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# Review of *Paradiscocyrtus* Mello-Leitão, 1927 (Gonyleptidae, Opiliones), with the transfer of *Paradiscocyrtus cerayanus* Roewer, 1929 to *Discocyrtus* Holmberg, 1878 and a new interpretation of its type locality

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*Paradiscocyrtus neglectus* Mello-Leitão, 1927 (male), in vivo, from Itatiaia, Rio de Janeiro, Brazil. Photo: A. Kury.

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# Review of *Paradiscocyrtus* Mello-Leitão, 1927 (Gonyleptidae, Opiliones), with the transfer of *Paradiscocyrtus cerayanus* Roewer, 1929 to *Discocyrtus* Holmberg, 1878 and a new interpretation of its type locality

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**ABSTRACT**
After the type species of *Paradiscocyrtus* Mello-Leitão, 1927 (*Paradiscocyrtus neglectus* Mello-Leitão, 1927) was recognized and redescribed, the difference between it and the other two species of the genus proved to be remarkable. Herein, a maximum parsimony phylogenetic analysis with morphological characters (2519 scorings; 28 taxa; 105 characters) was performed under equal and implied weights to test the monophyly of *Paradiscocyrtus* for the first time. According to the relatively stable results obtained, herein: 1) the transfer of *Paradiscocyrtus cerayanus* Roewer, 1929 to *Discocyrtus* Holmberg, 1878 (forming *Discocyrtus cerayanus* n. comb.) is proposed, and *Paradiscocyrtus* becomes monotypic (represented only by its type species); 2) the assignment of *Paradiscocyrtus trochanteralis* Roewer, 1929 (already detected as junior synonym of *Bunopachylus orientalis* (Roewer, 1913)) to Roeweriinae Carvalho & Kury, 2018 is corroborated; 3) the presence of *Paradiscocyrtus* in DRMN-group is detected and its relationship with *Discocyrtus sensu stricto* is discussed. *Paradiscocyrtus* can be separated from *Discocyrtus s. str.* by some external characters (as dorsal scutum gamma-type, a pair of finger-phalanx-shaped spines on the scutal area III and coxa IV retrolateral apophysis with the same length as the prolateral) and genital characters (as the stylus of glans slightly dorsally convex). *Discocyrtus cerayanus* n. comb. is herein redescribed, and its geographic distribution is contested. The meaning of "Ceraya", assigned to the specimen SMF RII 996/53 (male holotype of *Paradiscocyrtus cerayanus*), is newly attributed to "Serra do Caraça", a mountain range in Minas Gerais, Brazil instead of Northeastern Brazilian "Ceará".

**KEY WORDS**
Arachnida,
Roeweriinae,
Neopachylinae,
Pachylinae,
Laniatores,
new combination.

**RÉSUMÉ**
*Révision de* Paradiscocyrtus *Mello-Leitão, 1927 (Gonyleptidae, Opiliones), avec le transfert de* Paradiscocyrtus cerayanus *Roewer, 1929 à* Discocyrtus *Holmberg, 1878 et une nouvelle interprétation de sa localité type.*
Après que l'espèce type de *Paradiscocyrtus* Mello-Leitão, 1927 (*Paradiscocyrtus neglectus* Mello-Leitão, 1927) a été reconnue et redécrite, sa différence avec les deux autres espèces du genre s'est avérée remarquable. Dans ce contexte, une analyse phylogénétique de parcimonie maximale avec des caractères morphologiques (2519 observations ; 28 taxons ; 105 caractères) a été réalisée avec une pondération égale et implicite pour tester la monophilie de *Paradiscocyrtus* pour la première fois. D'après les résultats relativement stables obtenus : 1) le transfert de *Paradiscocyrtus cerayanus* Roewer, 1929 à *Discocyrtus* Holmberg, 1878 (formant *Discocyrtus cerayanus* n. comb.) est proposé, et *Paradiscocyrtus* devient monotypique (représenté uniquement par son espèce type) ; 2) l'attribution de *Paradiscocyrtus trochanteralis* Roewer, 1929 (déjà détecté comme synonyme junior de *Bunopachylus orientalis* (Roewer, 1913)) aux Roeweriinae Carvalho & Kury, 2018 est corroborée ; 3) la présence de *Paradiscocyrtus* dans le groupe DRMN est détectée et sa relation avec *Discocyrtus sensu stricto* est discutée. *Paradiscocyrtus* peut être séparé de *Discocyrtus s. str.* par des caractères externes (comme le scutum dorsal de type gamma, une paire d'épines en forme de doigts sur la zone scutale III et l'apophyse rétrolatérale du coxa IV de la même longueur que la prolatérale) et génitaux (comme le stylet du gland légèrement convexe dorsalement). *Discocyrtus cerayanus* n. comb. est ici redécrit, et sa distribution géographique est contestée. Le sens de "Ceraya", attribué au spécimen SMF RII 996/53 (holotype mâle de *Paradiscocyrtus cerayanus*), est nouvellement attribué à "Serra do Caraça", une chaîne de montagnes dans le Minas Gerais, Brésil au lieu de "Ceará", le Nord-Est du Brésil.

**MOTS CLÉS**
Arachnida,
Roeweriinae,
Neopachylinae,
Pachylinae,
Laniatores,
combinaison nouvelle.

## INTRODUCTION

*Paradiscocyrtus* Mello-Leitão, 1927 is currently included in Pachylinae Sørensen, 1884, a subfamily which has almost half of the described diversity of Gonyleptidae Sundevall, 1833 (Kury 2003; Kury *et al.* 2020). The original description was not extensive, and it gave the readers a five-line diagnosis based exclusively on features as 1) the number of spines on the abdominal scutum areas; 2) the number of spines on the ocularium; and 3) tarsal counts of legs I-IV (see Carvalho 2018 to an extensive discussion). As Carvalho (2018) explained, although its type species (*Paradiscocyrtus neglectus* Mello-Leitão, 1927) was for the first time recognized in the literature and redescribed, the Mello-Leitão's original diagnosis of the genus *Paradiscocyrtus* presents several problems. For example, *P. neglectus* does not present a pair of conspicuous tubercles on the dorsal scutum area II (a relevant point to differ between *Paradiscocyrtus* and *Discocyrtus* Holmberg, 1878). Besides that, if that characters (results of the so-called "Roewerian system") were used as putative hypothesis in a cladistic analysis, they would not carry much phylogenetic information according to a modern paradigm (because it does not discriminate plesiomorphic and apomorphic conditions; see Carvalho & Kury 2020 for a more detailed discussion).

Based on that diagnosis, *Paradiscocyrtus* until recently had three valid species. Soon after its proposition, Roewer (1929) described another two members from Brazil: *Paradiscocyrtus cerayanus* Roewer, 1929 from "Ceraya" (universally misinterpreted as "Ceará" starting from Roewer 1931), and *Paradiscocyrtus trochanteralis* Roewer, 1929 (from "Mato Grosso"). Their original descriptions include each an illustration of the holotype habitus in dorsal view, along with the translation of *Paradiscocyrtus* diagnosis and *P. neglectus* description into German. Roewer (1929) also provided an identification key to the three valid (until that moment) species of *Paradiscocyrtus*. When that three species are reunited and compared side by side (Fig. 1), their morphs are remarkably different, raising a suspicion of them not forming a clade. Other facts that build a polyphyletic scenario to *Paradiscocyrtus* are: 1) *P. trochanteralis* was detected as a junior synonym of *Bunopachylus orientalis* (Roewer, 1913) and transferred from Pachylinae to Roeweriinae Carvalho & Kury, 2018 (Carvalho *et al.* 2021); and 2) *P. cerayanus* shows morphologic similarity with the *Discocyrtus sensu stricto* concept (Carvalho & Kury 2018), a monophyletic core of *Discocyrtus* – currently the second largest genus of Pachylinae and proven polyphyletic as currently defined (Carvalho & Kury 2018, 2020).

Here, in addition to the work started by Carvalho (2018), *Paradiscocyrtus* is reviewed. The species *P. cerayanus* is studied and redescribed with the first illustration of its male genitalia. The systematic position of *Bunopachylus orientalis* (which has *P. trochanteralis* in its synonym list) is only passingly mentioned here, as it was already redescribed and discussed within the scope of another work (Carvalho *et al.* 2021). To evaluate the hypothesis whether *Paradiscocyrtus* constitutes a clade, the first cladistic analysis (based on morphological characters) focused on this genus is presented. Based on the phylogenetic results: 1) *P. cerayanus* is transferred to *Discocyrtus* Holmberg, 1878; 2) the presence of *B. orientalis* in Roeweriinae has renewed support; and 3) the relationship between *P. neglectus* (considered here as the only valid species of *Paradiscocyrtus*) and *Discocyrtus sensu stricto* is discussed. Finally, the type locality of *P. cerayanus* is discussed, and herein receives a new interpretation.

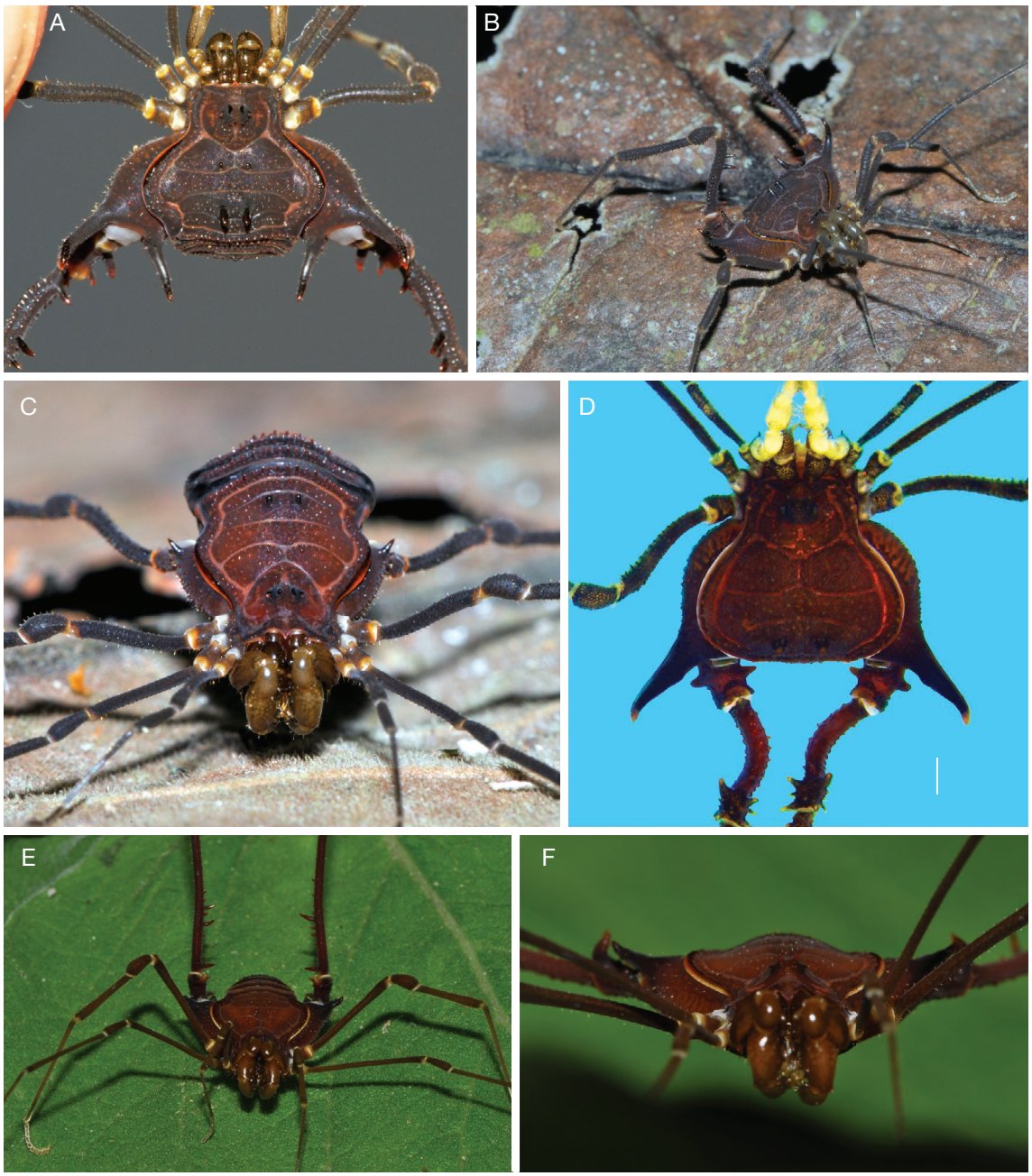


FIG. 1. — Previous state of knowledge of the *Paradiscocyrtus* Mello-Leitão, 1927 species composition between 1929-2020: **A**, **B**, *Paradiscocyrtus neglectus* Mello-Leitão, 1927 (male), *in vivo*, from Itatiaia, Rio de Janeiro, Brazil; **C**, *Paradiscocyrtus neglectus* Mello-Leitão, 1927 (female), *in vivo*, same locality; **D**, *Discocyrtus cerayanus* (Roewer, 1929) n. comb. [previously *Paradiscocyrtus cerayanus*] (male), MNRJ 7245†, *in alcohol*, from Caeté, Minas Gerais, Brazil; **E**, **F**, *Bunopachylus orientalis* (Roewer, 1913) [of which *Paradiscocyrtus trochanteralis* Roewer, 1929 is recognized as junior synomyn] (male), *in vivo*, from Águas Mornas, Santa Catarina, Brazil. Scale bar: 1 cm. Photos: A-C, A. Kury; D, R. Carvalho; E, F, M. Medrano.

