

THE GENUS *BRACHISTOSTERNUS* IN ARGENTINA, WITH A DESCRIPTION OF A NEW PATAGONIAN SPECIES (SCORPIONES, BOTHRIURIDAE)

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ABSTRACT. The new species *Brachistosternus paulae* is described. This is the southernmost species of the genus, occurring in southern Patagonia in Santa Cruz Province. It can be distinguished from all the other species of the genus by the presence of only 4 ventral trichobothria on the pedipalpal chela, and by the shape of the hemispermatophore, in which the cylindrical apophysis is shorter than the laminar apophysis; all internal spines are absent, except for the row of spines, which in some specimens is vestigial. This species can not be included in any of the known subgenera due to its trichobothrial pattern; nevertheless it is closer to the subgenus *Leptosternus* on the basis of its remaining morphology. A key for the species of the genus in the country is provided together with some data on them. The hemispermatophores of the three subgenera are compared and two maps detailing the distribution of the species in the country are provided.

El género *Brachistosternus* en la Argentina, con la descripción de una nueva especie de la Patagonia (Scorpiones, Bothriuridae). En este trabajo se describe a *Brachistosternus paulae* n. sp. Esta es la especie conocida más austral del género, habitando en el sur de la Patagonia en la provincia de Santa Cruz. Puede diferenciarse del resto de las especies del género por la presencia de solo 4 tricobotrias ventrales en la pinza y por el escaso desarrollo de su hemispermatóforo, en éste la apófisis cilíndrica se encuentra poco desarrollada y es más corta que la apófisis laminar, además carece de todos los procesos espiniformes, salvo las espinas en hilera que en algunos ejemplares pueden presentarse en forma vestigial; la particular tricobotriotaxia de esta especie no permite incluirla en ninguno de los subgéneros descritos hasta el momento, sin embargo su morfología la aproxima más al subgénero *Leptosternus*. Se presenta además una clave para las especies del género en el país y se aportan algunos datos sobre éstas. Se comparan los hemispermatóforos de los distintos subgéneros y se presentan dos mapas con la distribución de las distintas especies presentes en el país.

Keywords: Scorpiones, *Brachistosternus*, key, new species, Argentina

Within Argentina, the genus *Brachistosternus* Pocock 1893 is a dominant component of the scorpion fauna in the arid and semiarid areas that occupy more than half of the national territory. It can be found from sea level up to more than 4000 m a.s.l.. Although the Argentinian scorpion fauna has been well studied, relatively few works have been published on this genus: Roig Alsina (1977), Maury (1973, 1974, 1975, 1978a, 1978b, 1984), Roig Alsina & Maury (1981, 1984), Prendini (2000), San Martín (1969), Ojanguren Affilastro (2000, 2001, 2002) and Ojanguren Affilastro & Roig Alsina (2001).

This genus presents a high degree of intraspecific variability, especially in the species of

the subgenus *Leptosternus* Maury 1973. For this reason, it is sometimes necessary to study large numbers of specimens to define a species clearly. Intraspecific variability is shown by color, external morphological structures or the structures of the hemispermatophore, and it may be intrapopulation or interpopulation.

An interesting characteristic of the genus *Brachistosternus* is the complexity of its hemispermatophore, which has a basic pattern in the three subgenera. Nevertheless, there are important differences in the internal structures of the lobe region. A comparison of the hemispermatophores of the three subgenera is herein presented.

There are no modern keys for the species of the genus. The last one was provided by Mello Leitão (1945). A key and a catalogue for the known species of the genus *Brachistosternus* from Argentina is herein presented. The characters that are more often used in the taxonomy of this genus are the structures of the hemispermatophore, the trichobothrial pattern, the number of metasomal and tarsal setae, morphometric ratios and the particular morphological characteristics of the different species, such as the granulation of the telson or the shape of the telotarsi.

In this work, *Brachistosternus paulae*, the southernmost species of the genus, is described. Its particular trichobothrial pattern prevents it from being included in any of the known subgenera of the genus. Maps of the distribution of the Argentinian species of *Brachistosternus* have been prepared based upon all localities cited by the bibliography of the present catalogue, except for the localities of *B. paulae*.

METHODS

Terminology of the structures of the hemispermatophore follows Maury (1974). Trichobothrial terminology follows Vachon (1974). Terminology of the androvestigia follows Cekalovic (1973). Terminology of the telson gland follows Roig Alsina & Maury (1981). Terminology of the metasomal carinae follows Stahnke (1970). Terminology of the metasomal ventral setae follows Ojanguren Affilastro & Roig Alsina (2001). Terminology of the Phytogeographic Provinces follows Cabrera & Willink (1980). Terminology of the Scorpiological Areas follows Acosta & Maury (1998). Abbreviations are as follows: MACN-Ar = Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", National Arachnological Collection (Cristina Scioscia); a.s.l. = above sea level; NMW = Naturhistorisches Museum Wien, Vienna, Austria; MIZT = Museo ed Instituto di Zoologia sistematica della Università, Turin, Italy; MNHN = Museum National D'Histoire Naturelle, Paris, France; NRS = Naturhistoriska Riksmuseet, Stockholm, Sweden; ZMH = Zoologische Staatinstitut, Zoologisches Museum, Hamburg, Germany; NMB = Naturhistorisches Museum, Basel, Switzerland. All measurements are in mm, and were taken using an ocular micrometer. Illustrations were produced using a

stereomicroscope and camera lucida. The hemispermatophores were dissected from surrounding tissues and observed in 80% ethanol.

RESULTS

CATALOGUE OF THE ARGENTINIAN SPECIES OF *BRACHISTOSTERNUS*

Brachistosternus (Brachistosternus) ehrenbergii (Gervais 1841)

Scorpio ehrenbergii Gervais 1841:282–283, figs. 18–22, pl. I. (Holotype male, Callao, Peru (ZMH), not examined).

Scorpio glaber Gervais, 1841:285, figs. 28–32, pl. I (synonymized by Simon, 1880:397). (Holotype, Peru (MNHN), not examined).

Telogonus politus Koch, 1867:234–235 (synonymized by Kraepelin, 1894:216). (Holotype female, South America (ZMH), not examined).

Remarks.—This is the type species of the genus. It has been collected from Ecuador to Chile, but the presence of this species in Argentina is dubious (Fig. 28) (Maury 1973).

