



A new *Bothriurus* (Scorpiones, Bothriuridae) from the Somuncura Plateau, with additions to the knowledge to the endemic scorpion fauna of the area

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Abstract

Bothriurus nendai n. sp. is described. This species is endemic to the upper level of the Somuncura plateau, a Patagonian island placed in the Monte Phytogeographic province. This is the third known endemic scorpion from this area. *Bothriurus nendai* n. sp. is closely related to the *patagonicus* group; however, several morphological characters separate *B. nendai* from the species of this group. New data on the scorpion species of the plateau are also provided.

Key words: Scorpiones, Patagonia, Argentina, Somuncura, Bothriuridae, *Bothriurus*, endemism

Introduction

The Patagonian scorpion fauna has received little attention by taxonomists until recent years; however, in the last decade several papers have been published on this subject (Acosta 2003; Mattoni 2007; Ojanguren-Affilastro 2001, 2003, 2007; Ojanguren-Affilastro & Cheli 2009; Ojanguren-Affilastro & Roig-Alsina 2001). Most of the scorpions of this area belong to genus *Bothriurus* Peters 1861, with five described species: *B. burmeisteri* Kraepelin 1894, belonging to the *burmeisteri* group; *B. patagonicus* Maury 1969, *B. sanctaerucis* Mattoni 2007, and *B. ceii* Ojanguren-Affilastro 2007, belonging to the *patagonicus* group (Mattoni 2007; Maury 1969; Ojanguren-Affilastro 2007); and *B. huincul* Mattoni 2007 that has some morphological characters that place it in an intermediate position between the *patagonicus* and *vittatus* groups (Mattoni 2007). Species of the *patagonicus* group and *B. huincul* are restricted to the Patagonian phytogeographic province as defined by Cabrera and Willink (1980), whereas *B. burmeisteri* occurs in a wide area with different environments belonging to the Patagonian, Monte and Espinal phytogeographic provinces (Mattoni 2007; Ojanguren-Affilastro 2005).

The Somuncura plateau is a basaltic tableland, placed in an extended plain in north-eastern Argentinean Patagonia (fig. 22). The average altitude of this plateau is about 900 to 1400 m, with some internal hills that can reach up to 2000 m. The area that surrounds this tableland and the foothills of it (up to 900-1000 m) belongs to the Monte phytogeographic province (Cabrera and Willink 1980), occupied by the typical Monte scorpion species of northern Patagonia: *B. burmeisteri*, *Brachistosternus* (*Brachistosternus*) *angustimanus* Ojanguren Affilastro & Roig Alsina 2001, *Brachistosternus* (*Brachistosternus*) *alienus* Lönnberg 1898, and *Urophonius exochus* (Penther 1913) (Ojanguren Affilastro 2007; Ojanguren-Affilastro & Cheli 2009). On the other hand, the upper level of this formation (above 900-1000 m), has ecological characteristics of the Patagonian phytogeographic province (Acosta 2003; Cei 1969, 1986; Menni 2004; Ojanguren-Affilastro 2007), and its scorpion fauna is composed of endemic species closely related to the Patagonian scorpion fauna. Up to now there are only two described species of this area, *Bothriurus ceii* belonging to the *patagonicus* group, and *Urophonius somuncura* Acosta 2003, belonging to the *granulatus* group (Acosta 2003; Maury 1979; Ojanguren-Affilastro 2007).

In this contribution we describe a new species of *Bothriurus* from the upper level of the Somuncura plateau, *Bothriurus nendai* n. sp. This species is closely related to the species of the *patagonicus* group, but it has several morphological characters that clearly separate it from this group, so we do not include *B. nendai* in the *patagonicus* group.

In this contribution we also provide new data about the scorpion fauna of the Somuncura plateau and about their relationships with the rest of the Patagonian scorpion fauna.

Methods

Descriptive terminology follows Mattoni and Acosta (2005) for the hemispermatothores; Vachon (1974) for the trichobothria; and Stahnke (1970) for the metasomal carinae, abbreviated as follows: DL: dorsolateral; LIM: lateral inframedian; LSM: lateral supramedian; VSM: ventral submedian; VL: ventrolateral; VM: ventromedian; Francke (1977) for the pedipalpal carinae, abbreviated as follows: DI: dorsal internal; DE: dorsal external; VI: ventral internal. Abbreviations of collections are as follows: MACN-Ar: Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia'. Illustrations were produced using a Leica M165C stereomicroscope and camera lucida. Photographs were taken using a digital camera (Leica DFC290) attached to a stereomicroscope (Leica M165C), the focal planes composed with Helicon Focus 3.10.3 (<http://helicon.com.usa/heliconfocus/>); photographs of habitus were taken using white light, photographs of external morphology with UV lamps. Measurements, taken using an ocular micrometer, were recorded in mm. Scorpions were collected manually by ultraviolet collection at night. Point locality records were georeferenced in the field with portable Global Positioning System devices (Garmin GPS Etrex Vista-C).

Results

Bothriurus nendai n. sp.

