

The first cave-dwelling *Spinopilar* Mello-Leitão 1940 (Opiliones Gonyleptidae Tricommatinae), described from a Brazilian cave

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The fifth species of the genus *Spinopilar* Mello-Leitão 1940 is described. This is the second cavernicolous species of the subfamily, the other being *Pararezendesius luridus* H. Soares 1972 from caves in São Paulo State, Brazil. *Spinopilar moria*, new species, shows elongate appendages, significantly longer than the epigeal species of *Spinopilar*, higher tarsal counts and lighter coloration, which may be regarded as troglomorphisms. The type locality — Caverna Morena, Cordisburgo, Minas Gerais, Brazil — is currently threatened because of the increasing visitation (tourism and local visitors). The presence of this new and fragile troglobite arachnid is an indication of the biospeleological richness of the region. It needs to be taken into account in order to produce adequate management policy to protect this karstic area.

KEY WORDS: taxonomy, Laniatores, Grassatores, caves, karst, troglobite species.

INTRODUCTION

The Brazilian speleofauna comprises six troglobite harvestmen — the escadabiid *Spaeleoleptes spaeleus* H. Soares 1966 and the gonyleptids *Pachylospeleus strinatii* Šilhavý 1974, *Iandumoema uai* Pinto-da-Rocha 1996, *Giupponia chagasi* Pérez & Kury 2002 (SOARES 1966, ŠILHAVÝ 1974, PINTO-DA-ROCHA 1996, PÉREZ-GONZÁLEZ & KURY 2002) — and two Pachylinae with lesser degrees of troglomorphism from caves in Bahia State (KURY 2008). The morphological expression of cave-dwelling adaptation in those opilions exhibits different degrees, from a complete anophthalmic light-coloured species (such as *Giupponia chagasi*) to pigmented, eye-reduced harvestmen (e.g. *Iandumoema uai*). A recent expedition to the Karst of Minas Gerais State,

Brazil, yielded a few specimens of a troglobitic *Spinopilar* Mello-Leitão 1940, which is here described as a new species.

The genus *Spinopilar* includes four species of short-legged Laniatores which are usually found in leaf litter of the Brazilian Atlantic Forest (KURY 2003). One of them — *Spinopilar anomalis* (Sørensen 1932) — is poorly known (type material lost, unillustrated, too generic description). The new species proposed is the fifth species and the first troglobite representative of this genus and the second cavernicolous one in the subfamily Tricommatinae, the other being *Pararezendesius luridus* H. Soares 1972. This species is commonly found in São Paulo State caves (Vale do Ribeira Speleological province, see: TRAJANO & GNASPINI-NETTO 1991, GNASPINI & TRAJANO 1994, PINTO-DA-ROCHA 1995), but the type locality is an artificial cavity “Minas de São Francisco” in Iporanga, São Paulo (SOARES 1972).

The new species was collected in the Morena Cave, located in the Cordisburgo municipality of Minas Gerais State, Brazil. This cave with approximately 7500 m of horizontal development is the biggest of the 25 caves recorded in this region. The faunas of these caves were studied by the team led by Prof. Eleonora Trajano from the Biology Institute of São Paulo University (IB-USP) and the preliminary results were published in a congress abstract (TRAJANO et al. 2007). TRAJANO and collaborators stated that the cave is biologically very important because it contains a very high diversity of habitats with complex animal communities. An example of the biological richness is the presence of three populations belonging to three different families of troglophile fishes in the same cave, two of them syntopic; this is an unusual phenomena in Brazil and deserves further study. They also recorded a rich troglophile terrestrial fauna in the cave (insects, arachnids and diplopods) and warned about the urgent necessity of protection measures to preserve this fragile ecosystem, including the possibility to consider the cave as a conservation unit. The new species described herein is the first troglobite recorded in the Morena Cave, as well as an endemic, fragile and highly specialized animal species. Undoubtedly this finding increases the biological value of the cave and confirms the necessity of an adequate management policy to protect this karstic area.

Abbreviations of depository institutions are: HSPC (Private Collection Helia Soares, now in MNRJ), MNRJ (Museu Nacional, Universidade Federal do Rio de Janeiro) and MZSP (Museu de Zoologia, São Paulo). All measurements are in millimeters (mm). Tarsal formula (number of tarsomeres) is given as follows: I(d), II(d), III, IV. Numbers for legs I-II are followed by the distitarsal count (d) in parentheses.

