Bonner zoologische Beiträge	Band 53 (2004)	Heft 1/2	Seiten 99–107	Bonn, Juni 2005

Leptopholcus (Araneae: Pholcidae) in Continental America: Rare Relicts in Low Precipitation Areas[1]

Bernhard A. HUBER[2)], Abel PÉREZ G.[3)] & Renner L. C. BAPTISTA[3)]
[2)] Zoological Research Institute and Museum Alexander Koenig, Bonn, Germany
[3)] Museu Nacional, Universidade do Brasil, Rio de Janeiro, Brazil

Abstract. The genus *Leptopholcus* has a circumtropical distribution, but the only New World records previously known were for the Greater Antilles. On these islands, *Leptopholcus* is quite common, probably due to the absence of *Metagonia* from the Antilles. On the other hand, *Leptopholcus* was previously thought to be absent from the mainland where *Metagonia* is ubiquitous and species-rich, occupying the preferred habitat of *Leptopholcus* (the underside of leaves). The present paper describes three new species of *Leptopholcus* from South America: *L. brazlandia* from Distrito Federal, Brazil, *L. pataxo* from Bahia, Brazil, and *L. evaluna* from Sucre, Venezuela. All these species were collected in low numbers at low precipitation areas, and no further specimens could be found in large collections of South American pholcids, indicating a relict status of the genus in South America. The known distribution of the genus is documented, and taxonomic problems regarding its relationship with *Pholcus* and other genera are briefly discussed.

Key words. New species, taxonomy, relict, South America, competitive exclusion, *Metagonia*

1. INTRODUCTION

Representatives of *Leptopholcus* Simon, 1893 are relatively rare in collections, which is probably mainly due to their cryptic habits. Almost all known species live on the underside of leaves (PETRUNKEVITCH 1929; BRIGNOLI 1980; IRIE 1999), where they spend most of the day pressed against the surface (HUBER & PEREZ 1998). Their greenish coloration when alive and their extremely thin legs make them highly cryptic, both for predators and collectors.

SIMON (1893) created the group Leptopholceae to include pholcids with a flattened prosoma lacking depressions and sutures, and with a sternum that is longer than wide. Two genera were included: *Leptopholcus* (eight eyes) and *Micromerys* Bradley, 1877 (six eyes). Even though SIMON noted the similarities in the male genitalia between *Pholcus* Walckenaer, 1805 and *Leptopholcus*, he put *Pholcus* in a different group, the Pholceae. BRIGNOLI (1980) and DEELEMAN-REINHOLD (1986) suggested that the female external genitalia provide further means to separate *Pholcus* from *Leptopholcus*: they are covered by a chitinous plate in *Pholcus*, by unsclerotized cuticle in *Leptopholcus*. In this regard, *Leptopholcus* is similar to *Micromerys*, *Micropholcus* Deeleman-Reinhold & Prinsen, 1987 and *Calapnita* Simon, 1892. Substantial homoplasy is obviously present, and neither the relationships among genera nor the monophyly of the genera involved has ever been tested by cladistic analysis or supported by convincing arguments. Even worse, neither *Pholcus* nor *Leptopholcus* have ever been revised, and together they include some 120 nominal species. Pending a large scale revision, we consider BRIGNOLI'S (1980) statement still valid: "il conviendrait de se montrer prudent avant de réunir les deux groupes".

Considering this taxonomic situation, the assignment of the species below to *Leptopholcus* needs justification. First, we chose to follow the traditional, non-phylogenetic concept of the genus, i.e. pale pholcids with long abdomen, long and thin legs, rather flat carapace, widely spaced lateral eye triads, unsclerotized external female genitalia, and without the synapomorphies or distinctive characters of similar genera (*Panjange* Deeleman-Reinhold & Deeleman, 1983 and *Calapnita*, see DEELEMAN-REINHOLD & DEELEMAN 1986; *Micromerys*, see HUBER 2001; *Pehrforsskalia* Deeleman-Reinhold & van Harten, 2001, see DEELEMAN-REINHOLD & VAN HARTEN 2001; *Micropholcus*, see DEELEMAN-REINHOLD & PRINSEN 1987). Second, the main point of this paper is barely affected by these taxonomic problems. Neither *Pholcus* nor *Leptopholcus* (nor any of the other genera mentioned) have previously been recorded from South America [except for the synanthropic *P. phalangioides* (Fuesslin, 1775) and some taxa that were misplaced and have been transferred to New World genera; see HUBER 2000]. The only previously known autochthonous representatives of the *Pholcus*-group sensu HUBER (1995) in the New World are some *Leptopholcus* species on the Antilles and some *Pholcus* species in the eastern United States (HUBER 2000). Third, the new species seem related to the species on the Antilles (both groups have modified hairs on the tips of the male palpal trochanter apophyses), and these are presently considered as *Leptopholcus*.