figs 1–22, Table 1

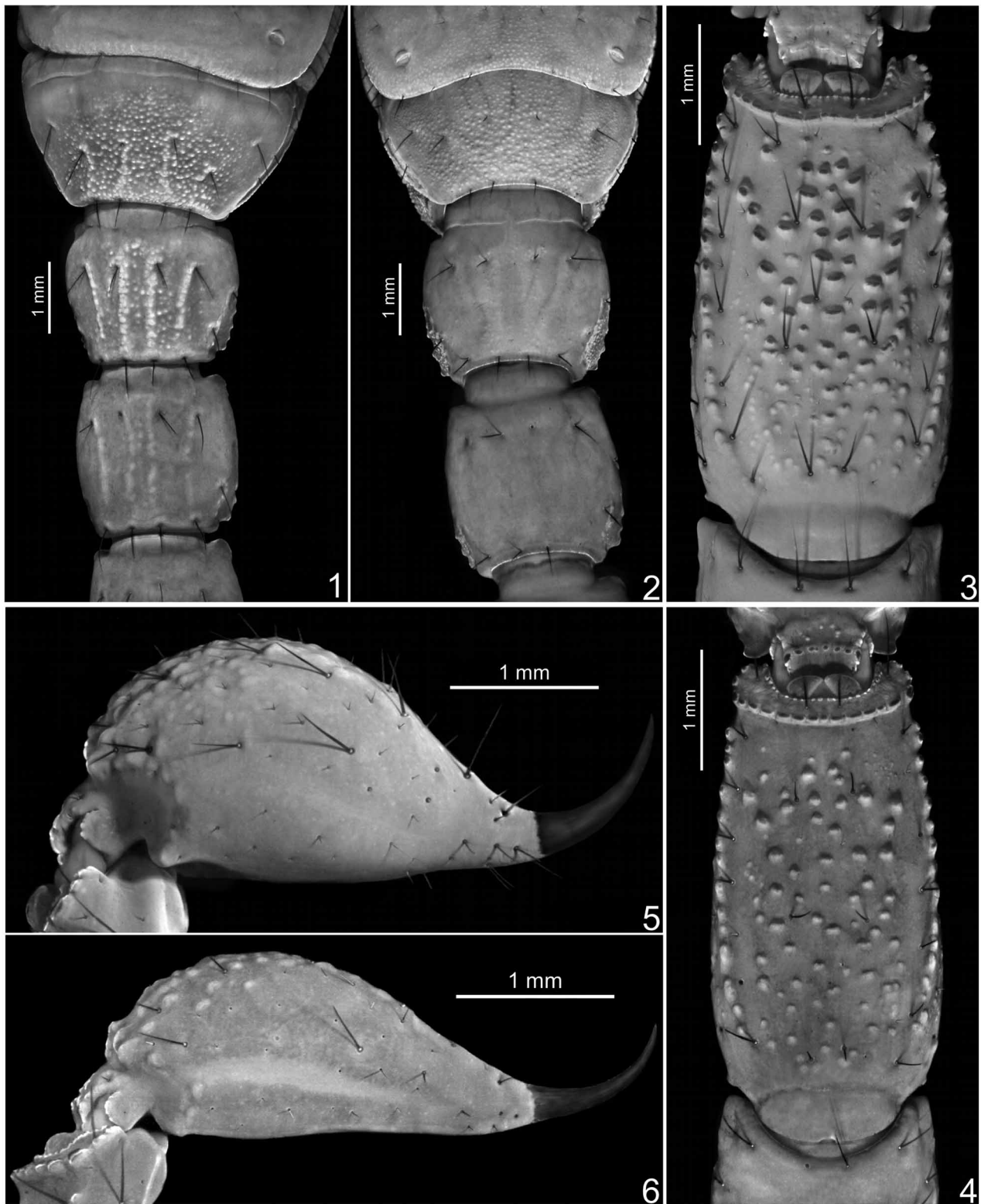
Type series: Holotype male (MACN-Ar 22127): ARGENTINA: *Río Negro Province*, Somuncura Plateau: internal road from Chipauquil to Cona-Niyeu, 4125'20.6''S, 6658'37.6''W, 1465 m asl, 29 November 2008, A. Ojanguren-Affilastro, S. Nenda, and L. Compagnucci coll. Paratypes: same data as holotype, 1 female, 1 male, 5 juveniles (females) (MACN-Ar 22128).

Etymology: This species is named after the Argentinean herpetologist Santiago Nenda, from the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia, who was among the collectors of the species, providing invaluable help during fieldwork.

Diagnosis: *Bothriurus nendai* n. sp. can be separated from the rest of the Patagonian species of genus *Bothriurus* because it bears six ventral trichobothria in the pedipalp chela (Fig. 8), whereas the rest of the species bear five. This species seems to be more closely related to the species of the *patagonicus* group, because they share a similar pigmentation, a similar hemispermatothore, and a similar development of the metasomal carinae; however, *Bothriurus nendai* n. sp. can be separated from the species of the *patagonicus* group because it bears two subdistal teeth in the movable finger of chelicerae, whereas the species of this group bear only one.

Bothriurus nendai n. sp. occurs in sympatry with *B. ceii*, both species can be separated by several morphological differences besides those mentioned above. They can be separated because in *B. ceii* the ventral surface of sternite VII and metasomal segments I and II are smooth, and without carinae in both genders, whereas *B. nendai* females bear two VL and two VSM carinae in sternite VII, and in metasomal segments I and II; (fig. 1) and *B. nendai* males bear these carinae only in sternite VII (fig. 2). Both species can also be distinguished because on the ventral surface of metasoma of *B. ceii* there are two VL and one VM dark stripes of pigment, that are present in all segments but don't join in any of them, whereas in *B. nendai* in metasomal segment I there are only two VL stripes (that don't join), and in the rest of the segments there are

two VL and a VM stripe that join in the posterior third of all segments. *Bothriurus nendai* is smaller than *B. ceii*: total length in *B. nendai*: 27–33 mm, total length in *B. ceii* 39–46 mm. The vesicle of the telson is much more globose in females of *B. nendai* (fig. 5) than in females of *B. ceii*. Telson length/height ratio is 2.19 in the only studied adult female of *B. nendai*, and 2.66, 2.68 and 2.77 in the three studied females of *B. ceii*.



