

A review of small Middle Pleistocene bears from France

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Abstract. Analysis of some Pleistocene bears assigned to *Ursus* (*Plionarctos*) *telonensis* Bonifay (Cimay, Var), *Ursus* (*Plionarctos*) sp. (Balaruc and Aldène, Hérault), *Ursus thibetanus* Cuvier (Ornac 3, Ardèche) and some undescribed material (Montmaurin Karst, Haute-Garonne: Boule, La Terrasse, and La Niche caves, Baume Troucade, Vaucluse) indicates that all should be referred to *U. thibetanus* Cuvier. Comparison of dental features with the Asiatic black bear from the Cèdres cave (Var), Reale cave (Italy) and Bruges clays (Gironde) confirms the existence of two different groups of black bear during the Middle Pleistocene. The first includes the Cèdres and Porto Longone specimens, while the second group includes the bears from Cimay, La Terrasse, Boule and Bruges. Morphometric differences are pointed out, which indicate the polymorphic nature of the species and the geographic isolation of some populations.

Key words: *Ursus thibetanus*, Middle Pleistocene, France, morphotype.

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I. INTRODUCTION

This paper concerns some small Middle Pleistocene Ursidae that have been referred to different genera and/or species: *Plionarctos stehlini* KRETZOI, 1941, *Ursus* (*Plionarctos*) *telonensis* BONIFAY, 1971, *Ursus mediterraneus* F. MAJOR, 1873, *Ursus thibetanus* CUVIER, 1823.

The absence of a review is at the heart of a confusing nomenclature (see CRÉGUT-BONNOURE & GAGNIÈRE 1989; FISTANI & CRÉGUT-BONNOURE 1993; RUSTIONI & MAZZA 1993). KURTÉN (1957, 1968; KURTÉN & POULIANOS 1977), referred all the above mentioned species to *U. thibetanus*, a point of view accepted by some paleontologists (FICCARELLI 1979). Recent discoveries of skulls have confirmed this interpretation (ARGANT 1991; FISTANI & CRÉGUT-BONNOURE 1993).

A first approach allows us to recognize morphotypes representative of two different groups, apparently dating to the end of the Middle Pleistocene (CRÉGUT-BONNOURE in press). The first includes the ursid discovered in the Cèdres cave (Le Plan d'Aups, Var, France) and in the Reale cave (Porto Longone, Elb Island, Italy). It is characterized by an upper P4 with a metacone relatively higher than the paracone and protocone than in the Recent *U. thibetanus*, an upper M1 with a very thick distal lobe, an upper M2 with a powerful parastyle and a short and straight talon. The second is represented by the Bruges bear (Gironde, France) which has an upper P4 with a metacone and protocone proportionally as high as in the Recent species, a distal lobe of the upper

M1 strait in comparison with the preceding group and with the Recent species, and an upper M2 without parastyle and with an elongated and broad talon.

The analysis of other material confirms the presence of the Asiatic black bear in the Middle Pleistocene of France at Cimay quarry (Evenos, Var), Montmaurin caves (Boule, La Terrasse, La Niche, Haute-Garonne), Orgnac 3 (Ardèche), Balaruc VII and Aldène (Hérault), Baume Troucade (Vaucluse). Some of these can be referred to the Bruges bear group.

A c k n o w l e d g m e n t s . I wish to express my sincere thanks to M.-F. BONIFAY for allowing me to study the material from Cimay, Boule and La Terrasse sites in her care and J.-Ph. BRUGAL who permitted me to study the Balaruc VII elements. I also want to thank R. BALLELIO who indicated to me the presence of a small ursid in the Orgnac 3 site and provided me with casts of this material and S. SIMONE and J.-F. BUSSIÈRE for the loan of the Aldene ursid. I am most indebted to L. WERDELIN for having reviewed the English presentation of this paper.

II. DESCRIPTION OF MATERIALS

1. The bear from Cimay quarry (Evenos, France).

The Cimay quarry, near Evenos (Var) has yielded some pieces assigned by BONIFAY (1971) to *Ursus (Plionarctos) telonensis*. The material is composed of a left, incomplete lower jaw without P3 and M3 belonging to an old individual (no° 112) and four other specimens which have remained undescribed because they were discovered after the description of the holotype (M.-F. BONIFAY, personal communication): a left lower M1 (no° 32), a right lower M2 (n° 25), a left lower M3 (n° 85), and a left maxillary with M1 and M2 which seems to correspond to the lower jaw (n° 113). This material belongs to at least three individuals.

