UNIVERSIDADE DE SÃO PAULO

Bruno Vinicius Bastos Rodrigues

Análise filogenética da subfamília Prodidominae Simon 1884 e taxonomia dos gêneros africanos (Arachnida; Araneae: Gnaphosidae)

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Esta tese não é uma publicação conforme descrito no Código de Nomenclatura Zoológica. Portanto, nomes novos e mudanças taxonômicas aqui propostos não tem validade para fins de nomenclatura ou prioridade.

WARNING

This thesis is not a publication as described by the International Code of Zoological Nomenclature. Therefore, new names and taxonomic changes here proposed are not valid for nomenclatural or priority purposes.

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ÍNDICE

INTRODUÇÃO GERAL

O status taxonômico de aranhas prodidomidas sempre foi controverso, uma vez que o status do grupo flutua entre família e subfamília (Simon, 1884; Platnick & Shadab, 1976; Platnick, 1990; Azevedo *et al.*, 2018). São aranhas de pequeno a médio porte e pouco abundantes em coleções.

Prodidomidae foi originalmente descrita como família por Simon (1884) para incluir os gêneros *Prodidomus* Hentz, *Zimiris* Simon e *Trocantheria* Karsch. A família foi sinonimizada com Gnaphosidae por Platnick e Shadab (1976) e seus gêneros mantidos como uma subfamília. Na ocasião, os autores sugeriram que Prodidominae Simon, junto com outras duas subfamílias de Gnaphosidae, Molycriinae Simon e Anagraphidinae Simon, formavam um grupo monofilético por compartilharem a presença de um lobo distinto entre as coxas IV. Ainda segundo os autores, Anagraphidinae e Prodidominae foram considerados grupos irmãos por compartilharem a presença de um aglomerado de cerdas peculiares entre as coxas.

Platnick (1990) reestabeleceu Prodidomidae onde incluiu também as subfamílias Molycriinae e Anagraphidinae, antes alocadas em Gnaphosidae. Posteriormente, Platnick & Baehr (2006) transferiram *Anagraphis* Simon para Gnaphosidae, e propuseram o nome Theuminae Platnick & Baehr para os gêneros de Anagraphidinae mantidos em Prodidomidae. Assim, Prodidomidae foi mantida como uma família bem estabelecida com 315 espécies distribuídas em 32 gêneros e três subfamílias (World Spider Catalog 2018): Prodidominae Simon, Theuminae Platnick & Baehr, and Molycriinae Simon.

Neste contexto, Prodidominae incluía 11 gêneros: *Austrodomus* Lawrence,1947, *Caudalia* Alayón, 1980, *Eleleis* Simon, 1893, *Katumbea* Cooke,1964, *Neozimiris* Simon,1903, *Plutonodomus* Cooke, 1964, *Prodida* Dalmas, 1919, *Prodidomus* Hentz, 1847, *Purcelliana* Cooke, 1964, *Zimirina* Dalmas, 1919 e *Zimiris* Simon, 1882. A subfamília era caracterizada pela morfologia peculiar dos fúsulos das glândulas ampulares menores, nas quais o eixo é reduzido para uma extensão da base em forma de agulha (Platnick, 1990). Sua distribuição abrangia praticamente todas as regiões biogeográficas. O gênero tipo, *Prodidomus*, é o mais diverso da família com 53 espécies distribuídas em todas as regiões biogeográficas. *Austrodomus*, *Eleleis*, *Katumbea*, *Plutonodomus e Purcelliana* são gêneros exclusivamente africanos, enquanto *Caudalia* e *Neozimiris* são exclusivamente neotropicais. *Prodida* é registrado somente nas Filipinas e nas Ilhas Seychelles. *Zimirina* é predominantemente paleártico, com apenas uma espécie descrita para África do Sul. *Zimiris* inclui uma espécie para o Iêmen e uma espécie sinantrópica, *Z. doriai* Simon, 1882, com distribuição circuntropical.

Theuminae incluía 14 gêneros: *Anagrina* Berland, 1920, *Brasilomma* Brescovit, Ferreira & Rheims, 2012, *Chileomma* Platnick, Shadab & Sorkin, 2005, *Chileuma* Platnick, Shadab & Sorkin, 2005, *Chilongius* Platnick, Shadab & Sorkin, 2005, *Lygromma* Simon, 1893, *Lygrommatoides* Strand, 1918, *Moreno* Mello-Leitão, 1940, *Oltacloea* Mello-Leitão, 1940, *Paracymbiomma* Rodrigues, Cizauskas & Rheims, 2018, *Theuma* Simon, 1893, *Theumella* Strand,1906, *Tivodrassus* Chamberlin & Ivie, 1936 e *Tricongius* Simon, 1893. A subfamília era caracterizada pela presença de uma grande protrusão entre as coxas IV com numerosas cerdas longas, dentes das unhas especializados e ductos extremamente complexos no epígino (Platnick *et al.* 2005). Sua distribuição era predominantemente neotropical, exceto *Lygrommatoides*, registrado para o Japão, e *Anagrina*, *Theuma* e *Theumella*, exclusivamente africanos.

Molycriinae incluía sete gêneros: *Cryptoerithus* Rainbow, 1915, *Molycria* Simon, 1887, *Myandra* Simon, 1887, *Namundra* Platnick & Bird, 2007, *Nomindra* Platnick & Baehr, 2006, *Wesmaldra* Platnick & Baehr, 2006 e *Wydundra* Platnick &

Baehr, 2006. A subfamília era predominantemente australiana, com exceção de *Wydundra voc* (Deeleman-Reinhold), registrada para Malásia e Ilhas Mollucas, e do gênero africano *Namundra* Platnick & Bird, com quatro espécies descritas para Angola e Namibia. Molycriinae era facilmente reconhecida pelas fiandeiras laterais anteriores extremamente alongadas, com origem próxima do meio do ventre abdominal, afastadas das fiandeiras posteriores (Platnick & Bird, 2007).

Tradicionalmente, Prodidomidae era considerado membro do grupo Dionycha, que incluía famílias com apenas duas unhas tarsais (Coddington 2005; Ramirez 2014). Prodidomidae, juntamente com Ammoxenidae Simon, Cithaeronidae Simon, Gallienellidae Millot, Gnaphosidae Pocock, Lamponidae Simon e Trochantheriidae Karsch, formavam a superfamília Gnaphosoidea, suportada pela presença de olhos médios posteriores irregulares e achatados, além de enditos obliquamente deprimidos (Platnick, 1990). Prodidomidae era considerado grupo-irmão de Gnaphosidae pela perda do anel esclerotizado nas fiandeiras laterais anteriores, que pode estar relacionada com o aumento da largura dos fúsulos da glândula piriforme (Platnick, 1990).

Ramírez (2014) realizou um trabalho de filogenia de Dionycha baseado somente em caracteres morfológicos, e não recuperou Gnaphosoidea como monofilética, e seus representantes apareceram distribuídos em vários outros agrupamentos. Prodidomidae foi incluído no grupo CTC (Claw Tuft Clasper), caracterizado pelo desenvolvimento de um novo mecanismo para mover o tufo de cerdas das garras das pernas, como alternativa para o movimento hidráulico. Nesse trabalho, Prodidomidae foi representado por duas subfamílias, Theuminae (*Lygromma* Simon e cf. *Moreno*) e Prodidominae (*Neozimiris* Simon e *Prodidomus* Hentz) e apareceu como grupo monofilético.

Em um trabalho de filogenia de aranhas, envolvendo apenas dados moleculares (Wheeler *et al.*, 2016), Gnaphosoidea também não foi recuperado como monofilético e a relação de Gnaphosidae e Prodidomidae ficou mais distante. Nesse trabalho, Theuminae e Prodidominae apareceram como grupos-irmãos e separados de Gnaphosidae. Molycriinae apareceu dentro de um grupo formado por algumas famílias que compunham o antigo clado Gnaphosoidea. Com base nesses resultados Prodidomidae seria parafilético. Contudo, os autores se abstiveram em fazer modificações taxonômicas até que mais estudos fossem realizados.

Com relação ao relacionamento entre os gêneros de Prodidomidae, pouco se conhece. Platnick & Baehr (2006) estudaram intensamente os gêneros australianos e realizaram uma análise filogenética incluindo *Prodidomus* e os gêneros australianos de Molycriinae. Esse trabalho ajudou a elucidar as relações entre os gêneros de Molycriinae, comprovando a monofilia da subfamília. Embora essa análise não tenha incluído o gênero africano *Namundra*, Platnick & Bird (2007) inferiram que este seria grupo-irmão de *Wydundra*, pois ambos compartilhavam a ampla separação das fiandeiras laterais anteriores.

O mais recente estudo envolvendo representantes de Prodidomidae foi realizado por Azevedo *et al.* (2018), que incluiu dez dos 32 gêneros da família em suas análises. Neste estudo, os autores reestabeleceram Prodidominae, sugerindo que a subfamília poderia ser um grupo derivado dentro de Gnaphosidae, como sugerido por Platnick & Shadab (1976). Com base nestes resultados, atualmente, Prodidominae é caracterizada por apresentar os fúsulos das glândulas piriformes das fiandeiras laterais anteriores extremamente alongados e associados a cerdas plumosas (Azevedo *et al.* 2018). Embora importantes decisões taxonômicas tenham sido feitas acerca de Prodidominae neste estudo, nada foi discutido sobre as relações dentro do grupo. A versão final desse estudo ainda não está oficialmente publicada, entretanto, a versão completa está disponível online como “early view”. No entanto, com a previsão de publicação para início de

2019, nós optamos por seguir as mudanças propostas. Assim, a tese é apresentada considerando Prodidominae como subfamília de Gnaphosidae.

Em vista disso, o objetivo da tese foi realizar uma análise filogenética incluindo os gêneros da subfamília Prodidominae, a fim de testar o seu monofiletismo e propor uma hipótese de relacionamento entre seus gêneros (capítulo 1). Além disso, ao examinar material proveniente de diferentes coleções africanas, observamos uma grande inconsistência na identificação deste material, tanto a nível específico quanto a nível genérico. Considerando que a maioria das espécies africanas foi descrita em trabalhos antigos (Purcell, 1904, 1907; Dalmas, 1919; Tucker, 1923; Lawerence, 1927, 1947; Cooke, 1964), decidimos contribuir para o melhor conhecimento da fauna africana de Prodidominae, revisando alguns desses gêneros e descrevendo novos taxa dentro de um contexto atualizado com novas figuras e ilustrações. Portanto, o capítulo 2 da tese consiste em uma revisão taxonômica de alguns gêneros africanos pouco estudados.