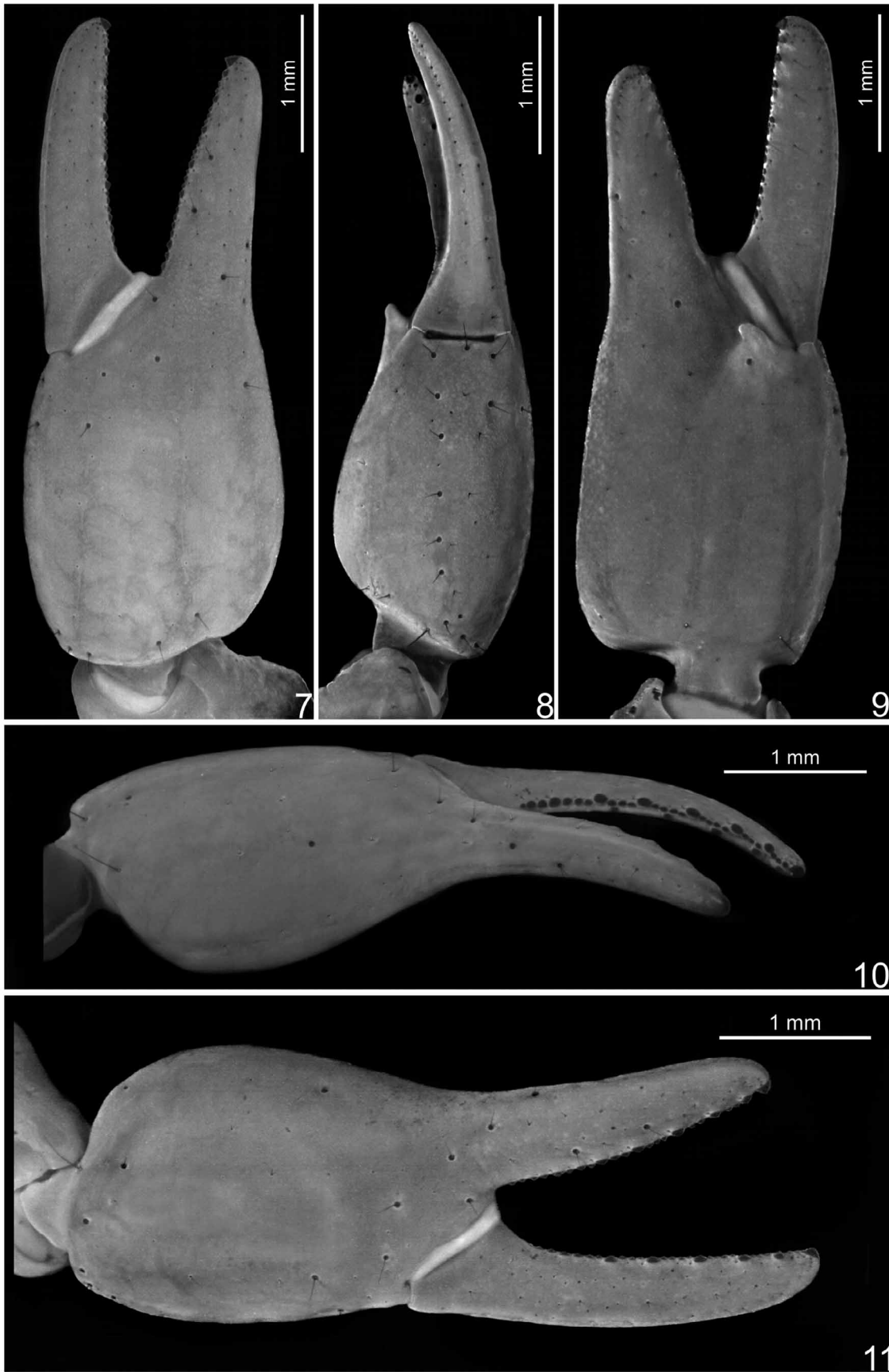
FIGURES 1–6. *Bothriurus nendai* n. sp. 1: sternite VII and metasomal segments I and II, female, ventral aspect; 2: sternite VII and metasomal segments I and II, male, ventral aspect; 3: metasomal segment V, female, ventral aspect; 4: metasomal segment V, male, ventral aspect. 5: telson, female, lateral aspect; 6: telson, male, lateral aspect.

TABLE 1. *Bothriurus nendai* n. sp. Measurements in mm of the male holotype (MACN-Ar 22127) and a female paratype (MACN-Ar 22128).

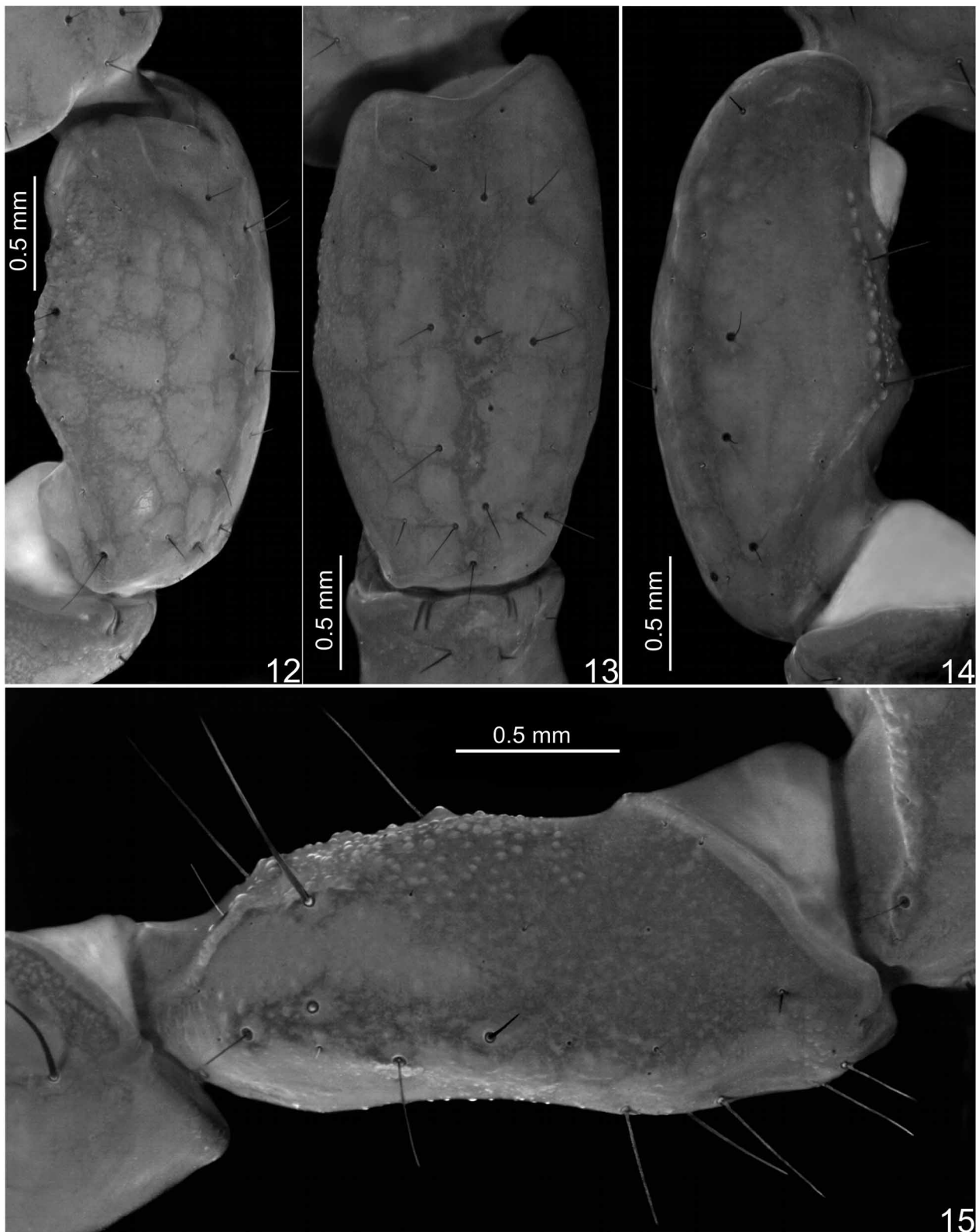
Measurements in mm	<i>Bothriurus nendai</i> n. sp.		
	Male holotype	Male paratype	Female paratype
Total length	28.17	27.93	32.98
Carapace, length	3.26	3.40	4.33
Carapace, anterior width	2.27	2.27	2.80
Carapace, posterior width	3.47	3.53	4.23
Mesosoma, total length	9.31	9.18	12.64
Metasoma, total length	11.97	11.62	12.28
Metasomal segment I, length/width/height	1.78/2.27/1.77	1.90/2.17/1.70	1.94/2.42/1.94
Metasomal segment II, length/width/height	2.10/2.10/1.80	2.27/2.03/1.70	2.25/2.37/1.94
Metasomal segment III, length/width/height	2.18/2.06/1.80	2.27/2.02/1.73	2.22/2.26/1.94
Metasomal segment IV, length/width/height	2.58/1.94/1.72	2.41/1.93/1.70	2.45/2.20/1.86
Metasomal segment V, length/width/height	3.33/1.94/1.52	2.77/1.93/1.50	3.42/2.18/1.66
Telson, length	3.63	3.73	3.73
Vesicle, length/width/height	2.67/1.60/1.33	2.73/1.47/1.24	2.73/2.07/1.7
Aculeus, length	0.97	0.99	1.00
Pedipalp, total length	8.74	9.3	9.88
Femur, length/width	2.17/0.97	2.40/1.01	2.47/1.20
Patella, length/width	2.24/1.2	2.37/1.00	2.48/1.23
Chela, length/width/height	4.33/1.47/1.87	4.53/1.53/1.93	4.93/1.56/1.93
Movable finger, length	2.27	2.20	2.73

