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Dense-sampling reveals a complex distributional pattern between the southernmost marsupials *Lestodelphys* and *Thylamys* in Patagonia, Argentina

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Q1: Please supply Abstract

Keywords: Didelphidae; geographic distribution; owl pellets; Patagonian opossum; slender mouse opossum; taxonomy; trapping localities.

The genera *Lestodelphys* Tate 1934 and *Thylamys* Gray 1843, both included in the tribe Thylamyini (family Didelphidae; see Voss and Jansa 2009), are the southernmost representatives of the order Didelphimorphia (Creighton and Gardner 2007, Pearson 2007). Both taxa are small and terrestrial mouse opossums that occupy arid to semiarid temperate to cold Patagonian steppes. They have several adaptations to these kinds of environments, such as the ability to conserve water, enter torpor at low temperatures, and the capacity to storage fat in the tail as energy source (e.g., Martin 2008, Braun et al. 2010, Martin and Udrizar Sauthier 2011). Although these genera reach latitudes around 46° or 47° S (Udrizar Sauthier et al. 2007, Martin 2009) most ecogeographic data of their Patagonian distribution are not recorded or miss recorded in the taxonomic literature (e.g., Palma et al. 2002, Braun et al. 2005, 2010, Martin et al. 2008).

Herein we review available information about the southernmost collection records (south of 42° S) of *Lestodelphys* and *Thylamys* in arid and semiarid steppes of south-central Patagonia, adding 100 new localities, and discuss the known distributions of both taxa considering environmental conditions and sampling efforts. Taking into account that effective analyses of distributional patterns are limited by taxonomic uncertainties, we also assessed the alpha-taxonomy relationships among Patagonian populations of *Thylamys* based on morphological evidence.

Studied samples corresponded to live-trapped individuals and cranial remains gathered from owl pellets collected in 120 localities across the territories of Chubut and Santa Cruz provinces, Patagonia, Argentina. Trapped specimens were prepared as skin, skeletal or both or conserved in alcohol. Specimens were identified by the examination of skull and mandibles (in the case of those retrieved from owl pellets) and by external characters (in the case of those trapped), following published literature (e.g., Marshall 1977, Voss et al. 2009, Giarla et al. 2010) and by comparison with reference collections. All the studied specimens (Table 1) are deposited in the Colección de Material de Egagrópilas y Afines ''Elio Massoia'' (CNP-E), and the Colección de Mamíferos (CNP), both of the Centro Nacional Patagónico (Puerto Madryn, Chubut, Argentina).

We recorded *Lestodelphys halli* (Thomas 1921) in 87 localities, and *Thylamys pallidior* (Thomas 1902) in 105 (Table 1). At a regional scale, both species are largely allopatric throughout a vast area of northwestern Chubut province, with limited records of sympatry in the southeastern portion of this province and along the middle course of the Chubut River. In a broad view, *L. halli* is restricted to the floristic district known as Patagonian Phytogeographic Province (sensu León et al. 1998), while *T. pallidior* is more closely linked with the Monte Phytogeographic Province (Figure 1).

Southernmost records of *Lestodelphys halli* occur like a wedge trough the central plateaus of Santa Cruz province, but avoiding the northeastern corner of the Deseado Massif. Interestingly this distributional pattern, with populations in the middle basin of the Deseado River and absence in the mouth of this water course, is shared by some rodents mostly related with the Monte Desert, such as *Akodon iniscatus* Thomas 1919, and *Graomys griseoflavus* Waterhouse 1837 (Pardiñas et al. 2003, Udrizar Sauthier et al. 2011). On the other hand, the type locality of *L. halli* is almost marginal to its current distribution, a feature shared by *Notiomys edwardsii* Thomas 1890, a small sigmodontine rodent also endemic of the Patagonian steppe (see Pardiñas et al. 2008). The southernmost locality for *L. halli* was reported by Martin et al. (2008): 134) as Estancia La Primavera (48° 25′ 14″ S, 69′ 33′ 41″ W). However, according to our observations, based on Instituto Geográfico Militar Argentina maps, Google Earth application and personal communication of G. Martin, this locality is actually placed at 47° 51′ 10″ S, 68° 56′ 46″ W, making it one of the southernmost records but not the most southern. The southernmost reference for *L. halli* corresponds to Estancia La María (Table 1), ca. 65 km S of Estancia La Primavera. South of this locality, there is a huge gap of information about small mammal assemblages covering about 20,000 km^2 to the Chico River in Santa Cruz province. This lack of sampling in Santa Cruz province makes impossible to adequately fix the southern limit in the

Q2: Please spell out Alt.

