

## EXCAVATIONS OF 2003 AT THE S. TEODORO CAVE (NORTH-EASTERN SICILY, ITALY): PRELIMINARY FAUNISTIC AND STRATIGRAPHIC DATA

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With 2 figures and 2 tables

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### Abstract

Systematic excavations have been carried out at the S. Teodoro Cave since 1998. Two trenches have been excavated on the eastern side of the cave. The "1998 trench", located between 9 and 13 meters from the entrance, covers an area of 25 m<sup>2</sup>. The "2002 trench" was located between 30 and 32 meters from the entrance and covers an area of 9 m<sup>2</sup>.

The 2003 excavations included the 2002 trench, which has been deepened for 1 m and enlarged by adding new squares. Remains of *Cervus elaphus siciliae*, *Bos primigenius siciliae*, *Elephas mnaidriensis*, *Crocota crocuta spelaea*, *Equus hydruntinus*, small mammals, birds, reptiles, invertebrates and plant remains have been recovered. The composition of the faunal assemblage and the lithologic features of the deposit, which is composed of clayey sands and gravels, are similar to those recognized in the 1998 trench. Fragmentation of remains, damages on almost all large mammal bones and abundant hyena coprolites testify an intense hyena activity. Complete and not damaged remains of elephant and deer have also been collected and actually represent a taphonomic novelty. A new sedimentary unit of clayey sands and gravels which does not contain fossil remains has been detected in the southern part of the trench. The age and the environmental significance of this new sedimentary unit are to be clarified.

### Introduction

The San Teodoro Cave opens in Jurassic limestone at an altitude of 150 m a.s.l.; it has huge dimensions (about 60 m long, 20 m wide and up to 20 m high) and a total surface of more than 1.000 m<sup>2</sup>. In previous excavations the authors (Anca, 1860; Vaufray, 1928, 1929; Tricomi, 1938; Maviglia, 1941; Graziosi, 1943, 1947; Graziosi and Maviglia, 1946) distinguished an upper sedimentary unit, Late Glacial in age, containing human feeding remains (mammal bones) associated with late Upper Palaeolithic (Epigravettian) stone artifacts (unit A in Bonfiglio et al., 2001), and a lower sedimentary unit (unit B in Bonfiglio et al., 2001) containing late Pleistocene endemic mammals.

The 1998 excavations were devoted to the reconstruction of the stratigraphy of the cave

deposits and to a better knowledge of the faunal assemblages, especially the older one. The 1998 trench has been located on the eastern side of the cave at a square surface of 25 m<sup>2</sup>, between 9 and 13 meters from the entrance (coordinates 9-13/E-I) (Fig. 1) and it has been deepened for 1.40 m. The investigated unit B is composed of clayey sands and gravels containing a highly diverse assemblage of vertebrates, invertebrates (molluscs) and plant remains. The large mammal assemblage which contains elephant (*Elephas mnaidriensis*), wild ox (*Bos primigenius siciliae*), deer (*Cervus elaphus siciliae*), wild boar (*Sus scrofa*), wolf (*Canis lupus*), hyena (*Crocota crocuta spelaea*), fox (*Vulpes vulpes*), associated with the equid *Equus hydruntinus* and the small mammal taxa *Microtus (Terricola) ex gr. savii*, *Apodemus cf. sylvaticus*, *Erinaceus cf. europaeus* and *Crocidura cf. sicula*, has been attributed to a