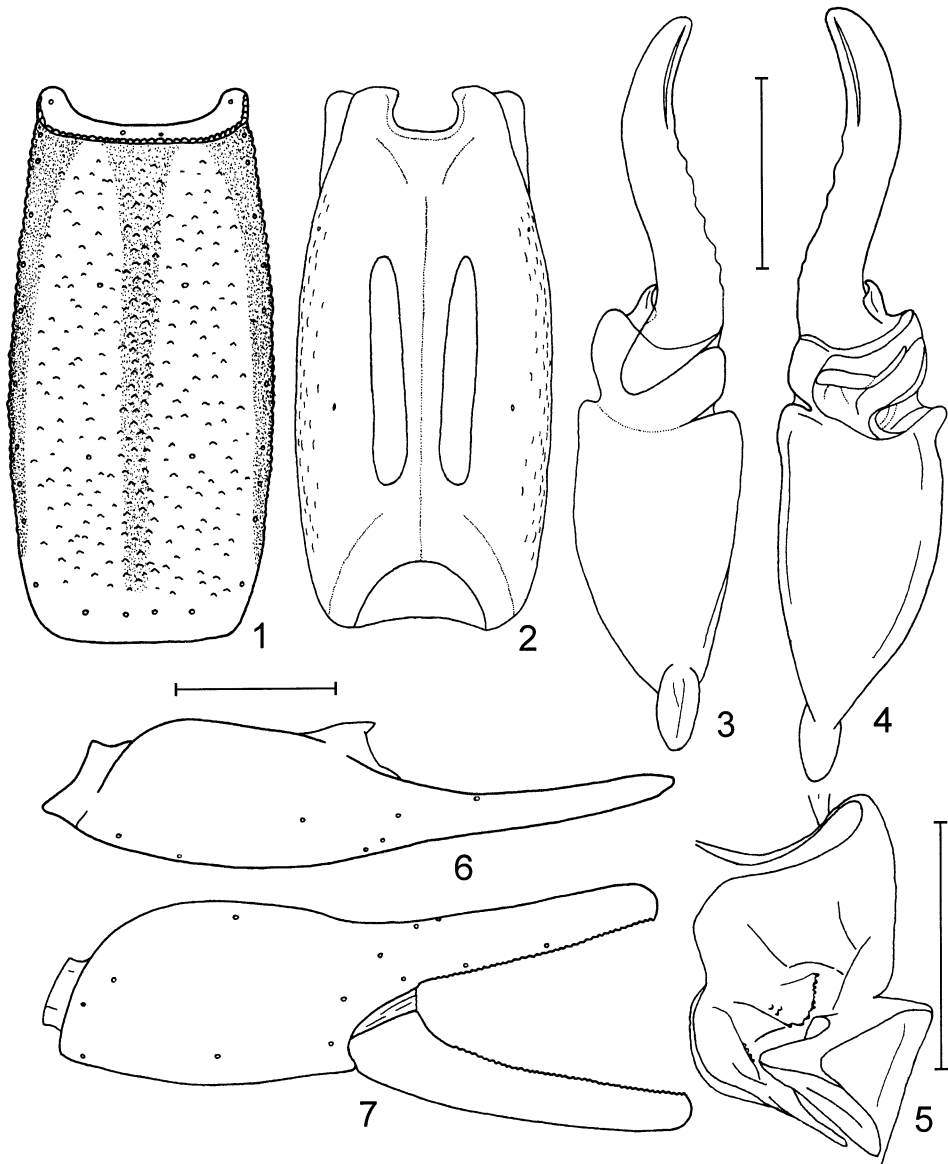
Brachistosternus (Leptosternus) alienus Lönnberg 1898

Brachistosternus alienus Lönnberg 1898:46–48. (Holotype female, Puerto Madryn, Chubut Province, Argentina (NRS), not examined).

Remarks.—*Brachistosternus alienus* is endemic to southern Argentina (Fig. 28). It has been collected in southern "Monte" Phytogeographic Province, and Northern "Patagonia" Phytogeographic Province; from sea level up to 1000 m a.s.l. (Ojanguren Affilastro 2001). Cekalovic (1966, 1983) reported this species from Chile, but its presence in this country is unlikely. This species was found in sympatry with *Bothriurus burmeisteri* Kraepelin 1894; *Zabius birabeni* Mello Leitão 1938; *Timogenes elegans* (Mello Leitão 1931); *Brachistosternus pentheri* Mello Leitão 1931 and *B. angustimanus* Ojanguren Affilastro & Roig Alsina 2001.

Brachistosternus (Leptosternus) angustimanus Ojanguren Affilastro & Roig Alsina 2001

Brachistosternus (Leptosternus) angustimanus Ojanguren Affilastro & Roig Alsina 2001: 16–22, 1–14, 17, tab. I, II. (Holotype male, Las Grutas, Rio Negro Province, Argentina (MACN-Ar 9732)).



Figures 1–7.—*Brachistosternus paulae* new species: 1. Fifth metasomal segment, ventral aspect; 2. Fifth metasomal segment, male, dorsal aspect; 3. Left hemispermaphore, dorsal aspect; 4. Left hemispermaphore, ventral aspect; 5. Left hemispermaphore, detail of the lobe region; 6. Right pedipalp chela, male, dorsal aspect; 7. Right pedipalp chela, female, retrolateral aspect. Scale bars = 1 mm.

Remarks.—This species is endemic to southern Argentina (Fig. 29), from sea level up to 1000 m a.s.l. (Ojanguren Affilastro & Roig Alsina 2001). It has been previously confused with *B. (L.) alienus* by several authors (Mello Leitão 1938; Maury 1973; Ringuelet 1953).

Most of the species of the genus *Brachis-*

tosternus are not found in sympatry with other congeners; when they inhabit the same region they are usually in parapatry, at different elevations or in different environments. However the distributions of *B. (L.) alienus* and *B. (L.) angustimanus* overlap almost entirely (Ojanguren Affilastro & Roig Alsina 2001). *Brachistosternus angustimanus* was also

found in sympatry with *Bothriurus burmeisteri*, *Zabius birabeni* and *Timogenes elegans*.

Brachistosternus (Leptosternus) intermedius Lönnberg 1902

Brachistosternus weijenberghi intermedia Lönnberg 1902:255. (Two juvenile syntypes, Ojo de Agua, Salta Province, Argentina (NRS), not examined).

Remarks.—This species occurs between 2500 and 4000 m a.s.l., from northwestern Argentina to southwestern Bolivia (Fig. 29). It was found in sympatry with *Bothriurus olaen* Acosta 1997. The specimens of *Brachistosternus (Leptosternus) castroi* Mello Leitão 1940 mentioned from Argentina (Ringuelet 1953), actually belong to *B. (L.) intermedius* Lönnberg (Ojanguren Affilastro in press b).

