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Fossils of *Scelidotheriinae Ameghino*, 1904 (Xenarthra, Pilosa) in the Pleistocene deposits of Rio Grande do Sul, Brazil

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ABSTRACT
Xenarthra (Mylodontidae) is a mammal group which fossil record is conspicuous in Southern Brazil, and includes until now the Mylodontinae, *Mylodon*, *Glossotherium* and *Lestodon* and the Scelidotheriinae *Catonyx*. Here it is presented new fossils of Scelidotheriines, represented by a fragment of a dentary, plus other four isolated teeth. A detailed description of the only other record of scelidotheriinae in Rio Grande do Sul, consisting in an almost complete right dentary, is also presented. The lacking of additional and more complete fossils complicates a more precise taxonomic insertion. Nevertheless, the specimens exhibit features that allow their recognition as *Catonyx*. The fossils are tentatively assigned to *C. cuvieri*, based on the assumption that it is the only valid scelidotheriine recognized so far for southern Brazil.

Key words: Xenarthra, Pilosa, Scelidotheriinae, *Catonyx* sp., Pleistocene, Brazil.

RESUMO
Fósseis de Scelidotheriinae Ameghino, 1904 (Xenarthra, Pilosa) em depósitos pleistocênicos do Rio Grande do Sul, Brasil. O registro fóssil da família Mylodontidae no sul do Brasil tem se mostrado abundante e inclui formas de três gêneros da subfamília Mylodontinae, *Mylodon*, *Glossotherium* e *Lestodon* e o Scelidotheriinae *Catonyx*. Neste trabalho, são apresentados novos registros da subfamília Scelidotheriinae, coletados em depósitos fossilíferos da região costeira do Rio Grande do Sul. Os espécimes consistem em um fragmento de dentário direito e outros quatro dentes isolados. É apresentada também uma descrição detalhada do único registro de *Catonyx* para o Rio Grande do Sul, que consiste de um dentário direito quase completo. A ausência de outros elementos associados e mais completos dificulta uma completa identificação taxonômica do material. Os espécimes, contudo, apresentam caracteres que possibilitam identificá-los ao gênero *Catonyx*. Aqui, são tentativamente classificados como *C. cuvieri*, com base na premissa de que este é o único scelidoteríneo válido até o momento para o sul do Brasil.

Palavras-chave: Xenarthra, Pilosa, Scelidotheriinae, *Catonyx* sp., Pleistoceno, Brasil.

INTRODUCTION

Remains of pilose Xenarthra are common in the Pleistocene fossiliferous deposits from Rio Grande do Sul State. The taxa found in these deposits include mostly members of the families Megatheriidae (*Megatherium americanum* Cuvier, 1796; *Eremotherium laurilladi* Lund, 1842) and Mylodontidae (subfamily Mylodontinae), like *Lestodon* Gervais, 1855, *Glossotherium* Owen, 1838 and *Mylodon* Owen, 1838 (Oliveira, 1992; Oliveira *et al.*, 2005; Ribeiro *et al.*, 2007). The only confirmed record of the Scelidotheriinae sub-family is a dentary mentioned by Pereira and Oliveira (2003), discovered in the fossiliferous deposits of Chuí Creek, near Santa Vitória do Palmar City (Figure 1). There is also a mention by Bombin (1976) of fossils belonging to the genus *Scelidotherium* Owen, 1838 from the westernmost portion of Rio Grande do Sul State (Touro Passo Formation). However, this material could not be located to verify its taxonomic validity (Kerber and Oliveira, 2008).

Here it is presented new fossils of scelidotheriinae sloths found in Pleistocene coastal deposits from Rio Grande

do Sul, consisting in a fragment of a dentary, plus four isolated molars. One of the molars was collected on the fossiliferous banks of Chuí Creek, and the other specimens were collected along the beach, in an area known as "Concheiros". A detailed description of the right dentary mentioned by Pereira and Oliveira (2003) is also presented.

The specimens described here are deposited in the paleontological collections of Coronel Tancredo Fernandes de Melo Museum, in Santa Vitória do Palmar City (specimen EPM-PV0400), and at the Universidade Federal do Rio Grande (FURG), in the city of Rio Grande, under catalog numbers LGP-Q0034, LGP-Q0035, LGP-Q0039, LGP-Q0041 and LGP-Q0045. The supraspecific taxonomy follows the classification of McKenna and Bell (1997).