Two mandibular foramina are present in the lower jaw: the first below the P2-P4 diastema, the second below the middle of P4 (see BONIFAY 1971: Fig. 48). In norma basalis, the mandible is sinusoidal in its distal part. These features are present in Pleistocene and Recent *U. thibetanus* (FISTANI & CRÉGUT-BONNOURE 1993). In this paper it was noted that, except for the distal mandibular height, the proportions and length of the teeth are the same as in the Pleistocene and Recent black bears (FISTANI & CRÉGUT-BONNOURE 1993). The P3 is absent (BONIFAY 1971: 211), but in my opinion it was present in life, because the bone at its position is thin and porous. This jaw corresponds to an old bear and ERDBRINK (1953 : 142) indicates that in the Recent species the P2 and P3 are sometimes lost because these are (especially in old specimens), more often used for the eating. In consequence, the presence of the P3 does not have any value in defining a subspecies of the *Ursus thibetanus* group. All the lower teeth are worn, but we can observe that the P4 is strait and without accessory cusps. The paraconid, protoconid, entoconid and hypoconid of the M1 are completely worn. Two cuspules are present in front of the metaconid, the anterior being the smaller. An elongated cusp is present at the internal base of the hypoconid, with an oblique notch separating them. Another cusplet exists in front of this accessory cusp, but is less developed. Together, they form an oblique edge in the direction of the metaconid base.

The isolated lower M1, which is partially worn, has a torpedo profile (ERDBRINK 1953) (Fig. 1). In the center of the trigonid the little cuspsule corresponding to the P4 protocone is well preserved. It is less developed than in *U. arctos*, in which the protocone is broader, and identical in form to that of the Recent black bear. The metaconid is composed of two small cusps. Another, still smaller cusp is present between them and the paraconid. The hypoconid is connected to the protoconid by a straight, worn edge. An oblique worn groove is present at the base of the metaconid connecting it to the hypoconid. This morphology is the same as in the Gajtan *U. thibetanus* (Albania; FISTANI & CRÉGUT-BONNOURE 1993) and in the Recent species (ERDBRINK 1953).

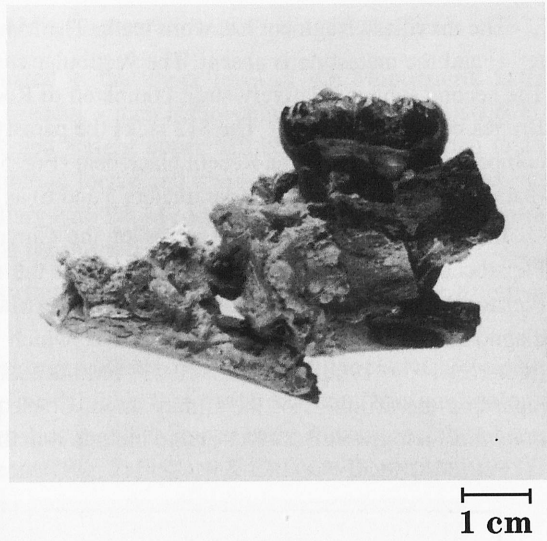
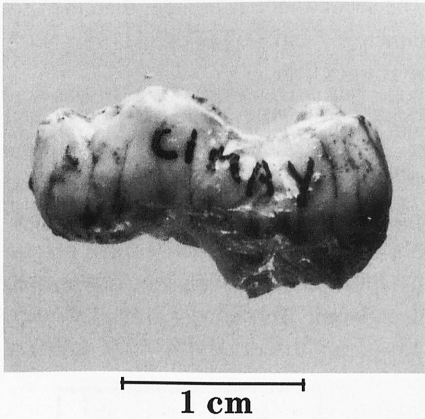


Fig. 1. *Ursus thibetanus telonensis* BONIFAY. Cimay quarry. Left lower M1 (n° 32). Vestibular view.

Fig. 2. *Ursus thibetanus telonensis* BONIFAY. Cimay quarry. Right lower M2 (n° 25). Lingual view.

The isolated lower M2 is slightly worn and its vestibular side is partially broken (Fig. 2). The morphology is the same as that of the lower M2 from Reale cave: conids set internally, profile a broken line, protoconid connected to the metaconid by a rugged transverse V-shaped ridge, central ridge running forward from the base and middle of this V-shaped ridge, diagonal ridge connected to the distal rim of the protoconid (CRÉGUT-BONNOURE in press). The mandibular bone is preserved; its height is approximately 30 mm. In the type lower jaw this distance is 49,6 mm (BONIFAY 1971). In her diagnosis, BONIFAY (1971 : 216) pointed out that in the holotype "L'os mandibulaire est particulièrement robuste". Judging from this new specimen, it seems that this robustness is due to individual variation, sexual dimorphism or ontogenetic development.

The isolated lower M3 is oval in outline (Fig. 3). Minor wrinkles exist but are partially worn away. A transverse ridge runs from the protoconid to the middle of the crown. This morphology is the same as in the Cèdres bear (CRÉGUT-BONNOURE in press; DEFLEUR & CRÉGUT-BONNOURE 1995).

