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A new endemic scorpion species from the Somuncura Plateau, in northern Patagonia (Scorpiones, Bothriuridae)

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Abstract

A new scorpion species from Argentina, *Bothriurus ceii* **n. sp.**, is described. This species belongs to the *patagonicus* group, which includes *Bothriurus patagonicus* Maury 1969 and several undescribed species from Patagonia. *Bothriurus ceii* **n. sp.** is endemic to the upper level of the Somuncura plateau, which shows characteristics of the Patagonic phytogeographyc province, whereas the surrounding area belongs to the Monte phytogeographyc province. *Bothriurus ceii* **n. sp.** can be distinguished from the rest of the species of the *patagonicus* group because it lacks the VSM and VL carinae of sternite V and metasomal segment I, which are present in the rest of the species of the group.

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

Introduction

Only two species of genus *Bothriurus* Peters 1861 have been described from Argentinean Patagonia: *Bothriurus burmeisteri* Kraepelin 1894, belonging to the *burmeisteri* group, which is widely distributed from central Argentina to southern Patagonia, and *Bothriurus patagonicus* Maury 1969, from north-western Patagonia; however, several undescribed species, related with *B. patagonicus* occur in western and southern Patagonia (Maury 1969; Ojanguren-Affilastro 2005; Mattoni, in press). These species are included in the *patagonicus* group; the distinctive characteristics of this group are as follows: hemispermatophore with the distal lamina slightly curved, and the lobe region poorly developed, VM and VSM carinae of metasomal segment V occupying the posterior half of the segment, movable finger of chelicerae with one subdistal tooth, and *Esb* trichobothria of the pedipalp chela forming a triangle with *Eb1* and *Eb2*. The distribution of the *patagonicus* group matches almost exactly with the Patagonic Phytogeographyc province defined by Cabrera and Willink (1980), except for the species described in this contribution. *Bothriurus ceii* **n. sp.** inhabits far from this phytogeographyc province, in the Somuncura plateau, a basaltic tableland, isolated in an extended plain in north-eastern Argentinean Patagonia. The average altitude of the plateau is about 900 to 1400 m, with some internal hills reaching up to 2000 m. The area that surrounds this tableland belongs to the Monte phytogeographyc province; however, the upper level of this formation (above 900 m), shows ecological characteristics of the Patagonic phytogeographyc province. The closest area that belongs to this phytogeographyc province is placed almost 300 km western from this plateau. The isolation of this habitat has favoured the presence of several endemic species and subspecies of animals, as lizards, amphibians and even a fish species (Cei 1969, 1986; Menni 2004). The scorpion fauna of this area is closely related with that of the Patagonic scorpiological area defined by Acosta & Maury (1998). Up to now only two species have been collected there, *Urophonius somuncura* Acosta 2003, which is an endemism of the upper level of this plateau (Acosta 2003), closely

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related with *Urophonius granulatus* Pocock 1898 from southern Patagonia (Maury 1979a), and *Bothriurus ceii* **n. sp.** In his description of *U. somuncura* Acosta (2003) has provided new data about the distribution and ecology of *B. ceii*, referring to it as *Bothriurus* sp. belonging to the *patagonicus* species group. The presence of *B. ceii* n. sp in this area, (first mentioned by Maury (1979b)), is a new confirmation that the Somuncura plateau is a Patagonic ecological island, in the Monte Phytogeographyc province.

Methods

Descriptive terminology follows Mattoni and Acosta (2005) for the hemispermatophores; Vachon (1974) for the trichobothriae; 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 pedipalp carinae, abbreviated as follows: DI: dorsal internal; DE: dorsal external; VI: ventral internal. Abbreviations of collections are as follows: AMNH: American Museum of Natural History, New York; CDA: Cátedra de Diversidad Animal I, Universidad de Córdoba, Argentina; MACN-Ar: Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia'. Illustrations were produced using a stereomicroscope and camera lucida. Measurements, taken using an ocular micrometer, were recorded in mm.

Results

***Bothriurus ceii* n. sp.**
figs 1–5; 7–13, Table 1

Bothriurus patagonicus group: Maury 1979b: 707, 715 ("material de [...] Meseta de Somuncurá"); Acosta & Maury 1998: 554 ("una forma [...] habita en el piso superior de la Meseta de Somuncurá"); Ojanguren Affilastro 2005: 215 ("otra población [...] habita el piso superior de la Meseta de Somuncurá").
Bothriurus sp.: Acosta 2003: 2, 8, 10 ("belonging to '*patagonicus* species group'…").

