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A new rodent (Caviomorpha: Dinomyidae) from the upper Miocene of southwestern Brazilian Amazonia

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ABSTRACT

Recently, the fossil record of rodents from southwestern Brazilian Amazonia has been reviewed with regards to its diversity as well as its ecological relationships. In the reviews, the necessity to report new specimens collected with stratigraphic control was stated. Here, a new dinomyid specimen collected during a 2015 expedition to the Niterói locality, Acre River, is reported. The material is a fragment of skull with the right P4–M1 and the left P4–M2 preserved. The cheek teeth are protohypsodont, a characteristic employed to differentiate Potamarchinae dinomyids from the euhypsodont dinomyids Eumegamyinae and Tetrastylinae. The occlusal surface of the cheek teeth is composed of lophs with interruptions, showing little wear, which suggests that the specimen is not fully ontogenetically developed. The specimen has a unique combination of characters (protohypsodont and pentalophodont cheek teeth, with the leading edges of similar thickness to the trailing edges, and presence of a groove on the bottom of the infraorbital foramen) not present in other known dinomyids, which led us to erect a new taxon. The abundant and diverse fossil record of protohypsodont dinomyids suggests that an important radiative event may have occurred during the middle–late Miocene of northern South America.

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Introduction

Dinomyidae (pacaranas and extinct relatives) is a South American ctenohystrican group of rodents included in Chinchilloidea, one of the four main clades that compose Caviomorpha (Upham & Patterson 2015; Vucetich et al. 2015). Cladistic analyses based on molecular and morphological data have, respectively, recovered a sister-group relationship of dinomyids to either Chinchillidae (chinchillas, vizcachas, and extinct relatives) (Huchon & Douzery 2001; Upham & Patterson 2015) or Chinchillidae + Neoepiblemidae (Kerber et al. 2017a; Rasia & Candela 2017; this paper). The crown-group Dinomyidae arises in the fossil record during the early/middle Miocene, reaches its peak diversity during the late Miocene, and diminishes in diversity into the Pliocene and Quaternary (Rinderknecht & Blanco 2015 and references therein). Today, dinomyids are only represented by the pacarana, *Dinomys branickii* Peters, 1873, one of the largest living rodents, which inhabits the western Amazon forest (Tirira et al. 2008; Rinderknecht & Blanco 2015). Within Dinomyidae three groups are recognized: Eumegamyinae, Tetrastylinae, and Potamarchinae (Rinderknecht & Blanco 2015).

Potamarchinae is considered a ‘subfamily’ that includes basal dinomyids with protohypsodont cheek teeth (*sensu* Mones 1968, 1982) (Mones 1981; Rinderknecht & Blanco 2015). The interpretations on the phylogenetic affinities as well the taxonomic composition of this group have changed over time (Kerber et al. 2016) and remain inconclusive. When described, *Potamarchus* Burmeister, 1855 (the first known taxon of this group), was considered to be related to *Myocastor* Kerr, 1792 (today, an echimyid). Subsequently, Kraglievich (1926) erected the family Potamarchidae to include chinchilloids with protohypsodont cheek teeth. Fields (1957) considered this group to be a subfamily (Potamarchinae) of Dinomyidae. Following Fields (1957), Mones (1981) also considered it to be a subfamily of Dinomyidae and argued that these forms with protohypsodont cheek teeth are basal dinomyids. More recently, unpublished data based on cladistic analysis consider that Potamarchinae includes *Potamarchus* and *Paranamys* Kraglievich, 1934 (Nasif 2009). Despite these inferences, the phylogenetic relationships of the protohypsodont dinomyids are still poorly understood (see below). The main problem is the scarce knowledge about

the anatomy of these rodents, which is based mostly on cheek teeth and dentaries. One of the few cases where more anatomical data is available is an almost complete skull of the undoubted dinomyid *Drytomomys aequatorialis* Anthony 1922 described by Fields (1957). It is noteworthy that this skull has paracondyles, considered a synapomorphy of Dinomyidae (Rinderknecht & Blanco 2015). As there are no congruent data on the monophyly or paraphyly of Potamarchinae, in this paper, for comparative purposes we informally use ‘protohypsodont dinomyids’ to refer to Potamarchinae (*Potamarchus*, *Paranamys*, *Simplimus* Ameghino, 1904, *Drytomomys* Anthony 1922, and *Pseudopotamarchus* Kerber et al. 2016) plus the putative dinomyids *Scleromys* spp., ‘*Scleromys*’ *schurmanni* Stelin, 1940, and ‘*S*’ *colombianus* Fields 1957 (note that *Scleromys osbornianus* and ‘*S*’ *schurmanni* were considered dinomyids based on cladistic analysis – Rasia & Candela 2017).

