular forms of wild animal management during the "pre-pastoral" period (i.e. 9,000- 7.500 BP years).

One problem is the general poor quality of the archaeozoological record. Specific ways of studying the archaeological record, peculiar features of arid environments, different kinds of post-depositional processes are all factors which lead to the low number of finds, and in general the bad preservation of these remains in this region. Beyond the specific problems of these archaeo-

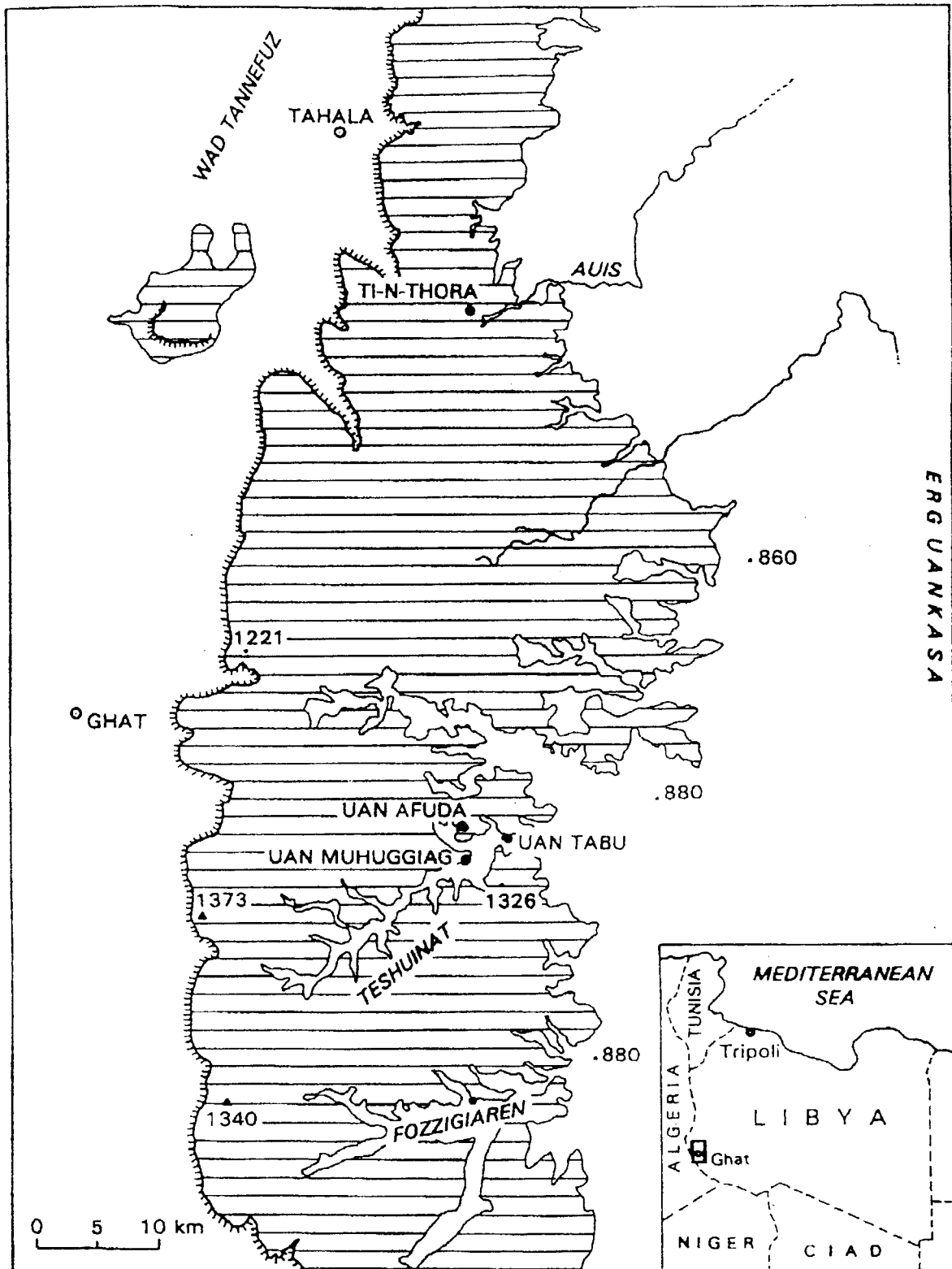
logical deposits, it must be rendered explicit as really the only archaeozoological approach is not sufficient to face totally the complex problematic of the animal management, but it is essential to integrate multi-dimensional analysis.

