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A new late Early Oligocene vertebrate fauna from Moissac, South-West France

Une nouvelle faune de vertébrés de la fin de l'Oligocène inférieur à Moissac (Sud-Ouest de la France)

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ABSTRACT

The new vertebrate locality Moissac-IV, in SW France, yields the alligatoroid *Diplocynodon* sp., the turtle *Trionyx* sp., and a diversified mammal fauna. The mammal assemblage includes the rodent *Protechimys* cf. *lebratierensis*, the artiodactyls *Caenomeryx* sp., *Lophiomeryx chalaniati*, *Gelocus* sp., *Metriotherium* aff. *mirabile*, *Entelodon* sp., and *Anthracotherium* sp., the perissodactyls *Protaceratherium albigense* and *Eggysodon gaudryi*, the carnivore *Nimravus intermedius*, and the creodonts *Hyaenodon dubius* and *Hyaenodon?leptorhynchus*. The Moissac-IV fauna, referred to the MP24 reference level, is both totally distinct from those of Moissac-I (MN1, Earliest Miocene) and Moissac-II (MP29, Late Oligocene) and older than Moissac-III (MP26). It provides original data in a stratified context just prior the Early-Late Oligocene transition, i.e. a stratigraphical interval, which for SW France, was essentially documented by karstic fillings of the Phosphorites of Quercy so far.

RÉSUMÉ

La nouvelle localité Moissac-IV, dans le Sud-Ouest de la France, livre l'alligatoroïde *Diplocynodon* sp., la tortue aquatique *Trionyx* sp. et une faune diversifiée de mammifères. L'assemblage mammalien inclut le rongeur *Protechimys* cf. *lebratierensis*, les artiodactyles *Caenomeryx* sp., *Lophiomeryx chalaniati*, *Gelocus* sp., *Metriotherium* aff. *mirabile*, *Entelodon* sp. et *Anthracotherium* sp., les périssodactyles *Protaceratherium albigense* et *Eggysodon gaudryi*, le carnivore *Nimravus intermedius* et les créodontes *Hyaenodon dubius* et *Hyaenodon?leptorhynchus*. La faune de Moissac-IV, attribuée au niveau repère MP24, est à

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la fois totalement distincte de celles de Moissac-I (MN1, Miocène basal) et Moissac-II (MP29, Oligocène supérieur) et plus ancienne que Moissac-III (MP26). Elle fournit, en contexte stratifié, des données originales précédant immédiatement la transition Oligocène inférieur-supérieur, un intervalle stratigraphique jusqu'alors essentiellement documenté, dans le Sud-Ouest de la France, par les remplissages karstiques des Phosphorites du Quercy.

1. Introduction

The middle Garonne Basin, in Southwestern France (Fig. 1), yields hundreds of Cenozoic vertebrate localities often documented by a few – or a single – species (Richard, 1948). Oligocene land mammal assemblages are noticeably well documented in the karsts of the Phosphorites of Quercy area and in fluvio-lacustrine deposits of peripheral basins, Southeast and West to it (Fig. 1; BiochroM'97, 1997; Astruc et al., 2003; Lihoreau et al., 2009; Rémy et al., 1987).

From the vicinity of Moissac (Tarn & Garonne), (Cuvier, 1825) first reported fossil mammals, including the type of "*Rhinoceros minutus*" (i.e., *Protaceratherium minutum*). Later on, (Richard, 1948) considered this old collection was originating from sites located in the lower part of the so-called "*Molasse Stampienne*" (i.e., Late Oligocene in age), notably due to the co-occurrence of the large rhinocerotid "*Aceratherium filholi*" (i.e., *Ronzotherium filholi*) and of the anthracotheriid *Anthracotherium magnum*. Since 1973, three other mammal-bearing sites were described nearby Moissac, and precisely located: Moissac-I (MN1, earliest Miocene–with *P. minutum*; de Bonis, 1973; de Bruijn et al., 1992), Moissac-II (MP29, Late Oligocene; de Bonis, 1973; Schmidt-Kittler et al., 1997), and Moissac-III (MP26, early Late Oligocene; Lihoreau et al., 2009). In 2007, one of us (SR) discovered a new locality 4 km east of the city (i.e. between Moissac and Lafrançaise; Fig. 1), which was therefore named Moissac-IV. This new locality documents another stratigraphical level, still lower in the series than Moissac-III, and referable to the late Early Oligocene.