Fossils from the tropical portion of South America have an important role in the understanding of Dinomyidae evolution. A rich fossil record, particularly from the middle/late Miocene, has been discovered in Venezuela, Colombia, Ecuador, and northern Brazil (see discussion). Besides the typical dinomyid eumegamylines and tetrastylines found mainly in the upper Miocene beds of Venezuela and Brazil (Horovitz et al. 2010; Kerber et al. 2017a), the fossil material from Colombia, Ecuador, and Peru has revealed several taxa, which possibly witness early adaptive events of this group that are not fully understood. This is the case for some still enigmatic taxa, such as the putative dinomyids ‘*Scleromys*’ *schurmanni* and ‘*Scleromys*’ *colombianus* from the middle Miocene of La Venta, Colombia (Walton 1997); *Scleromys praecursor* Boivin et al. 2016 plus the putative chinchilloid *Ucayalimys crassidens* Boivin et al. 2016 from the upper Oligocene of Peruvian Amazonia (Boivin et al. 2016); the Potamarchinae *Drytomomys aequatorialis* Anthony 1922 from Ecuador (Anthony 1922); and the specimens assigned to ‘*Olenopsis*’ spp. from the middle Miocene of La Venta (Walton 1997). These taxa (some of them also reported from Peru – Antoine et al. 2013, 2016; Tejada-Lara et al. 2015; and Brazil – Kerber et al. 2017a) require more study, and probably in the future they will furnish important data on the diversification of dinomyids at the low latitudes in South America.

The Brazilian territory has yielded Neogene and Quaternary fossils of dinomyids (Paula Couto 1951; Kerber et al. 2016, 2017a). Neogene records are found in the Solimões Formation, Acre Basin, southwestern Brazilian Amazonia. As a whole, the group is the most diverse caviomorph in deposits of the Solimões Formation (Ribeiro et al. 2013; Kerber et al. 2017a). These records include a skull and isolated teeth of *Telicomys amazonensis* Frailey 1986 (Frailey 1986; Kerber et al. 2017a); isolated teeth of indeterminate species of the Eumegamylinae genera ‘*Tetrastylus*’ Ameghino, 1886 and *Eumegamys* Kraglievich 1926 (Sant’Anna-Filho 1994; Kerber et al. 2017a); and dentaries, skull fragments, and cheek teeth of potamarchines (see discussion). Recently, the rodents from southwestern Brazilian Amazonia were reviewed with regards to their diversity and ecological relationships (Kerber et al. 2016, 2017a, 2017b). These reviews highlighted the necessity to report new specimens collected with stratigraphic control to better understand the depositional context as well as the biochronology and paleoenvironmental setting. Here, we report a new specimen collected during a 2015 expedition to the Niterói locality, Acre River, an exposure of the

upper Miocene of the Solimões Formation and one of the most significant fossil-bearing sites of the Acre Basin. Prior to this record, the published fossil record of rodents from this locality was restricted to the neopiblemid *Neopiblema ambrosettianus* (Ameghino, 1889) (see Kerber et al. 2017a).

Material and methods

The specimen UFAC 6460 is housed at Coleção de Paleovertebrados do Laboratório de Pesquisas Paleontológicas, Universidade Federal do Acre, Rio Branco-AC, Brazil.

For the phylogenetic analysis, UFAC 6460 was coded in the data-set matrix of Kramarz et al. (2013), with its subsequent modifications (Kerber et al. 2017a; Rasia & Candela 2017). The most recent version of this data-set is available in Rasia and Candela (2017). This modified data-set of 18 taxa and 45 characters (Electronic Supplementary Material - ESM) was analyzed in TNT 1.5 (Goloboff & Catalano 2016). The analysis consisted of a heuristic search (Traditional Search option) with 1000 replications of Wagner trees, followed by the Tree Bisection Reconnection (TBR) algorithm, saving 20 trees per replication. This software was also employed to test the robustness of the results, using the Bremer decay index, as well as the Bootstrap and Jackknife resampling techniques. The matrix was managed using Mesquite 3.03 (Maddison & Maddison 2015).

Geographic and geological remarks

The specimen was collected at the Niterói locality, Acre River, Solimões Formation in the Acre Basin (Figure 1). The Acre Basin is located in northwestern Brazil, neighboring Peru and Bolivia, and preserves a Paleozoic–Pliocene stratigraphic sequence (Cunha 2007). The Solimões Formation, located in the southwestern Brazilian Amazonia (Acre and Amazonas states), encompasses the Cenozoic sedimentary record of the basin.