Bothriurus nendai has a higher number of setae in metasoma, than the rest of Patagonian species: *B. nendai* has 14 ventral setae in metasomal segment IV, and 20 or more in segment V; the remaining *Bothriurus* species from Patagonia have up to 8 ventral setae in segment IV, and up to 14 in segment V (Mattoni, 2007). *Bothriurus nendai* bears 3 LSM setae in segment IV, and 6–7 in segment V; against 1 LSM setae in segment IV, and 3 in segment V in the remaining Patagonian species. DL setae on segment V are also more abundant in *B. nendai* being 2 or 3; whereas in the remaining Patagonian species there is always one.

Description. Colour: general colour yellowish, with brown spots (figs. 18–21). Carapace: anterior margin densely pigmented; ocular tubercle and area around the lateral ocelli dark brown; two oblique thick dark stripes extend from the base of the postocular furrow to the anterior margin; area near the lateral margins with dense reticulate pigment; with two posterolateral dark spots. The rest with reticulate pigment connecting all the spots. Chelicerae: with dorsal reticulate pigment, and with a dark spot near the articulation with the movable finger; movable finger densely pigmented. Tergites: almost completely covered with pigment, with some isolated internal unpigmented areas. Sternites, sternum, genital opercula and pectines depigmented. Metasoma: segments I–IV: dorsal surface with a median triangular spot, and with a thin line over the DL carina; lateral surface with reticulate pigment, and with a dark stripe below the LSM carina, that joins with the VL stripes in the posterior third of the segment; ventral surface: segment I with two VL stripes that don't join in the posterior margin, segments II–IV with three wide longitudinal dark stripes, two VL and one VM, that join in the posterior third of the segments; in segments II and III the VM stripe has a median unpigmented area in the posterior two thirds; segment V: dorsal surface with two faint longitudinal paramedian dark stripes in the anterior half of the segment, and with two DL stripes that extend the entire length of the segment; lateral surface with reticulate pigment; ventral surface with a thin VM stripe and two wide VL stripes, connected in the anterior half of the segment by reticulate pigment, and joining in the posterior half of the segment forming a dark a single wide dark spot. Telson: vesicle with dark reticulate pigment all over, with four unpigmented



FIGURES 7–11. *Bothriurus nendai* n. sp. 7: left pedipalp chela, male, external aspect; 8: left pedipalp chela, male, ventral aspect; 9: left pedipalp chela, male, external aspect; 10: left pedipalp chela, female, dorsal aspect; 11: right pedipalp chela, female, external aspect.