Table 1 Recording localities for *Lestodelphys halli* and *Thylamys pallidior* in south-central Patagonia, Argentina.

No	Locality	Latitude S	Longitude W	Alt.	Voucher	Main references	*L. halli*	*T. pallidior*
1	3 km S Punta Norte	-42.100125	-63.741586	–	–	Mares and Braun 2000		x
2	Puerto Lobos	-42.000556	-65.071944	26	CNP-E 225	Birney et al. 1996a		x
3	Arroyo Verde	-42.008333	-65.349444	100	CNP-E 272	This paper		x
4	0.5 km W conj. RP 60 and RN 1	-42.009722	-65.071944	8	CNP-E 35	This paper		x
5	Vecinity of Salina Grande	-42.053889	-70.105833	–	CNP-E 255	This paper	x	
6	Ea. San Pedro	-42.066667	-67.566667	–	–	Pardiñas et al. 2003	x	
7	Ea. Talagapa	-42.137778	-68.254722	1414	CNP-E 204	This paper	x	
8	Sa. de Talagapa, 53 km by road N Gan Gan	-42.200.000	-68.216667	–	–	Teta and Andrade 2002	x	
9	Ea. La Colmena	-42.216111	-65.049167	–	CNP-E 424	This paper		x
10	2 km NW Gastre	-42.233333	-69.200000	–	CNP-E 57	Udrizar Sauthier et al. 2007	x	
11	Sa. de Talagapa	-42.233333	-68.233333	–	–	Teta and Andrade 2002	x	
12	Cueva Loncon	-42.324167	-71.020278	692	CNP-E 235	This paper	x	
13	Campo de Netchovitch. Fofo Cahuel	-42.325278	-70.558333	598	CNP-E 120	Udrizar Sauthier et al. 2007, this paper	x	
14	Telsen	-42.350000	-67.016667	–	–	Nabte et al. 2006		x
15	Fofo Cahuel	-42.375356	-70.494167	–	CNP-E 117	Udrizar Sauthier et al. 2007, this paper	x	
16	Ea. Mallín Grande	-42.385556	-67.690278	1076	CNP-E 309	This paper	x	
17	Barranco de las Almejas, Fofo Cahuel	-42.400000	-70.516667	–	CNP-E 116	This paper	x	
18	Esc. N° 59, Fofo Cahuel	-42.408333	-70.529444	531	CNP-E 296	This paper	x	x
19	2 km N Telsen	-42.416944	-66.970833	350	CNP-E 82	This paper		x
20	Riacho San José	-42.426667	-64.601389	–	–	Massoia et al. 1988		x
21	Ea. El Pampero	-42.427222	-64.615833	–	–	Nabte 2003		x
22	R.P. Isla de los Pájaros, surroundings park ranger house	-42.429444	-64.516667	–	–	Daciuk 1974		x
23	R.P.I. Pájaros, vecinity P. Gales	-42.433056	-64.577500	–	–	Daciuk 1974		x
24	Istmo Carlos Ameghino	-42.465181	-64.499406	15	–	Birney et al. 1996a		x
25	Ea. Las Charas	-42.485833	-64.666944	–	–	Nabte 2003		x
26	Ea. El Desempeño	-42.510278	-64.747222	–	–	Nabte 2003		x
27	Ea. El Deseado	-42.533333	-64.858056	–	–	Nabte 2003		x
28	Ea. El Oasis	-42.533333	-65.666667	150	CNP-E 86	This paper		x
29	Cañadón del Loro	-42.560556	-69.899444	704	CNP-E 38	Martin 2005, this paper	x	
30	Puerto Pirámide	-42.570000	-64.276389	10	–	Birney et al. 1996a		x
31	Gualjaina and Chubut rivers conj.	-42.603611	-70.374583	–	–	Martin 2008	x	
32	Costa del Chubut	-42.604722	-70.457778	436	CNP-E 276	This paper	x	
33	Ea. El Doradillo	-42.625000	-65.024722	–	–	Nabte 2003		x
34	45 km SE Telsen. on RP 4	-42.626389	-66.490278	270	CNP-E 339	This paper		x
35	Piedra Parada 2	-42.638060	-70.222222	420	–	Martin 2003		x
36	Campo de Moncada	-42.640556	-70.129722	451	CNP-E 216	This paper		x
37	Tres cuevas	-42.647222	-70.152778	435	CNP-E 33	This paper		x
38	Cañadón de la Buitrera	-42.651389	-70.103056	420	CNP-E 8	Martin 2003, this paper	x	x
39	Piedra Parada 1	-42.658889	-70.109444	436	–	Martin 2003	x	x
40	Ea. La Gloria	-42.666667	-69.500000	–	–	Massoia and Pastore 1997	x	x
41	Piedra Parada 3	-42.671333	-70.087056	434	–	Martin 2005	x	x