## MATERIAL AND METHODS

### SPECIMEN DESCRIPTION PARAMETERS

The specimen description parameters follow Carvalho & Kury (2020). Descriptions of colors use the standard names (in italics) followed by the centroid code in parenthesis of the 267 Color Centroids of the NBS/IBCC Color System (Jaffer 2001). Photographs were taken with a stereomicroscope coupled to a Sony Cybershot DSC-V1 digital camera, combined using the CombineZP software (Hadley 2010) and edited with Adobe Photoshop CC 2015.5. All measurements are in millimeters (mm).

The diagnosis at genus rank given here compares *Paradiscocyrtus* (here represented only by *P. neglectus*) and 1) representatives of *Discocyrtus s. str.* (including *Discocyrtus cerayanus* n. comb.) and 2) *Bunopachylus orientalis* since one of its synonyms (*P. trochanteralis*) traditionally was part of *Paradiscocyrtus*. For the species diagnosis, we compare *Discocyrtus cerayanus* n. comb. with other species of *Discocyrtus s. str.*

Biogeographic units used here follow the regionalization of the Neotropics ("Provinces") proposed by Morrone (2014). Colored background areas indicate these provinces on the maps (Figs 5; 6) based on a shapefile created by Löwenberg-Neto (2014). The areas of endemism of the Brazilian Atlantic Rain Forest used in Figure 5 follow DaSilva *et al.* (2017)."

### Phylogenetic analysis

*Choice of terminals*

The analysis primary targets are the two species currently included in *Paradiscocyrtus*, *P. cerayanus* and *P. neglectus*. As one of its junior synonyms was a member of *Paradiscocyrtus* until mid-2021, *B. orientalis* is used here to evaluate its possible relationship with the type species of *Paradiscocyrtus* (*P. neglectus*). To test their monophyly, we choose some putative outgroup members from within the "DRMN-group" (as recognized in Carvalho & Kury 2020), including: 1) four representatives of *Discocyrtus s. str.*; 2) seven members of Roeweriinae, including *Bunopachylus armatissimus* (Roewer, 1913) (type species of *Bunopachylus* Roewer, 1943); 3) three of Mitobatinae Simon, 1879; and 4) six members of Neopachylinae Carvalho & Kury, 2020 – all these four groups represented by their type species. As *Paradiscocyrtus* at this time is a member of Pachylinae, two representatives of Pachylinae *s. str.* were also used here (*Acanthopachylus aculeatus* (Kirby, 1819) and *Pachylus chilensis* (Gray, 1833)). As other representatives of Gonyleptidae, we choose: 1) *Goniosoma varium* Perty, 1833 (the type species of the type genus of Goniosomatinae Mello-Leitão, 1935), sister-group of some members of today's DRMN in Pinto-da-Rocha *et al.* (2014) and in Carvalho & Kury (2020); and 2) *Gonyleptes horridus* Kirby, 1818, a notorious member of the K92 group (Kury 1992) and representative of the gonyleptid type-genus. Maintaining Carvalho & Kury (2018, 2020) procedure, *Ampycus telifer* (Butler, 1873) was used to root our analysis.

### Maximum parsimony (MP) analysis

The character states were organized in a matrix using Mesquite 3.10 (Maddison & Maddison 2017). The annotated list of characters is in Table 1. The matrix of characters states and terminals (2519 scorings; 421 missing data; 28 taxa; 105 characters) is in Table 2. Trees were searched in TNT (Goloboff *et al.* 2008b) using parsimony under equal weights and implied weights (Goloboff *et al.* 2008a), traditional search algorithm and with tree bisection-reconnection (TBR branch-swapping). Space was allocated for 99 999 trees in memory, and 100 replicates with 10 000 trees each were carried out. To evaluate the stability of results under different concavity values, we follow Mendes (2011) protocol. We use nine different concavity values (k = 1, 2, 3, 4, 5, 6, 10, 15, 20) and the results were summarized on space plots (Navajo rugs) in Figure 2. The branch-support was estimated using Absolute symmetric frequencies (SFq) (10 000 replicates, cut = 50, change probability = 33). The data substantiation was valued with absolute Bremer (or branch) support, i.e.,"decay index" (Bremer 1994). Both parameters were calculated using TNT (Goloboff *et al.* 2003) and are shown in Figure 2. The tree obtained most often during the analysis, and with the shortest number of steps, was chosen for discussion (Fig. 3). Its character distribution and ACCTRAN optimization were studied with WINCLADA (Nixon 1999-2002) (Fig. 3).

### Abbreviations

*Repositories*

MCN Museu de Ciências Naturais, Fundação Zoobotânica, Porto Alegre, Rio Grande do Sul;

MNRJ Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro (the material lost in the MNRJ 2018 fire (see Kury *et al.* 2018) is characterized by a † signal in the material examined list);

SMF Naturmuseum Senckenberg Sektion Arachnologie, Frankfurt am Main.

*Other abbreviations*

| | |
|---|---|
| AL | abdominal scutum length; |
| AS | abdominal scutum; |
| AW | abdominal scutum width; |
| Ch | chelicera; |
| Cl | claw (appendages); |
| CL | carapace length; |
| CW | carapace width; |
| Cx | coxa; |
| DS | dorsal scutum; |
| Fe | femur; |
| MS A1–A3 | basal macrosetae of VP; |
| MS B | ventro-basal macrosetae of VP; |
| MS C1–C3 | distal macrosetae of VP; |
| MS D | dorso-lateral subdistal small setae of VP; |
| MS E1–E2 | ventro-distal macrosetae of VP; |
| Mt | metatarsus; |
| Pa | patella; |
| Pp | pedipalpus; |
| Ta | tarsus; |
| Ti | tibia; |
| Tr | trochanter; |
| VP | ventral plate (penis). |

## RESULTS OF THE ANALYSIS

TNT yielded a single tree for each k-value tested (summary of larger groups is in Figure 2, characters mapped in Figure 3). The consistency index (CI), retention index (RI) and number of steps of these trees are summarized in Table 3. Here, the discussion is based on the most frequent topology (which appeared under k-values = 5, 6, 10, 15 and 20), whose RI and steps long values are more robust. As the primary analysis results, *Paradiscocyrtus* is considered a monotypic genus as its type species, *P. neglectus* is recovered as the sister group of *Discocyrtus s. str.* (Fig. 2, orange clade), but this branch shows low support values (SFq < 50; Bremer = 0) (Fig. 2). Added to this factor, some unique diagnostic characters (e.g. the shape of the penis stylus, DS area III with a pair of paramedian spines and the Cx IV retrolateral apophysis well-developed) are outstanding. Therefore, here *Paradiscocyrtus* is not synonymized with *Discocyrtus* (see more details in the discussion section). *Paradiscocyrtus neglectus* is a large brown gonyleptid with a known distribution restricted to localities higher than 2000 meters of altitude in the Serra da Mantiqueira (between Minas Gerais and Rio de Janeiro states) of Brazil (Fig. 4).

TABLE 1. — Character descriptions and states used in the present analysis.

| | |
|---|---|
| 1 | **Penis, macrosetae A, insertion on VP**: (0) lateral; (1) dorsal. |
| 2 | **Penis, podium, relative position to the ventral plate**: (0) reaching longitudinally half or more of the ventral plate height; (1) reaching longitudinally a third of the ventral plate height. |
| 3 | **Penis, glans, pedestal**: (0) absent; (1) present. |
| 4 | **Penis, glans, pedestal, insertion angle of the stylus on the pedestal**: (0) 90 degrees for dorsal portion; (1) more than 90 degrees for dorsal portion; (2) 45 degrees for dorsal portion. |
| 5 | **Penis, glans, stylus, stem, shape**: (0) medially inclined 45° to ventral portion; (1) with subapical curvature, ventrally oriented; (2) dorsoventrally flattened; (3) sigmoid and longitudinally elongated; (4) sigmoid; (5) straight; (6) with subapical curvature, dorsally oriented; (7) ventrally convex, (8) apically convex. |
| 6 | **Penis, glans, stylus, stem, medial spines**: (0) absent; (1) present. |
| 7 | **Penis, glans, stylus, apical portion, shape**: (0) longitudinally flattened; (1) transversely flattened; (2) only an extension of the stylus; (3) plateau with dorsal curvature; (4) as a tubular process, dorsally curved; (5) swollen in relation to the stem. |
| 8 | **Penis, glans, stylus, apical winglets**: (0) absent; (1) present. |
| 9 | **Penis, glans, stylus, apical winglets, spines**: (0) absent; (1) present. |
| 10 | **Penis, glans, stylus, apical portion covered by spines**: (0) absent; (1) present. |
| 11 | **Penis, glans, ventral process**: (0) extremely reduced or absent; (1) present. |
| 12 | **Penis, glans, ventral process, organization**: (0) without subdivisions, subconical, with ampulliform projections; (1) stem plus flabellum. |
| 13 | **Penis, glans, ventral process, shape of stem**: (0) inverted subconical; (1) tubular. |
| 14 | **Penis, glans, ventral process, shape of stem, tubular, pattern of curvature**: (0) straight or with one curve on proximal half; (1) sigmoid, with two pronounced curves. |
| 15 | **Penis, glans, ventral process, flabellum, frame**: (0) middle axis; (1) double V-shaped axis. |
| 16 | **Penis, glans, ventral process, flabellum, middle axis, type**: (0) scallop-shaped; (1) hand-shaped; (2) only an extension of the ventral process; (3) fan-shaped. |
| 17 | **Penis, glans, ventral process, flabellum, middle axis, type of ornamentation**: (0) serrulations; (1) spines. |
| 18 | **Penis, glans, ventral process, diameter**: (0) half of the stylus; (1) a third or less than the stylus; (2) same diameter of the stylus diameter; (3) wider than the stylus. |
| 19 | **Penis, glans, ventral process, height compared to the stylus**: (0) height lower than the stylus; (1) height higher height than the stylus. |
| 20 | **Penis, glans, ventral plate, border of the basal portion, shape**: (0) straight; (1) elliptical; (2) diagonal. |
| 21 | **Penis, ventral plate, border of the basal portion elliptical, lateral expansion (compared with the distal part)**: (0) not expanded; (1) expanded. |
| 22 | **Penis, ventral plate, basal convex format**: (0) absent; (1) present. |
| 23 | **Penis, ventral plate, shape of distal portion**: (0) with a groove; (1) without a groove. |
| 24 | **Penis, ventral plate, distal portion without a groove, type**: (0) trapezoidal (widest apically); (1) trapezoidal (narrower apically); (2) rectangular. |
| 25 | **Penis, ventral plate, ratio between distal and basal widths**: (0) same proportion; (1) basal twice wider than distal; (2) basal one-third wider than distal. |
| 26 | **Penis, ventral plate, macrosetae A1, position**: (0) on the basal part; (1) on the medial part. |
| 27 | **Penis, ventral plate, macrosetae B1**: (0) absent; (1) present. |
| 28 | **Penis, ventral plate, macrosetae B1, type**: (0) only the apical portion exposed; (1) more than the apical portion exposed. |
| 29 | **Penis, ventral plate, macrosetae C1-C3, insertion**: (0) all placed distally, united; (1) C3 is set widely apart from the other C, forming a diastema; (2) all placed distally with subequal intervals between them. |
| 30 | **Penis, ventral plate, macrosetae C, diameter in relation to macrosetae A**: (0) same diameter; (1) macrosetae A 0.001 mm thicker than the C; (2) macrosetae A 0.002 mm thicker than the C; (3) macrosetae A 0.003 mm or more thicker than the C; (4) macrosetae C thicker than A. |
| 31 | **Penis, ventral plate, macrosetae C, length**: (0) 0.06 mm or more; (1) between 0.04 and 0.05 mm; (2) less than 0.035 mm. |
| 32 | **Penis, ventral plate, macrosetae E, longitudinal distribution pattern**: (0) macrosetae E2 ventrally below of the range of distribution of macrosetae C; (1) macrosetae E ventrally inside of the range of distribution of macrosetae C; (2) macrosetae E1 ventrally above of the range of distribution of macrosetae C. |
| 33 | **Penis, ventral plate, shape of field of type 1 microsetae**: (0) field strongly reduced to a pair of latero-basal patches; (1) field entire, occupying most of VP; (2) field restricted to proximal third of VP. |
| 34 | **Chelicera, basal article, relation with the anterior margin of DS**: (0) largely covered by the previous margin; (1) well exposed. |
| 35 | **Chelicera, bulla, proximal margin, spines**: (0) absent; (1) present. |
| 36 | **Chelicera, bulla, proximal margin, spines, mesal portion quantity**: (0) one; (1) two. |
| 37 | **Chelicera, bulla, proximal margin, spines, ectal portion quantity**: (0) one; (1) two. |
| 38 | **Pedipalpus, femur, quantity of the ventral spines**: (0) a proximal spine; (1) two spines; (2) three spines; (3) four spines. |
| 39 | **Ocularium, position on the carapace in relation to the insertion of legs**: (0) at the level of the second pair of legs; (1) between the second and third pairs of legs; (2) at third pair of legs. |
| 40 | **Ocularium, shape (in frontal view)**: (0) convex, without depression; (1) convex, with medial depression; (2) rectangular, without depression. |
| 41 | **Ocularium, height (in lateral view)**: (0) twice the height of the eyes; (1) thrice or more the height of the eyes. |
| 42 | **Ocularium, armature, number of spines or tubercles**: (0) one; (1) two. |
| 43 | **Ocularium, armature, pair, the relation between the spines or tubercles**: (0) independent; (1) fused at the base. |
| 44 | **Dorsal scutum of male, outline, type (as in Kury & Medrano 2016)**: (0) gamma pyriform, Eusarcus-like; (1) gamma pyriform, Acanthogonyleptes-like; (2) gamma pyriform, Gonyleptes-like; (3) gamma pyriform, Acanthogonyleptes-like, with posterior curvature more convex than the original; (4) gamma; (5) gamma triangular; (6) beta; (7) lambda. |
| 45 | **Dorsal scutum, dry marks**: (0) absent; (1) present. |
| 46 | **Dorsal scutum, dry marks, distribution on mesotergum**: (0) on the margins of areas I-III; (1) around the tubercles all over the mesotergum; (2) restricted to tip of tubercles all over the mesotergum; (3) forming a Y-inverted pattern on the mesotergum. |
| 47 | **Dorsal scutum, lateral margins, color**: (0) dark brown, matching the mesotergum; (1) yellow, with brown reticulum, matching the mesotergum; (2) light brown, reticulated, contrasting with mesotergum, which has predominant background uniform dark brown |
| 48 | **Dorsal scutum, mesotergum, areolate pattern of stains**: (0) absent; (1) present. |

