Dataset

3D model related to the publication: An eosimiid primate of South Asian affinities in the Paleogene of Western Amazonia and the origin of New World monkeys

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Abstract

This contribution contains the three-dimensional digital model of one isolated fossil tooth of an anthropoid primate (*Ashaninkacebus simpsoni*), discovered in sedimentary deposits located on the upper *Rio Juruá* in State of Acre, Brazil (Western Amazonia). This fossil was described, figured and discussed in the following publication: Marivaux et al. (2023), An eosimiid primate of South Asian affinities in the Paleogene of Western Amazonia and the origin of New World monkeys. Proceedings of the National Academy of Sciences USA. https://doi.org/10.1073/pnas.2301338120

Keywords: Brazilian Amazonia, early Anthropoidea, Eosimiidae, Paleobiogeography, Platyrrhini

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INTRODUCTION

We present here the three-dimensional (3D) digital model of a single isolated tooth of a fossil primate (Fig. 1; Table 1) that was unearthed in allochthonous detrital Holocene sediments (PRJ-33', transported blocks of microconglomerate) deposited on the left bank of the *Rio Juruá* near Foz do Breu, Brazilian Amazonia (State of Acre, Brazil). The upriver provenance and stratigraphic context of the UFAC-CS 066 primate tooth from PRJ-33' remain so far unknown. However, biochronological inferences deriving from associated rodent teeth indicate a Paleogene age, likely around the Eocene/Oligocene transition (EOT; i.e., *ca.* 34 Ma; see, Kerber et al., 2017; Marivaux et al., 2023). The dental specimen (a pristine right upper M1; Fig. 1) has allowed the description of a new anthropoid primate, *Ashaninkacebus simpsoni* Marivaux et al. (2023), which was a diminutive species (230 g), equivalent in size to some small living marmoset callitrichine platyrrhines (e.g., *Callithrix jacchus*, 236–256 g after Ford, 1994). *Ashaninkacebus* is among the earliest primates to be known in South America. If recent fossil discoveries in Western Amazonia (Peru) revealed that two distinct anthropoid primate clades of African origin (Oligopithecidae-like primate and Parapithecidae; Bond et al., 2015; Seiffert et al., 2020) colonized South America near the Eocene/Oligocene transition, *Ashaninkacebus* demonstrates that a third clade of basal anthropoids was involved in the Paleogene colonization of South America by primates. This discovery provides increasingly puzzling insights into the origin and historical biogeography of New World monkeys, as this new taxon has strong affinities with stem anthropoid primates not of African but of South Asian origin: the Eosimiidae. Whatever the most ancient primates of South America known to date (*Ashaninkacebus*, *Perupithecus*, and *Ucayalipithecus*), they bear little adaptive resemblance to later Oligocene-early Miocene "true" platyrrhines, and the scarcity of paleontological data so far assembled precludes elucidating firmly their affinities with or within Platyrrhini. Measurement of the M1 buccal cutting-edge development of *Ashaninkacebus* (lengths of the buccal shearing crests were measured on the 3D digital model of the UFAC-CS 066 M1, using Avizo 2020.2 measurement tools) revealed a positive and high Shearing Quotient (SQ) value. The high SQ and the very small body size of this primate, indicate a diet with primarily insect and probably fruit consumption, but lacking exudates and leaves (after Kay et al., 2019, fig. 6B). Interestingly, such life-history traits (very small body size and insectivory) might have increased the chances of survival on a natural floating island during the extraordinary transatlantic journey to South America from Africa.

Inv nr.	Taxon	Description
UFAC-CS066	*Ashaninkacebus simpsoni*	Right first upper molar (rM1).