Niterói is a classic paleontological site located on the right bank of the Acre River in southeastern Acre, Brazil (UTM 19L 629983 E / 8879539 S, datum WGS84, Figure 1) and is one of the most important Neogene fossiliferous localities of southwestern Brazilian Amazonia (Latrubesse et al. 2010). It was discovered in 1987 and since then a rich and diverse paleofauna has been recovered, including Crocodylia (e.g. *Purussaurus brasiliensis* Barbosa Rodrigues, 1892, *Mourasuchus nativus* Gasparini, 1985), rodents (*Neopiblema ambrosettianus* Ameghino, 1889), xenarthrans (e.g. *Urumacotherium campbelli* (Frailey 1986)), characid fish (*Paleohoplias assisbrasiliensis* Bocquentin & Negri 2003), a turtle (*Chelus lewisi* Wood, 1976), and a bird (*Macranhinga ranzii* Alvarenga & Guilherme 2003) (see Bocquentin-Villanueva et al. 1990; Negri & Ferigolo 1999; Alvarenga & Guilherme 2003; Negri 2004; Negri et al. 2010; Cidade et al. 2013). Despite the lack of precise radiometric ages for the deposits of the Solimões Formation, the fossil content and facies analysis suggest that the upper levels were deposited during the late Miocene, Huayquerian SALMA (Cozzuol 2006; Latrubesse et al. 2007, 2010).

The deposits in the site are characterized by an 11-meter-thick massive and conglomeratic clay, with silt layers with gypsum veins, and two fossiliferous levels (Latrubesse et al. 1997). When the fossil here described was collected, the outcrop was covered by dense vegetation, with only two clay layers and one fossiliferous level visible (Figure 2(A)). These are typical of the

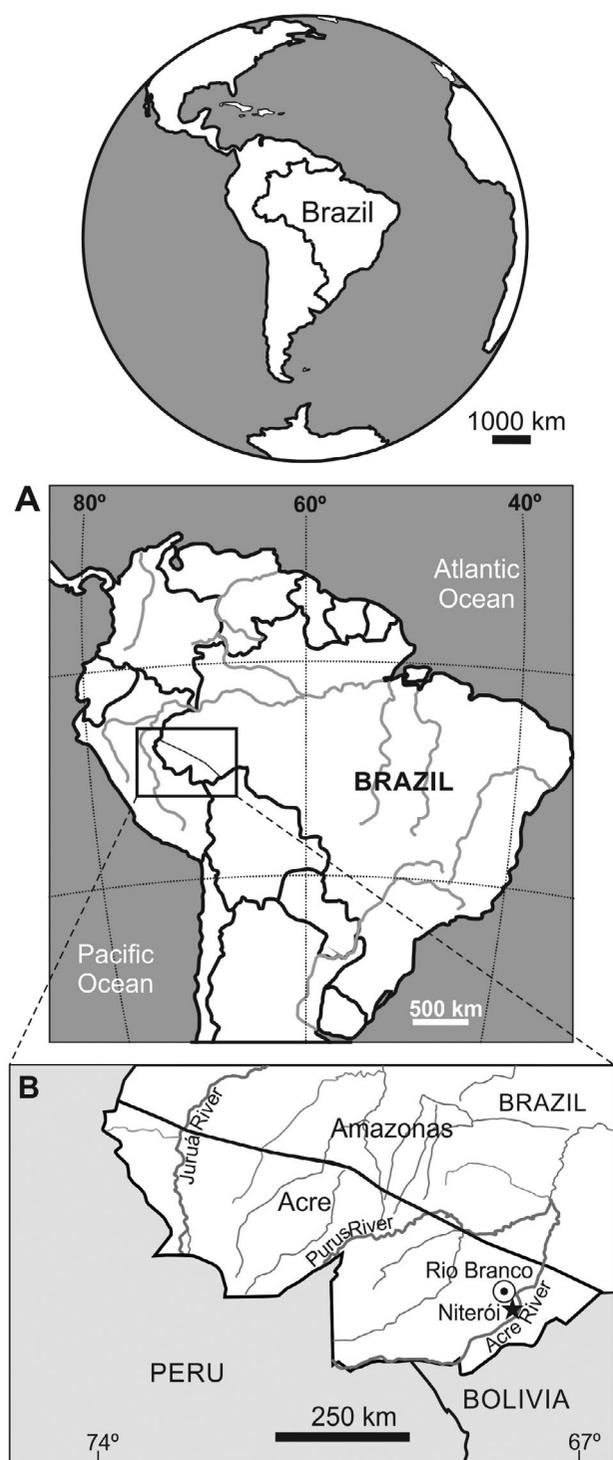


Figure 1. Map of South America showing the location of the Niterói locality, Acre River, Acre, Brazil.

floodplain-lacustrine low-energy facies found in most Neogene outcrops in the Brazilian Amazonia (Cozzuol 2006; Latrubesse et al. 2010).

In 2015, macrofossil remains (≥ 5 cm) were collected in randomized 2 m grid squares in the sampled area (adapted from Ghilardi 2004). We used a total station (model Topcon GTS 236 W) and a Brunton compass with the aim of avoiding the loss of taphonomic and provenance information. The total station is

a useful electronic device that measures angles and distances to a prism, allowing the recording of the precise three-dimensional location of remains within the surveyed area. This is commonly used in archaeological fieldwork, but more rarely on paleontological digs (McPherron 2005; Conolly & Lake 2006; Marean et al. 2007; Domínguez-Rodrigo et al. 2012). Based on the total station data, a 3D reconstruction was generated using Surfer 10 (Golden Inc. C. 80401USA. 2011) (Figure 2(B)).

