

ARTÍCULO:

A new troglomorphic *Charinus* from Minas Gerais state, Brazil (Arachnida: Amblypygi: Charinidae)

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**A NEW TROGLOMORPHIC *CHARINUS* FROM
MINAS GERAIS STATE, BRAZIL
(ARACHNIDA: AMBLYPYGI: CHARINIDAE)**

R. L. C. Baptista & A. P. de L. Giupponi

Abstract

A new species of *Charinus* is described from the Olhos d'Água cave, in Itacarambi, Minas Gerais, Brazil. Hitherto seven other species were known from this country. The new species is the second troglobiont *Charinus* from Brazil. It has only tiny median eye spots (sometimes absent), reduced lateral eyes, the ventral corner of the prolateral face of femora II-IV prolonged in a spiniform apophysis, elongated spines and legs, thin cuticle and pale coloration.

Key words: Amblypygi, Charinidae, whip-spiders, cave fauna, troglobiont, Biospeleology, South America,

Taxonomy: *Charinus eleonorae* sp. n.

Un nuevo *Charinus* troglomórfico del estado de Minas Gerais, Brazil (Arachnida: Amblypygi: Charinidae)

Resumen

Se describe una nueva especie de *Charinus* que habita en la cueva Olhos d'Água, Itacarambi, Minas Gerais, Brasil. Hasta ahora se conocían otras siete especies de este país. La nueva especie constituye el segundo *Charinus* troglomórfico de Brasil. Entre sus características morfológicas sobresalen: Ojos medianos ausentes (en su lugar existen diminutas manchas oculares, ausentes en algunos ejemplares), ojos laterales reducidos, esquina ventral de la cara prolateral de los fémures II-IV prolongada formando una apófisis espiniforme, espinas y patas alargadas, cutícula delgada y despigmentada.

Palabras clave: Amblypygi, Charinidae, fauna cavernícola, troglóbios, Bioespeleología, América del Sur.

Taxonomía: *Charinus eleonorae* sp. n.

Introduction

The genus *Charinus* Simon, 1892 “*sensu lato*” (including *Charinides* Gravely, 1911 and *Tricharinus* Quintero, 1986) currently includes 23 described Neotropical species, of which seven are known from Brazil (Weygoldt, 1972, 2000; Quintero, 1983; Giupponi & Kury, 2002; Baptista & Giupponi, 2002). In South America, they are typically hard to find, cryptic arachnids, known only from a few specimens, although recently larger series have been reported (Pinto-da-Rocha *et al.*, 2002; Baptista & Giupponi, 2002). In Brazil, most species live under stones and logs in Atlantic Forest, being active at night. A collecting trip to Olhos d'Água Cave, at Itacarambi, a dry locality at the northwest of the Minas Gerais state (Fig. 14), yielded a large series of troglomorphic specimens belonging to a new species herein described. In Brazil, there is only one other known troglomorphic species, *Charinus troglobius* Baptista & Giupponi, 2002, described from caves in Serra do Ramalho, southwest of Bahia state, a locality around 200 km north from Itacarambi, but also close to São Francisco river. Both localities belong to the Bambuí Speleological Province, the larger karstic area in Brazil, covering also parts of the states of Goiás and the Federal District.

Charinus eleonorae sp. n. fits in the genus *Charinus sensu stricto*, as it has the basitibia IV divided in four pseudo-articles, besides the large body size and presence of vestiges of the median eyes.

Material and methods

For measurements and nomenclature in general we follow the proposals of Quintero (1981). The measurements of pedipalp articles were taken between the external condyles of each segment, in order to establish fixed points and proper length measurements. The article called tarsus by Quintero is here divided in distitarsus

and tarsal claw (pretarsus) as the two articles are not fused in Charinidae. The measurements were taken from several specimens (number indicated as "n=") and the median value is given first followed by the range in parentheses. The measurement accuracy is 0,1 mm.