Table 1. List of models. Collection: Paleontology Laboratory, Universidade Federal do Acre, Cruzeiro do Sul, Acre, Brazil

METHODS

The dental specimen documenting *Ashaninkacebus simpsoni* from the PRJ-33' fossil-bearing sediments (Fig. 1) was scanned with a resolution of 5.64 µm, using a high energy µCT-scanning station SkyScan 1173. AVIZO 2020.2 (Visualization Sciences

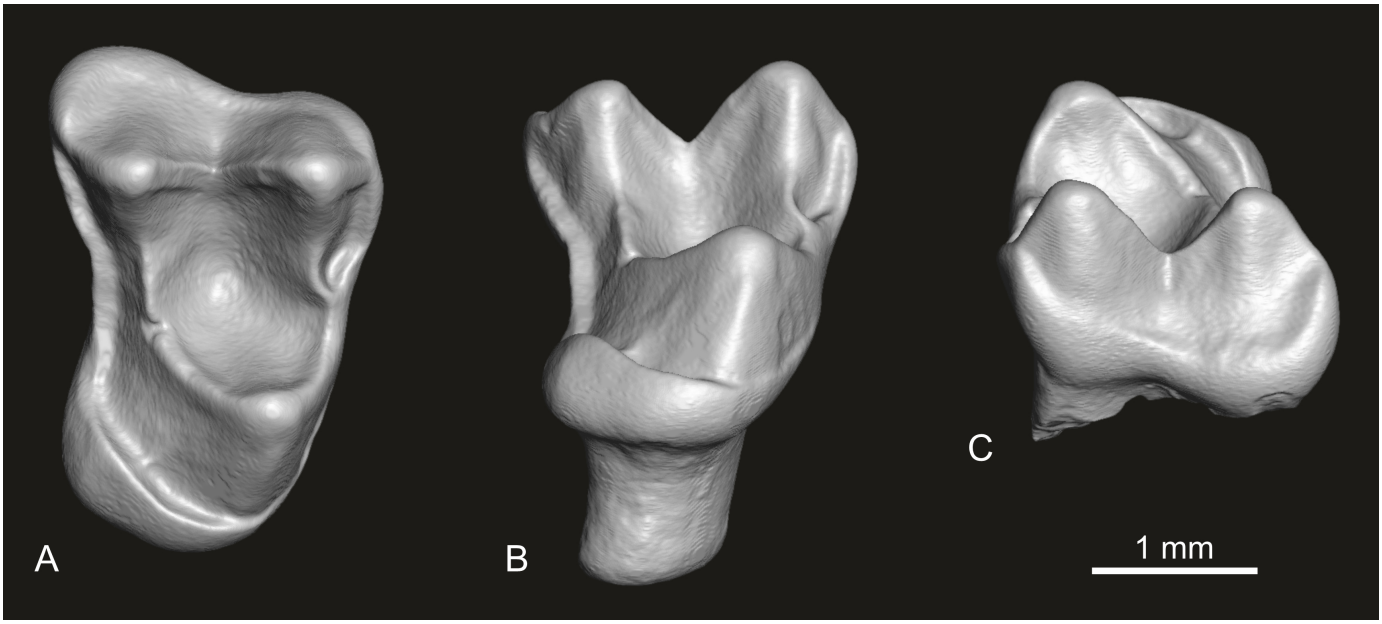

Figure 1. Dental remain of *Ashaninkacebus simpsoni* (UFAC-CS 066, Holotype). Images are renderings of a 3D digital model of the fossil specimen (right upper M1), obtained by a X-ray micro-computed (µCT) surface reconstruction (rendering of the segmented surface). A) occlusal view; B) lingual view; C) buccal view.

Group) software was used for visualization, segmentation and three-dimensional (3D) rendering. This isolated tooth was prepared within a "labelfield" module of AVIZO, using the segmentation threshold selection tool. The crown and roots of the tooth were virtually delimited by manual segmentation. The 3D model is provided in ".ply" format, and thus can be opened with a wide range of software programs (e.g., MorphoDig 1.6.5., an open-source 3D freeware (Lebrun, 2018; https://morphomuseum.com/Pages/morphodig).

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