Type series: ARGENTINA: Río Negro Province: Somuncura Plateau: Holotype male (MACN-Ar 12063), between "Cerro Corona Chico" and "Laguna Blanca", 1450 m, , 8-I-2003, A. Ojanguren-Affilastro and L. Piacentini coll. Paratypes: 1 female and 3 juveniles (MACN-Ar 12064) same data as holotype; 2 males, 2 females and one juvenile (MACN-Ar 12065), "Meseta de Somuncura", 1400 m, 20-XII-1967, Raimunda and Cei coll.; 1 male, 1 female, 1 juvenile (CDA), near "Cerro Corona Chico" 1300 m, 9-I-2003, A. Ojanguren-Affilastro and L. Piacentini coll; 1 male, 1 female, 1 juvenile (AMNH), same data.

Etymology: This species is named after the herpetologist José M. Cei, who has been the first collector of scorpions in the Somuncura plateau.

Diagnosis: *Bothriurus ceii* can be separated from *B. patagonicus* by means of the pigmentation pattern. In *B. ceii* the ventrolateral and the ventromedian stripes of the ventral surface of metasomal segments I–V do not join in any segment, whereas in *B. patagonicus* they join in the posterior third of each segment. They can also be separated for the ventral carination of sternite V and metasomal segment I: in *B. ceii* the surfaces are smooth in both sexes (Fig. 7), whereas in *B. patagonicus* females there are two VL carinae in sternite V, and four longitudinal carinae in metasomal segment I, two VL and two VSM (Fig. 6); in *B. patagonicus* males there are only two VL carinae in metasomal segment I.

The only *Bothriurus* species that inhabits in the nearby area surrounding the Somuncura tableland is *B. burmeisteri*, which can be separated from *B. ceii* by means of the cheliceral dentition: *B. ceii* possesses one subdistal tooth in the movable finger, whereas *B. burmeisteri* possesses two. Additionally, the VSM and VM carinae of metasomal segment V occupy only the posterior half of the segment in *B. ceii*, whereas in *B. bur-*

meisteri they occupy almost the entire length of the segment (Roig Alsina 1974; Acosta 1997; Ojanguren Affilastro 2005).

Description: *Colour*: General colour yellowish, with dark brown spots of pigment. *Carapace*: anterior margin densely pigmented; ocular tubercle and area around the lateral ocelli dark brown; two oblique thick dark stripes extending 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, occupying almost the entire posterior margin. *Chelicerae*: fixed finger with dense reticular pigment near the articulation with the movable finger; movable finger densely pigmented. *Tergites*: with two lateral dark spots, joint in the median area of the segment. Sternites, sternum, genital opercula and pectines depigmented. *Metasoma*: segments I–IV: dorsal surface with a median triangular spot; lateral surface with slight reticular pigment in the area below the LIM carina; ventral surface with three longitudinal dark stripes, two ventrolaterals and one ventromedian, that do not join in any segment; segment V: dorsal surface with two faint longitudinal dark stripes, lateral and ventral surfaces like segments I–IV. *Telson*: vesicle: dorsal surface depigmented or slightly pigmented, ventral surface with dark reticular pigment; aculeus dark brown. *Legs*: femur and patella densely pigmented on the lateral surfaces, tibia and basitarsus slightly pigmented near their VL margins, the rest unpigmented. *Pedipalps*: femur with the dorsal surface densely pigmented, the rest unpigmented; patella with four longitudinal stripes, on the dorsointernal, dorsoexternal, external and ventroexternal margins; chela, with seven longitudinal stripes, three on the external surface, two on the ventral surface, and two on the internal surface.