(Table 1 continued)

No	Locality	Latitude S	Longitude W	Alt.	Voucher	Main references	*L. halli*	*T. pallidior*
42	8 km W Paso del Sapo	-42.680556	-69.674167	402	CNP-E 224	This paper	x	x
43	Paso del Sapo 1	-42.681111	-69.663611	411	–	Martin 2003		x
44	Paso del Sapo	-42.681667	-69.663667	–	–	Martin 2003	x	
45	Paso del Sapo 2	-42.685278	-69.722778	–	–	Pardiñas et al. 2003	x	x
46	Campo de Cretón 4	-42.695556	-70.025833	411	CNP-E 124	This paper	x	x
47	20 km S Gan Gan, on RP 67	-42.695833	-68.232222	1084	CNP-E 340	This paper	x	
48	3 km S RP 12 to Colan Conhue	-42.697500	-70.125556	574	CNP-E 234	This paper	x	x
49	Campo de Cretón 5	-42.698889	-70.068611	443	CNP-E 207	This paper	x	x
50	Campo Cretón, Piedra Parada	-42.700000	-70.033333	478	CNP-E 39	This paper	x	
51	Gualjaina	-42.700000	-70.466667	470	–	Martin 2003	x	
52	Campo de Cretón 6	-42.703889	-70.041944	478	CNP-E 39	This paper		x
53	Arroyo Mayoco III	-42.716667	-70.833333	744	–	Martin 2003	x	
54	Lepa and Gualjaina rivers conj.	-42.730833	-70.494167	628	CNP-E 205	This paper	x	x
55	Campo de Cretón 3	-42.743889	-70.055000	809	CNP-E 122	This paper	x	x
56	Mayoco	-42.750028	-70.863722	-	–	Martin 2005	x	
57	Cueva Watkins	-42.750278	-70.873611	837	–	Martin 2003	x	
58	Arroyo Mayoco I	-42.751667	-70.870000	797	–	Martin 2003	x	
59	Arroyo Mayoco II	-42.783333	-70.816667	915	–	Martin 2003	x	
60	Playa Kaiser	-42.783333	-64.966667	–	CNP-E 26	This paper		x
61	Punta Este	-42.783333	-64.933333	–	–	De Santis and Pagnoni 1989		x
62	Base Aeronaval de Puerto Madryn	-42.796667	-65.026667	–	–	De Santis et al. 1997		x
63	Playa Paraná	-42.803611	-64.940556	–	CNP-E 183	This paper		x
64	4 km S Tres Banderas, on RP 11	-42.808333	-68.015556	956	CNP-E 36	This paper	x	
65	2.5 km W Laguna Honda	-42.818056	-68.301389	1258	CNP-E 336	This paper	x	
66	Laguna La Blanca	-42.821389	-65.135556	–	–	De Santis and Pagnoni 1989		x
67	Vecinity Cerro Avanzado	-42.827778	-64.890556	–	CNP-E 107	Flores et al. 2007, this paper		x
68	13.5 km SE Paso del Sapo, on RP 12	-42.839167	-69.533611	370	CNP-E 115	This paper	x	x
69	22.5 km SE Paso del Sapo, on RP 12	-42.906667	-69.481111	332	CNP-E 160	This paper		x
70	Bahía Cracker	-42.950556	-64.479167	–	CNP 1409[b]	This paper		x
71	Ea. Los Pinos	-42.955278	-64.641667	–	–	This paper		x
72	Boquete Nahuel Pan	-42.965556	-71.156667	765	–	Martin 2003	x	
73	Nahuel Pan	-42.987500	-71.183056	842	–	Martin 2003	x	
74	Gualjaina river, 1 km W RP 25 and RP 14	-43.016667	-70.796667	574	–	Martin 2003	x	
75	Cabaña A° Pescado 2	-43.025278	-70.792778	568	CNP-E 202	This paper	x	
76	Est. Gorro Frigio	-43.040556	-69.331944	352	CNP 1667[a]	This paper		x
77	Cabaña A° Pescado 3	-43.041944	-70.800833	557	CNP-E 237	This paper	x	
78	Punta León	-43.068889	-64.466944	–	CNP-E 331	This paper		x
79	Cabaña A° Pescado	-43.069722	-70.912778	–	–	Martin 2003, this paper	x	
80	Arroyo Pescado	-43.073750	-70.913583	593	–	Martin 2005	x	
81	Gorro Frigio, on RP 12	-43.087222	-69.325278	362	CNP-E 40	Udrizar Sauthier et al. 2007, this paper	x	x
82	Colan Conhue	-43.135194	-70.469000	–	–	Martin 2005	x	
83	11 km W Laguna Aleusco	-43.140000	-70.607500	700	CNP-E 508	This paper	x	