The following abbreviations are used: **BT 1-4**- Subdivisions of basitarsus. **DT**- Distitarsus. **CZACC**- Colecciones Zoológicas del Instituto de Ecología y Sistemática. La Habana, Cuba. **MNRJ**- Museu Nacional, Universidade Federal do Rio de Janeiro. Rio de Janeiro, Brazil. **MZSP**- Museu de Zoologia, Universidade de São Paulo. São Paulo, Brazil.

Genus *Charinus* Simon, 1892

Brazilian species: **1:** *Charinus schirchii* (Mello-Leitão, 1931); **2:** *Charinus brasiliensis* Weygoldt, 1972; **3:** *Charinus montanus* Weygoldt, 1972; **4:** *Charinus asturius* Pinto da Rocha, Machado & Weygoldt, 2002; **5:** *Charinus acaraje* Pinto da Rocha, Machado & Weygoldt, 2002; **6:** *Charinus mysticus* Giupponi & Kury, 2002; **7:** *Charinus troglobius* Baptista & Giupponi, 2002; and **8:** *Charinus eleonora* **new species**.

Charinus eleonora new species

Figs 1-14.

ETYMOLOGY: The species is named after Dr. Eleonora Trajano, a renowned Brazilian biospeleologist, who was the first person to collect it.

TYPE MATERIAL: Holotype: BRAZIL: *Minas Gerais*: Itacarambi, Gruta Olhos d'Água, 26.VI.2001, Baptista, R. L. C. & Giupponi, A. P. L. (one male, MNRJ 9070).

Paratypes: BRAZIL: *Minas Gerais*: Itacarambi, Gruta Olhos d'Água, 26.VI.2001, Baptista, R. L. C. & Giupponi, A. P. L. (seven males, six females, two immature males, two immature females, two young, MNRJ 9033; one male, MZUSP; one male, CZACC). *Idem*, 10.VII.1993, Trajano, E. (one female, MNRJ 9024). *Idem*, 30.III-02.IV.1994, Gnaspini, P. & Trajano, E. (one female, one young, MNRJ 9023).

DIAGNOSIS: Body length: males 7.8 (7.0-9.1 mm), females 7.8 (7.3-8.3 mm). Carapace length a bit less than 4/5 of its width (ratio in *C. mysticus* is a little under 4/5, but most other species have wider carapaces). Corners of anterior margin of carapace weakly developed in a small roundish knob. Median eyes tubercle indistinct, usually with only two very small eye spots (rarely no eye spots present). Lateral eyes present, but reduced in size and with flattened lenses. Sternal plates narrow, convex and rounded, tritosternum a little over three times longer than wide. Pedipalpal spines much longer than in other species, except *Charinus troglobius*. Pedipalpal femur with three dorsal and three + one ventral spines and distitarsus with two long spines of about the same size. Ventral prolateral corner of walking legs spiniform. Basitibia + distitibia of leg IV with 18 trichobothria (one + 17). Basitarsus IV barely over twice as long as distitarsus IV.

DESCRIPTION: Carapace (Fig. 1): flattened, wider than long (ratio a bit less than 4/5), its anterior margin with 10 (sometimes nine or eight) small, rigid, projecting setae. There is an anterior median depression, whose center bears the median eye spots. A thin median furrow starts at the depression and reaches a small transversal furrow (sometimes absent) placed about the same level of the first pair of lateral depressions. A low frontal hump present at each side, starting just at front of the lateral eyes and almost reaching the above cited pair of depressions. Corners of anterior margin of carapace weakly developed in a small roundish knob. Carena beginning at the corners of anterior margin, widening backwards from coxa II on, widest over coxa III and IV, reaching the posterior margin. Tiny punctuations, more abundant in the frontal area. Punctuations arranged in lines and spots, irradiating from the fovea and interspersed with glabrous areas. Three pairs of deep furrows and a very deep, pentagonal fovea (its corners forming the starting point of the 2nd and 3rd furrows and a middle, posterior, low furrow). First pair of furrows placed just behind the frontal hump and not reaching the middle line. Four lateral pairs of depressions (only the third pair not placed over the furrows). Ocular tubercle indistinct, usually with only two very small, flat, roundish eye spots, presenting a variable degree of reduction (some specimens have just an unpaired eye spot at one of the sides or a single, fused, larger spot in the center; two specimens have no vestige of middle eyes at all). Lateral eyes present, but reduced in size and with flattened lenses. The most internal eye of the triads is reduced to a tiny eye spot, with a small amount of pigment. The other two eyes may present variable degrees of reduction, from two clearly defined lenses with distinct pigment shields, to very small and flattened lenses without clear delimitation between the pigment areas of each eye. Frontal process well developed, much longer than larger, with pointed apex (Fig. 2).