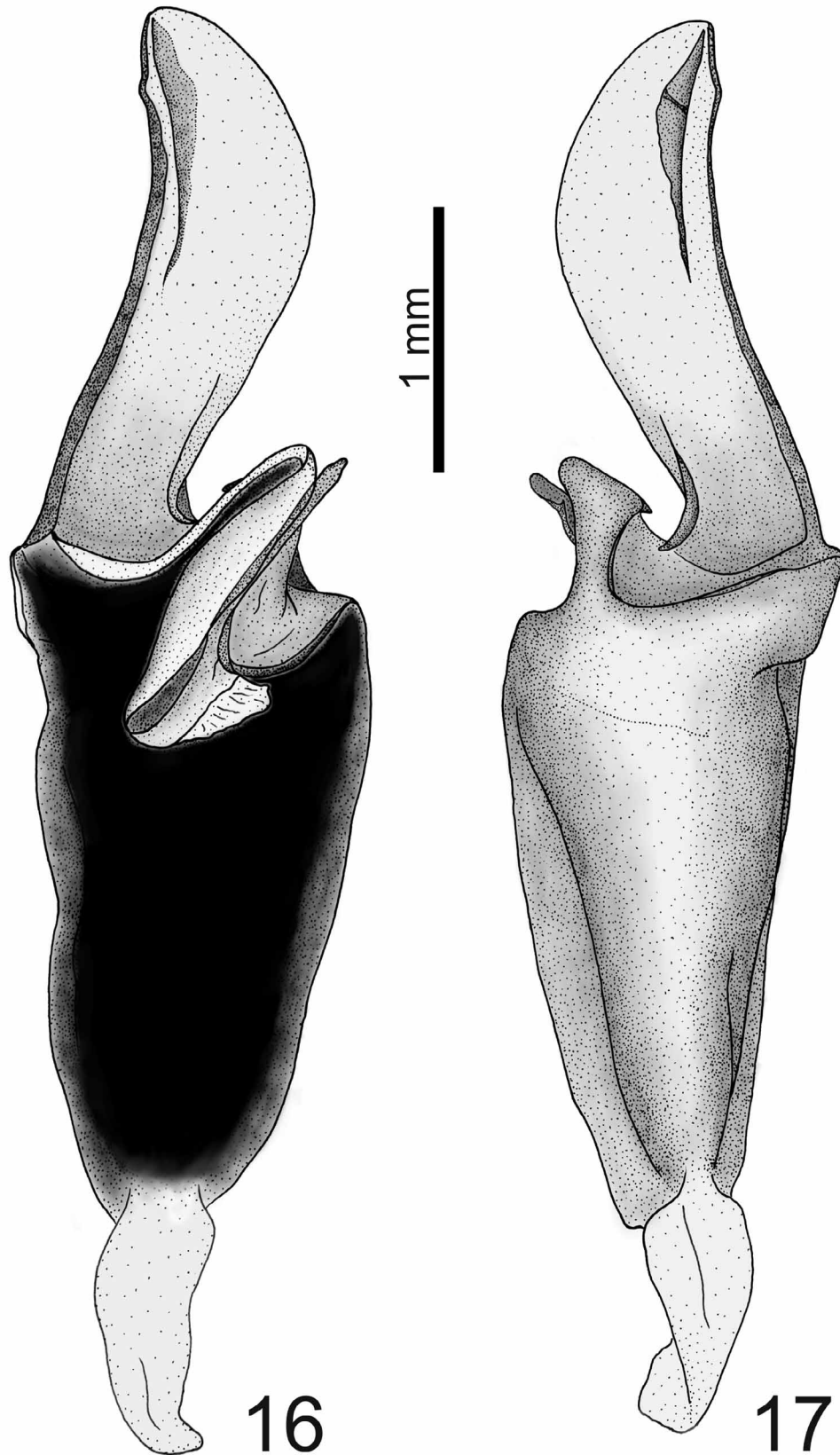


FIGURES 12–15. *Bothriurus nendai* n. sp. 12: right pedipalp patella, male, dorsal aspect; 13: right pedipalp patella, male, external aspect; 14: right pedipalp patella, male, ventral aspect; 15: right pedipalp femur, male, dorsoexternal aspect.

longitudinal stripes, two laterals and two ventral; aculeus dark brown. Legs: femur densely pigmented on the pro lateral surfaces and near the articulation with patella; patella densely pigmented on the lateral surfaces, trochanter, tibia and basitarsus unpigmented or slightly pigmented near their VL margins, coxa and telotarsus

unpigmented. Pedipalps: trochanter slightly pigmented near the articulation with femur; femur dorsal surface densely pigmented near the articulation with patella, internal and external surfaces slightly pigmented; patella dorsal and external surfaces covered with reticulate pigment, ventral and internal surfaces unpigmented; chela, manus with seven longitudinal stripes connected by reticulate pigment, and joining in an external dark spot near the articulation with the movable finger.

Morphology: Measurements of the holotype male (MACN–Ar 22127), a paratype male and a paratype female (MACN–Ar 22128), are recorded in Table 1. Total length in the two studied males: 27.93 and 28.17 mm; in the only adult studied female: 32.98. *Carapace:* tegument smooth in females, finely granular in males; anterior margin slightly convex, with a poorly developed median notch, anterior longitudinal sulcus absent; with three lateral eyes on each side of the carapace; each group of lateral eyes has two eyes placed close together in the same horizontal line, and proximally, whereas the third one is placed one diameter apart, above of them and more distally, being also about a 30 % smaller; ocular tubercle well developed, median eyes small, two diameters apart; posterior longitudinal sulcus poorly developed, posterolateral sulci and postocular furrow deeply marked. *Chelicerae:* with two subdistal teeth. *Tergites:* tergites I–VI slightly granular in males; in females smooth with a slightly granular area near the posterior margin; tergite VII: slightly granular in the anterior half, densely granular in the posterior half, more densely granular in males; with two paralateral carinae in the posterior half of the segment and two paramedian carinae reduced to some scattered granules and an elevation of the tegument in the posterior quarter of the segment. *Sternites:* III–V with smooth tegument, spiracles small and elliptic; VI smooth in the anterior two thirds, granular in the median part and in the posterior third; spiracles small and elliptic; VII densely granular, females with four longitudinal carinae, two well developed VSM carinae that occupy the posterior half of the segment, and two poorly developed paramedian carinae restricted to some granules (fig. 1); males with two VSM carinae less developed than in females (fig. 2). *Metasoma:* segment I dorsal surface smooth, with some scattered granules near the posterior margin, DL carina restricted to some granules in the posterior third of the segment, with one DL setae; lateral surface: LSM and LIM carinae restricted to the posterior half of the segment, with some scattered granules between carinae, with two LSM and one LIM setae; ventral surface: females densely granular tegument, with four well developed longitudinal carinae that occupy the entire length of the segment, two VL and two VSM; males with smooth tegument, with two VSM and two VL carinae as a barely visible elevation of the tegument; with eight ventral macrosetae arranged in an anterior row of four macrosetae (two VSM and two VL) and a similar row of four setae in the posterior margin of the segment; segment II similar to segment I but less granular and with less developed carinae, ventral surface in females with poorly developed VSM and VL carinae, smooth in males; segment III: as segment II but even less granular and with less developed carinae, DL and LSM carina restricted to some blunt granules in the posterior quarter of the segment, LIM carina absent, reduced to a LIM macroseta, ventral surface smooth, the rest as in segment II; segment IV: DL carina restricted to some posterior granules and a median DL macroseta, lateral accessory carina reduced to a slight elevation of the tegument and a macroseta, LSM carina reduced to an anterior and a posterior bulge and three macrosetae, LIM carinae reduced to a macroseta, ventral surface smooth, with 14 ventral macrosetae arranged in four transversal rows, an anterior row with two VL macrosetae, two median rows with four macrosetae (2 VL and 2 VSM), and a posterior row with four macrosetae in the posterior margin of the segment; segment V: dorsal surface smooth, DL carina restricted to an anterior bulge and two or three DL macrosetae, lateral surface smooth in males with some scattered granules in females, and six or seven LSM macrosetae, ventral surface with granular tegument (figs. 3, 4), VL carinae granular, extending the entire length of the segment, with six to eight VL macrosetae, VSM carinae longitudinal in the anterior half of the segment, diverging in the posterior half of the segment and connecting with the VL carinae in the posterior quarter, with three rows of two VSM macrosetae each (in some specimens there are one or two additional setae), VM carina longitudinal, occupying almost the entire length of the segment, barely visible between the granulation; with a posterior row of four macrosetae. *Telson:* vesicle remarkably globose in females (fig. 5), more elongated in males (fig. 6), ventral surface granular, dorsal surface smooth, in males there is a median dorsal tegumentary depression that most probably corresponds to the telson gland; aculeus short and curved, more curved in females. *Legs:* smooth tegument, leg I with asymmetrical unguis and basitarsal spurs, being the prolateral spur and unguis