Results and discussion

Systematic paleontology

Mammalia Linnaeus, 1758
 Euarchontoglires Murphy et al. 2001
 Rodentia Bowdich, 1821
 Ctenohystrica Huchon, Catzeflis, and Douzery, 2000
 Hystricognathi Tullberg, 1899
 Caviomorpha Wood and Patterson in Wood, 1955
 Dinomyidae Alston, 1876
Ferigolomys gen. nov.

Etymology

Ferigolo = in honor of Dr Jorge Ferigolo, for his contributions to Brazilian paleomastozoology; *mys* = rat.

Type species

Ferigolomys pacarana gen. et sp. nov.

Included species

Only the type species.

Distribution

Upper Miocene of southwestern Brazilian Amazonia.

Diagnosis

As for the type and only species.

Ferigolomys pacarana gen. et sp. nov.

Etymology

pacarana = pacarana, the popular name for *Dinomys branickii*, the only living dinomyid.

Holotype

UFAC 6460, fragment of skull with cheek teeth with right P4–M1 and left P4–M2.

Locality and horizon

UFAC 6460 was collected at the Niterói locality, horizon B (Figure 2) (UTM 19L 629983 E/8879539 S, datum WGS84), Acre River, Brazil.

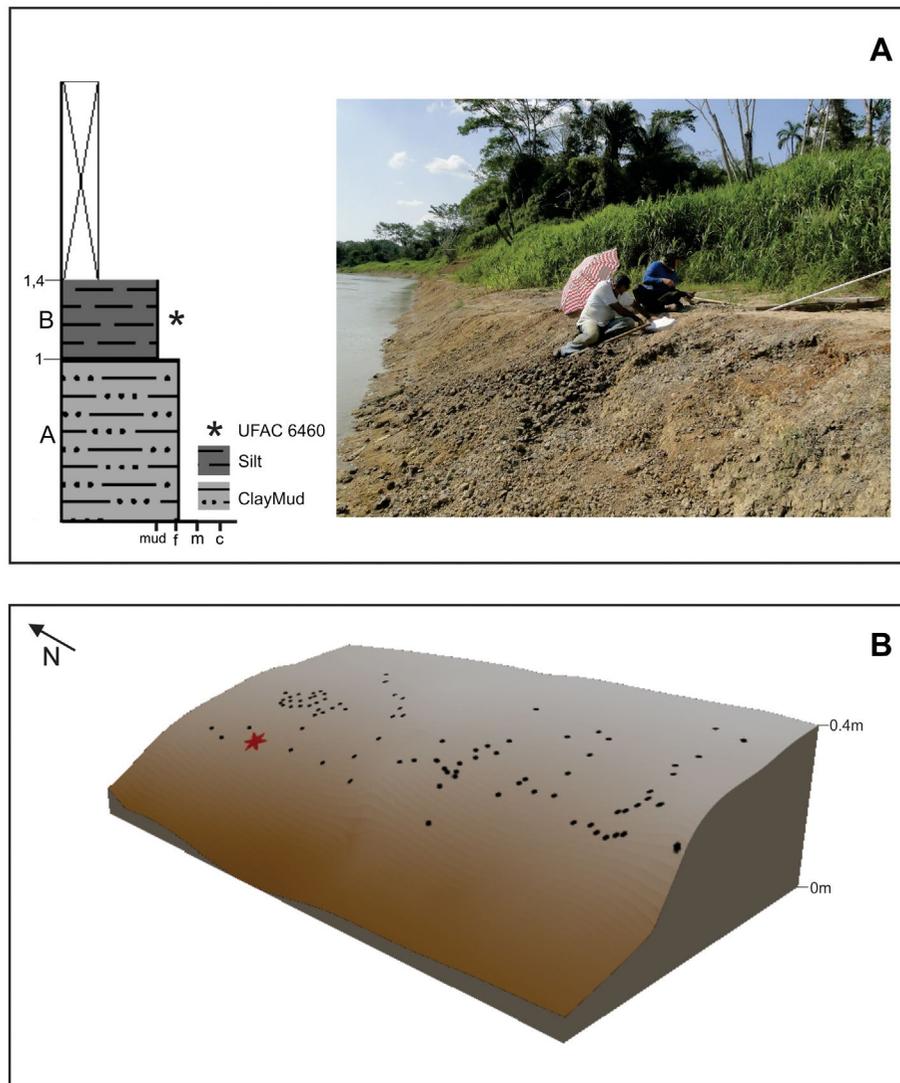


Figure 2. (A) Schematic stratigraphic profile of the Niterói locality. (B) 3D reconstruction of the fossiliferous level (red star marks spot where UFAC 6460 was found) that was excavated.

