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REVOLUTION OF THE MIOCENE CAVIOMORPH RODENTS FROM THE RÍO SANTA CRUZ (ARGENTINEAN PATAGONIA)

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Abstract. Fossil rodents from the Río Santa Cruz (RSC) classic localities (Santa Cruz Formation, Early–Middle Miocene) are known by the works of F. Ameghino and W.B. Scott since the end of the 19th and beginning of the 20th centuries. These caviomorph rodents have not been comprehensively reviewed since then. In this contribution, we studied new fossil specimens from the cliffs of the RSC (Province of Santa Cruz, Argentina) collected with accurate stratigraphic and geographic data during fieldtrips in 2013 and 2014. An increase in the caviomorph taxonomic richness is observed, based upon our taxonomic study of caviomorphs previously recorded in the RSC. Also, these fieldworks recovered for the first time several taxa previously found in other Santacrucian and even older Patagonian localities (Colhuehuapian, Early Miocene). As a general evolutionary pattern, we note an increase of derived euhypsodont taxa (Prolagostomus, Pliolagostomus, Schistomys, and Eocardia) in Segundas Barrancas Blancas (16.47–15.3 Ma). In addition, a taxonomic replacement of Phanomys by Schistomys is noted between Barrancas Blancas (17.21–16.3 Ma) and Segundas Barrancas Blancas, as well as a notably increase in the abundance of the large Perimys anustus in the latter locality. The present study provides a revision of the caviomorph systematics, and intends to be the starting point to understand the diversity (in all its aspects) and the evolution of this group during the Santacrucian, a major event in the South American mammalian history.

Key words. Santacrucian. Province of Santa Cruz. Hystricognathi. Taxonomy. Systematics. Biostratigraphy. Evolution.

Resumen. REVISIÓN DE LOS ROEDORES CAVIOMORFOS MIOCENOS DEL RÍO SANTA CRUZ (PATAGONIA ARGENTINA). Los roedores fósiles provenientes de localidades del Río Santa Cruz (RSC; Formación Santa Cruz, Mioceno Temprano–Medio) se conocen desde fines del siglo 19 y principios del 20, gracias a los trabajos de F. Ameghino y W.B. Scott. Sin embargo, no fueron estudiados a nivel integral desde ese momento. En este sentido, analizamos nuevos ejemplares recolectados en las barrancas del RSC (Santa Cruz, Argentina) durante los años 2013 y 2014 que cuentan con datos de procedencia estratigráfica y geográfica precisos. El estudio taxonómico permitió reconocer taxones previamente descriptos para el RSC, así como nuevos taxones conocidos en otras localidades santacrucenses o en localidades más antiguas de Patagonia (Colhuehuapense, Mioceno Temprano). Se corroboró un aumento en la riqueza taxonómica del conjunto de roedores del RSC. Como patrón evolutivo general, se observa un incremento en formas euhypsoodontes derivadas (Prolagostomus, Pliolagostomus, Schistomys, Eocardia) en Segundas Barrancas Blancas (16.47–15.3 Ma). A su vez, observamos un reemplazo taxonómico de Phanomys por Schistomys desde la localidad de Barrancas Blancas (17.21–16.3 Ma) a Segundas Barrancas Blancas y un notable aumento en la abundancia de Perimys anustus, la especie más grande del género, en esta última localidad. El presente estudio es una puesta al día de la sistemática de los caviomorfo del RSC y pretende ser el punto de partida para entender la diversidad y la evolución de los caviomorfo durante el Santacrucense, un periodo crucial en la historia de los mamíferos sudamericanos.

Palabras clave. Santacrucense. Provincia de Santa Cruz. Hystricognathi. Taxonomía. Sistemática. Bioestratigrafía. Evolución.

CAVIOMORPHS are the endemic hystricognath rodents of Central and South America (Wood, 1955; Upham and Patterson, 2015). They constitute the most diverse group of rodents from a morphological and ecological point of view, and have a long evolutionary history during the Cenozoic (Vassallo and Antenucci, 2015; Vucetich et al., 2015). The systematics and biology of extant taxa have been intensively studied and are relatively well-known (Álvarez et al., 2011; Patton et al., 2015; Vassallo and Antenucci, 2015). However, these aspects still require intensive study in fossils. In this regard, the Early Miocene represents a crucial moment in the evolutionary history of caviomorphs since the fossil record indicates that Santacrucian rodents were a critical part of an important caviomorph diversification (Pérez and Pol, 2012;
The Early–Middle Miocene of Patagonia (Colhuehuapian, “Pinturan”, Santacrucian, and “Colloncuran” South American Land Mammal Ages, SALMA), has yielded an excellent record of mammals (e.g., Ameghino, 1887a,b, 1889; Scott, 1905; Kramarz, 2001, 2002, 2004, 2006a,b; Kramarz et al., 2010, 2013; Pérez, 2010a; Pérez et al., 2010; Vucetich et al., 2010; Pérez and Vucetich, 2012; Vizcaíno et al., 2012a; Arnal and Pérez, 2013; González Ruiz et al., 2013, 2017; Brandoni et al., 2017, 2019; Vera et al., 2017, 2018; Busker et al., 2018; Rasia and Candela, 2019). In particular, the Santa Cruz Formation (Early–Middle Miocene; Santacrucian) is widely distributed in the Province of Santa Cruz, Argentina (Fig. 1; Cuitiño et al., 2016, 2019). It is one of the richest Cenozoic vertebrate fossil units bearing abundant and well-preserved specimens. Caviomorphs recorded in the cliffs of the classic localities of the Río Santa Cruz (RSC; Fig. 1) were first studied by F. Ameghino (1887a,b, 1889, 1891a,b, 1894) who erected 23 caviomorph genera and 45 species (Tab. 1). These rodents were later revised by Scott (1905) who described new species from other Santacrucian localities of the Province of Santa Cruz (Fig. 1), but no new caviomorph genera were identified. In this regard, Scott (1905, p. 384) stated: “It must not be supposed that the full number of Santa Cruz genera has been already discovered, though it is improbable that the list will be very greatly extended in the future”. Since that time, several other Santacrucian–age localities have been identified at high and middle latitudes of South America. However, caviomorphs have been listed or mentioned in only some of them: coastal localities in the Province of Santa Cruz (Tauber, 1997; Candela et al., 2012), Las Hornillas, Province of San Juan, Argentina (López et al., 2011), Alto Río Cisnes (Marshall and Salinas, 1990), Pampa Castillo (Flynn et al., 2002), Laguna del Laja (Flynn et al., 2008), and Sierra Baguales (Bostelmann et al., 2013) of southern Chile, and Chucal of northern Chile (Croft et al., 2004). In agreement with Scott’s conclusion, almost no new taxa were formally recognized since Ameghino’s work (but see Arnal and Vucetich, 2015b).

Despite the importance of this rodent fauna owing to their excellent fossil record and widespread geographical distribution, no comprehensive studies of the caviomorph assemblages either from the RSC or from other Santacrucian localities have been perform ed to date. Only partial revisions or isolated studies of specimens from different Santacrucian localities have been published (Pérez, 2010b; Arnal, 2012; Pérez and Vucetich, 2012; Arnal and Vucetich, 2015b; Arnal et al., 2017).

A particular problem of this fauna is that the abundant fossil remains found by Carlos Ameghino in the RSC and other localities lack accurate geographic and stratigraphic data, which makes comparisons between localities and biostratigraphic correlations difficult (Fernicola et al., 2019). Since those first collections, almost no new intensive field work had been made to remedy this deficiency. At the beginning of the 21st century a group of scientists headed by Drs. S.F. Vizcaíno, M.S. Bargo (Museo de La Plata, MLP), R.F. Kay (Duke University, USA), and J.C. Fernicola (Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”), launched a project focused on the Santa Cruz rocks (Santa Cruz Formation, Early–Middle Miocene) cropping out along the Atlantic coast of the Province of Santa Cruz, and along the cliffs on the southern bank of the RSC. Within this project, numerous new specimens with good stratigraphic provenance were collected (Vizcaíno et al., 2012a; Fernicola et al., 2014, 2019; Cuitiño et al., 2016), which considerably
enlarge the Santacrucian caviomorph collections and allow integral studies of the whole Santacrucian assemblage to be performed. Furthermore, on the basis of a systematic revision and owing to the precise provenance data, different Santacrucian localities bearing rodents can now be harnessed in the search for evolutionary trends related to climatic and environmental changes. In this contribution, a revision of the caviomorph rodents from the Santa Cruz Formation at the RSC is performed, including new specimens. Their taxonomic richness is compared with those from other Santacrucian localities of the Province of Santa Cruz (Scott, 1905; Candela et al., 2012; Fernicola et al., 2019). Additionally, general evolutionary trends of the group are also discussed.

MATERIALS AND METHODS
More than 750 fossil specimens (Appendix 1) housed at the Vertebrate Paleontology Collection of the Museo Regional Provincial “Padre Manuel Jesús Molina” (MPM-PV) were studied. Several Santacrucian caviomorphs specimens were used for comparison, mainly those housed at the American Museum of Natural History (AMNH), New York, USA; Field Museum of Natural History (FMNH), Chicago, USA; Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Ameghino National Collection (MACN-A), Buenos Aires, Argentina; Museo de La Plata, La Plata, Argentina (MLP); Museum National d’Histoire Naturelle (MNHN), Paris, France; Museo Paleontológico Egidio Feruglio (MPEF-PV),
| Table 1 - Caviomorph rodents from the Río Santa Cruz described by Ameghino | Current taxonomy |
|---------------------------------------------------------------|-----------------|
| **Ameghino, 1887a**  | **Ameghino, 1887b** | **Ameghino, 1889** | **Ameghino, 1891a,b** | **Ameghino, 1902** |
| Acaremys murinus | Acaremys murinus<sup>1</sup> | Acaremys mossor<sup>2</sup> |  |  |
| Acaremys minutus | Acarechimys minutus<sup>1</sup> | Acarechimys minutissimus<sup>2</sup> |  |  |
| Acaremys minutissimus | Acarechimys varians<sup>1</sup> | Sciamys principalis |  |  |
| Sciamys varians | Sciamys varians<sup>2</sup> | Adelphomys candidus<sup>3</sup> | Stichomys regularis<sup>4</sup> | Stichomys constans<sup>7</sup> |
| Adelphomys candidus | Adelphomys candidus | Sciamys regularis<sup>8</sup> |  |  |
| Stichomys regularis<sup>9</sup> |  |  |  |  |
| Stichomys constans<sup>7</sup> |  |  |  |  |
| Spaniomys riparius<sup>10</sup> | Spaniomys riparius<sup>11</sup> | Spaniomys modestus<sup>12</sup> |  |  |
| Spaniomys modestus<sup>13</sup> |  |  |  |  |
| Sciamys principalis | Sciamys latidens<sup>14</sup> | Pseudoacaremys kramarzii<sup>1</sup> |  |  |
| Sciamys varians |  |  |  |  |
| Neoreomys australis<sup>15</sup> |  |  |  |  |
| Neoreomys indivisus |  |  |  |  |
| Neoreomys decisus<sup>16</sup> | Neoreomys insulatus<sup>17</sup> |  |  |  |
| Eocardia divisa | Eocardia montana<sup>18</sup> |  |  |  |
| Eocardia perforata<sup>19</sup> |  |  |  |  |
| Dicardia excavata<sup>20</sup> | “Eocardia” excavata<sup>21</sup> |  |  |  |
| Schistomys erro | Schistomys erro<sup>22</sup> |  |  |  |
| Phanomys mixtus | Phanomys mixtus | Phanomys vetulus<sup>23</sup> |  |  |
| Phanomys vetulus<sup>24</sup> |  |  |  |  |
| Hedymys integrus<sup>25</sup> | Nomen nudum<sup>26</sup> |  |  |  |
| Perimys erutus | Perimys erutus<sup>27</sup> |  |  |  |
| Perimys onustus<sup>28</sup> | Perimys onustus |  |  |  |
| Perimys planaris<sup>29</sup> |  |  |  |  |
| Sphigomys scalaris | Perimys incavatus<sup>30</sup> | Perimys incavatus<sup>31</sup> | Perimys zonatus<sup>32</sup> |  |
| Prolagostomus pusillus | Olenopsis uncinus<sup>33</sup> |  |  |  |
| Prolagostomus divisus | Prolagostomus pusillus<sup>34</sup> |  |  |  |
| Prolagostomus profluens |  |  |  |  |
| Prolagostomus imperialis |  |  |  |  |
| Lagostomus lateralis |  |  |  |  |
| Lagostomus primigenius |  |  |  |  |

<sup>1</sup>Arnal and Vucetich (2015b); <sup>2</sup>Arnal et al. (2017); <sup>3</sup>this work; <sup>4</sup>Kramarz (2006b); <sup>5</sup>Pérez (2010b); <sup>6</sup>sensu Wood and Patterson (1959); <sup>7</sup>Kramarz (2002);<sup>8</sup>Ameghino (1894) transferred this species to Perimys zonatus; <sup>9</sup>Candela and Nasif (2006) synonymized this species with Neoreomys; <sup>10</sup>Rasia (2016); <sup>11</sup>Scott (1905) synonymized this species with Prolagostomus pusillus; <sup>12</sup>Kramarz (2002) synonymized this species with Prolagostomus; <sup>13</sup>Rasia and Candela (2019); <sup>14</sup>Mones.
Trelew, Argentina; and Princeton University Collection of the Yale Peabody Museum (YPM-PU), New Haven, USA.

Caviomorph systematics follow Pérez (2010a,b), Arnal (2012), Arnal and Vucetich (2015b), Rasia (2016), and references in Table 1.

The studied localities along the southern banks of the RSC are, from East to West (Fernicola et al., 2014; Cuitiño et al., 2016, 2019) (Fig. 1): Barrancas Blancas (BB; 17.21–16.3 Ma), with two sites, Estancia Aguada Grande (EAG) and Estancia Santa Lucía (ESL); Segundas Barrancas Blancas (SBB; 16.47–15.3 Ma), with three sites, Estancia Cordón Alto1 (ECA), Estancia Cordón Alto2 (ECA2), and Estancia el Tordillo (EET); Yaten Huageno (YH; 17.21–16.68 Ma) with one site, Estancia El Refugio (EER).

SYSTEMATIC PALEONTOLOGY

Order Rodentia Bowdich, 1821
Suborder Hystriognathi Tullberg, 1899
Superfamily Octodontoidea Waterhouse, 1839

Genus Spaniomys Ameghino, 1887a

Type species. Spaniomys riparius Ameghino, 1887a. Pinturas Formation, Early Miocene and Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

Spaniomys riparius Ameghino, 1887a

Referred materials. See Appendix 1.
Locality and Horizon. See Appendix 1.

Spaniomys sp.
Figure 2.1–4

Referred materials. See Appendix 1.
Locality and Horizon. See Appendix 1.

Comments. Spaniomys is characterized by being higher crowned than Acaremys Ameghino, 1887a and Acarechimys Patterson in Kraglievich, 1965. Cheek teeth have planar occlusal surfaces and undifferentiated cusps (Fig. 2.1–3), unlike Acarechimys, but resembling Adelphomys Ameghino, 1887a and Stichomys Ameghino, 1887a. This genus retains the deciduous premolar through life, unlike acaremyids (= Acaremys, Sciamys Ameghino, 1887a, Pseudoacaremys Arnal and Vucetich, 2015b, Galileomys Vucetich and Kramarz, 2003, and Platypittamys Wood, 1949; Arnal and Vucetich 2015b). Lophs and lophids are thin with pointed labial and lingual ends respectively, unlike Adelphomys and Stichomys. Lower cheek teeth have four lophs (MPM-PV 20178; Fig. 2.1–2) and upper cheek teeth have four (MPM-PV 20310; Fig. 2.3) or five lophs.

Ameghino recognized three species: S. riparius, S. modestus Ameghino, 1887a, and S. biplicatus Ameghino, 1894 that differ in size and in the number of flexion lower cheek teeth. However, size differences are not great. In this work, several well-preserved specimens were recognized as S. riparius owing to their slightly larger size (MPM-PV 20115, MPM-PV 20524, MPM-PV 20557; Appendix 1; Tab. 2), but most of them (Fig. 2.1–4) were recognized as Spaniomys sp. (MPM-PV 20562; MPM-PV 20618; MPM-PV 20770; Appendix 1; Tab. 2) until a systematic revision is performed. Within the new rodents sample, Spaniomys is present and abundant in EAG and ESL (BB) and ECA, ECA2, and EET (SBB). In EER (YH) rodents are very scarce, but it is represented by one specimen (MPM-PV 20770; Tab. 2).

Genus Stichomys Ameghino, 1887a

Type species. Stichomys regularis Ameghino, 1887a. Pinturas Formation, Early Miocene, and Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz; Río Frías Formation, Middle Miocene, Province of Chubut.

Stichomys regularis Ameghino, 1887a

Figure 2.5–6, 9–10

Referred materials. See Appendix 1.
Locality and Horizon. See Appendix 1.

Stichomys sp.
Figure 2.7–8

Referred materials. See Appendix 1.
Locality and Horizon. See Appendix 1.