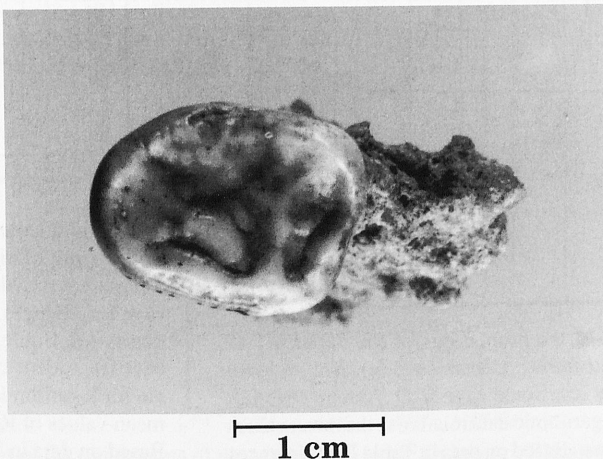


Fig. 3. *Ursus thibetanus telonensis* BONIFAY. Cimay quarry. Left lower M3 (n° 185). Occlusal view.

The maxillary fragment has worn teeth. The M1 parastyle is well developed (Fig. 4, parameter 4) and the metastyle is absent. The vestibular cusps are not expanded and internally situated. The second lobe is relatively strait compared to Recent *U. thibetanus*, as is also the case in the Bruges bear (parameter 6). The M2 lacks the parastyle. The second lobe is broader than the first compared to the case in the Recent black bear (Fig. 5, parameters 7 and 8). The talon is very thick (parameter 9) and elongated (parameters 5 and 6) as in the Bruges bear.

In conclusion, the dental features of the Cimay bear are the same as in the Recent and Pleistocene *U. thibetanus*. The proportions of the upper M1 and M2 show affinities with the Pleistocene Bruges bear. Without a revision of the Mauer and Mosbach lower jaws and an amended diagnosis of *Plionarctos stehlini* KRETZOI, which is apparently a synonym of *U. thibetanus* (KURTÉN 1957, 1968; ERDBRINK 1953; FICCARELLI 1979), it is not possible to be more precise regarding the affinities of the Cimay ursid. Consequently, I propose to retain the trinomen *U. thibetanus telonensis* BONIFAY and to include it in the lineage of the Bruges bear group.

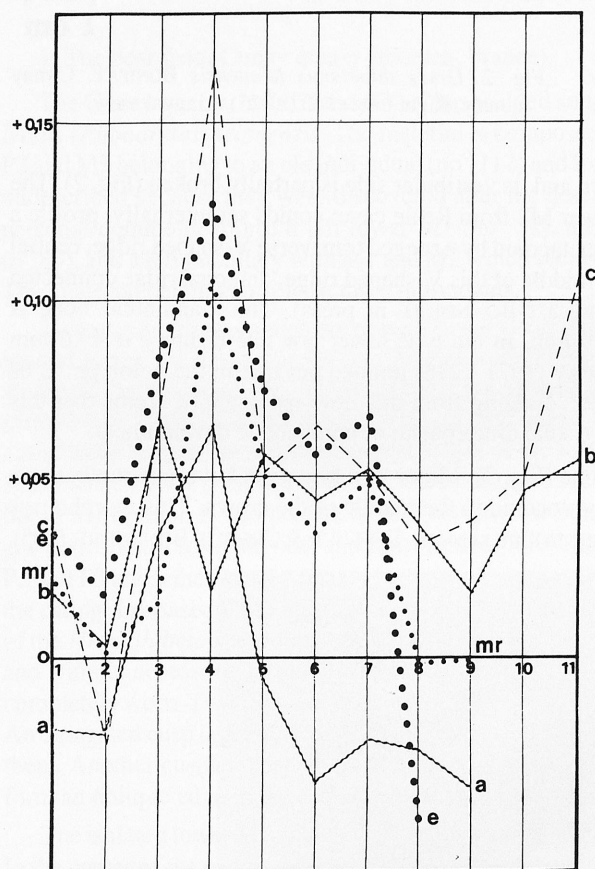


Fig. 4. Ratio diagram of the proportions of the upper M1 in Pleistocene *Ursus thibetanus*: Cèdres cave (c), Bruges loam pit (b), Cimay quarry (e), Boule cave (mr), Aldène cave (a). Differences are for logarithmic data relative to the mean values of Recent *U. thibetanus*. Based on data in Table II. References for measurements in Table II.

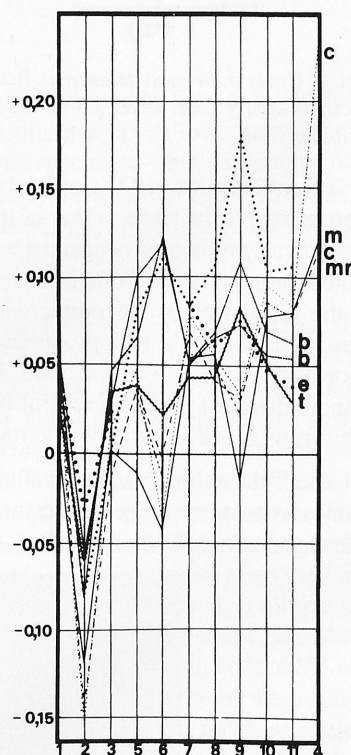


Fig. 5. Ratio diagram of the proportions of the upper M2 in Pleistocene *Ursus thibetanus*: Cèdres cave (c), Reale cave (m), Bruges loam pit (b), Cimay quarry (e), Boule cave (mr), Terrasse cave (t), Aldène cave (a). Differences are for logarithmic data relative to the mean values of Recent *U. thibetanus*. Based on data in Table II. References for measurements in Table II.

