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Short Note

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New distributional record of *Chelemys megalonyx* (Rodentia: Cricetidae) from the central valley of Chile, and some implications for its distribution and conservation

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Abstract: We report a new locality for the rodent *Chelemys megalonyx* in Rinconada de Maipú (Santiago, metropolitan region, central Chile), located in the central valley of Chile, in the eastern slope of the Chilean coastal range. Although the collected specimens show morphological similarities with other members of *Chelemys*, some cranial and body measurements confirmed our identification. Despite extensive field effort in the central coast of Chile, *C. megalonyx* has been barely recorded. In light of previous evidence and our findings, we suggest that the *C. megalonyx* distribution range has been previously underestimated, limiting our understanding about its current conservation status. The presence of *C. megalonyx* in the central valley of Chile opens additional questions to be resolved regarding its distribution and ability for dispersal.

Keywords: Abrotrichini; Maipo River; Mammalia; semi-fossorial; Sigmodontinae.

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Three species of the genus *Chelemys* are currently recognized for Chile: *Chelemys megalonyx* (Waterhouse 1844), *Chelemys macronyx* (Thomas 1984), and *Chelemys delfini* (Cabrera 1905, Wilson and Reeder 2005). Although recent studies provide information on the taxonomical status and phylogenetic relationships of *Chelemys* within Abrotrichini (e.g. D'Elía 2003, Rodríguez-Serrano et al. 2008, Alarcón et al. 2011), basic knowledge on their ecology and distributional patterns is still scarce.

Chelemys megalonyx, the shrub mole-rat, large long-clawed mouse, or “rata topo del matorral”, is an endemic semi-fossorial sigmodontine inhabiting the forests and shrublands of the central coast of Chile (Osgood 1943, Mann 1978, Muñoz-Pedrerros and Yáñez 2009). Given its restricted range, its presumed reduced population, and the increasing negative effects of agricultural activities, *C. megalonyx* is now considered as a Near Threatened species according to the International Union for Conservation of Nature (D'Elía and Patterson 2008). Its geographic distribution extends from the Elqui Province, Coquimbo Region (29°36' S) in north-central Chile, to Cautín Province, La Araucanía Region (38°40' S), in south-central Chile (Figure 1A). Although some proposed distributions for the species extend to the eastern slope of the Chilean coastal range up to the western side of the Andes mountain range (see D'Elía and Patterson 2008), historical records and captures suggest that this rodent would be confined to the western side of the Chilean coastal range, from sea level to 500-m altitude (Muñoz-Pedrerros and Yáñez 2009, Figure 1A). Here, we document a new distributional record for *C. megalonyx* that supports its occurrence outside the coastal range, and discuss its potential implications for the species' conservation.

As part of a long-term research into the community assembly of small mammals at Rinconada de Maipú, Santiago, metropolitan region (33°29'16.37" S, 70°53'07.62" W,

