

3D models related to the publication: A comprehensive evolutionary history of Peradectidae (Mammalia: Metatheria) revealed by a new dental morphology-based phylogenetic framework, with insights from late early Eocene French specimens

Killian Gernelle^{1*}, Sandrine Ladevèze², Rodolphe Tabuce¹

¹Institut des Sciences de l'Évolution de Montpellier (ISEM, UMR 5554), Univ Montpellier, CNRS, IRD, c.c. 064, Place Eugène Bataillon, F-34095 Montpellier Cedex 05, France

²Centre de Recherche en Paléontologie - Paris (CR2P, UMR 7207), Sorbonne Université, Muséum National d'Histoire Naturelle, CNRS, 8 rue Buffon, F-75005, Paris, France

*Corresponding author: killian.gernelle@umontpellier.fr

Abstract

This contribution contains three-dimensional models of the holotypes of *Euoperadectes marivauxi* Gernelle, 2026, and *E. williamsoni* Gernelle, 2026, as well as other fossil material referred to these species from their type locality, Prémontré (Paris Basin; late early Eocene, 50.4–50.3 Ma). These specimens, among the youngest known for *Euoperadectes* Gernelle, 2026, were analyzed and discussed in: Gernelle et al. (2026), A comprehensive evolutionary history of Peradectidae (Mammalia: Metatheria) revealed by a new dental morphology-based phylogenetic framework, with insights from late early Eocene French specimens.

Keywords: Cenozoic, Laurasia, opossum-like, phylogeny, tribosphenic teeth

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INTRODUCTION

Peradectidae is a clade of small metatherians with an unspecialized, superficially “opossum-like” tribosphenic dentition that is currently known only from the Paleogene of North America and Western Europe (Gernelle et al., 2024, 2026). As inferred from phylogenetic evidence, peradectids most likely dispersed only once from North America to Europe, possibly shortly after the Paleocene–Eocene Thermal Maximum, and survived on this continent until the early middle Eocene (Gernelle et al., 2024, 2026). *Euoperadectes* Gernelle, 2026, has recently been erected to accommodate the modest radiation of peradectids in Europe, whose representatives were previously assigned to the North American genus *Peradectes* Matthew and Granger, 1921 (Gernelle et al., 2026). Among the taxa included in this genus, several occurred during the late early Eocene (e.g., Vianey-Liaud et al., 2024; Gernelle et al., 2026). The precisely dated late early Eocene French fossiliferous locality of Prémontré (Paris Basin; 50.4–50.3 Ma; see Steurbaut et al., 2016) yielded a rich mammalian fauna, most of which consists of previously studied eutherians (e.g., Dégremont et al., 1985). Prémontré is the type locality of *Euoperadectes marivauxi* Gernelle, 2026 (Fig. 1A–E) and *E. williamsoni* Gernelle, 2026 (Fig. 1F–M), which are the first peradectids known from this fauna (Gernelle et al., 2026). The two species differ in size and in subtle yet consistent aspects of molar morphology (Gernelle et al., 2026). We present here 3D digital models of six key specimens from Prémontré allocated to these two species (Table 1). Whereas *Euoperadectes marivauxi* is documented by isolated upper and lower molars (e.g., MNHN.F.PMT169, Fig. 1A–C) and by its partial maxilla holotype (MNHN.F.PMT166, Fig. 1D–E), *E.*

Inv nr.	Taxon	Description
MNHN.F.PRE26	<i>Euoperadectes williamsoni</i>	right m3 (holotype)
MNHN.F.PRE643	<i>Euoperadectes williamsoni</i>	left m2
MNHN.F.PRE272	<i>Euoperadectes williamsoni</i>	right m1
MNHN.F.PMT167	<i>Euoperadectes williamsoni</i>	left m4
MNHN.F.PMT169	<i>Euoperadectes marivauxi</i>	left M2
MNHN.F.PMT166	<i>Euoperadectes marivauxi</i>	partial right maxilla with M3–M4 (holotype)

Table 1. List of 3D models of *Euoperadectes marivauxi* and *E. williamsoni* specimens from Prémontré (Paris Basin). Collection: Muséum national d'Histoire naturelle, Paris (MNHN)

williamsoni is known only from isolated lower molars, some of which represent successive loci (m1 to m4; Fig. 1F–M). The six *Euoperadectes* specimens from Prémontré illustrated here present the characteristic combination of morphological features of the genus, as detailed in Gernelle et al. (2026), such as stylar cusp B positioned directly labial to the paracone on M2 (Fig. 1A, C) and an entoconid height less than 30% that of the metaconid on m3 (MNHN.F.PRE26, holotype of *E. williamsoni*; Fig. 1K). These specimens are permanently housed in the fossil collections of the Muséum national d'Histoire naturelle (MNHN).

METHODS

The six *Europeradectes* specimens were scanned by one of us (KG) using a μ CT scanning station EasyTom 150/Rx Solutions (Montpellier Ressources Imaging [MRI], ISEM, Montpellier, France), with a resolution between 5.95 and 8.60 μ m. The 3D surfaces were extracted semi-automatically from an isolated upper molar of *E. marivauxi* (see Fig. 1A-C) and the four isolated lower molars of *E. williamsoni* (see Fig. 1F-M) using the segmentation threshold selection tool of Avizo® 9.3. The upper molars of the holotype of *Europeradectes marivauxi* (MNHN.F.PMT166, Fig. 1D-E), scanned with a resolution of 5.95 μ m, were isolated from the maxilla by segmentation. A pre-segmentation of one slice every 5–10 slices was performed for MNHN.F.PMT166, employing the ‘blow’ selection tool of Avizo® 9.3. The smart interpolation tool of the online platform Biomedisa (Lösel et al., 2020) was used to complete the segmentation of MNHN.F.PMT166. The 3D surface models, visualized with Avizo® 9.3, are provided in .ply format and can therefore be opened with a wide range of freeware (e.g., MorphoDig).

