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New data on the genus *Urophonius* in Patagonia with a description of a new species of the *exochus* group (Scorpiones: Bothriuridae)

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Abstract. New data on the distribution and systematics of Patagonian species of the scorpion genus *Urophonius* Pocock 1893 are provided. A species of this genus from Península Valdés in central eastern Argentinean Patagonia, *Urophonius martinezi* new species, is described. The surface activity period of most of the species of the genus is reviewed and clearly established. A distribution map as well as a key for the Patagonian species of the genus are provided.

Keywords: Scorpiones, systematics, Neotropics, Patagonia, summer vs. winter activity

Species of the scorpion genus *Urophonius* Pocock 1893 occur in southern South America, from southern Brazil to southern Patagonia. Most species inhabit grasslands and shrub steppes, but some species have been collected in forests and even in low mountain ranges (Ojanguren-Affilastro 2005). According to Prendini (2000, 2003), the genus shows an intermediate position in the phylogeny of the family Bothriuridae, being the sister group of the genus *Cercophonius* Peters 1861 from Australia. One of the most remarkable characteristics of *Urophonius* is that most species of this genus have their surface activity period in the winter, opposite to most of the Bothriuridae, which have their surface activity period in the summer (Maury 1968, 1969, 1977, 1979; Ojanguren-Affilastro 2002, 2005). Only some species of the genus *Vachonia* Ábalos 1953 apparently share this winter activity period (López & Magnanelli 2002; Ojanguren-Affilastro 2005); however, the information available on this genus is still scarce.

In a revision of *Urophonius*, Acosta (1988) has separated the species of this genus into three different groups of species: *U. brachycentrus*, *U. granulatus*, and *U. exochus* groups. The first two groups were formerly included in a single group (group B, Maury 1973), whereas *exochus* group corresponds to group A of Maury (1973), which also corresponds to the original definition of genus *Iophorus* Penther 1913.

Most of the information we have on this genus concerns species of the *brachycentrus* group (Ábalos & Hominal 1974; San Martín & Gambardella 1974; Maury 1977; Acosta 1999), and information on members of the *exochus* and *granulatus* groups is still scarce (San Martin 1965; San Martín & Cekalovic-Kuschevich 1968; Maury 1979; Cekalovic-Kuschevich 1981; Acosta 2003). The species of the *exochus* group have only been collected in Argentina from southern Patagonia to the central part of the country. Only three species have been described in this group, *Urophonius exochus* (Penther 1913), *Urophonius mahuidensis* Maury 1973, and *Urophonius eugenicus* (Mello-Leitão 1931); all of these species have been redescribed with modern standards in a recent monograph on the Argentinean scorpion fauna (Ojanguren-Affilastro 2005). Besides these species, several specimens of this group have already been cited from a wide area of central and southern Patagonia; however, in most cases they were juveniles or females without clear diagnostic characters for assigning them to a species; so our previous information about this genus in Patagonia is scarce and fragmentary. Recently we have collected additional material of this genus that allowed us to clarify, at least partially, some aspects of the systematics of this group. In this contribution we describe a new species of the *exochus* group; we provide information about the surface activity period of most species of this genus, as well as a key and a distribution map of the Patagonian species of *Urophonius*.

METHODS

Descriptive terminology follows Mattoni & Acosta (2005) for the hemispermatophores, Vachon (1974) for the trichobothria, and Francke (1977) for the metasomal carinae, abbreviated as follows: DL: dorsolateral; LIM: lateral inframedian; LSM: lateral supramedian; VSM: ventral submedian; VL: ventrolateral; VM: ventromedian. We followed Francke (1977) for the pedipalp carinae, abbreviated as follows: DI: dorsal internal; DE: dorsal external; VI: ventral internal; VE: ventral external; D: digital; E: external; V: ventral; VM: ventral median; DM: dorsal marginal; DS: dorsal secondary. Abbreviations of collections are as follows: AMNH: American Museum of Natural History (New York, USA); CDA: Catedra de Diversidad Animal I (Universidad de Córdoba, Córdoba, Argentina); MACN-Ar: Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia", (Buenos Aires, Argentina); MHNC: Museo de Historia Natural, Facultad de Ciencias Biológicas, Universidad San Antonio Abad del Cusco (Cusco, Peru); CENPAT: Centro Nacional Patagónico (Puerto Madryn, Argentina); MZUC: Museo de Zoología de la Universidad de Concepción, (Concepción, Chile). Other abbreviations: NPA-PV: Natural Protected Area Península Valdés. Illustrations were produced using a Leitz Wetzlar stereomicroscope and camera lucida. Photographs where taken using a Digital Camera (Nikon DXM 1200) attached to a stereomicroscope (Nikon SMZ 1500), the focal planes composed with Helicon Focus 3.10.3 (Online at http://

helicon.com.ua/heliconfocus/). Measurements, taken using an ocular micrometer, were recorded in mm. Scorpions where collected manually by ultraviolet collection at night, and by pitfall traps in Natural Protected Area Península Valdés (NPA-PV). Traps were placed in shrubby steppes with 40–60% vegetation cover, where the shrub *Chuquiraga avellanedae* Lorentz and the grass *Stipa tenuis* Philippi were the most representative species. The traps used were open plastic containers, 11 cm in diameter and 12 cm depth, with 300 cm^3 of 30% propylene glycol; the traps were neatly buried in the soil near *Ch. avellanedae* bushes. Trap contents were collected after 15 days, fixed in 70% ethyl alcohol, and taken to the laboratory for specimen identification.

RESULTS

Family Bothriuridae Simon 1880
Genus *Urophonius* Pocock 1893

Urophonius Pocock 1893:100–101.

Type species.—*Urophonius iheringi* Pocock 1893, by original designation.

Urophonius martinezi new species
Figs. 1, 2, 6–11, 13, 18, 20; Table 1

Urophonius sp. grupo *exochus*: Ojanguren-Affilastro 2002:185, 186 ("ejemplares del grupo *exochus* provenientes de Península Valdés"); Ojanguren-Affilastro 2005:145, 146 ("escorpiones provenientes de Península Valdés [...] muy relacionados con *U. eugenicus*").

