

# **The *Ursus spelaeus* disappearance archaeologically registered in the Northeast of Catalonia**

Registro arqueolóxico de la desaparición de  
*Ursus spelaeus* en el Noreste de Cataluña

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## **ABSTRACT**

**The extinction of *Ursus spelaeus* remains controversial. In this paper, data from two archaeological sites from NE Iberian Peninsula are presented. Thus, the Middle-Upper Paleolithic term is thoroughly analysed by combining radiocarbon datings, palaeontological remains and archaeological findings.**

**Key words: *Ursus spelaeus*, Palaeolithic, Ermitons cave, Arbreda cave, Archaeology**

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## INTRODUCTION

The fossil register shows a plentiful presence of the *Ursus spelaeus* on the Middle Palaeolithic in Europe, but during the Upper Palaeolithic a progressive decline was registered, which inevitably took the *Ursus spelaeus* to its extinction (ALTUNA, 1971; PRAT 1976; GAMBLE, 1986; GUÉRIN & PATOU-MATHIS, 1996). In order to explain the reasons of extinction of the *Ursus spelaeus* we will provide data concerning the transition between the Middle and Upper Palaeolithic based on two archaeological sites, the Arbreda Cave and the Ermitons Cave (Catalonia), located on the Northeast of the Iberian Peninsula, one of the meridional areas of distribution of this Ursidae.

## THE ARBREDA CAVE

### *Natural surroundings and Site's Excavation*

The Arbreda Cave belongs to the group of the Reclau Caves (Serinyà). These caves are located at a height of 200 and 210 metres, and they open to a cascading travertine backing the west margin of a plain, the Pla d'Usall, formed by limestone of lacustrine origin and constituent of a small but relative abrupt talus.

The territory is easily accessible and offers many natural resources within an hour radius: the great plain of the Pla d'Usall, the Lake of Banyoles and the swamps that surround it, a long stretch of the middle Fluvià river, and the valley of

the Ser river with a variety of reliefs, from subtle to abrupt. The site is also located at about 3 hours from the relevant natural north and south passway along the Prelitoral Catalan Depressions, and near the Fluvià river, which also serves as a natural way into the inland territories, as the massif of Alta Garrotxa, for example.

Digging was undertaken by J.M. Corominas on 1972 and 1973. Since 1975, excavations have been systematic, but with a few interruptions. Nowadays, the excavations are supervised by Professors Narcís Soler and Julià Maroto, from the University of Girona.

The stratigraphic sequence of the site is complete, for its chronology includes from Middle Palaeolithic (approximately 100.000 years) to well into Upper Palaeolithic (about 15.000 years ago).

### *The Levels of Middle Palaeolithic*

The diggings have not yet reached the lower levels of the stratigraphic sequence of the site, which we only know from the 1972-73 sounding (Alfa Sector). The constant presence along the Mousterian register of the *Ursus spelaeus* is evident on the work of ESTÉVEZ (1987) about the fauna materials corresponding to this sounding.

Level I (recent Middle Palaeolithic known from new excavations) is dated with  $^{14}\text{C}$  AMS in  $39,9 \pm 0,6$  ka (average resulting from four datings).

Excluding the rabbit, abundant but only partly hunted, the presence of carnivores dominates (MNI=28). Within them we mostly find *Ursus spelaeus* predominant over the ungulates (MNI=14) (Table 1).

The cave bear is represented by 21 individuals: 16 fetals-newborns-infantils, 2 juvenile, 2 adults (1 male, 1 female) and 1 senile. With this information we infer that the cave was used by bears as an hibernation and breeding site when it was not occupied by the Neanderthals. The abundance of *Ursus spelaeus* (together with other carnivores as the wolf, fox, hyena, lynx and wild cat) seems to indicate a low frequency of human presence during Middle Palaeolithic.

None of the carnivores remains show any anthropic activity, for this reason we think they have a clear paleontologic character. On the other hand, some of the ungulates remains (deer, horse, large bovine) show evident signs of having been consumed and digested by some carnivore. But the percentage of ungulates remains into the cave brought by carnivores is still unknown.

Regarding burned remains 5% of the total remains, we were able to verify that they belong strictly to ungulates.

Cultural material is essentially represented by the lithic industry, typical of the Middle Palaeolithic (Mousterian), mostly cut in quartz and quartzite, found locally and made by the Neanderthals (Maroto et al., 1996).

#### The Levels of Upper Palaeolithic

Level H (initial Upper Palaeolithic known from recent excavation) is dated with  $^{14}\text{C}$  AMS in  $38,3 \pm 0,5$  ka (average resulting from four datings).

Again, rabbits are the most dominant, but this time, this species shows evidence of anthropic activity. Disregarding rabbit, contrary to the period mentioned in the previous section, the presence of

ungulates dominates, even though the amount of individuals found is approximately the same (MNI=15). The number of ungulates double the number of carnivores (MNI=6).

The *Ursus spelaeus* is registered only with 5 deciduous teeth. The presence of wolf, fox, hyena and lynx is found with equally low frequency (table 1).