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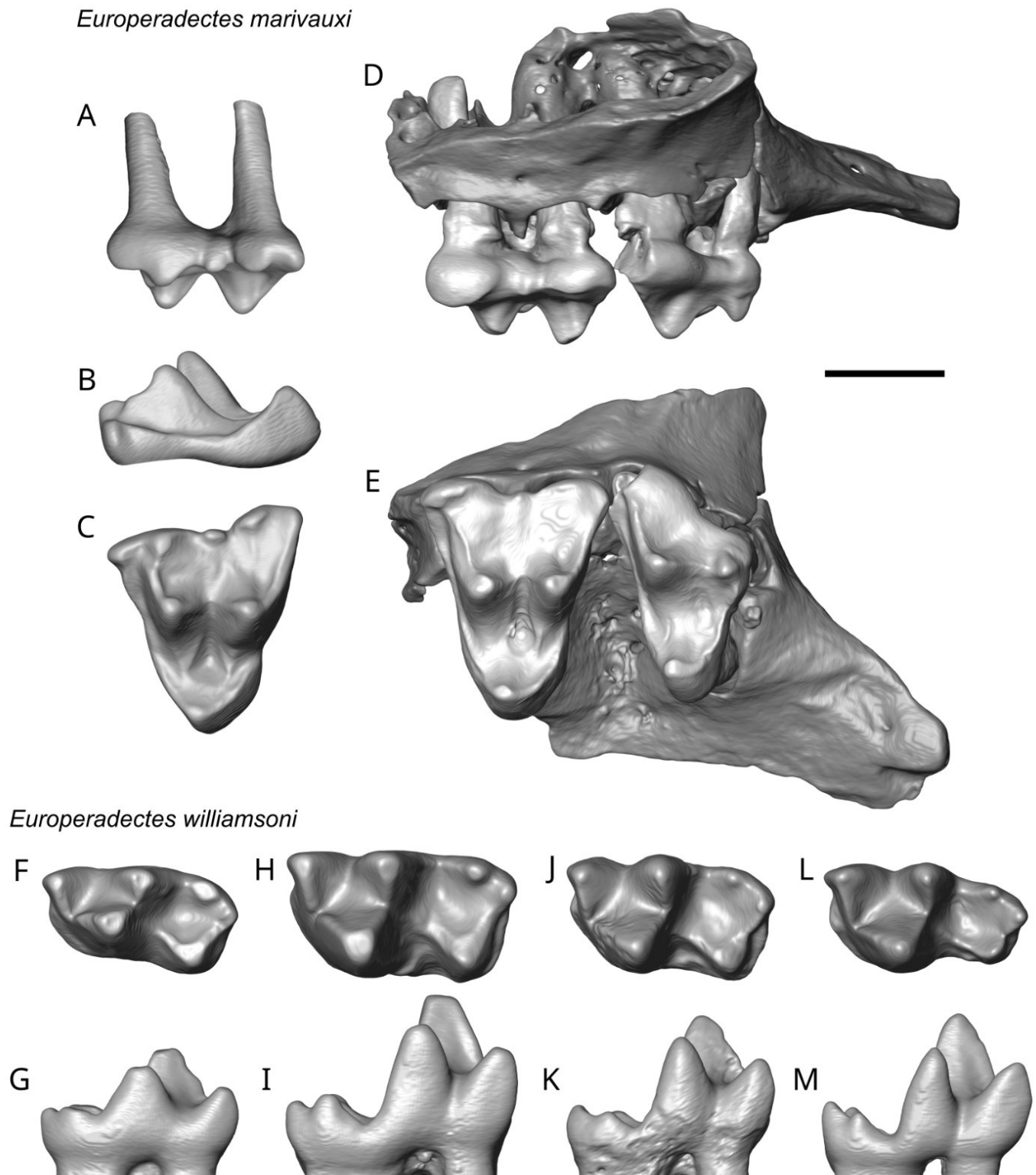


Figure 1. Three-dimensional models of upper molars of *Euoperadectes marivauxi* Gernelle, 2026 (A-E) and lower molars of *E. williamsoni* Gernelle, 2026 (F-M) from Pr montr  (Paris Basin; late early Eocene, 50.4-50.3 Ma). **A-C**, MNHN.F.PMT169, left M2 in labial (A), mesial (B), and occlusal (C) views. **D-E**, MNHN.F.PMT166, holotype of *E. marivauxi*, partial right maxilla with M3-M4 in reversed lateral (labial) (D) and ventral (occlusal) (E) views. **F-G**, MNHN.F.PRE272, right m1 in reversed occlusal (F) and lingual (G) views. **H-I**, MNHN.F.PRE643, left m2 in occlusal (H) and lingual (I) views. **J-K**, MNHN.F.PRE26, holotype of *E. williamsoni*, right m3 in reversed occlusal (J) and lingual (K) views. **L-M**, MNHN.F.PMT167, left m4 in occlusal (L) and lingual (M) views. The scale bar equals 1 mm.