Dessa maneira a tese de doutorado aqui apresentada é composta por dois capítulos, ambos apresentados em forma de artigo. O capitulo 1 compreende os resultados da análise filogenética baseada em caracteres morfológicos da subfamília Prodidominae, enquanto o capítulo 2 contém uma visão geral sobre os gêneros africanos. Os resultados do capitulo 2 são baseados nos resultados filogenéticos descritos no capítulo 1. Além desses capítulos, a tese inclui também um artigo publicado durante o doutoramento com a descrição de um novo gênero de Prodidominae (em anexo).

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CHAPTER 1

Phylogenetic analysis of the genera of the subfamily Prodidominae Simon 1884 (Arachnida: Araneae: Gnaphosidae)

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Abstract

Prodidominae was recently reestablished as a subfamily of Gnaphosidae, comprising 315 species distributed in 32 genera. In this study, we conducted a cladistic analysis including 55 species of Prodidominae and 32 outgroup species. The matrix is composed of 282 morphological characters and the data was analysed under the parsimony criterion, using TNT 1.5. Prodidominae was not recovered as monophyletic. *Anagrina* was not recovered within Prodidominae and appears more related to Leptodrassinae, it is here removed from Prodidominae and considered *incertae sedis*. *Cryptotoerithus* Rainbow, *Molycria* Simon, *Myandra* Simon, *Nomindra* Platnick & Baher, *Wesmaldra* Platnick & Baher and *Wydundra* Platnick & Baher arise as a monophyletic unit, characterized by the presence of ALS extremely elongated situated far in advance of the posterior spinnerets, piriform gland spigots elongated with retractile area and presence of an apical hood in the basal article. Thus, we reestablish Molycriinae as a distinct subfamily within Gnaphosidae, sister to Prodidominae. We redefine the limits of Prodidominae to include the genera *Austrodomus* Lawrence, *Brasilomma* Brescovit, Ferreira & Rheims, *Caudalia* Alayón, *Chileomma* Platnick, Shadab & Sorkin, *Chileuma* Platnick, Shadab & Sorkin, *Chilongius* Platnick, Shadab & Sorkin, *Eleleis* Simon, *Lygromma* Simon, *Lygrommatoides* Strand, *Moreno* Mello-Leitão, *Namundra* Platnick & Bird, *Neozimiris* Simon, *Nopyllus* Ott, *Paracymbiomma* Rodrigues, Cizauskas & Rheims, *Plutonodomus* Cooke, *Prodidomus* Hentz, *Purcelliana* Cooke, *Theuma* Simon, *Theumella* Strand, *Tivodrassus* Chamberlin & Ivie, *Tricongius* Simon, *Zimirina* Dalmas and *Zimiris* Simon. Species of these genera share the presence of anterior lateral spinnerets with piriform gland spigots associated with patches of long setae and the presence of a large protrusion between coxae IV with erect setae and unsclerotized margins. In addition, based on the results of the analysis, we propose three new synonymies: *Oltacloea* Mello-Leitão, 1940 as a junior synonym of *Tricongius* Simon, 1893, *Prodida* Dalmas, 1919 as junior synonym of *Prodidomus* Hentz, 1847 and *Katumbea* Cooke, 1964 as a junior synonym of *Austrodomus* Lawrence, 1947. We remove *L. ybyguara* Rheims & Brescovit from *Lygromma* and place it as *incertae sedis*.

Keywords: Phylogeny, morphology, spiders

Introduction

The taxonomic status of prodidomine spiders has always been controversial, since the group has historically bounced between family and subfamily status (Simon, 1884; Platnick & Shadab, 1976; Platnick, 1990; Azevedo *et al.*, 2018). Simon (1884) originally described Prodidomidae to include *Prodidomus* Hentz, *Zimiris* Simon and *Trocantheria* Karsch. It retained family status for almost a century, until Platnick & Shadab (1976) reclassified it as a subfamily of Gnaphosidae. At the time, the authors suggested that Prodidominae Simon, along with Molycriinae Simon and Anagraphidinae Simon, formed a monophyletic group within Gnaphosidae. This group was supported by the presence of a distinct lobe of the sternum, projecting between the coxae IV. Platnick (1990) revalidated Prodidomidae based on spinneret morphology and transferred Molycriinae and Anagraphidinae from Gnaphosidae. Platnick & Baehr (2006) later transferred *Anagraphis* Simon back to Gnaphosidae and proposed Theuminae Platnick & Baehr for the remaining genera of the former Anagraphidinae. Prodidomidae remained a well-established family, comprising the subfamilies Prodidominae Simon, Theuminae Platnick & Baehr, and Molycriinae Simon, although, with the exception of Molycriinae (Platnick & Bird 2007), their monophyly was never tested.

Prodidominae comprised 88 species distributed in 11 genera (*Austrodomus* Lawrence, 1947, *Caudalia* Alayón, 1980, *Eleleis* Simon, 1893, *Katumbea* Cooke, 1964, *Neozimiris* Simon, 1903, *Plutonodomus* Cooke, 1964, *Prodida* Dalmas, 1919, *Prodidomus* Hentz, 1847, *Purcelliana* Cooke, 1964, *Zimirina* Dalmas, 1919 and *Zimiris* Simon, 1882) grouped together by the presence of a peculiar minor ampullate gland spigot, where the shaft is reduced to a needlelike extension of the base (Platnick 1990). *Prodidomus* is the largest genera with 53 species occurring worldwide. *Austrodomus*, *Eleleis* and *Purcelliana* are endemic from South Africa, and *Katumbea* and *Plutonodomus* from Tanzania. *Zimirina* is mostly Palaearctic, with one species described from South Africa while *Prodida* occurs in the Phillipines and the Seychelles Islands. *Neozimiris* occurs from Mexico to Ecuador. *Caudalia* is endemic from Cuba. *Zimiris* includes one species from Yemen and another, *Z. doriae* Simon, 1882 with a circuntropical distribution, having been introduced in several countries throughout the World.

Theuminae included 88 species in 14 genera (*Anagrina* Berland, 1920, *Brasilomma* Brescovit, Ferreira & Rheims, 2012, *Chileomma* Platnick, Shadab & Sorkin, 2005, *Chileuma* Platnick, Shadab & Sorkin, 2005, *Chilongius* Platnick, Shadab

& Sorkin, 2005, *Lygromma* Simon, 1893, *Lygrommatoides* Strand, 1918, *Moreno* Mello-Leitão, 1940, *Oltacloea* Mello-Leitão, 1940, *Paracymbiomma* Rodrigues, Cizauskas & Rheims, 2018, *Theuma* Simon, 1893, *Theumella* Strand, 1906, *Tivodrassus* Chamberlin & Ivie, 1936 and *Tricongius* Simon, 1893), characterized by the sternum with a large protrusion between the coxae IV that lacks a sclerotized margin (Platnick *et al.* 2005, Platnick & Baehr 2006). The group is mostly Neotropical, with the exception of *Anagrina*, from eastern Africa and Niger, *Lygrommatoides*, from Japan, *Theuma*, from South Africa and Namibia, and *Theumella* from Ethiopia. *Paracymbiomma* and *Brasilomma* are endemic from Brazil and *Tivodrassus* edemic from Mexico. *Lygromma* occurs from Mexico to Brazil. *Tricongius* occurs in Colombia, Venezuela and Brazil. *Chileomma*, *Chileuma* and *Chilongius* are endemic from Chile. *Moreno* is recorded from Chile and Argentina and *Otalcloea* from Argentina and Brazil.

Molycriinae was by far the largest and best known prodidomid subfamily with 139 species distributed in seven genera *(Cryptoerithus* Rainbow, 1915, *Molycria* Simon, 1887, *Myandra* Simon, 1887, *Namundra* Platnick & Bird, 2007, *Nomindra* Platnick & Baehr, 2006, *Wesmaldra* Platnick & Baehr, 2006 and *Wydundra* Platnick & Baehr, 2006). Their members were recognized by the extraordinarily elongated anterior lateral spinnerets, which originate far in advance from the other spinneret pairs, near the middle of the ventral abdominal surface (Platnick & Baehr 2006). It is predominantly Australian, with the exception of the African genus *Namundra*.

Studies on the phylogenetic relationships between Prodidomidae genera are scarce. Platnick & Baehr (2006) studied intensively the Australian genera and carried out a phylogenetic analysis including *Prodidomus* and Molycriinae. Although the analysis included only 11 taxa and 11 characters, the study helped elucidate the relationships between these genera, confirming the monophyly of the group. However, the analysis did not include the African genus *Namundra*, the single non-Australian genus that also has such characteristics. Thus, even though the relationships between the Australian genera were studied, the relationships between this group and other Prodidomidae are still uncertain.

Recently, several studies, including morphological and molecular data, were carried out to elucidate the relationships between spider families (Ramirez 2014; Garrinson *et al.* 2016; Wheeler *et al.* 2016; Fernández *et al.* 2018). Traditionally, Prodidomidae was associated to other families (Ammoxenidae Simon, Cithaeronidae Simon, Gallienellidae Millot, Gnaphosidae Pocock, Lamponidae Simon and Trochantheriidae Karsch) that comprised the traditional Gnaphosoidea, by sharing irregular and flattened posterior medium eyes and obliquely depressed endites (Platnick 1990). Nevertheless, Ramirez (2014) did not recover Gnaphosoidea and its representatives were distributed in several other groupings. Prodidomidae was included in the CTC clade (Claw Tuft Clasper), characterized by the development of a new mechanism for moving the claw tuft setae of the legs.

In a study involving only molecular data, Wheeler *et al.* (2016) also didn't recover Gnaphosoidea as monophyletic and the relations of Prodidomidae and Gnaphosidae became more obscure. The authors obtained the Australian genera separated from other Prodidomidae and grouped with other subfamilies of Gnaphosidae. Despite suggesting that Prodidomidae was not monophyletic, taxonomic changes were not carried out and the authors recommended that more studies be performed to better understand the phylogenetic position of their genera.