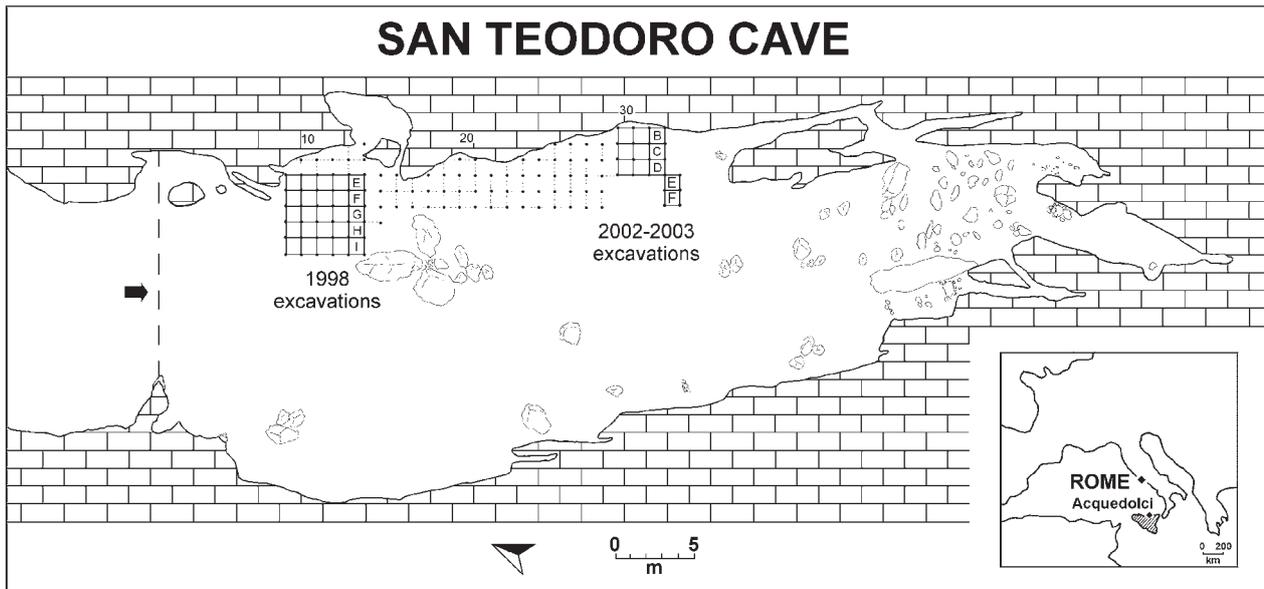


Fig. 1: Plan of the S. Teodoro Cave with the location of the excavation areas of 1998 and 2002-2003. The black arrow indicates the cave entrance.

new faunal complex in the Pleistocene of Sicily, named "S. Teodoro Cave-Pianetti" faunal complex, which contain some endemic taxa surviving from the previous faunal complex ("*Elephas mnaidriensis* F.C.") associated with non-endemic taxa (*Equus hydruntinus*, *Microtus (Terricola) ex gr. savii*, *Erinaceus cf. europaeus*) (Bonfiglio et al., 2001).

The various evidences of cave frequentation by spotted hyena populations are the most prominent taphonomic feature of this deposit. Evidence comes from the occurrence of several *Crocota* skeletal elements (skull, teeth, limb bones), an impressive quantity of coprolites, and from ubiquitous traces of crushing, gnawing, chewing and digestion that have been detected on almost all the large mammal remains (Bonfiglio et al., 1999, 2001). These taphonomic characters have been found so far only in a few cave deposits of the Italian peninsula ("Grotta dei Moscerini", Stiner, 1990-91; "Buca della lena", Pitti and Tozzi, 1971; Stiner, 1990-91; "Grotta Guattari", Piperno and Giacobini, 1990-1991; Stiner, 1990-91; "Tana delle iene", Giaccio and Coppola, 2000) and are actually a novelty for insular environments.

Geochemical and radiometric data are not available for the deposits of the S. Teodoro Cave; the dispersal to Sicily of the ground vole, which has a fossorial habit, and of horses, that prefer open landscapes, might imply that a fully exposed connection (a temporary land bridge related to an eustatic sea-

level lowstand) existed, perhaps more than once during the last glaciation (Bonfiglio et al., 2002).

Pollen spectra from samples of coprolites from unit B show the existence of a vegetation which was mainly dominated by grass with moderate arboreal taxa (*Artemisia*, *Ephedra*) and low percentages of mesophilous pollen taxa (*Quercus*, *Betula*, *Abies*, *Alnus*, *Pistacia*, among others) which depict a glacial landscape (Yll et al., in press).