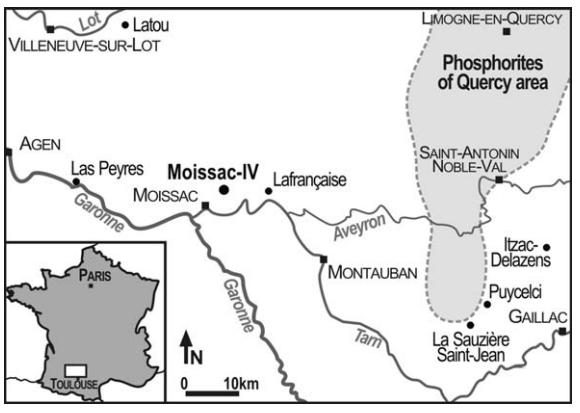

Fig. 1. Location map of Moissac-IV (SW France) and main surrounding vertebrate localities referred to in the text.
Fig. 1. Localisation de Moissac-IV (SW France) et des principaux gisements de vertébrés avoisinants et mentionnés dans le texte.

Moissac-IV consists of a lens of unconsolidated and massive grey fluvial sands, located at the very bottom of the surrounding hills, at 85m above sea-level. This lens, ca. 1 m-thick and 30 m^2-wide, was excavated between 2007 and 2010; it yielded 166 identifiable specimens documenting twelve terrestrial mammal species, as well as aquatic vertebrates (alligatoroid: *Diplocynodon* sp., left dentary with 19 alveoli (287 mm-long), isolated teeth, and dermal plates; turtle: *Trionyx* sp., two neural plates and a fragmentary hypoplastron, with characteristic cupules). Even though some remains are eroded or fairly crushed, most specimens are complete and well-preserved.

The present article aims first to describe this original mammal assemblage, spanning five orders (rodents, cetartiodactyls, perissodactyls, carnivores, and creodonts) and documenting twelve species, second to enhance its biostratigraphical significance.

2. Material and methods

We use I/i, C/c, P/p, M/m, and D/d for upper/lower incisors, canines, premolars, molars, and deciduous molars, respectively. Dimensions are given in mm, except when mentioned.

Abbreviations: ant, anterior; ect, ectometaloph; est, estimated; FAD, first appearance datum; H, height; L, length; LAD, last appearance datum; max, maximum; post, posterior; S, synclinid; Sd, sinusid; W, width.

Institutional abbreviation: MNHN, Muséum National d'Histoire Naturelle, Paris.

3. Systematic palaeontology

Order RODENTIA Bowdich, 1821
Family THERIDOMYIDAE Alston, 1876
Genus ***Protechimys*** Schlosser, 1884
Protechimys cf. *lebratierensis* Vianey-Liaud, 1998
Fig. 2

This taxon is only documented by a damaged right mandibular fragment, bearing p4 (wear surface: L = 2.26; W = 1.66; labial H = 1.13; total crown L = 2.46; W = 2.05; Fig. 2.1) and a broken m1 (total crown L = 2.07; H = 1.10), and a well-preserved isolated right m1 (wear surface: L = 1.74; W = 1.28; labial H = 1.67; total crown L = 2.03; W = 1.84; Fig. 2.2). It has been compared directly to the type material, from Lébratières 14 (MP24, Quercy). The teeth display the primitive features of *Protechimys*. The mure is still separating the synclinid III from the sinusoid. There is a weaker difference in enamel thickness between the mesial and distal flanks of anticlinids than