Brachistosternus (Leptosternus) montanus Roig Alsina 1977

Brachistosternus (Leptosternus) montanus Roig Alsina 1977:255–259, figs. 1–7. (Holotype male, Puente del Inca, Mendoza Province, Argentina (MACN-Ar 7060), examined)

Remarks.—*Brachistosternus (L.) montanus*, a closely related species to *B. (L.) intermedius* Lönnberg (Ojanguren Affilastro in press b), occurs at the same altitudes but in the center of the country (Fig. 29), in the Provinces of San Juan and Mendoza (Roig Alsina 1977; Roig Alsina & Maury 1981). It was found in sympatry with *Orobothriurus alticola* (Pocock 1899) (Roig Alsina 1977; Roig Alsina & Maury 1981).

Brachistosternus (Leptosternus) multidentatus Maury 1984

Brachistosternus (Leptosternus) multidentatus Maury 1984:113–116, figs. 1–7, tab. I. (Holotype male, Bermejo, Caucete department, San Juan Province, Argentina (MACN-Ar 7849), examined).

Remarks.—This is a psammophilic species that has a disjunct distribution in the Provinces of San Juan and Buenos Aires (Fig. 28). It occurs in dunes without vegetation. In dunes with some vegetation, it is replaced by *Brachistosternus pentheri* Mello Leitão 1931 (Maury 1984). *Brachistosternus multidentatus* has been collected in sympatry with *Vachonia martinezi* Abalos 1954, in southern Buenos Aires. This species has the highest number of pectinal teeth of the genus, the females have

38–44 pectinal teeth and the males 45–58 (Maury 1984).

Brachistosternus (Leptosternus) pentheri Mello Leitão 1931

Brachistosternus pentheri Mello Leitão 1931:94, 95. (Holotype male, Arístides Villanueva Department, Mendoza Province, Argentina (NMW), not examined).

Brachistosternus (Leptosternus) psammophilus Maury 1978a:169–175, fig. 1–9, tab. I–IV (synonymized by Roig Alsina & Maury 1984:18). (Holotype male, Sauce Grande, Coronel Dorrego, Buenos Aires Province, Argentina (MACN-Ar 7026), examined).

Remarks.—This species was reviewed by Roig Alsina & Maury (1984). It is endemic to central and northern Argentina, from sea level up to 1500 m a.s.l.; from Buenos Aires Province to Jujuy Province (Roig Alsina & Maury 1984) (Fig. 29). It was found in sympatry with: *Bothriurus burmeisteri*, *B. prospicius* Mello Leitão 1934, *B. cordubensis* Acosta 1995, *B. chacoensis* Maury & Acosta 1993, *Zabius birabeni*, *Z. fuscus* (Thorell 1877), *Timogenes elegans*, *T. dorbignyi* (Guérin & Menneville 1843), *Vachonia* sp., *Brachistosternus alienus*, *B. weyenberghii* (Thorell 1876), *B. ferrugineus* (Thorell 1876), *B. telteca* Ojanguren Affilastro 2000, *Tityus trivittatus* Kraepelin 1898 and *T. confluens* Borelli 1899 (Acosta 1995).

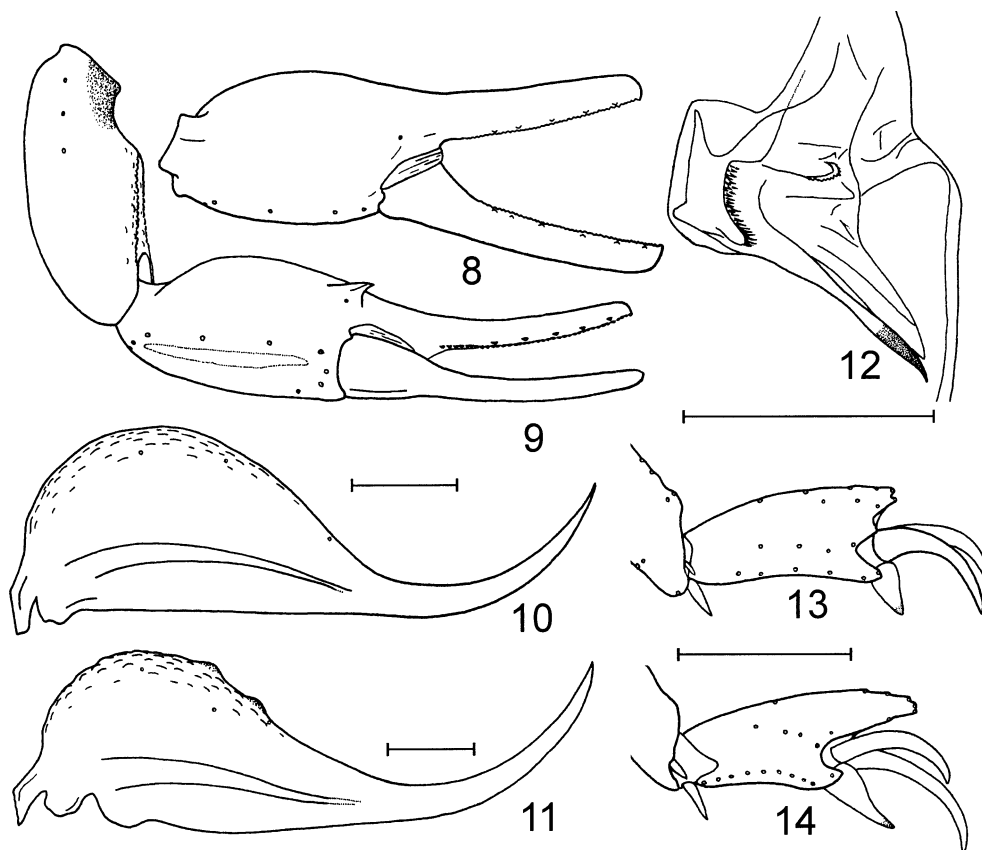
Brachistosternus (Leptosternus) weyenberghii (Thorell 1876)

Telogonus weijenberghii Thorell 1876:173–176: (Holotype male, Cordova, Argentina (NRS), not examined).

Brachistosternus weijenberghi reimoseri Penther 1913:247–248 (synonymized by Ojanguren Affilastro in press a). (Holotype juvenile female, Mendoza, Argentina (NMW), not examined).

Brachistosternus intermedius borellii Kraepelin 1911:86 (synonymized by Ojanguren Affilastro in press a). (Holotype female, Cacheuta, Mendoza, Argentina (MIZT), not examined).

Remarks.—*Brachistosternus borellii* Kraepelin 1911 and *B. weijenberghii reimoseri* Penther 1913 are junior synonyms of *B. weyenberghii* (Thorell 1876) (Ojanguren Affilastro in press a), which occurs between 900 and 2900 m a.s.l., in the center and northwestern areas of Argentina (Ojanguren Affilastro in press a) (Fig. 28). This species demonstrates clinal variation of the length of the distal lam-



Figures 8–14.—8–10. *Brachistosternus paulae* new species: 8. Left pedipalp chela, female, prolateral aspect; 9. Left pedipalp chela and patella, male, ventral aspect; 10. Telson, male, lateral aspect; 11. *Brachistosternus* (*L.*) *weyenberghii*, telson, male, lateral aspect; 12. *Brachistosternus* (*L.*) *intermedius*, left hemispermatophore, detail of the lobe region; 13. *Brachistosternus* (*L.*) *pentheri*, telotarsus IV, lateral aspect; 14. *Brachistosternus* (*L.*) *multidentatus*, telotarsus IV, lateral aspect. Scale bars = 1 mm.

ina of the hemispermatophore, with the one in the northern populations being longer than the one in southern populations.