The most recent analysis including Prodidomidae was carried out by Azevedo *et al.* (2018), in which ten Prodidomidae genera were included. In this study, the authors reestablished the synonymy of Prodidomidae with Gnaphosidae, suggesting that

Prodidominae, as currently delimited, could be a derived group within Gnaphosidae, as suggested by Platnick & Shadab (1976). Thus, Prodidominae is characterized by incomplete distal article of the anterior lateral spinnerets composed of patches of setae closely associated to the piriform gland spigots, with their base longer than the shaft (Platnick 1990; Azevedo *et al.* 2018). Although important taxonomic decisions were made about this group of spiders in this study, nothing was discussed of the relationships within the group.

Therefore, a phylogenetic analysis of Prodidominae, including 31 of the 32 valid genera, will contribute towards the elucidation of the internal relationships, especially of those less studied, such as the African genera. In addition, this analysis can also contribute to a better understanding of the evolution of some characters within this poorly explored group. To continue and expand the recent morphological studies involving Prodidominae, this study aims to carry out a phylogenetic analysis, based on morphological characters, test the monophyly of the subfamily and propose a relationship hypothesis for their genera.

MATERIAL AND METHODS

Material examined

The examined material belongs to the following institutions (acronyms and curators in parentheses): Australian Museum, Sidney, Australia (AM, G.A. Milledge); American Museum of Natural History, New York, USA (AMNH, L. Prendini); Agricultural Research Council, National Collection of Arachnida, Petroria, South Africa (ARC.LNR, R. Lyle); Instituto Butantan, São Paulo, Brazil (IBSP, A.D. Brescovit); Instituto de Ciencias Naturales, Universidad Nacional, Bogota, Colombia (ICN, E. Florez); Instituto de Ecología y Sistemática, Havana, Cuba (IES, L.F. Armas); Instituto

Nacional de Pesquisas da Amazônia, Manaus, Brazil (INPA, A.L. Henriques); Museu Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina (MACN, M. Ramírez); Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Brazil (MCN, R. Ott); Museum of Comparative Zoology, Harvard University, Cambridge, USA (MCZ, G. Giribet); Museum National d'Histoire Naturelle, Paris, France (MNHN, C. Rollard); Museu Paraense Emílio Goeldi, Belém, Brazil (MPEG, A.B. Bonaldo); National Museum Bloemfontein, Bloemfontein, South Africa (NMBA, L. Lotz); National Museum of Namibia, Windhoek, Namibia (NMNW [SMN], B. Muramba); Oxford University Museum of Natural History, Oxford, England (OUMNH, Z.M. Simmons); Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil (PUCRS, R. Teixeira); Queensland Museum, Brisbane, Australia (QMB, R. Raven); Senckenberg Research Institute and Museum, Frankfurt, Germany (SMF, P. Jäger); Royal Museum of Central Africa, Tervuren, Belgium (RMCA, R. Jocque); Iziko South African Museum, Cape Town, South Africa (SAMC [SAM], D. Larson); Universidade de Brasília, Distrito Federal, Brazil (UNB, P. Mota); Western Australian Museum, Welshpool, Australia (WAM, M. Harvey).

Specimen preparation

The material was examined immersed in alcohol 70-80%, with a Leica MZ125 stereomicroscope. For visualization of internal structures of the female genitalia, the epigyne was detached from the body and digested with contact lens cleaner enzyme Ultrazime®. Compound digital photographs were taken using a DFC295 camera mounted in a Leica M205A stereomicroscope. Extended focal range images were composed with the program Leica Application Suite version 3.3.0. Scanning electron micrographs (SEM) images were taken using a FEI Quanta 250 Scanning Electron Microscope at Instituto Butantan and a FEI XL 30 TMP Scanning Electron Microscope at Museu Argentino de Ciencias Naturales Bernardino Rivadavia. For SEM preparations, the specimen was selected and cleaned with brushes or with ultrasonic cleaner. The material was dissected and dehydrated through a series of graded ethanol (80% to 100%), critical point dried, fixed on metal stubs with adhesive copper tape and sputter coated with gold.

Data matrix

The data matrix is composed of 87 terminal taxa, 32 comprising the outgroup and 55 the ingroup. Whenever possible, the type species of the genus was used to preserve nomenclatural stability. The outgroup was chosen based on recent studies (Murphy 2007; Ramirez 2014; Wheeler *et al.* 2016; Azevedo *et al.* 2018) and includes representatives of species of the families Anyphaenidae Bertkau, Cithaeronidae Simon, Corinnidae Karsch, Gallieniellidae Millot, Lamponidae Simon, Miturgidae Simon, Phrurolithidae Banks and Trochanteriidae Karsch, as well as different genera of Gnaphosidae. The latter were selected based on groups and subfamilies proposed by Murphy (2007) and Azevedo *et al.* (2018), respectively. Genera from all biogeographic regions were selected. The Gnaphosidae genera *Hypodrassodes* Dalmas, 1919 and *Zelanda* Özdikmen, 2009, were scored based on matrix data from Azevedo *et al.* (2018), since they showed an important relationship with Prodidominae. *Xiruana gracilipes* (Keyserling, 1891), Anyphaenidae, was used to root the tree based on recent phylogenetic analyses (Ramirez 2014; Wheeler *et al.* 2016; Azevedo *et al.* 2018). Of the 32 outgroup species, 24 are type species of genera.

The ingroup is composed of representatives of 31 of the 32 valid genera of Prodidominae, as well as three possibly new genera. In total, 55 species of Prodidominae were included, of which 25 are type species of genera. The monotypic genus *Lygrommatoides* Strand, 1918 was not included in the analysis, since the type specimen was not located and is probably lost. In addition, the original description is imprecise and without illustrations, which makes it difficult to identify additional material. In the few cases when females and males from different species of the same genus were studied, we treated them as a single chimera taxon, such as *Namundra griffinae* Platnick & Bird, 2007 and *Namundra* sp. Whenever possible, the genera were represented by more than one species to better represent the inter-generic relationship.

Several characters were scored based on SEM images and this procedure cannot be done for some of our terminal taxa, since only the holotype was analyzed. This resulted in a dataset with several missing and inapplicable data. However, when possible, complementary observations were taken from literature and reported in the voucher list.

The data matrix is composed of 282 morphological characters, of which 60 are herein proposed and 222 are characters previously used in cladistic analyses that included Prodidominae species (Platnick 1990; Platnick 2000; Platnick 2002; Platnick & Baher 2006; Ramirez 2014; Azevedo *et al.* 2018). Some of these characters were slightly altered and these modifications are indicated in the character list. For characters used by more than one author, only the most recent is cited. The description of characters follows Sereno (2007). All characters are treated as unordered and the autapomorphies were kept in the analysis, since it is possible to use them in future analyses.

Cladistic analysis

The phylogenetic analysis was performed under the parsimony criterion, using TNT 1.5 (Goloboff *et al.* 2008; Goloboff & Catalano 2016). The dataset was analyzed with New Technology Search under equal weights and weighting regimes against homoplasy with the implied weighting option (Goloboff 1993), using different values of concavity constant (K=1-10, 15, 20, 25, 30). The analysis was carried out using the following parameters: *Sectorial Search* (default mode), *Ratchet* (default mode), *Drift* (default mode) and *Tree Fusing* (five rounds) (Goloboff 1999) until the most parsimonious tree was reached 50 times independently. The strict consensus of the different weighting regimes (EW and IW) were compared to evaluate the frequency and stability of clades (Goloboff *et al.* 2008; Magalhães & Santos 2012; Azevedo *et al.* 2018). Navajo-rugs were used to indicate the frequency of a clade in the preferred tree. Bremer relative support was used to evaluate clade support (Bremer 1994; Goloboff & Farris 2001), searching for suboptimal trees with 1-10 steps more than the MPTs and retaining 2000-20000 trees, respectively (*sub 1 hold 2000; bb=tbr fillonly; unique**). A comparative analysis, using SPR- distances for the strict consensus of different MTPs under weighting regimes, was used to determine topology stability (Robinson & Foulds 1981; Goloboff *et al.* 2008). The tree with maximum congruence was chosen for the discussion and optimization of characters. WinClada v. 1.00.08 (Nixon, 2002) was used for character state optimizations and only unambiguous optimizations were analyzed.

Some topology tests were conducted to evaluate the stability of taxonomic groups established within Prodidominae, as well as groups established in recent analysis (Ramirez 2014; Wheeler *et al.* 2016; Azevedo *et al.* 2018) but not supported by our results. Topologies with constrained search were analyzed through Relative FIT difference (RFD), in which RFD is the measure of the difference of evidences contradicting the constrained tree in relation to the evidences favoring that tree (Goloboff & Farris 2001). This measurement is calculated by the formula 1 - (C/F), where C is the sum of character FITs that had their values increased (favorable evidence) and F represents the character FITs that had their values decreased (contradictory evidence). Both values were calculated using TNT. Thus, the highest value of RFD in constrained trees indicates a low support for these clades, and therefore favors the relationship hypotheses of the most parsimonious unconstrained trees.

Terminology

The terminology and abbreviations follow Ramirez (2014) and Azevedo (2018): **A**—atrium; **Ac—**aciniform gland spigot; **AF**—anterior fold; **AFH**—anterior fold hood; **ALS**—anterior lateral spinnerets; **C**—conductor; **CbRmP**—cymbial retromedian process; **CbTS**—cymbial thick setae; **CbVG**—cymbial ventral groove; **CD**—copulatory duct; **CO**—copulatory opening; **CSS**—claw slit suture; **Cy—**cylindrical gland spigot; **dRTA**—dorsal retrolateral tibial apophysis; **DTA**—dorsal tibial apophysis; **E**—embolus; **FD**—fertilization duct; **HCD**—hyaline duct copulatory; **IM**—inflatable membrane; **LETe**—laminar extension of tegulum; **LFF**—lateral fold furrow; **LFS**—lateral fold suture; **MA**—median apophysis; **MaAm—**major ampullate gland spigot; **MiAm—**minor ampullate gland spigot; **Pa**—patella; **Pcb**—paracymbium; **PE**s—promarginal escort seta; **PH**—posterior hood; **Pi**—piriform gland spigots; **PiB**—piriform spigot base; **PIn**— postepigastric invaginations; **PiS**—piriform spigot shaft; **PLS**—posterior lateral spinnerets; **PMS**—posterior median spinnerets; **PN**—posterior notched; **PRk**—promarginal rake seta; **PS**—primary spermathecae; **PWh**—promarginal whisker seta; **REs**—retromarginal escort seta; **ReT**—reduced tooth; **RRk**—retromarginal rake seta; **RTA**—retrolateral tibial apophysis; **RWh**—retromarginal whisker seta; **SBP**—setae bearing projection; **Sk**—serrated keel; **T**—tegulum; **TA**—terminal apophysis; **TEx**—tegular excavation; **Ti**—tibia; **Tr**—trochanter; **TSP**—tegular spine-like process; **vRTA**—ventral retrolateral tibial apophysis; **VTA**—ventral tibial apophysis; **S**—septum; **SS**—secondary spermathecae.