FIGURES 16–17. *Bothriurus nendai* n. sp. 16: left hemispermaphore, internal aspect; 17: left hemispermaphore, external aspect



FIGURES 18–21. *Bothriurus nendai* n. sp. habitus of male and female. 18: male, dorsal aspect; 19: male, ventral aspect; 20: female, dorsal aspect; 21: female, ventral aspect.

about a 20 percent more developed than the retrolateral, in leg II spurs and unguis are almost symmetrical and in legs III and IV they are symmetrical, telotarsi with a ventral row of hyaline setae, and with well developed VL spines; spinal formula: tarsus I: 1-1; tarsus II: 2-2, tarsi III and IV: 3-3. *Pectines*: number of pectinal teeth in the two studied males: 12–13 and 13–14; in females: 9–11 (N = 6; mode = 10), the basal lamella is more elongated in females than in males. *Pedipalps*: femur: tegument smooth in females, without conspicuous carinae, granular in males, DI, DE, and VI carinae granular and extending the entire length of the segment (fig. 15); patella: tegument smooth and without carinae in females, granular in males, VI and DI carinae granular and extending the entire length of the segment (figs. 12, 13, 14); chela: robust with short fingers and smooth tegument (figs. 7–11), in females it is less robust, with longer fingers (figs. 10, 11); males with a strong conical apophysis near the articulation with the movable finger (figs. 8, 9). Internal surface of fingers with a median row of denticles and five pairs of accessory denticles (fig. 10), being the external basal denticles almost superposed to the median row. *Trichobothrial pattern*: neobothriotaxic major type C, with two accessory trichobothrium in the V series of chela (fig. 8); femur (fig. 15) 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*), *esb*2 petit (fig. 13); chela with 27 trichobothria (1 *Est*, 5 *Et*, 6 *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*); *Esb* forming a triangle with *Eb*1 and *Eb*2; *Et*4 and *Esb* petit. *Hemispermatothorax*: distal lamina narrow, similar in size to the basal portion, slightly curved in its upper third (figs. 16, 17); distal crest parallel to the posterior margin, occupying the distal half of the lamina; internal lobe with a small apophysis in its external surface (fig. 17); basal lobe laminar; frontal ridge well developed; capsular cavity well developed (fig. 16).

Distribution and habitat: *Bothriurus nendai* n. sp. has only been collected at the type locality, in the upper level of the Somuncura plateau. This is a tableland situated in Río Negro and Chubut provinces, in northern Argentinean Patagonia (fig. 22). The type locality is a plain, at almost 1500 m, near a temporary lake (which was full of water in spring); the soil is covered with sparse rocks of 20 to 40 cm diameter, and the vegetation is similar to the rest of the upper level of the plateau, which is a grassland of “Coirón (*Poa* spp., *Festuca* spp. and *Stipa* spp.) (Ceja 1969).

During the same trip in which we collected *B. nendai*, we also collected scorpions in other plains on the upper level of the Somuncura Plateau, with a slightly drier soil (not near a lake), and almost without rocks; however no specimens of *B. nendai* were found in these areas.

The Somuncura Plateau is connected to the foothills of the Andes by areas of intermediate altitudes (about 1000 m). We have made some collections in these areas, in early spring, in two different years (2007 and 2008) and could not collect any specimens of *B. nendai*. We also had access to several pitfall traps from ecological studies performed during the spring and summer of 2005–2007, in several different environments from this intermediate area, and from the foothills of the Andes. However, no specimens of *B. nendai* were captured in these traps. We therefore assume that *B. nendai* is endemic to the upper level of the Somuncura Plateau, and probably restricted to the more humid areas of the plateau.

Natural history: All known specimens of *Bothriurus nendai* n. sp. were collected in early spring. Despite several previous summer field trips to the Somuncura Plateau, no other specimens of this species appear to have been collected. It is possible that this species has a different activity period, being active during early spring instead of in summer as the rest of the known *Bothriurus* from Patagonia. However, we cannot affirm conclusively that this is the case, without long term ecological studies in the area.

Only a few species of Bothriuridae are known to have a spring surface activity period. These are the species of *Urophonius* Pocock 1893 of the *granulatus* group (three known species), *Brachistosternus telteca* Ojanguren Affilastro 2000 (Ojanguren Affilastro 2000, 2005; Ojanguren Affilastro & Ramirez 2009), and some species of *Orobothriurus* (Ochoa pers. comm.). All these species are syntopic with larger and more abundant species of *Bothriurus* and *Brachistosternus* Pocock 1893 that have a summer surface activity period. Perhaps the spring activity period evolved to avoid direct competition or predation with larger, more abundant species. In the same area where *B. nendai* was collected occurs *B. ceii*, a larger species that is very abundant in summer (Acosta 2003; Ojanguren-Affilastro 2007).

Bothriurus nendai is syntopic with *U. somuncura*, both species being active in the same period of the year. However, even if both species have been collected together, *U. somuncura* is more abundant in rocky habitats, where *B. nendai* is absent.