1 In commemoration of Clas Michael Naumann zu Königsbrück (26.06.1939 – 15.02.2004)

According to the concept above, *Leptopholcus* has a circumtropical distribution, with all known records between 29ºS and 26ºN. Figure 1 shows all published records (circles) as well as unpublished records (squares) of material deposited in various institutions.

DEELEMAN-REINHOLD & VAN HARTEN (2001) suggested that *Leptopholcus dioscoridis* Deeleman-Reinhold & van Harten, 2001 on Socotra Island might represent a relict. Pholcids in general, and *Leptopholcus* in particular (PETRUNKEVITCH 1929; MILLOT 1946), seem to prefer humid habitats, but Socotra has a mean annual precipitation of no more than about 170-190 mm (DEELEMAN & VAN HARTEN 2001). The three species described below might also be relicts for two reasons: first, all were collected in low precipitation areas: *L. evaluna* along a river in an area of xeric shrublands near the northern coast of Venezuela, *L. brazlandia* in 'cerrado' (i.e., tropical grasslands, savannas and shrublands), and *L. pataxo* in a transitional zone between 'cerrado' and mixed palm-sand vegetation. Second, the preferred microhabitat of *Leptopholcus* (underside of leaves) is in the New World occupied by the very species-rich genus *Metagonia* Simon, 1893. Intriguingly, *Metagonia* is absent from the Antilles (except one cavernicole species: PÉREZ & HUBER 1999), and it is only on the Antilles that *Leptopholcus* is fairly common and species-rich (HUBER 2000; see also Fig. 1).

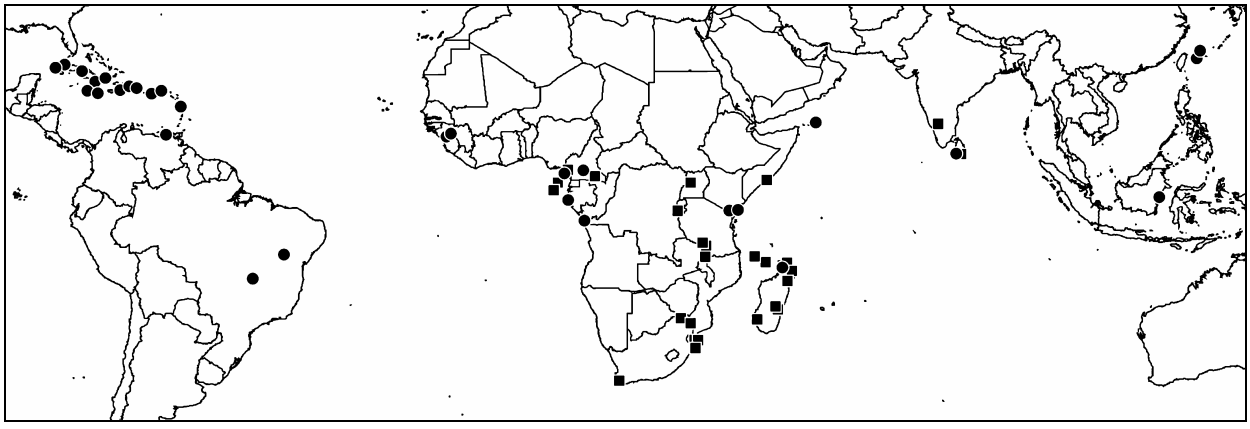


Fig. 1: Known distribution of *Leptopholcus*. Circles represent published records, squares represent unpublished material from the following institutions: National Museum of Natural History, Washington, D.C.; Zoological Research Institute and Museum Alexander Koenig, Bonn; collection Suresh Benjamin; National Museum, Bloemfontein; National Collection, Pretoria; California Academy of Sciences, San Francisco; Musée royal de l'Afrique Centrale, Tervuren.

2. TAXONOMY

Style of descriptions is as in HUBER (2000). Measurements are in mm unless indicated otherwise. Material is deposited in the Museu Nacional, Rio de Janeiro (MNRJ) and in the Museo de Historia Natural de la Fundación La Salle, Caracas (MFLS).