Diagnosis

Ferigolomys pacarana gen. et sp. nov. is a small/middle-sized dinomyid rodent diagnosed by the unique combination of the following characters: presence of protohypsodont and pentalophodont cheek teeth, with the leading edges of similar thickness to the trailing edges; and presence of a groove on the bottom of the infraorbital foramen. This suit of characters is not present in other known dinomyids.

Description and comparison

The holotype of *Ferigolomys pacarana* gen. et sp. nov., UFAC 6460, is a fragment of skull, with right P4–M1 and left P4–M2 *in situ*. The material shows the same taphonomical modifications (e.g. loss of dental tissues) (Figure 3(F)) reported for other rodents by Kerber et al. (2017b). Although damaged, the morphology of the occlusal surface is visible (Figure 3(B)). The specimen represents an immature individual, as it does not have differentiated roots and there is minor wear on the occlusal surface (traits mainly observed on P4 and M2). The third loph of

P4 (mesolophule/mesoloph – Nasif 2009) is divided into two subunits, the third and fifth (posteroloph – Nasif 2009) lophs of M2 are divided into two subunits, and the fourth (metaloph – Nasif 2009) into three subunits. The presence of lophs divided in subunits characterizes young specimens. With wear, there is a trend for them to fuse, forming a single loph (Nasif 2009; Nasif & Abdala 2015).

The cheek teeth of *Ferigolomys pacarana* gen. et sp. nov. are protohypsodont (Figure 3(B), (E), and (G)), a characteristic employed to differentiate Potamarchinae dinomyids from the euhypsodont dinomyids (Eumegamyinae and Tetrastylinae; Rinderknecht & Blanco 2015). The main root of each cheek tooth is still open and they do not show labial roots as in the holotypes of *Potamarchus adamae* Kerber et al. 2016 and *Pseudopotamarchus villanuevai* Kerber et al. 2016 from the Juruá and Acre rivers (Solimões Formation), respectively (Kerber et al. 2016). This may, however, be a factor of its young ontogenetic stage.

The occlusal surface of the cheek teeth of *Ferigolomys pacarana* gen. et sp. nov. has no crenulations, such as those present in *Potamarchus murinus* Burmeister 1885 and *Potamarchus adamae* Kerber et al. 2016. The enamel that outline the lophs is thick