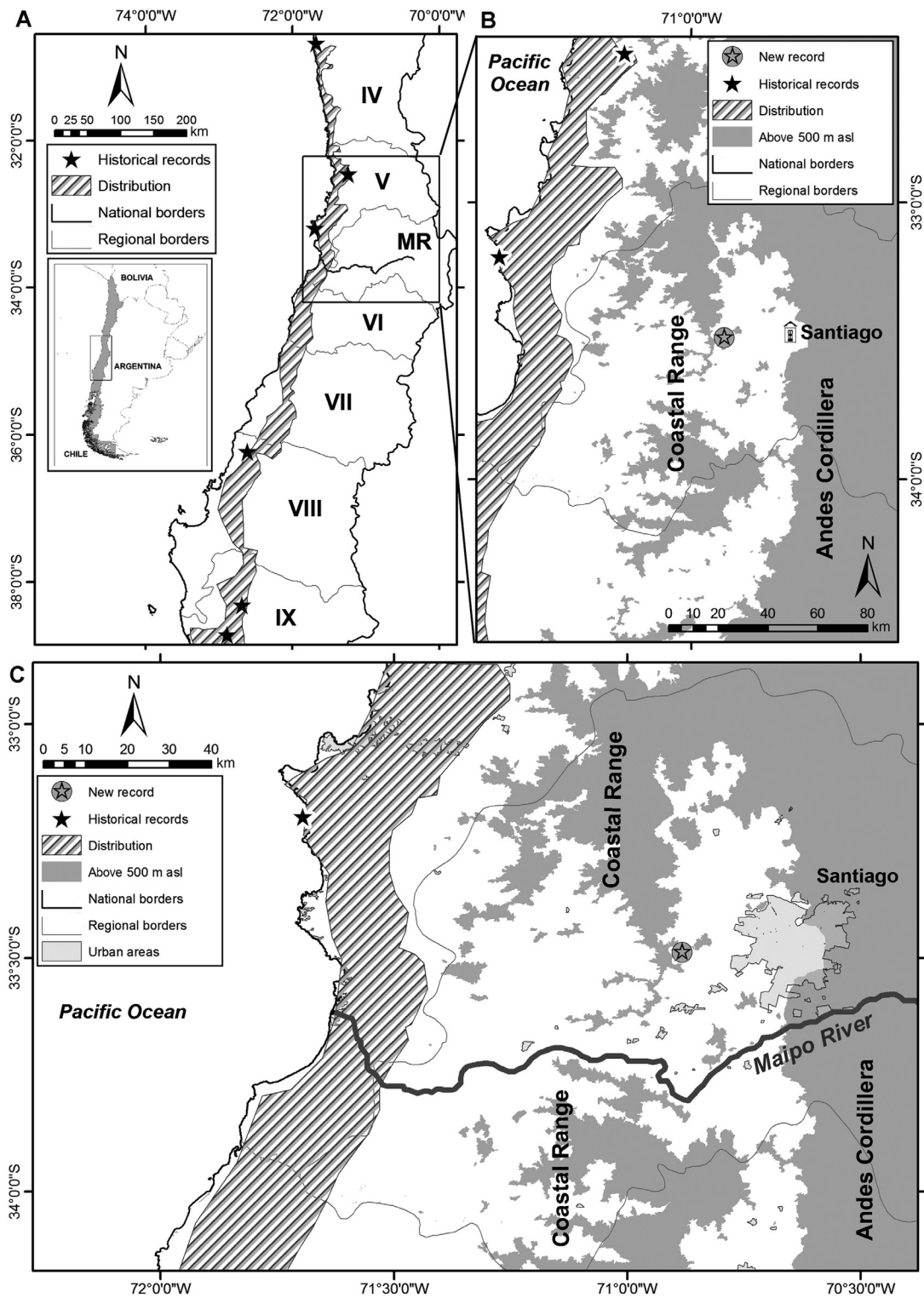


Figure 1: Geographical distribution of *Chelemys megalonyx*.

The Rinconada de Maipú site is indicated as “New record,” while Roman numerals and MR indicate the administrative regions of Chile (IV, Coquimbo region; V, Valparaíso region; MR, Metropolitan region; VI, Libertador General Bernardo O’Higgins region; VII, Maule region; VIII, Bío-Bío region; IX, Araucanía region).

530 m a.s.l.), we have used a grid of 16×15 trap stations (10 m apart, encompassing an area of 21,000 m²) since October 2011. We have used a modified mesh-version of Sherman traps (8×9×22 cm) for live capture, sampling during five consecutive trapping-nights every 45 days. Traps were baited with a mixture of tuna, oatmeal, and banana, and opened daily at dusk in order to capture nocturnal small mammals. The site is dominated by sclerophyllous scrub vegetation type (Luebert and Plissock 2006), and it is located in the eastern slope of the Chilean coastal range, in the central valley of Chile (also known as Intermediate Depression).