SYSTEMATIC ACCOUNTS

Genus *Spinopilar* Mello-Leitão 1940

Spinopilar MELLO-LEITÃO 1940: 102; KURY 2003: 204 (complete synonymy).

Type species. Spinopilar armatus Mello-Leitão 1940, by original designation.

Included species. *Spinopilar anomalis* (Sørensen 1932), *Spinopilar apiacaensis* Kury 1992, *Spinopilar armatus* Mello-Leitão 1940, *Spinopilar friburguensis* (H. Soares 1946) and *Spinopilar moria* n. sp.

Emended diagnosis. Outline of dorsal scutum (peltidium) in dorsal view bell-shaped. Lateral margins of carapace convex in dorsal view. Outline of carapace somewhat projected antero-laterally. Ocularium unarmed or with a small median acuminate spine. Mesotergal area I entire. Trochanter IV of male ventro-retrolateral with spiniform slightly procurved apophysis bearing small side branch. Tarsal counts of leg IV five-six. Length of basichelicerite comparable to the carapace. Shape of lamina parva roughly subrectangular with sides concave. Setae of basal portion of ventral plate very long and pointing basally. Sexual dimorphism in coxa/trochanter/femur IV, femur not especially elongate in male.

KEY TO THE SPECIES OF *SPINOPILAR*

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|---|--|--|----------|
| 1 | Coxa IV dorsally unarmed; ocularium unarmed; hypogean troglomorph species, with appendages elongate (leg II more than seven times longer than dorsal scutum) | <i>S. moria</i> n. sp. (Minas Gerais) | |
| — | Coxa IV dorsally with one spiniform apophysis; ocularium with one erect spine; epigean species without troglomorphism, with appendages normal (leg II less than 5 times longer than dorsal scutum) | | 2 |
| 2 | Ocularium low and rounded..... | <i>S. armatus</i> (Rio de Janeiro) | |
| — | Ocularium very high bell-shaped | | 3 |
| 3 | Retrolateral apophysis of trochanter IV wide, crenulate anteriorly; femur IV robust | <i>S. friburguensis</i> (Rio de Janeiro) | |
| — | Retrolateral apophysis of trochanter IV tapering; femur IV thin | <i>S. apiacaensis</i> (Espírito Santo) | |

The very poorly known *S. anomalis* cannot be included in the key until its identity can be ascertained. The original description does not match with *S. moria* at least in the armature of the ocularium. Nor does it match the other described species in aspects of armature of coxa and trochanter. However in view of the loss of the type material (JANET BECCALONI pers. comm. to A.B. KURY 2007), information has to be drawn from the unillustrated original description until topotypes are found.

Spinopilar moria n. sp. (Figs 1-10)

Etymology. Species name a noun in apposition, from *Moria*, the fictitious system of underground tunnels of the dwarves, created by J.R.R. Tolkien in his fantasy book “The Lord of the Rings”. It is an obvious allusion to the cavernicolous habitat of the species.

Type material. Male holotype (MNRJ 18986), 3 male, 4 female and 2 juvenile paratypes (MNRJ 18985). Caverna Morena [S 19.16949°, W 44.33934°] Cordisburgo,

Table 1.

Material examined of males of species of *Spinopilar*, with data [in brackets] on ratio leg II length/peltidium length.

Spinopilar apiacaensis: ♂ holotype [3.47], 2 ♂ paratypes [3.79, 4.27] (MZSP 13742) Apiacá, Fazenda Santa Maria, 20.VII.1991, R. Baptista & A. Kury col. sifting leaf litter.

Spinopilar armatus: ♂ holotype [3.87] (MNRJ 94) Rio de Janeiro, Pilar, Roger Arlé col.; 1 ♂ [4.07] (MNRJ 4796) Rio de Janeiro, Floresta da Tijuca: Trilha do Alto da Bandeira, 15.X.1999 A. Giupponi & D. Pedroso col., 1 ♂ [4.21] (MNRJ 4508) Rio de Janeiro, Floresta da Tijuca, A.P.L., Giupponi, R.L.C. Baptista & D.R. Pedroso col.

Spinopilar moria: ♂ holotype [7.91] (MNRJ 18.986), 3 ♂ paratypes [7.75, 7.79, 7.91] (MNRJ 18.985).

Minas Gerais State, Brazil (Figs 9-10), July 19, 2007, Abel Pérez González, Eleonora Trajano and Flávia Pelegatti-Franco col.