Sternum (Fig. 3): Formed by three pieces, all of which are sclerotized and convex. Tritosternum with a round basis and projected anteriorly between the palpal coxa in an elongated, forked tubercle, a little over three times longer than wide, with two apical (one on each prong of the fork), two middle and two basal setae. Middle piece rounded, convex, with two setae at the corners of the higher middle portion, and a few scattered setulae. Third piece also rounded and convex, but smaller, lower and with smaller setae than the second piece. Sternites separated from each other by a little over the diameter of the middle piece.

Abdomen (Fig. 1): oblong, with almost indistinguishable punctuation, finer than in the carapace.

Chelicera: Cheliceral furrow (Fig. 4) with four internal teeth, the distal one bifid, its first cusp bigger than the second one. Fourth tooth around one third longer than the first. Teeth length (from tip to basis) IV>Ia>Ib=II>III. Claw with 10-11 denticles, the third basal ones larger.

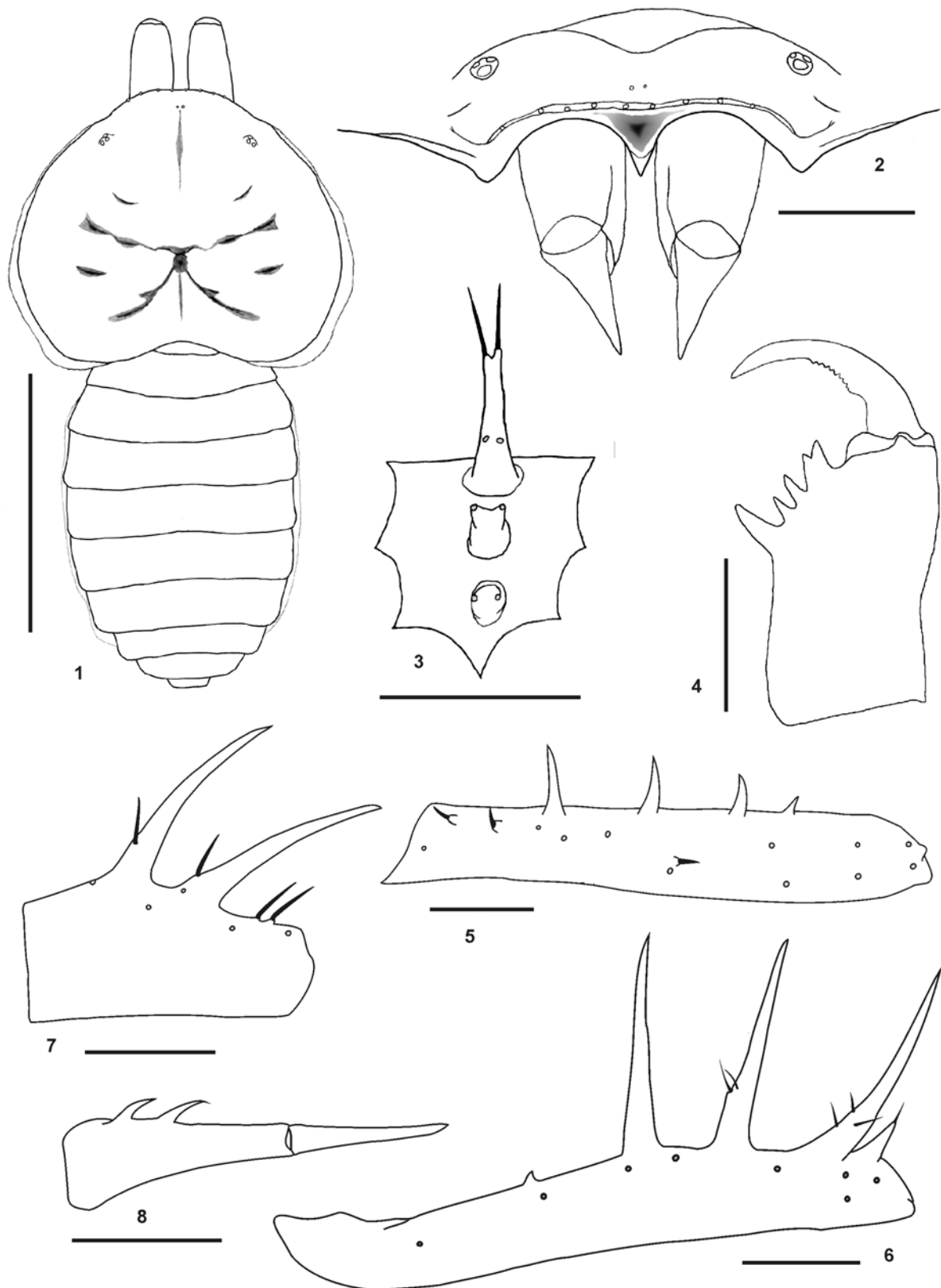


Fig. 1-8. *Charinus eleonora* sp. n., male paratype (MNRJ 9033). **1:** Habitus, dorsal view. Scale bar = 5 mm. **2:** Anterior margin of carapace, frontal view, showing long, rebordered, frontal process and anterior boss. Scale bar = 1 mm. **3:** Sternum, ventral view. Scale bar = 1 mm. **4:** Right chelicera, outer view. Scale bar = 1 mm. **5:** Right pedipalp, femur, retrolateral view, showing dorsal spines. Scale bar = 1 mm. **6:** Right pedipalp, tibia, retrolateral view, showing dorsal spines. Scale bar = 1 mm. **7:** Right pedipalp, basitarsus, retrolateral view, showing dorsal spines. Scale bar = 1 mm. **8:** Right pedipalp, distitarsus and claw, lateral view. Scale bar = 1 mm.

Pedipalp: Trochanter: large, distal, spiniform, ventral apophysis, bearing many strong setae and with a blunt tip pointed forwards, and two subequal spines, one at the median third and the other at the distal tip of the prolateral face. **Femur** (Fig. 5): three middle-sized dorsal spines situated at the middle and distal third of the segment (sometimes one additional tiny spine near the distal apex), decreasing in size towards the distal part (sometimes the second spine a little larger than the first), two setal tubercle of about the same size at the basal third (sometimes the second absent); three elongated ventral primary spines, much longer than the dorsal ones, decreasing in size towards the distal part, a little larger than the dorsal ones, the first placed at the end of the basal third, the second at the middle third and the last at the distal third. First ventral spine much larger than the second one. An additional spine is found near the basal corner and a little more dorsally placed (in one female, this spine is bifid and oddly looking, probably due to a theratology). At the same level, but a little more ventrally placed, there is a setal tubercle. One additional spinule is usually found between the first and second primary spines, and sometimes also between the second and the third ones. **Tibia** (Fig. 6): four dorsal spines (III>II>I>IV) placed at the distal half of the segment. Spine IV with one setae of about one half its length. Spines II-III with two setae at the end of the basal third. No setal tubercles. Sometimes a setal tubercle (rarely a spinule) of variable size placed basally after the first spine. Three ventral spines, the basal placed at the beginning of the distal half, the middle much larger than the others and placed at the beginning of the distal third, and the distal near the apex. One spinule at the end of the basal third (sometimes an additional, smaller spinule close to it). One setal tubercle between the middle and distal spines and another near the apex, both more laterally placed than the spines. **Basitarsus** (Fig. 7): Two dorsal spines arising from a same bulging area at the end of the basal half, the distal one just a bit longer (rarely the basal longer than the distal), with about the same length as the article, and one small setal tubercle after the distal spine. One ventral spine at the distal half, around half the article length, and one setal tubercle just before the spine. **Distitarsus** (Fig. 8): Two small spines at the basal half, the second a bit larger. Cleaning organ about one half the article length. **Claw** (Fig. 10): long, with an acute, curved tip.