Table 1. — Continuation.

| | |
|---|---|
| 49 | **Dorsal scutum, mesotergum, areolate pattern of stains, type**: (0) cross-shaped; (1) on all areas of mesotergum, only absent on the lateral margins of the areas I–II; (2) on all areas of mesotergum; (3) forming circles around of the tubercles. |
| 50 | **Dorsal scutum, mesotergum, width of the grooves between the areas**: (0) very narrow, not totally visible; (1) ordinary, visible. |
| 51 | **Dorsal scutum, mesotergum, area I, distribution pattern of tubercles**: (0) transversal posterior row of 5-6 tubercles; (1) transversal row of four dome-shaped tubercles; (2) pair of conspicuous tubercles; (3) two pairs of conspicuous tubercles; (4) three pairs of conspicuous tubercles; (5) scattered ordinary tubercles on all area extension. |
| 52 | **Dorsal scutum, mesotergum, relation between the lateral margins of areas I (posterior) and II (anterior)**: (0) without the lateral invasion of area II on area I; (1) with the lateral invasion of area II on area I. |
| 53 | **Dorsal scutum, mesotergum, area II, distribution pattern of tubercles**: (0) transversal row in all medial extension; (1) transversal row with four dome-shaped tubercles; (2) two anterior e six posterior; (3) inconspicuous, without defined pattern; (4) four anterior and six posterior; (5) a pair of conspicuous tubercles; (6) two anterior e eight posterior; (7) two pairs of conspicuous tubercles. |
| 54 | **Dorsal scutum, mesotergum, relation between the lateral margins of areas II (posterior) and III (anterior)**: (0) without the lateral invasion of area II on area III; (1) with the lateral invasion of area II on area III. |
| 55 | **Dorsal scutum, mesotergum, area III, highlighted tubercles between the paramedian armature**: (0) absent; (1) present. |
| 56 | **Dorsal scutum, mesotergum, area III, highlighted tubercles between the paramedian armature, quantity**: (0) one pair; (1) two pairs; (2) three pairs. |
| 57 | **Dorsal scutum, mesotergum, area III, paramedian armature, type**: (0) acuminated tubercles; (1) spine(s); (2) domes. |
| 58 | **Dorsal scutum, mesotergum, area III, paramedian armature, acuminated tubercles, shape**: (0) without any inflection; (1) with an inflection to the posterior portion. |
| 59 | **Dorsal scutum, mesotergum, area III, paramedian armature, domes, shape**: (0) ellipses with little height; (1) circular, slightly compressed on lateral portions; (2) circular, longitudinally slight compressed; (3) almost forming a cylinder; (4) circular, almost forming a globe. |
| 60 | **Dorsal scutum, mesotergum, area III, paramedian armature, spine(s), shape**: (0) with medial constriction and rounded apex; (1) conical with rounded apex; (2) with slight distal inflection to ventral portion, pointy apex. |
| 61 | **Dorsal scutum, mesotergum, area III, highlighted pair of tubercles from the external side of the paramedian armature**: (0) absent; (1) present. |
| 62 | **Dorsal scutum, mesotergum, area IV, medial division**: (0) absent; (1) present. |
| 63 | **Dorsal scutum, mesotergum, relation between area IV and area V**: (0) area IV invading area V; (1) parallel to each other; (2) area V invading area IV. |
| 64 | **Dorsal tubercles, posterior margin and free tergites, conspicuous tubercles , organization**: (0) uniform row on all transversal extension; (1) a highlighted pair on paramedian portion; (2) a transversal row on all extension, without armature on medial portion; (3) increasing size towards the medial portion. |
| 65 | **Ventral area, proportion between the Cx I-III area and Cx IV (in situ)**: (0) Cx IV twice larger than the Cx I-III; (1) Cx IV thrice larger than the Cx I-III; (2) same proportion between them. |
| 66 | **Ventral area, coxa I, transversal row of spines, pattern** : (0) spines overlapping; (1) spines separated at regular intervals. |
| 67 | **Ventral area, coxa II, medial constriction by coxa I**: (0) absent; (1) present. |
| 68 | **Ventral area, coxa II, medial constriction by coxa III**: (0) absent; (1) present. |
| 69 | **Legs (most markedly III-IV), trichromatic striped pattern in yellow, black, and red**: (0) absent; (1) present. |
| 70 | **Leg II, coxa, prodorsal proximal spine**: (0) conical, geminated, anterior larger and swollen; (1) triad, central larger and swollen; (2) conical, not geminated; (3) conical, geminated, posterior larger and swollen. |
| 71 | **Leg II, femur, retrodorsal distal spur**: (0) absent; (1) present. |
| 72 | **Leg II, femur, retrodorsal distal spur, size compared in relation to the Cx II width**: (0) about one-third of the size; (1) about half of the size: |
| 73 | **Leg III, femur, shape**: (0) straight; (1) sinuous. |
| 74 | **Leg III, femur, retrodorsal distal spur**: (0) absent; (1) present. |
| 75 | **Leg IV, coxa, angle in relation to the body axis**: (0) oblique; (1) parallel. |
| 76 | **Leg IV, coxa, prolateral margin, tubercles**: (0) absent; (1) present. |
| 77 | **Leg IV, coxa, prolateral margin, tubercles, shape**: (0) convex; (1) acuminated. |
| 78 | **Leg IV, coxa, prodorsal apophysis, basal second branch**: (0) absent; (1) present. |
| 79 | **Leg IV, coxa, prodorsal apophysis, basal thickness in relation to the medial portion**: (0) about the same; (1) swollen. |
| 80 | **Leg IV, coxa, prodorsal apophysis, posterior margin, shape**: (0) flat, without any projection; (1) with a medial rectangular projection. |
| 81 | **Leg IV, coxa, prodorsal apophysis, medial-distal second branch**: (0) absent; (1) present. |
| 82 | **Leg IV, coxa, prodorsal apophysis, medial-distal second branch, type**: (0) secondary branch not perceived (in dorsal view); (1) secondary branch perceived (in dorsal view). |
| 83 | **Leg IV, Cx, prodorsal apophysis, distal portion, angle in relation to the body axis**: (0) obtuse, more than 90 degrees; (1) 90 degrees. |
| 84 | **Leg IV, coxa, retrolateral apophysis**: (0) absent; (1) present. |
| 85 | **Leg IV, coxa, retrolateral apophysis, shape**: (0) stunted, with a tiny geminated branch; (1) stunted, single branch; (2) well-developed, bigger than the prodorsal apophysis. |
| 86 | **Leg IV, trochanter, shape**: (0) trapezoidal, widest base distal; (1) trapezoidal; widest base proximal; (2) approximately quadrangular; (3) rectangular. |
| 87 | **Leg IV, trochanter, size in relation to the width of the trochanter III**: (0) less than or equal to 1.5x the size of the trochanter III; (1) 2× or more the size of the trochanter III. |
| 88 | **Leg IV, trochanter, prolateral proximal apophysis**: (0) absent; (1) present. |
| 89 | **Leg IV, trochanter, prolateral medial apophysis**: (0) absent or inconspicuous; (1) conspicuous. |
| 90 | **Leg IV, trochanter, retrolateral proximal apophysis**: (0) absent or inconspicuous; (1) conspicuous. |
| 91 | **Leg IV, femur, diameter when compared to the Fe I-III**: (0) larger; (1) almost equal. |

Table 1. — Continuation.

| | |
|---|---|
| 92 | **Leg IV, femur, shape (in dorsal view)**: (0) C-shaped, dorsal concavity; (1) approximately straight; (2) S-shaped, sinuous; (3) C-shaped, prolateral concavity; (4) entirely straight. |
| 93 | **Leg IV, femur, dorsal face, armature between the proximal and medial portions**: (0) absent; (1) present. |
| 94 | **Leg IV, femur, dorsal face, armature between the proximal and medial portions, type**: (0) spine comb; (1) one or two spines with acuminated apex; (2) one to three spines, curved to the retrolateral portion; (3) two or three well-developed spines. |
| 95 | **Leg IV, femur, dorsal face, armature between the medial and distal portions**: (0) absent; (1) present. |
| 96 | **Leg IV, femur, prodorsal distal spur**: (0) absent; (1) present. |
| 97 | **Leg IV, femur, retrolateral face, armature between the proximal-medial and distal portions**: (0) absent; (1) present. |
| 98 | **Leg IV, femur, retrolateral face, armature between the proximal-medial and distal portions, type**: (0) spine comb, almost united; (1) spine comb, spaced in equal intervals. |
| 99 | **Leg IV, femur, retrolateral face, medial-distal spine**: (0) absent; (1) present. |
| 100 | **Leg IV, patella, proventral distal spur**: (0) absent; (1) present. |
| 101 | **Leg IV, patella, proventral distal spur, size in relation to the width of itself**: (0) approximately one-fifth the size; (1) approximately one-third the size. |
| 102 | **Leg IV, patella, retroventral row of tubercles**: (0) absent; (1) present. |
| 103 | **Leg IV, patella, retroventral face, medio-distal armature**: (0) absent; (1) present. |
| 104 | **Leg IV, patella, retroventral face, medio-distal armature, type**: (0) two-three tiny spines, with isometric size; (1) three developed spines, without isometric size. |
| 105 | **Leg IV, Ti, dorsal portion, type of tubercles**: (0) not acuminated; (1) acuminated. |

As for the other species of *Paradiscocyrtus*, *P. cerayanus* is transferred to *Discocyrtus*, forming *Discocyrtus cerayanus* n. comb. It appears as a sister group of (*Discocyrtus testudineus* Holmberg, 1876 + *Discocyrtus flavigranulatus* Soares, 1944), with SFq (= 76) and Bremer (= 3) support values (Fig. 2). However, considering the internal topology of *Discocyrtus s. str.*, two important points must be highlighted here. The first is that the clade formed by these three species does not have any real support (SFq < 50; Bremer = 0), and their geographic distribution indicates that the two Brazilian species (*D. cerayanus* n. comb. and *D. flavigranulatus*) would be closer to each other in relation to *D. testudineus*. The second is that their relationship with the other branch of *Discocyrtus s. str.* species (*Discocyrtus crenulatus* Roewer, 1913 + *Discocyrtus moraesianus* Mello-Leitão, 1923) has a low SFq value (< 50) (Fig. 2). That conflicts with the higher support levels of *Discocyrtus crenulatus* + *Discocyrtus moraesianus* (SFq = 98; Bremer = 5), which may mean that the currently *Discocyrtus s. str.* concept should be reviewed in the future. The third species that was included in *Paradiscocyrtus* until mid-2021 (*B. orientalis*) has its allocation in Roeweriinae corroborated, and the absence of a close phylogenetic relationship between it and *Paradiscocyrtus* is clearly evidenced (Fig. 2).

The DRMN clade internal relationship is unstable (Fig. 2). Here, even the relation showed by the chosen tree (Fig. 3), based in (Roeweriinae + (Neopachylinae + (*Discocyrtus s. str.* + Mitobatinae))) is supported only by k-values (= 5, 6, 10, 15, 20) and without support. The nickname remains a form of contrasting some ex-Pachylinae to the Pachylinae *s. str.*, but needs much more effort to be established as a formal category.