Diagnosis. It can be easily distinguished from the other four *Spinopilar* species by the elongate appendages (leg II more than seven times longer than dorsal scutum) (Fig. 8, Table 1) and higher tarsal counts. The combination of matching apophyses of coxa + trochanter IV is also unique.

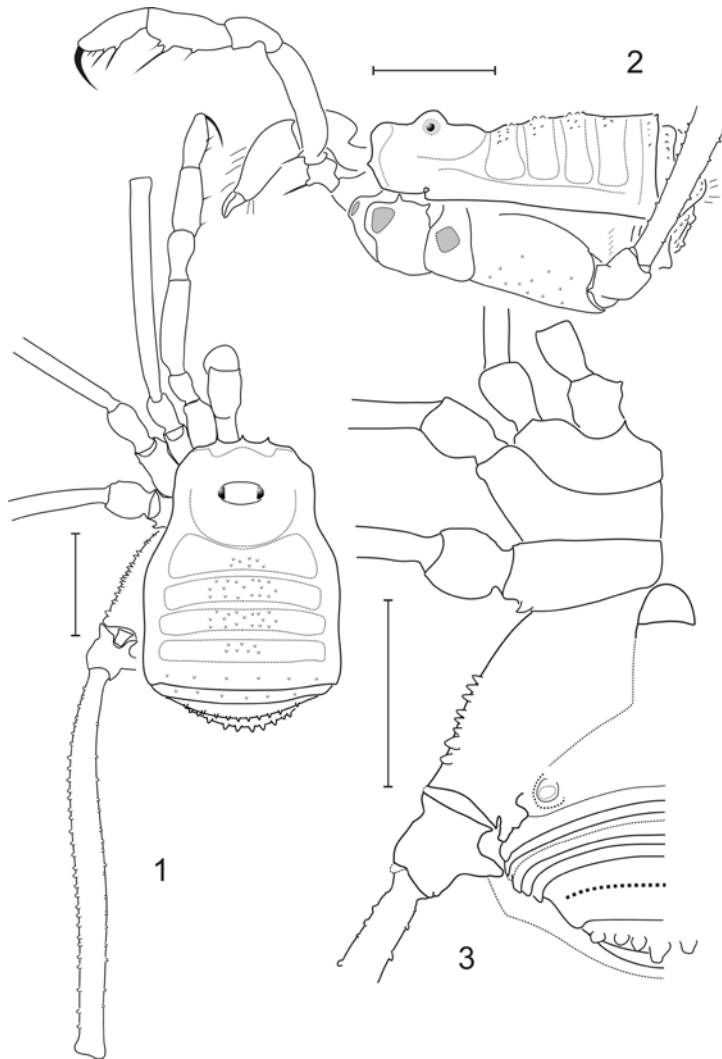
Description. Male holotype (MNRJ 18986). Measurements (in mm). Carapace length 1.01, width 1.37; abdominal scutum length 1.43, width 1.92. Femora I-IV: 2.13, 4.52, 2.68 and 4.17.

Dorsum. Outline of dorsal scutum (peltidium) in dorsal view bell-shaped, with very smooth constrictions at area III (Fig. 1). Ocularium low, narrow, elliptical, entirely unarmed (Figs 1-2). Mesotergum divided into four areas, area I not divided into left and right halves (Fig. 1). Carapace, all areas of dorsal scutum and free tergites unarmed, with some granulation concentrated around the mid-line of mesotergum. Anal operculum coarsely granulous (Figs 1-2).

Venter. Stigmatic area short, Y-shaped. Stigmata isolated on a well-marked island, directed ventrally. First free sternite projected on a lobe matching coxal apophysis (Fig. 3).

Pedipalps (Figs 1-2). None of the segments especially elongate. Trochanter with dorsal mound and ventral setiferous tubercle. Femur with 1 ventrobasal setiferous tubercle. Patella unarmed. Tibia with 3 ectal (iIi) and 2 mesal (ii) very weak setiferous tubercles. Tarsus ectal (II) and mesal (ii) each with 2 weak setiferous tubercles.