Legs: All very setose. Ventral corner of the prolateral face of femora II-IV projecting in a distinct spiniform process. **Femur length** I>III>IV>II. Tibia I with 23 articles (up to 26 in regenerated legs). Tarsus (basitarsus + distitarsus) I with 40-41 articles (up to 46 in regenerated legs). **Leg IV: Basitibia:** Four pseudo-articles, one trichobothrium at the last pseudo-article. **Distitibia:** One basal, two median and 15 distal trichobothria (Fig. 9). **Basitibia-distitibia length** DT>BT1>BT3>BT4>BT2. **Basitarsus/distitarsus ratio** 8/4, distitarsus tetramerous.

Measurements: Males (n = 5): Cephalothorax: Length: 3.5 mm (3.1-4.0), Width: 4.3 mm (3.9-5.1). Abdomen: 5.0 mm (4.2-5.6). Pedipalp: Femur 4.2 mm (3.4-5.6), Tibia 4.0 mm (3.2-5.4), Basitarsus 1.8 mm (1.6-2.2), Distitarsus 1.2 mm (1.1-1.4), Tarsal claw 0.9 mm (0.8-1.1). **Females** (n = 5): Cephalothorax: Length: 3.4 mm (3.2-3.6), Width: 4.5 mm (4.1-4.7). Abdomen: 5.5 mm (5.1-6.4). Pedipalp: Femur 3.2 mm (2.3-3.4), Tibia 3.1 mm (2.4-3.4), Basitarsus 1.8 mm (1.3-1.9), Distitarsus 1.3 mm (1.1-1.5), Tarsal claw 0.9 mm (0.7-0.9). The cephalothorax of the females and the smaller (and presumably younger) males has similar sizes, but males may get larger and have longer appendices. Female abdomen is usually larger as it is inflated when full of eggs.

Color Pattern (in alcohol): Carapace and pedipalps yellowish brown. Chelicerae reddish brown or yellowish brown. Legs light yellowish. Abdomen pale yellow. Live animals have color pattern similar to the preserved ones.

Genitalia: Male gonopods (Figs. 10-11) a little wider than long, soft, the only sclerotized areas are the latero-posterior margin of the dorsal lobes and the basal sclerite of lateral lobes; median lobes long and thin, lamellar, with wide, rounded tip, not reaching the tip of the lateral lobes; latero-dorsal lobes with triangular tip, a little smaller than the tip of the lateral lobe; latero-ventral lobes lamellar, very thin, elongated and curved; lateral lobes with two projections, the second longer and more pointed than the basal one, the basal sclerite small, rounded, with internal and posterior angles projecting. All the membranous lobes have their internal margins with many digitiform lobes, exceedingly difficult to visualize and draw. Female gonopods (Fig. 12) very small, a bit longer than wide, barrel shaped, with rounded opening, distant less than half its length from the margin of genital operculum and about its length from each other. The margin of the gonopods openings is membranous, very pliable, being easily distorted during preparation for microscope observation, as in the case of our illustration.