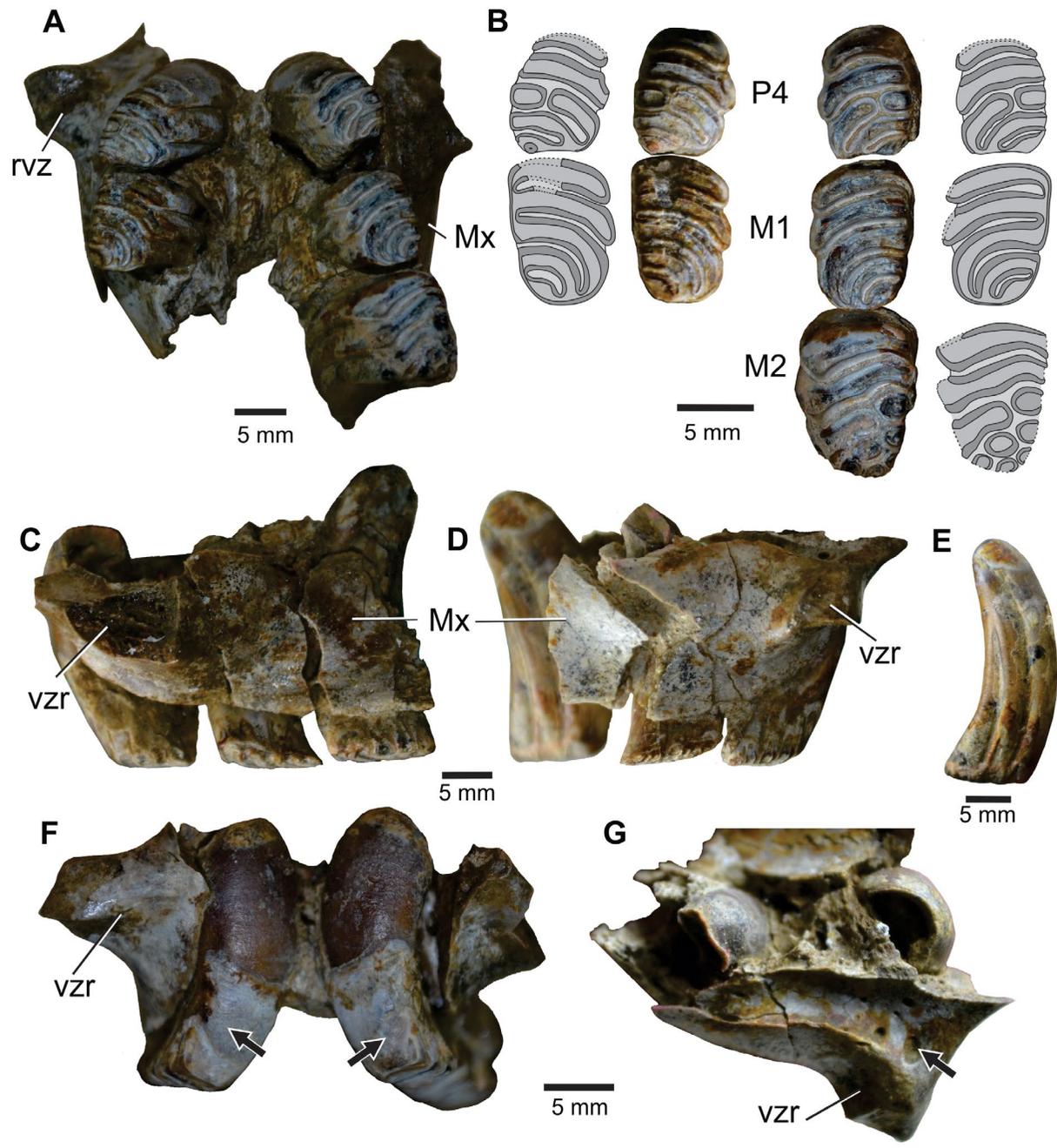


Figure 3. Holotype (UFAC 6460) of *Ferigolomys pacarana* gen. et sp. nov. Fragment of skull with cheek teeth with right P4–M1 and left P4–M2: (A) palatal view; (B) detail of the occlusal surface of the cheek teeth; (C) left lateral view; (D) right lateral view; (E) lingual view of the left M2; (F) anterior view, showing taphonomic modification on the extra-alveolar portion of the cheek teeth (see Kerber et al. 2017b); (G) dorsal view showing the groove on the bottom of the infraorbital foramen. Abbreviations: M1, first molar; M2, second molar; Mx, maxilla; P4, fourth pre-molar; rvz, ventral zygomatic root.

and differing from other potamarchines, the leading edges have a similar thickness compared to the trailing edges (Character 8; Rasia & Candela 2017) at least in comparison to other taxa where this feature is evident, such as *Potamarchus* spp. P4 has five lophs, but in the right P4 there is a very small fossette on the last loph. This possibly indicates the presence of an additional distal loph during an earlier ontogenetic stage. Except for this small fossette, the other flexi are still open. The lophs of the P4 are less oblique and less compressed than those of *Pseudopotamarchus*. In *P. murinus*, the second loph is the widest, followed by the third. In UFAC 6460, the first, second, and third lophs have a similar width. The third loph is interrupted in the middle of the occlusal

surface. M1 is pentalophodont and, as expected, it is more worn than P4 and M2. The first two lingual flexi and the labial one are open. The fourth flexus is closed, forming an oblique fossette (Figure 3(B)). The third and fourth lophs are more curved than in *Potamarchus*. For this reason, the lingual end of the labial flexus is oriented distally, and not linguodistally as in *Potamarchus*. It has a rectangular outline, and is mesiodistally longer than M1 of *Potamarchus* spp. M2 is possibly pentalophodont. As in P4, the third loph is interrupted. The pentalophodont pattern of the cheek teeth is different from that of *Drytomomys* and *Scleromys* (including ‘*Scleromys*’ from northern South America), which have tetralophodont teeth since early ontogenetic stages.