GEOLOGICAL SETTING

A great number of mammal fossils remains are found in the coastal plain of Rio Grande do Sul State, both in the banks of Chuí Creek, a fluvial system located between two Pleistocene sandy barriers, and along the beach (Figure 1). In the first place the vertebrate fossils occur in a two meter-thick layer of muddy sandstones, where cingulate xenarthrans, meridiungulates, proboscideans, cervids, equids, carnivores and rodents have been recovered (Oliveira, 1992; Oliveira *et al.*, 2005; Lopes *et al.*, 2005; Ribeiro *et al.*, 2007; Ubilla *et al.*, 2008). Dating on fossil teeth using electron spin resonance (ESR) revealed ages between 33 and 42 ka, indicating a much younger age than previously estimated (Lopes *et al.*, 2008, 2009).

The fossils collected along the beach are found associated to large natural concentrations of marine bioclasts called "Concheiros", originated from fossiliferous deposits on the continental shelf (Figueiredo Jr., 1975). They consist of shell fragments of marine mollusks and remains of teleost and elasmobranch fishes, cetaceans, crustaceans and echinoderms. Remains of terrestrial mammals, seabirds and reptiles are also found on these concentrations (Buchmann, 2002; Rodrigues and Ferigolo, 2004; Lopes *et al.*, 2006; Hsiou and Fortier, 2007). The shell and bone concentrations are formed during fall and winter times by storm surges that remove the fossil material from the near continental shelf and throw it onto the beach. Those from terrestrial organisms can be found along the continental shelf up to depths of 46 m and their presence on marine environment is assumed to be a result of the sea-level advances over continental areas at the end of glacial epochs (Villwock, 1984; Lopes and Buchmann, 2009). Although the remains from the continental shelf come from deposits that are being eroded today due to wave action, thus lack a precise stratigraphic