Roig Alsina & Maury (1984) reviewed *B. borellii* and observed and described for the first time, a kidney shaped gland on the dorsal face of the telson. This gland does not correspond to the androvestigia described by Cecalovic (1973). Recently this kidney shaped gland was found in other species of the genus (Ojanguren Affilastro 2001).

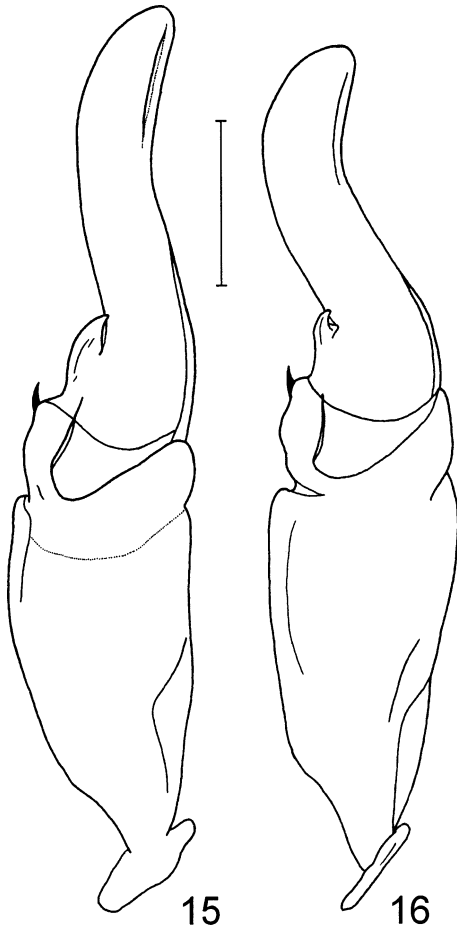
This species has never been collected again in its type locality in Cordoba Province (Acosta & Rosso de Ferradás 1996). It was found in sympatry with *Bothriurus burmeisteri*, *B. olaen* and *Brachistosternus zambrunoi* Ojanguren Affilastro 2002. An isolated population of this species from southern La Rioja is also

in sympatry with *Zabius fuscus*, *Timogenes elegans*, *T. dorbignyi*, *Bothriurus cordubensis* Acosta 1995, *Tityus confluens*, *Brachistosternus pentheri* and *B. ferrugineus* (Mattoni & Acosta 1997).

In this work the specific epithet *weyenberghii* is used following Fet, Sissom, Lowe & Braunwalder (2000), but the actual spelling of the surname of the scientist in honor of whom this species was named was Weijenbergh, not Weyenbergh (Dr. A. O. Bachmann pers. comm.).

Brachistosternus (*Leptosternus*) *zambrunoi*
Ojanguren Affilastro 2002

Brachistosternus (*Leptosternus*) *zambrunoi* Ojanguren Affilastro 2002:33–38, figs. 1–8, 15–19, tab. I. (Holotype male: El Arenal, Catamarca Province, Argentina (MACN-Ar 10206)).



Figures 15–16.—15. *Brachistosternus* (L.) *zambranoi*, left hemispermatophore, dorsal aspect. 16. *Brachistosternus* (L.) *intermedius*, left hemispermatophore, dorsal aspect. Scale bar = 1 mm.

Remarks.—This is a psammophilic species that occurs in a small area in northern Catamarca and southern Salta, between 1500 and 2000 m a.s.l. (Fig. 29). It was found in sympatry with *Brachistosternus weyenberghii*, *Bothriurus olaen* and *Timogenes elegans* (Ojanguren Affilastro 2002).

Brachistosternus (*Ministernus*) *ferrugineus*
(Thorell 1876)

Telogonus ferrugineus Thorell 1876:176, 177. (Holotype female, “Cordova”, Argentina (NRS), not examined).

Brachistosternus andinus reichlini Schenkel 1949: 197–201, figs. 4a, 4c (synonymized by Maury, 1974:75). (Holotype female: Rio “Saludo”, Chaco Province, Argentina (NMB), not examined).

Remarks.—This species was reviewed by Maury (1974). It was collected from central Argentina to southern Paraguay (Fig. 28); from the sea level up to 1000 m a.s.l. (Mattoni & Acosta 1997). This is probably the most common *Brachistosternus* of the “Chaqueña” Phytogeographic Province, but it also occurs at the “Monte” and “Espinal” Phytogeographic Provinces (Maury 1974). It was found in sympatry with *Bothriurus burmeisteri*, *B. prospicius*, *B. cordubensis*, *B. chacoensis*, *Zabius birabeni*, *Z. fuscus*, *Timogenes elegans*, *T. dorbignyi*, *Vachonia* sp., *Brachistosternus pentheri*, *B. weyenberghii*, *Tityus trivittatus* and *T. confluens* (Acosta 1995).

Brachistosternus holmbergi
Carbonell 1923

Brachistosternus holmbergi
Carbonell 1923:358, 359, fig. (Holotype male, Jujuy Province, Argentina (depository unknown)).

Remarks.—*Brachistosternus holmbergi* (whose type is lost) is considered a probable synonym of *B. (B.) ehrenbergii*. Although there are no specimens to confirm its presence in this country, this species occurs in Bolivia and Chile, and this is the only *Brachistosternus* of the region that matches the description of *B. holmbergi* (Maury 1973).