RESULTS

The cladistic analysis under equal weights resulted in 39 most parsimonious trees (MPTs) with 1378 steps each (CI=22; RI=64). The strict consensus shows that relationships between the Prodidominae genera are generally well resolved, except for a clade including nine genera that had the relationships weakly resolved (Fig. 1). The topologies obtained under implied weighting with different concavity values (*K*) showed few changes regarding the number of MPTs and steps. Only the analysis with k=1–2 resulted in 10 MPTs, while the analyses with the other K values resulted in five most parsimonious trees. Thus, considering the maximum congruence and stability of the results of strict consensus (Table 1), we decided to choose the trees obtained with k =7–8 to discuss the relationships of Prodidominae (Fig. 2). The analysis with k=7–8 resulted in five MPTs with 1395 steps each (CI=22; RI=64).

Table 1. Similarity values calculated through SPR distances (150 replications) to strict consensus of trees under different weighting regimes. Value in bold indicates maximum congruence between the topologies. EW= equal weighting.

	EW	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**	**25**
EW	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.6667	-	-	-	-	-	-	-	-	-	-	-	-	-
2	0.7500	0.8333	-	-	-	-	-	-	-	-	-	-	-	-
3	0.7381	0.8095	0.9762	-	-	-	-	-	-	-	-	-	-	-
4	0.8571	0.6905	0.7976	0.8333	-	-	-	-	-	-	-	-	-	-
5	0.8810	0.7143	0.7619	0.7976	0.9524	-	-	-	-	-	-	-	-	-
6	0.8690	0.7024	0.7738	0.7976	0.9405	0.9881	-	-	-	-	-	-	-	-
7	0.8690	0.7024	0.7738	0.7976	0.9405	0.9524	0.9643	-	-	-	-	-	-	-
8	0.8690	0.7024	0.7738	0.7976	0.9405	0.9524	0.9643	**1.0000**	-	-	-	-	-	-
9	0.8571	0.6786	0.7500	0.7738	0.9405	0.9286	0.9167	0.9524	0.9524	-	-	-	-	-
10	0.8929	0.7143	0.7857	0.8095	0.9286	0.9405	0.9286	0.9643	0.9643	0.9643	-	-	-	-
15	0.9167	0.7381	0.7857	0.8095	0.9048	0.9167	0.9048	0.9405	0.9405	0.9405	0.9762	-	-	-
20	0.9286	0.7143	0.7976	0.7738	0.8810	0.9048	0.8929	0.9048	0.9048	0.9048	0.9405	0.9643	-	-
25	0.9524	0.7024	0.7619	0.7619	0.8571	0.8810	0.8690	0.8929	0.8929	0.8810	0.9167	0.9405	0.9762	-
30	0.9881	0.6548	0.7500	0.7500	0.8571	0.8810	0.8690	0.8810	0.8810	0.8690	0.9048	0.9286	0.9405	0.9643

Gnaphosidae was not recovered as monophyletic in our analysis, since *Micaria* Westring, 1851 arose sister to Cithaeronidae (Figs 2, 3). Trochanteriidae, represented by the genera *Platyoides* O. Pickard-Cambridge, 1891, *Hemicloea* Thorell, 1870 and *Vectius* Simon, 1897, was recovered as monophyletic with strong support.

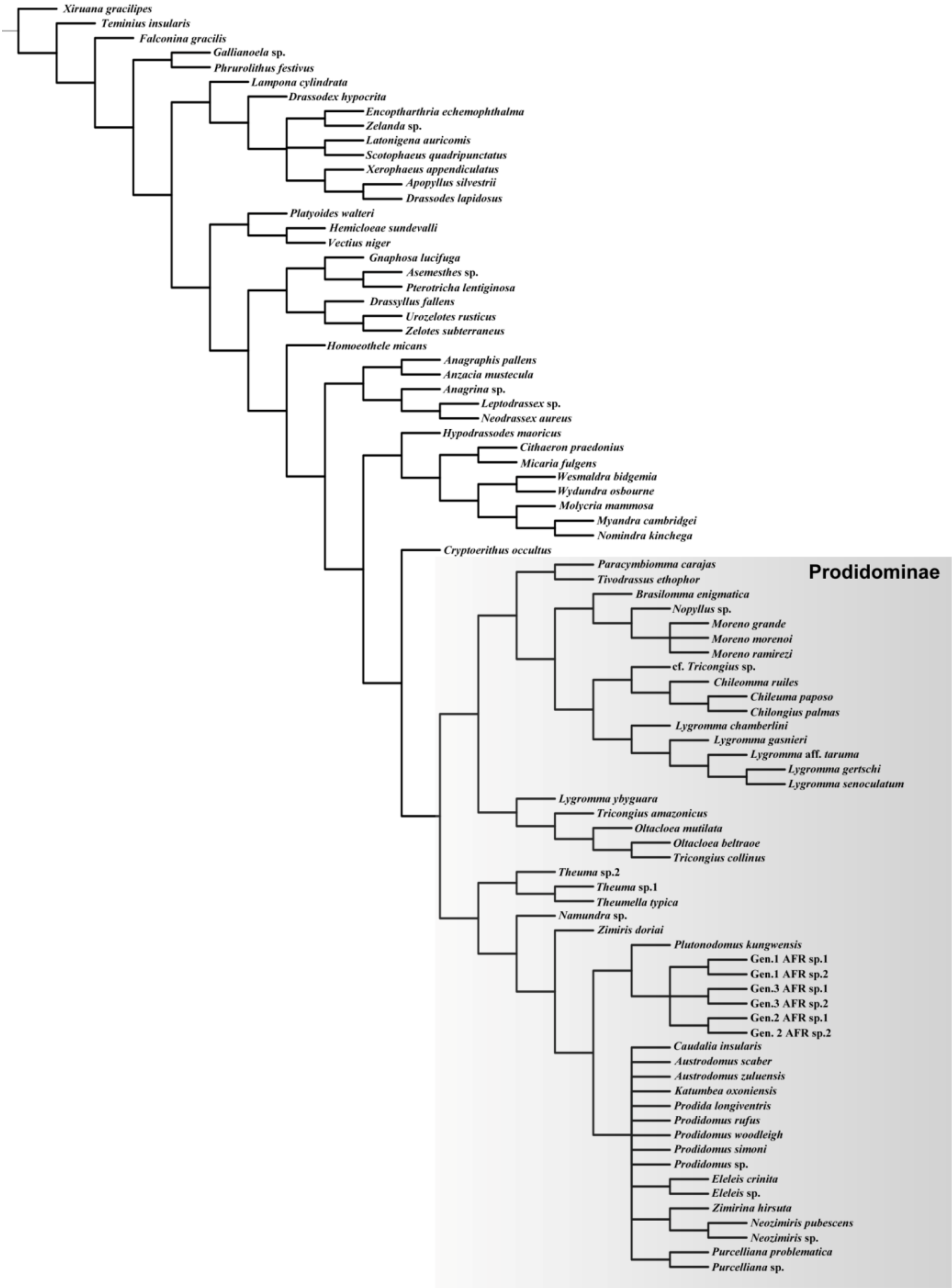


Fig. 1. Strict consensus of the 39 most parsimonious trees obtained under equal weights analyses.