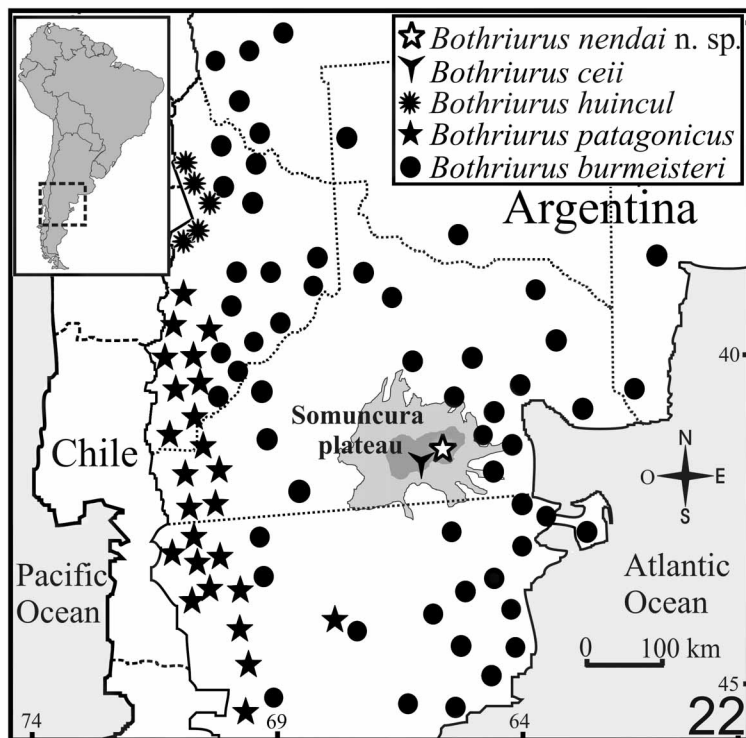


FIGURE 22. Map of northern Argentinean Patagonia, showing the known distribution of the *Bothriurus* species of this area, and the Somuncura plateau (in light grey area with altitudes from 500 to 900 m asl, in dark grey area above 900 m asl).

Discussion

Phylogenetic relations of *Bothriurus nendai*: This species has several morphological characters similar to the species of the *patagonicus* group (see the diagnosis of the species). However, it has some particular morphological characters that separate it from the group. *Bothriurus nendai* bears two subdistal teeth in the movable finger of chelicerae, whereas the species of the *patagonicus* group bear only one. The presence of two subdistal teeth is plesiomorphic in genus *Bothriurus* (Prendini 2000, 2003; Mattoni 2007), and this character is shared with other related groups of species as *vittatus*, *coriaceus*, and *burmeisteri* (Mattoni 2002a, b, c, 2007; Mattoni & Acosta 2006). *Bothriurus nendai* bears six ventral trichobothria on the pedipalp chela, whereas all except but one of the known species of *Bothriurus* bear five. Only *Bothriurus rochai* Mello-Leitão 1932 shares this character (Maury 1982), but this is a Brazilian species that belongs to a very different group, with different external morphology and a different spermatophore. Such variation in the number of trichobothria is common in other bothriurid genera like *Timogenes* Simon 1880 and *Brachistosternus*, in which the number of trichobothria can vary even in different populations of the same species (Ojanguren-Affilastro 2005; Ojanguren-Affilastro & Ramírez 2009; Roig-Alsina & Maury 1984), but is rare in *Bothriurus*. Both the characters mentioned hinder an accurate placement of *B. nendai* in any of the existing groups of species, as currently defined. A more comprehensive contribution on the phylogeny of the group will be necessary to resolve this problem.

Other additions to the scorpion fauna of the Somuncura plateau: During the same spring collection trip when we collected *B. nendai*, we collected two other scorpion species not previously recorded on the

upper level of the Somuncura Plateau. In a plain at about 1350 m, we collected some females and juveniles of a species of *Urophonius* belonging to the *exochus* group, and several specimens (males, females and juveniles) of a species of *Brachistosternus* in subgenus *Brachistosternus*.

The species of *Urophonius* found on the upper level of the plateau is probably *U. exochus*, but it is impossible to affirm this conclusively without an adult male, because in this group of species the hemispermaphore is essential to identify the species. *Urophonius exochus* (as all known species of *exochus* group), has a winter activity period (Ojanguren-Affilastro & Cheli 2009), but in early spring it is still possible to find some isolated active specimens on the surface. Up to now no winter collection trips were undertaken to the upper level of the Somuncura Plateau, which explains why no scorpion species with a winter activity period were previously mentioned for this area. However, the presence of *U. exochus* has been mentioned for the base of the plateau and the surrounding area belonging to the Monte phytogeographic province (Maury 1973; Ojanguren-Affilastro & Cheli 2009). If it is confirmed that the specimens of *Urophonius* on the upper level of the plateau belong to *U. exochus*, this would be the first case of a species found at both different levels of the Somuncura Plateau. The presence of *U. exochus* in these phytogeographic provinces (Monte and Patagonian), has already been mentioned (Ojanguren-Affilastro & Cheli 2009), with records of this species from the Monte phytogeographic province of the Rio Negro and Mendoza provinces, to Patagonian localities in Neuquén province. *Bothriurus burmeisteri* has an even wider distribution (Acosta 1997; Ojanguren-Affilastro 2005), being found in areas belonging to Monte, Espinal and Patagonian phytogeographic provinces; however, this species does not occur in the Patagonian area of the Somuncura Plateau, only reaching the ecotonal area between the Monte and Patagonian phytogeographic provinces, at about 1000 m (Acosta 2003).

The presence of *Brachistosternus* on the upper level of the plateau has not been previously mentioned until now. The absence of records of this genus in this area is difficult to explain as all previous fieldwork on the plateau was conducted in summer, and most species of genus *Brachistosternus* have a summer activity period (except *B. telteca*). The specimens found on the plateau probably belong to a new species closely related to *Brachistosternus alienus* Lönnberg 1898, which may also have a spring activity period like *B. telteca*, explaining the absence of previous records.

During the spring fieldtrip, we did not collect any specimens of *Bothriurus ceii* at any of the localities sampled.