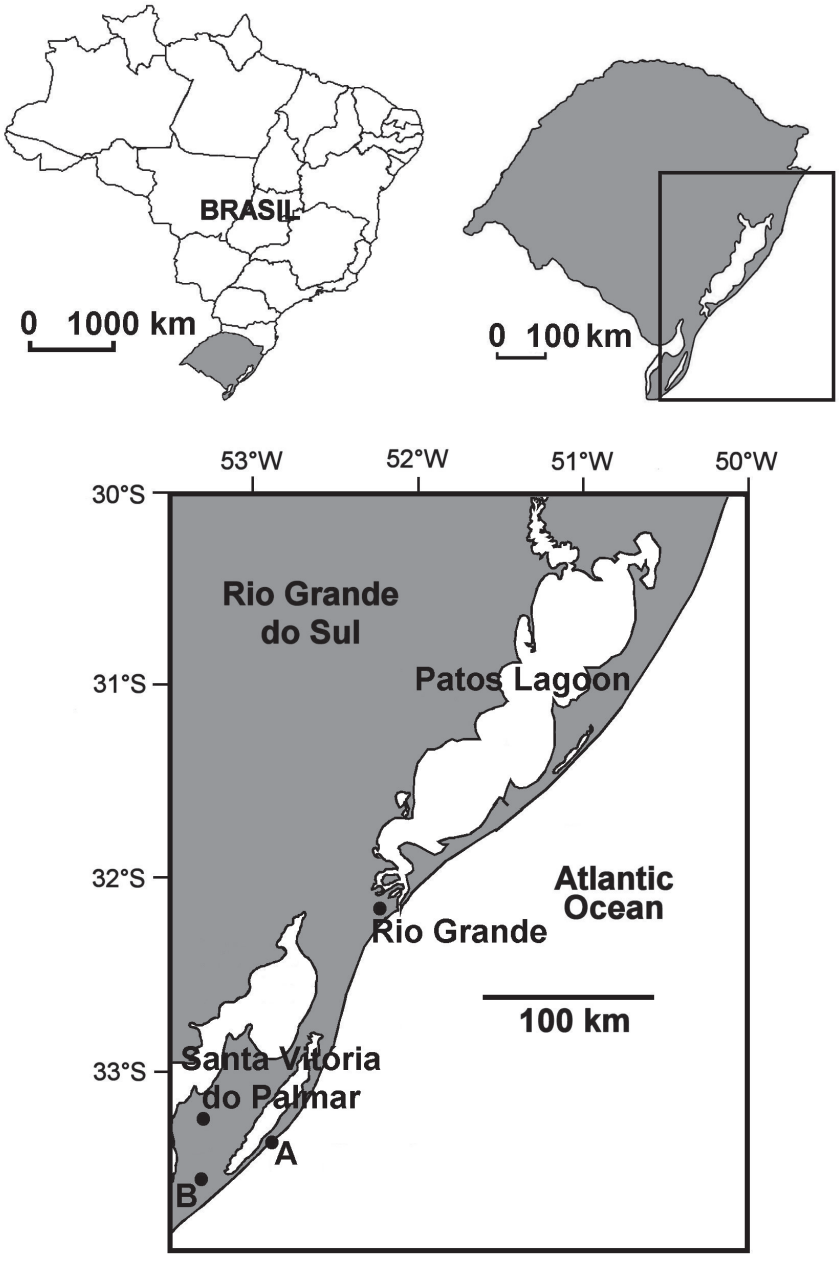

Figure 1. Location map from Rio Grande do Sul State and a detail of the coastal plain: **A**. "Concheiros"; **B**. Chuí Creek.

context, ESR ages obtained on fossil teeth of mammals from these deposits revealed ages between 650 ka and 18 ka (Lopes *et al.*, 2008, 2009).

SYSTEMATIC PALEONTOLOGY

Magnaorder XENARTHRA Cope, 1889
Order PILOSA Flower, 1883
Family MYLODONTIDAE Gill, 1872
Subfamily SCELIDOTHERIINAE Ameghino, 1904
Genus *Catonyx* Ameghino, 1891

Catonyx cf. *C. cuvieri* Lund, 1842
(Figures 2-5)

Material. An almost complete right dentary of an adult individual (EPM-PV0400, Figure 2); a fragment of a right dentary of a juvenile individual (LGP-Q0034, Figure 3); an isolated lower m4 of a juvenile (LGP-Q0035, Figure 4); two incomplete lower molars (LGP-Q0039, Figure 5A; LGP-Q0041, Figure 5B), and a fragment of an upper m5 of a juvenile individual (LGP-Q0045, Figure 5C).
Localities. Chuí Creek, about 6 km SE of Santa Vitória do Palmar City (EPM-PV0400 and LGP-Q0035); in "Concheiros" found on the beach about 150 km to the south of the inlet of Patos Lagoon (LGP-Q0034, 0039, 0041 and 0045).

DESCRIPTION AND COMPARISONS

The adult right dentary has a maximum length of 400 mm, with maximum height and width (at the level of the m3) of 78 and 19 mm respectively (Figure 2). The mandibular symphysis is long and narrow, dorsally curved and measuring almost the same length of the dental series; it possesses a ventral keel. A small portion of the left dentary is still sutured to the rostral end, attesting the mature age of the individual. The symphysis is shorter and more curved dorsally than that of *Scelidotherium leptocephalum* (Owen, 1856). It has two small mental foramina on the lateral side, at the same level of the alveoli. The area between the symphysis and the base of the coronoid process is deeper than in *S. leptocephalum*, and the bony wall on the lateral side of the dental series is about 15 mm taller than the lingual one. The body of the dentary tapers anteriorly, while in *Valgipes bucklandii* the height of the body is constant (Cartelle *et al.*, 2009). The total length of the dental series is 112 mm and although the teeth are not preserved, the shape of the alveoli shows that the m1 was subtriangular, with the mesial and distal lobes separated by a deep longitudinal groove on the lingual side. The m2 and m3 were subtriangular, with the widest portion on the labial side, and obliquely oriented relative to the dentary. The m4 had a distal lobe curved towards the lingual side, separated from the lingual lobe by a deep longitudinal groove. The posterior opening for the dentary channel is large and located below the level of the alveoli. The area behind the m4, comprising the coronoid, condylar, and angular processes, is thin and have a deep concavity on its medial side for attachment of the *pterigoideus internus* muscle. On its lateral side the crests for attachment of the *masseteric* muscle are distinct, but not much prominent. The coronoid process is partially broken above the level of the alveoli.