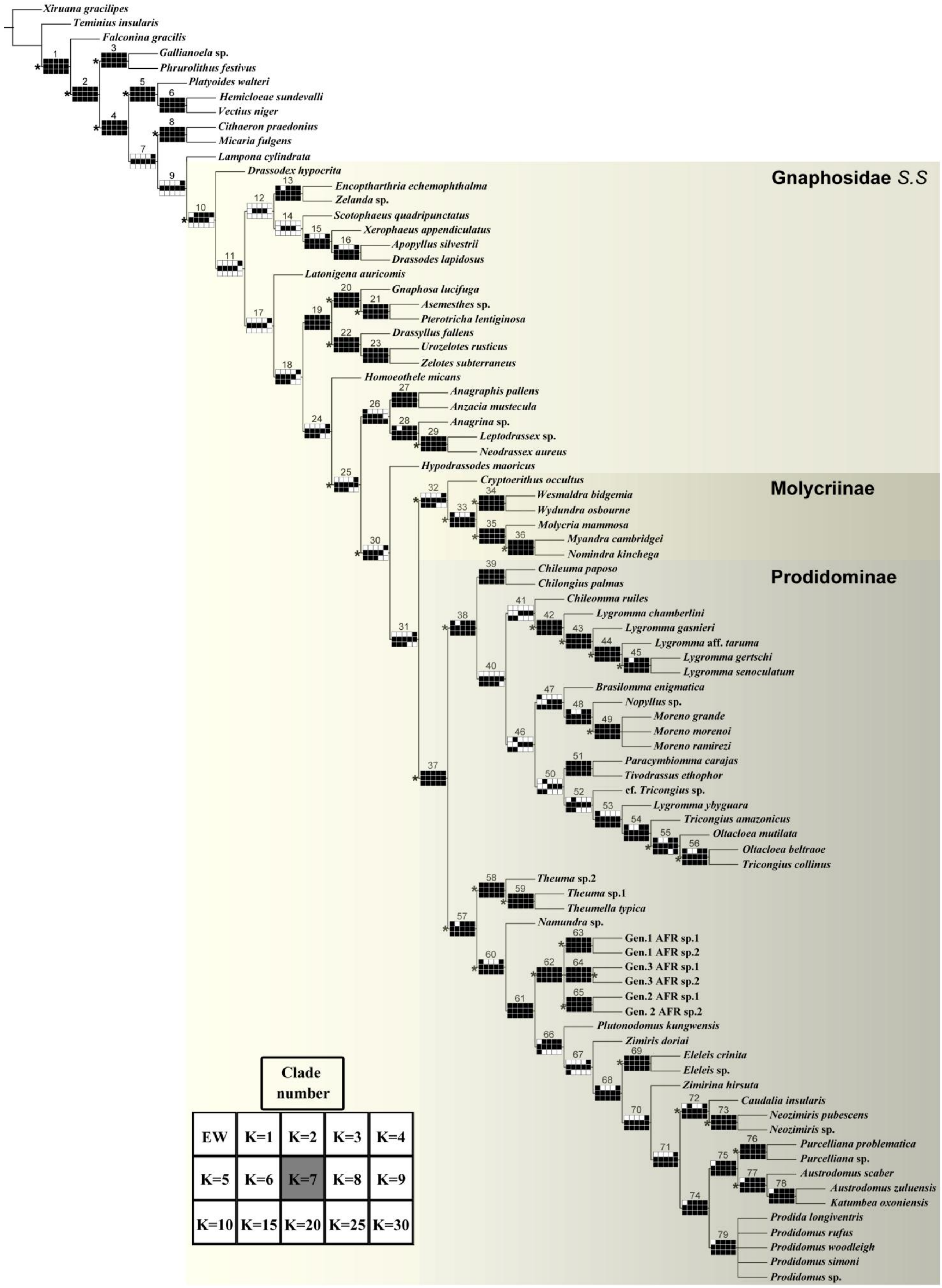


Fig. 2. Strict consensus of phylogenetic hypothesis of Prodidominae, found under implied weighting (k=7). Clades with the sensitivity to different weighting regimes; white squares represent absence of clade in corresponding analyse and black squares represent its presence. Relative Bremer support higher 50% are indicates with asterisk.

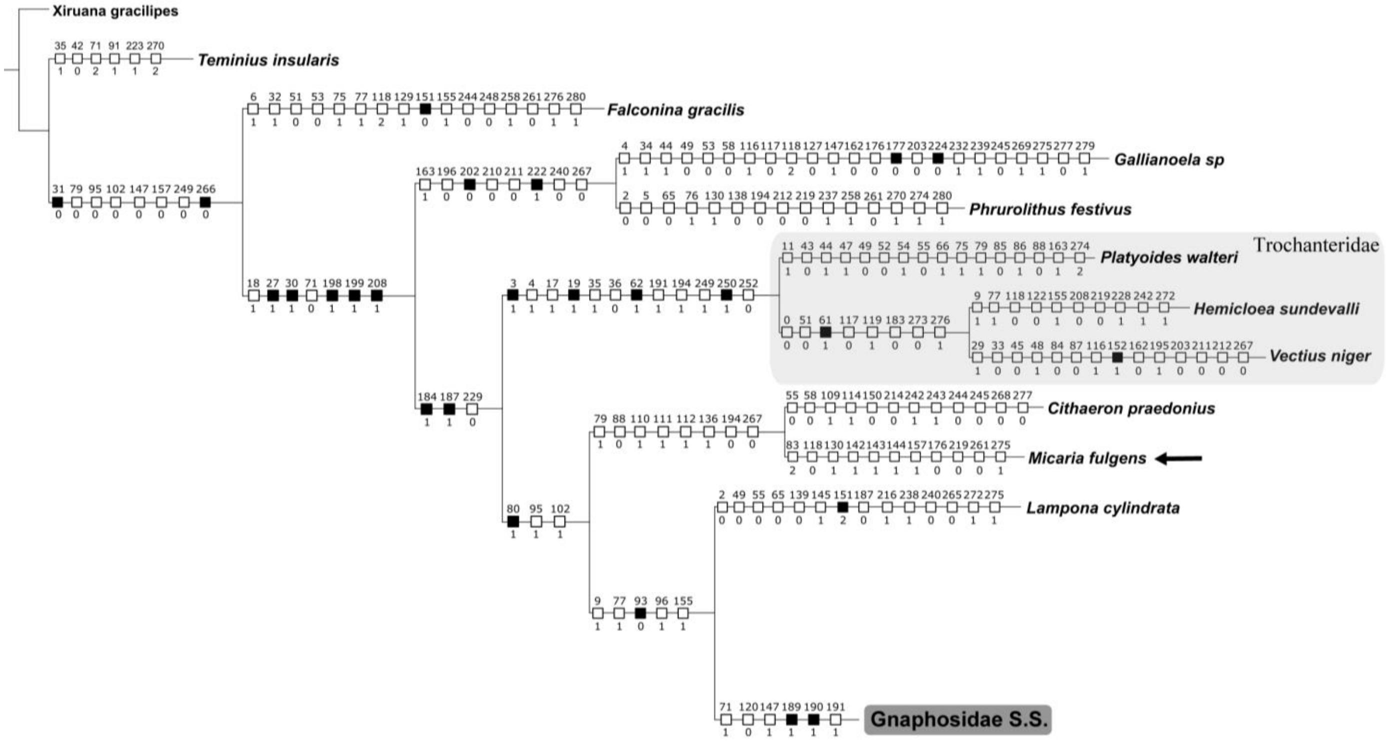


Fig. 3. Optimization of common synapomorphies of the outgroup, except Gnaphosida *S.S.*, on strict consensus of phylogenetic hypothesis of Prodidominae found under implied weighting (k=7). Black squares show non-homoplasious synapomorphies and white squares show homoplasious ones.

Azevedo *et al.* (2018) defined the group Gnaphosidae *S.S.*, to include all taxa with piriform gland spigots longer and wider than major ampullate gland spigots, therefore excluding all problematic taxa. In our analysis this group was recovered as monphyletic, with *Lampona* (Lamponidae) as sister group (Fig. 4). Some relationships found by Azevedo *et al.* (2018) within this clade were also recovered in our analysis, such as the subfamilies Leptodrassinae, Zelotinae and Gnaphosinae.

Fig. 4. Optimization of common synapomorphies of the Gnaphosidaae S.S. on strict consensus of phylogenetic hypothesis of Prodidominae found under implied weighting (k=7). Black squares show non-homoplasious synapomorphies and white squares show homoplasious ones.

Prodidominae, as defined by Azevedo et al. (2018), was not recovered as monophyletic in our analysis (Fig. 2) since *Anagrina* Berland, 1920 arose as sister to Leptodrassinae Azevedo *et al.*, 2018 (*Leptodrassex* Murphy, 2007 + *Neodrassex aureus*

Ott, 2012). The genera *Cryptotoerithus* Rainbow, *Molycria* Simon, *Myandra* Simon, *Nomindra* Platnick & Baher, *Wesmaldra* Platnick & Baher and *Wydundra* Platnick & Baher do not show the main synapomorphy of Prodidominae, the ALS with piriform gland spigots with long base and associated with plumose setae. They arise as a monophyletic unit supported by ALS extremely elongate situated far in advance of the posterior spinnerets and elongate base of piriform gland spigots not associated with plumose setae (Table 2, Figs 5, 9). Thus, we reestablish the subfamily Molycriinae as a distinct subfamily within Gnaphosidae.

Table 2. Synapomorphies of Molycriinae with their respective transformation states.

Character	Synapomorphies of Molycriinae (clade 32)
16	Eyes, posterior eye row, shape: straight to recurved → procuverd
126	Legs, tarsus, cuticle, texture: fingerprint → smooth
136	Legs, tarsus, apical, claws, pointed solid clasper: absent → present
164	Spinnerets, ALS, length relative to abdomen: less than 22% to abdomen → more than 22% to abdomen
166	Spinnerets, ALS, distance between them in relation to their diameter: separated by approximately one ALS diameter or more → contiguous to separated by less one ALS diameter
267	Epigyne, median field, plate surface, atrium: absent → present

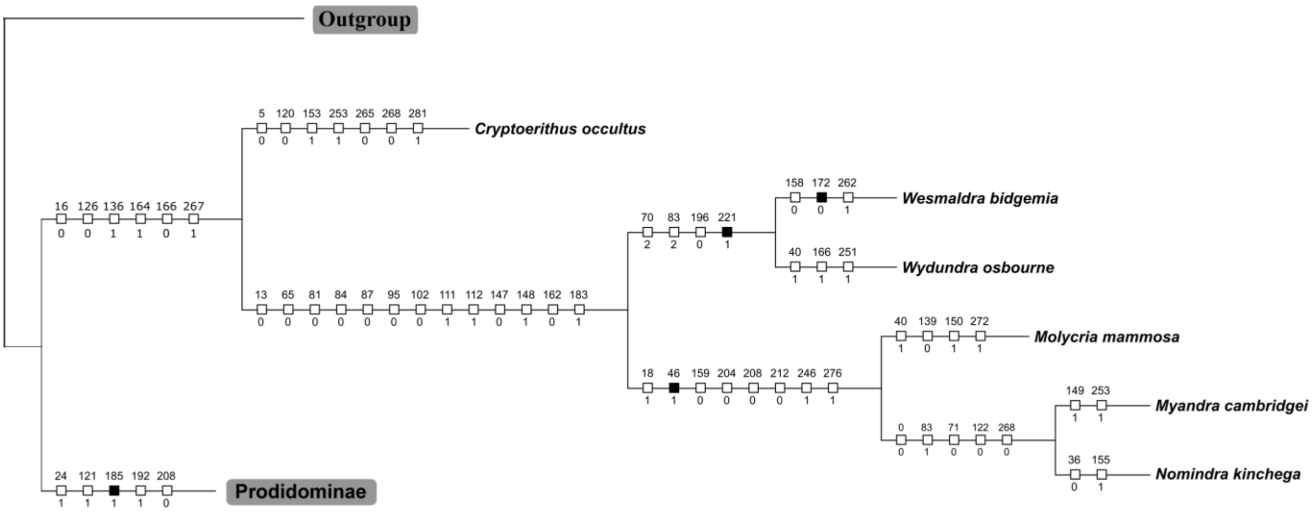


Fig. 5. Optimization of common synapomorphies of Molycriinae on strict consensus of phylogenetic hypothesis of Prodidominae found under implied weighting (k=7). Black squares show non-homoplasious synapomorphies and white squares show homoplasious ones.

Prodidominae (Fig. 2), as redefined in our study, is supported by ALS with piriform gland spigots with long base and associated with plumose setae (Table 3; Figs 6, 7). *Nopyllus* Ott, 2014, a genus that was not assigned to any subfamily in Azevedo *et al.* (2018), arose within Prodidominae (Fig. 2).