Stichomys? sp.
Table 2 - Caviomorph rodents reported in this contribution with a comparison of the taxonomic richness between the Río Santa Cruz localities

| Taxa                    | Octodontoidea | BB  | SB  | YH |
|-------------------------|---------------|-----|-----|----|
| Spaniomyx riparius      | X 1           | X 6 |     |    |
| Spaniomyx sp.           | X 18          | X 38| X 1 |    |
| Stichomyx regularis     | X 14          | X 1 |     |    |
| Stichomyx sp.           | X 7           | X 28|     |    |
| Acarechiomyx minutus    | X 5           |     |     |    |
| Acarechiomyx minutissimus| X 1  | X 14|     |    |
| Acarechiomyx constans   | X 7           |     |     |    |
| Acarechiomyx gracilis   | X 6           |     |     |    |
| Dudumys sp. nov.?       | X 1           |     |     |    |
| Prospaniomyx sp. nov.?  | X 1           | X 2 |     |    |
| Acaremys murinus        | X 2           |     |     |    |
| Acaremys sp.            | X 2           | X 1 |     |    |
| Sciomyx principalis     | X 2           | X 10|     |    |
| Sciomyx latidens        | X 1           |     |     |    |
| Sciomyx sp.             | X 1           | X 4 |     |    |

| Taxa                    | Erethizontoidea | BB  | SB  | YH |
|-------------------------|-----------------|-----|-----|----|
| Steiromys detentus      | X 1             | X 5 |     |    |
| Steiromys duplicatus    | X 11            | X 1 |     |    |
| Steiromys sp.           | X 2             |     |     |    |

| Taxa                    | Cavioida        | BB  | SB  | YH |
|-------------------------|-----------------|-----|-----|----|
| Neoreomyx australis     | X 51            | X 66|     | X 1|
| Phanomys mixtus        | X 13            |     |     |    |
| Phanomys sp.           |                 |     |     |    |
| Eocardiomyx montana    | X 8             | X 22|     |    |
| “Eocardiomyx excavata” | X 5             | X 4 |     |    |
| Eocardiomyx sp.        | X 22            | X 32|     |    |
| Schistomyx erro        | X 3             |     |     |    |

| Taxa                    | Chinchilloidea  | BB  | SB  | YH |
|-------------------------|-----------------|-----|-----|----|
| Prolagostomus pusillus  | X 34            |     |     |    |
| Prolagostomus sp.       | X 2             | X 80|     |    |
| Pliolagostomus notatus  |                 |     |     |    |
| Perimys erutus          | X 11            | X 3 |     |    |
| Perimys onustus         | X 1             | X 23|     |    |
| Perimys incavatus       | X 1             |     |     |    |
| Perimys sp.             | X 7             | X 6 |     |    |
| Scleromyx sp.           | X 8             | X 4 |     |    |

BB, barrancas Blancas; SBB, Segundas Barrancas Blancas; YH, Yaten Huageno; n, number of specimens (see Appendix 1). *Dubious taxa (?) are not included in the table.

Referred materials. See Appendix 1.
Locality and Horizon. See Appendix 1.

Stichomyx sp./Adelphomyx sp.

Referred materials. See Appendix 1.
Locality and Horizon. See Appendix 1.

Comments. Stichomyx is characterized by being relatively high-crowned, resembling Adelphomyx and Spaniomyx in this respect. It has derived cheek teeth with planar occlusal surfaces, undifferentiated cusps, and retention of the deciduous premolars through life (Fig. 2.5–10), also as in Adelphomyx and Spaniomyx. Nevertheless, their cheek teeth have broader lophs/ids with rounded end tips (Fig. 2.5–7 and 2.9), as Adelphomyx and unlike Spaniomyx. Upper molars with four lophs and lowers with three main lophids, as
in *Adelphomys* and *Spaniomys*. *Adelphomys* is very similar to *Stichomys*. The two genera differ in that the former has planar anterior face on the incisors and the latter convex ones (Ameghino, 1887a). In general terms, *Stichomys* is more abundant than *Adelphomys* (convex incisors are more abundant than planar incisors; see Appendix 1). Nevertheless, in the new rodent collection several specimens have no incisors preserved, and thus, they could not be recognized at generic level. These specimens were referred to as *Stichomys* sp./*Adelphomys* sp. (MPM-PV 20356, MPM-PV 20550; Appendix 1).

Seven species of *Stichomys* were described (Ameghino, 1887a, 1891a). Three of them were transferred to *Acarechimys* (Arnal et al., 2017). The remaining species require taxonomic revision. At present, we recognize several large and well-preserved specimens as *S. regularis* (Fig. 2.5–6, 9–10), but the remaining specimens only as *Stichomys* sp. (MPM-PV 20415; Fig. 2.7–8).

Within the new rodent sample *Stichomys* is the most abundant octodontid with more than 60 specimens (Appendix 1). We identified *Stichomys regularis*, *Stichomys* sp., *Stichomys* sp./*Adelphomys* sp., and *Stichomys?* sp. (Appendix 1). These taxa are more abundant in ECA, ECA2, and EET (SBB), while in BB (ESL and EAG) they are only represented by three specimens recognized as *Stichomys* sp. (Tab. 2). In EER (YH) there is one specimen recognized as *Stichomys regularis* (MPM-PV 20771). The phylogenetic relationships of *Stichomys* and *Adelphomys* are not clear. Based on the dental morphology they have been included in “Adelphomyinae”, an echimyid fossil lineage (Wood and Patterson, 1959; Kramarz, 2001). Nevertheless, most phylogenetic analyses (Arnal et al., 2014; Arnal and Vucetich, 2015a; Verzi et al., 2014) do not recover this clade. In fact, both *Stichomys* and *Adelphomys*, together with *Spaniomys* and other fossil octodontoids (i.e., *Eodelphomys* Frailey and Campbell, 2004 from the late Eocene of Peru and *Xylechimys* Patterson and Pascual, 1968 from the late Oligocene of Patagonia), represent a basal radiation of crown-octodontoids (Arnal and Vucetich, 2015a).

Genus *Acarechimys* Patterson in Kraglievich, 1965

**Type species.** *Acarechimys minutus* Ameghino, 1887a. Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz; Collon Curá Formation, early Middle Miocene, Province of Neuquén; unnamed formation, late Middle Miocene, Quebrada Honda, Bolivia.

**Acarechimys minutus** (Ameghino, 1887a)

**Referred materials.** See Appendix 1.

**Locality and Horizon.** See Appendix 1.

**Acarechimys constans** (Ameghino, 1887a)

**Referred materials.** See Appendix 1.

**Locality and Horizon.** See Appendix 1.

**Acarechimys gracilis** (Ameghino, 1891)

**Referred materials.** See Appendix 1.

**Locality and Horizon.** See Appendix 1.

**Comments.** *Acarechimys* was a successful evolutionary lineage of octodontoids with brachydont cheek teeth, thin loph/lophids, and identifiable cusps, unlike *Stichomys*, *Adelphomys*, and *Spaniomys*. It retained the deciduous premolars through life (Fig. 2.11, 14), unlike acaremysids. Upper cheek teeth have four lophs (Fig. 2.11) and lowers have three main lophids with another variably developed (Fig. 2.14; Arnal et al., 2017). This genus represents the octodontid with the widest temporal (Late Oligocene–Late Miocene) and geographic distribution (southern Argentinean Patagonia to Colombia), reaching its maximum recorded diversity in the Santacrucian (Arnal et al., 2017). Five species are recognized: *A. leucotheae* Vucetich et al., 2014 (Late Oligocene, Province of Chubut), *A. minutus*, *A. minutissimus* (Early–Middle Miocene of Argentinean Patagonia, Bolivia, and Colombia), *A. constans* and *A. gracilis* (Early–Middle Miocene, provinces of Chubut and Santa Cruz, Argentina). For detailed descriptions of the species see Arnal et al. (2017).
Acarechimys is represented in all the stratigraphic levels of SBB (Appendix 1). Four of the five known species are recorded: *A. minutus* (MPM-PV 15088, MPM-PV 15089; Fig. 2.11–13), *A. minutissimus* (MPM-PV 15100, MPM-PV 20069, MPM-PV 20346; see Appendix 1), *A. constans* (MPM-PV 15093, MPM-PV 15096, MPM-PV 20637; see Appendix 1), and *A. gracilis* (MPM-PV 17430; Fig. 2.14–15). On the other hand, only one specimen of *A. minutissimus* is recorded in BB (MPM-PV 20069; EAG-80 mts) and none in YH.

**Genus** *Dudumus* Arnal et al., 2014

**Type and only species.** *Dudumus ruigomezi* Arnal et al., 2014. Sarmiento Formation, Trelew Member, Early Miocene, Province of Chubut.

*Dudumus* sp. nov.?

Figure 2.16

**Referred material.** MPM-PV 20561, right M1-M2.

**Locality and horizon.** Segundas Barrancas Blancas (ECA2), Río Santa Cruz, Province of Santa Cruz, Early–Middle Miocene.

**Comments.** One small maxillary fragment with M1-M2 is here assigned to *Dudumus* sp. nov.? The molars are bunolophodont, brachydont, and slightly terraced (Fig. 2.16), as in *Dudumus ruigomezi* and *Caviocricketus* Vucetich and Verzi, 1996. As in *Dudumus ruigomezi* and *Caviocricketus*, the third loph, interpreted as a mesolophule, is shorter than the remaining lophes and does not reach the metacone. The length of this crest and the degree of terracing in the molars are more similar in these respects to *Dudumus ruigomezi* than to *Caviocricketus*. Nevertheless, the new specimen has different teeth proportions and therefore is here interpreted as a possible new species.

MPM-PV 20561 (Fig. 2.16) was found in ECA2 of SBB locality (Tab. 2). It represents the first record of *Dudumus* for the Santa Cruz Formation, since it was previously known for Colhuehuapian (Early Miocene) of the Province of Chubut.

**Genus** *Prospaniomys* Ameghino, 1902

**Type species.** *Prospaniomys priscus* Ameghino, 1902. Sarmiento Formation, Early Miocene, Province of Chubut.

*Prospaniomys* sp. nov.?

Figure 2.17–18

**Referred materials.** See Appendix 1.

**Locality and horizon.** Barrancas Blancas (ESL) and Segundas Barrancas Blancas (ECA2), Río Santa Cruz, Province of Santa Cruz, Early–Middle Miocene.

**Comments.** Three bunolophodont specimens are identified as *Prospaniomys* sp. nov.? MPM-PV 20294 (Fig. 2.17) is a right maxillary fragment with DP4-M1 and MPM-PV 20560 is an isolated upper molar. These cheek teeth have four lophes of which the anterior most (= anteroloph) does not contact the paracone and the third and fourth lophes are labially fused to the metacone, delimiting a posterior fossette (Fig. 2.17), unlike *Protacaremys* Ameghino, 1902. MPM-PV 20207 (Fig. 2.18) is an isolated lower molar that has four thin lophids and acuminated labial cusps, as in *Prospaniomys priscus* and unlike *Protacaremys*. Nevertheless, these specimens seem to be a new species since they are smaller than the type species and have slightly higher crowns.

These new findings are remarkable since *Prospaniomys* was previously only recognized in Colhuehuapian sediments (Early Miocene) of the Province of Chubut. MPM-PV 20207 was recorded in ESL (BB); and MPM-PV 20294 and MPM-PV 20560 were found in ECA2 from SBB (Tab. 2; Appendix 1).

**Family** Acaremyidae Wood, 1949

**Genus** *Acaremys* Ameghino, 1887a

**Type species.** *Acaremys murinus* Ameghino, 1887a. Sarmiento Formation, Colhue Huapi Member, Early Miocene, Province of Chubut; Pinturas Formation, upper sequence, late Early Miocene, and Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

*Acaremys* murinus Ameghino, 1887a

**Referred materials.** See Appendix 1.

**Locality and Horizon.** See Appendix 1.

*Acaremys* sp.

**Referred material.** See Appendix 1.
**Locality and Horizon.** See Appendix 1.

**Comments.** Acaremys, Sciamys and other octodontoids are grouped within Acaremynidae, the only extinct octodontoid family recognized (Arnal and Vucetich, 2015b). Acaremys is lower-crowned than Sciamys and higher-crowned than Galileomys and Platypittamys. Cheek teeth have discernible cusps, relatively thin lophs/ids, and replace the deciduous premolars with age, unlike most fossil octodontoids. Upper and lower molars have four main lophs/ids, unlike Acaremichmys. Acaremys is recognized by three valid species: *A. murinus*, *A. messor* Ameghino, 1889 and *A. major* Scott, 1905 (Early–Middle Miocene, Province of Santa Cruz). For a detailed description of these species see Arnal and Vucetich (2015b).

Within the new rodent sample, Acaremys is represented in ESL from BB by *Acaremys* sp. (MPM-PV 20175, MPM-PV 20216; Tab. 2); in SBB by *A. murinus* in ECA (MPM-PV 20272) and ECA2 (MPM-PV 20538), and by *Acaremys* sp. in ECA2 (MPM-PV 20653) (Tab. 2).

**Genus Sciamys** Ameghino, 1887a

**Type species.** Sciamys principalis Ameghino, 1887a. Pinturas Formation, upper sequence, late Early Miocene and Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

Sciamys principalis Ameghino, 1887a

Figure 2.19–20

**Referred materials.** See Appendix 1.

**Locality and horizon.** See Appendix 1.

Sciamys latidens Scott, 1905

Figure 2.21–22

**Referred material.** MPM-PV 2066B, right mandible with p4–m2.

**Locality and horizon.** Segundas Barrancas Blancas (ECA2), Río Santa Cruz, Province of Santa Cruz. Early–Middle Miocene.

Sciamys sp.

**Referred materials.** See Appendix 1.

**Locality and horizon.** See Appendix 1.

**Comments.** Sciamys is similar to Acaremys, but differs in having higher crowns and less discernible cusps. As in Acaremys, it has upper and lower molars with four lophs/ids and replaces the deciduous premolar through life. Sciamys is more abundant than Acaremys (Appendix 1) and it is recognized by at least six species: *S. principalis*, *S. varians* Ameghino, 1887a, *S. robustus* Ameghino, 1894, *S. rostratus* Scott, 1905, *S. latidens* Scott, 1905 (Early–Middle Miocene, Province of Santa Cruz), and *S. petisensis* Arnal and Pérez, 2013 (Middle–Late Miocene, Province of Chubut).

Within the new rodent sample, the genus is present but scarce at EAG (*Sciamys principalis* and *Sciamys* sp.) of BB, but absent in ESL (Tab. 2). On the contrary, it is very abundant in SBB, especially in ECA2 where *S. principalis*, *S. latidens*, and *Sciamys* sp. have been identified (Tab. 2; Appendix 1). The genus is absent in YH. A notably new record for the RSC is the presence of *Sciamys latidens* in ECA2 (MPM-PV 2066B; Fig. 2.19–20). This species is well-characterized by having a molarized posterior portion of the p4 (Fig. 2.19), as in *Sciamys petisensis* and unlike all the remaining Early Miocene species, and was previously known only for Killik Aike, coastal Santa Cruz Province, Argentina (Scott, 1905; Fig. 1).

Several specimens could not be recognized at generic level and are listed as Acaremynidae (Appendix 1).

**Superfamily ERETHIZONTOIDEA Simpson, 1945**

**Family ERETHIZONTIDAE Thomas, 1897**

**Genus Steiromys** Ameghino, 1887a

**Type species.** Steiromys detentus Ameghino, 1887a. Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

Steiromys detentus Ameghino, 1887a

Figure 3.23–24

**Referred materials.** See Appendix 1.

**Locality and horizon.** See Appendix 1.

Steiromys duplicatus Ameghino, 1887a

**Referred material.** See Appendix 1.

**Locality and horizon.** See Appendix 1.
Genus Neoreomys Ameghino, 1887a

Type species. Neoreomys australis Ameghino, 1887a. Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

Comments. Neoreomys is traditionally characterized by having hipsodont and rooted cheek teeth, more high crowned than in Dasyprocta Illiger, 1811, Myoprocta Thomas, 1903, Asteromys Ameghino, 1897, and Luantus initialis Ameghino, 1902. Cheek teeth have more penetrating flexus/id with persistent fossettes/ids: the hypoflexus is joined to the paraflexus and the hypoflexid joined to a posteroflexid (Fig. 3.1). The enamel is continuous around the entire crown and cementum is present in the hypoflexus/id.

Ameghino recognized nine species of Neoreomys from the Santa Cruz Formation (Ameghino, 1887a; 1891; 1894). Scott (1905) considered only three of those to be valid. Fi-

Several broken teeth were recognized as Steiromys sp. in BB (MPM-PV 20096, MPM-PV 20097; Tab. 2; Appendix 1).

Figure 3.1–3

Referred materials. See Appendix 1.