During the 2002 excavations a new trench has been located on the inner eastern side of the cave at a square surface of 9 m<sup>2</sup>, between 30 and 32 m from the entrance (coordinates 30-32/B-D) (Fig. 1), in order to verify the extension of the evidences of the frequentation by spotted hyenas in the inner part of the cave. The 2002 trench has been deepened for about 40 cm. The sediments of unit B are again composed of clayey sands and gravels and contain several carbonatic concretion levels often incorporating fossil remains. Remains of the same large mammals collected during the 1998 excavations have been found together with small mammals (*Microtus (Terricola) ex gr. savii*, *Crocidura cf. sicula*, *Myotis* sp.), birds, reptiles and hyena coprolites. The taphonomic features are very similar to those detected in the 1998 trench and confirm the extension of the deposit as far as 32 m from the entrance of the cave, as well as the intense and extensive frequentation by hyenas (Mangano and Bonfiglio, 2003).

	2002 trench		1998 trench
	2003 excavations	2002 excavations	1998 excavations
Coprolites	1064	291	4271
Bones	543	132	2228
Unidentifiable bones	437	94	1686
Identifiable bones	106	38	542
<i>Cervus elaphus siciliae</i>	75	24	392
<i>Bos primigenius siciliae</i>	6	1	21
<i>Equus hydruntinus</i>	5	5	41
<i>Elephas mnaidriensis</i>	11	1	26
<i>Crocota crocota spelaea</i>	9	3	38
<i>Sus scrofa</i>		2	14
<i>Vulpes vulpes</i>		1	7
<i>Canis lupus</i>		1	3

Tab. 1: Number of recovered remains during the three excavation surveys at S. Teodoro Cave.

### Excavations of 2003 (G. Mangano)

During the 2003 excavation the "2002 trench" has been deepened for 1 m and enlarged by adding two new squares on the southern side (coordinates 33/E-F) (Fig. 1).

#### Stratigraphic data

Besides unit B containing the fossil remains, in the southern area of the trench (squares 32B/C/D, and part of the squares 31B and 31C) a new unit of clayey sands and gravels lacking fossil remains has been detected. In this unit numerous white-yellowish pisolith-like elements with phosphatic composition, diameters between 1 and 5 cm and lacking crystalline structure, are scattered. A subvertical, quite irregular surface separates the fossiliferous unit B from the sterile deposit and suggests that an erosional phase cut the sterile deposit unit before deposition of unit B. Age and precise environmental significance of this new sedimentary unit are to be clarified by deepening the trench.

#### Faunistic data

A total number of 543 large mammal bones and 1064 coprolites have been recovered (Tab.1). Almost all the skeletal remains are strongly fragmented, not articulated and horizontally and vertically scattered without preferential orientation. A very large number of them (437) is represented by unidentifiable bone splinters. The composition of the skeletal part is characterized by the abundance of isolated teeth and antlers (Tab. 2).

*Cervus elaphus siciliae* Pohlig, 1893. The endemic red deer of Sicily is the most abundant species: 8 shed antlers, 13 antlers, 2 skull fragments, 3 hemimandibles, 18 teeth, 3 scapulae, 8 anterior limb bones, 9 metapodials, 5 podials and 6 phalanges have been recovered. Morphological and biometrical features ascribe them to *Cervus elaphus siciliae* (Gliozzi et al., 1994). Particularly, two almost complete right shed antlers, different in size, have been recovered arranged side by side. They were totally covered by carbonatic concretions. The largest one is 1.20 m long and actually is the largest antler fragment belonging to this species so far recovered (Fig. 2, a). Teeth grooves which cannot be ascribed certainly to hyenas are present on the surface of these antlers.