In *Valgipes bucklandii* the condyle is projected above the occlusal surface of the molariforms (Cartelle *et al.*, 2009); in the specimen EPM-PV0400 the condyle is at the level of the molariforms.

Figure 2. Right dentary of *Catonyx* cf. *C. cuvieri* Lund, 1842 (EPM-PV0400), in dorsal (**A**), medial (**B**), and lateral (**C**) views. Scale bar: 50 mm.

In comparison to the *S. leptocephalum* described by Owen (1856) the condyle is more projected backwards, is more robust and it possesses a larger articular surface. The angular process is less projected backwards and it is concave on its medial side. The lateral and medial sides of the dentary exhibit thin longitudinal crackings along the surface, indicating that it has been exposed to some weathering.

A fragment of a right dentary was collected on the beach at the "Concheiros" deposits. It comprises the dental series and it is broken ahead of the m1 and behind the m4 (Figure 3). All four molars are present and broken at the level of the alveoli, with the m1 less preserved than the other teeth. The maximum length of the specimen is 69.5 mm, and its maximum height and width at the level of the m3 is 42.5 and 21 mm, respectively. The preserved portion of the dental series is 63 mm in length. Although the teeth exhibit the same transverse profile of those of the adult dentary EPM-PV0400, their smaller dimensions suggest a juvenile individual. The specimen exhibits taphonomic features observed in all fossils found on the beach, like dark color, high density, and signs of abrasion due to wave transport (Lopes *et al.*, 2008). The cavities are filled with sand grains and calcite crystals. Its ventral portion is intact; the bony wall on the lateral side is higher than on the medial one. Due to the fracturing of the anterior portion of the dentary, only the distal lobe of the m1 is preserved, but it is visible that this tooth was concave on the lingual side. The m2 and m3 are subtriangular in transversal section, wider on its lingual side, and disposed obliquely relative to the dentary. The m4 is subtriangular in transversal section, with a mesial and a distal lobe subparallelly aligned with the dentary, plus a smaller lobe on the lingual side, projected backwards, and forming an acute angle with the distal lobe. The tooth exhibits a shallow longitudinal depression on its labial side. The distal lobe is not as turned to the lingual side and do not exhibit the longitudinal crest on its labial side as seen in other scelidotheriines, (e.g., Owen, 1856; Paula Couto, 1953; Pascual *et al.*, 1966; Sedor *et al.*, 2004).

A lower left m4, collected in Chuí Creek deposits, have maximum height of 35.5 mm, with mesiodistal length of 19.5 mm and labiolingual width of 85 mm (Figure 4). It is conical-shaped, subtriangular in tranversal section, and shows the vertices formed by the mesial, distal and lingual lobes. The morphology is the same observed in the m4 of the specimen LGP-Q0039. The lingual lobe is turned distally and separated from the distal lobe by a deep groove, while there is only a shallow depression between it and the mesial lobe. Longitudinally, the labial side is almost straight, while the lingual side is convex. The pulpar cavity occupies about 1/3 of the tooth, and its conical shape indicates that it was a juvenile individual.

Three other isolated molars were also found in the "Concheiros", two of them probably corresponding to a right lower m2 (Figure 5). They are subtriangular in transversal section, mesiodistally compressed, longitudinally straight and transversally concave on the mesial side, and convex on the distal side; both exhibit dark color, high density and abraded surface. One of the specimens (Figure 5A) has a flat occlusal surface, and although the ventral side is fractured, part of the pulpar cavity is still visible. Its labial and lateral surfaces are marked by shallow and irregular short thin grooves, probably a result of bioerosion by marine organisms. Its maximum height is 46 mm, mesiodistal length is 11 mm and labio-lingual width is 24 mm. The other molar (Figure 5B) is much more abraded, making impossible to distinguish between the occlusal and basal surfaces, thus it isn't clear if it corresponds to a right or left tooth. The abrasion has removed also large portions of the external cementum. The labial concavity and the lateral

Figure 3. Right dentary of a probable juvenile form of *Catonyx* cf. *C. cuvieri*, identified in "Concheiros" deposits (LGP-Q0034), showing the dark color and abrasion features. View of the medial (**A**), anterior (**B**), and dorsal (**C**) norms. Scale bar: 50 mm.

convexity are not well distinguishable. It measures 43.5 mm in height, 10.5 mm of mesiodistal length and 22 mm of labiolingual width. The prismatic shape of both specimens indicates that they were from adult individuals.