Locality and horizon. See Appendix 1.
nally, Fields (1957) and later authors (e.g., Kramarz and Bellosi, 2005; Kramarz, 2006b; Pérez, 2010b; Vucetich et al., 2015) recognized *Neoreomys australis* as the sole species present in the Santa Cruz Formation. Other two species of *Neoreomys* have been described elsewhere in South America: *Neoreomys huieliensis* Fields, 1957 from Villavieja Formation (La Venta, Colombia) and *N. pinturensis* Kramarz, 2006b from the Pinturas Formation (Province of Santa Cruz, Argentina). *Neoreomys australis* is the largest and most abundant caviomorph (more than 120 specimens; see Appendix 1). An exhaustive revision of this genus (currently under study by MEP) is necessary to corroborate the taxonomic status of the species of *Neoreomys*, and its specific richness in the Santa Cruz Formation. Within the new rodent sample, *Neoreomys* is the only cavioid present in YH, the oldest locality (Tab. 2). Moreover, this genus is well-represented in the other localities of the SCR: EAG and ESL from BB, and ECA, ECA2, and EET from SBB (Tab. 2; Appendix 1).

**Genus Phanomys** Ameghino, 1887a

*Phanomys mixtus* Ameghino, 1887a  
*Phanomys mixtus* Ameghino, 1887a  
Type species. *Phanomys mixtus* Ameghino, 1887a. Río Jeanemení Formation, Pinturas Formation and Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

**Referred materials.** See Appendix 1.  
**Locality and horizon.** See Appendix 1.

**Eocardia** Ameghino, 1887b

*Eocardia montana* Ameghino, 1887b  
*Eocardia montana* Ameghino, 1887b  
Type species. *Eocardia montana* Ameghino, 1887b. Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

**Referred materials.** See Appendix 1.  
**Locality and horizon.** See Appendix 1.

"Eocardia" *excavata* Ameghino, 1891b  
"Eocardia" *excavata* Ameghino, 1891b  
Figure 3.10

**Referred materials.** See Appendix 1.  
**Locality and horizon.** See Appendix 1.

**Eocardia** sp.  
**Eocardia** sp.

**Referred materials.** See Appendix 1.  
**Locality and horizon.** See Appendix 1.

**Comments.** *Eocardia* was originally defined by Ameghino (1887b) and traditionally several species were included in this genus or subgenus (e.g., Ameghino, 1887a, 1891b, 1894, 1906; Scott, 1905). Pérez (2010b) reduced the nominal diversity of Santacrucian forms to three species: the type species *Eocardia montana*, “*E.*” *excavata* and the smaller “*E.*” *fissa* Ameghino, 1891a. *Eocardia* is characterized by having continuous growth of the cheek teeth without root formation, double and heart–shaped cheek teeth, ephemeral fossettes/ids, presence of cementum beginning at very
early ontogenetic stages, and a narrow and discontinuous enamel layer surrounding the crown (Fig. 3.6–10). *Eocarida* is the only euhypsodont cavioid whose upper premolar has only one lobe (Fig. 3.6). The new RSC remains are assigned to *E. montana*, *E. excavata*, and *Eocarida* sp. (Tab. 2). It is interesting to note that although *E. fissa* has not been recorded in the new collections, this species was mentioned as coming from the RSC by Ameghino (1891; Pérez, 2010).

*Eocarida* is present at EAG and ESL from BB, and ECA, ECA2, and EET from SBB.

**Genus Schistomys** Ameghino, 1887a

*Type species.* *Schistomys erro* Ameghino, 1887a. Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

*Schistomys erro* Ameghino, 1887a

*Prolagostomus pusillus* Ameghino, 1887a

*Refereed materials.* See Appendix 1.

*Locality and horizon.* See Appendix 1.

*Prolagostomus* sp.

Figure 3.12

*Refereed materials.* See Appendix 1.

*Locality and horizon.* See Appendix 1.

*Comments.* *Prolagostomus* is a small to medium sized caviomorph, similar to *Pliolagostomus* Ameghino, 1887a. The upper and lower cheek teeth are euhypsodont and bilophodont, with the exception of the M3, which has three lophs. The hypoflexus/id are narrower than in *Perimys* Ameghino, 1887a, but broader than in *Lagostomus* Brookes, 1828. Molar crown walls are more curved and hypoflexid is more sinuous (Fig. 3.12) than in *Pliolagostomus*. The anterior lophid of lower molars is more labially extended (Fig. 3.12), unlike *Perimys*. The p4 is more obliquely oriented than molars (Fig. 3.12), unlike *Pliolagostomus*.

*Prolagostomus* is in general more abundant than *Pliolagostomus* (Appendix 1). Within the new rodent sample this genus is relatively well-represented in ECA, ECA2, and EET from SBB (Tab. 2; Appendix 1). It is only represented by two broken molars of *Prolagostomus* sp. (MPM–PV 20231, MPM–PV 20232; Tab. 2) in ESL from BB and is absent in YH.

**Genus Pliolagostomus** Ameghino, 1887a

*Type species.* *Pliolagostomus notatus* Ameghino, 1887a. Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

*Pliolagostomus notatus* Ameghino, 1887a

*Refereed materials.* See Appendix 1.

*Locality and horizon.* See Appendix 1.

*Comments.* *Pliolagostomus* is a small to medium sized caviomorph, similar to *Prolagostomus* Ameghino, 1887a. Upper and lower cheek teeth are euhypsodont and bilophodont, with the exception of the M3 which has three lophs. Cheek-tooth crown walls are straighter than *Prolagostomus*. Hypoflexus/
id is narrow, as in *Prolagostomus*. For a detailed description of this species see Rasia and Candela (2019).

As in *Prolagostomus*, this species is relatively well-represented in the three sites of SBB (ECA, ECA2, and EET; Tab. 2; Appendix 1). Notably, it is absent in BB and YH. Several specimens could not be identified at generic level and were assigned to *Prolagostomus sp./Pliolagostomus sp.* (MPM-PV 20259, MPM-PV 20349, MPM-PV 20381; Appendix 1).

Family **Neoeopilemidae** Kraglievich, 1926

Genus *Perimys* Ameghino, 1887a

*Type species.* *Perimys erutus* Ameghino, 1887a. Pinturas Formation, Early Miocene, and Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

*Figure 3.13*

**Perimys erutus** Ameghino, 1887a

*Referred materials.* See Appendix 1.

*Locality and horizon.* See Appendix 1.

*Perimys onustus* Ameghino, 1887a

*Figure 3.14–16*

*Referred materials.* See Appendix 1.

*Locality and horizon.* See Appendix 1.

*Perimys incavatus* Ameghino, 1902

*Referred materials.* See Appendix 1.

*Locality and horizon.* See Appendix 1.

*Comments.* *Perimys* is a medium to large sized caviomorph. Cheek teeth are protohypsodont, unlike *Prolagostomus* and *Pliolagostomus*. Upper and lower cheek teeth are bilophodont, with the exception of the M3 which has three lophs, as in *Prolagostomus* and *Pliolagostomus*. Nevertheless, *Perimys* differs in that this third loph is parallel to the anterior two lophs, and in that the hypoflexus/id are conspicuously broader and filled with more cementum. Thus, these teeth have a U-shape occlusal surface (Fig. 3.13–16).

The genus was abundantly recovered in both in BB and SBB, but notably, the largest species, *P. onustus*, is very abundant in SBB, while in BB it is represented by a single specimen (MPM-PV 20160), and the small species, *P. incavatus*, is more abundant in BB (Tab. 2; Appendix 1).

Family **Dinomyidae** Alston, 1876

Genus *Scleromys* Ameghino, 1887a

*Scleromys angustus* Ameghino, 1887a. Santa Cruz Formation, Early–Middle Miocene, Province of Santa Cruz.

*Figure 3.17–20*

*Scleromys sp.*

*Referred materials.* See Appendix 1.

*Locality and horizon.* See Appendix 1.

*Comments.* Among the species of *Scleromys* recognized in

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Figure 3. Cavoidea (1–11) and Chinchilloidea (12–17). 1–3, *Neoreomyx australis* MPM-PV 20292, right maxillary fragment with M1–M3 in occlusal, lingual, and labial views; 4–5, *Phanomys mixtus* MPM-PV 20048, right maxilla with M2–M3 in occlusal and lingual views; 6, *Schistomys erro* MPM-PV 20529, right maxilla with P4–M3 in occlusal view; 7, *Eocardia excavata* MPM-PV 20241, right maxilla with P4–M3 in occlusal view; 8–9, *Eocardia montana* MPM-PV 20401, left mandible with P4–M2 in occlusal and labial views (inverted); 10–11, *Eocardia montana* MPM-PV 20053, right mandible with P4–m2 in occlusal and lingual views; 12, *Prolagostomus sp.* MPM-PV 20314, right mandible with P4–m2 in occlusal view; 13, *Perimys erutus* MPM-PV 20671, right mandible with P4–m3 in occlusal view; 14–16, *Perimys onustus* MPM-PV 20670, left mandible with P4–m3 in occlusal, lingual and labial views (inverted); 17–18, *Scleromys sp.* MPM-PV 20098, left upper molar; 19–20, *Scleromys* sp. MPM-PV 20099, left upper molar. Anterior to the right. Scale bars= 5 mm (1–13), 7.5 mm (14–16), and 3 mm (17–20).
the Santa Cruz Formation, *S. osbornianus* Ameghino, 1894 is the largest and the most abundant, whereas the type species, *S. angustus*, is less common. *Scleromys* is characterized by high-crowned molariforms with root formation and an occlusal pattern that consists in a long posterior labial flexid and an anterior lingual flexus. During the ontogeny, this genus displays a great amount of dental morphological change due to flexi/ids closure, fossette/ids disappearance, and changes in molar size and outline. For this reason, isolated teeth are difficult to assign to a species.

In the RSC the genus is not abundant, but *Scleromys* sp. was recorded both in BB and SBB (Tab. 2; Appendix 1).

**DISCUSSION**

**Caviomorph assemblages of the Río Santa Cruz localities**

In this contribution, a revision of the rodent fauna recorded in the localities of the RSC is presented (Tab. 1). The three fossil localities (BB, SBB, and YH; Appendix 1) represent different age ranges, and only the upper part of BB overlaps with the lowest part of SBB (Cuitiño et al. 2016, 2019). Not all the Santacrucian caviomorphs were found in all these localities (see above). SBB is the most fossiliferous locality with 557 specimens (72.5% of the fossil record at RSC is presented (Tab. 1). In turn, *Dudumus* sp. nov.? was recorded in ECA2 (SBB). These records extend the biochron of both genera from the Colhuehuapian to the Santacrucian, as well as their geographic distributions (provinces of Chubut and Santa Cruz). Additionally, other brachydont specimens found in ESL (BB) could represent new taxa (e.g., MPM-PV 20184, MPM-PV 20205; Appendix 1). These specimens are important because low-crowned octodontoids dominated older caviomorph assemblages of Patagonia (Vucetich et al., 2010; Kramarz, 2004) and, until now, they were scarce in the Santa Cruz Formation –represented only by *Acarechimys* (Arnal et al. 2017)–. Thus, these new records expand the number of brachydont octodontoids for the Santacrucian.

**Erethizontidae.** Erethizontids have the least specific richness and abundance in the RSC. Within the new sample only 22 specimens are identified as *Steiromys detentus* (Fig. 3.23), *S. duplicatus*, and *Steiromys* sp. They have been found in BB (in EAG) and in SBB (in ECA2, ECA2, and EET) (Appendix 1). This low abundance is in accordance with previous works (Ameghino, 1887a, 1889; Scott, 1905; Candela, 2000), in which *Steiromys* is the only recognized Santacrucian genus. Scott (1905) described *Steiromys intermedius*, another species from Guer Aike Department, Province of Santa Cruz (Fig. 1), that is not recorded in the RSC localities. As with octodontoids, the abundance of erethizontoids in the Santacrucian late Early–Middle Miocene greatly contrasts with that of the Colhuehuapian Early Miocene, where they are represented by four genera and several species (Vucetich et al., 2015). Neither erethizontids nor octodontoids show any biostratigraphic zonation within the RSC localities.

**Cavioida.** Unlike the above mentioned caviomorph clades, cavioids and chinchilloids have interestingly different distribution and taxonomic abundance in the different RSC localities. Within cavioids the derived euhyopsodont *Schistomys* is present in SBB (ECA2 and EET) but absent in BB and YH. *Phanomys* and *Eocardia* are present in BB and in SBB.
localities of the east of the Province of Santa Cruz (Kilik Aike, 10 miles south of Coy inlet; Marshall, 1976; Vizcaíno et al., 2012b; Fig. 1). Except for a few species, all of them belong to the genera recovered previously in the RSC cliffs (i.e., *Neoreomys*, *Phanomys*, *Schistomys*, *Eocardia*, *Stichomys*, *Spaniomyx*, *Steiromys*, *Sciomyx*, *Acaremys*, *Acarechimys*, and *Scleromys*).

In summary, we observed a reduction in the taxonomic diversity but an increased in the morphological disparity of the rodent assemblage from the RSC (Tab. 1 and discussion above) than previously known (Ameghino, 1887a,b, 1889, 1891; Scott, 1905; Tab. 1). This work is the first comprehensive attempt in revising the Santacrucian caviomorphs. Similar systematic revisions should be approached with the caviomorph materials collected in other Santacrucian localities, in order to better understand the Santacrucian caviomorph assemblage as a whole.

**GENERAL EVOLUTIONARY ASPECTS**

Santacrucian rodents show significant changes compared with those of older Colhuehuapian and “Pinturan” SALMAs (Kramarz, 2004, 2006a,b; Kramarz and Belloso, 2005; Vucetich et al. 2010; Pérez and Pol, 2012; Arnal and Vucetich, 2015a). Several lineages experienced a progressive increase in hypsodonty (e.g., octodontoids with *Sciomyx*, *Stichomyx*, *Spaniomyx*) or even acquired euhypsodonty for the first time (e.g., cavioids, chinchillids). Those rodents with more generalized dental patterns (e.g., *Steiromys*) became less common. Within Cavioida, the acquisition of hypsodonty is first seen during the Santacrucian SALMA (Pérez and Pol, 2012), but the increase in dental crown height is already recorded in previous ages (e.g., *Luantis* in the Colhuehuapian and “Pinturan”; *Chubutomys* Wood and Patterson, 1959 in the Deseadan SALMA), unlike what is observed in octodontoids, which show increased crown height for the first time in the Santacrucian. In the RSC localities, meso-, proto, and euhypsodont taxa coexisted for some time during the Santacrucian (see previous section). Until now mesodont forms that would eventually give origin to the modern Dasyproctidae on the one hand and euhypsodont forms that would originate the Family Caviidae on the other hand, were recorded only in younger ages (e.g., “Colloncuran”, Laventan, Mayoan, early Late Miocene). Interestingly, a similar trend

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occurs within Chinchilloidea. During the Santacrucian, *Perimys* is the most abundant chinchilliod in BB and had the greatest specific richness. In SBB this taxonomic richness decreased (represented mostly by *P. onustus*); the record from SBB marks the last appearance of the genus. This taxonomic decrease is observed together with the rise in the abundance of specimens of the derived lagostomines *Pliolarogostomus* and *Prolagostomus*. Noteworthy, one *Perimys* species in SBB coexisted, which is larger than the abovementioned lagostomines. This may be related to the biology of these taxa, probably *P. onustus* not competing for ecological requirements with the other chinchilliods.

Within octodontoids, the record of *Dudumus* sp. nov.? and *Prospaniomys* sp. nov.? expand the biochron and geographic distribution of these genera. Both taxa and *Acarechimys* are the only brachydont octodontoids in the RSC and are also recorded in older Colhuehuaian beds. Nevertheless, they differ in that *Dudumus* and *Prospaniomys* were abundant in older beds and are represented by only four specimens in the RSC, while *Acarechimys* is much more abundant in the Santacrucian. In addition, *Acarechimys* and *Sciamys* are the only octodontoids recorded in younger Middle Miocene beds (Arnal and Pérez, 2013; Arnal et al., 2017). These younger *Acarechimys* maintained the brachydont cheek tooth structure, and are not recorded in Patagonia but in middle latitudes of the continent (Quebrada Honda, Bolivia; see Arnal et al., 2017). This geographic distribution was proposed to be the result of a migration event (from Patagonia to lower latitudes regions) induced by the marked aridization and cooling of higher latitudes of South America after the Early Miocene (Arnal et al., 2017). On the other hand, the last record of *Sciamys* is that of *Sciamys petisensis*, found in the locality of El Petiso, Province of Chubut (Arnal and Pérez, 2013). The fossil-bearing bed of El Petiso is estimated to be of Middle–Late Miocene Age. *Sciamys petisensis* is higher-crowned than its Santacrucian relatives. In fact, it is the highest-crowned and last recorded acaremyid (Arnal and Pérez, 2013). This survival would be the result not of a migration like *Acarechimys*, but of increasing hyp sodonty in order to counteract the aridization of these latitudes. Erethizontids became scarce in Patagonia by the Santacrucian, being since then recorded only in lower latitudes (e.g., Bolivia, Colombia).

In addition to this turnover in teeth morphology, Santacrucian rodents have different sizes; they were large (*Neoreomys, Perimys onustus*), medium-sized (*Scleromys, Steiromys, Eocardia*, and the remaining *Perimys* species) and small (octodontoids). This diversity reflects a wide range of habits, suggesting they had acquired broad paleobiologic adaptations by the Early–Middle Miocene (Candela et al., 2012; Muñoz et al., 2019). This, in turn, is related to the environment in which they lived. Recent works proposed more humid and forested paleoenvironments for the Santa Cruz Formation (Kay et al., 2008, 2012; Brea et al., 2012; Rasia, 2016) than historically proposed (Pascual et al., 1996; Vucetich et al., 2015). Evidently, these varied landscape scenarios (that resulted from considerable climatic changes) permitted the evolution and diversification of the Santacrucian caviomorphs. Paleobiological aspects deserve further detailed analyses which are beyond the scope of this systematic study.