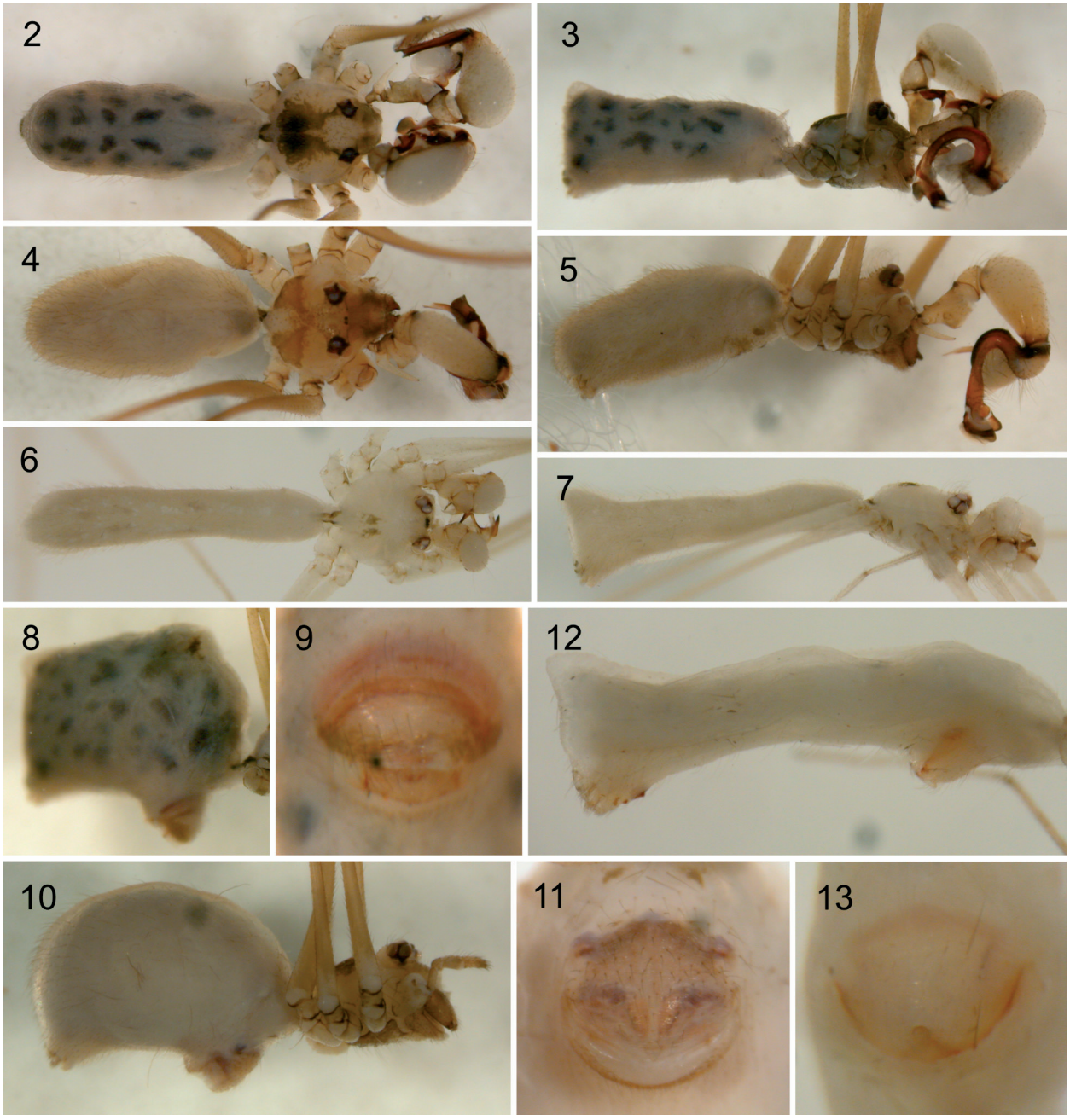
2.1. *Leptopholcus brazlandia* Huber, Pérez & Baptista, new species (Figures 2, 3, 8, 9, 14-18)

Types. Male holotype and two female paratypes from Brazlândia (15º41'S, 48º12'W), Nucleo Rural, Chacara 33, Distrito Federal, Brazil; Dec. 19, 2003 (A. Chagas, B. Segal), in MNRJ (04149-50).