Finally, another isolated molar collected in the "Concheiros" consists of a fragment of the occlusal portion from an upper left m5 (Figure 5C). It is conical-shaped, with subtriangular form in transversal section and elongated labiolingually. Its maximum height is 22 mm, its mesiodistal length is 9.5 mm and its labiolingual length is 14.5 mm. The molar has a mesial and a distal lobe on the lingual side and one larger labial lobe. The labial and distal lobes are separated by a deep longitudinal groove. The occlusal surface shows no sign of wear by mastication, although the tooth exhibits signs of abrasion due to transport and reworking. The conical shape indicates that it also corresponds to a juvenile individual.

The Table 1 presents a comparison between the dimensions of the dentary and molars of a sample from Chuí Creek and another from the "Concheiros". The Figure 6 shows a comparison between lower right dental series of several scelidotheriines with the specimen LGP-Q0034 described here.

DISCUSSION

The systematic of Scelidotheriinae is very complex and has been object of several discussions and revisions through the years. The first known scelidotheriinae fossils are represented by *Scelidotherium leptocephalum*, collected by Darwin in Argentina and described by Owen (1838, 1856). In Brazil, two kinds of scelidotheriines were recognized among the fossils collected in the caves of Minas Gerais State: *Scelidotherium owenii* Lund, 1846, and *Scelidotherum bucklandii* Lund, 1846 (Cartelle *et al*., 2009). Winge (1915) re-described those remains, respectively designating them to *Catonyx giganteus* and *S. magnum,* the last one after assigned to *S. wingei* by Kraglievich (1923). After Hoffstetter (1954) concluded that the remains attributed to *S. magnum* were in fact *Scelidodon cuvieri*, and that *C. giganteus* was an invalid taxa (Dantas and Zucon, 2007; Cartelle *et al*., 2009).

McDonald (1987) considered that the only valid Pleistocene scelidotheriine genera are *Scelidotherium* and *Catonyx*, the latter replacing the invalid *Scelidodon*, and recognized three valid species: *Catonyx cuvieri*, *C. tarijensis* (= *S. capellini* Ameghino, 1889) and *C. chiliense* (= *Scelidotherium chiliense* Lydekker, 1886). Later, McKenna and Bell (1997) have considered both *Scelidodon* and *Catonyx* as junior synonyms of *Scelidotherium*, although several other researchers have pointed several cranial and postcranial characters that justify the distinction between *Catonyx* and *Scelidodon*, the latter found in Argentina, Peru, Bolivia, Chile and Ecuador, while the former would be endemic to Brazil (Pascual *et al*., 1966; Pujos, 2000; Guérin and Faure, 2004; Miño-Boilini, 2006; Miño-Boilini and Carlini, 2009).

During the last 50 years several remains of scelidotheriines have been found in Brazil, especially in Piauí, Ceará, Bahia, São Paulo and Paraná States (Paula Couto, 1953; 1973; 1979; Guérin, 1991; Guérin and Faure, 2004; Sedor *et al*., 2004; Dantas *et al*., 2005; Dantas and Zucon, 2007). The only species recognized has been *Catonyx cuvieri*, although Guérin and Faure (2004) have described a new specie of *Scelidodon* (*S. piauiense*) from northeastern Brazil, and Sedor *et al.* (2004) have assigned remains found in Paraná State to the genus *Scelidodon*. Nevertheless, recent reviews have concluded that the only valid scelidotheriines found at least in the intertropical zone of Brazil are *Catonyx cuvieri* and *Valgipes bucklandii* Cartelle *et al*., 2009 (Ferrero, 2008; Cartelle *et al*., 2009; Miño-Boilini and Carlini, 2009) and that *S. piauiense* is a synonym of *Valgipes bucklandii* (Cartelle *et al*., 2009).