2. The bear from the Boule cave (Montmaurin, France)

The Boule, or Montmaurin cave, is situated in the upper level of the Montmaurin karst (Haute-Garonne, France). The bone-bearing breccia, which is Holsteinian in age (TAVOSO et al. 1990), has yielded a fragment of lower jaw and a right upper M2 belonging to a small ursid (SAINT-PERRIER 1922). It has not been possible to locate and revise this material. However, an undescribed right upper canine and left maxillary with P4, M1 and M2 (M sur brèche voûte) from the L. MÉROC excavations belong to this same taxon.

The canine is laterally compressed and has a thin and trenchant edge on its lingual face, a normal feature of *U. thibetanus* (ERDBRINK 1953).

The upper molars are characterized by weakly expanded cusps set internally relative to the base of the crown (Fig. 6). The vestibular cusps are much higher than the lingual one. This morphology corresponds to *U. thibetanus*. The dental proportions are the same as in the Pleistocene black bear, in which M1 is shorter than in the Recent species (Fig. 7; FISTANI & CRÉGUT-BONNOURE 1993).

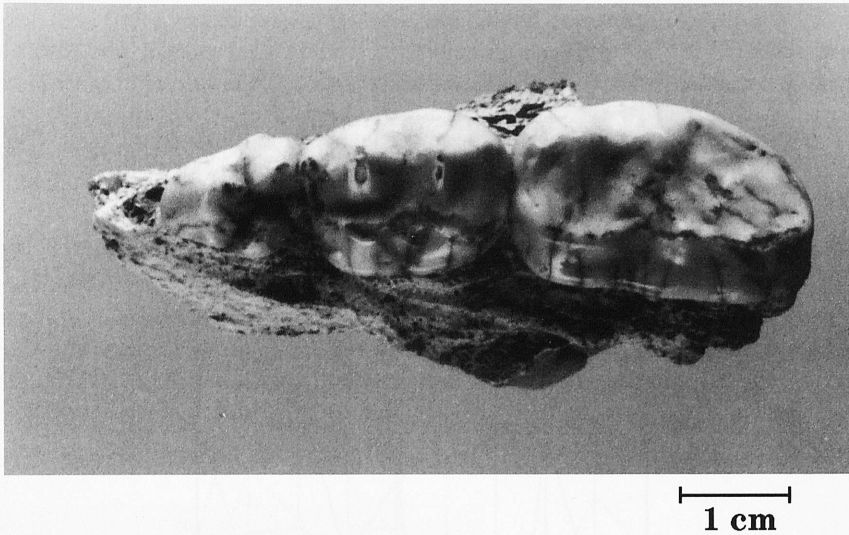


Fig. 6. *Ursus thibetanus* from the Bruges group. Boule cave. Left maxillary (Brèche sur voûte). Occlusal view.

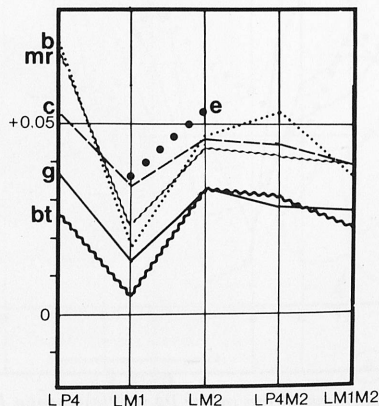


Fig. 7. Ratio diagram of the dimensions of the upper teeth in the Gajtan (g), Blanot (bt), Cèdres (c), Bruges (b), Bouk (mr) and Cimay (e) *Ursus thibetanus* in comparison with the Recent black bear (0). L: length.

The P4 has a paracone which is higher than the metacone. Its mesial rim and edge are straight, as in the Bruges bear. The protocone, smaller and straighter than in *U. arctos*, is situated anterior to the vestibular notch. It is relatively elongated compared with the case in the other small ursids examined (Fig. 8, parameter 4). The paracone is low as in the Cèdres and Reale bears (parameter 7). The M1 has a less developed parastyle than in the Cèdres and Cimay ursid (Fig. 4, parameter 4) and a short metacone (parameter 3). The first lobe is relatively broader than in the Recent species and the second is straighter (parameters 5 and 6). The M2 does not have a parastyle, but has a strong lingual cingulum. The vestibular shape is convex: the width of the crown increases from the first to the second lobe, which is broader than in the Recent species (Fig. 5; parameters 7 and 8). The width of the talon is great compared with the Recent species and the Pleistocene bears examined (parameter 9).

In conclusion, the Boule bear can be assigned to *U. thibetanus*. The upper P4 shows morphological analogies with the Bruges bear and some metrical similarities to the Cèdres and Reale ursids. On the other hand, the two molars are different from these two bears and correspond rather to the Bruges and Cimay ursids. In consequence, I propose to include this material in the Bruges bear group.