### **Early Holocene "pre-pastoral" phase: the archaeological background**

The "pre-pastoral" phases of the Early Holocene of the Acacus show a particular evolution of the economic strategies of subsistence (Di Lernia 1996). The more ancient phases, preliminary labelled "Epipalaeolithic" (Cremaschi and Di Lernia 1995), now "Early Acacus" (Di Lernia and Garcea 1996), and approximately C14-dated to all the X millennium BP, are characterised by a narrow spectrum of exploited resources. These are almost exclusively *Ammotragus lervia*; this is recorded at Uan Afuda and Uan Tabu, in the central Acacus (Corridi in press), but also in the northern Acacus (Gautier 1987). This situation is confirmed by recent surveys in surrounding dunes, where several Epipalaeolithic specialised sites were identified, which help to define a picture of logistic exploitation of the territory (Cremaschi and Di Lernia 1996). In these sites only Barbary sheep are found.

The more recent phases, on the contrary, preliminary defined as "Mesolithic" (Cremaschi and Di Lernia 1995) and now "Late Acacus" (Di Lernia and Garcea 1996), belong approximately to the IX and part of the VIII Millennia BP. They are characterised by a broad exploitation of resources, with special emphasis on plants (Castelletti and Cottini 1996). Animal species present reveal an exploitation of small and large mammals, fish and birds (Corridi in press). This broadening of subsistence basis is generally linked to increasing sedentism. The surveys performed in the last years demonstrate that the "Mesolithic" or "Late Acacus" sites are most common in the mountainous areas, and scarce in the lake sites in the fields of dunes. What kind of relationship does exist between the presence of plant accumulations and of decimetric dung layers and the socio-economic organisation of the "Late Acacus" groups?

Figure 1: The Tadrart Acacus mountain range.



## The Uan Afuda cave: a key-site for the analysis of Early Holocene hunter-gatherer groups

The cavity of Uan Afuda is located in the wadi Kessan (Central Acacus), and it is known since the 1960s due to the presence of "Round Heads" paintings (Mori 1965). Four trenches were excavated in the internal, atrial and external portion of the cave (Cremaschi and Di Lernia 1995; Di Lernia and Cremaschi 1996). The atrial part shows a 4-meter stratigraphic sequence (Figure 2), which documents archaeological phases of the Middle Palaeolithic (perhaps Aterian), and the Early Holocene "Epipalaeolithic" and "Mesolithic" phases. Uan Afuda is the site where the differentiation of these two previously linked "pre-pastoral" phases was first recognised. The faunal documentation is very scarce, because of the very bad state of preservation of bones.

In the "Epipalaeolithic" or "Early Acacus" layer, characterised by colluvial sediments, Barbary sheep is the species almost exclusively found, with only one fragment of Golden jackal. C14 dates span from  $9765 \pm 105$  BP to  $9260 \pm 290$  BP (Table 1). In the upper levels, the "Mesolithic" or "Late Acacus" phase, constituted of plant accumulations and hearth lenses, different species are recorded, such as *Ammotragus lervia*, *Alcelaphus buselaphus*, *Equus* sp. *Hystrix cristata*, *Erinaceus* cf. *algerius*, *Canis* cf. *aureus*; some traces of fish and birds were also reported (Corridi in press). The radiometric dates represent the IX millennium BP (Table 1). The internal part of the cave, which is very uneven, is characterised by a decimetric package of dung and vegetables: charcoal, scarce faunal remains and rare archaeological artifacts are present. This pack has been dated to 8000 BP (Table 1).

## Material and methods

We used the following "tools" for detecting animal management: site formation processes (micromorphology of deposits), intrasite organisation (spatial and functional variations), faunal assemblage, composition of plant accumulations and their archaeological implications, ethnoarchaeology and the behaviour of the animal species (Barbary sheep) represented. Particular emphasis was drawn to spherulites as a specific