The most distinct dental feature of mylodontids is the bilobate shape of the last upper and lower molars, with the Scelidotheriinae distinguishing from the Mylodontinae by the presence of a slender skull, a more elongated dentary, dorsally concave on the rostral end, and compressed teeth with subtriangular transverse profile, obliquely located in relation to the dentary (McDonald and Perea, 2002; Cartelle *et al*., 2009). The main difference between the genera *C. chiliense, C. tarijense and C. cuvieri* is that the

Table 1. Comparison between the samples of Chuí Creek (EPM-PV 0400) and "Concheiros" (LGP-Q 0034), comparing the dimensions of dentary and molars. **DS** = length of the dental series; **LLMW** = labiolingual maximum width; **MDML** = mesiodistal maximum length (at the level of the alveoli); **ML** = maximum length; **MH** = maximum height; **MW** = maximum width (at the level of the m3).

Material	Chuí (EPM-PV0400)	"concheiros" (LGP-Q0034)
ML	40	6,95
MH	7,8	4,25
MW	1,9	2,1
DS	11,2	6,3
m1MDML	3,4	-
m1LLMW	1,25	-
m2MDML	1,8	0,65
m2LLMW	2,75	1,35
m3MDML	1,75	0,7
m3LLMW	2,75	1,3
m4MDML	3,7	2,15
m4LLMW	1,5	0,7

latter does not possess an entepicondylar foramen on the humerus (Paula Couto, 1979; Pasquali and Tonni, 2005; Goes *et al.*, 2001; McDonald and Perea, 2002), a feature impossible to be evaluated in the material described here.

Although incomplete, the specimens here described exhibit features that allow their recognition as remains of scelidotheriinae sloths. The adult dentary (EPM-PV0400) possesses characteristic features of *Catonyx,* such as the height of the dentary tapering anteriorly, ventral keel in the mandibular symphysis and the condyle positioned at the same level of the occlusal plane (McDonald and Perea, 2002; Cartelle *et al.*, 2009). The remains are tentatively classified as *C. cuvieri,* based on the assumption that up to date this is the only scelidotheriinae found in Brazil (Dantas and Zucon, 2007). Cartelle *et al.* (2009) have reinterpretated *Valgipes bucklandii* as another species of scelidotheriinae, but until now this form is restricted to the intertropical zone of Brazil.

The occurrence of *Catonyx* in deposits of Rio Grande do Sul State increases the known diversity of pilose Xenarthra and extends the geographical range of Brazilian scelidotheriines to the southernmost portion of the country, some 1000 km farther than previously known (Sedor *et al.*, 2004; Cartelle *et al.*, 2009). It is noteworthy that in these deposits the remains of megatheriid and mylodontinae sloths are much more abundant in comparison to the scelidotheriines, a pattern similar to that observed in fossiliferous deposits of northern Argentina (Carlini *et al.*, 2008; Ferrero, 2008) and Uruguay (McDonald and Perea, 2002). Scelidotheriines are considerd morphologically conservative, and the scarcity of scelidotheriines in comparison to mylodontines might be a result of the lower taxonomic diversity of the former (McDonald and Perea, 2002; Gaudin, 2004).

The conical shape of some of the teeth (Figures 4, 5C) and the smaller dimensions of the dentary fragment (Figure 3) in comparison to the dentary found in Chuí Creek (Table 1), indicate that these remains represent juvenile individuals. Very young sloths do exhibit teeth with conical-shaped occlusal surfaces that progressively wear, due to mastication, becoming prismatic (Cartelle, 1992; Cartelle and De Iuliis, 2006). In comparison to larger specimens of *Catonyx* (Paula Couto, 1953; Sedor *et al.*, 2004), the isolated m4 (Figure 4) and the m4 on the dentary fragment do not possess the longitudinal ridge on the labial side, and have a distal lobe less lingually curved (Figure 6). However, it must be noted that the dentary fragment and the isolated m4 described here belong to juvenile individuals, thus these morphological differences might be related to the ontogenetic development in *Catonyx*.