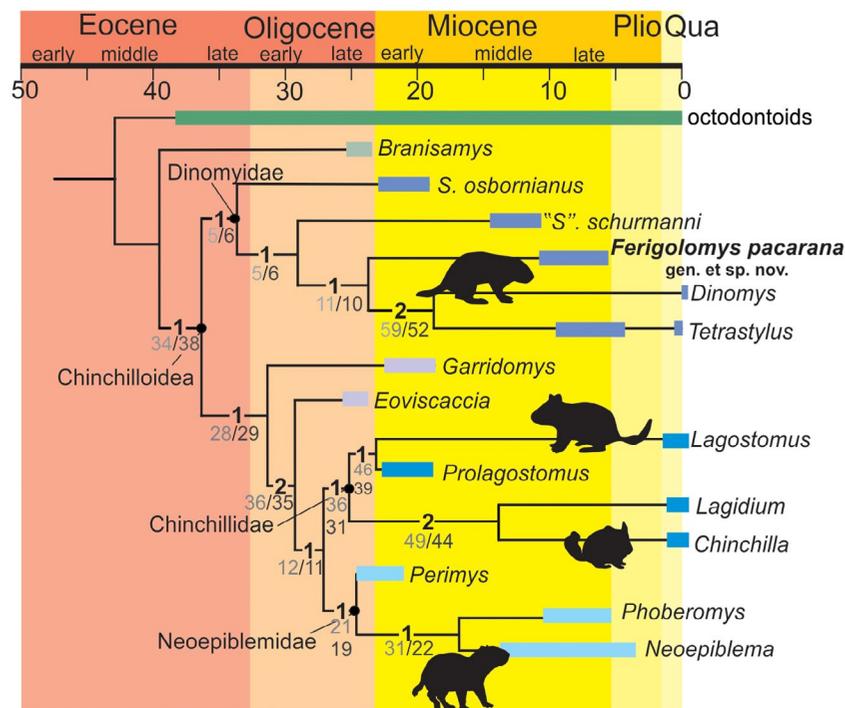


Figure 4. Phylogenetic relationships of *Ferigolomys pacarana* gen. et sp. nov. (UFAC 6460) and selected Chinchilloidea. Most parsimonious tree with length of 101 steps (IC: 0.554, IR: 0.731). Numbers in bold indicate Bremer support values, in light gray represent absolute Bootstrap values, and in dark gray represent absolute Jackknife values. See also the Electronic Supplementary Material.

The ventral zygomatic root is at the level of P4. On the anterior face of this root, there is no notch as in *Pseudopotamarchus*. The lateral surface of the maxilla bears a groove, presumably for nerves and blood vessels (Patterson & Wood 1982). It is located on the bottom of the infraorbital foramen, which is delimited laterally by a thin bony wall (Figure 3(G)). This groove is present in several chinchilloids, such as the extinct chinchillids *Prolagostomus* Ameghino, 1894 and *Lagostomus* Brookes, 1828, the dinomyids ‘*Scleromys*’ Ameghino, 1887, *Tetrastylus*, and *Dinomys*, the neopiblemid *Neopiblema*, and the cuniculid *Cuniculus* Brisson, 1762 (Fields 1957; Kramarz et al. 2013; Mayer et al. 2016; Kerber et al. 2017a), but not in *Chinchilla* Bennet, 1829. In the known cranial portions of potamarchines, the region where this groove is located is usually lacking by fragmentation (e.g. MACN-Pv 5870, UFAC 4762, UFAC-CS 11). However, a fragmented maxilla of *P. murinus* (MACN 3500) shows this structure.

In size, *Ferigolomys pacarana* gen. et sp. nov. is slightly larger than *P. adamaiae* and *P. villanuevai*, and of similar proportions to adult specimens of *P. murinus*.

Phylogenetic analysis

A phylogenetic analysis including *Ferigolomys pacarana* gen. et sp. nov. was performed using the taxon-character matrix of Kramarz et al. (2013), modified by Kerber et al. (2017a) and more recently by Rasia and Candela (2017) to include neopiblemids (Figure 4, S1). When *Ferigolomys pacarana* gen. et sp. nov. is included in this matrix, one most parsimonious tree (MPT) of 101 steps is recovered. This tree shows a dichotomy between the dinomyid lineage and a clade including *Garridomys* Kramarz et al. 2013, *Eoviscaccia* Vucetich, 1989, chinchillids + neopiblemids

(Figure 4, S1A). As expected, *Ferigolomys pacarana* gen. et sp. nov. is nested among dinomyids. Most nodes within Chinchilloidea show low support, with Bremer support values mostly of 1. Only nodes 24 (*Dinomys* Peters, 1873 + *Tetrastylus* Ameghino, 1886), 27 (*Eoviscaccia* + chinchillids and neopiblemids), and 31 (*Chinchilla* Bennett, 1829 + *Lagidium* Meyen 1833) have Bremer support values of 2 (ESM). Low support is also shown by bootstrap and jackknife resampling analyses, where only nodes 24 and 31 have values above 50%.

The groove on the bottom of the infraorbital foramen (Character 19: state 1; Rasia & Candela 2017) is present in *Ferigolomys pacarana* gen. et sp. nov. In chinchilloids, it appears in dinomyids, but also in the chinchillid *Lagostomus* Brookes, 1828 and the neopiblemid *Neopiblema* Ameghino, 1889 (ESM). Also according to this analysis, the euhyposodont cheek teeth (*sensu* Mones 1968, 1982) (Character 1: state 2; Rasia & Candela 2017) appeared at least two times among chinchilloids, one in a dinomyid clade (node 24) and the other in the chinchillid–neopiblemid clade (node 30) (ESM).