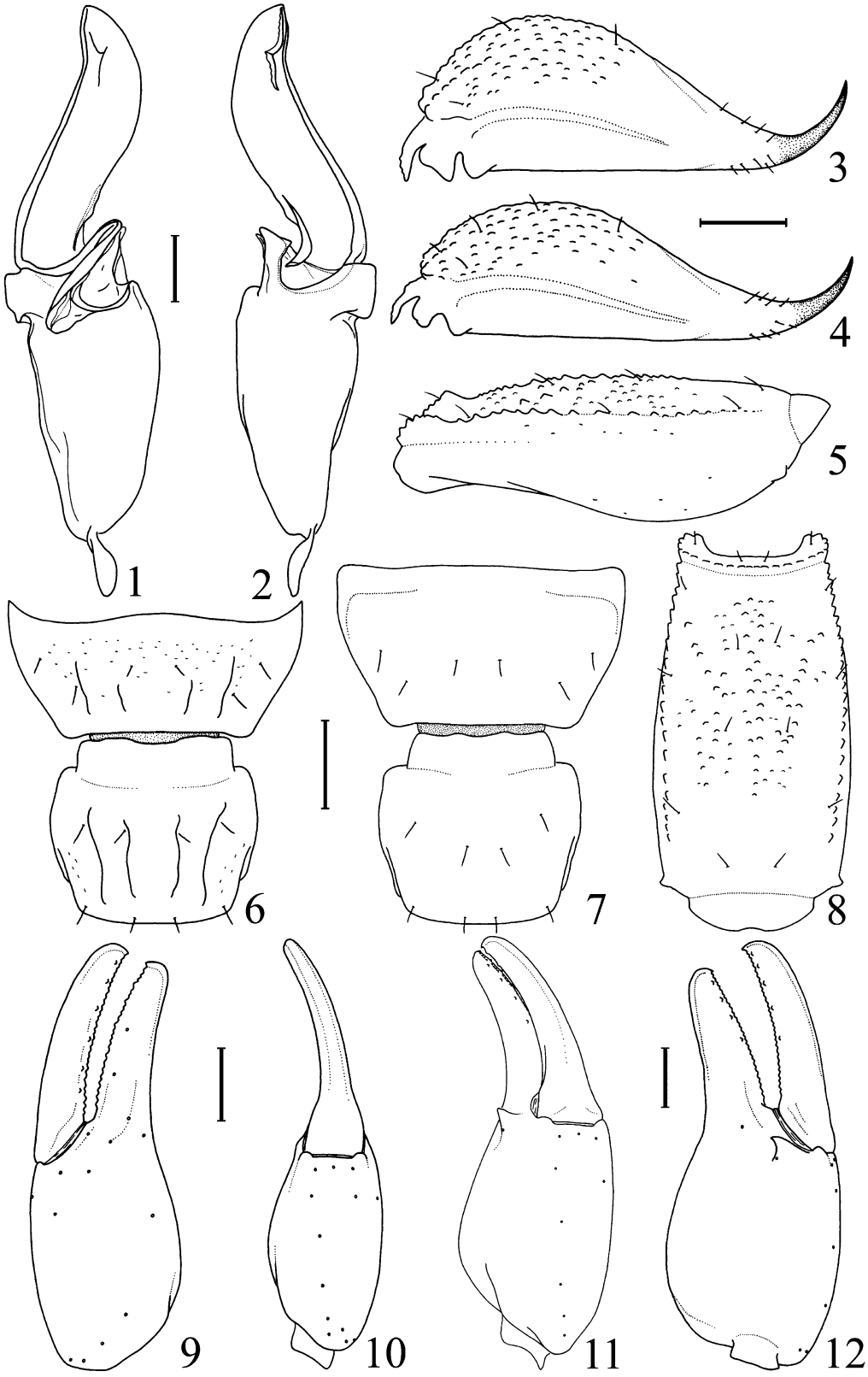
Morphology: Measurements of the holotype male and a paratype female (MACN–Ar 12063, 12064) are recorded in Table 1. Total length in males 39–46 mm (N = 5, mean = 42.3), 40–46 in females (N = 5; mean = 43.4). *Carapace*: tegument smooth in the median area, slightly granular near the lateral margins; anterior margin slightly convex, anterior longitudinal furrow absent; ocular tubercle weakly developed, median eyes small, two diameters apart; posterior lateral and posterior median furrow deeply marked. Chelicerae: similar to the rest of the species of the genus but with one subdistal tooth, like in *B. patagonicus* (Maury 1969, Ojanguren Affilastro 2005). *Tergites*: I–VI smooth in females, slightly granular in males; VII slightly granular in the anterior half, densely granular and with four longitudinal carinae in the posterior half. *Sternites*: smooth tegument, spiracles small and narrow. *Metasoma*: segment I: ventral surface smooth, with eight macrosetae, four ventral and four ventrolateral (Fig. 7); LIM carina granular and well marked in the posterior half of the segment, with one macroseta near the distal margin; LSM carina granular, occupying the posterior half of the segment, with one macroseta almost in the middle of the carina; DL carina granular, occupying the entire length of the segment, the rest of the tegument smooth except for the area between DL and LSM carinae, that is granular; segments II–III: similar to segment I but less granular and with less developed carinae, LSM and LIM carinae restricted to the distal third of the segment; with one macroseta in the DL carina, and one macroseta in the LSM carina, there are no macrosetae in the LIM carina; segment IV: DL carina granular, extending the entire length of the segment; LSM carina only represented by some granules in the posterior third of the segment; macrosetae like segment III; segment V: dorsal surface smooth, with one DL seta; lateral surface with scattered blunt granules and three setae on each side; LSM carina represented by a small apophysis in the anterior margin of the segment; ventral surface densely granular in its posterior half, with six ventral setae and six VL setae; VL carinae extending almost the entire length of the segment (Fig. 5); VSM carinae oblique, only present in the second half of the segment, and connecting with the VL carinae in its posterior margin; VM carina present in the second half of the segment, hardly distinguishable between the ventral granulation (Fig. 8). *Telson*: vesicle globose, being more globose in females (Figs. 3, 4), ventral surface densely granular; dorsal surface slightly granular, with a slight median glandular depression in males; aculeus short and curved. *Legs*: smooth tegument, with two well developed and symmetrical basitarsal spurs; telotarsi with a ventromedian row of hyaline setae, and with well developed ventrolateral spines: tarsus I: 1-1; tarsus II: 2-2, tarsi III and IV: 3-3; telotarsal unguis curved and symmetrical. *Pectines*: number of pectinal teeth in males: 17–18 (N = 5; median = 17); in females: 15–16 (N = 5; median = 15). *Pedipalps*: DE carina extending the entire length

