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Dataset

3D models related to the publication: Early Oligocene chinchilloid caviomorphs from Puerto Rico and the initial rodent colonization of the West Indies

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Abstract

This contribution contains the 3D models of the fossil teeth of two chinchilloid caviomorph rodents (*Borikenomys praecursor* and Chinchilloidea gen. et sp. indet.) discovered from lower Oligocene deposits of Puerto Rico, San Sebastian Formation (locality LACM Loc. 8060). These fossils were described and figured in the following publication: Marivaux et al. (2020), Early Oligocene chinchilloid caviomorphs from Puerto Rico and the initial rodent colonization of the West Indies. Proceedings of the Royal Society B. http://dx.doi.org/10.1098/rspb.2019.2806

Keywords: Caribbean islands, Caviomorpha, Paleobiogeography, Paleogene, Rodentia

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INTRODUCTION

We present here the 3D digital models of three dental remains of fossil rodents (Fig. 1; Table 1) that were recently unearthed in shallow marine Oligocene deposits (29.5 Ma; San Sebastian Formation) at locality LACM Loc. 8060, situated on the west bank of Río Guatemala, San Sebastián, Puerto Rico (Vélez-Juarbe et al., 2007, 2014; Ortega-Ariza et al., 2015; Marivaux et al., 2020). Two specimens (a complete lower molar [LACM 162447; Fig. 1A-C] and a half lower molar [LACM 162446; Fig. 1D-F]) have allowed the description of a new small-bodied chinchilloid caviomorph (*Borikenomys praecursor* Marivaux et al., 2020). Although fragmentary, the third dental specimen (LACM 162448; Fig. 1G-I) documents a distinctively larger species, also referred to as a chinchilloid (Marivaux et al., 2020). These Puerto Rican fossil chinchilloids are of undisputable South American origin, and represent the earliest West Indian rodents known thus far. This find has substantial biogeographic implications since it attests to an early dispersal of land mammals from South America to the West Indies, perhaps via the emergence of the Aves Ridge that occurred *ca.* 35–33 Ma (GAARlandia hypothesis; MacPhee & Iturralde-Vinent, 1995, 2005; Iturralde-Vinent & MacPhee, 1999). Considering both this new paleontological evidence and recent molecular divergence estimates (Brace et al., 2015; Courcelle et al., 2019), the natural colonization of the West Indies by rodents likely occurred through multiple and time-staggered dispersal events (chinchilloids, then echimyid octodontoids [spiny rats/hutias], caviids, and lastly oryzomyin muroids [rice rats]) in the last 35 million years. This find has also raised the critical question of a possible link between these Oligocene Puerto Rican chinchilloids and some of the Pleistocene–Holocene West Indian "giant hutias" (*Amblyrhiza* Cope, 1868 and *Elasmodontomys* Anthony, 1916), for which a chinchilloid status is also strongly supported in the framework of that study (Marivaux et al., 2020). Although the pre-Pleistocene evolutionary history of these endemic "giant hutias" remains so far undocumented, lineages of these iconic recently-extinct rodents could have a very great antiquity on the islands, extending back more than 30 million years (as also recently demonstrated for West Indian sloths and coquí frogs; Delsuc et al., 2019; Presslee et al., 2019; Blackburn et al., 2020).

Inv nr.	Taxon	Description
LACM 162447	*Borikenomys praecursor*	Right lower m3.
LACM 162446	*Borikenomys praecursor*	Fragment of lower molar (most of the mesial part).
LACM 162448	Chinchilloidea gen. et sp. indet	Fragment of either an upper tooth (mesial laminae) or a lower tooth (distal laminae).

Table 1. List of 3D models. All specimens belong to the collections of the Natural History Museum of Los Angeles, California, USA.

METHODS

Each specimen was scanned with a resolution of 6 µm using a µ-CT scanning station EasyTom 150 / Rx Solutions (Montpellier Ressources Imagerie, ISE-M, Montpellier, France). AVIZO 7.1 (Visualization Sciences Group) software was used for vi-

sualization, segmentation, and 3D rendering. The isolated teeth and fragment of teeth were prepared within a "labelfield" module of AVIZO, using the segmentation threshold selection tool. The 3D models are provided in ".ply" format, and thus can be opened with a wide range of softwares (e.g., MorphoDig, an open-source 3D freeware (Lebrun, 2018; https://morphomuseum.com/Pages/morphodig).