In January, March, and August 2012, we captured three adult individuals of *Chelemys* sp., one female and two males (Figure 1B). The individuals were captured in different station traps (150 m apart) in dense thickets of thorny bush, *Trevoa trinervis* (female: 33°29'13.3" S, 70°53'05.7" W; males: 33°29'16.75" S, 70°53'09.93" W and 33°29'13.76" S, 70°53'05.99" W). The female and one of the males were deposited in the Museo Nacional de Historia Natural (MNHN), Santiago, Chile (MNHN codes: male 1545; female 1587). All three individuals were identified taxonomically as *Chelemys megalonyx* according to the literature (Philippi 1872, Osgood 1925, 1943, Tate 1932, Reise 1973, Mann 1978, Muñoz-Pedreros and Yáñez 2009) and by direct comparison with other *Chelemys* specimens stored at the MNHN (Table 1, Figure 2). As described by Osgood (1925), the collected specimens showed uniform brownish upperparts (extending to the base of the tail) and grayish underparts (Figure 2A). Body and skull measurements were relatively similar to other specimens of *Chelemys* (see Osgood 1925); however, the body total length (Figure 2A),

the longer claw, and upper toothrow (Figure 2C,D) were noticeably and consistently different when compared with *C. macronyx* and other similar species (Table 1).

Chelemys megalonyx is considered rare and has been barely captured (e.g. Cofré and Marquet 1999), being recorded from only a few localities (cf. Osgood 1943, Quintana 2009), despite the extensive field effort in the central coast of Chile (Schamberger and Fulk 1974, Pine et al. 1979). As a result, published works on the species geographical distribution and natural history are very limited (e.g. Meserve et al. 1987, Muñoz-Pedreros et al. 2010), and there are only skins (without its skeletons) of two specimens available at the MNHN. Although the presumed decreasing trend of its population remains to be confirmed (D'Elía and Patterson 2008), some studies suggest that its rarity would be partly due to its high sensitivity to habitat transformation (Vásquez and Simonetti 1999). However, there is no way to confirm if its low abundances and apparently restricted distribution would be a reflection of its current population status or may be a consequence of the failure to capture more individuals given its semi-fossorial habits (see Mann 1978). Whichever the consequences of its status, our findings certainly reveal that the distribution range of *C. megalonyx* has been previously underestimated.

Previous captures indicated that the geographical range of *Chelemys megalonyx* only covered the western flank of the coastal range (Osgood 1925, D'Elía and Patterson 2008, Muñoz-Pedreros and Yáñez 2009). Although the form *Oxymycterus niger* described by Philippi (1872) from Peine (central Andes range) is a junior synonym of *C. megalonyx*, its identification remains doubtful, given

Table 1: Measurements of *Chelemys megalonyx* specimens captured at Rinconada de Maipú and deposited at the MNHN, Santiago, Chile.

Species/locality	MNHS code	Sex	W	TL	T	F	E	LC	LS	BL	ZB	IC	CB	APF	D	UT
<i>Chelemys megalonyx</i>																
Type locality	22494 (FMNH)	M	–	170	56	28	–	–	30.4	–	16.8	5.35	–	–	8.4	4.8
Rinconada de Maipú	1587	F	45	145	46	26.5	13.5	11.6	29.3	25.5	14.1	5.4	13.9	6.2	8.1	4.6
Rinconada de Maipú	1545	M	53.5	169	60	28	17	11.5	28.2	25	14	5.4	13.8	5.9	8.4	4.1
Rinconada de Maipú		M	60	174	58	27	18	11.6	32.1	ND	ND	ND	ND	ND	ND	ND
<i>Chelemys macronyx</i>																
Romeral	1549	F	ND	184.5	54.6	25.3	ND	7.6	ND	ND	ND	ND	ND	ND	ND	ND
Region XI	1264	M	ND	195.5	51.4	27.1	ND	7.2	31.7	26.5	17.6	4.8	13.4	7	7.8	5.4
Coyaihye N.R.	1267	M	ND	208.8	45.1	27.9	ND	6.5	31	25.9	18	5.1	14	7.1	8.1	5.3
Coyaihye N.R.	1266	M	ND	207.7	58.4	27	ND	7.3	ND	ND	17.5	5.2	R	7.3	8.1	5.3
Coyaihye N.R.	1261	F	ND	195	50.1	25.3	ND	7.2	ND	ND	ND	ND	ND	ND	ND	ND
Coyaihye N.R.	1262	F	ND	211.5	59.5	28.2	ND	7.3	ND	ND	ND	ND	ND	ND	ND	ND