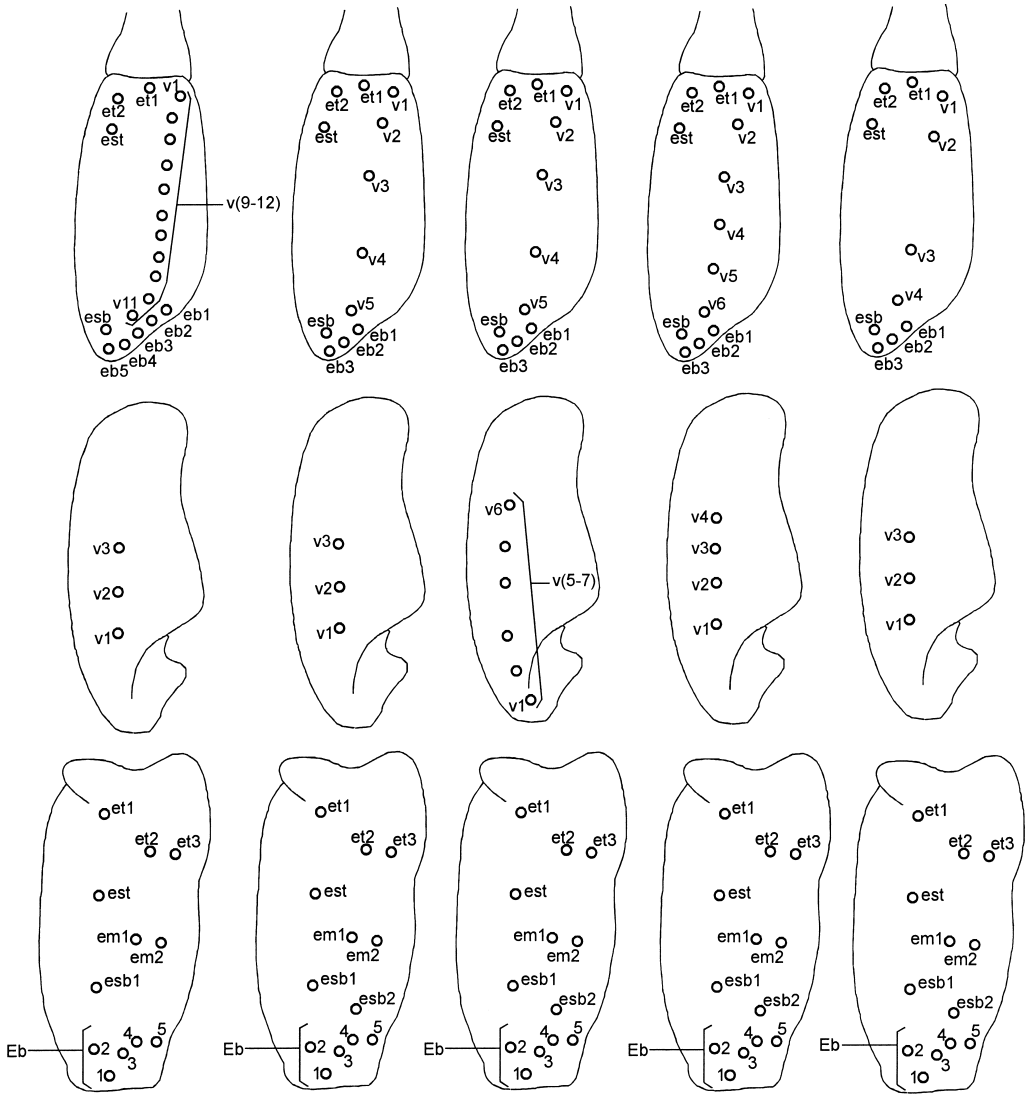
Brachistosternus telteca Ojanguren
Affilastro 2000

Brachistosternus telteca Ojanguren Affilastro 2000: 157–160, figs. 1–8, tab. I. (Holotype male, Reserva Telteca, Mendoza Province, Argentina (MACN-Ar 9931)).

Remarks.—This is a very rare psammophilic species that occurs in a small area in northern Mendoza Province (Ojanguren Affilastro 2000) (Fig. 28). It was found in sympatry with *Brachistosternus pentheri*, *Bothriurus burmeisteri* and *Timogenes elegans*. *Brachistosternus telteca* can not be included in any of the known subgenera because of its particular trichobothrial pattern (Fig. 20).

Brachistosternus paulae new species
(Figs. 1–10, 21, 29)

Type data.—Holotype male, Punta Peligro (46°44’S, 67°53’W), Santa Cruz Province, Argentina, 5 February 1978, Maury coll. (MACN-Ar 10082). Paratypes: ARGENTINA: Santa Cruz Province: 28 females, 24 males, 9 juveniles, Punta Peligro, 5 February



17. *B. (Ministernus)* 18. *B. (Leptosternus)* 19. *B. (Brachistosternus)* 20. *B. telteca* 21. *B. paulae*

Figures 17–21.—Trichobothrial pattern of genus *Brachistosternus*: chela, ventral aspect, patella ventral aspect and patella dorsal aspect; 17. subgenus *Ministernus*; 18. subgenus *Leptosternus*; 19. subgenus *Brachistosternus*; 20. *B. telteca*; 21. *B. paulae*.

1978, Maury coll. (MACN-Ar 10083); 9 females, 2 males, 4 juveniles, 11 January 1978, Maury coll. (MACN-Ar 10084); 8 females, 2 males, 21 January 1977, Maury coll. (MACN-Ar 10085).

Other specimens examined.—ARGENTINA: *Santa Cruz Province*: 1 ♀, 1 ♂, 1 juvenile, Lago Ghio (47°26'S, 70°56'W), 16 January 1978, Maury coll. (MACN-Ar 10086); 1 juvenile, Las Heras (46°32'S, 68°57'W), 18

January 1978, Maury coll. (MACN-Ar 10087).

Etymology.—This species is named after Paula Korob for her help in the field work

Diagnosis.—*Brachistosternus paulae* can be distinguished from the remaining species of the genus by having only 4 ventral trichobothria on the pedipalp chela. Its closest relative is *Brachistosternus (Leptosternus) alienus* Lönnberg 1898. Both species can be

distinguished, besides the trichobothrial pattern, by the different shape of their hemispermatophores. In *B. paulae* the cylindrical apophysis is poorly developed and shorter than the laminar apophysis (Fig. 5); it also lacks all spines, except for the row of spines that may be present in some specimens but in a vestigial form. In *B. alienus* the cylindrical apophysis is longer than the laminar apophysis; the row of spines and the basal spines are always well developed (Fig. 23). *Brachistoternus paulae* has three rows of ventral setae in the fifth metasomal segment, the usual disposition being 4-2-2 (Fig. 1), whereas in *B. alienus* the usual disposition is 4-2, although fewer than 10% of the specimens have an additional row of setae.

Description.—*Color:* General color light yellow with a dusky pattern. Prosoma with a dark stripe from the lateral eyes to the postocular furrow; anterior edge with black spots; ocular tubercle black; anterior and posterior longitudinal sulcus with an underlying dark stripe. *Pedipalps:* femur with a black spot at the articulation with the patella. Tergites I to IV with a light dark reticulation; V with two posterolateral dark spots. Metasomal segments I to III dorsally with two posterolateral dark spots; I to IV with a narrow stripe; segments I to IV ventrally with two lateroventral stripes; V with two lateroventral stripes and a median stripe that does not converge with the lateroventral stripes in the posterior margin of the segment. Some specimens are almost completely yellow, without the dusky pattern.