*Elephas mnaidriensis* A.L. Adams, 1870. The elephant is represented by a small fragment of a mandible, 3 teeth, 2 vertebrae, 1 rib, 1 pelvis, 1 anterior limb bone, 1 posterior limb bone and 1 metapodial. Teeth include one large fragment of incisor and two very worn molar fragments belonging to an adult specimen. A complete and not damaged right tibia, absolutely lacking typical damages produced by hyenas, is also preserved (Fig. 2, b). Morphological features and biometrical data allow to identify these specimens as *Elephas mnaidriensis* (Ambrosetti, 1968; Bonfiglio and Berdar, 1979).

*Bos primigenius siciliae* Pohlig, 1911. The endemic wild ox of Sicily is represented by 2 hemimandibles, 1 femur shaft, 1 tibia, 1 metatarsal bone

	<i>Cervus elaphus siciliae</i>	<i>Bos primigenius siciliae</i>	<i>Equus hydruntinus</i>	<i>Elephas mmaidriensis</i>	<i>Crocota crocuta spelaea</i>
shed antlers	8				
antlers	13				
skull	2				1
mandible	3	2	1	1	4
teeth	18		4	3	3
axis				3	
girdles	3			1	
anterior limb	8			1	
posterior limb		2		1	
metapodials	9	1		1	1
podials	5	1			
phalanges	6				

Tab. 2: Skeletal element distribution of large mammals recovered in the excavations of 2003 at S. Teodoro Cave.

and 1 scaphoid bone. M/1, M/2 and M/3 are preserved on mandibular fragments. M/3 has a slightly inclined hypoconulid. The femur shaft belongs to a juvenile specimen. The proximal end of the left tibia was totally removed by crunching of the hyenas (Fig. 2, c). The dimensions of remains are within the range of the variation of *Bos primigenius siciliae* (Brugal, 1987).

*Equus hydruntinus* Regàlia, 1904. The small equid is represented by 1 right mandible fragment including the tooth row from M/2 to P/2 (Fig. 2, d), 2 upper molars and 2 deciduous premolars. The upper molars have a short protocone and a well marked pli caballin. In the lower cheek teeth the pli caballin is less evident.

*Crocota crocuta spelaea* (Goldfuss, 1832). The spotted hyena is the only carnivore recovered during the 2003 excavations. One small maxillar bone fragment, 4 hemimandibles, 3 isolated teeth (canines) and 1 metapodial small fragment are present. Two right hemimandibles include the tooth row from M/1 to C (Fig. 2, e). Lower premolars are sturdy and oval in section.

The preliminary study of mammal remains indicates the predominance of the non-endemic species *Microtus (Terricola) ex gr. savii*.

The recovered taxa belong to the "S. Teodoro Cave-Pianetti" faunal complex, late Pleistocene in age, just recognized for the first time at the S. Teodoro Cave (Bonfiglio et al., 2001).

Almost all large mammal bones are fragmentary and show typical damages produced by the activity of hyenas, such as strong fragmentation, ragged edges, tooth grooves, tooth pits, digestion traces,

scooping out of cancellous bone (Sutcliffe, 1970; Brain, 1981; Bunn, 1983). Nevertheless, some complete and undamaged bones of elephant (tibia) and deer (antlers) have also been recovered and actually represent a taphonomic novelty.

## Conclusion

Fossil remains collected during the 2003 excavations at the S. Teodoro Cave belong to the same taxa previously recovered.

Most of the remains are fragmentary and unequivocally damaged by hyenas, but some complete and undamaged bones are also present.

The cave is confirmed as a very large hyena den and the spotted hyena is assumed to be the main collecting agent of the skeletal elements of unit B, although some new recognized features could indicate the existence of a different accumulation process of the faunal remains.

A new sterile sedimentary unit has been discovered, but its age and environmental significance are to be clarified.