Measurements from the species' type specimen from the Field Museum of Natural History at Chicago (Osgood 1925) and specimens of *C. macronyx* from the MNHN are also included. Morphological data are coded as follows: weight in grams (W), and the morphological measurements in millimeters: total length (TL), tail (T), hind foot (F), ear (E), longer claw (LC), length skull (LS), basilar length (BL), zygomatic breadth (ZB), interorbital constriction (IC), cranial box width (CB), anterior palatine foramen (APF), diastema (D), and upper toothrow (UT).

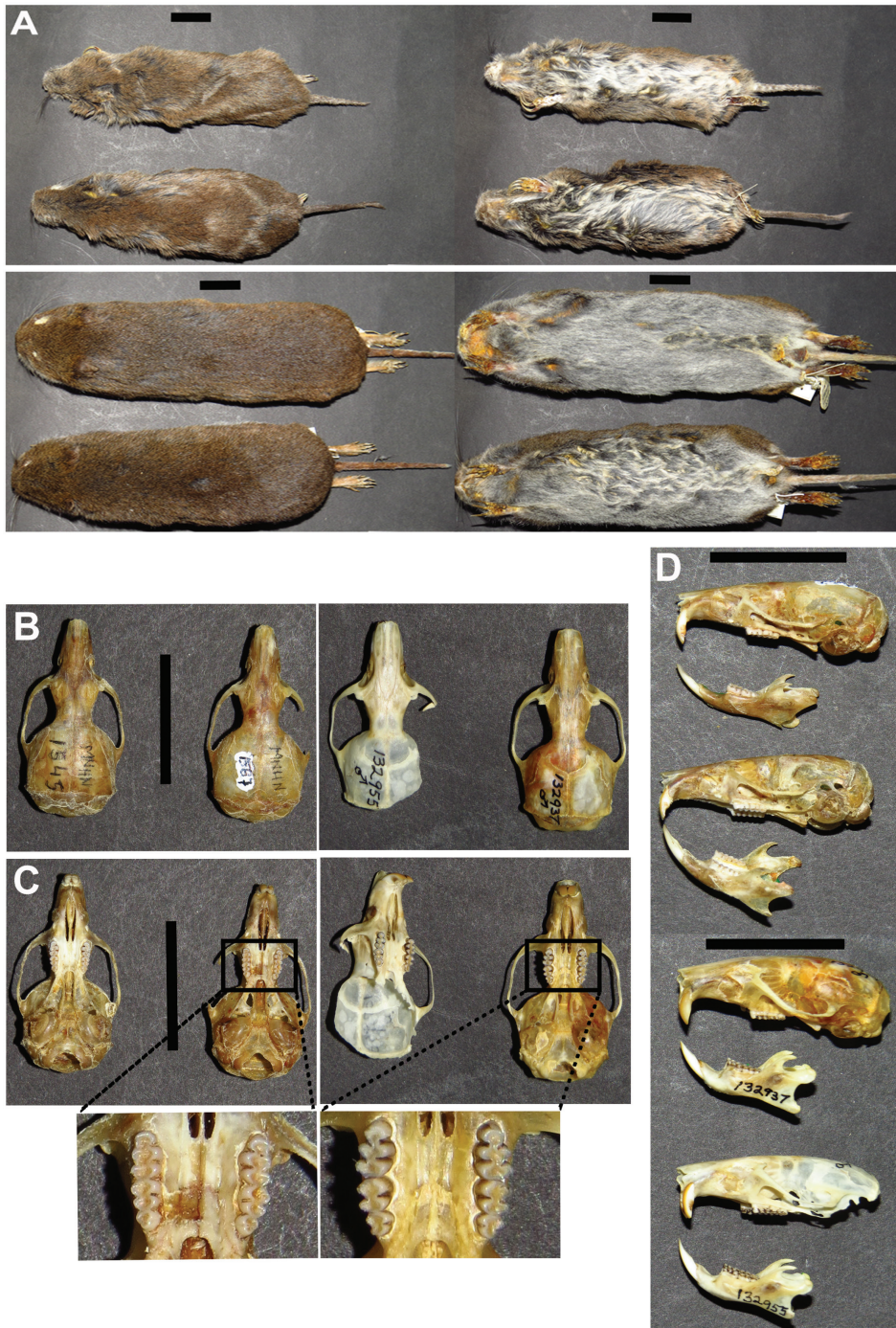


Figure 2: Specimens of *Chelemys megalonyx* and *Chelemys macronyx* deposited at the Museo Nacional de Historia Natural (MNHN), Santiago, Chile.

All pictures used the same scale reference (2 cm). (A) Dorsal and ventral views of two specimens of *C. megalonyx* (above: MNHN-1545 and MNHN-1585) and *C. macronyx* (below: MNHN-1264 and MNHN-1267); (B) dorsal, (C) ventral, and lateral views of two skulls of *C. megalonyx* (left in B, C; above in D: MNHN-1545 and MNHN-1585) and *C. macronyx* (right in B, C; below in D: MNHN-1264 and MNHN-1267).

that its description was based on a damaged specimen recovered from the claws of a bird of prey (Philippi 1872). Osgood (1925) and Tate (1932) have therefore criticized this identification and questioned its validity, which

could mean that our captures are the first records confirming that *C. megalonyx* occurs on both sides of the central coastal range (Figure 1B). Although current knowledge about this rodent is not adequate to confirm

if our captures reveal a recent range expansion or are due to the lack of distributional records, considerable field effort since the 1970s at Rinconada de Maipú without any capture would support the first possibility. Several studies focused on small mammals have been conducted there (e.g. Fulk 