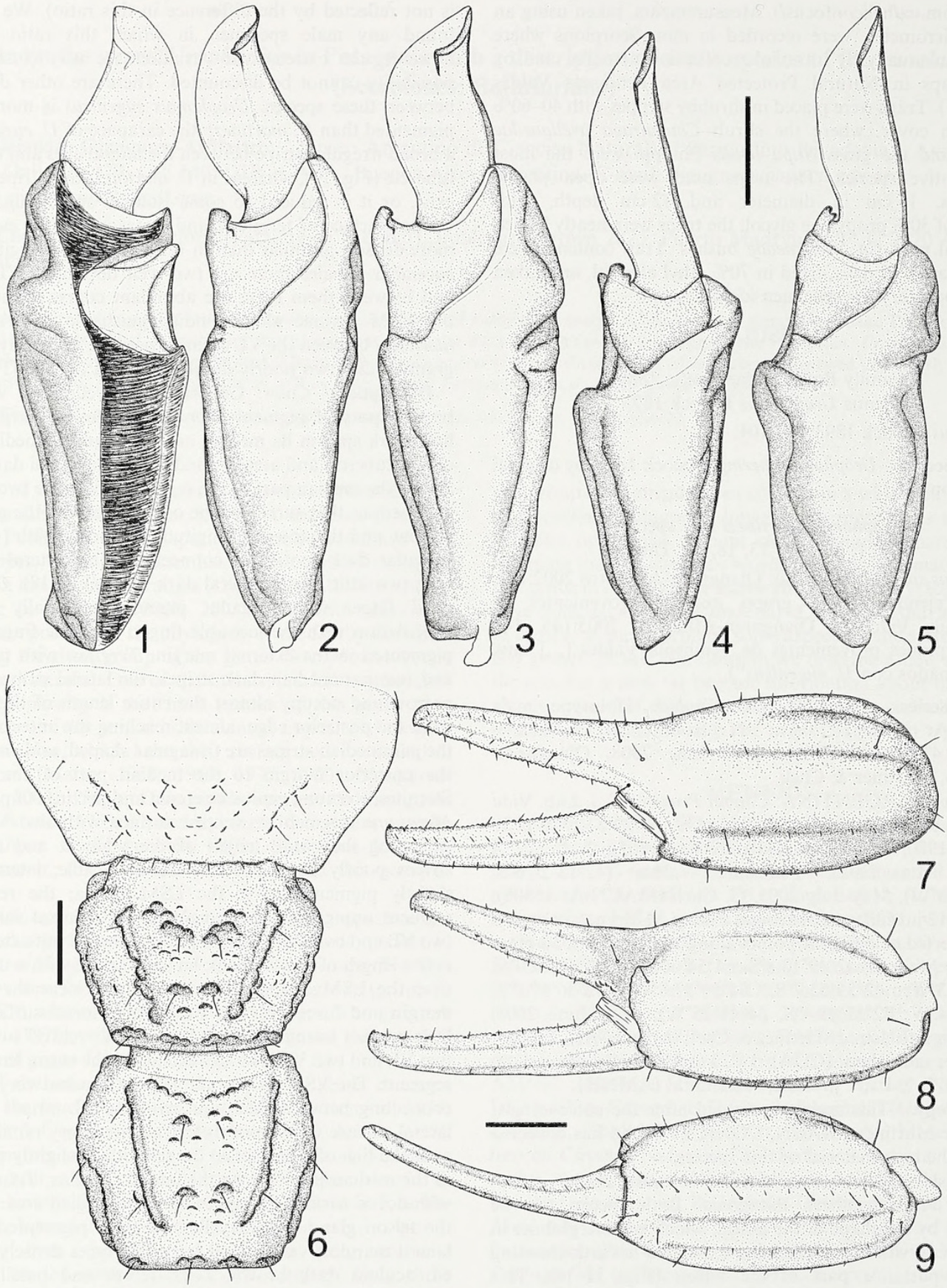
Type series.—ARGENTINA: *Chubut*: Holotype male (MACN-Ar 15808) 20 km N from Puerto Madryn (42°32′49.4″S, 64°48′25″W), 6–10 June 2008, Ojanguren-Affilastro, Martínez & Cheli.

Paratypes: ARGENTINA: *Chubut Province*: 2 ♂, Lab. Vida Silvestre, San José Gulf (42°27′51.01″S, 64°29′57.15″W), 28 October 1970, J. Dacinde (MACN-Ar 15805); 1 ♂, 2 ♀, 4 juveniles, La Falsa, Península Valdés (42°13′26.6″S, 63°51′45.3″W), May–July 2005, G. Cheli (MACN-Ar 15806); 12 ♂, 7 ♀, 12 juveniles, area around Puerto Madryn, (specimens were collected at different points along the coastal road close to Puerto Madryn: 42°49′10.8″S, 64°54′00.1″W; 42°48′02.7″S, 64°57′17.3″W; 42°39′52.7″S, 64°59′37.8″W; 42°36′57.8″S, 64°51′47.4″W; 42°32′49.4″S, 64°48′25″W), 6–10 June 2008, Ojanguren-Affilastro, Martínez & Cheli (MACN-Ar); 1 ♂, 1 ♀, 1 juvenile, same data, (CDA); 1 ♂, 1 ♀, 1 juvenile, same data, (MHNC); 1 ♂, 1 ♀, 1 juvenile, same data, (AMNH).