Within DRMN, Roeweriinae (Fig. 2, green clade) was retrieved by all trees studied here with SFq (= 74) and Bremer (= 3) support values. Here, *Bunopachylus* does not present good support values (SFq < 50; Bremer = 2) (Fig. 2). That fact could be understandable by the different focus of the analysis shown here (based on the *Paradiscocyrtus* relationship). For the other three Roeweriinae genera, high support values were obtained: *Amazochroma* Carvalho & Kury, 2018 (SFq = 99; Bremer = 8), *Discocyrtanus* Roewer, 1929 (SFq = 94; Bremer = 3) and *Roeweria* Mello-Leitão, 1923 (SFq = 98; Bremer = 6).

Mitobatinae (Fig. 2, blue clade) does not present support (SFq < 50; Bremer = 0), but the configuration [*Discocyrtoides nigricans* (Mello-Leitão, 1922 + (*Mitobates triangulus* Sundevall, 1833+ *Mitobatula castanea* Roewer, 1931)] is recovered in all the trees obtained here.

Neopachylinae (Fig. 2, red clade) has low SFq and Bremer support (64 and 1, respectively). Still, in the same way as for the other large groups analyzed here, it was retrieved in all of the trees recovered here. Its internal relationship does not present support values, but the three genera show higher support: *Neopachylus* (SFq = 96; Bremer = 4), *Pachylobos* (SFq = 97; Bremer = 6) and *Senu* (SFq = 97; Bremer = 3).

Here, Pachylinae *s. str.* has the best support values of the analysis presented here (SFq = 100; Bremer = 15) and does not show any close relationship with the DRMN members.

## SYSTEMATIC ACCOUNTS

### Genus *Paradiscocyrtus* Mello-Leitão, 1927

*Paradiscocyrtus* Mello-Leitão, 1927: 15; 1932: 205; 1935: 100. — Roewer 1929: 246. — Soares & Soares 1954: 286. — Kury 2003: 185. — Carvalho 2018: 190.

INCLUDED SPECIES. — *Paradiscocyrtus neglectus* Mello-Leitão, 1927 – type species by original designation.

DIAGNOSIS. — Stylus of glans slightly dorsally convex (Fig. 4A) (sinuous in *B. orientalis*; almost straight in *Discocyrtus s. str.* (Fig. 4B)). Ocularium with pair of spines almost forming a right angle concerning the basis (Fig. 4C) (forming an acute angle concerning the basis in *B. orientalis* and *Discocyrtus s. str.* (Fig. 4D)). DS gamma form

TABLE 2. — Matrix of character states used in the present analysis.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Ampycus telifer* | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | – | – | – | 0 | 2 | – | 0 | 0 | – | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 7 | 0 | – | 0 | 0 | – | 1 | 3 | 1 | 4 |
| *Acanthopachylus aculeatus* | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | – | 0 | 1 | 0 | – | – | – | – | – | – | 0 | 0 | – | 0 | 1 | 0 | 2 | 0 | 0 | – | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | – | – | 1 | 0 | 0 | 0 | 0 | – | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 |
| *Pachylus chilensis* | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | – | 0 | 1 | 0 | – | – | – | – | – | – | 0 | 0 | – | 0 | 1 | 0 | 2 | 0 | 0 | – | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | – | 1 | 0 | 0 | 0 | 0 | – | 0 | 0 | – | 0 | 0 | – | 0 | 0 | 0 | 0 |
| *Gonyleptes horridus* | 0 | 1 | 1 | 0 | 3 | 0 | 3 | 0 | – | 0 | 1 | 1 | 1 | ? | 0 | 3 | ? | 3 | 1 | 1 | 0 | 1 | 0 | – | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | – | – | ? | 1 | 2 | 0 | 1 | 0 | 2 | 0 | – | 0 | 0 | – | 1 | 3 | 0 | 7 |
| *Goniosoma varium* | 0 | 1 | 1 | 0 | 3 | 0 | 4 | 0 | – | 0 | 1 | 1 | 0 | – | 0 | ? | – | – | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 0 | – | 1 | 0 | – | – | 2 | 1 | 2 | 0 | 1 | 0 | 5 | 1 | 0 | 2 | 0 | – | 1 | 3 | 0 | 3 |
| *Paradiscocyrtus neglectus* | 0 | 1 | 1 | 2 | 8 | 1 | 2 | 0 | – | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | – | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 4 | 0 | – | 0 | 0 | – | 1 | 2 | 1 | 3 |
| *Discocyrtus cerayanus* n. comb. | 0 | 1 | 1 | 2 | 5 | 1 | 2 | 0 | – | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | – | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 3 | 0 | – | 0 | 0 | – | 1 | 2 | 0 | 3 |
| *Discocyrtus crenulatus* | 0 | 1 | 1 | 2 | 5 | 1 | 2 | 0 | – | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | – | 0 | 0 | 2 | 0 | 1 | 1 | 1 | 3 | 0 | – | 0 | 1 | 1 | 1 | 5 | 0 | 3 |
| *Discocyrtus flavigranulatus* | 0 | 1 | 1 | 2 | 5 | 1 | 2 | 0 | – | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 3 | 0 | – | 0 | 0 | – | 1 | 2 | 1 | 3 |
| *Discocytus moraesianus* | 0 | 1 | 1 | 2 | 5 | 1 | 2 | 0 | – | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | – | 0 | 0 | 2 | 0 | 1 | 1 | 1 | 3 | 0 | – | 0 | 0 | – | 1 | 2 | 1 | 3 |
| *Discocyrtus testudineus* | 0 | 1 | 1 | 2 | 5 | 1 | 2 | 0 | – | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | – | 0 | 1 | 0 | 1 | 1 | 1 | 3 | 0 | – | 0 | 0 | – | 1 | 2 | 0 | 3 |
| *Discocyrtoides nigricans* | 0 | 1 | 1 | 2 | 5 | 1 | 2 | 0 | – | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | – | – | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 3 | 2 | 0 | – | 1 | 5 | 1 | 3 |
| *Mitobates triangulus* | 0 | 1 | 1 | 0 | 2 | 1 | 5 | 0 | – | 0 | 1 | 1 | 0 | – | 1 | – | – | 3 | 1 | 1 | 0 | 1 | 0 | – | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | – | – | 0 | 1 | 2 | 0 | 1 | 0 | 6 | 0 | – | 2 | 1 | 0 | 1 | 5 | 0 | 3 |
| *Mitobatula castanea* | 0 | 1 | 1 | 0 | 2 | 1 | 5 | 0 | – | 0 | 1 | 1 | 0 | – | 1 | – | – | 3 | 1 | 1 | 0 | 1 | 0 | – | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | – | – | 0 | 1 | 2 | 0 | 1 | 0 | 6 | 1 | 0 | 2 | 2 | 1 | 0 | 1 | 2 | 0 | 6 |
| *Neopachylus bellicosus* | 0 | 1 | 1 | 2 | 6 | 0 | 3 | 0 | – | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | ? | ? | ? | ? | 1 | 0 | 0 | 0 | – | 4 | 0 | – | 0 | 0 | – | 1 | 2 | 1 | 5 |
| *Neopachylus imaguirei* | 0 | 1 | 1 | 2 | 6 | 0 | 3 | 0 | – | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | – | – | ? | 1 | 0 | 0 | 0 | – | 4 | 0 | – | 0 | 0 | – | 1 | 5 | 1 | 3 |
| *Pachylobos littoralis* | 0 | 1 | 1 | 2 | 6 | 0 | 3 | 0 | – | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 7 | 0 | – | 0 | 1 | 3 | 1 | 4 | 1 | 0 |
| *Pachylobos longicornis* | 0 | 1 | 1 | 2 | 6 | 0 | 3 | 0 | – | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 0 | 0 | – | 1 | 4 | 1 | 3 |
| *Senu leonardosi* | 0 | 1 | 1 | 2 | 6 | 0 | 3 | 0 | – | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 4 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 4 | 1 | 3 | 0 | 0 | – | 1 | 4 | 1 | 3 |
| *Senu vestita* | 0 | 1 | 1 | 2 | 6 | 0 | 3 | 0 | – | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 4 | 1 | 3 | 0 | 0 | – | 1 | 4 | 1 | 3 |
| *Amazochroma carvalhoi* | 0 | 1 | 0 | – | 4 | 0 | 1 | 1 | 1 | 0 | 0 | – | – | – | – | – | – | – | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 3 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | – | 1 | 2 | 1 | 2 |
| *Amazochroma pedroi* | 0 | 1 | 0 | – | 4 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | ? | 0 | ? | 1 | 1 | 1 | 2 | – | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | – | 1 | 2 | 1 | 2 |
| *Bunopachylus armatissimus* | 0 | 1 | 0 | – | 4 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | – | – | 1 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | – | 0 | 0 | – | 1 | 1 | 1 | 1 |
| *Bunopachylus orientalis* | 0 | 1 | 0 | – | 4 | 0 | 1 | 1 | 0 | 0 | 0 | – | – | – | – | – | – | – | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | – | 0 | 0 | – | 1 | 1 | 1 | 1 |
| *Discocyrtanus goyazius* | 0 | 1 | 0 | – | 4 | 0 | 1 | 1 | 1 | 0 | 0 | – | – | – | – | – | – | – | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 2 | 0 | 0 | – | 1 | 2 | 1 | 3 |
| *Discocyrtanus pertenuis* | 0 | 1 | 0 | – | 4 | 0 | 1 | 1 | 1 | 0 | 0 | – | – | – | – | – | – | – | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | – | 1 | 2 | 1 | 3 |
| *Roeweria bittencourti* | 1 | 1 | 0 | – | 7 | 0 | 1 | 1 | 0 | 0 | 0 | – | – | – | – | – | – | – | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 3 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | – | 1 | 1 | 2 | 1 | 2 | 1 | 3 |
| *Roeweria virescens* | 1 | 1 | 0 | – | 7 | 0 | 1 | 1 | 0 | 0 | 0 | – | – | – | – | – | – | – | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 3 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | – | 1 | 1 | 2 | 1 | 2 | 1 | 3 |

| | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Ampycus telifer* | 1 | 1 | 0 | 0 | 1 | – | – | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | – | 0 | 1 | 0 | – | 0 | 0 | – | 1 | 0 | – | 1 |
| *Acanthopachylus aculeatus* | 1 | 0 | – | 2 | – | 0 | – | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 0 | – | 1 | 0 | 1 | 0 | – | 0 | 0 | 0 | 0 | – | 0 | 0 | – | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | – | 0 | 0 | 0 | – | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| *Pachylus chilensis* | 1 | 0 | – | 2 | – | 0 | – | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 0 | – | 1 | 0 | 1 | 0 | – | 0 | 0 | 0 | 0 | – | 0 | 0 | – | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | – | 0 | 0 | 0 | – | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| *Gonyleptes horridus* | 1 | 0 | – | 0 | 1 | – | – | 0 | – | – | 2 | 0 | 0 | 0 | 0 | 0 | ? | 0 | – | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | ? | ? | 0 | 0 | – | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | – | 0 | ? | 0 | – | 0 | 0 | – | 1 | ? | ? | ? |
| *Goniosoma varium* | 1 | 0 | – | 1 | – | – | ? | 0 | – | – | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 2 | 3 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | – | 0 | 1 | 0 | – | 0 | 0 | – | 1 | 0 | – | 0 |
| *Paradiscocyrtus neglectus* | 1 | 0 | – | 1 | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | ? | 0 | 0 | – | 0 | 0 | – | 1 | 0 | – | 0 |
| *Discocyrtus cerayanus* n. comb. | 1 | 0 | – | 2 | – | ? | – | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | – | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 3 | 0 | – | 0 | 1 | 1 | 0 | – | 0 | 1 | 1 | 1 | 1 | 1 |
| *Discocyrtus crenulatus* | 1 | 0 | – | 2 | – | 2 | – | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | – | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 0 | – | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| *Discocyrtus flavigranulatus* | 1 | 1 | 2 | 2 | – | 2 | – | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | – | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | – | 0 | 1 | 0 | – | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| *Discocytus moraesianus* | 1 | 0 | – | 2 | – | 2 | – | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 0 | – | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| *Discocyrtus testudineus* | 1 | 0 | – | 2 | – | 2 | – | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | – | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 1 | 3 | 0 | – | 0 | 1 | 0 | – | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| *Discocyrtoides nigricans* | 0 | 0 | – | 1 | – | – | 0 | 0 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 4 | – | – | – | – | – | – | – | 0 | – | 1 | 0 | – | 0 |
| *Mitobates triangulus* | 0 | 1 | 2 | 1 | – | – | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 3 | 0 | – | 0 | 0 | 0 | 1 | 0 | 0 | – | – | – | – | – | – | – | 3 | 1 | 0 | 0 | 0 | 0 | 4 | – | – | – | – | – | – | – | 0 | – | 1 | 0 | – | 0 |
| *Mitobatula castanea* | 0 | 0 | – | 1 | – | – | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 3 | 0 | – | 0 | 0 | 0 | 1 | 0 | 0 | – | – | – | – | – | – | – | 3 | 0 | 0 | 0 | 0 | 0 | 4 | – | – | – | – | – | – | – | 0 | ? | 1 | 0 | – | 0 |
| *Neopachylus bellicosus* | 1 | ? | ? | 2 | – | 4 | – | 0 | 1 | 2 | 0 | 0 | 1 | ? | ? | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | – | 0 | ? | ? | 1 | 1 | 0 | 0 |
| *Neopachylus imaguirei* | 1 | 0 | – | 2 | – | 3 | – | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | – | 0 |
| *Pachylobos littoralis* | 1 | 0 | – | 2 | – | 4 | – | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 1 | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| *Pachylobos longicornis* | 1 | 0 | – | 1 | – | – | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 1 | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| *Senu leonardosi* | 1 | 0 | – | 1 | – | – | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | – | 1 | 1 | 0 | 3 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | – | 1 | 0 | – | 1 | 1 | 0 | 1 |
| *Senu vestita* | 1 | 0 | – | 1 | – | – | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | – | 1 | 1 | 0 | 3 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | – | 1 | 0 | – | 1 | 1 | 0 | 0 |
| *Amazochroma carvalhoi* | 1 | 1 | 1 | 1 | – | – | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 1 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | – | 0 | 1 | 0 | – | 0 | 1 | 0 | 0 | 0 | – | 0 |
| *Amazochroma pedroi* | 1 | 1 | 1 | 2 | – | 1 | – | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 0 | – | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | – | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | – | 1 |
| *Bunopachylus armatissimus* | 1 | 1 | 0 | 2 | – | 1 | – | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | ? | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | – | 1 | 0 | – | 1 | 1 | ? | ? |
| *Bunopachylus orientalis* | 1 | 1 | 0 | 2 | – | 1 | – | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | – | 1 | 0 | – | 1 | 0 | – | ? |
| *Discocyrtanus goyazius* | 1 | 1 | 1 | 0 | 0 | – | – | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | – | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | – | 0 | 1 | 1 | 3 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | – | 0 |
| *Discocyrtanus pertenuis* | 1 | 1 | 1 | 0 | 0 | – | – | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | – | 1 | 1 | 0 | 1 | 0 | ? | 0 | 1 | 0 | – | 0 | 1 | 1 | 3 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | – | 0 |
| *Roeweria bittencourti* | 1 | 0 | – | 1 | – | – | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | – | 0 | 0 | 0 | – | 0 | 0 | – | 0 | 0 | – | 1 |
| *Roeweria virescens* | 1 | 0 | – | 1 | – | – | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | – | 0 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | – | 0 | 0 | 0 | – | 0 | 1 | 0 | 1 | 0 | – | 0 |