NATURAL HISTORY: One of the females had an egg-sac with 15 eggs and another had five embryos. All specimens were collected in the dark zone of caves, along the cylindrical stream gallery, which is entirely flooded during the big rains in the wet season. They were usually found inside small galleries or holes in the cave walls. Specimens of *C. eleonora* sp. n. actively tried to hide when we tried to capture them, probably due to the air movement we caused in the closed ducts. No specimen was found in the dry, upper galleries, where the phrynichid *Trichodamon froesi* Mello-Leitão, 1940 was abundant. Conversely, only one specimen of that very large whip-spider was found in the stream gallery, close to a lateral duct coming from the upper galleries. There seems to be a clear microhabitat separation between

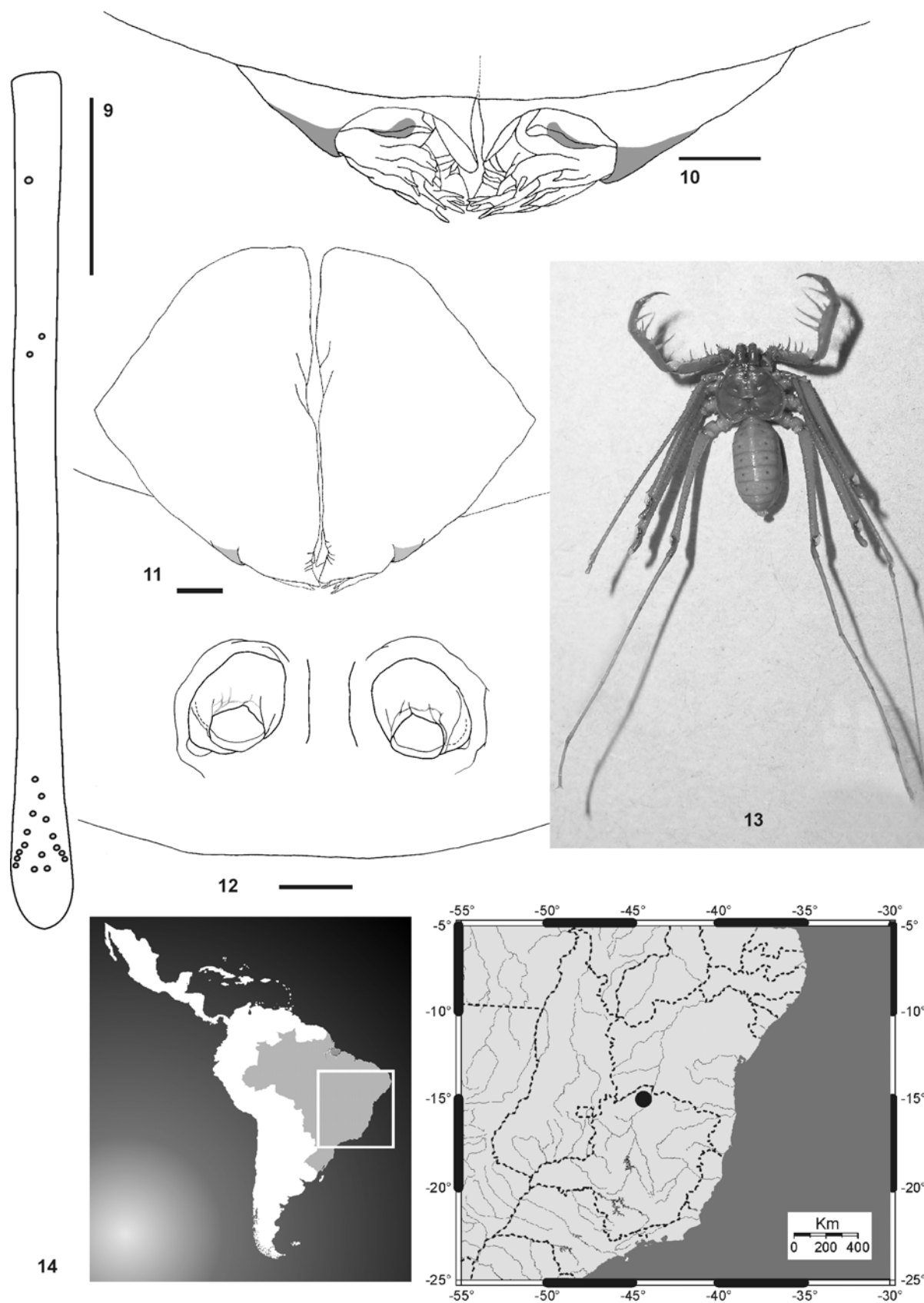


Fig. 9-11. *Charinus eleonora* sp. n., male paratype (MNRJ 9033). **9:** Leg IV, distitibia, dorsal view showing trichobothria. Scale bar = 1 mm. **10:** Gonopods, ventral view. Basal sclerite in gray. Scale bar = 0.5 mm. **11:** Gonopods, dorsal view. Scale bar = 0.5 mm. **Fig. 12-13.** *Charinus eleonora* n. sp., female paratype (MNRJ 9082). **12:** Gonopods, dorsal view. Scale bar = 0.5 mm. **13:** *Charinus eleonora* n. sp., female paratype (MNRJ 9024). Dorsal view. Scale bar = 0.5 mm. **Fig. 14.** *Charinus eleonora* n. sp. Distribution map. The black dot displays the position of the type locality on central-eastern Brazil.

these two whip-spiders of very different size. The same “niche” separation may be noticed between species of *Charinus* and the larger *Trichodamon* or *Heterophrynus* (Phryniidae) in many other caves in Brazil (Baptista & Giupponi, pers. obs.). One explanatory hypothesis we can advance for this separation is that the smaller *Charinus* species may have a higher resistance to water immersion or to current displacement during floods.

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KEY TO IDENTIFICATION OF THE BRAZILIAN SPECIES OF *CHARINUS*

- 1 Ocular tubercle (bearing the median eyes) absent or only a pair of eye spots present 2