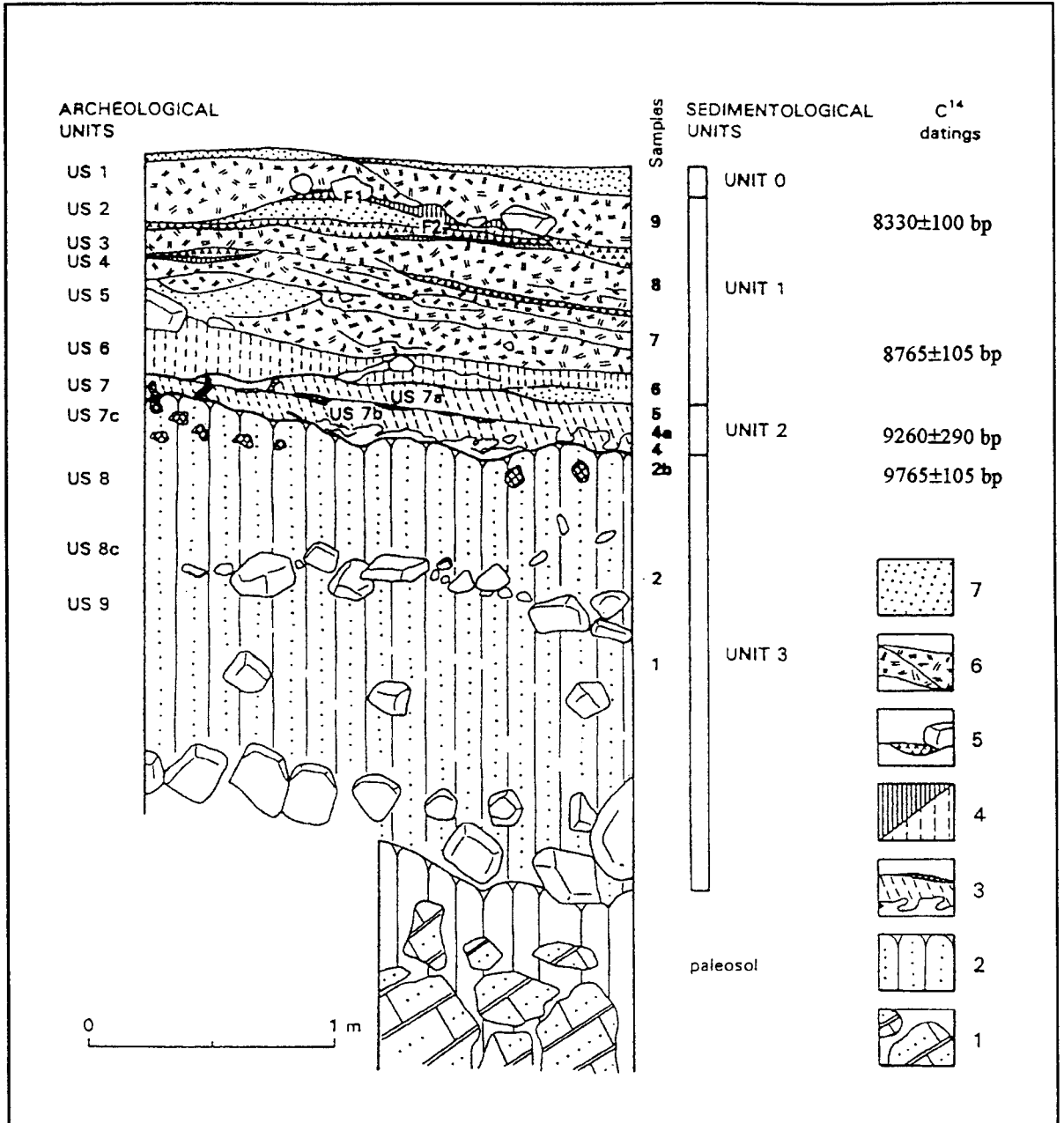
indicator of caprioid presence, as stated by Brochier et al. (1992). To this indicator, we add the recognition of coprolites, on both macroscopic and microscopic levels. Image processing techniques were used, in order to quantify the specific components of these deposits (Table 2). Morphology and dimensions of the cave were interpreted as constraints for the introduction of the animal and specific behaviour. Composition of uncharred vegetable species was also considered in order to detect the specific diet of the "dung-maker" and the recognition of fodder stocking. Ethnographic and ethnoarchaeological indications provided a more adequate framework for these data.

## The data

The "Epipalaeolithic" or "Early Acacus" phase is present in Unit 2. A stone wind-break structure (Figure 3) is the most impressive feature together with a multi-activity tool-kit. This unit is composed of colluvial sediments which are mainly subangular quartz grains (80-90%), and by very little fine organic material. This material is concentrated in thin laminae and includes finely subdivided charcoal. Rounded fragments of coprolites containing very few spherulites also occur. Plant fragments are scanty (<5%) and appear to be much more weathered than in the overlying horizons (Table 2).