(Fig. 4E) (gamma-pyriform form in *B. orientalis* and *Discocyrtus s. str.* (Fig. 4F)). Area III paramedian armature with a pair of phalanx-shaped spines (Fig. 4E) (a pair of dome-shaped tubercles in *B. orientalis* and *Discocyrtus s. str.* (Fig. 4F)). Area IV posterior groove invading the DS posterior border medially (Fig. 4E) (absent in *B. orientalis* and *Discocyrtus s. str.* (Fig. 4F)). Cx IV retrolateral apophysis with the same length as the prolateral, without a secondary branch (Fig. 4E) (tiny and with a second branch in *B. orientalis* and *Discocyrtus s. str.* (Fig. 4F)). Tr IV with a pair of prolateral medial apophyses (Fig. 4E) (absent in *B. orientalis* and *Discocyrtus s. str.* (Fig. 4F)).

DISTRIBUTION. — Brazil, states of Minas Gerais and Rio de Janeiro (Fig. 5).

## *Paradiscocyrtus neglectus* Mello-Leitão, 1927
(Figs 1A; 4A, C, E)

*Paradiscocyrtus neglectus* Mello-Leitão, 1927: 3; 1932: 206. — Roewer 1929: 247. — Soares & Soares 1954: 286. — Kury 2003: 185.

*Discocyrtus alticola* Mello-Leitão, 1935b: 6, fig. 3 [junior subjective synonym of *Paradiscocyrtus neglectus* Mello-Leitão, 1927 by Carvalho (2018: 190)]; 1935a: 101. — B. Soares 1945: 371. — Soares & Soares 1954: 246; 1970: 340. — Kury 2003: 160.

*Discocyrtus perfidus* Mello-Leitão, 1932: 181, fig. 103 [junior subjective synonym of *Paradiscocyrtus neglectus* Mello-Leitão, 1927 by Carvalho (2018: 190)]. — B. Soares 1945: 374. — Soares & Soares 1954: 254. — Kury 2003: 165.

TYPE DATA. — *Paradiscocyrtus neglectus*: **Brazil** • "Itatiaia", without further locality data; whereabouts unknown • ♂ neotype (examined); Minas Gerais, Itamonte, Parque Nacional de Itatiaia; MNRJ 5578† (lost in the 2018 fire in Museu Nacional).
*Discocyrtus alticola*: **Brazil** • "Itatiaia", without further locality data; MNRJ 18198 (lost).
*Discocyrtus perfidus*: **Brazil** • 2 ♂ syntypes (examined); Rio de Janeiro, "Nictheroy" [Niterói], locality probably mistaken (see Carvalho 2018); MNRJ 1419† (lost in the 2018 fire in Museu Nacional).

DISTRIBUTION AND DIAGNOSIS. — Same as provided previously here for the genus *Paradiscocyrtus*.

DESCRIPTION. — See Carvalho (2018) for the extensive description and illustrations.

## Genus *Discocyrtus* Holmberg, 1878

## *Discocyrtus cerayanus* (Roewer, 1929) n. comb.
(Figs 1B; 4B, D, F; 6; 7; 8)

*Paradiscocyrtus cerayanus* Roewer, 1929: 247, fig. 29; 1931: 104. — Mello-Leitão 1932: 206. — Soares & Soares 1954: 286. — Acosta 1996: 221. — Kury 2003: 185.

TYPE DATA. — **Brazil** • ♂ holotype (examined), "Ceraya" [= Minas Gerais, Serra do Caraça], wrongly identified as "Ceará" by Roewer (1931), see discussion in the geographical remarks section below; SMF RII 996/53.

RECORDS. — Without further literature records.

MATERIAL EXAMINED. — **Brazil** • 1 ♂, 1 ♀, 2 juv; Minais Gerais, Caeté, Projeto Apolo, AP-09; 05-09.VII.2011; A. Giupponi, D. Pedroso, C. Sampaio *leg.*; MNRJ 7244† (Fig. 6) • 5 ♂, 10 ♀; same data; MNRJ 7245†.

TABLE 3. — TNT values of consistency index (**CI**), retention index (**RI**) and step length of the trees analyzed here.

| k-values | CI | RI | Steps |
|---|---|---|---|
| 1, 2, 3, 4 | 52 | 71 | 313 |
| 5, 6, 10, 15, 20 | 52 | 72 | 311 |

TABLE 4. — Leg measurements of *Discocyrtus cerayanus* Roewer, 1929 n. comb., male holotype redescribed here (SMF RII 996/53).

| | Tr | Fe | Pa | Ti | Mt | Ta | Cl | Total |
|---|---|---|---|---|---|---|---|---|
| Pp | 0.60 | 1.56 | 0.71 | 1.09 | – | 0.88 | 0.85 | 5.69 |
| Leg I | 0.63 | 2.40 | 0.92 | 1.73 | 2.79 | 1.35 | – | 9.82 |
| Leg II | 0.76 | 4.17 | 1.14 | 3.50 | 4.23 | 3.88 | – | 17.68 |
| Leg III | 0.85 | 3.49 | 1.25 | 2.65 | 3.82 | 1.85 | – | 13.91 |
| Leg IV | 1.84 | 4.44 | 1.49 | 3.45 | 5.03 | 2.49 | – | 18.74 |

DISTRIBUTION. — Brazil: Minas Gerais: Caeté, new record; Serra do Caraça (Fig. 5).

DIAGNOSIS. — Area IV divided into left and right halves by a median groove (Fig. 4F; 8A) (as in *D. crenulatus* and *D. testudineus*; entire in *D. flavigranulatus*). Stigmatic area inverted T-shape (Figs 6B, 8D) (inverted Y-shape in *D. crenulatus*, *D. flavigranulatus* and *D. testudineus*). Tr IV with a protuberance oriented to dorsal, which resembles a hook (Figs 6A, B; 8A, E) (armature absent or reduced in *D. crenulatus*, *D. flavigranulatus* and *D. testudineus*). Pa IV with proximal retroventral apophysis (Fig. 7G, J) (as in *D. flavigranulatus*; absent in *D. crenulatus* and *D. testudineus*). Ti IV dorsal portion with outstanding tubercles (Fig. 7E, F, H, I) (as in *D. crenulatus*, ordinary tubercles in *D. flavigranulatus* and *D. testudineus*). DS outline of female lambda-shaped (gamma-pyriform-shaped in *D. crenulatus*, *D. flavigranulatus* and *D. testudineus*). Glans ventral process almost the same height as the stylus (Fig. 8A, B) (as in *D. flavigranulatus*; with half of the height in *D. crenulatus* and *D. testudineus*).

### REDESCRIPTION

*Male specimens*

SMF RII 996/53 for the external body illustrations; DS, measurements: CW 3.6, CL 2.1, AW 6.1, AL 3.6; legs I-IV measurements in the Table 4; right / left tarsal (distitarsal) counts: 6(3) / 5(3) - 9(3) / 10(3) - 7 / 7 - 7 / 7. MNRJ 7244† for color references and genitalic illustrations.

**Dorsum.** DS gamma-pyriform, as long as wide, with lateral margins of the AS convex, widest at areas II-III and thickest at area III, with concave posterior margin (Figs 6A, C, D; 8A, B). DS anterior margin with two sets of five acuminated tubercles, divided by a small apophysis in the center and a pair of shallow cheliceral sockets (Fig. 7A). Carapace with many tubercles on the posterior portion, with a transversal row of four prominent tubercles (Fig. 7A). Ocularium elliptical (in dorsal view), high (*c.* 4.5× the eye diameter), inclined frontwards, placed in the anterior portion of the carapace (Figs 6A, C; 8A, B). Ocularium armed with a pair of divergent spines (c. 3× the eye diameter) fused at baseline (Figs 6D; 8A-C). Mesotergum is divided into four clearly defined areas (Fig. 7A). Areas I and IV are divided into left and right halves by a median groove (Fig. 7A). AS lateral borders with two rows of tubercles: one external, composed

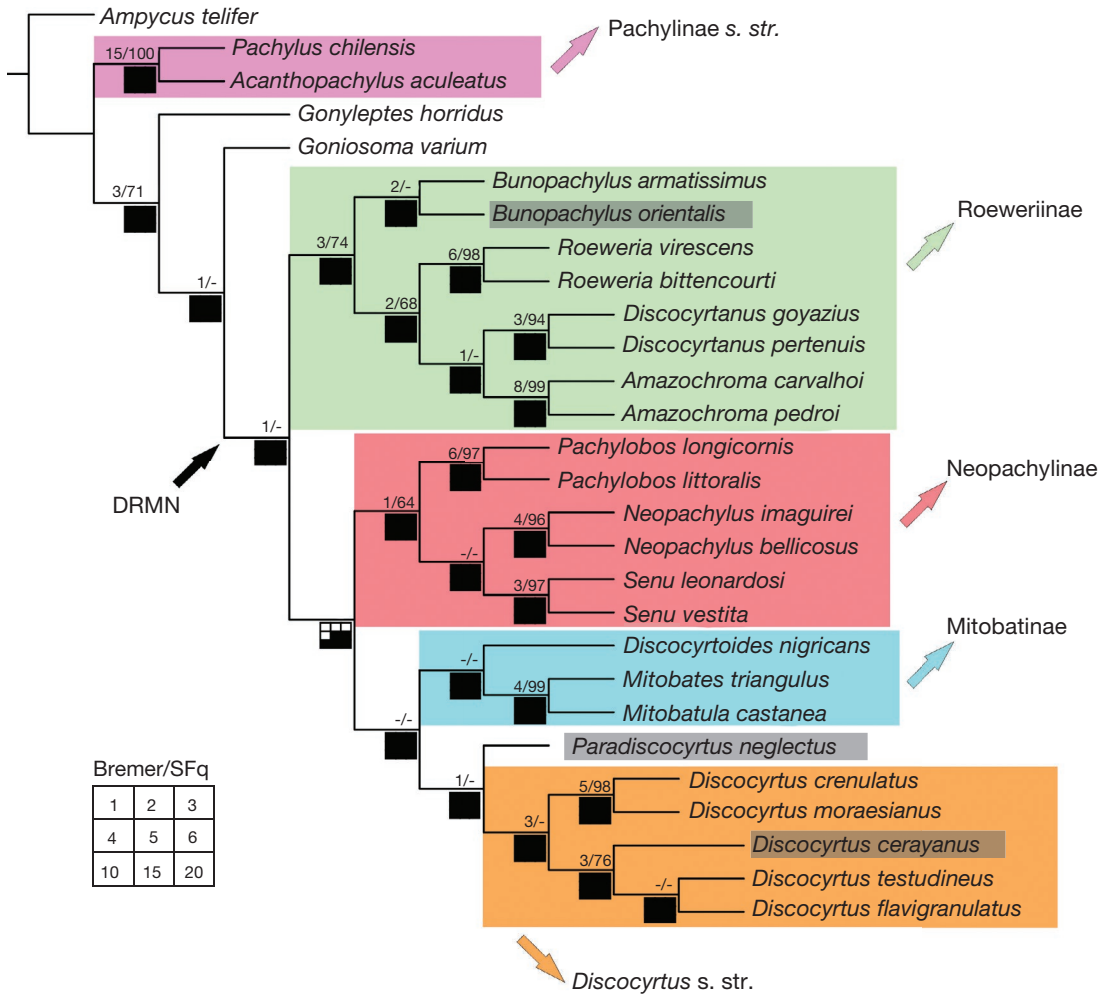


FIG. 2. — The most frequent tree (k-values = 5, 6, 10, 15 and 20; 311 steps, consistency index = 52, retention index = 72) obtained by the protocol applied. Clade support values are indicated above the branches (absolute Bremer support values/absolute symmetric frequencies). Clade stability is indicated below the branches by the sensitivity plots ('Navajo rugs'), which indicate different concavity values (**k**) tested (**black squares** indicate monophyly; **white squares** indicate non-monophyly). Main groups have colored branches: Pachylinae *s. str.* (**magenta**), Roeweriinae (**green**), Neopachylinae (**red**), Mitobatinae (**blue**) and *Discocyrtus s. str.* (**orange**). The unmarked groups are not members of either DRMN or Pachylinae *s. str.* Shaded taxa names (**in grey**) evidence the representants of *Paradiscocyrtus* Mello-Leitão, 1927 status quo 2020.