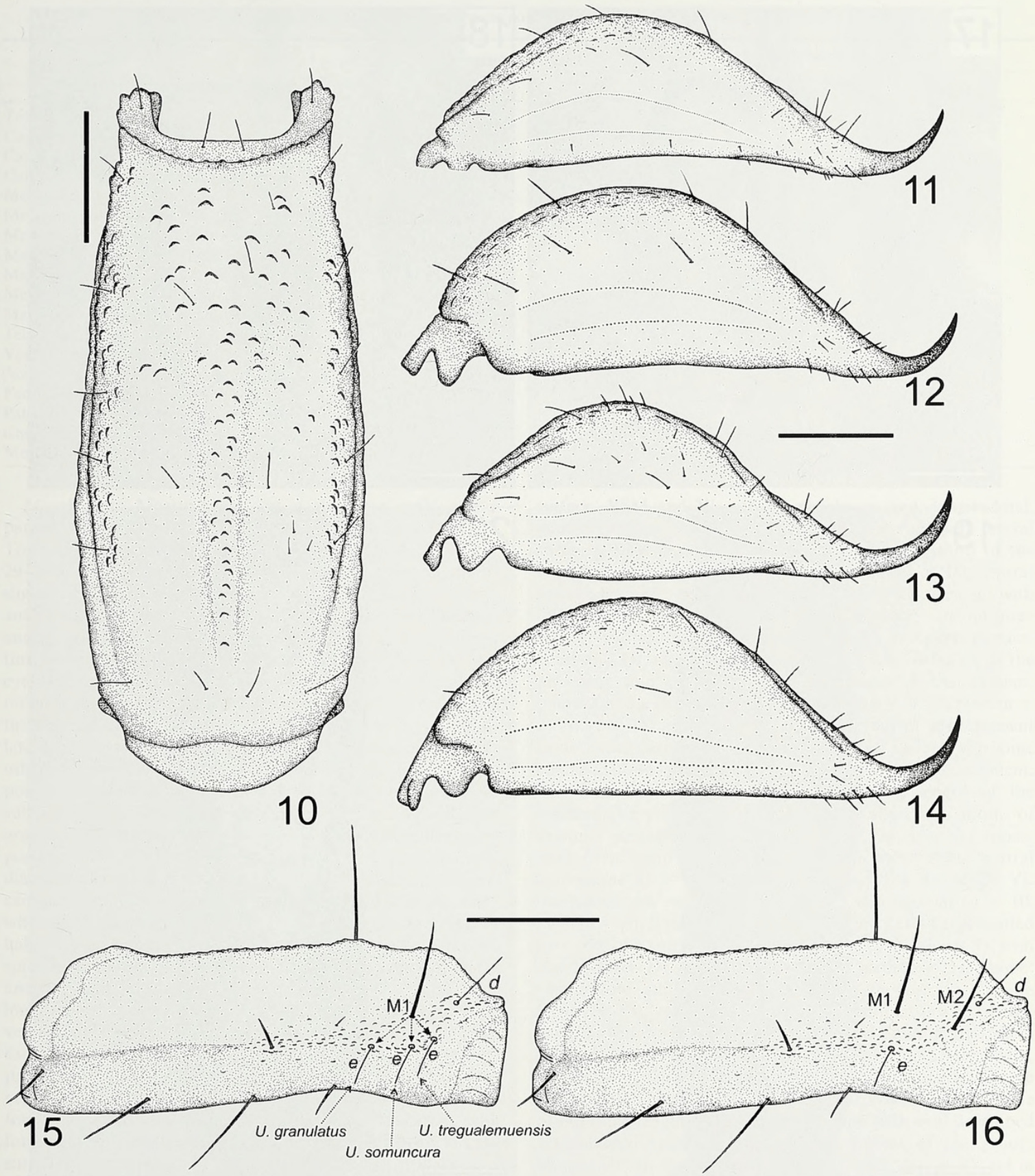
Etymology.—This species is named after the entomologist Juan José Martínez (MACN, CONICET), who has collected most of the type material of this species.

Diagnosis.—*Urophonius martinezi* is most similar to *U. eugenicus* from southern Patagonia. Both species can be separated by the shape of the telson, which is more globose in *U. eugenicus*, with its vesicle more expanded towards the sting and the posterior part of the telson (Figs. 11–14). This difference is more conspicuous in males than in females, because the telson of *U. martinezi* males is dorsoventrally compressed (Fig. 11), such that males of both species can be separated by means of the length/height ratio of the telson: *U. martinezi* 3.10–3.52, $n = 20$, mean = 3.28; *U. eugenicus* 2.54–3.03, $n = 18$, mean = 2.85; (in females the difference in shape is not reflected by the difference in this ratio). We have not found any male specimen in which this ratio overlaps; however, the extremes of variation are very close, so this possibility cannot be discounted. There are other differences between these species. *Urophonius eugenicus* is more densely pigmented than *U. martinezi*: the carapace of *U. eugenicus* has a broad irregular stripe between the lateral eyes and the ocular tubercle (Fig. 17), whereas in *U. martinezi* this stripe does not exist, or it is reduced to some isolated spots (Fig. 18). The ventral surface of tergite V and metasoma of *U. eugenicus* is more densely granular than in *U. martinezi*. In tergite V of *U. eugenicus* females there are two well developed VL carinae, and between them there are abundant coarse granules, with the VSM carinae almost indistinguishable; whereas in *U. martinezi* between the VL carinae there are some tiny scattered granules and two poorly developed VSM carinae (Fig. 6).