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REFERENCES

Álvarez, A., Pérez, S.I., and Verzi, D.H. 2011. Ecological and phylogenetic influence on mandible shape variation of South American caviomorph rodents (Rodentia, Hystricomorpha). *Biological Journal of the Linnean Society* 102: 828–837.

Ameghino, F. 1887a. Enumeración sistemática de las especies de mamíferos fósiles coleccionadas por Carlos Ameghino en los terrenos eocenos de la Patagonia austral. *Boletín del Museo de La Plata* 1: 1–26.

Ameghino, F. 1887b. Observaciones generales sobre el orden de mamíferos extinguidos sudamericanos llamados toxodontes (Toxodonta) y sinopsis de los géneros y especies hasta ahora
conocidos. *Anales del Museo de La Plata* (Entrega especial, 1936): 1–66.

Ameghino, F. 1889. Contribución al conocimiento de los mamíferos fósiles de la República Argentina. *Actas de la Academia Nacional de Ciencias en Córdoba* 6: 1–1027.

Ameghino, F. 1891a. Caracteres diagnósticos de cinco especies nuevas de mamíferos fósiles argentinos. *Revista Argentina de Historia Natural* 1: 129–167.

Ameghino, F. 1891b. Nuevos restos de mamíferos fósiles descubiertos por Carlos Ameghino en el Cenozoico inferior de la Patagonia austral. Especies nuevas, adiciones y correcciones. *Revista Argentina de Historia Natural* 1: 289–328.

Ameghino, F. 1894. Enumeración synoptique des espèces des mamifères fósiles des formations écocenes de Patagonie. *Boletín de la Academia Nacional de Ciencias de Córdoba* 13: 259–452.

Ameghino, F. 1897. Mammíferos Crétacés de l’Argentine. Deuxième contribution à la connaissance de la faune mammalogique des couches à Pyrotherium. *Boletín del Instituto Geográfico Argentino* 18: 460–521.

Ameghino, F. 1902. Première Contribution à la connaissance de la faune mammalogique des couches à Colpodon. *Boletín de la Academia Nacional de Ciencias en Córdoba* 17: 71–138.

Ameghino, F. 1906. Les Formations sedimentaires du Crétacé supérieur et du Tertiaire de Patagonie. *Anales del Museo Nacional de Buenos Aires* 8: 1–568.

Arnal, M. 2012. *Evolución de los Rodentia* (Caviomorpha, Hystricognathi) del Oligoceno tardio–Mioceno medio vinculados al origen de la familia Octodontidae. Tesis doctoral, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, La Plata, 317 p. Unpublished.

Arnal, M., Kramarz, A.G., Vucetich, M.G., and Vieytes, C.E. 2014. A new Early Miocene octodontoid rodent (Hystricognathi, Caviomorpha) from Patagonia (Argentina) and a reassessment of the early evolution of Octodontoidae. *Journal of Vertebrate Paleontology* 34: 397–406.

Arnal, M., and Pérez, M.E. 2013. A new acaremys rodent (Hystricognathi, Octodontoidae) from the Middle Miocene of Patagonia (South America) and considerations on the early evolution of Octodontoidae. *Zootava* 3616: 119–134.

Arnal, M., and Vucetich, M.G. 2015a. Main radiation events in Pan–Octodontidae (Rodentia, Caviomorpha). *Zoological Journal of the Linnean Society* 175: 587–606.

Arnal, M., and Vucetich, M.G. 2015b. Revision of the fossil rodent *Acaremys Ameghino*, 1887 (Hystricognathi, Octodontoidae, Acaremyidae) from the Miocene of Patagonia (Argentina) and the description of a new acaremys. *Historical Biology* 27: 42–59.

Arnal, M., Vucetich, M.G., Croft, D.A., Bargo, M.S., Fernicola, J.C., and Vizcaíno, S.F. 2017. Systematic revision and evolutionary history of *Acarechimys* Patterson in Kraglievich, 1965 (Rodentia, Caviomorpha, Octodontidae). *Ameghiniana* 54: 307–330.

Bostelmann, J.E., Le Roux, J.P., Vásquez, A., Gutierrez, N.M., Oyazun, J.L., Carreño, C., Torres, T., Otero, R., Llanos, A., Fanning, C.M., and Herve, F. 2013. Burdigalian deposits of the Santa Cruz Formation in the Sierra Baguales, Austral (Magallanes) Basin: Age, depositional environment and vertebrate fossils. *Andean Geology* 60: 458–489.

Brandoni, D., González Ruiz, L., and Bucher, J. 2019. Evolutionary implications of *Megathericulus patagonicus* ( Xenarthra, Megatheriinae) from the Miocene of Patagonia Argentina. *Journal of Mammalian Evolution*. doi: 10.1007/s10911-019-09469-6

Brandoni, D., González Ruiz, L., Reato, A., and Martin, G. 2017. Chro-

ological implications of the nothrotherid *Xyophorus* (Mammalia, Xenarthra) from the Collón Curá Formation (Miocene of Patagonia, Argentina). *Historical Biology*. doi: https://doi.org/10.1080/08912963.2017.1398748

Brea, M., Zucol, A.F., Iglesias, A. 2012. Fossil plant studies from late Early Miocene of the Santa Cruz Formation: paleoecology and paleoclimatology at the passive margin of Patagonia, Argentina. In: S.F. Vizcaíno, R.F. Kay, and M.S. Bargo (Eds.), *Early Miocene Paleobiology in Patagonia*. Cambridge University Press, Cambridge, p. 104–128.

Busker, F., Pérez, M.E., Krause, J.M., and Vucetich, M.G. 2018. First record of *Banderomyx leanzae* Kramarz, 2005 (Rodentia, Caviomorpha) in Chubut province, Patagonia (Argentina). *Revista del Museo Argentino de Ciencias Naturales* 19: 121–129.

Candelas, A.M. 2000. *[Los Erethizontidae (Rodentia, Hystricognathi) fósiles de Argentina. Sistemática e historia evolutiva y biogeografía.]* Tesis doctoral, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, La Plata, 352 p. Unpublished.

Candelas, A.M., and Nasif, N.L. 2006. Systematics and biogeographic significance of *Drytomomys typicus* (Scalabrini in Ameghino, 1889) nov. comb., a Miocene Dinomyidae (Rodentia, Hystricognathi) from northeastern Argentina. *Neues Jahrbuch für Geologie und Paläontologie* 3: 165–181.

Candelas, A.M., Rasia, L.L., and Pérez, M.E. 2012. Paleobiology of Santacrucian caviomorph rodents: a morphofunctional approach. In: S.F. Vizcaíno, R.F. Kay, and M.S. Bargo (Eds.), *Early Miocene Paleobiology in Patagonia: High-Latitude Paleocommunities of the Santa Cruz Formation*. Cambridge University Press, Cambridge, p. 287–305.

Croft, D.A., Flynn, J.J., and Wys, A.R. 2004. Notoungulata and Litopterna of the Early Miocene Chuca Fauna, northern Chile. *Fieldiana: Geology* (New Series) 50: 1–52.

Cuitiño, J.I., Fernicola, J.C., Kohn, M.J., Trayler, R., Naipauer, M., Bargo, M.S., Kay, R.F., and Vizcaíno, S.F. 2016. U-Pb geochronology of the Santa Cruz Formation (Early Miocene) at the Río Bote and Río Santa Cruz (southernmost Patagonia, Argentina): implications for the correlation of fossil vertebrate localities. *Journal of South American Earth Sciences* 70: 198–210.

Cuitiño, J.I. Fernicola, J.C., Raigemborn, M.S., and Kravpovichkas, V. 2019. Stratigraphy and depositional environments of the Santa Cruz Formation (Early–Middle Miocene) along the Río Santa Cruz, Southern Patagonia, Argentina. In: J.C. Fernicola, M.S. Bargo, S.F. Vizcaíno, and R.F. Kay (Eds.), *Early–Middle Miocene Paleontology in the Río Santa Cruz, Southern Patagonia, Argentina*. 130 years since Ameghino, 1887. Publicación Electrónica de la Asociación Paleontológica Argentina 19: 14–36.

Fernicola, J.C., Bargo, M.S., Vizcaíno, S.F., and Kay, R.F. 2019. Historical background for a revision of the paleontology of the Santa Cruz Formation (Early–Middle Miocene) along the Río Santa Cruz, Patagonia, Argentina. In: J.C. Fernicola, M.S. Bargo, S.F. Vizcaíno, and R.F. Kay (Eds.), *Early–Middle Miocene Paleontology in the Río Santa Cruz, Southern Patagonia, Argentina*. 130 years since Ameghino, 1887. Publicación Electrónica de la Asociación Paleontológica Argentina 19: 1–13.

Fernicola, J.C., Cuitiño, J.I., Vizcaíno, S.F., Bargo, M.S., and Kay, R.F. 2014. Fossil localities of the Santa Cruz Formation (Early Miocene, Patagonia, Argentina) prospected by Carlos Ameghino in 1887 revisited and the location of the Notohippidion. *Journal of South American Earth Sciences* 52: 94–107.

Fields, R.W. 1957. Hystricomorph rodents from the Late Miocene of Colombia, South America. *University of Califomia Publications in Geological Sciences* 32: 273–404.
Phanomys Ameghino, 1887 (Rodentia, Hystricognathi, Cavioida) from the early Miocene of Patagonia (Argentina) and the acquisition of euhyposodonty in Cavioida sensu stricto. *Paläontologische Zeitschrift* 86: 187–204.

Pérez, M.E., Vucetich, M.G., and Kramarz, A.G. 2010. The first Eocardiidae (Rodentia) in the Colhuehuapian (early Miocene) of Bryn Gwyn (Northern Chubut, Argentina) and the early evolution of the peculiar cavioid rodents. *Journal of Vertebrate Paleontology* 30: 528–534.

Rasia, L.L. 2016. *Los Chinchillidae (Rodentia, Caviomorpha) fósiles de la República Argentina: sistemática, historia evolutiva y biogeográfica, significado bioestratigráfico y paleoambiental*. Tesis Doctoral, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, La Plata, 246 p. Unpublished.

Scott, W.B. 1905. *Mammalia of the Santa Cruz beds. Part III, Glires*. *American Museum Novitates* 528: 845–863.

Vasallo, A.I., and Gondi, A.M. 2015. *Phylogeny and evolution of the peculiar cavioid rodents. Journal of Vertebrate Paleontology* 23: 435–444.

Vasallo, A.I., and Antenucci, D. 2015. *Phylogeny of Caviomorph rodents: Diversity and Evolution*. SAREM Series A, Mammalogical Research (Investigaciones Mastozoológicas), Ciudad Autónoma de Buenos Aires, p. 63–120.

Vera, B., González Ruiz, L., Novo, N., Martín, G., Reato, A., and Tejedor, M.F. 2018. The interatheriinae (Mammalia, Notoungulata) of the Frasian *sensu stricto* and Mayoan (middle to late Miocene), and the fossils from Cerro Zeballos, Patagonia, Argentina. *Journal of Systematic Palaeontology*. doi: 10.1080/14772019.2018.1511387

Vera, B., Reguero, M.A., and González Ruiz, L. 2017. The interatheriinae (Notoungulata) from the Collón Curá Formation (middle Miocene), Argentina. *Acta Palaeontologica Polonica* 62: 845–863.

Verzi, D.H., Olivares, A.I., and Morgan, C.C. 2014. Phylogeny, evolutionary patterns and timescale of South American octodontoid rodents. The importance of recognizing morphological differentiation in the fossil record. *Acta Palaeontologica Polonica* 757–769.

Vizcaíno, S.F., Kay, R.F., and Bargo, M.S. 2012a. *Early Miocene Paleobiology in Patagonia: High-latitude Paleocommunities of the Santa Cruz Formation*. Cambridge University Press, Cambridge, 370 p.

Vizcaíno, S.F., Kay, R.F., and Bargo, M.S. 2012b. Background for a paleoecological study of the Santa Cruz Formation (late Early Miocene) on the Atlantic coast of Patagonia. In: S.F. Vizcaíno, R.F. Kay, and M.S. Bargo (Eds.), *Early Miocene Paleobiology in Patagonia*. Cambridge University Press, Cambridge, p. 1–22.

Vucetich, M.G., Arnal, M., Deschamps, C.M., Pérez, M.E., and Vieytes, E.C. 2015. A brief history of caviomorph rodents as told by the fossil record. In: A.I. Vasallo, and D. Antenucci (Eds.), *Biología de Caviomorfos Rodentes: diversidad y evolución*. SAREM Series A, Mammalogical Research (Investigaciones Mastozoológicas), Ciudad Autónoma de Buenos Aires, p. 11–62.

Vucetich, M.G., Dozo, M.T., Arnal, M., and Pérez, M.E. 2014. New rodents (Mammalia) from the Late Oligocene of Cabeza Blanca (Chubut) and the first rodent radiation in Patagonia. *Historical Biology: An International Journal of Paleobiology* 27: 236–257.

Vucetich, M.G., and Kramarz, A.G. 2003. New Miocene rodents of Patagonia (Argentina) and their bearing in the early radiation of the octodontiform octodontoids. *Journal of Vertebrate Paleontology* 23: 435–444.

Vucetich, M.G., Kramarz, A.G., and Candela, A.M. 2010. Colhuehuapian rodents from Gran Barranca and other Patagonian localities: the state of the art. In: R.H. Madden, A.A. Carlini, M.G. Vucetich, and R.F. Kay (Eds.), *The Paleontology of Gran Barranca: Evolution and Environmental Change through the Middle Eocene of Patagonia*. University of Cambridge Press, Cambridge, p. 206–219.

Vucetich, M.G., and Verzi, D.H. 1996. A peculiar octodontoid (Rodentia, Caviomorpha) with terraced molars from the Lower Miocene of Patagonia (Argentina). *Journal of Vertebrate Paleontology* 16: 297–302.

Wood, A.E. 1949. A new Oligocene rodent genus from Patagonia. *American Museum Novitates* 1435: 1–54.

Wood, A.E. 1955. A revised classification of the rodents. *Journal of Mammalogy* 36: 165–187.

Wood, A.E., and Patterson, B. 1959. The rodents of the Deseadan Oligocene of Patagonia and the beginnings of South American rodent evolution. *Bulletin of the Museum of Comparative Zoology* 120: 281–428.