3. The bear from the Terrasse cave (Montmaurin, France)

The Terrasse cave is an other cave of the upper level of the Montmaurin karst. The deposit dates to the Holsteinian and the beginning of the Saalian (TAVOSO et al. 1990). A left upper M2 was found in the latter complex by L. MÉROC (T. 5G2 os sup. 5509 – 2 level).

The lingual edge and occlusal surface of the talon are partially worn. The morphology is the same as in the Boule specimen (Fig. 9). The differences concern the proportions of the first and

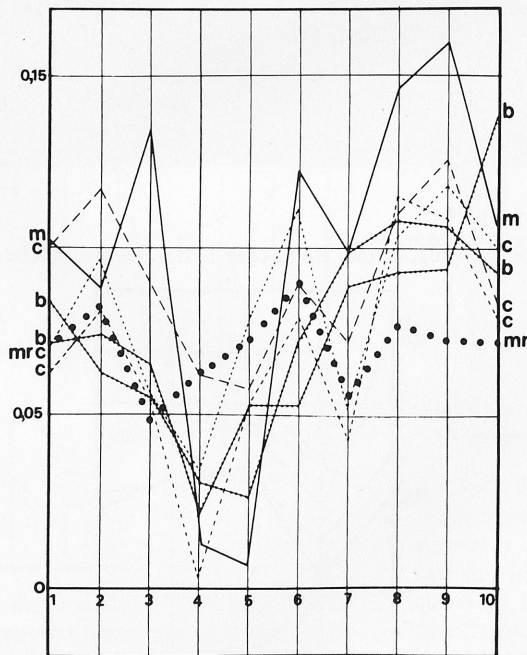


Fig. 8. Ratio diagram of the proportions of the upper P4 in Pleistocene *Ursus thibetanus*: Cèdres cave (c), Reale cave (m), Bruges loam pit (b), Boule cave (mr). Differences are for logarithmic data relative to the mean values of Recent *U. thibetanus*. Based on data in Table II. References for measurements in Table II.

second lobes, which are the same as in the Recent black bear (Fig. 5; parameters 7 and 8), and also the talon, which is shorter than in the Boule specimens (parameters 5 and 6).

According to the morphometric data, the Terrasse tooth belongs to *U. thibetanus*. It seems possible to refer this specimen to the Bruges bear group.

4. The bear from La Niche cave (Montmaurin, France)

La Niche cave is one of two caves of the middle level of the Montmaurin karst. Its sediments date from the end of the Saalian at the base to the beginning of the Upper Pleistocene in the upper strata (TAVOSO et al. 1990). The find consists of two naviculars (T.174 - left, T.185 - right) from a single individual, and comes from the Saalian complex.

The proportions are similar to those of *U. arctos* (left specimen: transverse diameter: 33.8 mm; antero-posterior diameter: 35.3 mm; height: 17.6 mm), but the morphology differs. In distal view the dorsal side is bilobed: the dorso-lateral part is more developed than the dorso-medial part, which articulates with the first cuneiform (Fig. 10a). The bilobation is weak or non-existent in the brown bear. In dorsal view, the bone is laterally thickened at the level of the third cuneiform facet (Fig. 10b), then becomes concave at the level the second cuneiform facet (Fig. 10c) while the internal side is straight at the level of the first cuneiform facet (Fig. 10d). In *U. arctos* there is little variation in width. This morphology is characteristic of the Recent *U. thibetanus*.

In conclusion, the specimens from La Niche cave belong to *U. thibetanus*. Unfortunately, it is not possible to be more precise regarding their position relative to the other black bears examined because of the absence of dental material.

5. The small bear from Orgnac 3 (Ardèche, France)

The sediments of the Orgnac 3 lapiaz (Orgnac-l'Aven, Ardèche) date to the Middle Pleistocene (Elsterian to Saalian) and Upper Pleistocene (Eemian or Weichselian) (COMBIER 1976; DEBARD 1988). A right lower M3 (C8-7 12834) from stratum 7, dated at 339 000 BP, was referred by AOURAGHE (1992) to *U. thibetanus*. Judging from the figure (AOURAGHE 1992: Fig. 82c) and a cast, the morphology and dimensions are the same as in the Cèdres and Cimay *U. thibetanus*.

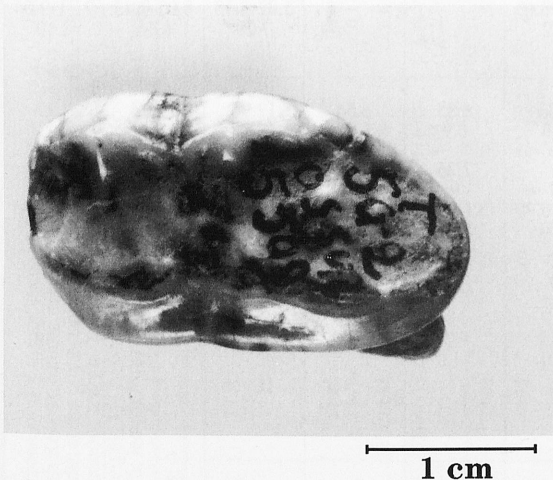


Fig. 9. *Ursus thibetanus* from the Bruges group. Terrasse cave. Left upper M2 (T 5 G2 5509). Occlusal view.