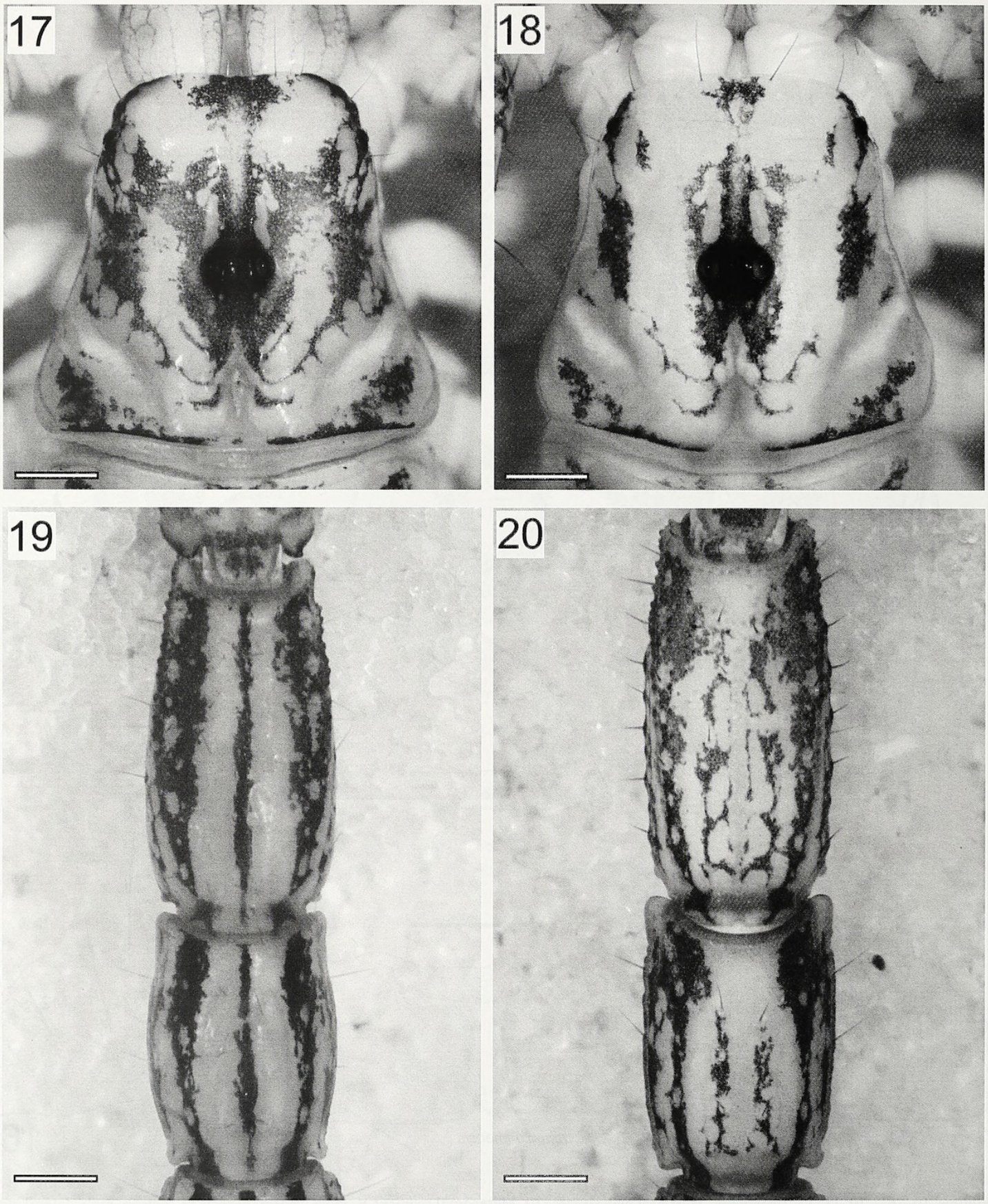
Description.—*Color*: General color yellowish, with dark brown spots of pigment. *Carapace*: anterior margin with a little dark spot in its median area, around the median notch; ocular tubercle and area around the lateral ocelli dark brown; and in the median part of the carapace there are two irregular dark stripes that surround the ocular tubercle, the postocular furrow, and the anterior longitudinal sulcus. With two lateral irregular dark spots that connect with the lateral eyes, and with two little posterolateral dark spots (Fig. 18). *Chelicerae*: fixed finger with reticular pigment, especially near the articulation with the movable finger; movable finger densely pigmented in the external margin. *Tergites*: with two lateral and two paramedian dark stripes, the lateral stripes are very narrow and occupy almost the entire length of the segment, from the posterior edge, almost reaching the anterior margin; the paramedian stripes are triangular shaped, and extend from the posterior margin to the median part of the segment. Sternites, sternum, genital opercula and pectines unpigmented. *Metasoma*: segment I: ventral surface with two VL stripes extending the entire length of the segment and two VSM stripes poorly developed and barely visible; lateral surface slightly pigmented over the LSM carina; the rest of the segment unpigmented. Segments II–IV: ventral surface with two VL and two VSM stripes poorly marked but extending the entire length of the segment; lateral surface with a dark stripe over the LSM carinae, which is thicker near the posterior margin and fuses with the VL stripes; dorsal surface with a little median triangular spot. Segment V: ventral surface with two VL and two VSM stripes extending the entire length of the segment. The VSM stripes are very diffuse and very ramified, connecting between them and with the VL stripes (Fig. 20); lateral surface with a poorly marked and very ramified stripe over the line of LSM setae; dorsal surface slightly pigmented in the median part and on the lateral margins. *Telson*: vesicle with dorsal surface unpigmented in its median area. In males, the telson gland is light yellow; slightly pigmented near the lateral margins; ventral and lateral surfaces densely pigmented; aculeus dark brown. *Legs*: femur and patella densely pigmented on the internal surface and near the articulation, the rest unpigmented. *Pedipalps*: femur and patella slightly pigmented near the articulations and on the dorsal and external surfaces, the rest unpigmented; chela, with six longitudinal stripes over the DI, DM, DS, D, E, V and VM carinae.



Figures 1–9.—1, 2, 6–9. *Urophonius martinezi* new species: 1. Left hemispermatophore, internal aspect; 2. Left hemispermatophore, external aspect; 6. Sternite V and metasomal segments I and II, female, ventral aspect; 7. Left pedipalp chela, female, external aspect; 8. Right pedipalp chela, male, internal aspect; 9. Right pedipalp chela, male, ventral aspect. 3. *Urophonius eugenicus*, left hemispermatophore, external aspect. 4. *Urophonius exochus*, left hemispermatophore, external aspect. 5. *Urophonius mahuidensis*, left hemispermatophore, external aspect. Scale bars: 1 mm.



Figures 10–16.—10, 11, 13. *Urophonius martinezi* new species: 10. Metasomal segment V, male, ventral aspect; 11. Telson, male, lateral aspect; 13. Telson female, lateral aspect. 12, 14. *Urophonius eugenicus*: 12. Telson male, lateral aspect; 14. Telson female, lateral aspect. 15. Retrolateral aspect of a stereotyped left pedipalp femur of a *Urophonius* belonging to the *granulatus* group, showing the relative position of *e* trichobothria respect to M1 macroseta in the different species of the group. 16. Retrolateral aspect of a stereotyped left pedipalp femur of a *Urophonius* belonging to the *brachycentrus* group. Scale bars: 1 mm.



Figures 17–20.—17. *Urophonius eugenicus*, carapace, dorsal aspect. 18. *Urophonius martinezi*, carapace, dorsal aspect. 19. *Urophonius granulatus*, metasomal segments IV and V, ventral aspect. 20. *Urophonius martinezi*, metasomal segments IV and V, ventral aspect. Scale bars: 1 mm.

Table 1.—Measurements of a male and a female paratype of *Urophonius martinezi* (MACN-Ar 15807).