Zachos, J., Pagani, M., Sloan, L., Thomas, E., and Billups, K. 2001. Trends, rhythms, and aberrations in global climate 65 Ma to present. *Science* 292: 686–693.
## APPENDIX 1 - List of fossil caviomorph specimens from the Río Santa Cruz. In different shades of green: Barrancas Blancas (BB), Estancia Aguada Grande (EAG), and Estancia Santa Lucia (ESL); in different shades of blue: Segundas Barrancas Blancas (SBB), Estancia Cordón Alto (ECA), Estancia Cordón Alto2 (ECA2), and Estancia El Tordillo (EET); Orange: Yaten Huageno (YH) and Estancia El Refugio (EER)

| Locality | Estancia                          | Collection number | Systematic taxonomy                  | Material                          |
|----------|----------------------------------|-------------------|--------------------------------------|-----------------------------------|
| BB       | Estancia Aguada Grande (EAG)     | MPM-PV 20773      | Sciamyss principalis                 | left mandible with p4-m3          |
|          |                                  | MPM-PV 20036      | Phanomys mixtus                      | right P4                          |
|          |                                  | MPM-PV 20037      | Phanomys mixtus                      | right M1 or M2                     |
|          |                                  | MPM-PV 20038      | Neoreomys australis                  | right M1 or M2                     |
|          |                                  | MPM-PV 20039      | Perimys sp.                          | isolated upper tooth              |
|          |                                  | MPM-PV 20040      | Spaniomyss sp.                       | right upper molar                  |
|          |                                  | MPM-PV 20041      | Spaniomyss sp.                       | right upper molar                  |
|          |                                  | MPM-PV 20042      | Spaniomyss sp.                       | right upper molar                  |
|          |                                  | MPM-PV 20043      | Acaremynidae                         | left lower molar                   |
|          |                                  | MPM-PV 20044      | Sciamyss?                            | left p4                            |
|          |                                  | MPM-PV 20045      | Neoreomys australis                  | right maxilla with DP4-M3          |
|          |                                  | MPM-PV 20046      | Neoreomys australis                  | left M1 or M2                      |
|          |                                  | MPM-PV 20047      | Neoreomys australis                  | right p4                           |
|          |                                  | MPM-PV 20048      | Phanomys mixtus                      | right M2-M3                        |
|          |                                  | MPM-PV 20049      | Perimys erutus                       | left M1 or M2                      |
|          |                                  | MPM-PV 20050      | "Eocardia" excavata?                | left upper molar                   |
|          |                                  | MPM-PV 20051      | "Eocardia" excavata?                | left m1                            |
|          |                                  | MPM-PV 20052      | "Eocardia" excavata?                | right m3                           |
|          |                                  | MPM-PV 20053      | Eocardia montana                     | right mandibular fragment with p4-m2|
|          |                                  | MPM-PV 20054      | Eocardia sp.                         | left m3                            |
|          |                                  | MPM-PV 20055      | Perimys/ Prolagostomus              | right m3                           |
|          |                                  | MPM-PV 20056      | Neoreomys australis                  | right upper molar                  |
|          |                                  | MPM-PV 20057      | Octodontoida       | edentulous left zygomatic fragment |
|          |                                  | MPM-PV 20058      | Steiromys detentus                  | right upper molar                  |
|          |                                  | MPM-PV 20059      | Acaremynidae                         | broken P4                          |
|          |                                  | MPM-PV 20060      | Spaniomyss                          | right lower tooth broken           |
|          |                                  | MPM-PV 20061      | Neoreomys australis                  | right M1-M2                        |
|          |                                  | MPM-PV 20062      | Neoreomys australis                  | left m1 or m2                      |
|          |                                  | MPM-PV 20063      | Neoreomys australis                  | left M1 or M2                      |
|          |                                  | MPM-PV 20064      | Eocardia montana                     | left p4                            |
|          |                                  | MPM-PV 20065      | Eocardia montana                     | right m1                           |
|          |                                  | MPM-PV 20066      | Eocardia montana                     | right m2                           |
|          |                                  | MPM-PV 20067      | "Eocardia" excavata                 | left mandible with m1-m2           |
|          |                                  | MPM-PV 20068      | Spaniomyss sp.                       | right mandible with m1-m2          |
|          |                                  | MPM-PV 20069      | Acaremichys minutissimus            | right mandible with m1-m2          |
|          |                                  | MPM-PV 20070      | Octodontoida       | lower incisor                       |
|          |                                  | MPM-PV 20071      | Caviomorpha                          | lower incisor                       |
|          |                                  | MPM-PV 20072      | Phanomys mixtus                     | left M3                            |
|          |                                  | MPM-PV 20073      | Phanomys mixtus                     | right M3                           |
|          |                                  | MPM-PV 20074      | Phanomys mixtus                     | right M1                           |
|          |                                  | MPM-PV 20075      | Phanomys mixtus                     | left M1                            |
|          |                                  | MPM-PV 20076      | Phanomys mixtus                     | right M2                           |
|          |                                  | MPM-PV 20077      | Phanomys mixtus                     | left M2                            |
|          |                                  | MPM-PV 20078      | Phanomys mixtus                     | right m1 or m2                     |
|          |                                  | MPM-PV 20079      | Phanomys mixtus                     | left m1                            |
|          |                                  | MPM-PV 20080      | Phanomys mixtus                     | left m1 or m2                      |
### Appendix 1 - Continued

| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|---------------------|----------|
| MPM-PV 20081 |          | Spaniomys sp.      | upper cheek teeth   |          |
| MPM-PV 20082 |          | Neoreomys australis| right M1 or M2      |          |
| MPM-PV 20083 |          | Scleromys sp.      | left M1 or M2       |          |
| MPM-PV 20084 |          | Scleromys sp.      | left M1 or M2       |          |
| MPM-PV 20085 |          | Scleromys sp.      | P4?                 |          |
| MPM-PV 20086 |          | Steiromys duplicatus| left DP4             |          |
| MPM-PV 20087 |          | Steiromys duplicatus| right M1 or M2      |          |
| MPM-PV 20088 |          | Steiromys duplicatus| right M1 or M2 (broken)|          |
| MPM-PV 20089 |          | Steiromys duplicatus| right M1 or M2 (broken)|          |
| MPM-PV 20090 |          | Steiromys duplicatus| left M1 or M2       |          |
| MPM-PV 20091 |          | Steiromys duplicatus| left M1 or M2       |          |
| MPM-PV 20092 |          | Steiromys duplicatus| left M3              |          |
| MPM-PV 20093 |          | Steiromys duplicatus| left dp4             |          |
| MPM-PV 20094 |          | Steiromys duplicatus| left mandibular fragment with m2 |          |
| MPM-PV 20095 |          | Steiromys duplicatus| left lower incisor  |          |
| MPM-PV 20096 |          | Steiromys sp.      | 2 incisor fragments |          |
| MPM-PV 20097 |          | Steiromys sp.      | 2 broken teeth      |          |
| MPM-PV 20098 |          | Scleromys sp.      | left upper molar    |          |
| MPM-PV 20099 |          | Rodentia?          | 1 phalanx           |          |
| MPM-PV 20100 |          | Rodentia?          | distal left humerus |          |
| MPM-PV 20101 |          | Rodentia?          | right astragalus    |          |
| MPM-PV 20102 |          | Stichomys sp.      | left maxillary fragment with DP4-M1 |          |
| MPM-PV 20103 |          | Stichomys sp.      | right M1 or M2      |          |
| MPM-PV 20104 |          | Octodontoida       | left lower molar broken|          |
| MPM-PV 20105 |          | Stichomys sp.      | right m3            |          |
| MPM-PV 20106 |          | Steiromys duplicatus?| right DP4?           |          |
| MPM-PV 20107 |          | Perimys erutus     | right M3            |          |
| MPM-PV 20108 |          | Eocarida montana   | right M1 or M2      |          |
| MPM-PV 20109 |          | Eocarida montana   | right M1 or M2      |          |
| MPM-PV 20110 |          | Caviomorpha        | 2 incisors          |          |
| MPM-PV 20111 |          | cf. Scleromys      | right P4            |          |
| MPM-PV 20112 |          | Neoreomys?         | mandibular fragment with incisor |          |
| MPM-PV 20113 |          | Eocarida sp.       | right M1 or M2      |          |
| MPM-PV 20114 |          | Spaniomys riparius | left mandibular fragment with dp4-m2 |          |
| MPM-PV 20115 |          | Perimys erutus     | left M1 or M2       |          |
| MPM-PV 20116 |          | Sciomys sp.        | left M1 or M2       |          |
| MPM-PV 20117 |          | Phanomys sp.       | left M1             |          |
| MPM-PV 20118 |          | Phanomys sp.       | left p4             |          |
| MPM-PV 20119 |          | Eocarida sp.       | broken tooth        |          |
| MPM-PV 20773 |          | Caviomorpha        | brachydont molar    |          |
| MPM-PV 20774 |          | Caviomorpha        | brachydont molar    |          |
| MPM-PV 20775 |          | Eocarida sp.       | left lower molar    |          |
| MPM-PV 20776 |          | Eocarida sp.       | left m2 or m3       |          |
| MPM-PV 20777 |          | Eocarida sp.       | left m3             |          |
| MPM-PV 20778 |          | Eocarida sp.       | right mandibular fragment with molar |          |
| MPM-PV 20779 |          | Neoreomys australis| right lower molar    |          |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|--------------------|----------|
| **Estancia Santa Lucía (ESL)** | | | Neoremyx australis | left M1 or M2 |
| MPM-PV 20121 | | | Eocardia sp. | left upper molar |
| MPM-PV 20122 | | | Octodontoidae | left lower incisor |
| MPM-PV 20123 | | | Neoremyx australis | left lower molar |
| MPM-PV 20124 | | | Neoremyx australis | right upper molar |
| MPM-PV 20125 | | | Neoremyx? | lower incisor fragment |
| MPM-PV 20126 | | | Octodontoidae | incisor fragment |
| MPM-PV 20127 | | | Neoremyx australis | left p4 |
| MPM-PV 20128 | | | Neoremyx australis | left m1 or m2 |
| MPM-PV 20129 | | | Neoremyx australis | left m3 (broken) |
| MPM-PV 20130 | | | Neoremyx australis | lower tooth? |
| MPM-PV 20131 | | | Neoremyx australis | right P4 |
| MPM-PV 20132 | | | Neoremyx australis | right M1 or M2 |
| MPM-PV 20133 | | | Sciamys principalis | left lower molar |
| MPM-PV 20134 | | | Stichomys sp. | left DP4 |
| MPM-PV 20135 | | | Stichomys sp. | right M1 or M2 |
| MPM-PV 20136 | | | Stichomys sp. | left lower molar |
| MPM-PV 20137 | | | Perimys incavatus | right upper molar |
| MPM-PV 20138 | | | “Eocardia” excavata | left m1 |
| MPM-PV 20139 | | | Eocardia sp. | right lower molar (broken) |
| MPM-PV 20140 | | | Phanomyx/ Eocardia | left M1 or M3 |
| MPM-PV 20141 | | | Caviomorpha? | long bone |
| MPM-PV 20142 | | | Spaniomys sp. | right mandible with m1-m2 |
| MPM-PV 20143 | | | Phanomys mixtus | left M1 or M2 |
| MPM-PV 20144 | | | Neoremyx australis | left mandible with p4-m1 |
| MPM-PV 20145 | | | Neoremyx australis | right upper molar |
| MPM-PV 20146 | | | Neoremyx australis | left lower molar |
| MPM-PV 20147 | | | Neoremyx australis | left m1(broken)-m2 and left molar |
| MPM-PV 20148 | | | Spaniomys sp. | left mandible with m1(broken)-m2 |
| MPM-PV 20149 | | | Neoremyx australis | right upper molar (broken) |
| MPM-PV 20150 | | | Perimys sp. | right P4 |
| MPM-PV 20151 | | | Eocardia sp. | right lower molar |
| MPM-PV 20152 | | | Neoremyx australis | mandibular symphysis with right m1, m2, and p4; and left, 1, m2, and p4 |
| MPM-PV 20153 | | | Neoremyx australis | 3 incisor fragments |
| MPM-PV 20154 | | | Perimys sp. | upper molar |
| MPM-PV 20155 | | | Eocardia sp. | right upper molar fragment |
| MPM-PV 20156 | | | Spaniomys sp. | right maxillary with DP4-M2 |
| MPM-PV 20157 | | | Perimys sp. | right lower molar |
| MPM-PV 20158 | | | Neoremyx australis | right lower molar |
| MPM-PV 20159 | | | Perimys onustus | right mandible with p4-m1 |
| MPM-PV 20160 | | | Perimys erutus | right mandibular fragment with p4 |
| MPM-PV 20161 | | | Perimys erutus | right mandibular fragment with p4-m1 |
| MPM-PV 20162 | | | Perimys erutus | left mandible with p4(broken)-m3 |
| MPM-PV 20163 | | | Perimys erutus | left m3 |
| MPM-PV 20164 | | | Eocardia montana | right mandible with m1-m2 |
| MPM-PV 20165 | | | Neoremyx australis | right maxilla with DP4-M1 |
| MPM-PV 20166 | | | Caviomorpha? | petrosal |
| Locality     | Estancia | Collection number | Systematic taxonomy | Material                                           |
|--------------|----------|-------------------|---------------------|---------------------------------------------------|
| MPM-PV 20168 |          | MPM-PV 20168      | Eocardidae          | right mandible with cheek teeth                   |
| MPM-PV 20169 |          | MPM-PV 20169      | Neoreomys?          | broken molar                                      |
| MPM-PV 20170 |          | MPM-PV 20170      | Scleromys sp.       | right P4                                           |
| MPM-PV 20171 |          | MPM-PV 20171      | Perimys sp.         | left upper tooth                                   |
| MPM-PV 20172 |          | MPM-PV 20172      | Neoreomys australis | left m1 or m2                                     |
| MPM-PV 20173 |          | MPM-PV 20173      | Neoreomys australis?| incisor                                           |