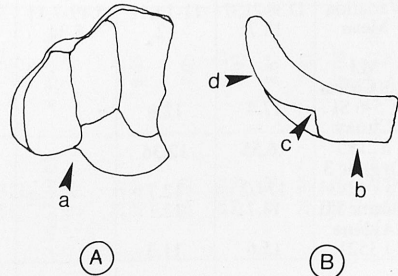


Fig. 10. *Ursus thibetanus*, left navicular. A: distal view, B: dorsal view.

Apparently, the morphology of this tooth does not vary temporally in the Tibetan bear lineage. In consequence, such material does not have any value in defining morphotypes and the position of the Orgnac 3 *U. thibetanus* relative to the other Pleistocene black bears is unknown.

6. The small bear from Balaruc VII (Sète, France)

The Balaruc VII fissure (Sète, Hérault) has yielded an Holsteinian fauna. A lower M3 was described by BRUGAL (1981) under the name of *Ursus (Plionarctos)* sp. Judging from the figures (BRUGAL 1981: Fig. 5-13) and a revision, the morphology is identical with the Cèdres, Cimay and Orgnac 3 teeth. The only point of difference concerns the dimensions, because this molar is very small (Table I). Without further information, this specimen is suggested to belong to an *U. thibetanus* female.

Table I

Dimensions of the lower teeth in Pleistocene *Ursus thibetanus* from Cèdres cave, Reale cave, Cimay quarry, Balaruc VII fissure, Aldène cave, and Orgnac 3 lapiaz together with Recent Asiatic black bear (in mm). For P4: 1: total length, 2: total width, 3: protoconid height, 4: distance from the protoconid cusp to the distal point. For M1 and M2: 1: total length, 2: trigonid length, 3: protoconid height, 4: hypoconid height, 5: metaconid height, 6: entoconid height, 7: trigonid width, 8: talonid width, 9: minimum width. For M3: 1: total length, 2: total width

Lower tooth	1	2	3	4	5	6	7	8	9
P4									
Les Cèdres									
C3-4-5 SI	10.61	5.91	6.2	7					
Cimay									
n° 112	9.39	5.82	8	8					
Recent - n									
Variation	8.88-10.96	5.24-6.16	5.22-6.54	5.12-9.43					
Mean	9.82	5.85	5.78	7.16					
M1									
Cimay									
n° 32	21.19	13.04	8.9	7.89			8.56	10.54	8.55
Recent - n									
Variation	18.32-21.15	12.43-15.62	6.68-8.52	6.77-8.63			5.82-8.13	8.05-9.43	7.71-9.04
Mean	19.64	13.76	7.57	7.2			7.29	8.66	8.19
M2									
Reale									
IGF 4808V	20.62	14	7.29	7.33	6.85	6.64	12.96	12.24	7.32
IGF 4807V	21.45	14.61	7.41	7.3	6.9	5.81	12.28	11.81	11.62
Cimay									
n° 25	20.88	7	8	8	7.26	6.61	9	9	8
Recent - n									
Variation	17.38-21.37	11-14.12	5.49-7.11	4.33-6.99	5.1-6.57	4.28-5.62	10.26-11.91	10.11-11.66	9.89-11.43
Mean	18.7	12	6.34	5.61	5.94	5.11	10.92	10.93	10.75
M3									
Les Cèdres									
C5-6 SI	17.4	12.8							
Cimay									
n° 185	16.55	12.36							
Orgnac 3									
C8-7 12834	17.02	12.7							
Balaruc VII									
I 3521	14.7	12.1							
Aldène									
I 3521	15.6	11.3							
Recent - n									
Variation	12.71-17.06	9.96-12.19							
Mean	14.52	11.11							

Table II

Dimensions of the upper teeth in Pleistocene *Ursus thibetanus* from Cèdres cave, Reale cave, Bruges loam pit, Cimay quarry, Boule cave and Terrasse cave together with Recent Asiatic black bear (in mm). For P4: 1: vestibular length, 2: paracone length, 3: metacone length, 4: protocone length, 5: paracone width, 6: width at the protocone, 7: paracone height, 8: metacone height, 9: protocone height, 10: distance from the protocone cusp to the mesial point. For M1: 1: vestibular length, 2: paracone length, 3: metacone length, 4: parastyle length, 5: first lobe width, 6: second lobe width, 7: minimum width, 8: paracone height, 9: metacone height, 10: protocone height, 11: hypocone height. For M2: 1: vestibular length, 2: paracone length, 3: metacone length, 4: parastyle length, 5: length from the metacone top to the distal point, 6: length from the metacone distal base to the distal point, 7: first lobe width, 8: second lobe width, 9: talon width, 10: paracone height, 11: metacone height