Morphology: Measurements of male holotype and a female paratype (MACN-Ar 10083) in Table 1. *Prosoma:* Chelicerae with two subdistal teeth; anterior edge with a slight median bulge and six setae, two on each side and two in the middle; tegument with coarse granules near the anterior margin, the rest finely granular; anterior and posterior longitudinal sulcus, lateral sulcus and postocular furrow deeply marked; ocular tubercle slightly anterior of the middle of the carapace with a slight interocular sulcus, eyes one diameter apart with a seta behind each eye. *Mesosoma:* tergites I to VI smooth near the anterior edge, the rest densely granular; VII smooth in the middle, the rest densely granular. *Metasoma:* segment I: ventral surface with scattered granulation and three pairs of ventral setae, lateral surface with scattered granulation, dorsally

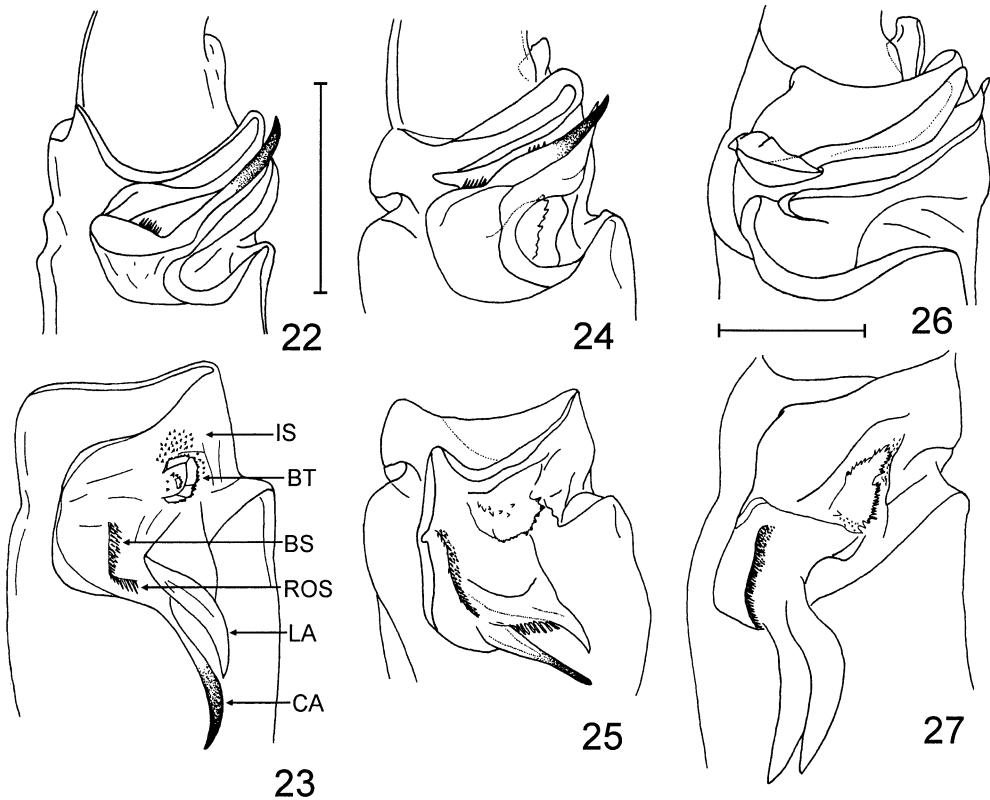
smooth, dorsosubmedian, dorsolateral and median lateral carinae extend the entire length of the segment and converge distally; segments II and III similar to segment I but less granular, with less well developed carinae and with four pairs of ventral setae; segment IV: dorsally smooth, lateral surfaces with sparse granulation, ventrally smooth with a large number of scattered setae; segment V ventral surface densely granular, ventromedian and ventrolateral carinae extend the entire length of the segment (Fig. 1); dorsal and ventral surfaces finely granular or smooth; ventral setae usually comprising 3 rows: 1 basal row of 3–5 setae, 1 median row of 1 or 2 setae, and 1 posterior row of 1 or 2 setae, in some specimens there is an additional row of 1 or 2 setae; in males the androvestigia (Cekalovic 1973) occupy almost 2/3 of the dorsal face (Fig. 2). Telson sparsely granular; vesicle with rounded ventral surface; aculeus slightly curved, of the same length as the vesicle (Fig. 10); kidney shaped gland of the dorsal surface (Roig Alsina & Maury 1981) absent.

Pedipalps: trichobothrial pattern, orthobothriotaxic type C: femur with 3 trichobothria: 1 d, 1 i and 1 e; patella with 3 v trichobothria and 13 trichobothria on its external face: 3 et, 1 est, 2 em, 2 esb and 5 eb; chela with 11 trichobothria on its prolateral face: 1 est, 2 et, 4 v, 1 esb and 3 eb; no intraespecific variation has been observed in this character (Fig. 21). Femur and patella without carinae, with scattered granulation on its anterior margin; chela stout with relatively short fingers (Figs. 6–9), smooth tegument, with a ventroexternal carina; in males the prolateral apophysis is well developed; movable finger with a central row of granules and 6 or 7 internal and external granules. *Legs:* finely granular; telotarsi I and II with the inner unguis 10 to 15 percent longer than the external. *Hemispermatophore* (Figs. 3–5): narrow distal lamina, shorter than the basal portion, with the external margin undulated; cylindrical apophysis poorly developed, shorter than the laminar apophysis; basal triangle well developed; row of spines generally absent, or if present, vestigial; internal spines and basal spines absent.

Variation.—Total length in males, 33–45 mm ($n = 30$; mean = 40.32), 34–45 mm in females ($n = 30$; mean = 42.15). Pectines with 19–27 pectinal teeth in females ($n = 30$;

Table 1.—*Brachistosternus paulae* n. sp.: measurements (mm), number of pectinal teeth and telotarsal setae of the male holotype (MACN-Ar 10082) and a female paratype (MACN-Ar 10083).