Measurements (mm)	*Urophonius martinezi* new species	
	Male paratype	Female paratype
Total length	32.24	33.23
Carapace, length	4.04	4.05
Carapace, anterior width	2.83	2.91
Carapace, posterior width	4.85	4.28
Mesosoma, total length	7.27	11.48
Metasoma, total length	15.27	12.85
Metasomal segment I, length/width/height	2.02/2.59/1.94	1.70/2.67/2.02
Metasomal segment II, length/width/height	2.42/2.51/1.94	2.10/2.59/2.01
Metasomal segment III, length/width/height	2.59/2.51/1.94	2.42/2.51/1.95
Metasomal segment IV, length/width/height	3.39/2.34/1.86	2.83/2.42/1.78
Metasomal segment V, length/width/height	4.85/2.18/1.65	3.80/2.42/1.70
Telson, length	5.66	4.85
Vesicle, length/width/height	4.44/2.34/1.78	3.88/2.34/1.78
Aculeus, length	1.21	0.97
Femur, length/width	3.88/1.21	3.56/1.21
Patella, length/width	3.72/1.37	3.64/1.41
Chela, length/width/height	7.03/2.26/2.66	6.30/1.86/2.18
Movable finger, length	3.55	3.35

Morphology: Measurements of a paratype male and a paratype female (MACN-Ar 15807) are recorded in Table 1. Total length in males 28.50–36 mm (n = 14, mean = 32.25), 29–39 in females (n = 12; mean = 34.60). *Carapace*: tegument slightly granular on the lateral margins, the rest smooth; anterior margin with a well developed median notch; anterior and posterior longitudinal sulci, lateral sulcus and postocular furrow well developed; ocular tubercle well developed, median eyes well developed, one diameter apart; with three lateral eyes on each side of the carapace placed in a small bulge, two of them placed in the lower part of it, aiming to the front and the lateral margins, and the third one, 20% smaller than the others, is placed in the upper part of the bulge, aiming to the posterolateral margin. *Chelicerae*: with two well developed subdistal teeth. *Tergites*: I–VI completely smooth or slightly granular near the posterior margin; VII slightly granular in the posterior half, with four longitudinal carinae (two paramedians, two laterals) marked by coarse granulation, the lateral carinae occupying almost the entire length of the segment, whereas the paramedian carinae are restricted to the posterior half of the segment. *Sternites* I–IV with smooth tegument, spiracles small and slightly elliptic; sternite V: smooth in the anterior half, posterior half slightly granular, with four longitudinal carinae poorly marked. *Metasoma*: segment I: ventral surface with two VL carinae well developed, two VSM carinae formed by scattered coarse granules diverging proximally almost forming a transversal carinae, with four ventral macrosetae (n = 10), two over each VSM carina, with four VL macrosetae (n = 10), two over each VL carina, with four distal macrosetae (n = 10) (Fig. 6); lateral surface: LIM carinae granular and well marked in the posterior three quarters of the segment, with one macroseta over the anterior third of the LIM carina, LSM and DL carinae well marked occupying the entire length of the segment; dorsal surface smooth. Segment II: similar to segment I, but the LIM carina is restricted to the second half of the segment, and there is a macroseta over the posterior third of the LSM carina. In some specimens there is also a DL macroseta. Segment III: ventral surface, VSM and VL carinae poorly marked, longitudinal, and occupying the entire length of the segment; lateral surfaces, LIM carina restricted to the posterior third of the segment, the rest similar to segment II. Segment IV: ventral surface smooth, or with poorly developed VL carinae, with four to six ventral macrosetae (n = 10; median = 6) and three or four VL macrosetae (n = 10; median = 3); lateral surface, LSM and DL carinae represented by a slight elevation of the tegument, and occupying the entire length of the segment, lateral surface with one to three LSM setae (n = 10; median = 2) and one DL macroseta (n = 10), the rest of the tegument smooth. Segment V: very elongated, ventral surface with some coarse scattered granules in the posterior third of the segment, VM and VL carinae occupying the entire length of the segment. Very close to the VL carinae there is a group of granules parallel to the lateral margin (Fig. 10) that apparently correspond to a VSM carina; with six or seven ventral macrosetae (n = 10; median =7) and five to seven VL macrosetae on each lateral margin of the segment (n = 10; median = 6); lateral surface smooth, LSM carina represented by a row of six to nine macrosetae (n = 10; median = 9), with one to three DL macrosetae (n = 10; median = 1). *Telson*: vesicle low and elongated in males, globose in females (Figs. 11, 13), ventral surface slightly granular; dorsal surface smooth, with a well developed median glandular depression in males; aculeus very short and curved. *Legs*: smooth tegument, with two well developed and symmetrical pedal spurs; telotarsi low and elongated, with a ventromedian row of hyaline setae of the same length as the VL spines, and with well developed ventrolateral spines; spinal formula typical of the group: tarsus I: 1-1 (n = 15); tarsus II: 2-2 (n = 15), tarsus III: 4-4 in most specimens (n = 13), but in some cases there is one additional external spine 4-5 (n = 2), tarsus IV: 4-5 in most specimens (n = 12), but in some specimens there is an additional internal spine 5-5 (n = 3); telotarsal ungues symmetrical, very curved. *Pectines*: number of pectinal teeth in males: 16–18 (n = 10; median = 17); in females: 15–17 (n = 10; median = 16). *Pedipalps*: femur: DE and VE carinae

extending the entire length of the segment, slightly granular in males, blunt in females; DI and VI carinae granular and well developed, extending the entire length of the segment. Patella: DI carina blunt, with some granules near the articulation with the femur, extending the entire length of the segment, VI carina granular, extending the entire length of the segment, DE and VE carinae blunt, extending the entire length of the segment, internal median carina represented by some scattered granules in the median part of the segment. Chela: slightly elongated, more robust in males, (Figs. 7, 9); on the internal surface males with a lobular expansion continued by a slight depression near the articulation with the movable finger (Figs. 8, 9); with six carinae poorly developed, most of them barely visible as a slight elevation of the tegument with some setae, but the ventral carinae is well developed and bears two rows of setae, probably a fusion of two different carinae: DI and DS (in the basal half of the segment), DM, D, E and V + VM, extending the entire length of the segment. *Trichobothrial pattern*: neobothriotaxic major type C, with one accessory trichobothrium in the *V* series of chela; femur with 3 trichobothria (1 *d*, 1 *i* and 1 *e*); patella with 19 trichobothria (3 *V*, 2 *d*, 1 *i*, 3 *et*, 1 *est*, 2 *em*, 2 *esb*, and 5 *eb*); chela with 27 trichobothria (1 *Est*, 5 *Et*, 5 *V*, 1 *Esb*, 3 *Eb*, 1 *Dt*, 1 *Db*, 1 *et*, 1 *est*, 1 *esb*, 1 *eb*, 1 *dt*, 1 *dst*, 1 *dsb*, 1 *db*, 1 *ib*, 1 *it*). *Hemispermatophore*: basal portion very developed; distal lamina short and curved, smaller than the basal portion; distal crest parallel to and almost transversal to the posterior margin, with a transversal crest; internal lobe with a small bilobate apophysis in its external surface that is not connected with the laminar apophysis (Fig. 2); lobe region well developed but very simple (Fig. 1), capsular concavity not very deep, restricted to the anterior margin of the basal lobe, but occupying most of the frontal surface of the lobe region; basal lobe very simple, without internal structures; internal lobe also very simple, almost completely covered by the basal lobe. We have dissected the hemispermatophores of seven specimens and have observed no conspicuous differences between them.