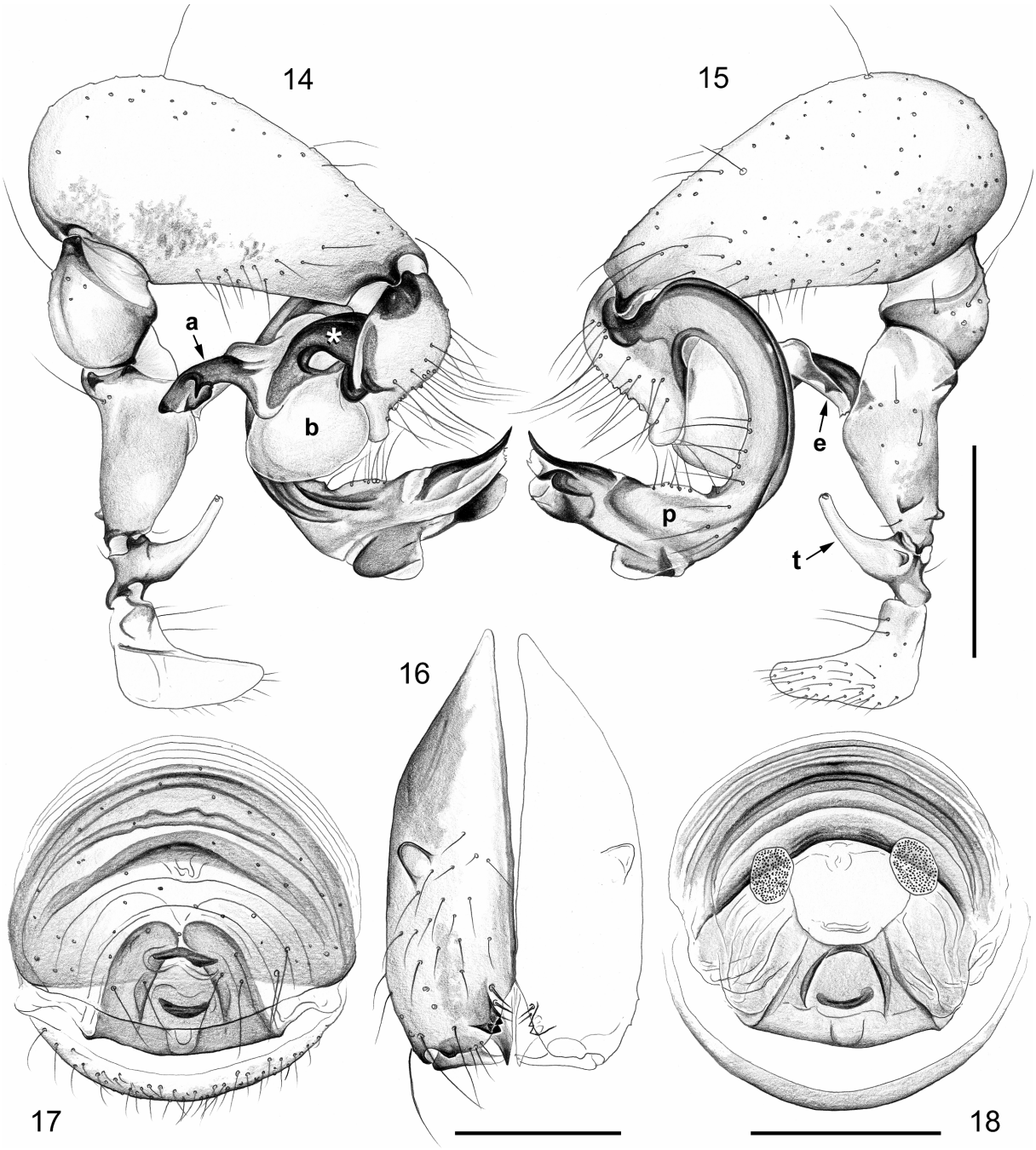
Etymology. The species name is a noun in apposition, taken from the type locality.

Diagnosis. Easily distinguished from other New World species by the spotted abdomen (Figs. 2, 3); also by the shapes of procursus, bulbal apophyses, and the internal female genital sclerites (Figs. 14, 15, 17, 18).

Male (holotype). Total length 2.8 (3.0 with clypeus), carapace width 0.97. Leg 1 missing, tibia 2: 3.8, tibia 3: 2.3, tibia 4 missing. Habitus as in Figures 2 and 3. Prosoma ochre-grey with blackish mark dorsally, clypeus barely darkened, posterior half of sternum darker, with light spots near coxae 3 and 4; legs ochre-yellow, patellae and tibia-metatarsus joints blackish; abdomen ochre-grey with many dark marks except ventrally. Ocular area slightly elevated (Fig. 3), apparently with brush of hairs between triads (most hairs missing), thoracic furrow absent; distance PME-PME 285 µm; diameter PME 90 µm; distance PME-ALE 20 µm; AME totally absent. Clypeus unmodified. Sternum wider than long (0.6/0.5), unmodified. Chelicerae as in Fig. 16, with distal apophyses carrying two modified hairs each, with some macrosetae on each side near the apophyses, proximally with slightly sclerotized projections. Palps as in Figures 14 and 15; coxa unmodified, trochanter with unsclerotized retrolateral hump and long retrolatero-ventral apophysis with modified hair distally (small and cone-shaped rather than cylindrical as in fig. 105 in Huber



Figs. 2-13: Habitus and female external genitalia photographs. 2-3. *L. brazlandia*. 4-5. *L. pataxo*. 6-7. *L. evaluna*. 8-9. *L. brazlandia*, female abdomen, lateral view, and external genitalia, ventral view. 10-11. *L. pataxo*, female, lateral view, and external genitalia, ventral view. 12-13. *L. evaluna*, female abdomen, lateral view, and external genitalia, ventral view.