of the segment, granular in males, blunt in females; DI carina marked by scattered granules, complete in males, restricted to the basal half of the segment in females; internal surface granular; dorsal and ventral surfaces granular in males, smooth in females. Patella: tegument slightly granular in males, smooth in females, DI and VI carinae granular and extending the entire length of the segment. Chela: robust with short fingers and smooth tegument, in females it is less robust, with longer fingers (Figs. 9, 10); males with a strong conic apophysis near the articulation with the movable finger (Figs. 11, 12). *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*: distal lamina similar in size to the basal portion, slightly curved in its upper third; distal crest parallel to the posterior margin, with a transversal crest; internal lobe with a small apophysis in its external surface (Fig. 2); basal lobe laminar; frontal fold well developed; capsular cavity well developed (Fig. 1).

TABLE 1. Measurements in mm of the male holotype (MACN-Ar 12063) and a female paratype (MACN-Ar 12064) of *Bothriurus ceii* **n. sp.**

Measurementes in mm	*Bothriurus ceii* **n. sp.**	
	Male holotype	Female paratype
Total length	39.20	45.57
Carapace, length	4.60	5.17
Carapace, anterior width	2.75	3.23
Carapace, posterior width	4.69	5.01
Mesosoma, total length	12.71	16.95
Metasoma, total length	16.15	17.69
Metasomal segment I, length/width/height	2.42/3.23/2.26	2.83/3.56/2.67
Metasomal segment II, length/width/height	2.83/2.99/2.34	3.15/3.31/2.66
Metasomal segment III, length/width/height	2.99/2.91/2.40	3.23/3.20/2.75
Metasomal segment IV, length/width/height	3.31/2.83/2.40	3.47/3.15/2.66
Metasomal segment V, length/width/height	4.60/2.75/2.10	5.01/3.07/2.18
Telson, length	5.74	6.06
Vesicle,length/width/height	4.04/2.26/1.80	4.28/2.91/2.26
Aculeus, length	1.69	1.78
Femur, length/width	3.47/1.25	3.72/1.61
Patella, length/width	3.96/1.45	4.04/1.78
Chela, length/width/height	6.79/2.26/2.99	7.76/2.34/2.83
Movable finger, length	3.39	4.53

Distribution and habitat: *Bothriurus ceii* **n. sp.** is endemic to the Somuncura tableland placed in Río Negro and Chubut provinces, in northern Argentinean Patagonia (Fig. 13). This species has only been collected in the upper belt of this plateau, between 1300 to 1450 m, in an area which has characteristics of the Patagonic phytogeographyc province. The vegetation of this area is a grassland of "Coiron" (*Poa* spp., *Festuca* spp. and *Stipa* spp.; Cei 1969); the soil is covered with small rocks of 30 to 40 cm in diameter; the landscape is a slightly undulated plain, with sparse, low hills, and with scattered temporary lakes that depend on summer rainfalls.