	Male holotype	Female paratype
Total length	42.50	41.00
Prosoma, length	4.00	4.50
Prosoma, anterior width	2.77	3.23
Prosoma, posterior width	4.24	4.85
Mesosoma, total length	18.00	17.30
Metasoma, total length	20.50	21.20
Metasomal segment I, length	2.50	2.83
Metasomal segment I, width	2.61	2.70
Metasomal segment I, height	2.00	2.18
Metasomal segment II, length	2.80	2.90
Metasomal segment II, width	2.30	2.30
Metasomal segment II, height	2.00	2.20
Metasomal segment III, length	3.00	2.90
Metasomal segment III, width	2.10	2.20
Metasomal segment III, height	2.00	2.00
Metasomal segment IV, length	3.90	3.70
Metasomal segment IV, width	2.00	2.10
Metasomal segment IV, height	1.80	1.80
Metasomal segment V, length	4.00	4.36
Metasomal segment V, width	2.00	2.02
Metasomal segment V, height	1.63	1.62
Telson, length	4.30	4.50
Vesicle, length	2.60	2.42
Vesicle, width	1.50	1.62
Vesicle, height	1.50	1.86
Aculeus, length	1.70	2.10
Pedipalp, total length	10.45	10.53
Femur, length	2.70	2.83
Femur, width	2.70	1.00
Patella, length	2.75	2.70
Patella, width	1.10	1.37
Chela, length	5.00	5.00
Chela, width	1.30	1.45
Chela, height	1.45	1.70
Movable finger, length	3.00	2.75
Number of pectinal teeth	27–27	24–24
Telotarsus I, ventrointernal setae	4	5
Telotarsus I, ventroexternal setae	4	4
Telotarsus I, dorsal setae	8	7
Telotarsus II, ventrointernal setae	6	5
Telotarsus II, ventroexternal setae	4	4
Telotarsus II, dorsal setae	11	10
Telotarsus III, ventrointernal setae	8	8
Telotarsus III, ventroexternal setae	8	9
Telotarsus III, dorsal setae	12	11
Telotarsus IV, ventrointernal setae	6	7
Telotarsus IV, ventroexternal setae	4	5
Telotarsus IV, dorsal setae	4	4



Figures 22–27.—Hemispermatophores of genus *Brachistosternus*; detail of the lobe region, top: closed aspect, bottom: open aspect. 22–23. *Brachistosternus* (*Leptosternus*) *alienus*, abbreviations: IS: internal spines; BT: basal triangle; BS: basal spines; ROS: row of spines; LA: laminar apophysis; CA: cylindrical apophysis. 24–25. *Brachistosternus* (*Ministernus*) *ferrugineus*; 26–27. *Brachistosternus* (*Brachistosternus*) *ehrenbergii*. Scale bars = 1 mm.

median = 23) and 22–29 in males ($n = 30$; median = 27). Length/height ratio of the pedipalp chela 3.05–3.41 in males ($n = 30$; mean = 3.29) and 2.90–3.25 in females ($n = 30$; mean = 3.14). Telotarsus I with 4 or 5 ventrointernal setae ($n = 40$; median = 5), 4 or 5 ventroexternal setae ($n = 40$; median = 5) and 7–9 dorsal setae ($n = 40$; median = 8). Telotarsus II with 5–7 ventrointernal setae ($n = 40$; median = 7), 4 or 5 ventroexternal setae ($n = 40$; median = 4) and 10–12 dorsal setae ($n = 40$; median = 12). Telotarsus III with 7–9 ventrointernal setae ($n = 40$; median = 8), 8 or 9 ventroexternal setae ($n = 40$; median = 8) and 10–13 dorsal setae ($n = 40$; median = 12). Telotarsus IV with 5–7 ventrointernal setae ($n = 40$; median = 7), 4–6 ventroexternal setae ($n = 40$; median = 4) and 4–6 dorsal setae ($n = 40$; median = 6). Fourth metasomal segment with 48–57 ventral setae ($n = 20$;

median = 53). Fifth metasomal segment with 8–13 ventrolateral setae ($n = 30$; median = 10), and 6–11 lateral setae ($n = 30$; median = 8).

Additional comments.—The hemispermatophore of *B. paulae* is the least developed of the genus. However a Chilean species (still unnamed) also presents such a scarce development of the internal structures, but a much longer distal lamina.

The number of pectinal teeth of *B. paulae* is similar in males and females, which is uncommon in genus *Brachistosternus* (Roig Alsina & Maury 1981; Ojanguren Affilastro 2000).

Although the morphology of *B. paulae* resembles the subgenus *Leptosternus*, its particular trichobothrial pattern does not allow for its inclusion in any of the known subgenera. The same situation occurs with *B. telteca*

(Ojanguren Affilastro 2000). The subgeneric division created by Maury (1973) is based on few characters and should be revised.

Distribution.—*Brachistosternus paulae* is endemic to Argentina in the north and center of Santa Cruz Province (Fig. 29). This area belongs to the “Patagonia” Phytogeographic Province, and to the “Monte” and “Patagonica” Scorpiological Areas.

HEMISPERMATOPHORES OF GENUS
BRACHISTOSTERNUS

Only the internal structures are compared, because the distal lamina and the basal portion are similar in the rest of the family.

The hemispermatophore of the subgenus *Leptosternus* Maury 1973 (Figs. 12, 15, 16, 22 & 23) has a basal triangle formed by two or more sclerified crests, that may be more or less developed depending on the species; the internal spines are beside the basal triangle, and they are always absent in *B. intermedius*, *B. zambrunoi* and *B. montanus*; and in some specimens of *B. alienus* (Ojanguren Affilastro 2001); the cylindrical apophysis is tubular shaped; the row of spines is a continuation of the basal spines, forming the same structure.