Distribution and habitat.—*Urophonius martinezi* has only been collected in Península Valdés and in an area very close to Puerto Madryn in central eastern Argentinean Patagonia (Fig. 21).

The Natural Protected Area Península Valdés (NPA-PV) is the largest unit of conservation of arid ecosystems of Argentina, it consists of a wide plateau of 4000 km^2 located in north-eastern Chubut province (42°05′–42°53′S, 63°35′–65°04′W) and has been declared Human Patrimony by UNESCO in 1999. Geologically it is formed by Oligo-Miocenic marine sediments and a continuous cover of aeolian sediments with quaternary gravels (Haller et al. 2001). Its actual landscape configuration was originated in the Pleistocene (~1 myrs) probably by strong periglacial winds that caused the deflation of the Gulfs of Nuevo and San José (Haller et al. 2001). The mean annual temperature is 14° C and the average annual precipitation is 175 mm in the coastal zone, with oscillations between 200 and 225 mm in internal zones (Barros & Rivero 1982). In this area, as in other arid ecosystems, the vegetation has a patchy structure alternating with bare ground (Bisigato & Bertiller 1997). The dominant physiognomy is a shrub steppe of *Chuquiraga avellanedae*, accompanied by *Chuquiraga hystrix* Don., *Condalia microphylla* Cav., *Lyciun chilense* Miers, *Schinus polygamus* (Cav.), and *Prosopidastrum globosum* (Gill.). At the grass layer, the most common species are *S. tenuis*, *Piptochaetium napostaense* (Speg.) Hack., and *Poa ligularis* Nees (Bertiller et al. 1981). In the southern portion of NPA-PV the shrub steppe is replaced by an herbaceous steppe where *Sporobolus rigens* Desv. as the most important species, along with patches of *Ch. avellanedae* and *Hyalis argentea* D. Don (Bertiller et al. 1981; León et al. 1998). The NPA-PV has been the subject of several scientific contributions; however, there is conflict over its biogeographical identity. Soriano (1956) classified this area as belonging to the phytogeographical province of Patagonia. Cabrera & Willink (1973) included NPA-PV within the Monte province, whereas León et al. (1998) and Elissalde et al. (2002) described this region as an ecotone Monte-Patagonia. From a zoogeographical perspective its identity is still confusing because Morrone (2001a, 2001b) placed NPA-PV at the Patagonia Central province, while Roig-Juñent & Flores (2001) classified it as Monte region. The information about the epigean arthropod fauna from NPA-PV included in these contributions is mainly based on sporadic samplings and some references about the presence of a few isolated taxa (e.g. Cuezzo 1998; Flores 1998; Ceballos 2008; Crespo 2008; Ocampo 2008). Thus these contradictions about the biogeographical identity of NPA-PV are a consequence of a fragmentary knowledge about its epigeal arthropods fauna. The first ecological study in Península Valdés including an intensive seasonal sampling effort (from 2003 to 2006) is the one performed by the second author (Cheli, unpublished data). The presence of *Urophonius martinezi* in the Península Valdés, its closest relative being *U. eugenicus* (a typical southern Patagonian species), adds support to Morrone's (2001a) proposal of including NPA-PV in the Patagonian region, but future studies are needed to clarify this matter.

The actual distribution of *U. martinezi* cannot be accurately established with the scarce distribution data we have at this moment. With the information available, we can only conclude that this species occurs in the coastal area of central Chubut province. Some 200 km further north in Valcheta, southern Río Negro Province, it is replaced by *U. exochus*, and 400 km south in Caleta Olivia, in northern Santa Cruz province, it is replaced by *U. eugenicus* (Fig. 21). Our data show that *U. martinezi* has a restricted distribution (compared to other species of the genus), but we cannot be certain that it is restricted only to the NPA-PV and the area close to it, or if it occurs in a wider area of Chubut province.

Comments on the distribution and activity period of *Urophonius* in Patagonia.—In a previous contribution on the genus *Urophonius* (Ojanguren-Affilastro 2002) the first author has suggested that the Patagonian species of group *exochus*, *U. eugenicus*, and the species described in this contribution may be active on the surface during summer, whereas the rest of the species of the group are active at the surface during the winter. We based this conclusion on the dates of collection of the material deposited in different collections. However, the Patagonian specimens of *Urophonius* previously studied by us were old, manually collected material. The fact that these specimens were collected in the summer does not necessary imply that they were actually active in that period; most