The "Late Acacus" occupation occupies Unit 1, composed of a large quantity of poorly degraded organic material, almost completely plant remains (grass, fragments of wood). Alternating lenses of undecomposed plant remains, ash from hearths and lenses of sand with low organic content make up this deposit. The observed lamination indicates that the organic material has been redistributed by trampling and animal activities. Lumps of coprolites are present. This unit is dominated by subrounded quartz grains (60%), undecomposed plant fragments represent about 20%. Preliminary analysis of uncharred plant remains (Castellani and Cottini 1996) indicate that about 75% of stems belong to Caparidaceae and *Calotropis*; around 25% are monocotyledonous Gramineae. Radiocarbon dates point to a substantial overlap between the plant accumulation in the atrial excavation and the dung layer unearthed in the internal excavation. However, their appearance looks quite different in excavation IV where the plant remains are hardened by

Figure 2: Stratigraphic section of the 1993 excavation at Uan Afuda (after Cremaschi and Di Lernia 1995).



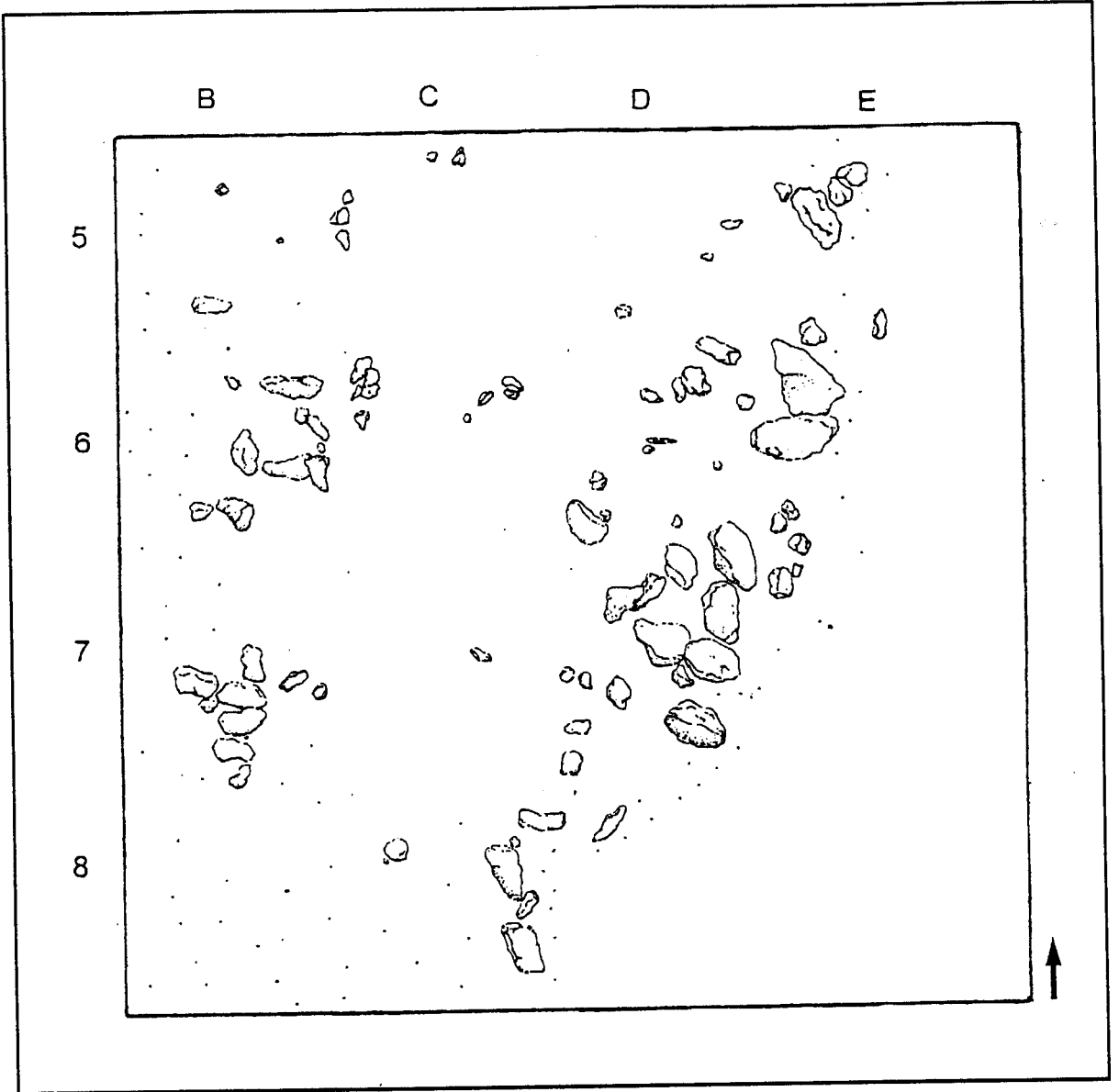
**Table 1:** Radiometric dating from Uan Afuda (BP uncalibrated)