Table 3. Synapomorphies of Prodidominae with their respective transformation states.

Character	**Synapomorphies of Prodidominae (clade 37)**
24	Eyes, AME, size relative to ALE: as large as or larger than ALE → smaller than ALE
121	Legs, tarsus, tarsal organ, opening, shape: round to oval → teardrop or keyhole
185	Spinnerets, ALS, distal article, incomplete ring, type: semi-circle in the anterior margin → patches of setae at the base of the gland spigots
192	Spinnerets, ALS, major ampullate gland spigots field, conical setae-bearing projection: field on a flat or slightly domed area → field on a conical, well-defined, setae-bearing article
208	Spinnerets (F), PMS, cylindrical gland spigots, forming separated field: present, the cylindrical spigots are not mixed with other spigots → absent

Prodidominae is divided into two large clades (38, 57). Clade 38 is composed of exclusively Neotropical genera, supported by the presence of a classic claw tuft clasper (Figs 24 A–D) and postepigastric invaginations on the abdomen (Table 4, Figs 6, 19K). In this group, *Lygromma* Simon, 1893 *Oltacloea* Mello-Leitão, 1940 and *Tricongius* Simon, 1893 were not recovered as monophyletic. *Lygromma ybyguara* Rheims & Brescovit, 2004, a troglobitic species, is more closely related to *Oltacloea* and *Tricongius*, by the presence of a ventral bunch of thick setae on cymbium (Figs 33E, J). *Oltacloea* and *Tricongius* arise as a monophyletic clade supported by the median apophysis not sclerotized (clade 54). *Nopyllus*, arose closely related to *Brasilomma* Brescovit, Ferreira & Rheims, 2012 and *Moreno* Mello-Leitão, 1940 by the absence of leg scopulae (clade 47).

Table 4. Synapomorphies of Neotropical Prodidominae with their respective transformation states.

Character	Synapomorphies of Neotropical Prodidominae (clade 38)
12	Carapace, surface, squamose setae, lateroventral appendages: absent → present
133	Legs, tarsus, apical, claws, classic clasper: absent → present
145	Abdomen, ventral, internally invaginated postepigastric sclerites: absent → present
158	Abdomen, surface, squamose setae, lateroventral appendages: absent → present
261	Epigyne, anterior fold: present → absent
268	Epigyne, vulva, primary spermathecae: conspicuous → inconspicuous
276	Epigyne, vulva, secondary spermathecae, position: approximately median, between PS and CO → closer to copulatory opening
277	Epigyne, vulva, copulatory ducts, shape: curved or with some curls → highly convoluted
279	Epigyne, vulva, copulatory ducts, width: similar width along the ducts → wider closest to the copulatory opening

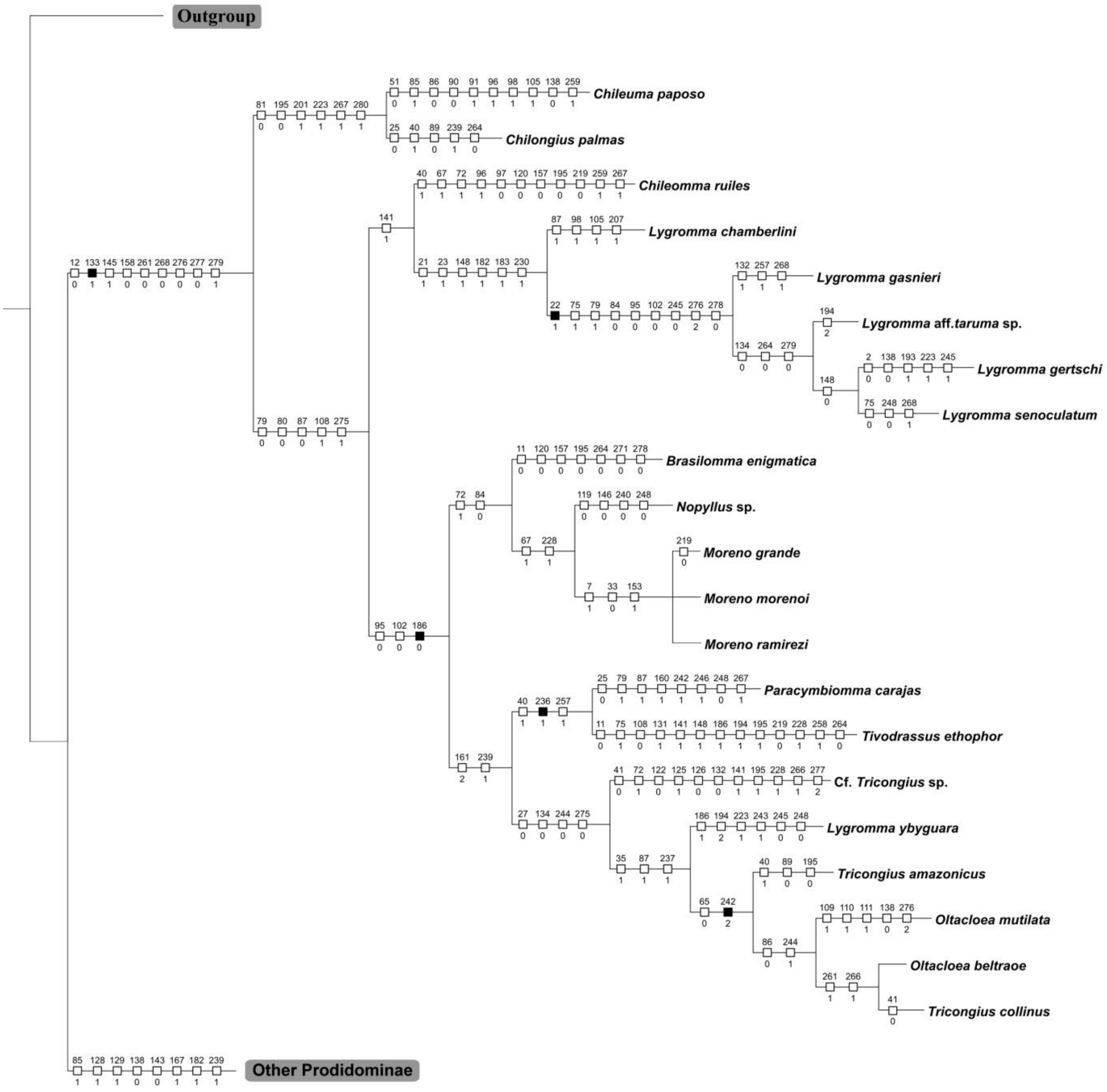


Fig. 6. Optimization of common synapomorphies of Neotropical Prodidominae on strict consensus of phylogenetic hypothesis of Prodidominae found under implied weighting (k=7). Black squares show non-homoplasious synapomorphies and white squares show homoplasious ones.

Clade 57 is composed of genera with predominantly African distribution, with the exception of the Neotropical *Neozimiris* Simon, 1903 and *Caudalia* Alayón, 1980. It is supported, among other characters, by the absence of leg claw teeth, ALS with sclerotizaton close to base and insertion of piriform gland spigots on well-defined base

(Table 5, Fig. 7). The genera *Austrodomus* Lawrence, 1947 and *Prodidomus* Hentz, 1847 were not recovered as monophyletic (clades 77, 79). *Prodida* Dalmas, 1919 was found along with *Prodidomus* supported by the massive PLS. *Austrodomus* and *Katumbea* Cooke, 1964 were recovered as closely related by sharing the longer patella (similar to tibia) and copulatory ducts wider and close the copulatory openings. *Theuma* Simon, 1893 and *Theumella* Strand, 1906, arose as a monophyletic unit, supported mainly by the thin and conical protrusion between coxae IV (clade 58). *Namundra* Platnick & Bird, 2007, a genus previously assigned to Molycriinae, arose sister to other African genera of Prodidominae (clade 60). We recovered a well-supported clade, formed by six new species (clade 62). This group was supported mainly by having the of the base piriform gland spigots with cracked texture. Three well-supported groups arise within this clade (Fig. 7).

Table 5. Synapomorphies of clade 57 of Prodidominae with their respective transformation states.

Character	Synapomorphies of clade 57
85	Legs I–II, tarsus, ventral, scopulae of tenent setae, density: sparse → dense
128	Legs, tarsus, apical, claw tuft, density: sparse → dense
129	Legs, tarsus, apical, claw tuft, insertion: continuous with lateral cuticle → well delimited plate
138	Legs, tarsus, apical, claws, teeth: present → absent
143	Legs, tarsus, apical, claw tuft, seta, base, packing: bases packed together → Bases inserted in individual sockets
167	Spinnerets, ALS, sclerotizaton close to base: absent → present
182	Spinnerets, ALS, piriform gland spigots, insertion: insertion simple, continuous with cuticle → on well-defined base
239	Palp, cymbium, dorsal, trichobothria: absent → present