(Table 1 continued)

No	Locality	Latitude S	Longitude W	Alt.	Voucher	Main references	*L. halli*	*T. pallidior*
84	Laguna Aleusco	-43.171389	-70.438889	–	–	This paper		x
85	Est. El Torito 2 on RP 12	-43.208056	-69.236667	349	CNP-E 239	This paper		x
86	16 km NE Los Adobes, on RP 58	-43.230833	-68.681667	591	CNP-E 333	This paper	x	
87	Est. La Elvira	-43.232778	-65.931389	–	CNP-E 184	This paper		x
88	2.2 km W casco Ea. El Camaruco	-43.262500	-70.449722	747	CNP-E 513	This paper	x	
89	Est. El Torito, on RP 12	-43.276389	-69.141.389	301	CNP-E 121	Udrizar Sauthier et al. 2007, this paper	x	x
90	Lle Cul	-43.333333	-65.583333	–	–	García Esponda et al. 1998		x
91	Km 1467 RN 3 S Trelew	-43.334722	-65.303333	50	CNP-E 332	This paper		x
92	Gaiman	-43.335000	-65.490000	–	–	Martin 2008		x
93	28 de Julio Entrance, on RN 25	-43.347778	-65.913889	88	CNP-E 330	This paper		x
94	La Angostura (Lle Cul)	-43.356667	-65.626667	39	CNP-E 106	This paper		x
95	Ea. La Mimosa	-43.378889	-70.881667	–	–	Schiaffini et al. 2008	x	
96	Vecinity Cerro Cóndor	-43.388889	-69.170278	340	CNP-E 66	Udrizar Sauthier et al. 2007, this paper	x	x
97	Ea. Los Manantiales	-43.400000	-70.016667	–	–	Reig 1959	x	
98	Sierra de Tecka N° 2	-43.409444	-70.647222	–	–	Martin 2008	x	
99	Sierra de Tecka N° 1	-43.428611	-70.750000	–	–	Martin 2008	x	
100	Sierra de Tecka N° 3	-43.429722	-70.751.111	–	–	Martin 2008	x	
101	12.8 km NE RN 40 and RP 17 conj.	-43.430000	-70.750278	910	CNP-E 514	This paper	x	
102	Boca Toma 1	-43.451389	-65.943611	–	CNP-E 238	This paper		x
103	30 km E Las Chapas	-43.453056	-66.113.889	332	CNP-E 128	This paper		x
104	Boca Toma 2	-43.467222	-66.024167	–	CNP-E 85	This paper		x
105	30 km NW Pampa de Agnia	-43.479444	-69.818056	–	–	Birney et al. 1996b	x	
106	Cerro del Viento, 200 km W Dolavon	-43.548611	-68.129444	400	–	Birney et al. 1996a		x
107	Campo de Pichiñan 3	-43.561667	-69.078889	463	CNP-E 171	This paper		x
108	Campo de Pichiñan 2	-43.563889	-69.067222	282	CNP-E 210	This paper	x	x
109	1 km N conj. RP 40 and RP 12	-43.573889	-69.046944	312	CNP-E 34	This paper		x
110	Piedra Grande 1	-43.601667	-66.381389	17	CNP-E 114	This paper		x
111	Piedra Grande 2	-43.624167	-66.378611	–	CNP 1678[a]	This paper		x
112	Ea. La Madrugada	-43.627778	-68.952222	297	CNP-E 218	This paper		x
113	Isla Escondida 1	-43.655000	-65.334722	48	CNP-E 10	This paper		x
114	Cerro Rosario, 280 km W Dolavon	-43.671667	-68.952778	550	–	Birney et al. 1996a		x
115	Cueva Peligro	-43.671667	-66.414722	–	CNP-E 63	This paper		x
116	Cueva Caolinera, Dique Ameghino	-43.680000	-66.432500	–	CNP-E 52; CNP 1730[a]	This paper		x
117	Dique Ameghino	-43.695000	-66.455833	56	CNP-E 159	This paper		x
118	Isla Escondida 3	-43.696111	-65.343333	–	CNP 2281[b]	This paper		x
119	1 km E Dique Ameghino	-43.696944	-66.463056	–	CNP-E 130	This paper		x
120	Cueva de la Virgen	-43.702778	-66.462222	–	CNP-E 50	This paper		x
121	9.5 km W Las Plumas, on RN 25	-43.721389	-67.379167	162	CNP-E 157	This paper		x
122	Las Plumas	-43.730000	-67.263333	–	CNP 1693[a]	This paper		x
123	280 km W Dolavon	-43.755000	-68.952833	–	–	Birney et al. 1996a		x
124	Cañadón Carbón 5	-43.821667	-67.872778	226	CNP-E 136	This paper		x