<b>“Mesolithic” or “Late Acacus” phase</b>		<b>“Epipalaeolithic” or “Early Acacus” phase</b>	
<u>Layers</u>	<u>Age (BP uncalibrated)</u>	<u>Layers</u>	<u>Age (BP uncalibrated)</u>
Dung (internal trench)	8000 ± 100	5b (atrial trench, 1994)	9245 ± 270
1 (atrial trench, 1993)	8330 ± 100	7a (atrial trench, 1993)	9260 ± 290
1 (atrial trench, 1994)	8555 ± 110	5t (atrial trench, 1994)	9765 ± 105
5 (atrial trench, 1993)	8765 ± 105		
3mb/4 (atrial trench, 1994)	8790 ± 95		
4S (atrial trench, 1994)	8935 ± 100		

**Table 2:** Uan Afuda sequence micromorphological counting (after Cremaschi et al. 1996).

<u>Stratigraphic Unit</u>	<u>Mineral coarse material</u>	<u>Plant remains</u>	<u>Coprolites</u>	<u>Charcoal</u>	<u>Bone Fragments</u>	<u>Textural pedofeatures</u>
excav. IV (internal) (Late Acacus)	20% quartz	50% undecomp.	10% bioturb.	5%	none	none
Unit 1 (atrial) (Late Acacus)	60% quartz	15%	common	5% fragments	none	none
Unit 2 (atrial) (Early Acacus)	80% quartz	<5% weathered	5% rounded fragments	<5% finely subdivided	none	none
Unit 3 (atrial) (MSA)	90% quartz	none	none	none	none	<5% cappings coatings

**Figure 3:** "Epipalaeolithic" or "Early Acacus" phase: stone wind-break at Uan Afuda, C14 dated to 9765 ± 105 BP.



manure, strongly bioturbated, and much richer in humified organic material. In the internal part of the cave, excavation IV, the stratigraphic sequence is characterised by subangular quartz grains (about 20%), while undecomposed plant fragments are about 60%, together with coprolites and spherulites. Charcoal occurs both in small subdivided and in few large fragments.

## Discussion

The presence of fragments of coprolites and spherulites in the Epipalaeolithic layer indicates the presence of capriovids. Actually, Brochier et al. (1992) stated that the abundance is the leading criterion for identifying forced penning or presence of domestic livestock. Then, the presence of spherulites alone is not sufficient to postulate "animal management" activity, as the spherulites are also produced by wild animals. Moreover, taphonomic features of the coprolites, which are broken and rounded, point out to some post-depositional disturbance process. Since geoarchaeological evidence, formation process and plant remains do not support the possibility of any kind of management of capriovids, occasional visit of Barbary sheep either before the occupation by human groups or during some phases of periodical abandonment of the site should explain the presence of spherulites.

Plant accumulations and dung layers in the "Late Acacus" phase are indicators of animal management. Commonly, the dung was considered an additional element to identify the presence of domestic cattle (*parc-à-boeufs* in Lhote in Gautier and Van Neer 1977-1982); the accumulations of plant remains are typical of the pastoral levels, while as concerns the "pre-pastoral" phases, the only reference is that of Wasilikowa (1993), which points out the presence of bedding at Ti-n-Thora.