by six or seven prominent tubercles at areas II-III (Fig. 7A, B); other internal with ordinary tubercles from the anterior portion of carapace backward (Fig. 7A). All areas tuberculate (Fig. 7A, B). Area I with two pairs of dome-shaped paramedian tubercles, twice the size of the ordinary tubercles (Fig. 7A, B); area II with three pairs of prominent tubercles. Area III with an outstanding pair of domed-shaped tubercles, each one surrounded by prominent tubercles (two external and three medial, with *c.* twice the ordinary tubercles). Area IV with two transversal sets of three prominent tubercles (c. twice the ordinary) interspersed by ordinary ones (Fig. 7A). DS posterior border and free tergites with a transversal row of larger tubercles (Fig. 7A). Anal operculum covered by rows of ordinary tubercles (Fig. 7A).

**Venter.** Cx I-III parallel to each other (Fig. 6B), each with ventral transverse rows of 8-13 setiferous tubercles (Cx I rows with higher and sharper tubercles than the others). Cx II with a retroventral distal row of seven acuminate tubercles. Cx III with a retroventral distal row of nine acuminate tubercles (Fig. 7D). Cx IV much larger than the others, directed obliquely (Figs 6B, C; 8D). Stigmatic area Y-inverted-shaped, clearly sunken concerning Cx IV distal part (Figs 6B; 8D). Cx IV covered by prominent tubercles (Figs 6B, C; 8D). Cx IV posterior margin and stigmatic area with a transversal row of the prominent tubercles (Figs 6B, C; 8D). Intercoxal bridges well-marked (Fig. 6B). Stigmata visible (Figs 6B; 8D). Free sternites with a transverse row of ordinary tubercles (Fig. 6B, C).

**Chelicera.** Basichelicerite elongate, bulla well-marked, with marginal setiferous tubercles – two ectal, two posterior (Fig. 7A), one mesal; hand not swollen.

**Pedipalpus.** Tr with two geminate ventral setiferous tubercles. Fe with a ventral basal and a mesal apical setiferous tubercle.

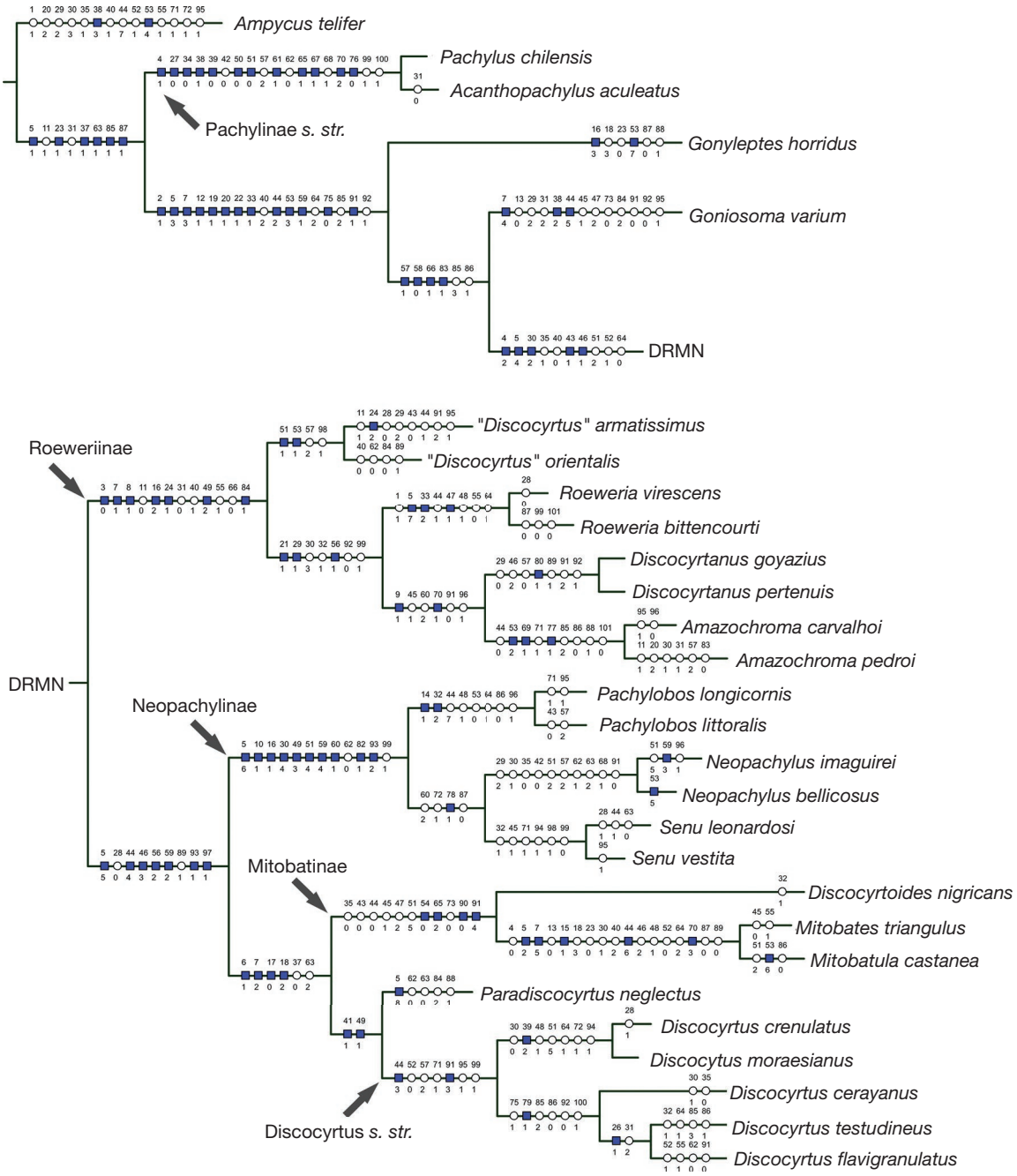


FIG. 3. — Cladogram depicting proposed external and internal phylogenetic relationships of *Paradiscocyrtus* Mello-Leitão, 1927, with synapomorphies for each clade mapped using ACCTRAN. This is the most frequent topology (k-values = 5, 6, 10, 15 and 20) obtained by TNT. **Blue squares**, nonhomoplastic synapomorphies; **white circles**, homoplastic synapomorphies. Number of characters above and number of states below symbols.

Pa unarmed (Fig. 6A). Ti with two rows of setiferous tubercles: four (IiIi) ventro-mesal; (IiIi) ventro-ectal (Fig. 6A). Ta with two rows of setiferous tubercles: three (IIi) ventro-mesal and four (IIIi) ventro-ectal.

**Legs.** Tr I-III each with several ventral tubercles. Fe I and III sub-straight; Fe II straight (Fig. 6A, B). Fe and Ti I-III with all faces containing rows of small tubercles; Fe III and Ti III with proventral and retroventral two rows of small acuminate tubercles. Fe II-III with an apical retrodorsal spur. Pa I-III covered dorsally by tubercles. Cx IV reaching the posterior margin of DS (Figs 6A; 8A). Cx IV tuberculate between prodorsal and ventral faces (Figs 6A-C; 8A, D). Cx IV with a thick prolateral distal conical apophysis, swollen at the basis, with apical portion slightly curved backwards (Figs 6A-C; 8A, B, D). Cx IV with a retrolateral spiniform apophysis, fused with a small secondary branch (Figs 6A, B; 8A, D). Tr IV square-shaped (Figs 6A, B; 8A). Tr IV proximal with conical prolateral and retrolateral apophyses, both curved to the dorsal portion (Figs 6A, B; 8A, E-H). Tr IV dorsal central with a pair

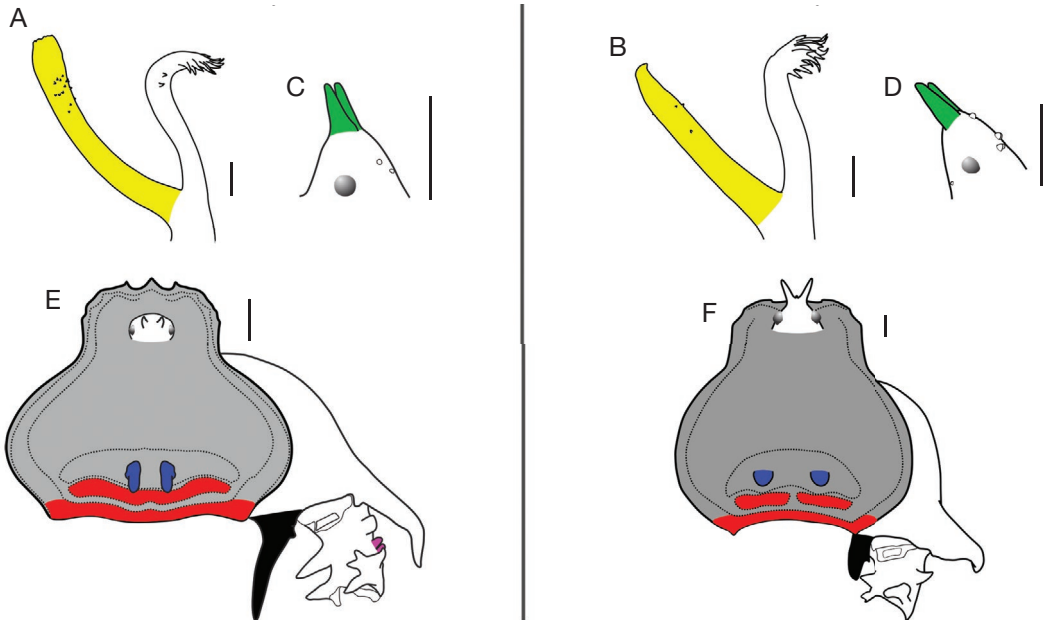


FIG. 4. — Diagnostic character states of *Paradiscocyrtus* Mello-Leitão, 1927 (**A**, **C**, **E**) in contrast to *Discocyrtus s. str.* (**B**, **D**, **F**): **A**, **B**, stylus of glans (**yellow**); **C**, **D**, ocularium pair of spines (**green**); **E**, **F**, DS shape (**gray**), area III armature (**blue**), comparative shape between area IV posterior and DS posterior borders (**red**), Cx IV retrolateral apophysis (**black**); Tr IV prolateral medial apophysis (**magenta**, absent in *Discocyrtus s. str.*). Scale bars: A, B, 50 µm; C, D, E, F, 1 mm.