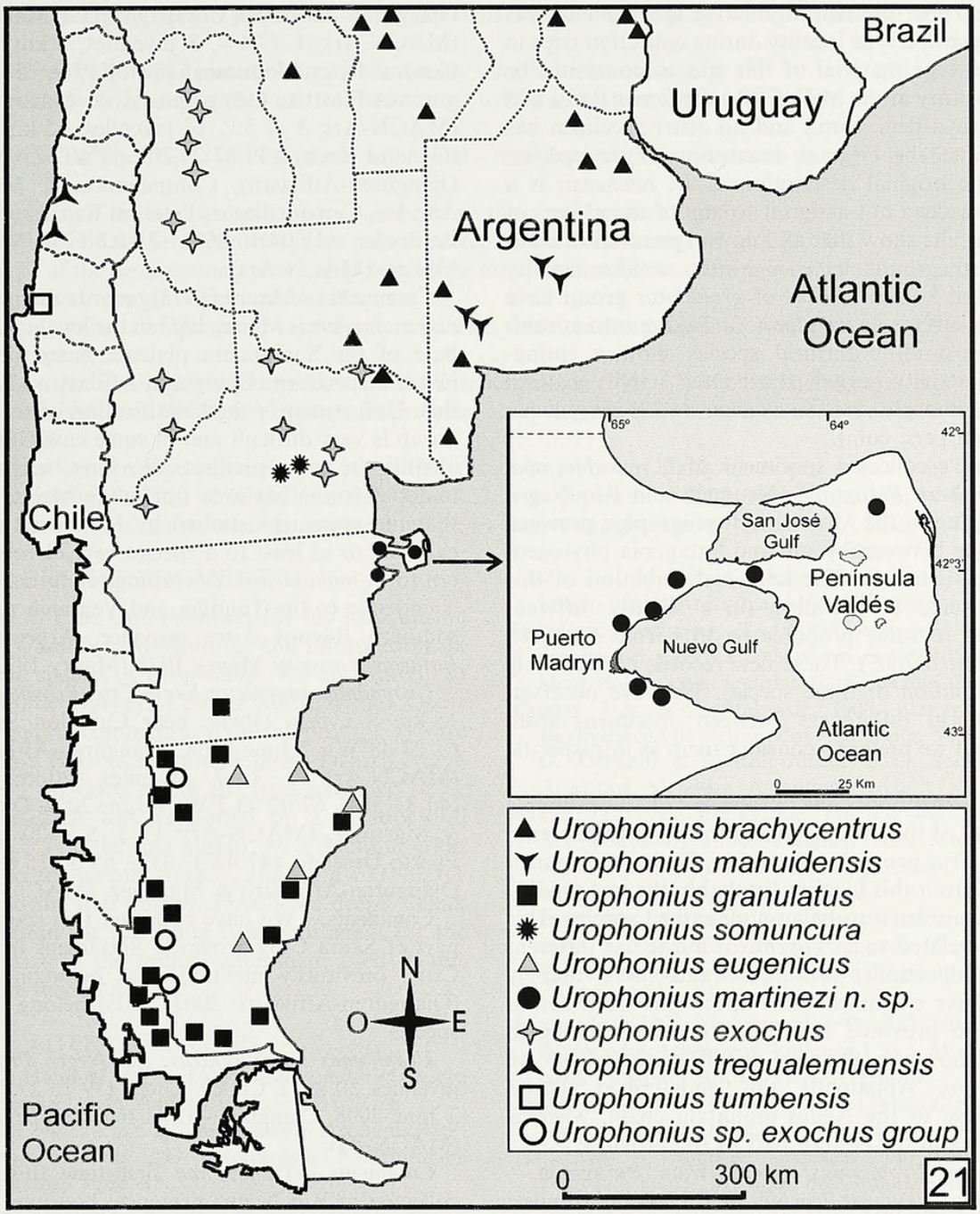


Figure 21.—Map of the southern part of South America, with the known distribution in this area of the species mentioned in this contribution. In detail, map of Península Valdés, with the known distribution of *Urophonius martinezi* new species.

probably this only reflects when most collecting trips in that area are carried out (during the summer), because of the extreme cold weather of the Patagonian winter. In a recent summer trip to Patagonia, no specimens of the *exochus* or *brachycentrus* group were observed during UV collecting at night (C.I. Mattoni pers. com.); the only active specimens of *Urophonius* observed at night were *Urophonius granulatus* Pocock 1898. In a recent trip to Patagonia in early winter (June–July 2008) we observed active specimens belonging to different species of *exochus* and *brachycentrus* groups: *U. exochus*, *U. eugenicus*, *U. martinezi*, and *Urophonius brachycentrus* (Thorell 1876), but no specimens of the *granulatus* group.

In addition, extensive collections from 2003 to 2006 performed in NPA-PV using pitfall traps by the second author have shown that the activity period of *Urophonius martinezi* is restricted to late autumn and winter (June, July, August), making it the only species of scorpion active in the area during this period of the year.

We have recently observed active populations of *Urophonius tregualemuensis* Cekalovic-Kuschevich 1981 in southern Chile during the spring and summer; this species of the *granulatus* group apparently has the same activity period as the Argentinean species of the *granulatus* group, *U. granulatus* and *Urophonius somuncura* Acosta 2003, which also have a spring-summer surface activity period (Maury 1979; Acosta 2003; Ojanguren-Affilastro 2005, 2007). The activity period of the other known species from southern Chile, *Urophonius tumbensis* Cekalovic-Kuschevich 1981, is still not known; we

could not collect, nor observe, any active specimen of this species in areas near the type locality during collection trips in the summer. The type material of this species could not be found in its depository at the MZUC (Raúl Briones Parra and Jaime Pizarro Araya pers. com.) and no other specimen has been collected since the original description of the species. Unfortunately the original description of *U. tumbensis* is a little vague, and we can not assign it to any of the groups of the genus. Our results show that all known species of *exochus* and *brachycentrus* groups have a winter surface activity period, whereas all known species of *granulatus* group have a spring-summer surface activity period. Taking into consideration that almost all bothriurid species show a spring-summer surface activity period, the winter activity pattern could be a synapomorphy for the *exochus* and *brachycentrus* group (C. Mattoni pers. com).

Recently we have collected specimens of *U. exochus* in a wide area of northern Patagonia (Neuquén and Río Negro provinces) belonging to the Monte phytogeographic province and to the ecotone between Monte and Patagonia phytogeographic provinces (Fig. 21). The known distribution of this species was restricted to Mendoza (in a slightly different environment) and to some probable records from Neuquén (Ojanguren-Affilastro 2005). These new records considerably expand the distribution of these species. We have observed slight morphological differences between specimens from different areas, but we prefer to consider them as intraspecific variation.

Acosta (1988) mentions the presence of a probable undescribed entity of the *exochus* group from Perito Moreno, in western Santa Cruz province, Argentina. We have examined a male specimen from this locality (probably the one studied by Acosta) and consider it to be an undescribed species. This species is closely related to *U. eugenicus*, but it has different morphometric proportions; is smaller and more densely pigmented. We have examined other specimens from southeastern Santa Cruz province, and they could also belong to this new species; however, they are poorly preserved, so we cannot assure this. Apparently this undescribed species inhabits areas close to the Andes mountain chain, whereas *U. eugenicus* occurs in the eastern part of the province.