 - Ocular (bearing the median eyes) tubercle present, with normal eyes 3
- 2 Median eyes reduced to a pair or one unpaired eye spot (rarely absent), palpal femur with three dorsal and three + one ventral spines, palpal basitarsus with the two dorsal spines of about the same size, palpal distitarsus with two small dorsal spines (Minas Gerais state: Itacarambi, Olhos d’Água cave) *C. eleonorae* sp. n.
 - Median eyes absent, palpal femur with two dorsal and two ventral spines, palpal basitarsus with the distal dorsal spine much longer than the basal one, palpal distitarsus with two elongated dorsal spines (Bahia state: Carinhanha, Serra do Ramalho caves) *C. troglobius*
- 3 Second and third sternal sclerites flattened and twice as wide as long (Espírito Santo state: Serra) *C. montanus*
 - Second and third sternal sclerites convex and more or less rounded 4
- 4 Distitibia of leg IV with 16 trichobothria (Espírito Santo state: São Domingos) *C. brasilianus*
 - Distitibia of leg IV with 18 trichobothria 5
- 5 Frontal process of carapace weak (Bahia state: Santa Luzia, Pedra do Sino cave) *C. acaraje*
 - Frontal process of carapace strong, large and triangular 6
- 6 Ocular tubercle (bearing the median eyes) high (São Paulo state: Ilhabela) *C. asturicus*
 - Ocular tubercle (bearing the median eyes) low (Bahia state: Gentio do Ouro, Toca do Encantado) *C. mysticus*

Remarks: *Charinus schirchii* (Mello-Leitão, 1931) from Rio de Janeiro state is very poorly known and has not been included in the key. The original description (Mello-Leitão, 1931) is vague and any charinid fits in it. The female holotype and all paratypes were once deposited in the MNRJ, but were borrowed some twenty years ago and never returned, despite many recovering attempts. For the moment they are unavailable for study and probably lost. Quintero (1983) synonymized *Enantiosarax* Mello-Leitão, 1931 with *Charinus* and promised a detailed redescription of *E. schirchii*, which has not yet been published.

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