Legs (Figs 1-2). Coxa IV with ventro-retrolateral distal bifid apophysis matching first free sternite and gross acuminate dorso-prolateral tubercles. Trochanter IV with retrolateral sub-basal lanceolate apophysis. All pod-

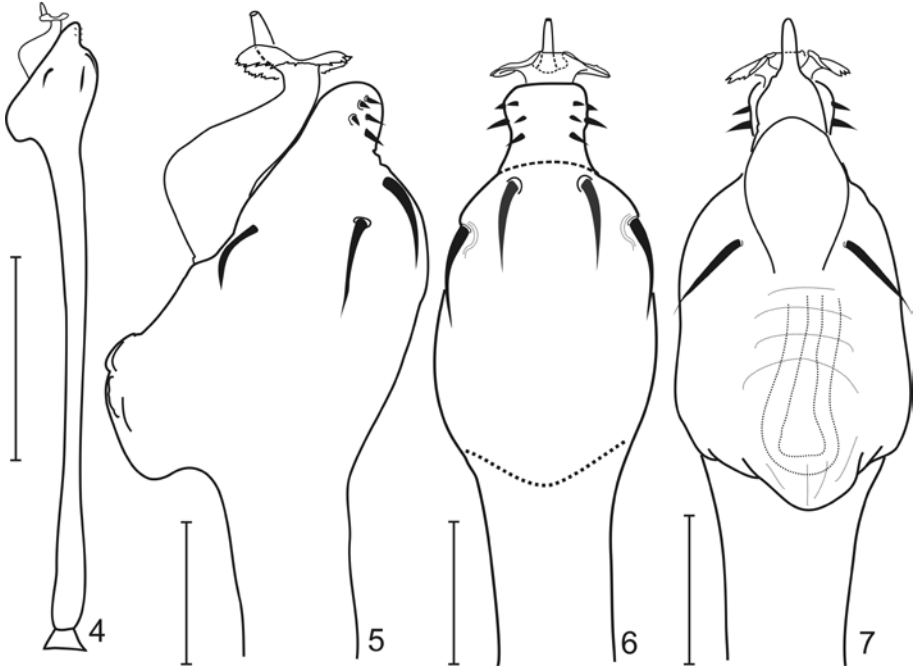


Figs 1-3. — *Spinopilar moria* new species, male holotype (MNRJ 18986), from Caverna Morena, Minas Gerais. Fig. 1: habitus, dorsal view; Fig. 2: same, lateral view; Fig. 3: half side of coxae, trochanters, stigmatic area and sternites, ventral view. Scale bars = 1 mm.

meres of legs I-IV unarmed. Femur IV only slightly sinuous, slender but slightly incrassate in mid-portion and with coarser granulation.

Colour. Body and appendages uniform light mahogany brown.

Penis (Figs 4-7). Lamina parva subrectangular, with sides slightly concave. Lateral borders armed with two rows of 2 (more ventro-lateral) + 3



Figs 4-7. — *Spinopilar moria* new species, male paratype (MNRJ 18985). Penis, distal part. Fig. 4: whole, lateral view; Fig. 5: distal portion, lateral view; Fig. 6: same, ventral view; Fig. 7: same, dorsal view. Scale bars: 0.5 mm (4) and 0.1 mm (5-7).

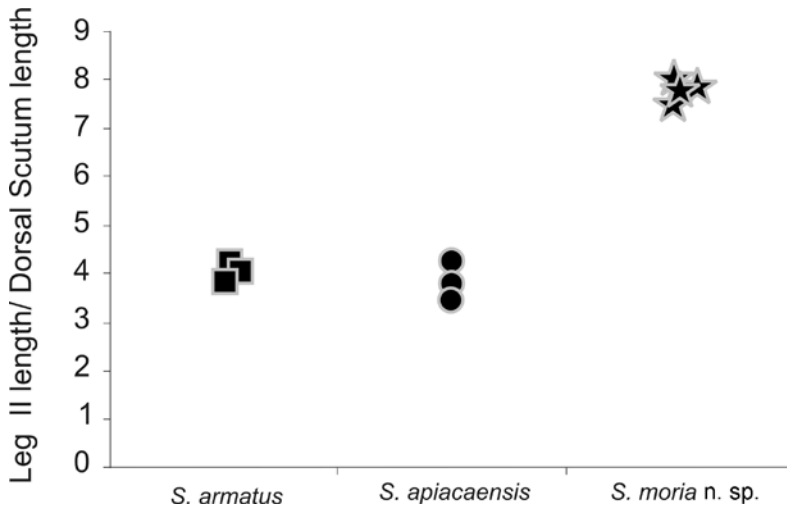


Fig. 8. — Comparative diagram of the ratio length of leg II / dorsal scutum for three species of *Spinopilar* showing the very elongate leg II of *Spinopilar moria*. Raw data and number/sex of examined specimens in Table 1.