New records for *Urophonius* species from Patagonia.—***Urophonius exochus*:** *Neuquén Province*: 6 ♂, 12 ♀, 18 juveniles, 30 km SW Zapala, (39°01′04.4″S, 70°09′21.2″W), 2 June 2008, Ojanguren-Affilastro, Compagnucci & Martinez (MACN-Ar); 7 ♂, 16 ♀, 23 juveniles, 20 km NE Piedra del Águila (39°58′46.5″S, 70°02′20.8″W), Ojanguren-Affilastro, Compagnucci & Martínez (MACN-Ar). *Río Negro Province*: 1 ♀, 1 juvenile, Pajalta, (40°45′0″S, 66°2′60″W), 18 August 1967, Maury (MACN-Ar); 1 juvenile, 60 km N Nahuel Niyeu, (40°30′04″S, 66°32′58.9″W), Bachmnn (MACN-Ar); 3 ♂, 4 ♀, 10 juveniles, 15 km N Valcheta, (40°43′05.7″S; 66°11′56.2″W), Ojanguren-Affilastro, Compagnucci & Martínez, 4 June 2008, (MACN-Ar); 1 ♂, 4 ♀, 8 juveniles, 8 km W. Choele-Choel, General Roca Monument (39°14′19″S, 65°40′48.7″W), Ojanguren-Affilastro, Compagnucci & Martinez, 3 June 2008, (MACN-Ar); 3 ♂, 5 ♀, 14 juveniles, 15 km S. Paso Córdova (General Roca), (39°07′29.7″S, 67°40′37.4″W), 31 May 2008, Ojanguren-Affilastro, Compagnucci & Martinez, (MACN-Ar); 1 ♀, Cerro Villegas, Estancia San Ramón, San Carlos de Bariloche, (41°04′10.86″S, 71°0.8′52.41″W), 17 July 1968, Muller, (MACN-Ar).

Comments.—Maury (1973) records the presence of *Urophonius mahuidensis* Maury 1973 in the locality of Paja Alta, in the base of the Somuncura plateau, based on a female and a juvenile specimen; Ojanguren-Affilastro (2002, 2005) repeats this. Unfortunately the identification of the specimens of this group is very difficult and in some cases it is only possible to identify the male specimens. We have been able to study more material from that area (including males) and we conclude that the specimens studied by Maury actually belong to *U. exochus*, or at least to a species very closely related to it, but not to *U. mahuidensis*. According to our results *U. mahuidensis* is endemic to the Tandilia and Ventania mountain chains in southern Buenos Aires province, Argentina, the same as *Bothriurus voyatti* Maury 1973 (Maury 1973).

***Urophonius eugenicus*:** *Santa Cruz Province*: 8 ♀, 16 juveniles, 15 km S Caleta Olivia, near Cañadón Seco (46°30′36.6″S, 67°27′48″W), 7 June 2008, Ojanguren-Affilastro & Martinez, (MACN-Ar); 5 ♀, 7 juveniles, 20 km W. Las Heras (46°33′35″S, 69°02′23.2″W), 8 June 2008, Ojanguren-Affilastro & Martinez, (MACN-Ar); 17 ♂, 5 ♀, 20 juveniles, 8 km N. Puerto Deseado, (47°42′42,43″S, 65°50′15.68″W), 6 June 2008, Ojanguren-Affilastro & Martinez, (MACN-Ar).

Comments.—We have collected this species in the Eastern part of Santa Cruz province. Specimens from Western Santa Cruz, previously mentioned as belonging to *U. eugenicus* (Ojanguren-Affilastro 2002, 2005) belong to an undescribed species.

***Urophonius brachycentrus*:** *Río Negro Province*: 1 ♂, 3 ♀, 8 juveniles, 30 km E Choele-Choel, (39°15′27.7″S, 65°35′59.3″W), 3 June 2008, Ojanguren-Affilastro, Compagnucci & Martinez, (MACN-Ar).

Comments.—This is the first time this species has been collected in Río Negro province; however, it was previously collected in nearby areas from the surrounding provinces of Buenos Aires and La Pampa. In the locality of Cholel-Choel, this species has been collected very close to *U. exochus*; however, both species have different habitat preferences; *U. exochus* apparently prefers slopes and areas with some rocks, whereas *U. brachycentrus* prefers plains. In the nearby locality of Paso Cordova, where *U. brachycentrus* is not present, *U. exochus* is present in both types of environment, but it is more abundant on slopes than in plains.

KEY TO THE PATAGONIC SPECIES OF *UROPHONIUS*

1. Ventral surface of metasoma with two VL and a VM stripe (Fig. 19) . . . . . *granulatus* group 2
   Ventral surface of metasoma with two VL and two VSM stripes (Fig. 20) 4
2. *e* trichobothria of pedipalp femur placed proximally with respect to M1 macroseta (Fig. 15) . . . . . *Urophonius granulatus*
   e trichobothria of pedipalp femur placed distally or in the same axis with respect to M1 macroseta (Fig. 15) 3

3. *e* trichobothria of pedipalp femur placed on the same axis or slightly distally with respect to M1 macroseta (Fig. 15) . . . . . *Urophonius somuncura*
   e trichobothria of pedipalp femur placed clearly more distally than M1 macroseta (Fig. 15) . . . . . *Urophonius tregualemuensis*
4. Pedipalp femur with two macrosetae (M1 and M2) associated with *d* and *e* trichobothria (Fig. 16) . . . . . *brachycentrus* group . . . . . *Urophonius brachycentrus*
   Pedipalp femur with one macroseta (M1) associated with *d* and *e* trichobothria (as in *granulatus* group) (Fig. 15) . . . . *exochus* group 5
5. Bilobate protuberance of the hemispermatophore connected to the distal lamina (Fig. 5) . . . . . *Urophonius mahuidensis*
   Bilobate protuberance of the hemispermatophore not connected to the distal lamina (Figs. 2, 3, 4) 6
6. Bilobate apophysis of the hemispermatophore very close to the distal lamina, but not forming a part of it; distal lamina slender, almost straight, anterior margin slightly curved (Fig. 4) . . . . . *Urophonius exochus*
   Bilobate apophysis of the hemispermatophore clearly separated from the distal lamina; distal lamina stout, anterior margin strongly curved (Figs. 2, 3) 7
7. Vesicle of the telson globose, highly developed toward the anterior margin (Figs. 12, 14), length/height ratio of telson in males: 2.54–3.03, n = 18, median = 2.85. Pigment pattern of prosoma occupying most of the area between the ocular tubercle and the lateral eyes (Fig. 17) . . . . . *Urophonius eugenicus*
   Vesicle of the telson slender, especially in males, in females it is globose but not highly developed towards the anterior margin (Figs. 11, 13), length/height ratio of telson in males: 3.10–3.52, n = 20, mean = 3.28. Pigment pattern of prosoma poorly developed, area between the ocular tubercle and the lateral eyes almost unpigmented (Fig. 18) . . . . . *Urophonius martinezi*

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