

# 3D models of fossils of Dinomyidae rodents (Rodentia: Caviomorpha) from the Miocene and Quaternary of Brazil

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## Abstract

This contribution contains 3D models of extinct rodents Dinomyidae from Miocene and Quaternary of Brazil. The Miocene specimens that were digitalized include the holotypes of *Potamarchus adamae*, *Pseudopotamarchus villanuevai*, and *Ferigolomys pacarana* collected in the Solimões Formation (Upper Miocene), northern Brazil. The Quaternary specimens are the holotype and paratype of *Niedemys piauiensis*, found in Upper Pleistocene deposits from northeast Brazil.

**Keywords:** Micro CT-Scan, Morphology, Potamarchinae, Serra da Capivara, Solimões Formation

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## INTRODUCTION

Dinomyidae (Rodentia: Caviomorpha: Chinchilloidea) is a group of South American rodents that were highly diversified during the Neogene (see Rinderknecht & Blanco 2015 for a review). During the late Miocene, dinomyids reached their acme; after this, they started to decline in diversity. Nowadays, they are represented by a single species, *Dinomys branickii* Peters, 1873, the pacarana, which is restricted to the Amazon region of western Brazil, Bolivia, Colombia, Ecuador, Peru, and Venezuela (Roach, 2017). The most expressive fossil record of this group have been found in Argentina, Uruguay, Peru, Colombia, and Venezuela, and more recently, new efforts have been shown the relevance of the Miocene and Quaternary fossils found in Brazil to the comprehension of the diversity of these animals through the time (Kerber et al. 2016a,b; 2017, 2018a,b).

In this contribution, in order to facilitate the access to the morphology of the Brazilian specimens, we present the three-dimensional models generated through the use of computed microtomography (Figure 1; Table 1). Three-dimensional models of Miocene dinomyids studied here, includes specimens collected at the Solimões Formation, Upper Miocene (Bissaro-Júnior et al. 2019): *Potamarchus adamae* Kerber et al. 2016 (Kerber et al. 2016a, 2017; UFAC-CS 011 – holotype, palatal region of the skull with cheek teeth; UFAC-CS 043, left dentary with cheek teeth), *Pseudopotamarchus villanuevai* Kerber et al. 2016 (Kerber et al. 2016b; UFAC 4762 – holotype, incomplete right maxilla with cheek teeth), *Ferigolomys pacarana* Kerber et al. 2018 (Kerber et al. 2018a; UFAC 6460 – holotype, palatal region of the skull with cheek teeth), and a specimen assigned to *Drytomomys* Anthony, 1922 (Kerber et al. 2017; UFAC 2742, right dentary with cheek teeth). Quaternary dinomyids are represented by the late Pleistocene species *Niedemys piauiensis* Kerber et al. 2016 (Kerber et al. 2016b; FUMDHAM 113-146365-2 - holotype, upper right tooth; FUMDHAM 113-145304-2 - paratype, left lower molar) from the Serra da Capivara region, northeast Brazil (Kerber et al. 2016b, 2018b).

## METHODS

The specimens were scanned at the Laboratório de Análise de Minerais e Rochas of the Universidade Federal do Paraná, Brazil, through a SkyScan 1172 micro-CT scanner (Table 1). 3D Slicer 4.8 (Fedorov et al. 2012) and Avizo 8.1 were employed to generate 3D models of these specimens using the segmentation threshold selection tool. The 3D surface models are provided in .ply format, and can, therefore, be opened with a wide range of freeware.