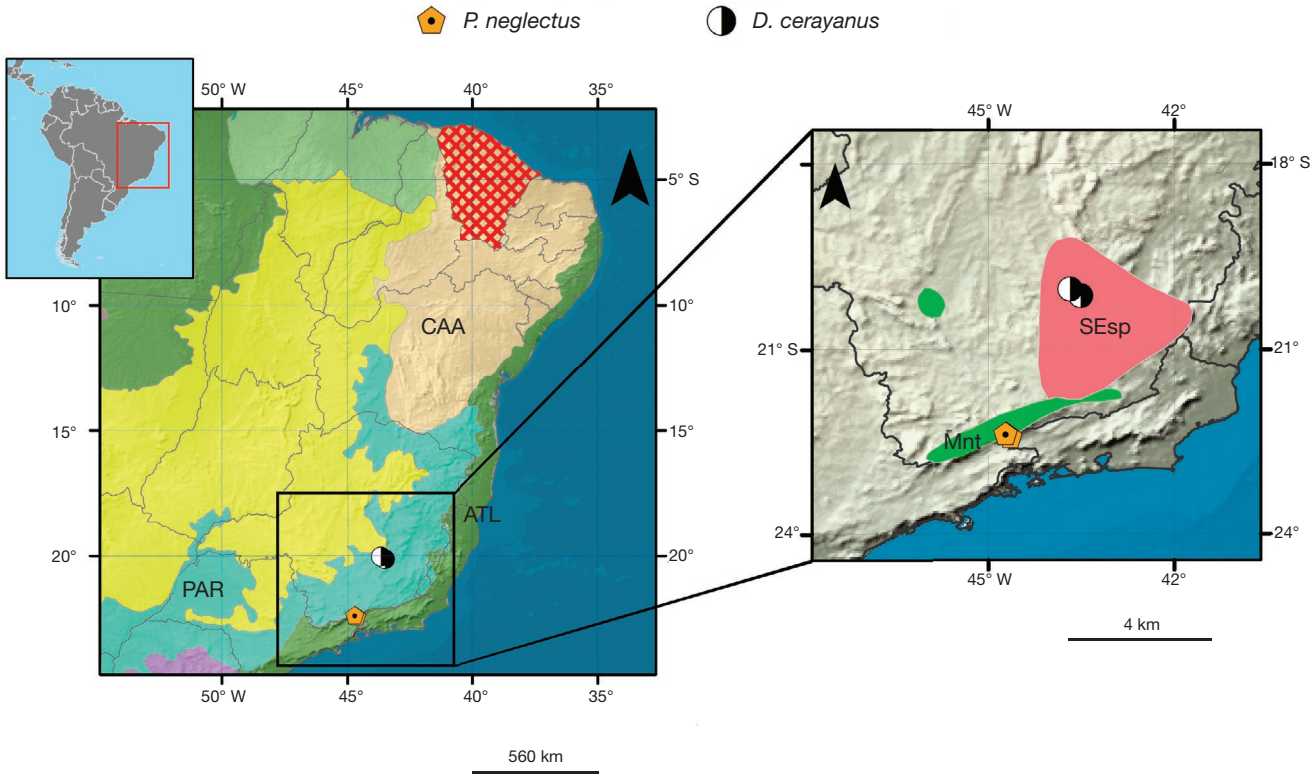


FIG. 5. — Brazil, showing distribution of *Discocyrtus cerayanus* (Roewer, 1929) n. comb. and *Paradiscocyrtus neglectus* Mello-Leitão, 1927. In the main map: 1) shaded areas in the background represent the regionalization ("Provinces") of the Neotropics (Morrone 2014); 2) the red-checkered area shows the Brazilian state of Ceará, misinterpreted by Mello-Leitão (in Roewer 1931) as the real meaning of "Ceraya" (type locality of *D. cerayanus* n. comb.) recorded by Roewer (1929). Here, "Ceraya" is interpreted as "Serra do Caraça", a mountain range from the Minas Gerais state. The inset shows the areas of endemism of the Brazilian Atlantic Rain Forest used here follow the concept exposed by DaSilva *et al.* (2017).

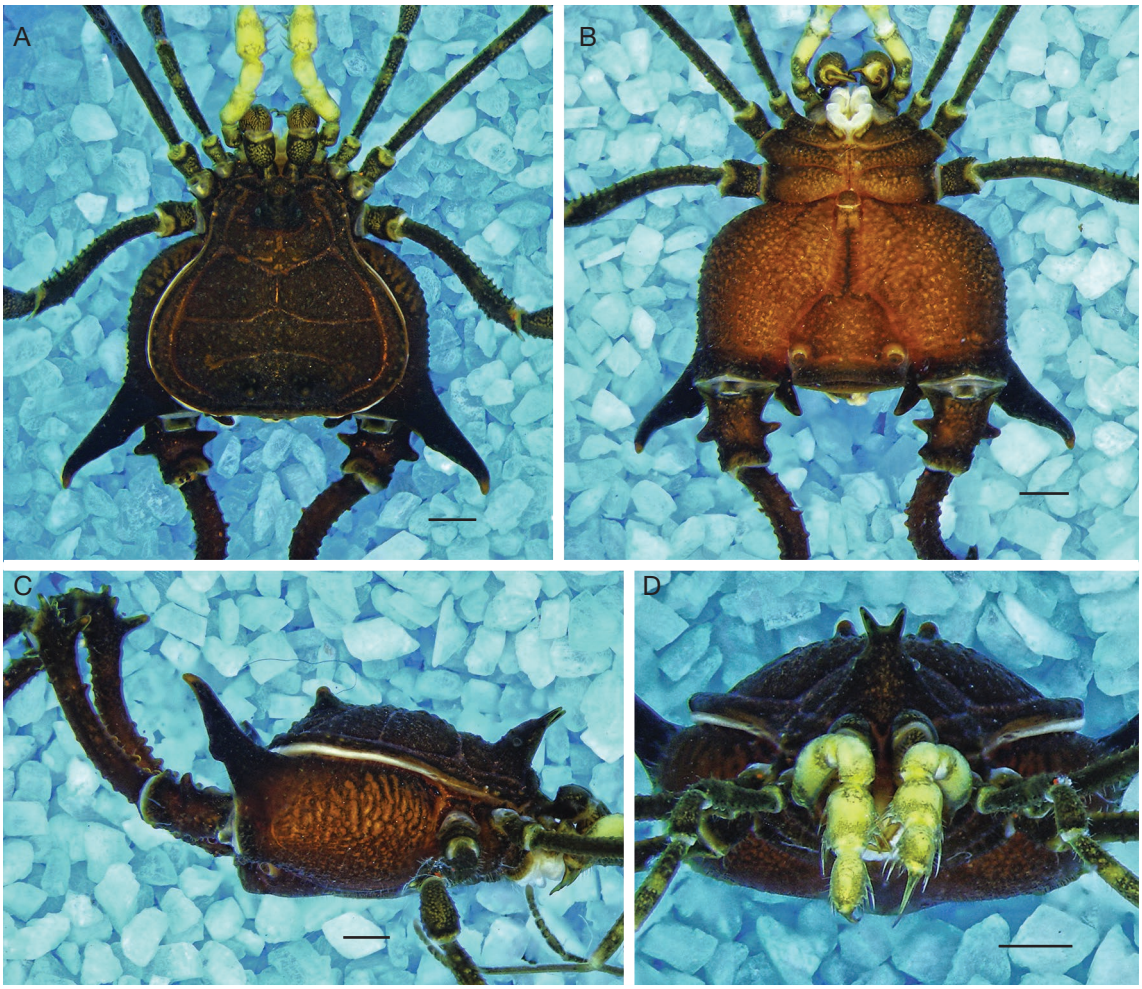


FIG. 6. — Habitus of *Discocyrtus cerayanus* (Roewer, 1929) n. comb., MNRJ 7244†, *in alcohol*, male from Caeté, Minas Gerais, Brazil: **A**, dorsal view; **B**, ventral view; **C**, lateral view; **D**, anterior view. Scale bars: 1 cm. Photos: R. Carvalho.

of highlighted tubercles, longitudinally arranged (Figs 6A; 8A, E, F, H). Tr IV distal retrolateral with a conical apophysis, without acuminated apex (Fig. 7E, F, H). Tr IV prodorsal distal with a protuberance oriented to dorsal, resembling a hook (Fig. 7A, E, F). Tr IV ventral face tuberculate (Fig. 7F-H). Fe IV C-shaped (using the right femur as a reference, in dorsal view), arched on the central portion towards dorsal (Figs 6C; 8E-H). Fe IV proximal-medial portion with 1) a dorsal row of five prominent tubercles (Fig. 7E, F, H) and 2) prodorsal, prolateral, proventral, retroventral, retrolateral and retrodorsal rows of ordinary tubercles (Fig. 7E, F, H). Fe IV distal portion with: 1) two prodorsal spines (Fig. 7E, H); 2) a proventral and retroventral apical spur each (Fig. 7E, F); 3) three retrolateral spines (Fig. 7G, H); and 4) one retrodorsal spine (Fig. 7E, H). Pa IV dorsally tuberculate (Fig. 7I). Pa IV retroventral and retrodorsal with conical apophyses (Fig. 7G, H, J). Pa IV proventral and retroventral with rows of six and three spines, respectively (Fig. 7I, J). Ti IV with all faces tuberculate (Fig. 7I, J); retroventral central-distal with a row of 10 spines (Fig. 7J). Mt IV prodorsal, proventral, retroventral and retrodorsal with rows of setiferous tubercles. Mt IV proventral and retroventral faces with a spur.

**Color** (in alcohol) (Fig. 6A-D). Ocularium, DS background and its borders *Strong Orange Yellow* (68). Pp *Vivid Yellow* (82). Chelicerae, Tr-Pa I-III, Ti-Ta II *Vivid Orange Yellow* (66). Ti-Ta I and III *Moderate Orange Yellow* (71). Ocularium pair of spines *Brownish Orange* (54). Area III pair of domed-shaped tubercles *Dark Red* (16). Articular membranes *Moderate Orange Yellow* (71). Cx IV medial and Tr IV *Deep Orange Yellow* (69). Cx IV proximal and distal and Tr IV apophyses *Strong Brown* (55). Fe-Ti medial IV *Strong Orange Yellow* (68). Ti medial-Mt IV *Vivid Yellow* (82). Ta II-IV *Light Greenish Yellow* (101).

**Male genitalia.** VP slightly divided into two regions: distal part forming a rectangle with latero-apical flaps, proximal part elliptical (Fig. 8A, C). VP ventral surface entirely covered with microsetae of type 1 (Fig. 8B, C). All macrosetae inserted on lateral of VP. MS A1-A3 cylindrical, thick, and acuminate, forming a triangle (with A2 more ventral than the other two) on the basal third of VP (Fig. 8B, C). MS B1 small, inserted ventrally, proximal to A2 (Fig. 8B, C). MS C1-C3 similar to the MS A, inserted on the ventrolateral border, forming a longitudinal row on the distal third of VP (Fig. 8A-C). MS D1 small, inserted on VP ventrolateral border, closer

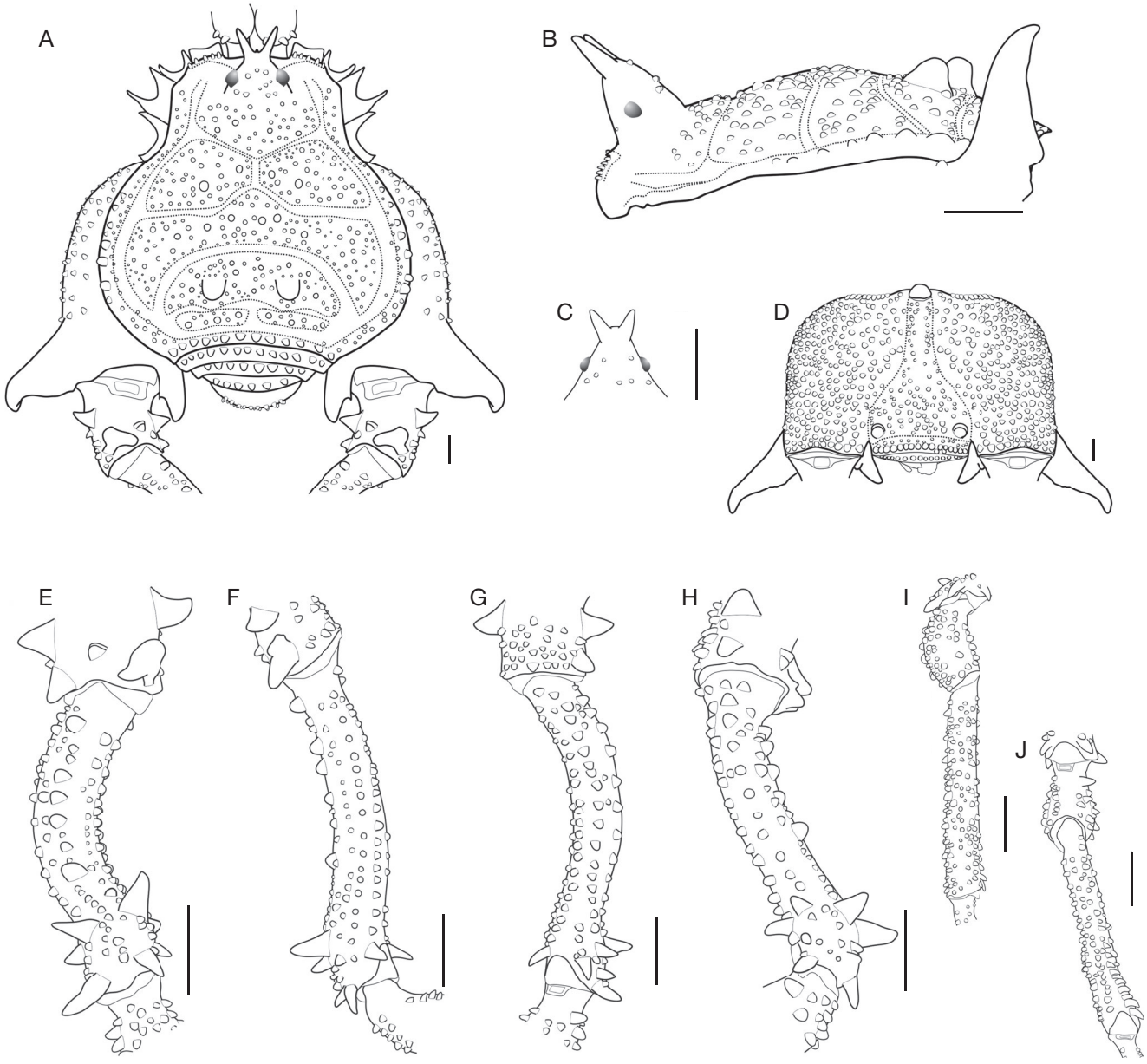


Fig. 7. — *Discocyrtus cerayanus* (Roewer, 1929) n. comb., (SMF RII 996/53), male holotype, from "Ceraya" [Serra do Caraça, Minas Gerais], Brazil: **A**, habitus, dorsal view; **B**, same, lateral view; **C**, ocularium, anterior view; **D**, Cx IV, ventral view; **E**, right Tr-Fe IV, dorsal view; **F**, same, prolateral view; **G**, same, ventral view; **H**, same, retrolateral view; **I**, right Pa-Ti IV, prolateral view; **J**, same, ventral view. Scale bars: 1 cm.