Figs. 14-18: *L. brazlandia*, left male palp in prolateral (14) and retrolateral (15) views, male chelicerae (16), and cleared female genitalia in ventral (17) and dorsal (18) views. **a:** appendix, **b:** bulb, **e:** embolus, **p:** procursus, **t:** trochanter-apophysis, asterisk: proximal sclerotized element of bulb. Scale lines: 0.5 mm (14, 15), 0.2 mm (16), 0.3 mm (17, 18).

2000); femur with indistinct ventral protrusion and two distinct retrolateral apophyses; procursus relatively simple except distally, with capsulate tarsal organ; bulb with proximal sclerotized element, apparently without uncus, with complex appendix(?) and slightly sclerotized embolus. Retrolateral trichobothrium of tibia 2 at 15%; legs apparently without spines, curved hairs, and vertical hairs (most hairs missing); tarsus 2 with about 10 fairly distinct pseudosegments. Abdomen posteriorly pointed dorsally (Fig. 3).

Female (paratype). In general similar to male. Tibia 1 missing in both specimens. Female external genitalia protruding but simple (Figs. 8, 9), consisting of frontal

plate and smaller median plate that carries a small indistinct knob-like structure. Internal genitalia with complex system of distinctive sclerites and folds (Figs. 17, 18).

Distribution. Known only from type locality.

Remarks. The collecting area is located near the borders of the Cupim river, at the northeast of the Federal District. The Cupim river flows down the Chapada da Contagem flanks, forming a series of rapids known locally as Mumunhas. The specimens were collected in gallery forest at the borders of one of the rapids. That spot is much more humid than the xeric 'cerrado' areas around it. The type locality is part of an area preserved by Brazilian Government, the Área de Proteção Ambiental de Cafuringa.

2.2. *Leptopholcus pataxo* Huber, Pérez & Baptista, new species (Figures 4-5, 10-11, 19-23)

Types. Male holotype, seven female paratypes and 2 juveniles from Gentio do Ouro, Toca do Encantado (11º25'S, 42º30'W), Bahia, Brazil; Nov. 10, 2002 (R.L.C. Baptista, A.P.L. Giupponi), in MNRJ (04147-48).

Etymology. The species name honours the Pataxó-Hãhãhãi Indians, formerly one of the largest Indian tribes in Bahia state. Only a few isolated communities remain, mainly due to extermination campaigns to clear land for cacao plantations. The epithet is a noun in apposition.

Diagnosis. Distinguished from other New World species by the shapes of procursus, bulbal apophyses, and the internal female genital sclerites (Figs. 19, 20, 22, 23).

Male (holotype). Total length 3.2 (3.4 with clypeus), carapace width 1.13. Leg 1: 8.7 + 0.5 + 8.3 + 15.3 (tarsus missing), leg 2 missing, tibia 3: 2.9, tibia 4: 4.1; tibia 1 L/d: 85. Habitus as in Figures 4 and 5. Prosoma pale ochre-grey with pair of brown marks dorsally and brown mark on clypeus, sternum light brown except frontally; legs ochre-yellow, patellae and tibia-metatarsus joints brown; abdomen monochromous ochre-grey, ventrally with pair of brown marks in booklung-area. Ocular area slightly elevated (Fig. 5), with brush of hairs between triads, thoracic furrow absent; distance PME-PME 375 µm; diameter PME 105 µm; distance PME-ALE 25 µm; AME-AME 15 µm, AME diameter 20 µm. Clypeus unmodified. Sternum wider than long (0.75/0.55), unmodified. Chelicerae as in Fig. 21, with distal apophyses carrying four modified hairs each, with some macrosetae on each side near the apophyses, proximally with slightly sclerotized projections. Palps as in Figures 19 and 20; coxa unmodified, trochanter with unsclerotized retrolateral hump and long retrolatero-ventral apophysis with characteristic modified hair distally (cf. fig. 105 in Huber 2000); femur with large ventral protrusion and two distinct retrolateral apophyses; procursus relatively simple except distally, with capsulate tarsal organ; bulb with proximal sclerotized element connected to small uncus(?), with complex appendix and slightly sclerotized long embolus (Fig. 19). Retrolateral trichobothrium of tibia 1 at 7%; tibia 1 without prolateral trichobothrium (present in all others); legs without spines, curved hairs, and vertical hairs; tarsus 3 with about 7 fairly distinct pseudosegments. Abdomen posteriorly not pointed dorsally (Fig. 5).

Female (paratype). In general similar to male, but abdomen thicker, clypeus barely darker. Tibia 1 in 4 females: 5.5-6.8. External genitalia protruding but very simple externally (Figs. 10, 11), apparently without knob-like structure. Internal genitalia with complex system of distinctive sclerites and folds (Figs. 22, 23).