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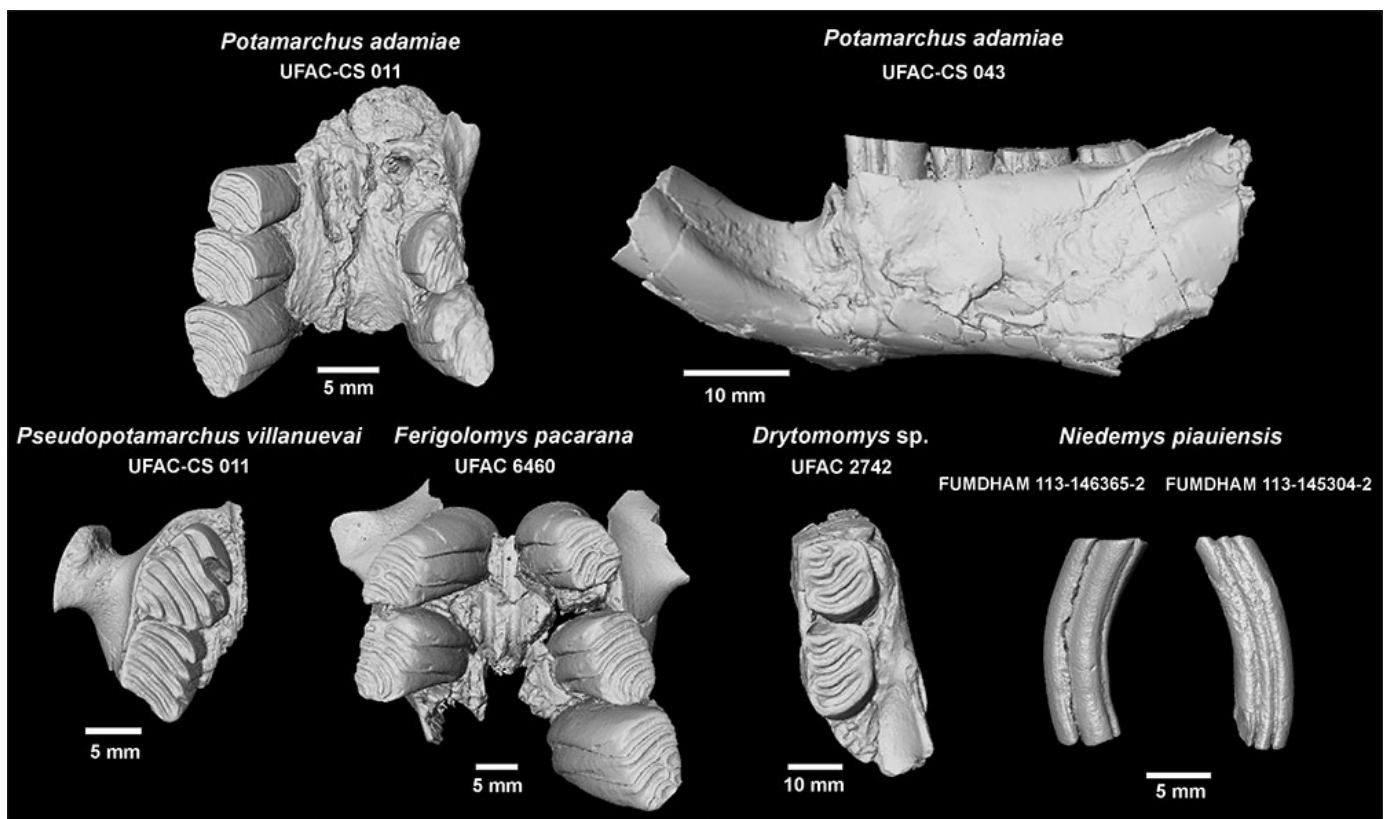
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| Inv. nr.            | Taxon                                | Description  | Collection |
|---------------------|--------------------------------------|--|------------|
| UFAC-CS011          | <i>Potamarchus adamaiae</i>          | Holotype, palatal region of the skull with cheek teeth | UFAC-CS    |
| UFAC-CS043          | <i>Potamarchus adamaiae</i>          | Left dentary with cheek teeth                          | UFAC-CS    |
| UFAC4762            | <i>Pseudopotamarchus villanuevai</i> | Holotype, incomplete right maxilla with cheek teeth    | UFAC       |
| UFAC6460            | <i>Ferigolomys pacarana</i>          | Holotype, palatal region of the skull with cheek teeth | UFAC       |
| UFAC2742            | <i>Drytomomys</i> sp.                | Right dentary with cheek teeth                         | UFAC       |
| FUMDHAM113-146365-2 | <i>Niedemys piauiensis</i>           | Holotype, upper right tooth                            | FUMDHAM    |
| FUMDHAM113-145304-2 | <i>Niedemys piauiensis</i>           | Paratype, left lower molar                             | FUMDHAM    |

**Table 1.** Analyzed specimens and  $\mu$ CT-Scan data. Institutional abbreviations: FUMDHAM, paleontological collection of the Fundação Museu do Homem Americano, São Raimundo Nonato, Brazil; UFAC, paleontological collection of the Universidade Federal do Acre, Rio Branco, Brazil; UFAC-CS, paleontological collection of the Universidade Federal do Acre, Cruzeiro do Sul, Brazil



**Figure 1.** 3D Models of fossils of Brazilian dinomyid rodents.