(Table 1 continued)

No	Locality	Latitude S	Longitude W	Alt.	Voucher	Main references	*L. halli*	*T. pallidior*
125	Cañadón Carbón 3	-43.825556	-67.857778	182	CNP-E 254	This paper		x
126	22 km E Los Altares	-43.831944	-68.180556	–	CNP-E 112	This paper		x
127	Cueva Oreja	-43.838889	-67.799722	209	CNP-E 397	This paper		x
128	50 km W Las Plumas	-43.841717	-67.802228	–	CNP-E 54	This paper		x
129	Los Altares	-43.844444	-68.422222	255	CNP-E 94	Pardiñas et al. 2003	x	x
130	20 km E Los Altares	-43.846389	-68.196667	–	CNP-E 252	This paper		x
131	8 km W Cañadón Carbón	-43.856944	-67.949722	208	CNP-E 53	This paper		x
132	Vecinity conj. RN 25 and RP 27	-43.857222	-67.948889	228	CNP-E 231	This paper		x
133	Conj. RN 25 and RP 27	-43.857500	-67.952778	–	CNP-E 67	This paper		x
134	36 km W Los Altares, on RN 25	-43.861389	-68.825278	276	CNP-E 70	Pardiñas et al. 2003, this paper		x
135	Los Altares	-43.891944	-68.398333	–	CNP-E 89	Pardiñas et al. 2003		x
136	Perfil Los Altares	-43.893056	-68.389167	219	CNP-E 277	This paper		x
137	Campo de Conrad	-43.894444	-66.344167	54	CNP-E 113	This paper		x
138	Los Altares 3	-43.896944	-68.404722	–	CNP-E 242	Pardiñas et al. 2003		x
139	7.3 km N conj. RP 27 and RP 53	-44.048500	-68.083278	426	CNP-E 321	This paper		x
140	Cueva de la Viborita	-44.090556	-66.704722	122	CNP-E 341	This paper		x
141	Cerro El Sombrero	-44.139167	-68.263333	611	CNP-E 294	This paper	x	
142	7.3 km SW Cabo Raso, on RP 1	-44.386389	-65.305389	21	CNP-E 310	This paper		x
143	Ea. La Maciega. Puesto El Palenque	-44.431944	-65.401944	72	CNP-E 316	This paper		x
144	Ea. La Argentina	-44.704167	-66.114.444	–	CNP 2365[a]	This paper	x	
145	Puerto Piojo	-44.883333	-65.671944	–	CNP 2324[b]	This paper		x
146	Ea. El Gauchito	-45.183333	-67.183333	–	–	Pardiñas et al. 2000	x	x
147	Cerro Dragón	-45.301667	-68.816110	492	CNP-E 495	This paper	x	
148	Ea. Puerto Visser	-45.345556	-67.145.833	116	CNP-E 319	This paper		x
149	Pampa de los Guanacos	-45.363056	-68.641111	423	CNP-E 303	This paper		x
150	Pico Salamanca	-45.400000	-67.400000	517	CNP-E 465; CNP 2114[a]	Simpson 1972 and this paper	x	
151	Cerro Guacho, Ea. Cerro Guacho	-45.404722	-68.479167	324	CNP-E 304	This paper		x
152	Est. Los Manantiales	-45.511389	-67.485833	350	CNP-E 83	This paper	x	
153	Astra	-45.733333	-67.483333	104	CNP-E 84	Pardiñas 1999	x	x
154	36 km E Sarmiento	-45.781070	-68.720830	345	CNP-E 455	This paper	x	
155	Comodoro Rivadavia	-45.866667	-67.500000	–	–	Flores et al. 2007	x	
156	14 km SE Comodoro Rivadavia	-45.883333	-67.583333	60	–	Rodríguez and Theiler 2007	x	
157	Ea. Sierras del Carril	-45.951840	-70.128330	536	CNP-E 456	This paper	x	
158	13 km SW Holdich	-46.014167	-68.328611	730	CNP-E 472	This paper	x	
159	Río Pinturas	-46.652761	-70.342661	356	CNP-E 451	This paper	x	
160	Cañadón Minerales	-46.721111	-67.590833	223	CNP-E 368	This paper	x	
161	El Pedrero Plateau	-46.772833	-69.641500	–	–	Birney et al. 1996b	x	
162	Ea. La Madrugada	-47.096111	-66.483333	–	–	Thomas 1921	x	
163	Ea. La Española	-47.383117	-69.336056	741	CNP-E 481	This paper	x	
164	17.3 km N RP 49 on RP 12	-47.491472	-68.641694	379	CNP-E 502	This paper	x	
165	MN Bosques Petrificados	-47.671667	-68.019722	–	–	Procopio D. (pers. comm.)	x	