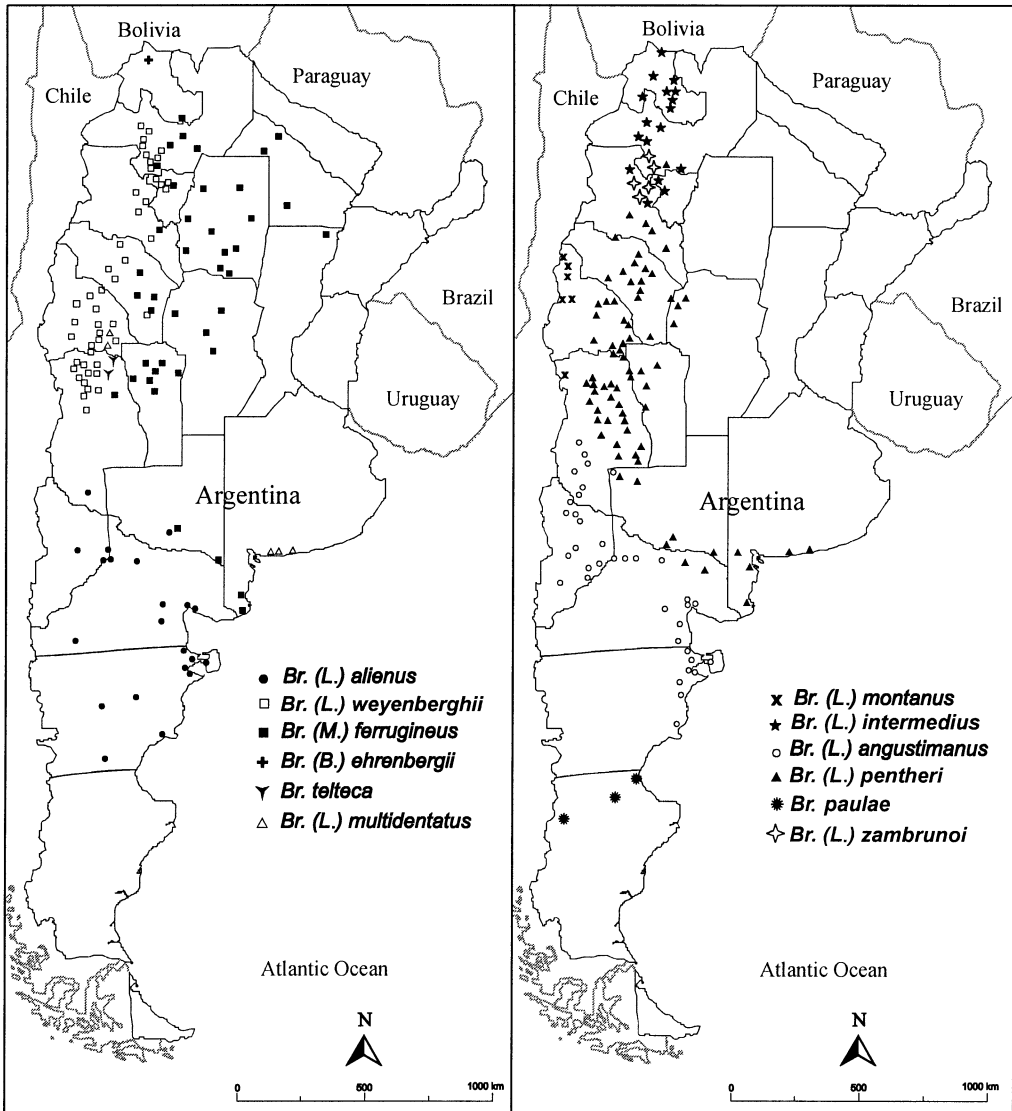
The hemispermatophore of the subgenus *Brachistosternus* Pocock 1893 (Figs. 26 & 27) is similar to that of subgenus *Leptosternus* but its cylindrical apophysis is dorsoventrally flattened and is quite similar to the laminar apophysis; the basal triangle is well developed and has an elongated characteristic shape; the internal spines are reduced to small granules; the row of spines is a continuation of the basal spines as in subgenus *Leptosternus*.

The hemispermatophore of the subgenus *Ministernus* Francke 1985 (Figs. 24 & 25) has some peculiarities, the internal spines are absent; the row of spines is separated from the basal spines by the cylindrical apophysis. The basal triangle is similar to that of subgenus *Leptosternus* in *B. (Ministernus) ferrugineus*, but in *B. (Ministernus) andinus* Chamberlin 1916 from Peru, the basal triangle is a small tubercle covered by small spines (Maury 1978b).

Brachistosternus telteca and *B. paulae* have hemispermatophores similar to that of subgenus *Leptosternus*. *Brachistosternus telteca* lacks the internal spines and its basal triangle is poorly developed (Ojanguren Affilastro 2000).

KEY TO THE ARGENTINIAN SPECIES OF *BRACHISTOSTERNUS*

1. Pedipalp chela with 9–12 v trichobothria and 5 eb, patella with 3 v trichobothria and 1 esb (Fig. 17) *Brachistosternus (Ministernus) ferrugineus* (Thorell 1876)
- Pedipalp chela with 4–6 v trichobothria and 3 eb, patella with 3–7 v trichobothria and 2 esb 2
2. Pedipalp chela with 6 v trichobothria; patella with 4 v trichobothria (Fig. 20)
..... *Brachistosternus telteca* Ojanguren Affilastro 2000
- Pedipalp chela with 4 or 5 v trichobothria; patella with 3 or 5–7 v trichobothria 3
3. Pedipalp patella with 5–7 v trichobothria (Fig. 19)
..... *Brachistosternus (Brachistosternus) ehrenbergii* (Gervais 1841)
- Pedipalp patella with 3 v trichobothria 4
4. Pedipalp chela with 4 v trichobothria (Fig. 21) *Brachistosternus paulae* new species
- Pedipalp chela with 5 v trichobothria (Fig. 18) *Brachistosternus (Leptosternus)* 5
5. Telson with 4 better developed granules on the ventral face of the vesicle, 2 near the aculeus and 2 in the median part (Fig. 11)
..... *Brachistosternus (Leptosternus) weyenberghii* (Thorell 1876)
- Telson without 4 better developed granules on the ventral face of the vesicle (Fig. 10) 6
6. Distal projection of telotarsus IV highly developed (Fig. 14)
..... *Brachistosternus (Leptosternus) multidentatus* Maury 1984
- Distal projection of telotarsus IV not highly developed (Fig. 13) 7
7. Basal triangle of the hemispermatophore well developed, internal spines usually present (Fig. 23) 8
- Basal triangle of the hemispermatophore poorly developed, internal spines always absent (Fig. 12) 9
8. Scorpions from small to medium size, males from 34–43 mm, females from 36–41 mm,



28

29

Figures 28 & 29.—Maps with the distribution of the Argentinian species of the genus *Brachistosternus*.

- internal spines usually present but in some cases, absent *Brachistosternus (Leptosternus) alienus* Lönnberg 1898
- Scorpions from medium to large, males from 46–85 mm, females from 60–91 mm; internal spines always present 10
- 9. Distal lamina straight and longer than the basal portion of the hemispermatophore (Fig. 15) *Brachistosternus (Leptosternus) zambrunoi* Ojanguren Affilastro 2002
- Distal lamina curved and shorter than the basal portion of the hemispermatophore (Fig. 16) 11
- 10. Pedipalp chela length/height ratio from 2.91–3.43 in males, and from 2.80–3.20 in females; ventral setae of the fifth metasomal segment usually comprising 2 rows of 2 setae each *Brachistosternus (Leptosternus) pentheri* Mello Leitão 1931

- Pedipalp chela length/height ratio from 3.47–4.14 in males, and from 3.40–3.63 in females; ventral setae of the fifth metasomal segment comprising 2–5 rows, the first one of 4 setae and the rest of 2 setae each
- *Brachistosternus (Leptosternus) angustimanus* Ojanguren Affilastro & Roig Alsina 2001
11. Pedipalp chela length/height ratio from 2.60–3.00 in males and from 2.62–2.90 in females; ventral setae of the fifth metasomal segment usually comprising 3 rows
- *Brachistosternus (Leptosternus) intermedius* Lönnberg 1902
- Pedipalp chela length/height ratio from 3.14–3.48 in males and from 3.06–3.23 in females; ventral setae of the fifth metasomal segment usually comprising 4 or more rows
- *Brachistosternus (Leptosternus) montanus* Roig Alsina 1977

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