The present authors however do not discard the possibility that *Scelidodon* might also be represented in southern Brazil because it was formerly considered a biostratigraphic marker of the Ensenadan Stage/Age in the Pampean region of Argentina (Cione and Tonni, 1999; Cione *et al.*, 1999), but recently has also been found in the younger deposits of Lujanian Stage/Age in the Mesopotamic region of northern Argentina (Carlini *et al.*, 2008; Ferrero, 2008; Miño-Boilini and Carlini, 2009), at nearly the same latitude as Rio Grande do Sul. A similar temporal/latitudinal pattern is observed in cervids of the genus *Antifer*, that in the Pampean region are restricted to the Ensenadan-Bonaerean, but are also found in Lujanian deposits of northern Argentina, Chile, Uruguay, and Rio Grande do Sul (Alcaraz and Zurita, 2004; Ubilla, 2004; Labarca and López, 2006; Kerber and Oliveira, 2008; Lopes and Pereira, 2009).

The fossils found in the continental shelf probably represent a large time span (6×10^4 years), and their reworked nature prevents the establishment of paleoecological reconstructions. However, at the deposits of Chuí Creek, the age of the remains is more restricted, between 40 and 30 ka (Lopes *et al.*, 2009). Here the co-occurrence of several species of ground sloths (scelidotheriines, mylodontines and megatheriids) reinforce the model of niche partitioning between giant sloths proposed by Bargo and Vizcaíno (2008). However, the time-averaging of about 10^4 years may imply that not all those taxa

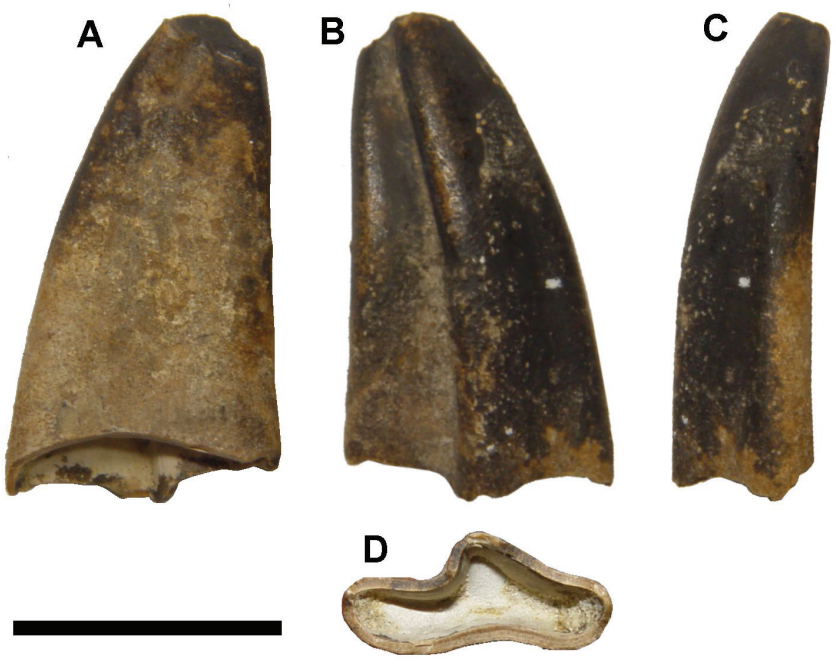

Figure 4. A lower left m4 (LGP-Q0035), in labial (**A**), lingual (**B**), mesial (**C**) and basal (**D**) norms. Scale bar: 20 mm