FIGURES 1–12. Figures 1–5, 7–12. *Bothriurus ceii* **n. sp.** 1: left hemispermatophore, internal aspect; 2: left hemispermatophore, external aspect; 3: telson, female, lateral aspect; 4: telson, male, lateral aspect; 5: metasomal segment V, male, lateral aspect; 7: sternite V and metasomal segment I, female, ventral aspect; 8: metasomal segment V, male, ventral aspect; 9: Left pedipalp chela, female, external aspect; 10: left pedipalp chela, female, ventral aspect; 11: left pedipalp chela, male, ventral aspect; 12: left pedipalp chela, male, internal aspect. Figure 6: *Bothriurus patagonicus*, sternite V and metasomal segment I, female, ventral aspect. Scale bars: 1 mm.
(fig 11-12)????

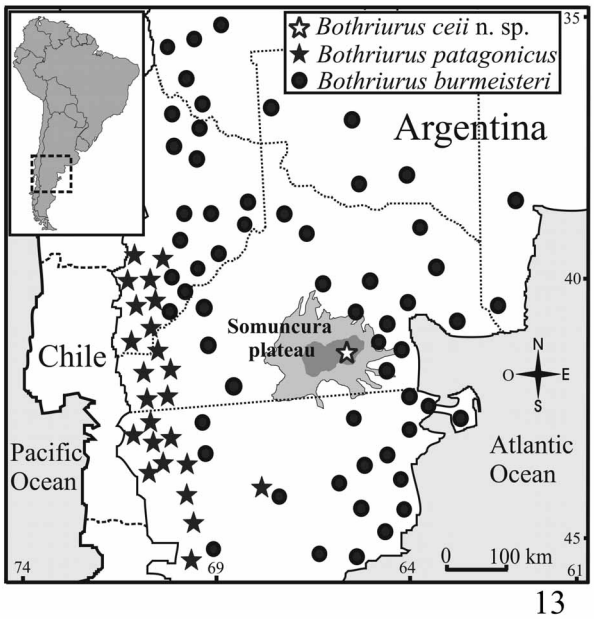


FIGURE 13. Map of northern Argentinean Patagonia, showing the known distribution of the *Bothriurus* species of this area, and the Somuncura plateau, (in light grey, area with altitudes from 500 to 900 m asl, in dark grey area above 900 m asl).

Discussion

Bothriurus ceii is isolated from the rest of the species of the *patagonicus* group; the closest species to *B. ceii* belonging to this group is *B. patagonicus*, which inhabits almost 300 km western to the Somuncura tableland (Fig. 13); the only *Bothriurus* species that occurs in the intermediate area is *B. burmeisteri* (Maury 1979b; Ojanguren Affilastro 2005; Mattoni, in press).

All known specimens of *B. ceii* **n. sp.** were collected in summer. In a collection trip to the Somuncura plateau in January of 2003 we have been able to collect some specimens under stones, in burrows of not more than 30 cm of depth, typical of the genus (San Martin 1961, San Martin & Gambardella 1975). In this trip, we have also collected some active specimens of this species (males, females and juveniles) during the night with a UV lamp. *Bothriurus ceii* is sympatric with *U. somuncura*; however, we have only collected inactive specimens of the later species in their burrows under stones, and we could not observe any active specimens during the night. This observations support Acosta's hypothesis that *U. somuncura* is active during spring, showing a decreasing activity at the beginning of the summer, when *B. ceii* becomes more active (Acosta 2003; Ojanguren Affilastro 2005).

Neither *B. ceii* nor *U. somuncura* occur below 1000 m (Acosta, 2003); below this altitude the landscape gradually changes to a shrub steppe, which finally becomes a typical Monte vegetation below 500 m (Cei 1969). In this area we have collected *B. burmeisteri*, *Brachistosternus alienus* Lönnberg 1898, and *Brachistosternus angustimanus* Ojanguren-Affilastro and Roig-Alsina 2001, all of them typical species of the southern part of the Monte phytogeographyc province (Ojanguren-Affilastro 2001; 2003; Ojanguren-Affilastro & Roig Alsina 2000).

In his description of *B. patagonicus*, Maury (1969) mentions the presence of at least two undescribed species or subspecies closely related to *B. patagonicus*, but he did not describe them; in a revision of the Patagonic species of genus *Bothriurus*, Mattoni (in press) clarifies their taxonomic position: these are two undescribed species, one of them, belonging to the *patagonicus* group, occurs in Santa Cruz province in

southern Argentinean Patagonia, and the other, with intermediate characteristics between the *vittatus* and the *patagonicus* group, occurs in northern Argentinean and Chilean Patagonia.

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