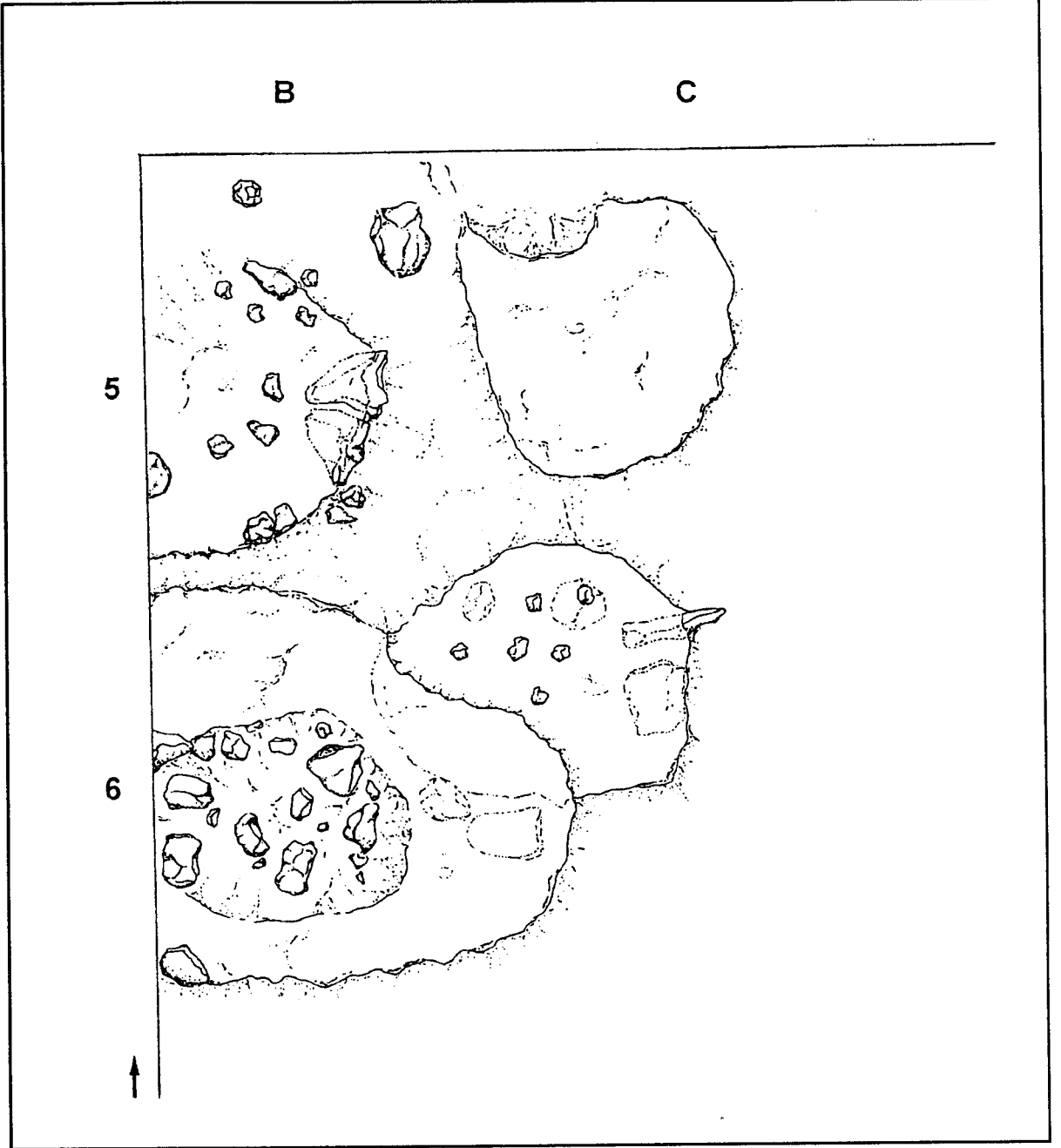
At Uan Afuda, the differences in the formation process and in the state of preservation of organic matter between the atrial and internal areas can be related to a different spatial organisation of the settlement. The atrial area (where the plant accumulations occur) was mainly devoted to the daily activities, such as construction of huts, hearths, tool knapping, cooking and so on (Figure 4). The massive input of vegetables and scarcity of

animal coprolites should be linked to food processing activities (see also the high incidence of grinding stones) and possible specific use of part of the area (fodder stocking?). The presence of animals in the same area may represent calves of small game, as indicated by the common but not intense frequency of coprolites; ethnographic evidence seems to support this interpretation (Kramer 1982). The situation in the excavation IV is characterised by the exclusive presence of dung and vegetables. The occurrence of spherulites in the dung layers of Excavation IV points out the presence of capriovids. Moreover, both morphological and dimensional aspects of the inner part of the cave (Figure 5) do not allow the introduction of big-sized animals, such as cattle or large antelopes. Ruminants can flock together but they do not introduce fodder (Dorst and Dandelot 1970; Couterier in Chang and Koster 1986); the presence of plant remains and charcoal as well as the occurrence of archaeological material emphasise the contemporaneous presence of wild animals and humans in the Uan Afuda cave. The thickness of dung layers points out the forced penning of the animals: in fact, even in stable or pens, dung is generally found in a thin-coated state (Kramer 1982). Finally, the composition of plant accumulation could be cautiously referred to the typical diet of the so-called Intermediate Feeders (*sensu* Wilson 1989), that is leaves of plants, blossoms (around 65%) on one side and tubers, seeds and other reserve organs (35%) on the other. Sheep, impala, Grant's gazelle, eland and springbok match this diet. We can exclude cattle, buffalo and wildebeest as possible foraged animals, as they are bulk and roughage feeders, and their diet is composed of only grass.

