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Orcemys, a new genus of arvicolid rodent from the early Pleistocene of the Guadix–Baza Basin, southern Spain

Orcemys, *un nouveau genre de rongeur arvicolidé du Pléistocène inférieur du bassin de Cadix–Baza, Espagne méridionale*

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ABSTRACT

A new arhizodont arvicoline rodent is described from early Pleistocene deposits of Barranco de los Conejos and Barranco del Paso in the Guadix–Baza Basin of southern Spain. The molars of *Orcemys* appear to represent a paedomorphic origination from a large rhizodont *Mimomys*. A few dental characters of *Orcemys* are superficially similar to those of the lagurines, but the presence of sparse cementum in reentrant folds and a *Mimomys*-kante formed opposite T5 on the first lower molar clearly identify *Orcemys* as an arvicoline. The character mosaic of *Orcemys* is unique among large early Pleistocene voles and the dentition of a potential ancestor probably resembled that of *Mimomys medasensis* with a tendency towards simplification. With *Tibericola vandermeuleni* and *Mimomys oswaldoreigi*, *Orcemys* represents one of the earliest experiments with arhizodonty among European voles. Including *Mimomys medasensis* at Barranco del Paso, this set of arvicolids redefines a previously recognized early Pleistocene MmQ1 biozone in Spain.

Mots clés :
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RÉSUMÉ

Un nouveau rongeur arvicoliné arhizodonte est décrit dans les dépôts du Pléistocène inférieur de Barranco de los Conejos et de Barranco del Paso dans le bassin de Cadix–Baza, en Espagne méridionale. Les molaires d'*Orcemys* semblent représenter une origine pédomorphique à partir d'un grand rhizodonte, *Mimomys*. Quelques caractéristiques dentaires d'*Orcemys* sont superficiellement similaires à ceux des lagurinés, mais la présence de cément épars dans les plis rentrants et un T5 formé à l'opposé de *Mimomys*-kante sur la première molaire inférieure identifient *Orcemys* comme un arvicoliné. La mosaïque de caractères d'*Orcemys* est unique parmi les

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grands campagnols du Pléistocène inférieur, et la dentition d'un potentiel ancêtre ressemble probablement à celle de *Mimomys medasensis*, avec une tendance à la simplification. Avec *Tibericola vandermeuleni* et *Mimomys oswaldoreigi*, *Orcemys* représente les essais les plus précoces d'arhizodontie parmi les campagnols européens. Si l'on inclut *Mimomys medasensis* dans Baqrranco del Paso, cet ensemble d'arvicolidés redéfinit une biozone MnQ1 reconnue antérieurement au Pléistocène inférieur en Espagne.

1. Introduction

Although the first arhizodont arvicolid rodents are known from the Pliocene (the Lemminae and Pliophenacomyinae [Zakrzewski, 1984], [Fejfar and Repenning, 1998]), during the early Pleistocene about 2.0 Ma (million years ago) arvicoline rodents with rooted molars began experimenting with arhizodonty. This group included voles of the nascent tribes Arvicolini and Lagurini originating from a vast radiation of mimomyine voles, predominantly in the Old World, and the Dicrostonychini, probably originating in the New World.

Among the earliest well-dated representatives of this radiation is *Microtus* (*Allophaiomys*) from the Short Haul locality of Kansas, USA, currently morphologically inseparable from *M. pliocaenicus* from the Betfia 2 locality of Romania (Hir, 1998; Kormos, 1933; Martin, 2008). Short Haul is bounded below by the Huckleberry Ridge ash dated at 2.11 Ma and above by the base of the Olduvai subchron (Martin et al., 2008). The importance of the Short Haul record is that it documents an ancient age for the origination of *Microtus* and also suggests that early Pleistocene European *Microtus* are the result of a later dispersal, probably originating in Asia. Other arhizodont arvicoline genera appearing during the early Pleistocene include the Old World *Arvicola, Chionomys, Tibericola, Stenocranius* and *Victoriamys* (Agustí et al., 2013; Cuenca-Bescós et al., 2016; Martin, 2012). Early Pleistocene arhizodont voles also originating as end members of endemic mimomyine stems in East Asia include *Huanonomys* and *Heteromimomys* (Zhang et al., 2010; Zheng, 1992). Another evident descendant of the Old World mimomyine radiation that reached North America (Tesakov and Kolfschoten, 2011) is a relative of the North American sagebrush vole, *Lemmsicus curtatus*, recovered from early Pleistocene deposits (probably between 0.78–1.0 Ma) in Porcupine Cave, Wyoming (Bell and Barnosky, 2000). According to Koenigswald and Tesakov (1997), rootless lagurines, represented by the transition from rhizodont *Borsodia* to arhizodont *Prolagurus* (=*Lagurodon*), occurred in eastern Europe at a point subsequent to the arrival of *Allophaiomys* close to the Olduvai subchron (perhaps between 1.90–1.75 Ma). Another lineage of lagurines, *Kalymnomys*, endemic to the Aegean-Anatolian region of southeastern Europe and western Asia, developed arhizodont molars prior to the dispersal of *Allophaiomys*, possibly between 2.1–1.9 Ma (van den Hoek Ostende et al., 2015).

One of the regions in Eurasia with a very dense Late Cenozoic fossil record is the Iberian Peninsula. This region documents the evolution of rhizodont mimomyine vole assemblages of the Villanyian into arhizodont arvicoline voles of the Biharian with several lineages representing a combination of autochthonous evolution and dispersal from the Eurasian mainland. In 2005, J. Gibert (Institut. Paleontologia Crusafont) provided R. Martin with arvicolid fossils recovered from Barranco (B.) del Paso in the Guadix–Baza Basin. Among the material were a number of molars from a large, arhizodont species with a high dentine tract at the position of the *Mimomys*-kante (ridge) (Fig. 1). Thinking that the taxon might be a large Iberian relative of *Borsodia* (Tesakov, 1993), Martin sent illustrations to A. Tesakov, at which point Tesakov suggested the taxon was an arvicoline and likely new. Unknown to Martin and Tesakov, J. Agustí (IPHES) had found a few molars of the same taxon at B. de los Conejos. Agustí et al. (2013) published an illustration of a first lower molar (m1) of the new taxon from B. de los Conejos and tentatively concluded it represented rootless *Mimomys medasensis*. At a recent workshop on arvicolid rodents held in Berlin, Germany as

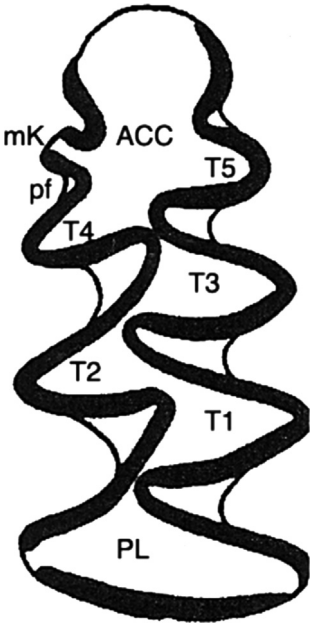

Fig. 1. Generalized *Mimomys* left m1 with a high mimosinuid on the *Mimomys*-kante (mK) breaking through the occlusal surface. Pf: prism fold; PL: posterior loop; T: triangle; ACC: anteroconid complex.
Fig. 1. M1 gauche de *Mimomys* avec une mimosinuide élevée sur la brisure de *Mymomys*-kante au travers de la surface occlusale. Pf : pli de prisme ; PL : boucle postérieure ; T : triangle ; ACC : complexe antéroconide.

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