(Table 1 continued)

No	Locality	Latitude S	Longitude W	Alt.	Voucher	Main references	*L. halli*	*T. pallidior*
166	10 km N conj. RP 12 and RP 75	-47.792139	-68.594222	395	CNP-E 482	This paper	x	
167	Ea. La Primavera	-47.851369	-68.934164	–	–	Martin et al. 2008	x	
168	Ea. Cerro Argentino	-47.946110	-69.780280	776	CNP-E 491	This paper	x	
169	Puesto Ea. El Piche	-47.993694	-68.501333	259	CNP-E 484	This paper	x	
170	Ea. San José	-48.167278	-69.444000	769	CNP-E 440	This paper	x	
171	Puesto El Cuero	-48.183667	-69.280333	739	CNP-E 442	This paper	x	
172	Ea. La María	-48.410111	-68.869944	240	CNP-E 426	This paper	x	

x=presence; CNP-E: skeletal remains retrieved from owl pellets; CNP: [a]specimens prepared as skin, skeletal or both or [b]conserved in alcohol.

Q3: Please confim Table footnote

distribution of *L. halli*. Three large studied owl pellet samples along the middle and lower course of the Chico River, at Cerro Ventana (49° 03′ 44.4″ S, 70° 14′ 32.38″ W), Estancia Julia (49° 35′ 26.9′ S, 69° 35′ 32.1″ W), and Punta Beagle (49° 56′ 10.4″ S, 68° 34′ 12.8″ W), indicate the absence of populations of this marsupial at least at these latitudes. Although there is a record without a voucher specimen available from the Parque Nacional Monte León (Gil 1989, Cinti 2005) on the Atlantic coast south of the Chico river (Santa Cruz province; ca. 50° 12′ 58.68″ S, 68° 47′ 23.7″ W), this sight record (made by a local resident) seems too dubious to use for analytic purposes (e.g., ecogeographic niche modeling). Supporting our position, several owl pellet samples that we studied and trapping data available from this national park, show a very poor assemblage of small mammals exclusively composed on rodents (Cueto et al. 2008, Roldán 2010, Formoso unpub. results). Regarding the southwestern boundary, it is noted that *L. halli* does not occur along the southern ranges of the Patagónides (Figure 1), a region that has been well sampled with owl pellets.