Distribution. Known only from type locality.

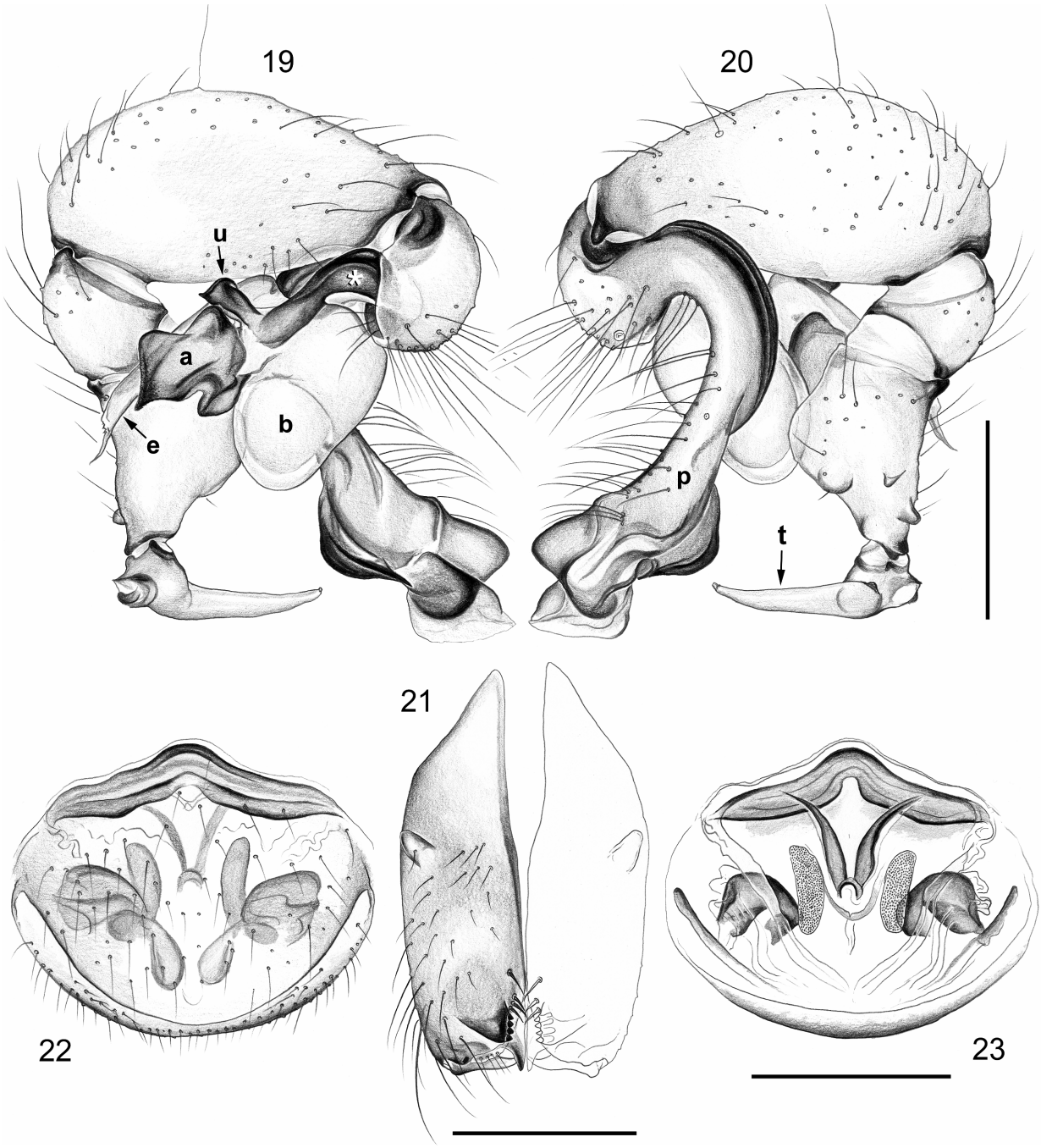
Remarks: The collecting area is located at the border of a small stream, the Encantado river, at less than 15 km from the São Francisco river. It is a small rocky gorge with the stream flowing through it and forming isolated ponds. Most of the area between the São Francisco river and Toca do Encantado is covered by a mixed vegetation of palms, trees and shrubs over a sandy and damp soil. The higher areas after Toca do Encantado are covered by a transitional xeric vegetation of 'cerrado'-'caatinga', over a rocky soil. All the *Leptopholcus* specimens were collected from webs placed against the underside of big boulders at the stream borders. The spiders were closely pressed against the rock, in a manner similar to other species of *Leptopholcus* that live on the underside of leaves. A search for *Leptopholcus* on the underside of leaves was made in the area, but no specimen was found. However, only a few bushes, palms and trees with small leaves cover the stream borders, which would not offer an adequate substrate for *Leptopholcus*.