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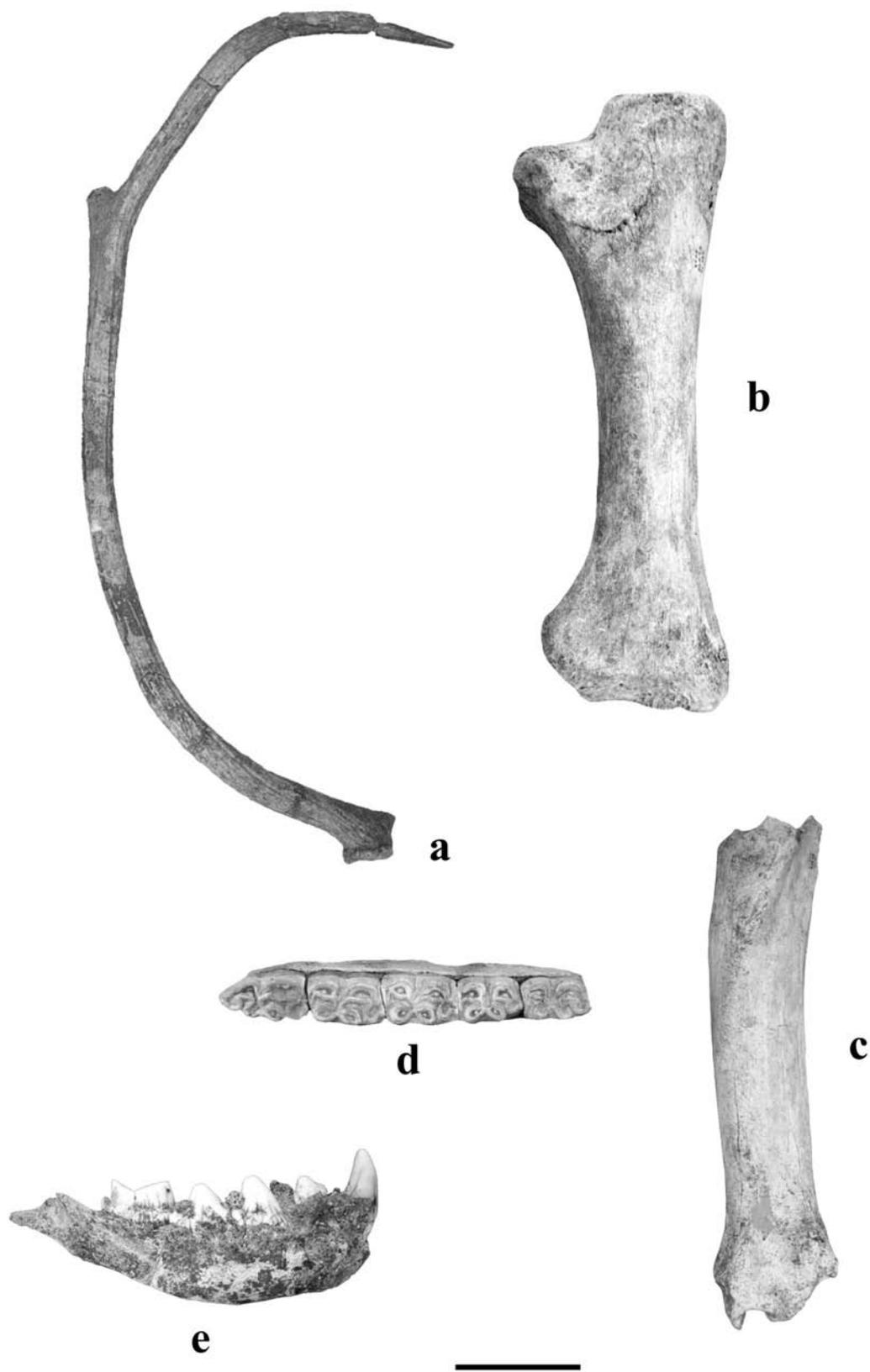


Fig. 2: a) *Cervus elaphus siciliae*, right antler, external view; b) *Elephas mnaidriensis*, right tibia, posterior view; c) *Bos primigenius siciliae*, left tibia, posterior view; d) *Equus hydruntinus*, right mandible, occlusal view; e) *Crocota crocota spelaea*, right mandible, external view. Scale bar = 10 cm (a, b, c); 5 cm (d, e).

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