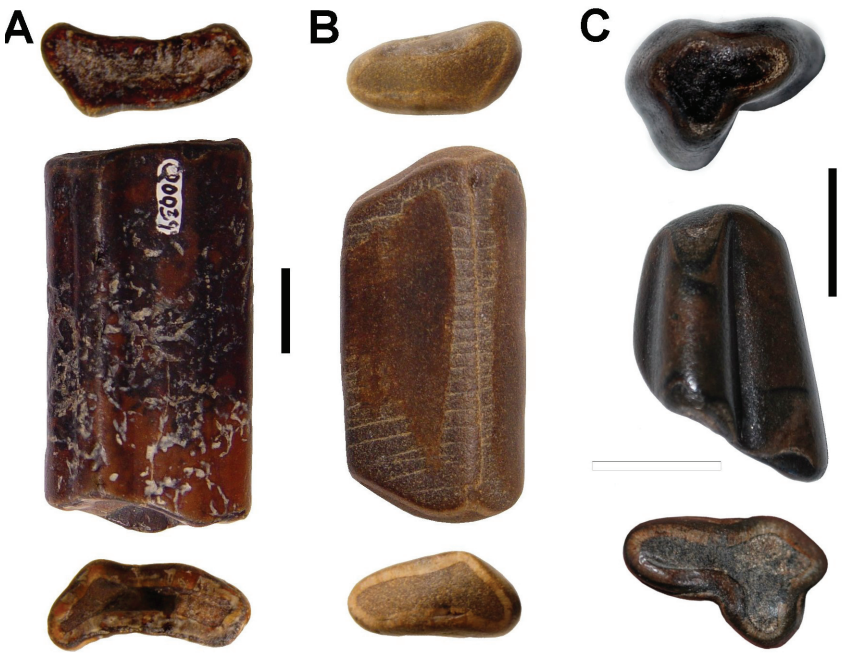

Figure 5. Two lower adult molars (LGP-Q0039, **A**; LGP-Q0041, **B**) and a juvenile one (LGP-Q0045, **C**) from the "Concheiros" deposits, showing occlusal (top), distal (middle) and basal (bottom) views. Scale bars: 10 mm.

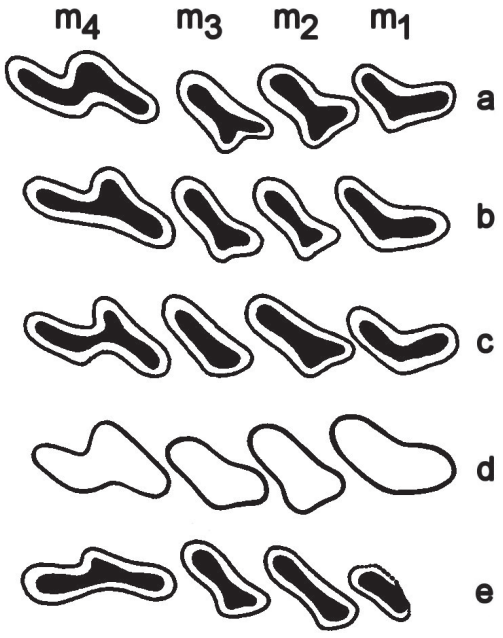

Figure 6. Comparison between lower right dental series (not shown on the same scale). **A**. *Scelidotherium leptocephalum* (modified from Owen, 1856, Plate IX, Figure 2); **B**. *Catonyx tarijensis* (= *Scelidodon capellini*, modified from Pascual *et al.*, 1966); **C**. *Scelidodon wingei* (modified from Paula-Couto, 1953; Plate X); **D**. *Valgipes bucklandii* (specimen MCL 4293, modified from Cartelle *et al.*, 2009); **E**. *Catonyx* sp. (specimen LGP-Q0034), from this paper.

occupied the area at the same time. Also to Bargo and Vizcaíno (2008) the overall shape of the masticatory apparatus of *Catonyx* and *Scelidotherium* indicates mixed or selective-feeders habit, while other sloths were more generalist herbivores.

The apparent mixture of Pampean taxa, such as *Lestodon armatus* and *Doedicurus clavicaudatus* (Henriques, 1992; Oliveira, 1992), with Brazilian ones, like *Eremotherium laurillardi*, *Catagonus stenocephalus* and *Protocyon troglodytes* (Oliveira *et al.*, 2005; Pereira *et al.*, 2009), might be a preservational artifact. Yet the presence of taxa that indicate distinct environments, such as *Myocastor coypus*, *Microcavia* sp., and Dolichotinae (Ubilla *et al.*, 2008; Pereira *et al.*, 2009), indicates distinct environmental changes through the time.

CONCLUSIONS

The fossils described here are tentatively identified as belonging to the species *Catonyx cuvieri* from the Scelidotheriinae, based mostly on dental features, although the incompleteness of most of the specimens precludes the conclusive identification at species level. These fossils show a southward geographical range farther than previously recorded.

Although the fossil remains from the continental shelf exhibit a wide age spectrum, the presence of *Catonyx* in the deposits of Chuí Creek attests their surviving into the late Pleistocene, and makes possible to establish chrono and biostratigraphic correlations with other fossiliferous deposits in Brazil.

The scarcity of the *Scelidotheriinae* in the fossil record from south Brazil, when compared with the mylodontine and megatheriid sloths, makes the present material a contribution to the diversity of pilose xenarthrans.

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