1975, Iriarte et al. 1989, Vásquez et al. 2002, Crespin and Lima 2006), including some long-term studies at the same site of our captures during 1983–1990, 1998–2006, and 1999–2003 (Crespin and Lima 2006, M. Lima pers. comm., and J.C.T-M.), and all failed to capture this rodent.

Besides the remaining gaps regarding its biology and ecology, the presence of *Chelemys megalonyx* on the central valley of Chile opens additional questions to be resolved regarding its distribution and ability for dispersal, and also about the environmental variables and mechanisms shaping and limiting its distribution. Even when a disjunct distribution is a possible scenario if the putative population at the central valley is isolated from the population at the coastal range, the riparian areas around the Maipo River could be acting as an environmental continuum between the coast and central valley of Chile, therefore allowing for a continuous range (see Figure 1C). Although speculative, both localities show similar environmental conditions and are part of the Mediterranean region of Chile, and therefore, the presence of *C. megalonyx* along this ecosystem is plausible (Luebert and Plissock 2006). Furthermore, field efforts will be necessary in order to confirm its presence in other localities within the central valley of Chile and along the Maipo River basin (see Figure 1C), whereas studies on its climatic niche and distribution will help understand the eventual role of the Maipo basin or other possible pathways favoring the species dispersal. Given that its range along the coastal region is covered by several protected areas (D'Elía and Patterson 2008), a better understanding of its entire distribution will be essential to better assess its current conservation status and to identify potential areas within its range requiring additional conservation measures.