Fig. 9. — Brazil, showing the situation of the Morena Cave.

(more ventral) pairs of short setae. Base of ventral plate hammer-shaped, armed with three pairs of long setae. Stylus straight, smooth and unarmed. Flabellum skirt-like, well-developed, completely surrounding the stylus.

Variation. Tarsal formula (males $n = 4$) 4-5(3-4)/10-13(4-5)/5/5; (females $n = 4$) 4(3)/7-9(3-4)/5/5.

Natural history. The specimens were collected in three different microhabitats deep inside the cave (Fig. 10). They live under vegetable debris in decomposition accumulated by the hypogean river, but were also found under stones and under mud blocks, both of them very humid microhabitats.

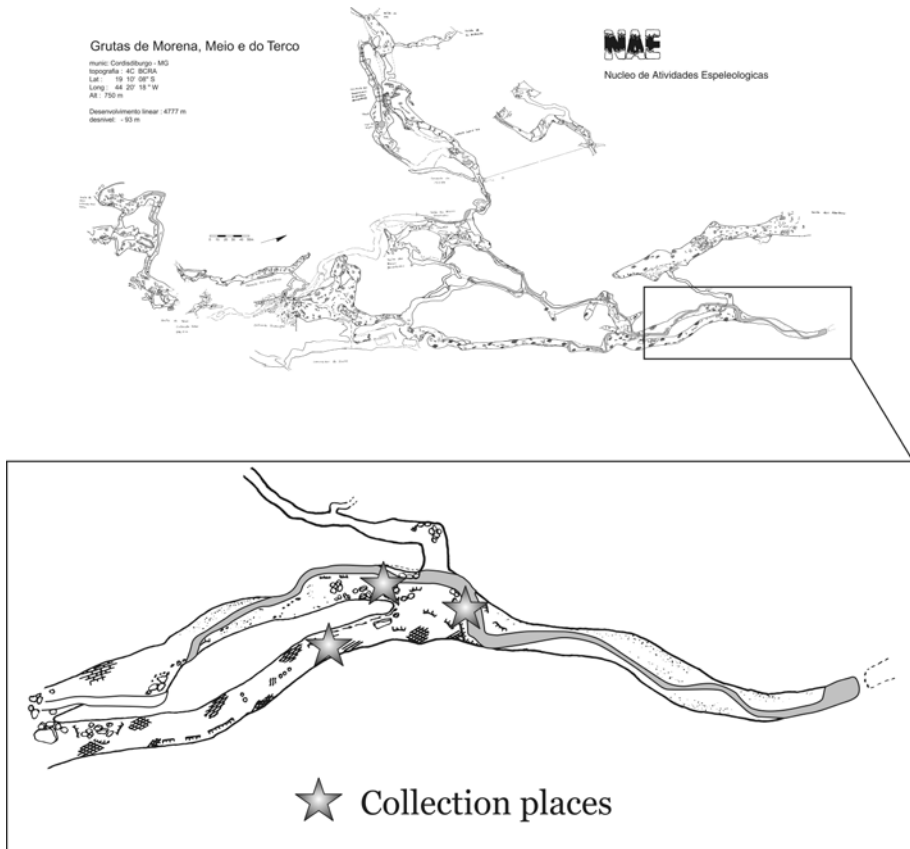


Fig. 10. — Diagram of the Morena Cave, marking the collecting sites of *Spinopilar moria*.

DISCUSSION

The core of the distributional range of Tricommatinae is the Brazilian Atlantic Forest, especially the humid forest segments that run along the continental coastal line from Santa Catarina to Rio de Janeiro. The vegetation around the type locality is drier than the typical Atlantic Forest and so far does not include records of any Tricommatinae representatives. *Spinopilar moria* n. sp. probably represents a relict of epigeal *Spinopilar* species that lived when the tropical forest in this area was more expanded due to the humidity. The same phenomenon of cavernicolous relicts of typical Atlantic Forest lineages in the Brazilian semi-arid region was also observed in other harvestmen families, such as Escadabiidae Kury & Pérez 2003, where the vast majority of the species and genera lives in the Atlantic Forest with the exception of *Spaeleoleptes spaeleus* which lives in a cave less than 10 km from the type locality of *Spinopilar moria* n. sp.

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