## Final Remarks

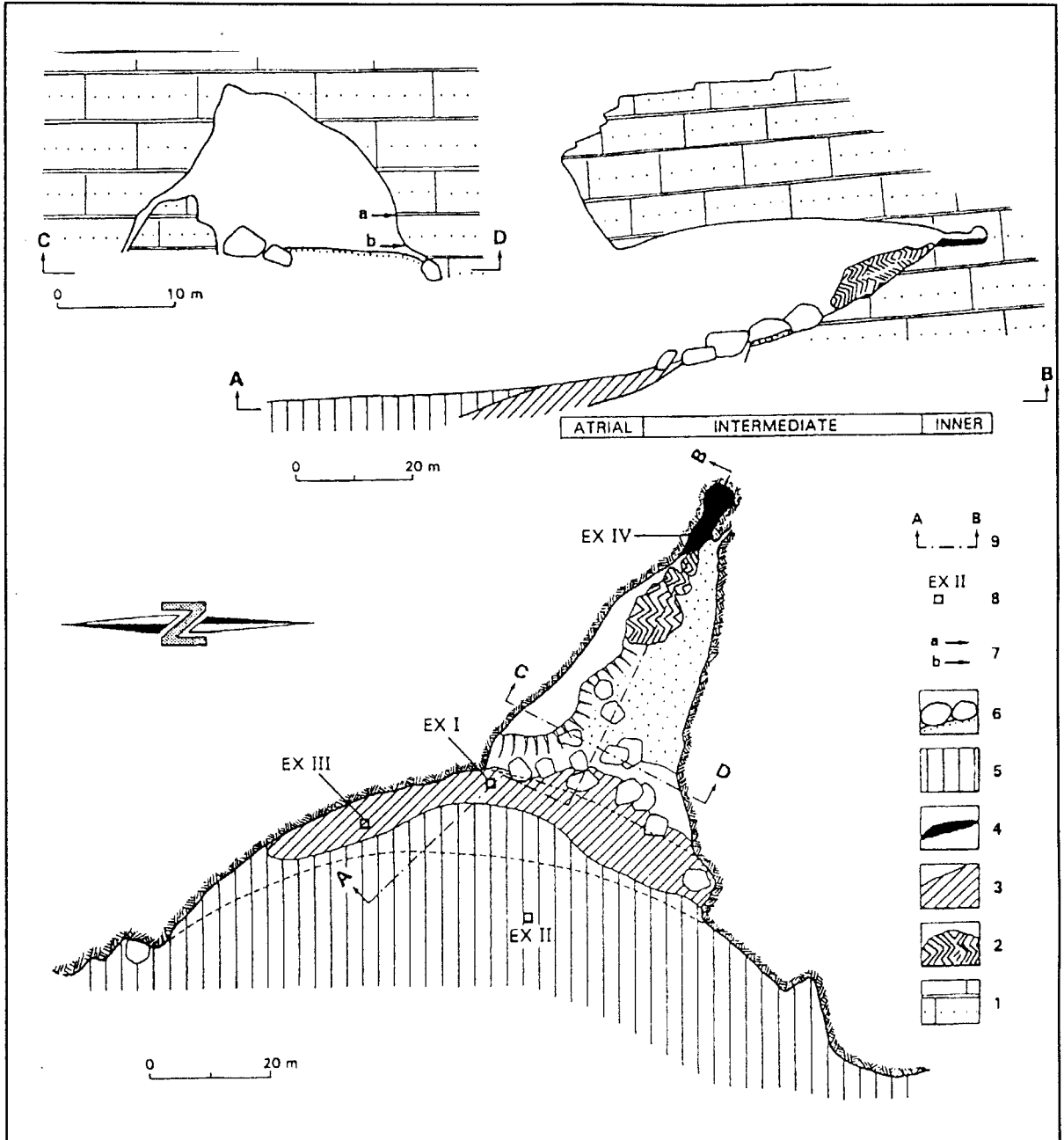
The case-study of Uan Afuda, and other sites in the central Tadrart Acacus, helps to identify the existence of animal management in an early Holocene phase. Morphology of coprolites, presence of spherulites and areas of animal shelters all point to the dwelling of wild ovicaprids. Since probably there are no wild ancestors for domestic sheep and goats in the area and *Ammotragus lervia* is the only referable species present in the archaeozoological record, we suggest the hypothesis of Barbary sheep taming during this phase. Actually, the hypothesis of controlling a potentially

**Figure 4:** 'Mesolithic' or 'Late Acacus' phase: concentration of hearths at Uan Afuda, C14 dated to the first half of the IX millennium BP.