If *Potamarchus* is included, 3 MPTs of 105 steps are recovered and a polytomy containing *Branisamys* Hoffstetter & Lavocat, 1970, *Scleromys osbornianus* and ‘*Scleromys*’ *schurmanni*, a clade with *Potamarchus*, *Ferigolomys pacarana* gen. et sp. nov., *Dinomys* + *Tetrastylus* appears in the strict consensus tree (Figure S1B). The clade with *Garridomys*, *Eoviscaccia*, and chinchillids + neopiblemids is maintained (node 30). In 66% of the MPTs, *Ferigolomys pacarana* gen. et sp. nov. appears as sister-group to *Potamarchus*, *Dinomys* + *Tetrastylus* (Figure S1C). The instability of the dinomyid clade in this analysis possibly reflects a low number of common synapomorphies among the analyzed taxa. One important character for the definition of this group is the presence of paracondyles (Character 32 – Rasia &



Figure 5. Artistic reconstruction of *Ferigolomys pacarana* gen. et sp. nov. in the late Miocene environment of southwestern Amazonia. Drawing by Renata Cunha.

Candela 2017), which are present in basal (*Drytomomys*) and derived (e.g. *Dinomys*, *Josephoartigasia* Mones, 1997, among others) forms (Rinderknecht & Blanco 2015). Unfortunately, the region of the skull where these structures are located is not known in the taxa analyzed herein (*Potamarchus* and *Ferigolomys pacarana* gen. et sp. nov.). At this stage in the knowledge on dinomyid phylogeny it is not possible to know if all the protohypsodont dinomyids represent a monophyletic group, or if more than one lineage existed. While some taxa show a more conservative occlusal morphology (e.g. *Scleromys*, *Drytomomys*), some of them, such as *Potamarchus* and *Pseudopotamarchus* trend towards increasing the number of lophs, which is possibly a derived condition, maybe representing a particular radiative event within Dinomyidae, as recovered by the study of Nasif (2009). Further analyses are needed involving the inclusion of more characters and more dinomyids as well as the discovery of more complete fossil remains.

Fossil record and diversification of protohypsodont dinomyids at low latitudes in South America

Among the middle/late Miocene South American faunas, that of the Solimões Formation, southwestern Brazilian Amazonia, has the highest diversity of protohypsodont dinomyids, including: *Potamarchus murinus* and *Potamarchus adamae*, *Drytomomys* sp., *Pseudopotamarchus villanuevai*, an M3 with a morphotype not present in the other dinomyids, and ‘*Scleromys*’ (Kerber et al. 2016, 2017a), plus *Ferigolomys pacarana* gen. et sp. nov. presented here (Figure 5). Other relevant middle/upper Miocene beds with protohypsodont dinomyids include those from the middle Miocene of La Venta, Colombia, with records of *Drytomomys* (*D. aequatorialis*) (= *Olenopsis*) (Fields 1957; Walton 1997) (see

Candela & Nasif 2006; Kerber et al. in 2017a), ‘*Scleromys*’ *colombianus* Fields 1957 and ‘*Scleromys*’ *schurmanni* Stehlin, 1939; the Amazonian Madre de Dios Subandean Zone, with a record of ‘*Scleromys*’ sp. (Antoine et al., 2013); Fitzcarrald, Peru, with records of *Potamarchus murinus*, *Drytomomys* cf. *aequatorialis* and ‘*Scleromys*’ cf. *schurmanni* (Tejada-Lara et al. 2015); the middle/upper Miocene transition (CTA-44), upper Miocene (CTA 43, 57, and 75) of the Contamana region, Peru, with records of *Drytomomys* sp., *Potamarchus* sp., and *Simplimus?* sp.; and *Potamarchus* sp., respectively (Antoine et al. 2016); the upper Miocene Ituzaingó Formation, Argentina (the most tropical of the Argentinean Neogene faunas), which records *Potamarchus murinus*, *Potamarchus sigmodon* Ameghino, 1891, and *Paranamys* (Nasif et al. 2013); and the upper Miocene Urumaco Formation, Venezuela, with putative records of *Potamarchus* (Linares 2004; Horovitz et al. 2010).

The rich and diverse fossil record of protohypsodont dinomyids in northern South America, more abundant in that paleolatitude than in more austral fossiliferous localities, suggests that a radiative event may have occurred in that portion of the continent during the middle–late Miocene.

Conclusion

A new dinomyid species, *Ferigolomys pacarana* gen. et sp. nov., from the upper Miocene of the Solimões Formation is described. Besides other minor differences, this taxon shows a unique combination of characters: the presence of protohypsodont cheek teeth (Character 1, state 1); M1–M2 pentalophodont (Character 4, state 0); cheek teeth with leading edges of similar thickness to trailing edges (Character 8, state 0), at least in this ontogenetic stage; presence of a groove on the bottom of the infraorbital

foramen (Character 19, state 1) (see character descriptions in Rasia & Candela 2017). Although this specimen does not seem to be fully ontogenetically developed, its unique suite of characters is not seen in any other known dinomyid. This new taxon contributes to the understanding of the Neogene diversity of dinomyids at the low latitudes in South America. In addition, the increase in knowledge about fossils from the Solimões Formation with precise stratigraphic provenance will provide much needed data for future biostratigraphic proposals based on tetrapod biochronology.

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