There is a remarkable increase of anthropic signs documented on the fauna, specially among the ungulates (horse, roe deer, deer and large bovine) as well as among the carnivores. At this level, the anthropic fauna is most significant in relation to the nonanthropic.

The material culture of this period suffers at this level a clear rupture in comparison to the culture which is closer to the Middle Palaeolithic.

At the Level H, the culture material corresponds to early Aurignacian, with a lithic industry manufactured with foreign flint possibly, fruit of the first modern humans in Europe (MAROTO *et al.*, 1996).

On the other levels of the Upper Palaeolithic there is a complete disappearance of the cave bear, and the presence of the rest of the great carnivores (ESTÉVEZ, 1987; GALOBART *et al.*, 1996).

## THE ERMITONS CAVE

### *Natural surroundings and Site's Excavation*

The Ermitons Cave (Sales de Llierca) is located inland of the calcareous massif at the Alta Garrotxa, belonging to the most

ARBREDA CAVE						
	LEVEL I			LEVEL H		
	MIDDLE PALAEOOLITHIC 39,9 ± 0,6 ka			UPPER PALAEOOLITHIC 38,3 ± 0,5 ka		
SPECIES	NISP	% NISP	MNI	NISP	% NISP	MNI
<i>Equus caballus</i>	57	7,8	4	34	18,8	4
<i>Equus hydruntinus</i>	10	1,4	1	3	1,7	1
<i>Equus caballus-hydruntinus</i>	10	1,4	-	12	6,5	-
Bos-Bison	68	9,3	3	18	9,9	4
<i>Rupicapra rupicapra</i>	-	-	-	4	2,2	1
<i>Cervus elaphus</i>	127	17,4	5	60	33,1	4
<i>Capreolus capreolus</i>	4	0,5	1	1	0,5	1
<i>Cervus-capreolus</i>	4	0,5	-	-	-	-
<i>Lepus europaeus</i>	39	5,3	7	8	4,4	1
<i>Elmoxeus europaeus</i>	8	1,1	1	12	6,5	2
<i>Canis lupus</i>	6	0,8	1	2	1,1	1
<i>Vulpes vulpes</i>	6	0,8	1	7	3,9	2
<b><i>Ursus spelaeus</i></b>	377	51,6	21	5	2,8	1
<i>Crocuta spelaea</i>	1	0,1	1	1	0,5	1
<i>Lynx cf. spelaea</i>	7	1,0	1	7	3,9	1
<i>Felis sylvestris</i>	5	0,7	2	-	-	-
<i>Panthera spelaea</i>	2	0,3	1	-	-	-
<i>Mammuthus-Elephas</i>	-	-	-	7	3,9	1
<b>TOTAL</b>	731	100,0	50	181	100,0	25

**Table 1.** Arbreda Cave, levels I and H. Number of Specimens and Minimum Number of Individuals of large and medium mammal fauna species, excluding the rabbit.

oriental sectors of the Prepyrenean. The cave is located at a altitude of 400 metres, 95 above Sant Aniol stream. These situation is different from the Reclau Caves, the surrounding relief is extremely abrupt due to the lithology (mainly of massive limestone) and to its intensely folded and broken structure.

Deep-carved rivers are the only way of penetration into the massif: you can get into the massif from the Fluvià valley by following the Llierca river and after taking Sant Aniol stream upwards.

For these reasons our interpretation of the human presence isn't accidental, but taking into account that you need two hours, from the archeological site, to go out of the massif and that the majority of animals and the raw material come from the surrounding of the cave, we think that it was used as sporadic shelter for seasonly hunting of the wild mountain goats (*Capra pyrenaica*). The Ermitons Cave was excavated by Muñoz & Pericot between 1970-71.

In 1996, J. Maroto began renewed

excavations. Stratigraphic sequences contain material from final Bronze Age and Neolithics in the upper strata. In the lower strata they contain material of the Middle Palaeolithic.

### ***The strata of the Middle Palaeolithic***

A predominance of anthropic remains is the main characteristic of the fauna of this stratum VI. The wild mountain goats is more abundant than the other species (<sup>a</sup> 85% NISP), but *Ursus spelaeus*, which is paleontologic is also present (<sup>a</sup> 8% NISP).

Stratum IV dated absolutely the <sup>14</sup>C result 33.190 ± 660 BP, contain mousterian industry.

In stratum IV we find predominance of the cave bear ( 57%), which nonanthropic, we also find some carnivores (hyena and panthera, for exemple, 4%) and goats ( 38%).

The bear bones findings are well distributed over the animal's entire body. We find offsprings, adults and senile individuals.

With this information we infer that the cave was used by bears as an hibernation and breeding site (MAROTO *et al.*, 1996).

## **DISCUSSION**

The documented register at both archeologic sites –Arbreda Cave and Ermitons Cave– indicates that the arrival of the first modern human from the beginning of the Upper Palaeolithic was very influential over the frequency and distribution of the cave bear in Catalonia, and probably also in other areas nearby. The

Modern humans would adopt a different model of settlement in territory than the Neanderthals. The Modern humans would occupy the caves with continuously, which implies a greater pressure for the large carnivores that inhabit of the caves.