**Figure 5:** Longitudinal profile of the Uan Afuda cave (see the internal part where dung layer occurs: the maximum height is 70 cm).



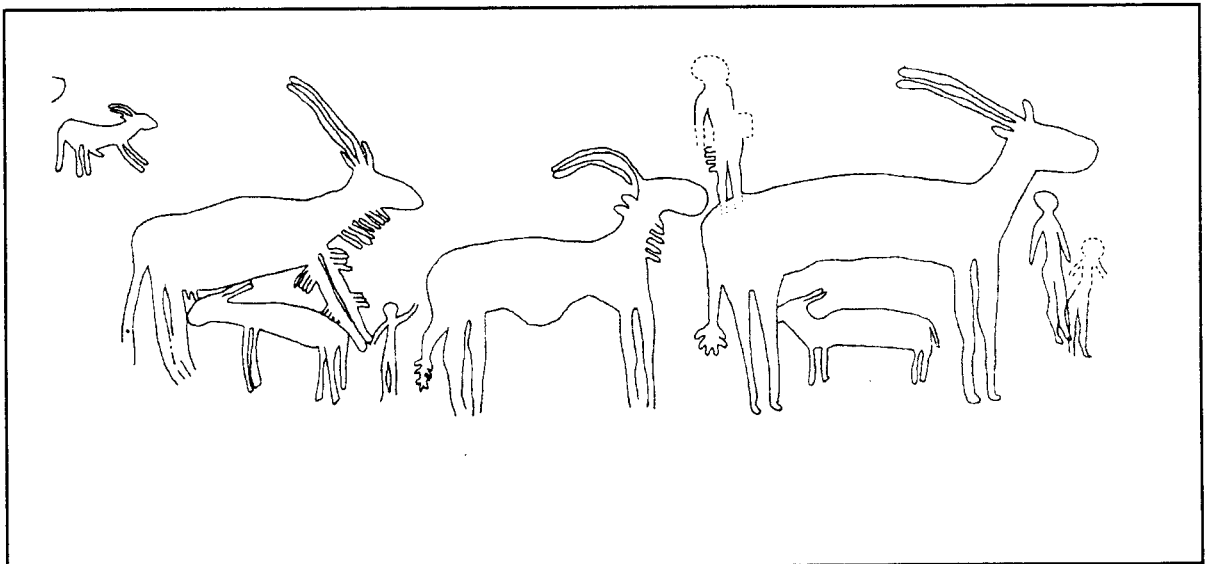
domesticable species like *Ammotragus lervia* is not new (Saxon 1976), even if Barbary sheep was not the genetic base of African domestic ovicaprids (Smith 1992). Management of animals does not mean domestication, also in our view, but rational control of animal resources, which may not produce any morphologically domesticated animals. Such behaviour is not rare in the ethnographic record: we can recall activities of driving and containing animals such as bison, deer and antelope in North America (Chang and Koster 1986); the interaction between reindeer and humans in North Europe (Ingold 1980), and other operations in which wild animals are used by human groups to perform specialised activities like hunting. Finally, we should take into account the presence of rock-art as an extraordinary indicator of these processes (Figure 6). Customary scenes between humans and Barbary sheep are recorded on the southern wall of Uan Afuda cave; careful representations of pregnant specimens and suckling are well represented in the early Round Head paintings at In Taharin; such representations could be related to a strict inter-relation between animals and humans.

The manipulation of animal resources testifies a deep transformation in the economic strategies of the "Late Acacus" groups, as also indicated by the intensive exploitation of wild cereal seeds. The social context of these transformations is discussed elsewhere (Di Lernia 1996); what we would like to recall here, however, is the evidence of increasing cultural complexity of these groups, as settlement dynamics, economic strategies and material culture indicate. This process should be related to pressures within the groups, in concomitance with specific environmental stress.

### Acknowledgements

Excavations at Uan Afuda were directed by S. Di Lernia, who is responsible for archaeological and ethnoarchaeological research. M. Cremaschi is responsible for geological and palaeoclimatological research. This research is carried out in the frame of the Italo-Libyan Joint Mission of the University of Rome "La Sapienza", led by Prof. F. Mori. A warm thank to the Libyan staff, and particularly to the President of the Department of Antiquities of Tripoli, Mr. Ali Khudduri, and to Ebrahim Elazabi. Special thanks to Andrew Smith for a first comment and discussion of the paper.

Figure 6: "Round-Heads" paintings at In-Taharin (central Tadrart Acacus). (after Sansoni 1994).



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