According to Creighton and Gardner (2007), specimens of *Thylamys* are known at least to 280 km W of Dolavon (one of the southernmost localities for the species before this work) and 3 km S of Punta Norte (Chubut province) considering both localities as marginal to its distribution (localities 1 and 114; see Figure 1). Our results, due to the increased amount of available data, allow us to define more appropriately the southern limits of this species. Eastern and southern penetrations of this mouse opossum into Patagonian steppes follow the courses of major rivers that dissect the region from west to east (e.g., Chubut, Chico) and coastal areas. In addition, most of the recorded localities in the studied area are below 700 m, suggesting some restriction of this mouse opossum to low elevations in this area of its distribution. In any case, there are no records of *Thylamys* in the highlands of central Patagonia, such as the plateau of Somuncurá, Montemayor-Castillo, or those of the central Santa Cruz province (Pardiñas and Teta 2007, Andrade et al. 2010, this paper). Southern distribution of *Thylamys* is much more reduced than in *Lestodelphys halli*, not reaching latitudes south of 46° S. All these data strongly contrast with respect to the map recently produced for the species by Braun et al. [(2010): Figure 3)]; in fact, these authors restricted *T. pallidior* to the northern portion of Chubut province missing records from Península Valdés area (cf. Daciuk 1974, Birney et al. 1996a, Flores et al. 2007).

We have recorded 20 localities of sympatry between *Lestodelphys halli* and *Thylamys pallidior*, 18 along the occidental part of the middle course of the Chubut river and two in the southeastern coastal zone of this province (Figure 1). However, all of these records are from owl pellet samples, and we have not found conclusive evidence of syntopy by trapping at any site (Table 1). We suspect that the two main raptors involved (*Bubo magellanicus* and/or *Tyto alba*) which are known to have large foraging territories (Evans and Elmen 1947, Hausser 1978), probably obtained their prey from several different habitats (e.g., low shrubs and high steppe landscapes, suitable for *T. pallidior* and *L. halli*,

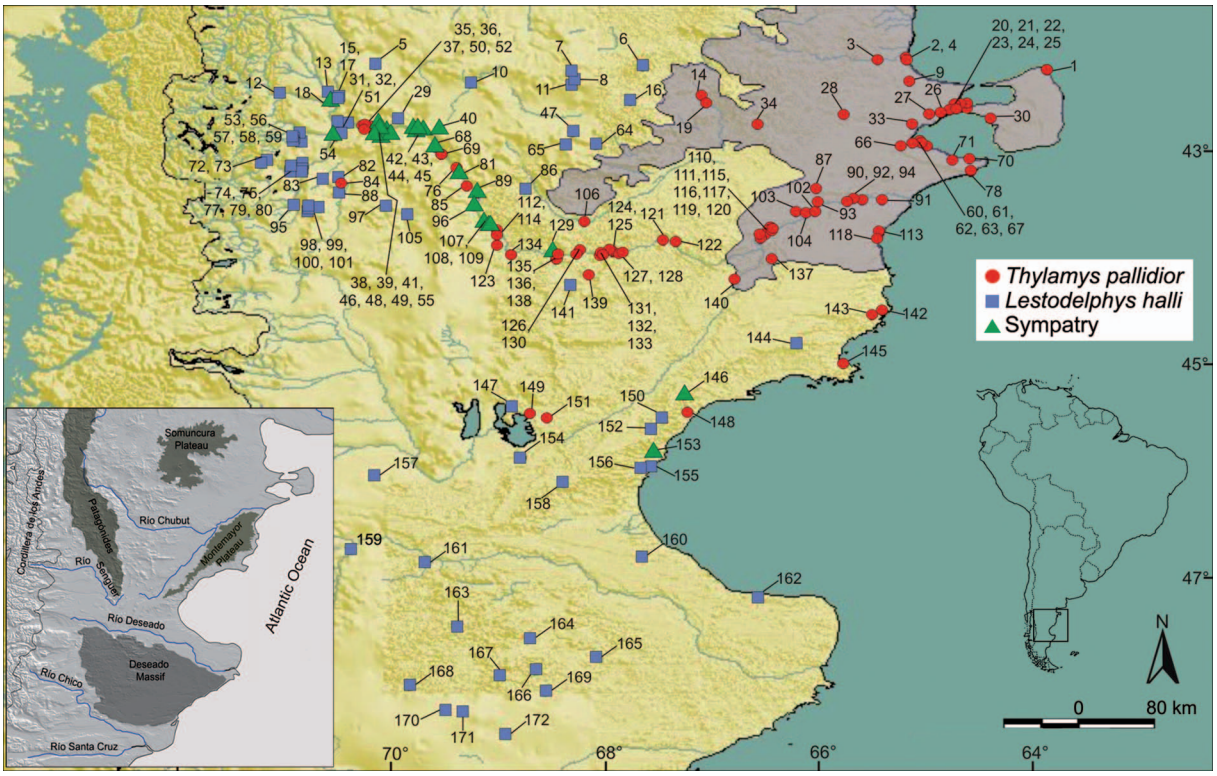

Figure 1 Recording localities of *Lestodelphys halli* and *Thylamys pallidior* in south-central Patagonia; the blue shading highlights the Monte desert. In the inset are shown the main geographical features mentioned in the text.