2.3. *Leptopholcus evaluna* Huber, Pérez & Baptista, new species (Figures 6-7, 12-13, 24-28)

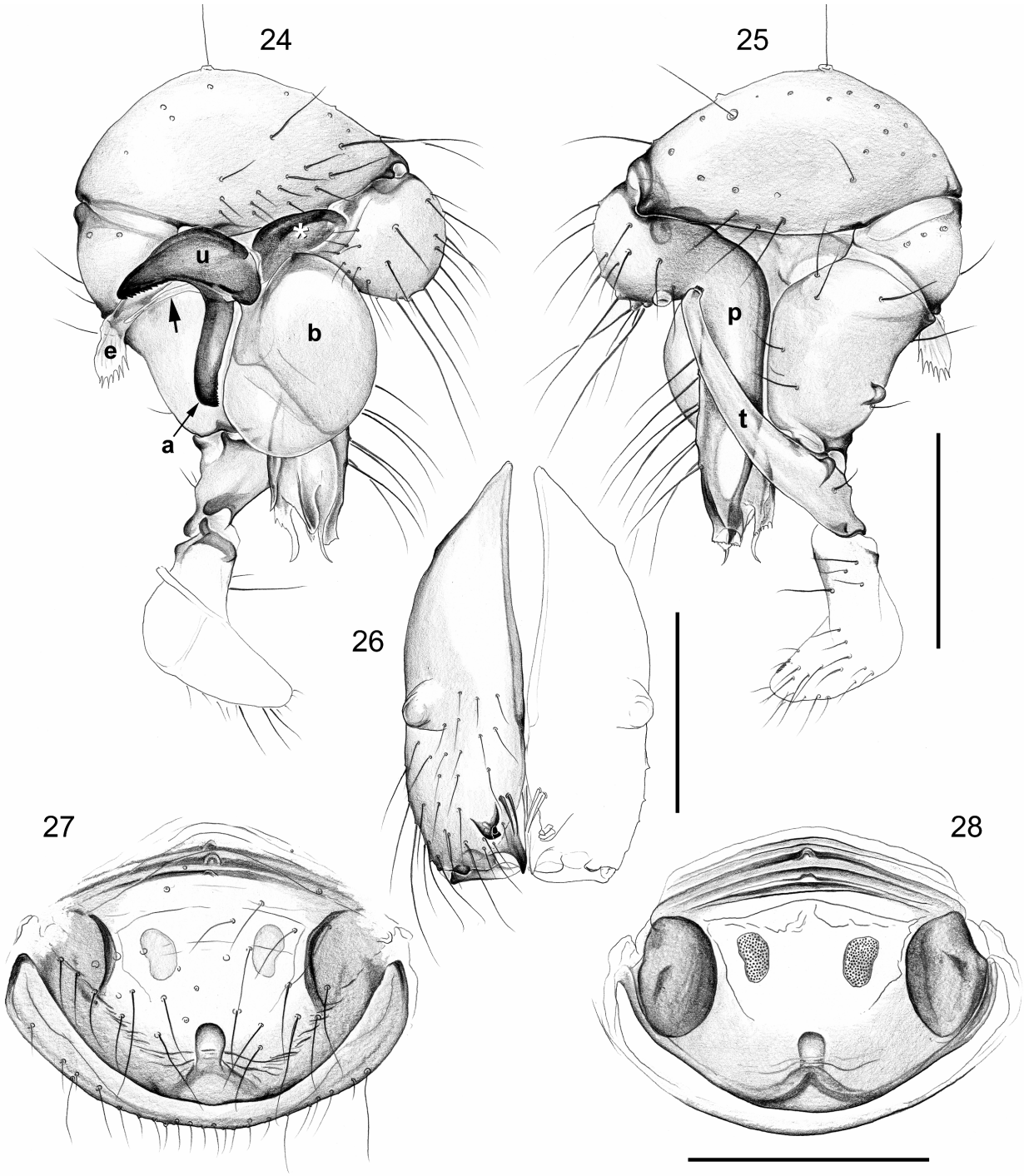
Types. Male holotype and one female paratype from underside of leaves along riverbed, Marigüitar (10º26.5'N, 63º54.5'W), ~30 m a.s.l., Sucre, Venezuela; Nov. 29, 2002 (B. A. Huber), in MFLS.

Etymology. Named for Isabel Allende's Venezuela-born protagonist and fantastic story-teller. The epithet is a noun in apposition.

Diagnosis. Distinguished from other New World species by the very long male palpal trochanter apophysis, and by the shapes of procursus, bulbal apophyses, and internal female genital sclerites (Figs. 24, 25, 27, 28).