In this way, in the Arbreda Cave, we observe that within a short time (around 1.500 years according to <sup>14</sup>C dating) the cave bear evolves from being the most represented great mammal to practically disappearing from its register. On the other hand, the transition from Middle to Upper Palaeolithic in these sites, does not have a correspondence with a climatic change according to the palinologic (BURJACHS & RENAULT-MISKOVSKY, 1992; BURJACHS, 1993), anthracological (M. Ros), fish-fossil (MUÑOZ & CASADEVALL, 1997), amphibian and reptile (Fèlix), bird (GARCIA, 1995), chiropter and insectivore (Galobart), and rodent studies (ALCALDE, 1987).

At stratum IV at Ermitons Cave, posterior in time to the documented disappearance of the *Ursus spelaeus* in the neighbouring Arbreda Cave, still of Neanderthal culture, cave bears are plentifully present.

We could postulate the hypothesis that cave bears and Neanderthals followed the same steps at the beginning of Upper Palaeolithic. Territorial pressure of Modern human beings would have directed them to more marginal areas, as for example Alta Garrotxa.

In regions next to Aude and the Cantabric we find parallels to the fact that has been explained above and that reinfor-

ces the hypothesis that we had foreseen for Catalonia.

In Aude, the Tournal Cave (Bize-Minervois) presents Middle Palaeolithic levels ( $33.650 \pm 1250$  BP) with Mousterian industry (TAVOSO, 1987). From the study by PATOU-MATHIS (1994) we know that during these moustertian levels the *Ursus spelaeus* is more frequent than the rest of carnivores (70% of these in the richer level) and that it is the second after the horse if we take into account all the fauna.

Above these Aurignacians levels to be found, with a cultural break. In these levels cave bears are absent or at last present with an anecdotal number of remains (2 maximum); the anthropic fauna is mainly represented by horses, large bovines and rein deers.

STRAUSS (1982) studied the intensity of use of Cantabrig caves from the relative presence of carnivores which has been extracted from archeological sites.

If carnivores are well represented this fact is taken as a prove of a less frequent use of this sites by human beings. The author infers that during Middle Palaeolithic there is a tendency as time passes by that goes from what he names

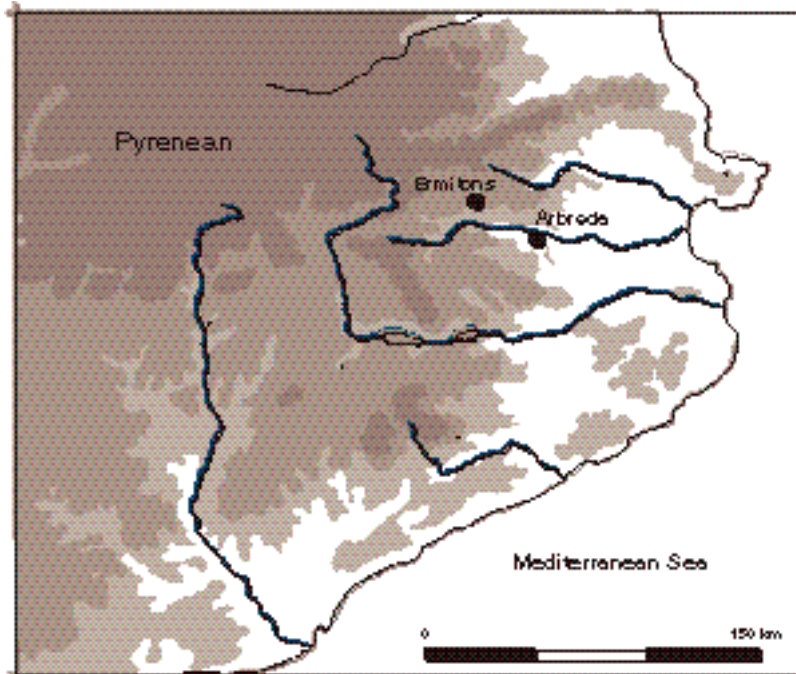
"partial time" caves, which means that they are both used by carnivores and human beings, to the "full time occupation" by human groups during the Upper Palaeolithic.

In the same Cantabrig area we have a concrete example in the Ekain Cave (ALTUNA & MERINO, 1984). While in the X level there has been 1109 remains of *Ursus spelaeus* registered and in the IX level (transition Middle Palaeolithic / Upper Palaeolithic) there has been a total amount of 248, in the posterior levels of Upper Palaeolithic there has been hardly any register (level VIII, 0 remains; level VII, 3 remains; level VI, 7 remains; level V, IV and III, 1 remains and in the level II, note one).

Finally we think that this fact concerning territorial pressure from Modern human towards cave bears taking must be into account, but other factors should not be excluded in the explanation of the great cave ursidae extinction.

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**Figure 1. Geographic situation of Ermitons Cave and Arbreda Cave in the northeast of the Iberian Peninsula.**

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