| MPM-PV 20174 |          | MPM-PV 20174      | Eocardia sp.        | tooth fragments and left DP4                       |
| MPM-PV 20175 |          | MPM-PV 20175      | Acaremys sp.        | p4, m1, and incisor                               |
| MPM-PV 20176 |          | MPM-PV 20176      | Rodentia            | edentulous right maxillary                        |
| MPM-PV 20177 |          | MPM-PV 20177      | Perimys sp.         | left lower tooth                                   |
| MPM-PV 20178 |          | MPM-PV 20178      | Spaniomys sp.       | left mandible with m1-m3 and incisor              |
| MPM-PV 20179 |          | MPM-PV 20179      | Spaniomys sp.       | right mandible with dp4-m2                        |
| MPM-PV 20180 |          | MPM-PV 20180      | Spaniomys sp.       | right maxillary fragment with m1                   |
| MPM-PV 20181 |          | MPM-PV 20181      | Neoreomys australis | right mandibular fragment with DP4-M1             |
| MPM-PV 20182 |          | MPM-PV 20182      | Spaniomys sp.       | right mandible with m1-m2                        |
| MPM-PV 20183 |          | MPM-PV 20183      | Eocardia montana    | right mandibular fragment with m2                  |
| MPM-PV 20184 |          | MPM-PV 20184      | Octodontoidae       | broken posterior portion of a lower tooth         |
| MPM-PV 20185 |          | MPM-PV 20185      | Acaremysidae        | left upper molar                                   |
| MPM-PV 20186 |          | MPM-PV 20186      | Eocardia sp.        | left M1                                           |
| MPM-PV 20187 |          | MPM-PV 20187      | Eocardia sp.        | left M1                                           |
| MPM-PV 20188 |          | MPM-PV 20188      | Eocardia sp.        | 3 tooth fragments                                  |
| MPM-PV 20189 |          | MPM-PV 20189      | Perimys erutus      | right mandibular fragment with p4                 |
| MPM-PV 20190 |          | MPM-PV 20190      | Perimys erutus      | left mandibular fragment with p4                   |
| MPM-PV 20191 |          | MPM-PV 20191      | Perimys sp.         | broken tooth                                       |
| MPM-PV 20192 |          | MPM-PV 20192      | Stichomys sp.       | right M1 or M2                                     |
| MPM-PV 20193 |          | MPM-PV 20193      | Phanomys?           | broken lower tooth                                 |
| MPM-PV 20194 |          | MPM-PV 20194      | Neoreomys australis | left mandibular fragment with m1-m3                |
| MPM-PV 20195 |          | MPM-PV 20195      | Neoreomys australis | right upper molar                                  |
| MPM-PV 20196 |          | MPM-PV 20196      | Neoreomys australis | left m3                                            |
| MPM-PV 20197 |          | MPM-PV 20197      | Neoreomys australis | left m3                                            |
| MPM-PV 20198 |          | MPM-PV 20198      | Neoreomys australis | right p4                                           |
| MPM-PV 20199 |          | MPM-PV 20199      | Neoreomys australis | right mandibular fragment with m1 or m2           |
| MPM-PV 20200 |          | MPM-PV 20200      | Neoreomys australis | left m1 or m2                                      |
| MPM-PV 20201 |          | MPM-PV 20201      | Spaniomys sp.       | left mandibular fragment with m1-m2                |
| MPM-PV 20202 |          | MPM-PV 20202      | Spaniomys sp.       | left M3                                            |
| MPM-PV 20203 |          | MPM-PV 20203      | Spaniomys sp.       | left upper molar                                   |
| MPM-PV 20204 |          | MPM-PV 20204      | Perimys erutus      | right M3                                           |
| MPM-PV 20205 |          | MPM-PV 20205      | Octodontoidae       | left mandibular fragment with dp4                  |
| MPM-PV 20206 |          | MPM-PV 20206      | Eocardia sp.        | left upper molar (broken)                           |
| MPM-PV 20207 |          | MPM-PV 20207      | Prospaniomys sp. nov.| left lower molar                                   |
| MPM-PV 20208 |          | MPM-PV 20208      | Perimys erutus      | right P4                                           |
| MPM-PV 20209 |          | MPM-PV 20209      | Octodontoidae       | right upper incisor                                |
| MPM-PV 20210 |          | MPM-PV 20210      | Eocardia sp.        | left lower molar                                   |
| MPM-PV 20211 |          | MPM-PV 20211      | Rodentia?           | metapodial                                         |
| MPM-PV 20212 |          | MPM-PV 20212      | Scleromys sp.       | left upper molar                                   |
| MPM-PV 20213 |          | MPM-PV 20213      | Neoreomys australis | right upper molar                                  |
| MPM-PV 20214 |          | MPM-PV 20214      | Neoreomys australis?| incisor fragment                                   |
| MPM-PV 20215 |          | MPM-PV 20215      | Neoreomys australis?| incisor fragment                                   |
| MPM-PV 20216 |          | MPM-PV 20216      | Acaremys sp.        | left mandibular fragment with m2-m3(broken)       |
| MPM-PV 20217 |          | MPM-PV 20217      | Neoreomys australis | right lower molar                                  |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|--------------------|----------|
| MPM-PV 20218 | | | Caviomorpha | left auditory fragment |
| MPM-PV 20219 | | | Neoreomys australis | right P4 |
| MPM-PV 20220 | | | Neoreomys australis | right upper molar |
| MPM-PV 20221 | | | Neoreomys australis | right upper molar |
| MPM-PV 20222 | | | Neoreomys australis | right M3 |
| MPM-PV 20223 | | | Eocardia sp. | palatal fragment with broken left P4 |
| MPM-PV 20224 | | | Eocardia sp. | right maxilla with M2-M3 |
| MPM-PV 20225 | | | Eocardia sp. | 2 broken upper tooth and 3 maxillary fragments |
| MPM-PV 20226 | | | Neoreomys australis | left M3? |
| MPM-PV 20227 | | | Neoreomys australis | right P4 |
| MPM-PV 20228 | | | Eocardia sp. | right upper molar |
| MPM-PV 20229 | | | Spaniomys sp. | right upper molar |
| MPM-PV 20230 | | | Prolagostomus sp. | broken molar |
| MPM-PV 20231 | | | Prolagostomus sp. | broken molar |
| MPM-PV 20232 | | | Neoreomys australis? | incisor fragment |
| MPM-PV 20233 | | | Neoreomys australis | left m3 |
| MPM-PV 20234 | | | Neoreomys australis? | incisor fragment |
| MPM-PV 20235 | | | Spaniomys sp. | left mandibular fragment with m1-m2 |
| MPM-PV 20236 | | | Stichomys regularis | left mandibular fragment with m1-m2 |
| MPM-PV 20237 | | | Prolagostomus sp. | isolated tooth |
| MPM-PV 20238 | | | Pliolagostomus notatus | left lower molar |
| MPM-PV 20239 | | | Pliolagostomus notatus | left lower molar |
| MPM-PV 20240 | | | “Eocardia” excavata | right maxilla with P4-M3 |
| MPM-PV 20241 | | | Prolagostomus sp. | right lower molar |
| MPM-PV 20242 | | | Acaremyidae | right lower molar |
| MPM-PV 20243 | | | “Eocardia” excavata | right m1 |
| MPM-PV 20244 | | | “Eocardia” excavata | right m2 |
| MPM-PV 20245 | | | Octodontoidea | edentulous left mandible |
| MPM-PV 20246 | | | Acaremyidae | right upper molar |
| MPM-PV 20247 | | | Scleromys sp. | left p4 |
| MPM-PV 20248 | | | Stichomys sp. | left DP4 |
| MPM-PV 20249 | | | Phanomys sp. | left upper molar |
| MPM-PV 20250 | | | Pliolagostomus notatus | 2 right low molars |
| MPM-PV 20251 | | | Pliolagostomus notatus | left lower molar |
| MPM-PV 20252 | | | Pliolagostomus notatus | 2 left lower molars |
| MPM-PV 20253 | | | Pliolagostomus notatus | right p4 |
| MPM-PV 20254 | | | Prolagostomus pusillus | 2 left p4s |
| MPM-PV 20255 | | | Prolagostomus pusillus | right p4 |
| MPM-PV 20256 | | | Prolagostomus pusillus | left upper molar |
| MPM-PV 20257 | | | Prolagostomus pusillus | right upper molar |
| MPM-PV 20258 | | | Pliolagostomus/Prolagostomus | 2 broken tooth |
| MPM-PV 20259 | | | Prolagostomus pusillus | left lower molar |
| MPM-PV 20260 | | | Perimys onustus | right lower molar |
| MPM-PV 20261 | | | Prolagostomus pusillus | left lower tooth |
| MPM-PV 20262 | | | Neoreomys australis | right lower molar (broken) |
| MPM-PV 20263 | | | “Eocardia” excavata | right M3 (broken) |
| MPM-PV 20264 | | | Eocardia sp. | left lower molar |
| MPM-PV 20265 | | | Pliolagostomus notatus | right lower molar |
| MPM-PV 20266 | | | Prolagostomus sp. | right lower molar |
| MPM-PV 20267 | | | Prolagostomus sp. | right lower molar |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|---------------------|----------|
| MPM-PV 20268 |          | Acarechimys? | right lower incisor |
| MPM-PV 20269 |          | Neoreomys australis | left upper molar | |
| MPM-PV 20270 |          | Neoreomys australis | right upper molar(broken) |
| MPM-PV 20271 |          | Perimys onustus | broken molar |
| MPM-PV 20272 |          | Acaremys murinus | right mandibular fragment with m1-m3 |
| MPM-PV 20273 |          | Eocardia montana? | right p4 |
| MPM-PV 20274 |          | Eocardia montana? | right m1 |
| MPM-PV 20275 |          | Eocardia montana? | left m1 or m2 |
| MPM-PV 20276 |          | Stichomys regularis | left mandibular fragment with m1-m2 |
| MPM-PV 20277 |          | Stichomys regularis | right mandibular fragment with m2-m3 |
| MPM-PV 20278 |          | Prolagostomus sp. | lower cheek teeth |
| MPM-PV 20279 |          | Eocardia montana | left m1 or m2 |
| MPM-PV 20280 |          | Eocardia montana | right p4 |
| MPM-PV 20281 |          | Eocardia montana | right m1 |
| MPM-PV 20282 |          | Eocardia montana | right m2 |
| MPM-PV 20283 |          | Neoreomys australis | right maxillary fragment with M1-M2 |
| MPM-PV 20284 |          | Neoreomys australis | left M1 or M2 |
| MPM-PV 20285 |          | Neoreomys australis | right M3 |
| MPM-PV 20286 |          | Neoreomys australis | left M3 |
| MPM-PV 20287 |          | Neoreomys australis | left M1 or M2 |
| MPM-PV 20288 |          | Neoreomys australis | right m1 |
| MPM-PV 20289 |          | Neoreomys australis | right m2 |
| MPM-PV 20290 |          | Neoreomys australis | right m3 |
| MPM-PV 20291 |          | Scleromys sp. | left P4 |
| MPM-PV 20292 |          | Neoreomys australis | right maxillary fragment with M1-M3 |
| MPM-PV 20295 |          | Eocardia sp. | right maxillary fragment with DP4-M1 |
| MPM-PV 20296 |          | Eocardia sp. | right upper molar |
| MPM-PV 20297 |          | Pliolagostomus notatus | left upper molar |
| MPM-PV 20298 |          | Octodontoidea | left upper incisor |
| MPM-PV 20299 |          | Spaniomys sp. | right mandible with dp4-m2 |
| MPM-PV 15098 |          | Acarechimys minutissimus | left mandible with dp4 and broken incisor |
| MPM-PV 20300 |          | Eocardia montana | right mandible with m1-m2 |
| MPM-PV 20301 |          | Eocardia montana | right m3 |
| MPM-PV 20302 |          | Prolagostomus sp. | left m3 |
| MPM-PV 20303 |          | Caviomorpha | mandibular fragment with broken incisor |
| MPM-PV 20304 |          | Stichomys sp. | left mandibular fragment with m2 |
| MPM-PV 20305 |          | Prolagostomus sp. | right lower molar |
| MPM-PV 20306 |          | Eocardia montana? | right mandibular fragment with p4-m2 and broken incisor |
| MPM-PV 20307 |          | Eocardia montana? | left m1 or m2 |
| MPM-PV 20308 |          | Sciamsys principalis | right mandible with p4-m3 |
| MPM-PV 20309 |          | Octodontoidea | left mandibular fragment with incisor |
| MPM-PV 20310 |          | Spaniomys sp. | left maxillary fragment with M1-M2 |
| MPM-PV 20311 |          | Octodontoidea | right lower incisor fragment |
| MPM-PV 20312 |          | Eocardia montana | right mandible with p4-m3 |
| MPM-PV 20313 |          | Neoreomys australis | right upper molar(broken) |
| MPM-PV 20314 |          | Prolagostomus sp. | left mandibular fragment with p4-m2 and incisor |
| MPM-PV 20315 |          | Prolagostomus sp. | left M3 |
| MPM-PV 20316 |          | Prolagostomus sp. | isolated incisor |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|----------------------|----------|
| MPM-PV 20317 | | | Prolagostomus pusillus | right maxillary fragment with M1-M2 |
| MPM-PV 20318 | | | Prolagostomus pusillus | right mandible with m1-m3 |
| MPM-PV 20319 | | | Pliolagostomus? | M3? |
| MPM-PV 20320 | | | Pliolagostomus? | right mandibular fragment with p4 |
| MPM-PV 15091 | | | Acarechimys constans | right mandible with dp4-m2 |
| MPM-PV 20321 | | | Perimys erutus | right mandible with p4-m3 |
| MPM-PV 20322 | | | Prolagostomus sp. | left lower molar |
| MPM-PV 20323 | | | Neoreomys australis | right lower molar |
| MPM-PV 20324 | | | Neoreomys australis | right lower molar |
| MPM-PV 20325 | | | Neoreomys australis | left P4 |
| MPM-PV 20326 | | | Eocardia montana | left mandible with p4-m3 |
| MPM-PV 20327 | | | Eocardia montana | left m2 or m3 |
| MPM-PV 20328 | | | Neoreomys australis | portion of a lower incisor |
| MPM-PV 20329 | | | Neoreomys australis | right M1 or M2 |
| MPM-PV 20330 | | | Neoreomys australis | left M1 or M2 |
| MPM-PV 20331 | | | Neoreomys australis | right M1 or M2 |
| MPM-PV 20332 | | | Neoreomys australis | right upper premolar |
| MPM-PV 20333 | | | Neoreomys australis | left upper molar |
| MPM-PV 20334 | | | Neoreomys? | 2 incisor fragments |
| MPM-PV 20335 | | | Stichomys sp. | mandibular fragment with m2 |
| MPM-PV 20336 | | | Prolagostomus sp. | right lower molar |
| MPM-PV 20337 | | | Spaniomyx sp. | right lower molar |
| MPM-PV 20338 | | | Stichomys sp. | right lower molar |
| MPM-PV 20339 | | | cf. Scleromyx | upper tooth fragment |
| MPM-PV 20340 | | | Octodontoides | edentulous left mandibular fragment |
| MPM-PV 20341 | | | Stichomys sp. | right DP4-M1 |
| MPM-PV 20342 | | | Stichomys sp. | left M1 or M2 |
| MPM-PV 20343 | | | Prolagostomus pusillus | left p4-m2 |
| MPM-PV 20344 | | | Neoreomys? | right upper molar (broken) |
| MPM-PV 20345 | | | Stichomys? | lower incisor |
| MPM-PV 20346 | | | Acarechimys minutissimus | left mandible with p4-m3 |
| MPM-PV 20347 | | | Stichomys sp. | left DP4 |
| MPM-PV 20348 | | | Prolagostomus sp. | right p4 |
| MPM-PV 20349 | | | Prolagostomus/Pliolagostomus | upper molar |
| MPM-PV 20350 | | | Rodentia? | humerus distal portion |
| MPM-PV 20351 | | | Rodentia? | metatarsal? |
| MPM-PV 20352 | | | Sciomyx sp. | left mandible with p4-m1 and incisor |
| MPM-PV 20353 | | | Pliolagostomus notatus | left lower tooth |
| MPM-PV 20354 | | | Eocardia sp. | lower molar fragment |
| MPM-PV 20355 | | | Perimys onustus | right mandible with m1-m3 |
| MPM-PV 20356 | | | Stichomys/Adelphomys | right mandible with dp4-m2 |
| MPM-PV 20357 | | | Neoreomys australis | left upper molar |
| MPM-PV 20358 | | | Neoreomys australis | right lower molar |
| MPM-PV 20359 | | | Prolagostomus pusillus | left upper molar |
| MPM-PV 20360 | | | Pliolagostomus notatus | left lower molar |
| MPM-PV 20361 | | | Neoreomys australis | skull fragment and broken teeth |
| MPM-PV 20362 | | | Prolagostomus pusillus | right mandibular fragment with p4-m2 (broken) and incisor |
| MPM-PV 20363 | | | Eocardia sp. | right p4 |
| MPM-PV 20364 | | | Acarechimys minutissimus | right mandible with m1-m3 |
## Appendix 1 - Continued

| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|---------------------|----------|
| MPM-PV 20365 |          | Eocardia sp. | right m3 |          |
| MPM-PV 20366 |          | Neoreomys australis | right lower molar |          |
| MPM-PV 20367 |          | Prolagostomus pusillus | right mandible with m1-m3(broken) |          |
| MPM-PV 20368 |          | Prolagostomus pusillus | maxilla with right and left P4-M3 |          |
| MPM-PV 15100 |          | Acarechimys minutissimus | right mandible with dp4(broken)-m2 |          |
| MPM-PV 15101 |          | Acarechimys minutissimus | right mandible with dp4-m1 |          |
| MPM-PV 20369 |          | Eocardia sp. | left upper cheek teeth |          |
| MPM-PV 20370 |          | Perimys sp. | right lower molar |          |
| MPM-PV 20371 |          | Prolagostomus pusillus | left maxillary fragment with P4-M3 |          |
| MPM-PV 15092 |          | Acarechimys constans? | right mandible with dp4-m2 and incisor |          |
| MPM-PV 20372 |          | Steiromys? | left maxillary fragment with P4-M1 |          |
| MPM-PV 20373 |          | Stichomys sp. | left M1 or M2 |          |
| MPM-PV 20374 |          | Eocardia sp. | left mandible with m1 or m2 |          |
| MPM-PV 20375 |          | Perimys anustus | left mandibular fragment with p4 |          |
| MPM-PV 20376 |          | Prolagostomus pusillus | left mandibular fragment with p4-m3 and broken incisor |          |
| MPM-PV 20377 |          | Prolagostomus sp. | left maxillary fragment with P4-M2 |          |
| MPM-PV 20378 |          | Eocardia sp. | left upper molar |          |
| MPM-PV 20379 |          | Prolagostomus pusillus | right p4 |          |
| MPM-PV 20380 |          | Prolagostomus pusillus | right lower cheek teeth |          |
| MPM-PV 20381 |          | Prolagostomus/Pliolagostomus | broken cheek teeth |          |
| MPM-PV 20382 |          | Acarechimys? | right mandible with m1-m2 |          |
| MPM-PV 20383 |          | Steiromys detentus | right mandible with dp4-m3(broken) |          |
| MPM-PV 20384 |          | Perimys onustus | left lower molar |          |
| MPM-PV 20385 |          | Neoreomys australis | right upper molar |          |
| MPM-PV 20386 |          | Pliolagostomus notatus | left M3 |          |
| MPM-PV 20387 |          | Acarechimys minutissimus | right mandible with m1-m3 |          |
| MPM-PV 20388 |          | Spaniomys sp. | right maxillary fragment with M1-M3 |          |
| MPM-PV 20389 |          | Spaniomys sp. | left maxillary fragment with M1-M2 |          |
| MPM-PV 20390 |          | Sciamys principalis | right mandibular fragment with p4-m2 |          |
| MPM-PV 20391 |          | Acarechimys minutissimus | left mandible with m1-m2 and broken incisor |          |
| MPM-PV 15099 |          | Spaniomys sp. | M2-M3 |          |
| MPM-PV 20392 |          | Eocardia sp. | right upper molar |          |
| MPM-PV 20393 |          | Eocardia montana | right upper molar |          |
| MPM-PV 20394 |          | Perimys sp. | left M1 or M2 |          |
| MPM-PV 20395 |          | Prolagostomus sp. | left M3 |          |
| MPM-PV 20396 |          | Prolagostomus sp. | left lower molar |          |
| MPM-PV 20397 |          | Prolagostomus/Pliolagostomus | broken tooth |          |
| MPM-PV 20398 |          | Prolagostomus/Pliolagostomus | broken tooth |          |
| MPM-PV 20399 |          | Eocardia sp. | isolated m1 or m2 |          |
| MPM-PV 20400 |          | Eocardia montana | left mandible with p4-m2 |          |
| MPM-PV 20401 |          | Eocardia sp. | right m3 |          |
| MPM-PV 20402 |          | Prolagostomus pusillus | right M3 |          |
| MPM-PV 20403 |          | Prolagostomus pusillus | left lower molar |          |
| MPM-PV 20404 |          | Pliolagostomus notatus | right maxillary fragment with P4-M3 |          |
| MPM-PV 20405 |          | Pliolagostomus notatus | left lower molar |          |
| MPM-PV 20406 |          | Prolagostomus/Pliolagostomus | left p4 |          |
| MPM-PV 20407 |          | Neoreomys australis | right lower molar |          |
| MPM-PV 20408 |          | Eocardia montana | left mandible with dp4-m1 and incisor |          |
| MPM-PV 20409 |          | Eocardia montana | left lower cheek teeth |          |
| Locality          | Estancia                        | Collection number | Systematic taxonomy      | Material                               |
|------------------|--------------------------------|-------------------|--------------------------|----------------------------------------|
|                 | Estancia Cordón Alto2 (ECA2)   | MPM-PV 20410      | Eocardia sp.             | right M3                               |
|                 |                                | MPM-PV 20411      | Eocardia sp.             | right lower molar                      |
|                 |                                | MPM-PV 20412      | cf. Neoreomys            | lower isolated molar                   |
|                 |                                | MPM-PV 20413      | Pliolagostomus notatus   | right upper molar                      |
|                 |                                | MPM-PV 20414      | Prolagostomus sp.        | left mandibular fragment with p4-m2    |
|                 |                                | MPM-PV 20415      | Stichomys sp.            | left mandibular fragment with m1-m3    |
|                 |                                | MPM-PV 20416      | Spaniomyys sp.           | left lower molar                       |
|                 |                                | MPM-PV 20417      | Neoreomys australis      | left dp4                               |
|                 |                                | MPM-PV 20418      | cf. Neoreomys            | right dp4                              |
|                 |                                | MPM-PV 20419      | Phanomys?                | left upper molar                       |
|                 |                                | MPM-PV 20420      | Eocardia montana         | left upper molar                       |
|                 |                                | MPM-PV 20421      | Perimys sp.              | left p4?                               |
|                 |                                | MPM-PV 20422      | Pliolagostomus notatus   | right lower molar                      |
|                 |                                | MPM-PV 20423      | Neoreomys australis      | left m1 or m2                          |
|                 |                                | MPM-PV 20424      | Sciamys principalis      | left mandibular fragment with p4(broken)-m1|
|                 |                                | MPM-PV 20425      | Spaniomyys sp.           | left mandibular fragment with m1-m2    |
|                 |                                | MPM-PV 20426      | Stichomys sp.            | left mandibular fragment with dp4-m2   |
|                 |                                | MPM-PV 20427      | Prolagostomus sp.        | left M3                                |
|                 |                                | MPM-PV 20428      | Prolagostomus sp.        | left lower molar                       |
|                 |                                | MPM-PV 20429      | Stichomys sp.            | right mandibular fragment with m1 and incisor |
|                 |                                | MPM-PV 20430      | Stichomys?/Adelphomyss?  | left DP4                               |
|                 |                                | MPM-PV 20431      | Eocardia sp.             | right mandibular fragment with p4-m2   |
|                 |                                | MPM-PV 20432      | Eocardia?                | right M3                               |
|                 |                                | MPM-PV 20433      | Eocardia?                | right upper molar                      |
|                 |                                | MPM-PV 20434      | Neoreomys australis      | right lower molar                      |
|                 |                                | MPM-PV 20435      | Neoreomys australis      | left M3                                |
|                 |                                | MPM-PV 20436      | Prolagostomus sp.        | left mandible with p4 and incisor      |
|                 |                                | MPM-PV 20437      | Neoreomys australis      | left upper tooth                       |
|                 |                                | MPM-PV 20438      | Neoreomys australis      | left p4                                |
|                 |                                | MPM-PV 20439      | Neoreomys australis      | right lower molar (broken)             |
|                 |                                | MPM-PV 20440      | Neoreomys australis      | P4                                     |
|                 |                                | MPM-PV 20441      | Eocardia sp.             | left lower molar                       |
|                 |                                | MPM-PV 20442      | Steiromys detentus       | right mandibular fragment with p4-m3   |
|                 |                                | MPM-PV 20443      | Perimys erutus           | right mandibular fragment with p4-m1   |
|                 |                                | MPM-PV 20444      | Stichomys regularis      | left mandibular fragment with dp4-m2   |
|                 |                                | MPM-PV 20445      | Spaniomyys sp.           | right mandible with m1-m2              |
|                 |                                | MPM-PV 20446      | Prolagostomus sp.        | right maxillary fragment with M1-M2    |
|                 |                                | MPM-PV 20447      | Stichomys sp.            | right mandible with m1-m2              |
|                 |                                | MPM-PV 20448      | Pliolagostomus notatus   | right maxillary fragment with M1-M2    |
|                 |                                | MPM-PV 20449      | Spaniomyys sp.           | left upper molar                       |
|                 |                                | MPM-PV 20450      | Eocardia sp.             | right M1 or M2                         |
|                 |                                | MPM-PV 20451      | Eocardia sp.             | broken upper molar                     |
|                 |                                | MPM-PV 20452      | Eocardia montana         | lower molar                            |
|                 |                                | MPM-PV 20453      | Prolagostomus notatus    | right lower molar                      |
|                 |                                | MPM-PV 20454      | Prolagostomus notatus    | left lower molar                       |
|                 |                                | MPM-PV 20455      | Prolagostomus notatus    | left lower molar                       |
|                 |                                | MPM-PV 20456      | Prolagostomus sp.        | isolated cheek teeth                   |
|                 |                                | MPM-PV 20457      | Prolagostomus sp.        | isolated cheek teeth                   |
|                 |                                | MPM-PV 20293      | Neoreomys australis      | right maxillary fragment with P4-M1    |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|---------|-------------------|---------------------|----------|
| MPM-PV 20294 | | | Prospaniomys sp. nov.? | right DP4-M1 |
| MPM-PV 20458 | | | Neoreomys australis | right P4 |
| MPM-PV 20459 | | | Neoreomys australis | right lower molar |
| MPM-PV 20460 | | | Prolagostomus sp. | right lower molar |
| MPM-PV 20461 | | | Sciamys principalis | right maxillary fragment with P4 |
| MPM-PV 20462 | | | Sciamys principalis | left mandible with p4-m2 |
| MPM-PV 20463 | | | Spaniomyms sp. | left maxillary fragment with M1 |
| MPM-PV 20464 | | | Spaniomyms sp. | left upper molar |
| MPM-PV 20465 | | | Spaniomyms sp. | right upper molar (broken) |
| MPM-PV 20466 | | | Stichomyms sp. | right m3 |
| MPM-PV 20467 | | | Acaremyidae | left lower molar |
| MPM-PV 20468 | | | Prolagostomus sp. | left lower molar |
| MPM-PV 20469 | | | Octodontoidae | right upper incisor |
| MPM-PV 20470 | | | Caviomorpha | right upper incisor |
| MPM-PV 20471 | | | Caviomorpha | left lower incisor |
| MPM-PV 20472 | | | Pliolagostomus/Prolagostomus | left p4 |
| MPM-PV 20473 | | | Prolagostomus sp. | left mandibular fragment with p4-m2 |
| MPM-PV 20474 | | | Pliolagostomus notatus | right mandibular fragment with p4 |
| MPM-PV 20475 | | | Spaniomyms sp. | left maxillary fragment with M1 |
| MPM-PV 20476 | | | Spaniomyms sp. | right maxillary fragment with DP4 |
| MPM-PV 20477 | | | Chinchilloidea | broken teeth |
| MPM-PV 20478 | | | Acarechimys minutus | left mandibular fragment with dp4-m2 |
| MPM-PV 20479 | | | Acarechimys minutissimus | left maxillary fragment with DP4-M1 |
| MPM-PV 20480 | | | Acarechimys minutissimus | left maxillary fragment with M1-M2 |
| MPM-PV 20481 | | | Octodontoidae | left mandibular fragment with incisor |
| MPM-PV 20482 | | | Caviomorpha | right mandibular fragment with incisor |
| MPM-PV 20483 | | | Spaniomyms sp. | right upper cheek teeth |
| MPM-PV 20484 | | | Stichomyms sp. | right DP4 |
| MPM-PV 20485 | | | Stichomyms sp. | left upper molar |
| MPM-PV 20486 | | | Stichomyms sp. | right upper molar |
| MPM-PV 20487 | | | Acaremyidae | broken cheek teeth |
| MPM-PV 20488 | | | Prolagostomus sp. | right cheek teeth |
| MPM-PV 20489 | | | Prolagostomus sp. | left cheek teeth |
| MPM-PV 20490 | | | Prolagostomus sp. | left cheek teeth |
| MPM-PV 20491 | | | Prolagostomus sp. | left cheek teeth |
| MPM-PV 20492 | | | Pliolagostomus notatus | left upper cheek teeth |
| MPM-PV 20493 | | | Pliolagostomus notatus | right p4 |
| MPM-PV 20494 | | | Pliolagostomus notatus | right upper cheek teeth |
| MPM-PV 20495 | | | Pliolagostomus notatus | right upper cheek teeth |
| MPM-PV 20496 | | | Pliolagostomus/Prolagostomus | isolated cheek teeth |
| MPM-PV 20497 | | | Pliolagostomus/Prolagostomus | isolated cheek teeth |
| MPM-PV 20498 | | | Eocardia sp. | left lower cheek teeth |
| MPM-PV 20499 | | | Eocardia sp. | upper cheek teeth |
| MPM-PV 20500 | | | Octodontoidae | left lower incisor |
| MPM-PV 20501 | | | Octodontoidae | edentulous left mandible |
| MPM-PV 20502 | | | Prolagostomus sp. | left M3 |
| MPM-PV 20503 | | | Stichomyms sp. | right m2 |
| MPM-PV 20504 | | | Prolagostomus sp. | isolated cheek teeth |
| MPM-PV 20505 | | | Pliolagostomus notatus | left lower molar |
| MPM-PV 20506 | | | Prolagostomus sp. | right p4 |
## Appendix 1 - Continued

| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|---------------------|----------|
| MPM-PV 20507 | | | Prolagostomus sp. | right lower molar |
| MPM-PV 20508 | | | Eocardia sp. | left lower molar |
| MPM-PV 20509 | | | Caviomorpha | left mandible with broken incisor |
| MPM-PV 20510 | | | Octodontoida | left mandible with broken incisor |
| MPM-PV 20511 | | | Prolagostomus sp. | left mandibular fragment with p4-m3 |
| MPM-PV 20512 | | | Pliolagostomus/Prolagostomus | isolated broken cheek teeth |
| MPM-PV 20513 | | | Pliolagostomus/Prolagostomus | isolated broken cheek teeth |
| MPM-PV 20514 | | | Stichomys sp. | right DP4 |
| MPM-PV 20515 | | | Stichomys sp. | left dp4 |
| MPM-PV 20516 | | | Stichomys sp. | upper molar (broken) |
| MPM-PV 20517 | | | Neoreomys australis | right lower cheek teeth |
| MPM-PV 20518 | | | Neoreomys australis | right lower cheek teeth |
| MPM-PV 20519 | | | Caviomorpha | incisor |
| MPM-PV 20520 | | | Octodontoida | incisor |
| MPM-PV 20521 | | | Octodontoida | left lower incisor |
| MPM-PV 20522 | | | Octodontoida | left upper incisor |
| MPM-PV 20523 | | | Rodentia? | isolated phalanx |
| MPM-PV 20524 | | | Spaniomyss riparius | right mandible with m1-m2 |
| MPM-PV 20525 | | | Neoreomys australis | left lower tooth |
| MPM-PV 20526 | | | Neoreomys? | upper tooth |
| MPM-PV 20527 | | | Neoreomys? | broken tooth |
| MPM-PV 20528 | | | Prolagostomus sp. | right m1-m2 |
| MPM-PV 20529 | | | Schistomys erro | right maxillary fragment with P4-M3 |
| MPM-PV 20530 | | | Prolagostomus sp. | left lower molar |
| MPM-PV 20531 | | | Prolagostomus sp. | left lower molar |
| MPM-PV 20532 | | | Pliolagostomus/Prolagostomus | isolated tooth |
| MPM-PV 20533 | | | Stichomys sp. | DP4 |
| MPM-PV 17430 | | | Acarechimys gracilis | left mandible with dp4-m3 |
| MPM-PV 20534 | | | Perimys sp. | right lower molar |
| MPM-PV 20535 | | | Perimys sp. | right lower molar (broken) |
| MPM-PV 20536 | | | Chinchilioidea? | left mandibular fragment with incisor |
| MPM-PV 20537 | | | Prolagostomus sp. | right mandibular fragment with p4 |
| MPM-PV 20538 | | | Acaremys murinus | right mandible with m2-m3 and isolated m1 |
| MPM-PV 20539 | | | Neoreomys australis | left lower molar |
| MPM-PV 20540 | | | Neoreomys australis | broken lower molar |
| MPM-PV 20541 | | | Prolagostomus sp. | lower cheek teeth |
| MPM-PV 20542 | | | Eocardia/ Schistomys | left lower molar |
| MPM-PV 20543 | | | Eocardia montana | right mandibular fragment with m2 |
| MPM-PV 20544 | | | Eocardia sp. | left mandibular fragment with m1-m2 |
| MPM-PV 20545 | | | Eocardia sp. | left mandibular fragment with m3 |
| MPM-PV 20546 | | | Caviomorpha | right maxilla with broken incisor |
| MPM-PV 20547 | | | Prolagostomus sp. | cheek teeth |
| MPM-PV 15093 | | | Acarechimys constans | right mandible with dp4-m2 |
| MPM-PV 15102 | | | Acarechimys minutissimus | left mandible with m1 |
| MPM-PV 17426 | | | Acarechimys minutissimus | right mandible with dp4-m1 and incisor |
| MPM-PV 20548 | | | Perimys? | broken tooth |
| MPM-PV 20549 | | | Stichomys regularis | right mandible with m1-m2 |
| MPM-PV 20550 | | | Stichomys/ Adelphomys | left mandibular fragment with m2 |
| MPM-PV 20551 | | | Perimys onustus | right p4 |
| MPM-PV 20552 | | | Prolagostomus sp. | broken tooth |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|---------------------|----------|
| MPM-PV 20553 | | | Eocaridia montana | right mandibular fragment with p4-m2 |
| MPM-PV 20554 | | | Phanomys sp. | right mandible with p4-m1 |
| MPM-PV 20555 | | | Steiromys detentus | right mandible with p4 and incisor |
| MPM-PV 20556 | | | Spaniomys riparius | right mandible with m1-m2 |
| MPM-PV 20557 | | | Spaniomys riparius | left mandibular fragment with m1-m3 |
| MPM-PV 20558 | | | Spaniomys riparius | left mandibular fragment with m1-m2 |
| MPM-PV 20559 | | | Stichomys regularis | left mandibular fragment with m1-m2 |
| MPM-PV 17433 | | | Acarechimys gracilis | left mandibular fragment with m1-m2 |
| MPM-PV 17434 | | | Acarechimys gracilis | left mandibular fragment with dp4-m2 |
| MPM-PV 20560 | | | Prospaniomys sp. nov.? | upper molar |
| MPM-PV 20561 | | | Dudumus sp. nov.? | right DP4-M1 |
| MPM-PV 20562 | | | Spaniomys sp. | left lower molar |
| MPM-PV 20563 | | | Prolagostomus pusillus | right M3 |
| MPM-PV 20564 | | | Prolagostomus pusillus | right mandibular fragment with p4-m2 |
| MPM-PV 20565 | | | Prolagostomus pusillus | left maxillary fragment with P4 |
| MPM-PV 20566 | | | Prolagostomus pusillus | left mandibular fragment with m2-m3 |
| MPM-PV 20567 | | | Prolagostomus sp. | right lower molar |
| MPM-PV 20568 | | | Pliolagostomus notatus | right upper molar |
| MPM-PV 20569 | | | Prolagostomus sp. | right upper molar? |
| MPM-PV 20570 | | | Prolagostomus sp. | left lower molar |
| MPM-PV 20571 | | | Eocaridia sp. | right upper molar |
| MPM-PV 20572 | | | Neoreomys australis | right upper molar |
| MPM-PV 20573 | | | Prolagostomus sp. | left maxillary fragment with M1-M2 |
| MPM-PV 20574 | | | Prolagostomus pusillus | right mandibular fragment with p4 |
| MPM-PV 20575 | | | Stichomys regularis | left dp4 |
| MPM-PV 20576 | | | Pliolagostomus notatus | right maxillary fragment P4-M2 |
| MPM-PV 20577 | | | Perimys onustus | right m3 |
| MPM-PV 20578 | | | Eocaridia sp. | left mandibular fragment with p4-m1 |
| MPM-PV 20579 | | | Pliolagostomus/Prolagostomus | left maxilla with P4-M2 (broken) |
| MPM-PV 20580 | | | Pliolagostomus/Prolagostomus | left maxillary fragment with P4-M1 |
| MPM-PV 20581 | | | Eocaridia montana | right mandible with dp4-m1 |
| MPM-PV 20582 | | | Eocaridia sp. | left? broken molar |
| MPM-PV 20583 | | | Neoreomys australis | left lower molar |
| MPM-PV 20584 | | | Neoreomys australis | left lower molar (broken) |
| MPM-PV 20585 | | | Perimys onustus | left M1 or M2 |
| MPM-PV 20586 | | | Prolagostomus pusillus | left maxillary fragment with P4 |
| MPM-PV 20587 | | | Prolagostomus pusillus | left M1 |
| MPM-PV 20588 | | | Eocaridia montana | left p4 |
| MPM-PV 20589 | | | Prolagostomus pusillus | left maxillary fragment with M1-M2 |
| MPM-PV 20590 | | | Prolagostomus sp. | left upper molar |
| MPM-PV 20591 | | | Prolagostomus sp. | right upper molar |
| MPM-PV 20592 | | | Prolagostomus sp. | isolated tooth |
| MPM-PV 20593 | | | Prolagostomus sp. | isolated tooth |
| MPM-PV 20594 | | | Prolagostomus sp. | left maxillary fragment with P4 |
| MPM-PV 20595 | | | Acarechimys sp. | left maxillary fragment with DP4-M1 |
| MPM-PV 20596 | | | cf. Acarechimys minutissimus | left mandibular fragment with dp4-m3 |
| MPM-PV 20597 | | | Prolagostomus sp. | isolated molar |
| MPM-PV 20598 | | | Steiromys detentus | left p4 |
| MPM-PV 20599 | | | Pliolagostomus notatus | left M3 |
| MPM-PV 20600 | | | Prolagostomus pusillus | right M3 |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|---------------------|----------|
| MPM-PV 20601 |  | Cavioida | broken tooth |
| MPM-PV 20602 |  | Octodontoidea | maxillary fragment with tooth |
| MPM-PV 20603 |  | Prolagostomus sp. | isolated tooth |
| MPM-PV 20604 |  | Prolagostomus sp. | right lower molar |
| MPM-PV 20605 |  | Prolagostomus sp. | left upper molar |
| MPM-PV 20606 |  | Prolagostomus pusillus | right mandibular fragment with p4 and broken incisor |
| MPM-PV 20607 |  | Prolagostomus sp. | left mandibular fragment with p4 |
| MPM-PV 20608 |  | Prolagostomus pusillus | left M3 |
| MPM-PV 20609 |  | Prolagostomus pusillus | left M3 |
| MPM-PV 20610 |  | Prolagostomus pusillus | left M3 |
| MPM-PV 20611 |  | Prolagostomus sp. | isolated tooth |
| MPM-PV 20612 |  | Pliolagostomus/Prolagostomus | right upper molar |
| MPM-PV 20613 |  | Prolagostomus sp. | left upper molar |
| MPM-PV 20614 |  | Prolagostomus notatus | isolated tooth |
| MPM-PV 20615 |  | Prolagostomus sp. | broken tooth |
| MPM-PV 20616 |  | Stichomys sp. | right M1 or M2 |
| MPM-PV 20617 |  | Spaniomiys sp. | left mandibular fragment with m2 |
| MPM-PV 20618 |  | Stichomys sp. | left dp4 |
| MPM-PV 20619 |  | Stichomys sp. | left m2 |
| MPM-PV 20620 |  | Spaniomiys sp. | upper molar (broken) |
| MPM-PV 20621 |  | Acarechimys? | right DP4-M1 |
| MPM-PV 20622 |  | Octodontoidea | broken upper tooth |
| MPM-PV 20623 |  | Neoreomys australis | left upper molar |
| MPM-PV 20624 |  | Neoreomys australis | left upper molar |
| MPM-PV 20625 |  | Neoreomys australis | left p4 |
| MPM-PV 20626 |  | Prolagostomus pusillus | left p4 |
| MPM-PV 20627 |  | Octodontoidea | left mandible with broken incisor |
| MPM-PV 20628 |  | Acarechimys constans | left mandible with dp4-m2 and incisor |
| MPM-PV 15096 |  | Prolagostomus sp. | right p4 |
| MPM-PV 20629 |  | Steiromys duplicatus | left upper molar |
| MPM-PV 20630 |  | Stichomys sp. | left M1 or M2 |
| MPM-PV 20631 |  | Spaniomiys sp. | left upper molar |
| MPM-PV 20632 |  | Spaniomiys sp. | left M3 |
| MPM-PV 20633 |  | Stichomys regularis | left mandibular fragment with m2-m3 |
| MPM-PV 20634 |  | Neoreomys australis | right upper molar |
| MPM-PV 20635 |  | Neoreomys australis | left lower molar |
| MPM-PV 20636 |  | Acarechimys constans | right mandible with dp4 and incisor |
| MPM-PV 20637 |  | Eocardia / Schistomys | broken tooth |
| MPM-PV 20638 |  | Prolagostomus pusillus | left M3 |
| MPM-PV 20639 |  | Stichomys regularis | left mandible with m1-m2 and incisor |
| MPM-PV 20640 |  | Acarechimys gracilis | right mandible with m1-m3 |
| MPM-PV 17431 |  | Acarechimys sp. | right mandible with m1-m2 |
| MPM-PV 20641 |  | Stichomys regularis | left mandible with dp4-m1 and incisor |
| MPM-PV 20642 |  | Stichomys regularis | right maxillary fragment with DP4-M2 |
| MPM-PV 20643 |  | Stichomys regularis | left maxillary fragment with DP4-M2 |
| MPM-PV 20644 |  | Stichomys regularis | right mandibular fragment with m3 |
| MPM-PV 20645 |  | Spaniomiys riparius | right mandible with dp4-m3 |
| MPM-PV 20646 |  | Spaniomiys riparius | left maxillary fragment with DP4-M2 |
| Locality | Estancia | Collection number | Systematic taxonomy | Material |
|----------|----------|-------------------|---------------------|----------|
| MPM-PV 17432 | | Acarechimys gracilis | right mandibular fragment with dp4 (broken)-m3 |
| MPM-PV 20648 | | Phanomys sp. | right mandible with m1-m2 |
| MPM-PV 20649 | | Octodontoidae | edentulous right mandibular fragment |
| MPM-PV 17427 | | Acarechimys minutissimus | right mandible with dp4-m2 and incisor |
| MPM-PV 15094 | | Acarechimys constans | left mandibular fragment with dp4-m1 |
| MPM-PV 20651 | | Sciomyz sp. | left maxillary fragment with P4-M3 |
| MPM-PV 20652 | | Perimys onustus | right maxillary fragment with P4-M3 |
| MPM-PV 20653 | | Steiromys detentus | left mandibular fragment with p4 |
| MPM-PV 20654 | | Acaremys sp. | basicranium/left auditory bulla? |
| MPM-PV 20655 | | Perimys onustus | left maxillary fragment with P4-M3 |
| MPM-PV 15095 | | Acarechimys constans | right mandibular fragment with m1-m3 |
| MPM-PV 20656 | | Stichomys/ Adelphomys | right m1 |
| MPM-PV 20657 | | Phanomys sp. | right upper molar? |
| MPM-PV 20658 | | Perimys onustus | right p4 |
| MPM-PV 20659 | | Perimys onustus | right p4 |
| MPM-PV 20660 | | Perimys onustus | left M1 or right M3 |
| MPM-PV 20661 | | Perimys onustus | left lower molar? |
| MPM-PV 20662 | | Perimys onustus | left lower molar? |
| MPM-PV 20663 | | Perimys onustus | left lower molar? |
| MPM-PV 20664 | | Perimys onustus | cheek tooth |
| MPM-PV 20665 | | Perimys onustus | cheek tooth |
| MPM-PV 20666 | | Sciomyz principalis | right mandible with p4-m3 |
| MPM-PV 20667 | | Sciomyz latidens | right mandibular fragment with p4-m2 |
| MPM-PV 20668 | | Neoreomys australis | right upper molar |
| MPM-PV 20669 | | Acarechimys constans | right mandible with m2-m3 |
| MPM-PV 15097 | | Perimys onustus | left mandible with p4-m3 and incisor |
| MPM-PV 20670 | | Perimys erutus | right mandible with p4-m3 |
| MPM-PV 20671 | | Perimys? | right mandible with broken incisor |
| MPM-PV 20672 | | Perimys? | incisor fragment |
| MPM-PV 20673 | | Eocardia/Schistomys | right maxillary fragment with M1-M3 |
| MPM-PV 20674 | | Prolagostomus sp. | right lower molar |
| MPM-PV 20675 | | Neoreomys australis | left p4 |
| MPM-PV 20676 | | Neoreomys australis | right p4 |
| MPM-PV 20677 | | Neoreomys australis | right p4 |
| MPM-PV 20678 | | Neoreomys australis | right M3 |
| MPM-PV 20679 | | Neoreomys australis | left lower molar |
| MPM-PV 20680 | | Neoreomys australis | left lower molar |
| MPM-PV 20681 | | Neoreomys australis | left P4 |
| MPM-PV 20682 | | Neoreomys australis | left p4 |
| MPM-PV 20683 | | Neoreomys australis | right p4 |
| MPM-PV 20684 | | Neoreomys australis | left upper molar |
| MPM-PV 20685 | | Neoreomys australis | left upper molar |
| MPM-PV 20686 | | Neoreomys australis | left lower molar |
| MPM-PV 20687 | | Prolagostomus sp. | right mandibular fragment with p4-m2 |
| MPM-PV 20688 | | Stichomys regularis | palate with left and right DP4-M3 |
| MPM-PV 20689 | | Spaniomys sp. | right mandible with dp4-m2(broken) |
| MPM-PV 20690 | | Spaniomys sp. | left mandibular fragment with dp4-m3 |
| MPM-PV 20691 | | Stichomys sp. | right mandible with dp4-m1 |
| MPM-PV 20692 | | Spaniomys sp. | left maxilla with 2 broken teeth |
| Locality   | Estancia | Collection number | Systematic taxonomy | Material                                    |
|------------|----------|-------------------|---------------------|---------------------------------------------|
| MPM-PV 20692 |          |                   | Prolagostomus sp.   | 2 right upper teeth                        |
| MPM-PV 20693 |          |                   | Spaniomys sp.       | left dp4                                    |
| MPM-PV 20694 |          |                   | Caviomorpha         | left mandibular fragment with incisor       |
| MPM-PV 20695 |          |                   | Spaniomys sp.       | right mandibular fragment with m1           |
| MPM-PV 20696 |          |                   | Prolagostomus sp.   | right P4                                    |
| MPM-PV 20697 |          |                   | Stichomys/ Adelphomys | left m2                                    |
| MPM-PV 20698 |          |                   | Eocardia sp.        | left upper molar                            |
| MPM-PV 20699 |          |                   | Spaniomys sp.       | left upper molar                            |
| MPM-PV 17438 |          |                   | Acarechimys minutissimus | left mandibular fragment with dp4-m2       |
| MPM-PV 15087 |          |                   | Acarechimys minutus | right mandible with m2                      |
| MPM-PV 20700 |          |                   | Neoreomys australis | right maxillary fragment with P4-M2         |
| MPM-PV 20701 |          |                   | Prolagostomus sp.   | left maxillary fragment with DP4-M1         |
| MPM-PV 20702 |          |                   | Stichomys sp.       | left maxillary fragment with DP4            |
| MPM-PV 20703 |          |                   | Prolagostomus sp.   | left upper molar                            |
| MPM-PV 20704 |          |                   | Prolagostomus sp.   | left M3                                     |
| MPM-PV 20705 |          |                   | Pliolagostomus notatus | right upper molar                          |
| MPM-PV 20706 |          |                   | Pliolagostomus notatus | right upper molar                          |
| MPM-PV 20707 |          |                   | Spaniomys sp.       | right lower molar (broken)                  |
| MPM-PV 20708 |          |                   | Prolagostomus sp.   | left lower molar (broken)                   |
| MPM-PV 20709 |          |                   | Neoreomys sp.       | broken tooth                                |
| MPM-PV 20710 |          |                   | Eocardia sp.        | broken tooth                                |
| MPM-PV 20711 |          |                   | Prolagostomus sp.   | right lower molar                           |
| MPM-PV 20712 |          |                   | Perimys sp.         | upper molar                                 |
| MPM-PV 20713 |          |                   | Perimys onustus      | P4 and small left maxillary with M1         |
| MPM-PV 20714 |          |                   | Prolagostomus sp.   | left mandibular fragment with p4-m3         |
| MPM-PV 20715 |          |                   | Prolagostomus sp.   | right mandibular fragment with p4            |
| MPM-PV 20716 |          |                   | Eocardia/ Schistomys | right maxillary fragment with M1-M2         |
| MPM-PV 20717 |          |                   | Prolagostomus sp.   | right maxilla with M1-M3(broken)            |
| MPM-PV 20718 |          |                   | Acarechimys minutus | left maxillary fragment with DP4-M3         |
| MPM-PV 15088 |          |                   | Spaniomys sp.       | left mandibular fragment with m1            |
| MPM-PV 20719 |          |                   | Spaniomys sp.       | left lower molar                            |
| MPM-PV 20720 |          |                   | Eocardia sp.        | isolated tooth                              |
| MPM-PV 20721 |          |                   | Prolagostomus sp.   | right lower molar                           |
| MPM-PV 20722 |          |                   | Sciameys principalis | left mandible with p4-m3                    |
| MPM-PV 20723 |          |                   | cf. Scleromys       | right p4                                    |
| MPM-PV 20724 |          |                   | Steironys ?         | left dp4                                    |
| MPM-PV 20725 |          |                   | Prolagostomus sp.   | left mandibular fragment with m1-m3         |
| MPM-PV 20726 |          |                   | Stichomys/ Adelphomys | left DP4-M1       |
| MPM-PV 20727 |          |                   | Prolagostomus sp.   | right upper molar                           |
| MPM-PV 20728 |          |                   | Prolagostomus sp.   | left p4                                     |
| MPM-PV 20729 |          |                   | Pliolagostomus notatus | left upper molar                          |
| MPM-PV 20730 |          |                   | Pliolagostomus notatus | left M3                                     |
| MPM-PV 20731 |          |                   | Spaniomys sp.       | left maxillary fragment with DP4            |
| MPM-PV 20732 |          |                   | Prolagostomus sp.   | right lower molar                           |
| MPM-PV 20733 |          |                   | Stichomys ?         | left dp4                                    |
| MPM-PV 20734 |          |                   | Stichomys/ Adelphomys | right upper molar                          |
| MPM-PV 20735 |          |                   | Prolagostomus sp.   | 2 broken teeth                              |
| MPM-PV 20736 |          |                   | Prolagostomus/Pliolagostomus | right upper molar                        |
| Locality | Estancia                          | Collection number | Systematic taxonomy | Material                                                                 |
|----------|----------------------------------|-------------------|---------------------|--------------------------------------------------------------------------|
| Yaten Huagena (YH) | Estancia El Refugio (EER) | MPM-PV 20738 | Schistomys erro      | right maxilla with P4-M1 and M2-M3 and left maxilla with M1-M2         |
|          |                                  | MPM-PV 20739 | Spaniomys sp.       | edentulous left mandible                                               |
|          |                                  | MPM-PV 20740 | Sciamys principalis | left mandibular fragment with dp4-m1                                   |
|          |                                  | MPM-PV 20741 | Sciamys principalis | right maxillary fragment with P4-M3                                     |
|          |                                  | MPM-PV 20742 | Sciamys principalis | left mandibular fragment with p4-m3                                     |
|          |                                  | MPM-PV 17436 | Acarechimys minutus  | right mandibular fragment with dp4                                      |
|          |                                  | MPM-PV 20743 | Sciamys sp.         | right maxillary fragment with P4-M1                                     |
|          |                                  | MPM-PV 20744 | Spaniomys sp.       | right maxillary fragment with M2                                       |
|          |                                  | MPM-PV 20745 | Spaniomys sp.       | right M1 or M2 (broken)                                                |
|          |                                  | MPM-PV 17439 | Acarechimys gracilis | left mandibular fragment with molar                                    |
|          |                                  | MPM-PV 17437 | Acarechimys minutus  | left dp4                                                                 |
|          |                                  | MPM-PV 20746 | Spaniomys sp.       | left DP4                                                                 |
|          |                                  | MPM-PV 20747 | Octodontoidea?      | left lower molar                                                        |
|          |                                  | MPM-PV 20748 | Schistomys erro?    | left M3                                                                 |
|          |                                  | MPM-PV 20749 | Neoreomys australis  | right m1 or m2                                                          |
|          |                                  | MPM-PV 20750 | Prolagostomus sp.   | left mandibular fragment with m1-m2                                     |
|          |                                  | MPM-PV 20751 | Perimys onustus      | left upper molar                                                        |
|          |                                  | MPM-PV 20752 | Prolagostomus sp.   | left p4                                                                  |
|          |                                  | MPM-PV 20753 | Eocardia sp.        | left lower molar                                                        |
|          |                                  | MPM-PV 20754 | Eocardia sp.        | right lower molar (broken)                                              |
|          |                                  | MPM-PV 20755 | Pliolagostomus notatus | isolated molar                                                      |
|          |                                  | MPM-PV 20756 | Pliolagostomus notatus | right lower molar                                                      |
|          |                                  | MPM-PV 20757 | Pliolagostomus notatus | right lower molar                                                      |
|          |                                  | MPM-PV 20758 | Pliolagostomus notatus | lower molar                                                           |
|          |                                  | MPM-PV 20759 | Pliolagostomus notatus | isolated molar                                                      |
|          |                                  | MPM-PV 20760 | Octodontoidea       | right mandibular fragment with incisor                                  |
|          |                                  | MPM-PV 20761 | Stichomys/ Adelphomys | right maxillary fragment with DP4(broken)-M2                           |
|          |                                  | MPM-PV 20762 | Sciamys sp.         | right mandible with m1-m2                                               |
|          |                                  | MPM-PV 20763 | Neoreomys sp.       | right upper molar (broken)                                              |
|          |                                  | MPM-PV 20764 | Caviomorpha?        | proximal ulna fragment?                                                |
|          |                                  | MPM-PV 20765 | Neoreomys australis | right lower molar                                                        |
|          |                                  | MPM-PV 20766 | Spaniomys sp.       | left mandibular fragment with m1-m2                                     |
|          |                                  | MPM-PV 20767 | Spaniomys sp.       | right lower molar                                                        |
|          |                                  | MPM-PV 20768 | Prolagostomus sp.   | left M3                                                                 |
|          |                                  | MPM-PV 20769 | Spaniomys sp.       | left maxillary fragment with DP4-M1                                     |
|          |                                  | MPM-PV 20770 | Spaniomys sp.       | left mandibular fragment with m1                                        |
|          |                                  | MPM-PV 20771 | Stichomys regularis | right maxillary fragment with DP4-M1                                    |
|          |                                  | MPM-PV 20772 | Neoreomys australis | left upper molar                                                         |