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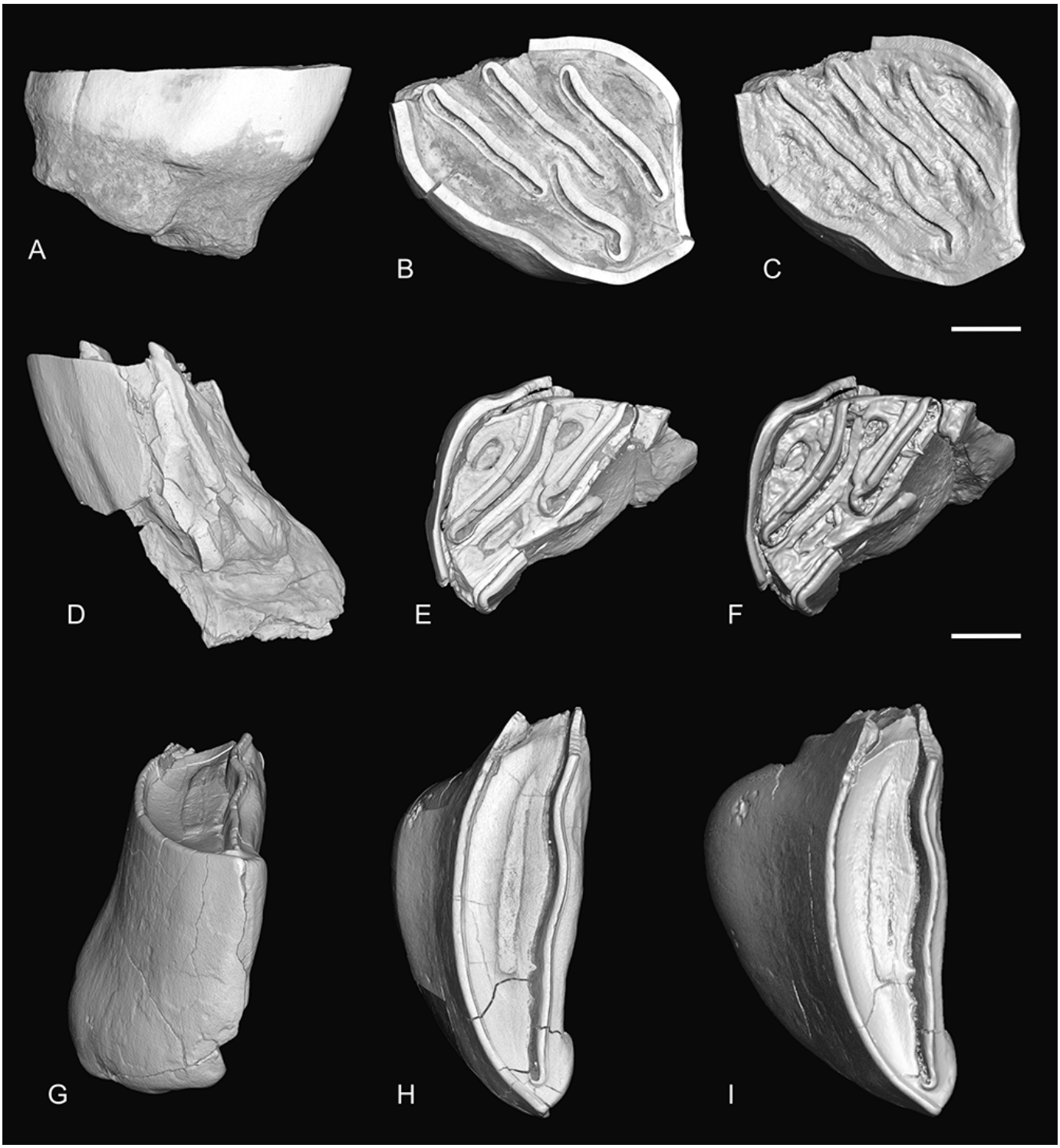

Figure 1. Fossil dental specimens of *Borikenomys praecursor* and Chinchilloidea gen. et sp. indet. from the late Early Oligocene of Puerto Rico (San Sebastian Formation). A-C) LACM 162447, right lower m3 in buccal (A) and occlusal (B-C) views; D-F) LACM 162446, fragment of lower molar (most of the mesial part) in lingual (D) and occlusal (E-F) views; G-I) LACM 162448, fragment of either an upper tooth (mesial laminae) or a lower tooth (distal laminae) in buccal or lingual (G) and occlusal (H-I) views. For each specimen, note the heterogeneous thickness of the enamel layer, which is thicker on the trailing edges than on the leading edges of laminae, a condition found primarily in chinchilloid rodents. Images are renderings of three-dimensional digital models of the fossil specimens, obtained by X-ray micro-computed tomography (µ-CT) surface reconstructions (A-B, D-E, and G-H are volume renderings of µ-CT scan data; C, F, and I are renderings of segmented surfaces). Scale bar = 1 mm.

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