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References

- Acosta, L.E. (1997) Descripción de *Bothriurus olaen*, nueva especie de escorpión de Argentina central (Scorpiones, Bothriuridae) *Revue Arachnologique*, 12(1), 1–8.
- Acosta, L.E. (2003) Description of a New Patagonian species of *Urophonius* Pocock (Scorpiones, Bothriuridae), from Meseta de Somuncura, Argentina, *Zootaxa*, 187, 1–12.
- Cabrera, A.L. & Willink, A. (1980) Biogeografía de América Latina. *Secretaría General de la Organización de los Estados Americanos (OEA), Departamento de Asuntos Científicos y Tecnológicos, Monografía 13 (Serie de Biología)*, 122 pp.
- Cei, J.M. (1969) La Meseta Basáltica de Somuncura. Río Negro. Su herpetofauna endémica y sus peculiares equilibrios biocenóticos. *Physis*, Sec. C, 28(77), 257–273.
- Cei, J.M. (1986) Reptiles del centro, centro-oeste y sur de la Argentina. *Monografie IV. Museo regionale di Scienze*

naturali di Torino, Italia. 527 pp.

- Francke, O.F. (1977) Scorpions of the genus *Diplocentrus* Peters from Oaxaca, Mexico. *Journal of Arachnology*, 4, 145–200.
- Mattoni, C.I. & Acosta, L.E. (2005) A new species of *Bothriurus* from Brazil (Scorpiones, Bothriuridae). *Journal of Arachnology*, 33(3), 735–744.
- Mattoni, C.I. & Acosta, L.E. (2006) Systematics and distribution of three *Bothriurus* species (Scorpiones, Bothriuridae) from central and northern Chile. *Studies on Neotropical Fauna and Environment*, 41, 235–250.
- Mattoni, C.I. (2002a) *Bothriurus picunche* sp. nov., a new scorpion from Chile (Scorpiones, Bothriuridae). *Studies on Neotropical Fauna and Environment*, 37, 169–174.
- Mattoni, C.I. (2002b) La verdadera identidad de *Bothriurus vittatus* (Guérin Méneville, [1838]) (Scorpiones, Bothriuridae). *Revue Arachnologique*, 14, 59–72.
- Mattoni, C.I. (2002c) *Bothriurus pichicuy* sp. nov., nuevo escorpión chileno del grupo *vittatus* (Scorpiones: Bothriuridae). *Iheringia*, 92, 81–87.
- Mattoni, C.I. (2007) The *Bothriurus* scorpions (Scorpiones, Bothriuridae) from Patagonia. *Insect Systematics & Evolution*, 38, 173–192.
- Maury, E.A. (1969) Aportes al conocimiento de los escorpiones de la República Argentina II. Algunas consideraciones sobre el género *Bothriurus* en la Patagonia y Tierra del Fuego, con la descripción de una nueva especie (Bothriuridae). *Physis*, Sec. C, 28(76), 149–164.
- Maury, E.A. (1973) Los escorpiones de los sistemas serranos de la provincia de Buenos Aires. *Physis*, Sec. C, 32(85), 351–371.
- Maury, E.A. (1979) Escorpiofauna Patagónica II. *Urophonius granulatus* Pocock 1898 (Bothriuridae). *Physis*, Sec. C, 38(94), 57–68.
- Maury, E.A. (1982) Dos *Bothriurus* del nordeste brasileño (Scorpiones, Bothriuridae). *Revista de la Sociedad Entomológica Argentina*, 41(1–4), 253–265.
- Menni, R.C. (2004) Peces y ambientes en la Argentina Continental. *Monografías del Museo Argentino de Ciencias Naturales*, Buenos Aires, Argentina, 5, 316 pp.
- Ojanguren Affilastro, A.A. (2000) *Brachistosternus telteca* (Scorpiones, Bothriuridae), una nueva especie de la República Argentina. *Revista del Museo Argentino de Ciencias Naturales*, 2(2), 157–160.
- Ojanguren-Affilastro, A.A. (2001) Sistemática y distribución de *Brachistosternus alienus* Lönnberg (Scorpiones, Bothriuridae). *Revista del Museo Argentino de Ciencias Naturales*, 3(2), 169–174.
- Ojanguren-Affilastro, A.A. (2003) The genus *Brachistosternus* in Argentina, with a description of a new Patagonian species (Scorpiones, Bothriuridae). *Journal of Arachnology*, 31(3), 317–330.
- Ojanguren-Affilastro, A.A. (2005) Estudio monográfico de los escorpiones de la República Argentina. *Revista Ibérica de Aracnología* 11, 75–241.
- Ojanguren Affilastro, A.A. (2007) A new scorpion species from Patagonia (Scorpiones, Bothriuridae). *Zootaxa*, 1466, 47–56.
- Ojanguren Affilastro, A.A. & Cheli, G. (2009) New data on genus *Urophonius* Pocock 1893 in Patagonia, with a description of a new species of the *exochus* group (Scorpiones; Bothriuridae). *Journal of Arachnology*, 37(3), 346–356.
- Ojanguren Affilastro, A.A. & Ramirez, M. (2009) Phylogenetic analysis of the scorpion genus *Brachistosternus* (Arachnida, Scorpiones, Bothriuridae). *Zoologica Scripta*, 38(2), 183–198.
- Ojanguren-Affilastro, A.A. & Roig-Alsina, A. (2000) *Brachistosternus angustimanus*, una nueva especie del norte de la Patagonia, Argentina (Scorpiones, Bothriuridae). *Physis*, Sec. C, 58(134–135), 15–22.
- Prendini, L. (2000) Phylogeny and classification of the superfamily corpionoidea Latrielle 1802 (Chelicerata, Scorpiones): An exemplar Approach. *Cladistics*, 16, 1–78.
- Prendini, L. (2003) A new genus and species of bothriurid scorpion from the Brandberg Massif, Namibia, with a reanalysis of bothriurid phylogeny and a discussion of the phylogenetic position of *Lisposoma* Lawrence. *Systematic Entomology*, 28(2), 149–172.
- Roig Alsina, A. & Maury, E.A. (1984) Sistemática y distribución geográfica de *Brachistosternus* (*L.*) *pentheri* Mello-Leitão, 1931 (Scorpiones, Bothriuridae). *Physis*, C, 42(102), 17–21.
- Stahnke, H.L. (1970) Scorpion nomenclature and mensuration. *Entomological News*, 83, 121–133.
- Vachon, M. (1973) [1974] Étude des caractères utilisés pour classer les familles et les genres de scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie. Sigles trichobothriax et types de trichobothriotaxie chez les scorpions. *Bulletin du Muséum national d'histoire naturelle* (Paris), 3 ser., 140, 857–958.