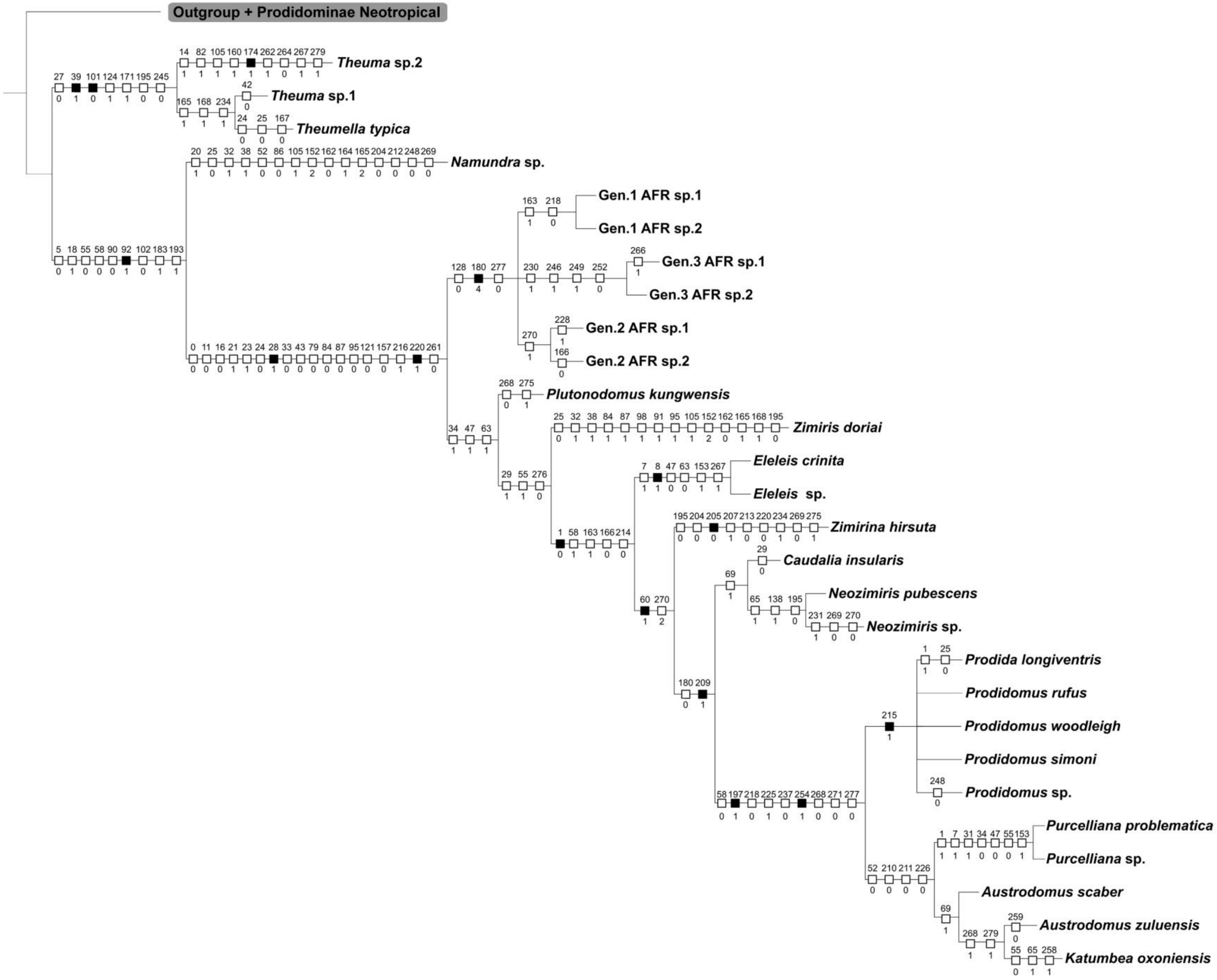


Fig. 7. Optimization of common synapomorphies of some Prodidominae on strict consensus of phylogenetic hypothesis of Prodidominae found under implied weighting (k=7). Black squares show non-homoplasious synapomorphies and white squares show homoplasious ones.

Topology tests were performed to evaluate the robustness of previously defined groups that were not recovered in our analysis, such as the former subfamiliy Theuminae (Neotropical Prodidominae, *Anagrina*, *Theuma* and *Theumella*). However, the high RFD values indicate that all alternative hypotheses that considered such groups monophyletic, are poorly supported, favoring our unconstrained hypothesis (Table 6).

Table 6. Alternative hypothesis using constrained searches with their respective steps number, total fit, RFD value and fit difference of those characters more favored to constrained tree.

Constraint	Steps (MPTs)	Total Fit (MPTs)	RFD	Fit difference of characters more favored
Former subfamily Theuminae monophyletic	1417	188.63545	0.438758	0.125 (char.115), 0.125 (char.187) 0.141(char.191)
Molycriinae + *Namundra* monophyletic	1405	189.58325	0.475406	0.097 (char.38), 0.097 (char.164)
Nopyllus inside Gnaphosidae	1419	188.59487	0.420273	0.136 (char.15), 0.125 (char.187)
***Lygromma* monophyletic**	1399	189.87515	0.292730	0.125 (char.67), 0.116 (char.72)
***Tricongius* monophyletic**	1398	189.87145	0.698639	0.038 (char.278)
Unconstrained	1395	189.95552	-	-

The topology obtained from forcing the monophyly of the former subfamily Theuminae shows that this clade would be supported only by the homoplastic synapomorphy of AME smaller ALE (Fig. 15H). In this hypothesis, Prodidominae would be monophyletic and sister to the clade *Cithaeron* + *Micaria*. *Nopyllus* would remain in Prodidominae, but associated to the African genera (Fig. 8A).

Forcing the monophyly of the subfamily Molycriinae, as defined by Platnick & Baher (2006), recovered the group within Prodidominae and supported by the marginal sclerotization of the posterior protrusion of sternum (Figs 7G, H), as well as the large size and advanced positions of ALS (Figs 8B, 27C, D).

The relationship of *Nopyllus* with the genera *Apopyllus* Platnick & Shadab, 1984, *Drassodes* Westring, 1851 *Drassodex* Murphy, 2007, *Latonigenai* Simon, 1893, *Scotophaeus* Simon, 1893 and *Xerophaeus* Purcell, 1907 was forced according the results obtained by Azevedo *et al.* (2018). The constrained topology resulted in a polytomy with these genera. In addition, the relationship between some Neotropical genera of Prodidominae were unresolved (Fig. 8C).

Forcing the monophyly of *Lygromma* resulted in the lowest value of RFD among the tested constrains. Nevertheless, the strict consensus does not recover a monophyletic *Lygromma*, which arises within a polytomy with other Neotropical Prodidominae (Fig. 8D).

Forcing the monophyly of *Tricongius* resulted in the highest value of RFD, indicating that this hypothesis is very weakly supported, favoring our unconstrained hypothesis. The strict consensus of this analysis results in a polytomy with *Tricongius* and *Oltacloea* (Fig. 8E), reinforcing our hypothesis that both genera are synonymous.

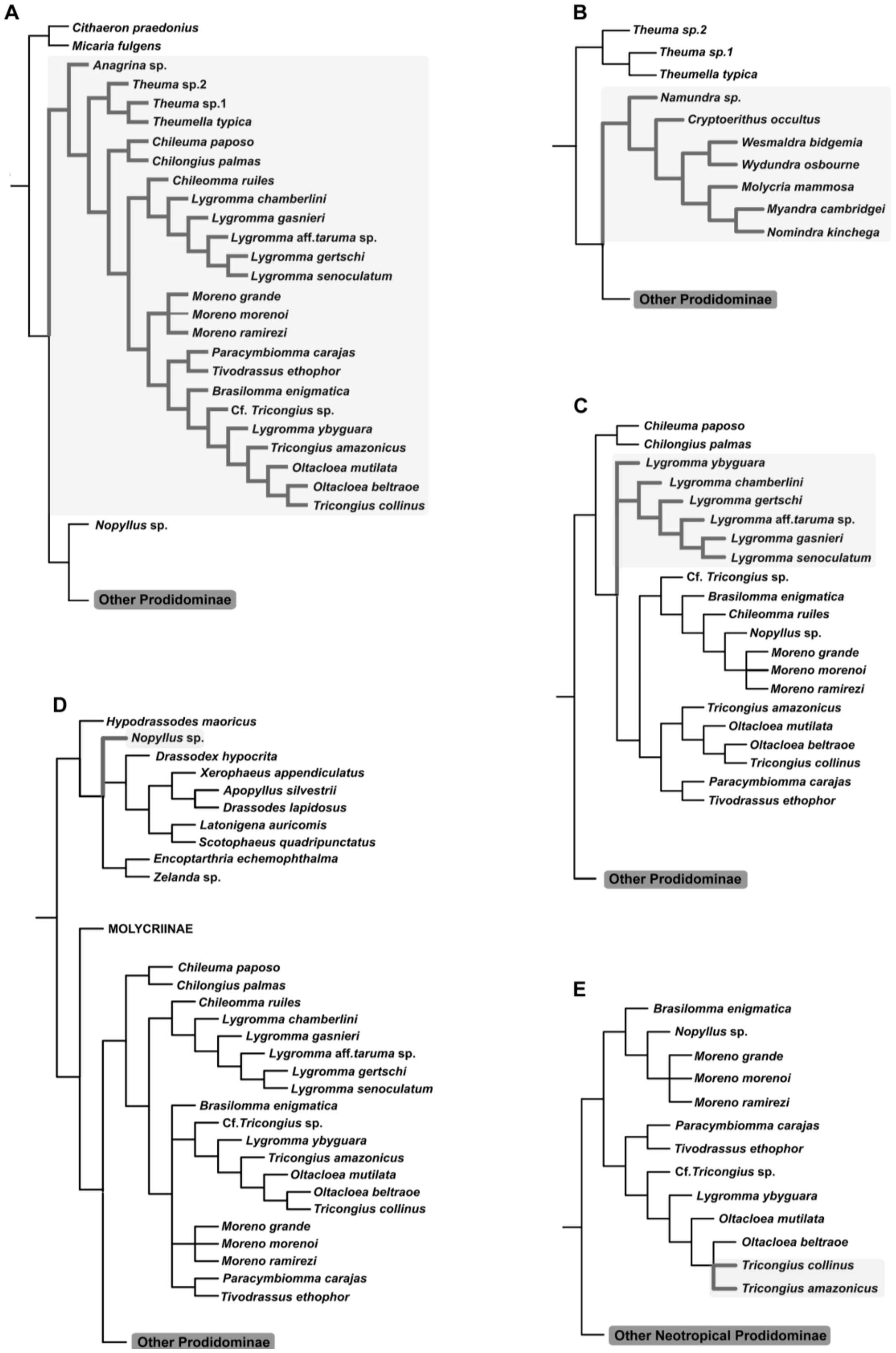


Fig 8. Strict consensus of constrained trees. **A)** Former subfamily monophyletic**; B)** Molycriinae + *Namundra* monophyletic; **C)** *Lygromma* monophyletic; **D)** *Nopyllus* inside Gnaphosidae non-Prodidominae; **E)** *Tricongius* monophyletic. Taxa submitted to constrain are in light gray and with thickened branch.

DISCUSSION

OUTGROUP

Azevedo *et al.* (2018) recently redefined the taxonomic limits of Gnaphosidae by means of a phylogenetic analysis based on morphological characters. They did not recover the family as monophyletic, since the genera *Micaria* Westring, 1851, *Nauhea* Forster, 1979 and *Verita* Ramirez & Grismado, 2016 arose more closely related to other families. Nevertheless, considering that the limits of these genera are still unclear, the authors preferred to keep them in Gnaphosidae, rather than place them in other well-established families. They proposed Gnaphosidae *S.S.* to include all genera that have piriform gland spigots longer and wider than the major ampullate gland spigots (Figs 15A, 16B), excluding the above mentioned genera, considering them problematic taxa. *Homoeothele* Simon, 1908 and *Matua* Forster, 1979, were not included in their analysis, but were also deemed problematic taxa and excluded from Gnaphosidae *S.S.* The authors suggest further studies to confirm the placement of these genera.