to C3 than to A1 (Fig. 8A-C). MS E1-E2 small, located on the laterodistal flange of VP – E1 between the height of MS C1-C2, E2 between the height of MS C2-C3 (Fig. 8B). Glans sac arising from the middle bulge on the podium, not extended as a dorsal process (Fig. 8A, B). Stylus and its ventral process axis fused basally (forming a short pedestal) at a 45° angle (Fig. 8A, B). Stylus cylindrical, almost straight, without clearly defined head and armed with a few small subdistal setae (Fig. 8A, B). Ventral process with almost the same stylus's length, with a ventro-apical flabellum (Fig. 8A, B). Flabellum curved proximally, scallop-shaped, measuring about 40% length of the ventral process stem (Fig. 8A, B).

**Intraspecific variation.** The material studied does not present *minor morph males*. It was also not found intraspecific variation among the major morph males and females.

*Female (MNRJ 7244†)*

DS lambda type. Area III with a pair of paramedian spines, with an elevated basis. Free tergites with a transversal row of ordinary tubercles. Cx IV narrower than in males, with the prodorsal apophysis reduced to a single spine and without the retroventral apophysis. Tr IV with a proximal retrolateral apophysis. Fe IV thinner compared to male, moderately curved in the proximal portion.

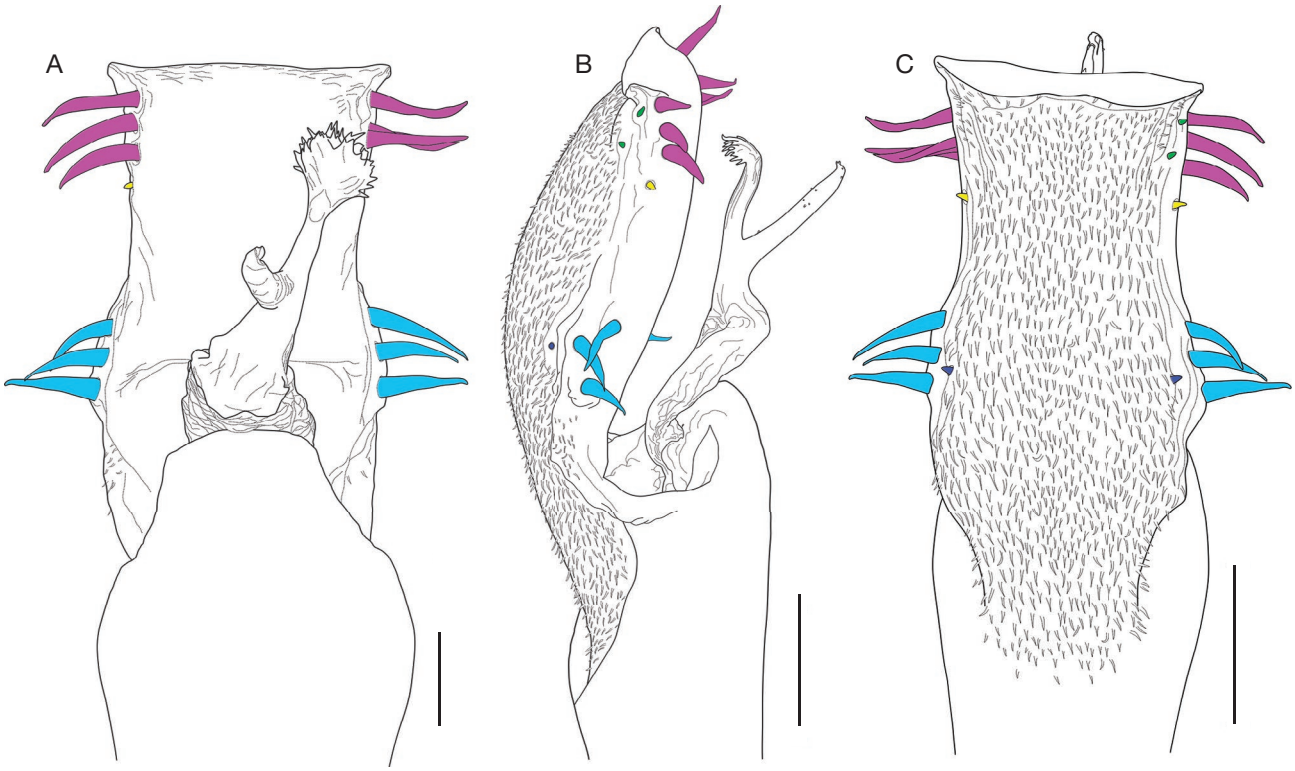


Fig. 8. — *Discocyrtus cerayanus* (Roewer, 1929) n. comb., MNRJ 7244†, male genitalia, distal part: **A**, dorsal view; **B**, lateral view; **C**, ventral view. Scale bars: A, 50 µm; B, C, 100 µm. Colored features are the genitalic macrosetae of VP: **light blue**, MS A; **dark blue**, MS B; **magenta**, MS C; **yellow**, MS D; **green**, MS E.

### Geographical remarks

The male holotype of *Paradiscocyrtus cerayanus* (SMF RII 996/53) was originally reported as from the locality "Brasilien (Ceraya)" by Roewer (1929: 248). As noted by Roewer (1931: 104), Mello-Leitão explained to him in a personal correspondence that Ceraya was a misspelling of the locality name and extrapolated this as being the state of "Ceará" in northeastern Brazil. Roewer added that all his records contained the misspelling and accepted without question Mello-Leitão's interpretation. Subsequent authors did not pursue this question and later cataloguers – Soares & Soares (1954: 286) and Kury (2003: 185) – simply repeated "Ceará". However, comparing that locality with the geographical data gathered and studied here, one cannot make sense of such an interpretation because the northeastern Brazilian fauna is quite different from the one in the Southeast (e.g. Kury 2003).

Diacritics are often a source of confusion in toponyms, as exemplified in the misinterpretation by Henriksen (1932: 420) of the names "Boyacá" and "Choachí" (Cundinamarca, Colombia) respectively as "Boydla" and "Choact" (Medrano *et al.* 2020). With the benefit of cumulative decades of study of Brazilian Gonyleptidae, for us it is easier to understand that a cedilla under a C could easily have been misspelled by European collectors as a "Y". This toponym "Ceraya" does not appear in further harvestmen literature, however, in the same paper, Roewer (1929: 255) described another Gonyleptidae as from "Caraya", which gives us the remaining piece of the puzzle.

This way, by replacing only a single letter, Caraya (or its further distortion Ceraya) can be easily retrieved as "Caraça", a small mountain range in Minas Gerais state, southeastern Brazil. Further material of *D. cerayanus* n. comb. studied by us corroborates this new interpretation, because the specimens hail from Caeté, Minas Gerais, which is extremely close to the Serra do Caraça (about 20 km in a straight line). Therefore, we herein rectify the incorrect interpretation of Mello-Leitão/Roewer (1931) of "Ceraya" as "Ceará" to [Serra do] Caraça, state of Minas Gerais, Brazil, which should be the correct type-locality of the species.

## DISCUSSION

The subfamily Pachylinae has been a target of extensive systematic research after the establishing of Pachylinae *sensu stricto* (Pinto-da-Rocha *et al.* 2014; see a discussion of the Chilean Pachylinae in Benavides *et al.* 2021), and the works with *Discocyrtus sensu lato* and correlated genera already provided new tools to solve this puzzle (Hara *et al.* 2018; Kury *et al.* 2020; Benavides *et al.* 2021). The DRMN concept (Carvalho & Kury 2018) showed some "pachylines" closer to Mitobatinae than *Pachylinae s. str.*, with the addition of two new subfamilies to Gonyleptidae, Roeweriinae and Neopachylinae (Carvalho & Kury 2018, 2020). But, since 2018, the clade of *Discocyrtus sensu stricto* did not receive a new formal subfamilial assignment. Here, it remains without alteration

in its subfamilial status due to another project in progress (with a more extensive scope, focused on the phylogeny of Gonyleptoidea) where this issue will be deeply discussed.

Here, the placement of *Discocyrtus s. str.* shows new possibilities of interpretations. The first, and not so new, is the sister group relation between *Discocyrtus s. str.* and Mitobatinae. This idea was proposed as early as 30 years ago (Kury 1991, who even coined the informal nickname "Discocyrtinae") but only corroborated by phylogenetic analyses much later (Pinto-da-Rocha *et al.* 2014; Carvalho & Kury 2018). Subsequently, that hypothesis was not corroborated by Carvalho & Kury (2020). However, *Discocyrtus s. str.* + Mitobatinae is recovered again herein (with some new relevant data). It is essential to highlight two points: the relation of *Discocyrtus s. str.* and *Paradiscocyrtus neglectus*, and the lack of substantial data of the DRMN internal relationships.

The similarity of *Paradiscocyrtus neglectus* and *Discocyrtus s. str.* is clear (mainly in the male genitalia). However, their relationship is poorly sustained in our results (Fig. 2) and *P. neglectus* lacks some very uniform diagnostic characters of *Discocyrtus s. str.* (they are summarized in Figure 4 and detailed in the *Paradiscocyrtus* diagnosis provided here). Based on these factors, we preferred not to combine *P. neglectus* under *Discocyrtus* (even if it means keeping *Paradiscocyrtus* as a monotypic genus).

The close relationship between Mitobatinae and *Paradiscocyrtus* + *Discocyrtus s. str.* was recovered in all trees examined here. But except for the branches that support the subfamilies, as occurred in Carvalho & Kury (2018, 2020), all other DRMN branches do not have real support. As another relevant point, the sampling of Mitobatinae of our analysis was limited and does not show any branch support (Fig. 2). Thus, a study focused on the internal relations of DRMN (with better sampling of taxa) is necessary to evaluate the relationship detected here.

Shifting the focus to the internal relations of *Discocyrtus s. str.*, the presence of *Discocyrtus cerayanus* n. comb. in there is reasonable as it is the most similar species described (until now) to *Discocyrtus testudineus*, both regarding external features and male genitalia. Its presence in *Paradiscocyrtus* since the original description reflects one of the Roewerian system problems in Opiliones systematics. In the most recent published diagnosis of *Discocyrtus* and *Paradiscocyrtus*, they are differentiated by only one character: the presence of "Área II inerme" [DS area II unarmed] for *Discocyrtus* (Soares & Soares 1954: 245), and "Área II do escudo abdominal com dois tubérculos" [DS area II with two tubercles] for *Paradiscocyrtus* (Soares & Soares 1954: 286). Due to only the ornamentation of area II, the entire range of characteristics similar in both species has been ignored in favor of a quick categorization formula. And, as an "ironic" point, the position of *Discocyrtus cerayanus* n. comb. is wrong even if Soares & Soares (1954) diagnosis was maintained. As noted here in the description section, *Discocyrtus cerayanus* n. comb. holotype (the only reported specimen of this species until now in the literature) shows three pairs of outstanding tubercles on DS area II. In that way, it does not fit *Paradiscocyrtus* unless the diagnosis is changed.

To conclude, two different main clades of *Discocyrtus s. str.* emerged from our analysis with some support: *D. cerayanus* n. comb. + *D. flavigranulatus* + *D. testudineus* (with regular support values) and *D. crenulatus* + *D. moraesianus* (with high support). Despite the uniformity presented by the male genitalia, these two groups have some notable differences in the exomorphology (mainly in the DS color pattern and the Cx IV prodorsal apophysis shape). The results obtained here can be a starting point for a more detailed study based on the *Discocyrtus s. str.* diagnosis in the future.

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