

## BOOK REVIEW

**EARLY PLEISTOCENE BEAR REMAINS FROM DEUTSCH-ALTENBURG (LOWER AUSTRIA)**

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2010. Mitteilungen der Kommission für Quartärforschung der Österreichischen Akademie der Wissenschaften, Band 17, Verlag der Österreichischen Akademie der Wissenschaften, Vienna

116 pages, 48 figures, 46 diagrams, 39 tables, 10 plates, hardback, 97.60 €  
ISBN 978-3-7001-6827-0, ISSN 978-3-7001-3753-5



So far the last monograph volume (Volume 17) published by the Publishing house of the Austrian Academy of Science (Verlag der Österreichischen Akademie der Wissenschaften) at the start of 2010 within the "Reports of the Commission for Quaternary Research" (Mitteilungen der Kommission für Quartärforschung) is dealing with an important fossil record of ursid carnivores from the Early Pleistocene karst fillings of the Deutsch-Altenburg site near Hainburg on the Danube in Lower Austria close to the Austrian-Slovak frontier. The three reputable authors (Prof. Gernot Rabeder, Dr. Martina Pacher, and Dr. Gerhard Withalm) yield a fully detailed analysis of over 100 fossil remains of ursids (isolated teeth, an almost complete endocast of a brain, postcranial elements, and an in situ forelimb), collected since 1971 in fossiliferous deposits of three karst cavities (DA 2C1, DA 4B, DA 49), which probably belong to one cave system. Based on found faunal assemblages, the geological age of DA 2C1 and DA 49 is estimated at about 1.2 to 1.3 Ma, whereas the fossil assemblage of DA 4B is somewhat younger with an estimated age of about 1.0 to 1.1 Ma.

The dimensions of the found ursid teeth are between the teeth dimensions of the Plio-Pleistocene Etruscan bear (*Ursus etruscus*) and the Middle Pleistocene Deningeri bear (*U. deningeri*). The metapodials are substantially longer and more slender than in *U. deningeri*. Based on other features (such as external shape of the brain, the expansion of the frontal sinus cavities, or the shape of mandibles), the authors included the ursid findings under study among primitive representatives from the *arctos* group within the redefined taxon *Ursus suessenbornensis* (or *U. arctos suessenbornensis* resp.), in which they also included *U. dolinensis* from Atapuerca in Spain and *U. rodei* from Untermaßfeld in Germany. Thus, the ursid fossils from Deutsch-Altenburg represent so far the earliest record of brown bears, indicating a split of the ursid evolutionary line into the arctoid and the speleoid branches around 1.3 Ma ago.

The monograph consists of four main chapters ("Description and Comparison of Cranial Elements", "Description and Comparison of the Postcranial Bones", "Systematic Position", and "Phylogeny"). The introduction with data on the site location, the research history, the fossil material under study, the methods, and the biostratigraphy is followed by two chapters, in which the ursid remains (1 I1, 1 I2, 1 I3, 2 i1, 1 C, 2 P4, 4 M1, 2 M2, 2 m1, 4 cranial fragments, 3 cranial casts, 3 mandibles, an almost complete ossa brachii in situ, a fragment of radius, 2 carpal bones, 2 Mcl, 2 McII, 1 McIV, 1 McV, a fragment of femur, 1 patella, 2 heel bones, 2 ankle bones, 2 tarsal bones, 4 MtII, 1 MtIII, 3 MtIV, 2 MtV, 2 metapodial bones, 2 sesamoid bones, and 36 phalanges) are described in full details from the morphological and the metrical point of view. They are also compared with findings of other ursid taxa from the European Pleistocene (*U. etruscus*, *U. cf. etruscus*, *U. suessenbornensis*, *U. dolinensis*, *U. rodei*, *U. cf. savini*, *U. deningeri*, *U. "deningeroides"*, *U. eremus*, *U. ladinicus*, *U. ingressus*, *U. priscus* and/or *U. taubachensis*) as well as with recent subspecies of brown bear (*U. arctos* ssp.).

Based on the morphometric analysis as well as the comparison with above mentioned ursid taxa, the taxonomic uniformity of the fossil record of bears from Deutsch-Altenburg is demonstrated by the authors in the "Systematic position". Within this part of the monograph, the authors also take a close look at some compared records, mainly from the territory of France or England. They, for example, place the findings of bears from Cromer Forest-Bed into relationship with *U. deningeri*, whereas ursid fossils from the site of West-Runton are assumed to be the remains of specimens from the *U. arctos* line. The chapter concludes with the taxonomic redefinition of *U. suessenbornensis* (or *U. arctos suessenbornensis* resp.), which includes apart from the bears from Deutsch-Altenburg, also ursid remains from Early Pleistocene sites of Süßenborn, Untermaßfeld, Atapuerca-Grand Dolina, West-Runton, and probably Ceysaguet, as well as from the Middle Pleistocene site of Grays Thurrock. A Middle Pleistocene fossil record from Hundshheim and Atapuerca-Cueva Mayor probably also belongs to this group-taxon of early arctoid bears. They differ significantly from *U. etruscus* and *U. deningeri* by both the level of dental evolution and the slimming of metapodials, being much closer relatives to brown bears than to primitive forms of cave bears.

The presented taxonomic conclusion is also mirrored in the chapter on the phylogeny of ursid carnivores in the Pleistocene of Europe. The bears from the selected *suessenbornensis* group are assumed by authors to be the oldest representatives of arctoid line, which separated in Europe together with the speleoid line from a common ancestor before, or at the beginning of the Early Pleistocene (in the sense of a new division of the Pleistocene with the base at 2.6 Ma). This assumption is in contradiction to the hypothesis of Mazza and Rustioni from 1994, according to which the brown bears originated in Asia and only came to Europe during the late Middle Pleistocene. It is not excluded, however, that the early brown bears from Europe represent a phylogenetic branch extinct without descendants, evolving in parallel with the main evolutionary line of arctoid bears in Asia.

Generally, the book brings many astonishing data not only on brown bears, their origin and evolution, but also on the phylogeny of ursid carnivores in the Pleistocene of Europe. This topic is today very animated and open for the reason of new knowledge achieved mainly by the study of ancient DNA. The presented results of the Austrian scientists, however, introduce a new look at the problems and it certainly stimulates a fruitful discussion among paleontologists (and as I hope, among neontologists as well). The reviewed monograph will be a standard reference for our knowledge on the Pleistocene fauna of Europe, representing a valuable publication for everybody who is seriously interested in the Quaternary faunal history and evolution.

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