Upper teeth	1	2	3	4	5	6	7	8	9	10	11
P4											
Les Cèdres											
CIII 239	14.37	9.65	5.7	6.23	8.41	10.97	8.17	7.04	5.9	9.5	
S1 C6	15.4	10.11	6.15	6.65	7.92	10.47	8.56	7.2	5.99	10.27	
C6	14.11	9.29	5.66	5.8	7.93	10.21	8	7.28	5.78	10.17	
Reale											
IGF 4806V	15.43	9.45	6.8	5.94	7.14	11.25	9.12	7.82	6.49	10.82	
Bruges											
Right	14.38	9.16	5.8	6.05	8.11	9.82	8.9	6.93	5.58	11.64	
Left	14.76	8.9	5.67	6.17	7.46	10.04	9.1	7.17	5.74	10.48	
Boule											
Mbrèche	14.34	9.35	5.58	6.63	8.29	10.45	8.24	6.52	5.32	9.99	
Recent - n	10	10	10	10	10	10	10	10	8	10	
Range	11.41-13.25	6.71-8.47	4.08-5.65	4.48-7.32	6.58-7.46	8.21-9.17	6.61-8.09	5.03-6.21	3.87-5.33	7.69-9.64	
Mean	12.21	7.71	4.99	5.84	7.03	8.51	7.26	5.59	4.49	8.46	
M1											
Les Cèdres											
C6	19.49	6.76	9.3	3.36	14.14	15.52	14.32	8.9	8.75	8.26	8.46
Bruges											
Right	18.75	7.18	9.37	2.4	14.3	14.79	14.27	9	8.42	8.15	7.51
Cimay											
n°113	19.51	7.42	9.55	3.08	14.94	15.25	14.82		7.48		
Boule											
Mbrèche	19.01	7.16	6.77	2.93	14.12	14.46	14.16	8.26	8.1		
Aldène	17.21	6.79	8.49	2.66	12.39	12.33	12.02		7.44		
Recent - n	10	10	10	10	10	10	10	9	9	7	
Range	16.67-19.07	6.35-8.38	5.81-9.82	2.12-2.52	11.61-13.41	12.13-14.33	11.99-13.22	7.54-9.01	7.54-8.69	6.57-7.73	5.97-7.32
Mean	17.99	7.13	7.87	2.30	12.58	13.39	12.70	8.28	8.09	7.35	6.63
M2											
Les Cèdres											
C6	28.51	6.5	9.62	4.95	16.99	10.32	16.36	15.66	11.84	7.65	7.56
C6 SII	28.37	6.65	7.15	3.71	16.59	11.15	15.97	15.18	11.71	7.46	7.56
C6 SII			8.31	16.38	16.38	19.91		15.48		7.48	7.56
Reale											
IGF 4806V	26.02	7.05	7.44	3.75	14.87	10.14	15.42	15.68	10.55	7.34	7.66
Bruges											
Right	28.62	10.21	8.24		17.68	13.4	15.29	16.01	12.9	6.97	7.05
Left	29.29	9.03	7.9		19.18	14.69	15.33	16.14	13.98	7.19	7.2
Cimay											
n°113	28.52	8.63	7.84				16.62	15.86	13	6.87	6.8
Boule											
Mbrèche	28.36	7.81	7.4		18.37	14.44	16.54	17.68	16.54	7.77	7.96
La Terrasse											
TSG2	27.09	8.08	8.04		16.67	11.78	15.08	15.27	13.19	6.9	6.66
Recent - n	10	9	9	1	9	9	9	9	9	9	8
Range	28.09-29.04	7.72-11.05	5.61-9.69	2.85	13.07-17.84	9.93-13.27	10.19-14.8	12.93-14.52	9.06-13.4	5.73-6.81	5.68-6.84
Mean	25.61	9.26	7.4	2.85	15.24	11.18	13.63	13.78	10.91	6.13	6.23

7. The small bear from Aldène (Cesseras, France)

Two teeth from the Aldène cave (Cesseras, Hérault) were assigned to *Ursus* (*Plionarctos*) sp. by BONIFAY & BUSSIÈRE (1989). The morphology of the right lower M3 (I-3521), which is Holsteinian in age (BONIFAY 1989), is the same as that of the Cèdres, Cimay, Orgnac 3 and Balaruc VII *Ursus*. This tooth is very small and comparable in this respect to the Balaruc VII molar (Table I).

The right upper M1 (K-1233), which dates from the Elsterian (BONIFAY 1989), is also small (Table II). We can observe the general features of *U. thibetanus*: cusps weakly expanded and set internally, medial channel large, lingual cones low, constituting a thin and trenchant edge. The general proportions are the same as in the Boule bear (Fig. 3).

These specimens are very small. Two alternatives are possible. The teeth could belong to females: the preservation of female remains only in Balaruc VII and Aldène, and in this last site at different periods, is simply a consequence of chance. However, Balaruc VII and Aldène are in the same geographical area: the ursids of these two caves could belong to a small sized population of the Tibetan group.