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References

- Alarcón, O., G. D'Elía, E.P. Lessa and U.F.J. Pardiñas. 2011. Phylogeographic structure of the fossorial long-clawed mouse *Chelemys macronyx* (Cricetidae: Sigmodontinae). *Zool. Stud.* 50: 682–688.
- Cofré, H. and P.A. Marquet. 1999. Conservation status, rarity, and geographic priorities for conservation of Chilean mammals: an assessment. *Biol. Conserv.* 88: 53–68.
- Crespin, L. and M. Lima. 2006. Adult survival and population dynamics in the leaf-eared mouse *Phyllotis darwini* in central Chile. *Rev. Chil. Hist. Nat.* 79: 295–308.
- D'Elía, G. 2003. Phylogenetics of Sigmodontinae (Rodentia, Muridea, Cricetidae), with special reference to the akodont group, and with additional comments on historical biogeography. *Cladistics* 19: 307–323.
- D'Elía, G. and Patterson, B., 2008. *Chelemys megalonyx*. In: IUCN, 2011, IUCN Red List of Threatened Species. Version 2011.2, available at: <http://www.iucnredlist.org>. Accessed 07 January, 2015.
- Fulk, G.W. 1975. Population ecology of rodents in the semiarid shrublands of Chile. Occasional papers. Mus. Texas Tech Univ. 33: 1–40.
- Iriarte, J.A., L.C. Contreras and F.M. Jaksic. 1989. A long-term study of a small mammal assemblage in the central Chilean matorral. *J. Mammal.* 70: 79–87.
- Luebert, F. and P. Plissock. 2006. Sinopsis bioclimática y vegetacional de Chile. Editorial Universitaria, Chile.
- Mann, G. 1978. Los pequeños mamíferos de Chile (Marsupiales, quirópteros, edentados y roedores). *Gayana* 40: 1–342.
- Meserve, P.O., E.J. Shadrick and D.A. Kelt. 1987. Diet and selectivity of two Chilean predators in the northern semi-arid zone. *Rev. Chil. Hist. Nat.* 60: 93–99.
- Muñoz-Pedrerros, A. and J. Yáñez. 2009. Mamíferos de Chile. CEA ediciones, Chile.
- Muñoz-Pedrerros, A., S. Fletcher, J. Yáñez and P. Sánchez. 2010. Diversity of small mammals in three environments of the National Reserve Lago Pañuelas, Región de Valparaíso, Chile. *Gayana* 74: 1–11.
- Osgood, W.H. 1925. The long-clawed South American rodents of the genus *Notiomys*. *Field Mus. Nat. Hist. Zool. Ser.* 12: 113–125.
- Osgood, W.H. 1943. The mammals of Chile. *Field Mus. Nat. Hist. Zool. Ser.* 30: 1–268.
- Philippi, R. 1872. *Zeitschragesamnten Naturwiss*, Berlin, New Series, VI.
- Pine, R.H., S.D. Miller and M.L. Schamberger. 1979. Contributions to the Chilean mammalogy. *Mammalia* 43: 339–376.
- Quintana, V. 2009. Registros de *Dromiciops gliroides* y *Chelemys megalonyx* en bosques nativos del centro-sur de Chile. *Gest. Ambient.* 17: 45–55.
- Reise, D. 1973. Clave para la determinación de los cráneos de marsupiales y roedores chilenos. *Gayana* 27: 3–20.
- Rodríguez-Serrano, E., R.E. Palma and C.E. Hernández. 2008. The evolution of ecomorphological traits within the Abrothrichini (Rodentia: Sigmodontinae): a Bayesian phylogenetics approach. *Mol. Phylogenet. Evol.* 48: 473–480.
- Schamberger, M.L. and G. Fulk. 1974. Mamíferos del Parque Nacional Fray Jorge. *Idesia* 3: 176–179.

- Tate, G.H.H. 1932. The taxonomic history of the South and Central American akodont rodent genera: *Thalpomys*, *Deltamys*, *Thaptomys*, *Hypsimys*, *Bolomys*, *Chroeomys*, *Abrothrix*, *Scotinomys*, *Akodon* (*Chalcomys* and *Akodon*), *Microxus*, *Podoxymys*, *Lenoxus*, *Oxymycterus*, *Notiomys*, and *Blarinomys*. *Am. Mus. Nov.* 582: 1–32.
- Vásquez, R.A. and J.A. Simonetti. 1999. Life history traits and sensitivity to landscape change: the case of birds and mammals of Mediterranean Chile. *Rev. Chil. Hist. Nat.* 72: 517–525.
- Vásquez, R.A., L.A. Ebensperger and F. Bozinovic. 2002. The influence of habitat on travel speed, intermittent locomotion, and vigilance in a diurnal rodent. *Behav. Ecol.* 13: 182–187.
- Wilson, D.E. and D.M. Reeder. 2005. *Mammal species of the world: a taxonomic and geographic reference*. Johns Hopkins University Press, Baltimore.