respectively). A clear example is Estancia El Gauchito (locality 146; see Figure 1), a locality placed in the Golfo San Jorge north portion, an area roughly dissected by temporary streams and tableland erosion remnants with an altitude ranging from 100 to 500 m. According to the available trapping data, *T. pallidior* inhabit the floor and lower faces between 100 and 400 m whereas *L. halli* is restricted to the top portions (Udrizar Sauthier 2009). However, both marsupials are present in the pellets produced by *Tyto alba* at this locality. This mixing of faunal components of different altitudinal assemblages also involves clearly non-syntopic sigmodontine rodents such as *Graomys griseoflavus* and *Euneomys chinchilloides* Waterhouse 1839.

Birney et al. (1996a), based on metric and morphological features, suggested that two morphs or phena of *Thylamys* were present in Patagonia. These authors suggested that one of these phena was restricted to the Patagonian biome, while the other was primarily restricted to the Monte Desert, using for them the names *T. pusillus* (Desmarest 1804) and *T. pallidior*, respectively. However, our examination of specimens from several localities trough Patagonia, including samples from both biomes, allow us to recognize only one phenotype referable to *T. pallidior*, a conclusion also reached by Giarla et al. (2010) using morphological and genetic evidences. This scenario is consistent with the current restriction of *T. pusillus* to northern Argentina, eastern Bolivia and western Paraguay (Teta et al. 2009, Giarla et al. 2010), and the recognition of only one species of *Thylamys* in southern latitudes of Argentina (Braun et al. 2005). In a recent contribution, Martin (2009) resurrected the name of *Thylamys fenestrae* (Marelli 1932) for populations in central Argentina, including some localities near the northeastern Patagonian border. Martin (2009) considered *T. fenestrae* different from *T. pallidior* mostly based on morphometric and morphological differences. However, we examined some of the same individuals analyzed by Martin (2009) in his study and found some inconsistencies with his results. For example, this author included the specimens MACN 18656 (from Sierra de la Ventana, Buenos Aires province; topotype of *T. fenestrae*) and MACN 13159 (from Córdoba province, central Argentina) within *T. fenestrae*, but both individuals shown some of the typical state characters that this author referred to *T. pallidior* (i.e., large and closely located maxillary fenestrae; wide ventral exposition of the presphenoid-basisphenoid suture). More in general, we observed a large amount of variation in these and other characters (e.g., form of the nasals, relative expansion of zygomatic arches, development of the alisphenoid, distance between tympanic bullae), both locally and regionally, including some individuals with a mosaic of Martin (2009) defined traits (e.g., MACN 19413 [(from Jujuy province, northwestern Argentina) and 22470 (from Mendoza province, west-central Argentina)]. In fact, some individuals from Neuquén province (e.g., MACN 13837), where only *T. pallidior* was cited (cf. Flores et al. 2007, Martin 2009), presented several of the state characters supposedly characteristic of *T. fenestrae*, such as very small maxillary fenestrae and narrow ventral exposition of the presphenoid-basisphenoid suture (sensu Martin 2009). In addi-

tion, genetic evidences, such as those presented by Giarla et al. (2010) also suggest the synonymy between *T. fenestrae* and *T. pallidior*. In this context, we do not discard some morphometric variation between individuals of different habitats, explaining the metric differences observed by Martin (2009).

The data presented in this contribution are conclusive to depict that both *Lestodelphys halli* and *Thylamys pallidior* have widespread distribution in south-central Patagonia. More indeed, two distributional, ecological, and probably biogeographic histories seem to be represented by these two marsupials. A western one and probably more largely, related to Patagonian steppes is reflected by *L. halli*. On the other hand, *T. pallidior*, the southernmost species of this genus, exemplified an eastern history more strictly linked to arid and semiarid lowlands that where filled by several small mammal species during postglacial times (Lessa et al. 2010). In this context, and in order to advance in a better understanding of the distributional patterns of both marsupials, additional data are much needed, especially about natural history and habits, such as diet, competition, or reproduction among others.

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