8. The small bear from the Troucade cave (Murs, France)

The Troucade cave (or Baume Troucade) is one of the caves of the Bérigoule cliff (Murs, Vaucluse). A bone-bearing breccia has yielded some faunal remains (LUMLEY-WOODYEAR 1969). Their revision permits us to refer the sediments to the Middle Pleistocene because of the presence of a small wolf (*Canis lupus*) and tahr (*Hemitragus* sp.). Some remains belong to a small ursid: three incomplete canines, two fragmentary cubitae (left and right), a right calcaneum, a right incomplete astragalus, three first phalanges, two second phalanges, and one third phalanx.

Of the teeth, only one lower canine could be studied. Two ridges run from the top to the base of the crown: one is mesial, the second is more distal than in *U. thibetanus* (ERDBRINK 1953).

The calcaneum lacks the tuber calcanei. Its morphology is the same as in the Baume Longue *U. thibetanus* (Dions, Gard: CRÉGUT-BONNOURE & GAGNIÈRE 1989): well developed groove under the tuberosity of the calcaneo-cuboid ligament, attachment of the quadratus plantae lower than the upper side of the sustentaculum tali, bone flattened. We can add the important obliqueness of the lateral facet in relation to the astragalus, which has an internal inclination, and the quadrangular shape of the sustentaculum facet.

Because of the lack of features that distinguish *U. arctos* from *U. thibetanus* on the other bones discovered in the site, the determination of the other remains is deferred.

In conclusion, two pieces permit us to recognize *U. thibetanus*. This material is insufficient to determine the position of this form relative to the other Pleistocene black bears.

III. DISCUSSION AND CONCLUSIONS

At the present time, fossil *U. thibetanus* is known from 16 French localities and 23 other European ones (Table III). Through analysis of the upper teeth and the newly described material, it is possible to confirm the presence of two different groups during the Middle Pleistocene (CRÉGUT-BONNOURE in press). Judging from the morphometry of the upper molars, the black bears belonging to the Bruges lineage are present in the Cimay quarry, and the Boule and Terrasse caves. The Cèdres type exists only in this site and in Italy (Reale cave) (CRÉGUT-BONNOURE in press).

The Bruges group is known from the Elsterian to the Saalian, whereas the Cèdres group is at present known only from the end of the Saalian. The absence of this morphotype before the end of the Middle Pleistocene corroborates a hypothesis of geographical isolation of the Cèdres

Table III

Temporo-spatial distribution of the European Pleistocene *Ursus tibetanus*. After ARGANT (1991), FISTANI & CRÈCUT-BONNOURE (1993), CRÈGUT-BONNOURE & GARNIERE (1989), JANOSSY (1986), and RUSTONI & MAZZA (1993)

Countries		France	Italy	Spain	Germany	Austria	Hungary	Former Yugoslavia	Czech Republic	Slovakia	Albania	Greece
Age												
Upper Pleistocene		Blanc 2										
Middle Pleistocene		Les Cèdres	Porto Longone	Villavieja	Ehringsdorf			Crvena Stijena				
		La Niche	Fornace di Comedo	Cau Boiras				(Montenegro)				
		Aachenheim										
Holsteinian		Bruges									Gajtan	
		Orignac 3 (c.7)										
		Grotte Boule										
		La Terrasse										
		Verzé										
		Balaruc VII										
		Aldène (c.I)										
Elsterian		Aldène (c.K)			Bannenthal	Laerberg						Petalona (B)
		Cimay			Mosbach		Varhegy			Gombászög		
		Nauterie			Mauer		Kövesvarad					
Cromerian			Breccia di Soave				Nagyharsányhegy 2 (?)					
Age unknown		Bérigoule										
		Baume Longue										
Lower Pleistocene							Villany	Vrhovlje (Slovenia)				
							Beremend (?)	Sandolija I (Istria)	Koneprusy			
							Csarnota (?)					

population. The same isolation was suggested for the *Hemitragus* from this cave (CRÉGUT-BONNOURE 1989). Such isolation could be due to the position of the Rhône and Durance rivers, which constitute geographical barriers. However, the origin of the Cèdres population is unclear: it is closely related to the Reale population and could have evolved from Italian stock.

The black bear from the Aldène and Balaruc VII localities, which are contemporaneous and from the same area, is characterized by small teeth: are these from females or a small-sized population? In this case, it is not possible to argue for geographic isolation.

It appears clear from these data that the Pleistocene black bear was a polymorphic species. Some dental characters are variable at the individual or population level. Unfortunately, the material is very scarce, even if post-cranial material is taken into account, and some specimens have been lost (*U. schertzi* from Achenheim, Boule cave elements). In consequence, it is difficult to determine the meaning of the differences. At present, two groups are clearly differentiated. Without a similar morphometric study of the Recent species, we can not be sure if these two morphotypes do not correspond to a continuous variation: the greatest care must be taken in the interpretations which only represent the present state of our knowledge of this small ursid. It will be necessary to continue these investigations for a better understanding of the temporo-spatial evolution of the European Pleistocene black bear.

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