Figs. 19-23: *L. pataxo*, left male palp in prolateral (19) and retrolateral (20) views, male chelicerae (21), and cleared female genitalia in ventral (22) and dorsal (23) views. **a:** appendix, **b:** bulb, **e:** embolus, **p:** procursus, **t:** trochanter-apophysis, **u:** uncus, asterisk: proximal sclerotized element of bulb. Scale lines: 0.5 mm (19, 20, 22, 23), 0.3 mm (21).



Figs. 24-28: *L. evaluna*, left male palp in prolateral (24) and retrolateral (25) views, male chelicerae (26), and cleared female genitalia in ventral (27) and dorsal (28) views. **a:** appendix, **b:** bulb, **e:** embolus, **p:** procursus, **t:** trochanter-apophysis, **u:** uncus, asterisk: proximal sclerotized element of bulb, arrow points to transparent projection of bulb. Scale lines: 0.3 mm (24, 25, 27, 28), 0.2 mm (26).

Male (holotype). Total length 2.95 (3.05 with clypeus), carapace width 0.77. Leg 1: 26.8 (6.5 + 0.4 + 6.4 + 12.4 + 1.1), tibia 2: 4.1, tibia 3: 2.5, tibia 4: 3.6; tibia 1 L/d: 96. Habitus as in Figures 6 and 7. Entire animal very pale whitish (in live rather greenish), with pair of dark dots on carapace, patellae and tibia-metatarsus joints slightly darkened, abdomen dorsally with two pairs of indistinct dark marks. Ocular area barely elevated (Fig. 7), only triads on low elevations, thoracic furrow absent; distance PME-PME 195 µm; diameter PME 70 µm; distance PME-ALE 20 µm; AME-AME 20 µm, AME diameter 30 µm. Clypeus unmodified. Sternum wider than long (0.55/0.45), unmodified. Chelicerae as in Fig. 26, with distal apophyses carrying two (or three?) modified hairs each, with two macrosetae on each side near the apophyses, proximally with unsclerotized projections. Palps as in Figures 24 and 25; coxa unmodified, trochanter with short retrolateral apophysis and very long retrolatero-ventral apophysis with characteristic modified hair distally (cf. fig. 105 in Huber 2000), femur with distinct retrolateral apophysis, procursus relatively simple, with capsulate tarsal organ, distally more complex with various membranous structures, bulb with proximal sclerotized element, sclerotized uncus and appendix and membranous embolus with distal transparent fringes, with additional slender transparent projection (arrow in Fig. 24). Retrolateral trichobothrium of tibia 1 at 8%; tibia 1 without prolateral trichobothrium (present on other legs); legs without spines, curved hairs, and vertical hairs; tarsus 1 apparently with >20 pseudosegments, but very indistinct and difficult to see, only distally about 5 fairly distinct. Abdomen posteriorly slightly pointed dorsally (Fig. 7).

Female. In general similar to male, but without dark spots on carapace. Tibia 1: 5.1. External genitalia very simple, slightly protruding (Figs. 12, 13), with distinct knob at posterior rim (Fig. 27), with small oval pore plates (Fig. 28).

Distribution. Known only from type locality.

Acknowledgements. We thank Osvaldo Villarreal, Celsa Señaris and Daniel Lew for their support in obtaining a collecting permit in Venezuela and for the loan of specimens, the Dirección General de Fauna y Oficina Nacional de Diversidad Biológica in Caracas for issuing permit N° 01-11-0966, and the Deutsche Forschungsgemeinschaft for financing a collecting trip to Venezuela (DFG grant HU 980/1-1). Venezuelan results are part of the project "Expedición Aracnológica a Venezuela", between the Zoological Research Institute and Museum Alexander Koenig, the arachnological laboratory of the National Museum of the Federal University of Rio the Janeiro and the Natural History Museum of the "La Salle" Foundation, Caracas. Thanks are also due to Pedro Gnaspini and FAPESP for funding the "Expedição Amblypygi" to Bahia State, Brazil, to Alessandro Giupponi, Amazonas Chagas Jr. and Barbara Segal for collecting specimens, to Frederico Araujo Ramos for providing information about the type locality of *L. brazlandia* and to Adriano B. Kury for the loan of the Brazilian specimens.

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Authors' addresses: Bernhard A. HUBER (corresponding author), Zoological Research Institute and Museum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany, b.huber.zfmk@uni-bonn.de; Abel PÉREZ González & Renner L. C. BAPTISTA: Laboratorio de Aracnología, Departamento de Invertebrados, Museu Nacional, Universidade do Brasil, Quinta da Boa Vista, Rio de Janeiro, Brazil, CEP 20940-040, abelpg@mn.ufrj.br, baptistr@mn.ufrj.br