In our study, we tested the placement of two of these problematic taxa, *Micaria* and *Homoeothele*. *Micaria* was included in several of the latest phylogenetic analyses but there has been no consensus on its position. Ramirez (2014) recovered *Micaria* as sister to Gnaphosidae + Prodidomidae. In Wheeler *et al.* (2016), *Micaria* arose within Gnaphosidae but sister to Molycrinnae. Azevedo *et al.* (2018) recovered a well-supported clade in which *Micaria* is sister to Cithaeronidae + Ammoxenidae. Our analysis corroborates the relationship between *Micaria* and *Cithaeronidae*, which arose as sister to each other.

Homoeothele was included in the *Anzacia* group (*Anzacia* Dalmas, 1919, *Hypodrassodes* Dalmas, 1919, *Matua, Nauhea*) by Murphy (2007), but Azevedo *et al.* (2018) found this group polyphyletic. Our analysis included representatives of

Homoeothele, *Anzacia* and *Hypodrassodes* and did not recover the *Anzacia* group, as proposed by Murphy (2007). However, *Homoeothele* arose well supported within Gnaphosidae *S.S.*, by sharing the same spinnerets characteristics of other Gnaphosidae, contradicting Azevedo *et al.* (2018).

Azevedo *et al.* (2018) rearranged the internal structure of Gnaphosidae. The authors placed the former Prodidomidae as a subfamily of Gnaphosidae (Prodidominae), redefined the limits of Gnaphosinae Pocock, Zelotinae Platnick, Herpyllinae Platnick, Drassodinae Simon, and proposed the new Leptodrasssinae. In contrast, several genera were considered unplaced and were not assigned to any subfamily due to the low support and unstable relationships. Among these unplaced genera, our analysis included representatives of *Anzacia*, *Apopyllus*, *Drassodex*, *Hypodrassodes*, *Nopyllus*, *Scotophaeus*, *Xerophaeus* and *Zelanda* Ozdikmen, 2009. We also included *Anagraphis* Simon, 1893, which was maintained in the monogeneric subfamily Anagraphidinae by Azevedo *et al.* (2018).

Our results show a poorly supported clade including *Apopyllus*, *Drassodes*, *Encoptarthriai* Main, 1954, *Scotophaeus*, *Xerophaeus* and *Zelanda* (clade 12). Of these, only *Drassodes* had been assigned to a subfamily (Drassodinae Platnick, 1990) by Azevedo *et al.* (2018). In addition to the above-mentioned genera, our analysis also included a representative of the genera *Encoptarthria*, not included in the study of Azevedo *et al.* (2018). Our results show a well-supported relationship between the latter and *Zelanda*, another Australian genus. Both genera are supported by spinneret characters, such as piriform gland spigots with the base longer and wider than the shaft.

The position of *Anagraphis* is still controversial within Gnaphosidae. Platnick & Baher (2006) redefined Anagraphidinae to include *Anagraphis* and *Talanites* Simon, 1893. Azevedo *et al.* (2018) did not recover this relationship in analyses performed under implied weighting. The authors found *Anagraphis* sister to *Anzacia*. Nevertheless, despite having found a well-established relationship between these taxa, they suggested not using the name Anagraphidinae for the group until more studies are carried out. Their results show this group sister to a clade including *Hypodrassodes*, *Notiodrassus* Bryant, 1935 and *Echemus* Simon, 1878 sister to Prodidominae. Our results corroborate the relationship between *Anagraphis* and *Anzacia* but, contrary to Azevedo *et al.* (2018), we recovered this clade sister to Leptodrassinae + *Anagrina* Berland, 1920 (formerly allocated in Prodidominae), supported by having the PMS cylindrical gland spigots mixed with other spigots (Fig. 30B). Although we removed *Anagrina* from Prodidominae, we refrain from allocating it in any other already established group, since the relationships involving these taxa are apparently unstable.

Nopyllus was considered unplaced within Gnaphosidae by Azevedo *et al.* (2018). Originally described by Ott (2014), the genus was considered closely related to *Apodrassodes* Vellard, 1924 and *Apopyllus* by the presence of a long filiform embolus. Our results show that this character arises independently in these genera and *Nopyllus* appears nestled within a well-established clade of Neotropical Prodidominae (clade 38). We tested the constrained monophyly of *Nopyllus* and other related genera, according to Azevedo *et al.* (2018), but the results were poorly supported.

MOLYCRIINAE

Platnick & Baher (2006) performed a cladistic analysis to test the monophyly of Molycriinae and understand the relationships between their genera. The authors characterized the subfamily by the position of the anterior lateral spinnerets, which are situated far in advance of the posterior spinnerets. Wheeler *et al.* (2016), in a molecular analysis, recovered Molycriinae as monophyletic sister to *Micaria*, nestled within

Gnaphosidae and not related to the other prodidomids. However, the authors refrained from making any taxonomic decisions until both groups were more adequately studied. Azevedo *et al.* (2018) using only morphology, recovered Prodidominae, including *Cryptoerithus* (Molycriinae), as monophyletic within Gnaphosidae, based on the presence of piriform gland spigots extremely elongated and associated with patches of plumose setae. These patches of setae are interpreted as being an incomplete ring of the distal article of ALS (Ramirez 2014; Azevedo *et al.* 2018). According to Ramirez (2014), this ring is sclerotized and barely visible but can be inferred by the presence of setae or their insertions.

In our study, we reinterpret the morphology of the distal article in Molycriinae. In SEM images, we noted that Molycriinae genera have piriform gland spigots extremely elongated, but not associated with plumose setae. The ALS of Molycriinae are very distinct from those of other Gnaphosidae. They have a structure that is able to retract the piriform gland spigots, leaving only the shaft tip exposed (Figs 28K, L). The latter protected by a hood projected from the basal article of the ALS (Figs 28H, L). This structure clearly has setae and apparently is present only in the anterior part. Thus, we coded this structure of the ALS of Molycriinae as a distal article with incomplete distal ring without patches of setae at the base of the piriform gland spigots. In some specimens, when the spigots are partially retracted it is possible to observe the setae very close to the spigots, giving the impression that both are closely related (Fig. 28F, H). Perhaps this situation has induced previous authors to determine this condition as similar to that observed in Prodidominae.

The morphology of the setae are also different in both subfamilies, in Molycriinae they are completely covered by barbs (Fig. 28G), while in Prodidominae the surface in close contact with the spigots is completely smooth (Figs 29D, F, H).

Therefore, although additional morphological studies are needed to elucidate the structures of spinnerets of Molycriinae, the absence of patches of setae associated at the base of the piriform gland spigots is evident.

Molycriinae and Prodidominae share the sternum with large posterior protrusion between the coxae IV (Figs 17G–P), though less pronounced in some Molycriinae. This characteristic was considered a synapomorphy of the former subfamily Theuminae (Platnick *et al.* 2005), but we observed that all Prodidominae and Molycriinae have this protrusion, as already suggested by Wunderlich (2011). In Molycriinae this structure has sclerotized margins (Figs 17G, H), while in Prodidominae this protrusion is unsclerotized (Figs 17I–N), except for *Namundra* and *Zimiris* where it is weakly sclerotized (Figs 17O, P). Thus, Molycriinae is here reestablished as a subfamily to include the genera *Cryptoerithus*, *Molycria*, *Nomindra*, *Wesmaldra* and *Wydundra*, supported by the presence of ALS extremely elongated situated far in advance of the posterior spinnerets (Figs 27C, D), piriform gland spigots elongated with retractile area (Figs 28G, K) and presence of an apical hood in the basal article (Figs 28H, L).

The relationships between Molycriinae genera obtained in this study corroborate those of Platnick & Baher (2006), with *Cryptoerithus* at the base of the clade (clade 32). *Wesmaldra* is sister to *Wydundra* supported by the presence of a lateroventral row of long and strong spines on female palpal femur (Fig. 32A). Both genera are sister to *Molycriia*, *Nomindra* and *Myandra*, which share the chelicerae fang with wide opening of the venon gland (Fig. 18C).

Namundra was originally proposed by Platnick & Bird (2007) as the only African member Molycriinae. The authors considered it more related to *Wesmaldra* and *Wydundra* by the presence of tarsal onychium, tarsal cracks, and female palpal spine row, although all were considered less pronounced in *Namundra*. In addition, the authors also suggested that the wide separation between ALS shared only with *Wyndundra* could indicate a closer relationship between the two genera. In SEMs, we observed that *Namundra* did not have a tarsal onychium or tarsal cracks (Fig. 24I), and although the female palpal femur apparently has differentiated setae, they are not the same as in *Wesmaldra* and *Wydundra* (Fig. 32B). In our analysis, the separation between ALS, shared with *Wyndundra,* appears independently in both genera, but this condition is even more pronounced in *Namundra* (Fig. 27J). Therefore, despite *Namundra* having been assigned to Molycriinae by sharing mainly the ALS position and size, the genus is removed from the subfamily and transferred to Prodidominae, where it appears nestled within a group of predominantly African genera. We tested an alternative hypothesis forcing the monophyly of Molycriinae plus *Namundra*, but this hypothesis has very low support.

Molycriinae and Prodidominae share the elongated piriform gland spigots (Fig. 9). However, Azevedo *et al.* (2018) suggests that this elongation might have evolved before the patches of long setae in Prodidominae, and that these could serve to protect the long spigots. Our observations corroborate this suggestion. The elongation of spigots appeared in both subfamilies and apparently, each subfamily developed an independent protection mechanism for their spigots. Prodidominae developed patches of setae, in which the internal surface of the setae is smooth, enabling a close contact association with the spigot and protecting the part that would be exposed to the external environment. In contrast, Molycriinae developed a structure connected to the piriform gland spigots that is able to retract these spigots inside the basal article, leaving exposed only the shaft, which is protected by an apical hood of the basal article. Nevertheless, behavioral studies are important to clarify the real function these structures in these spiders.

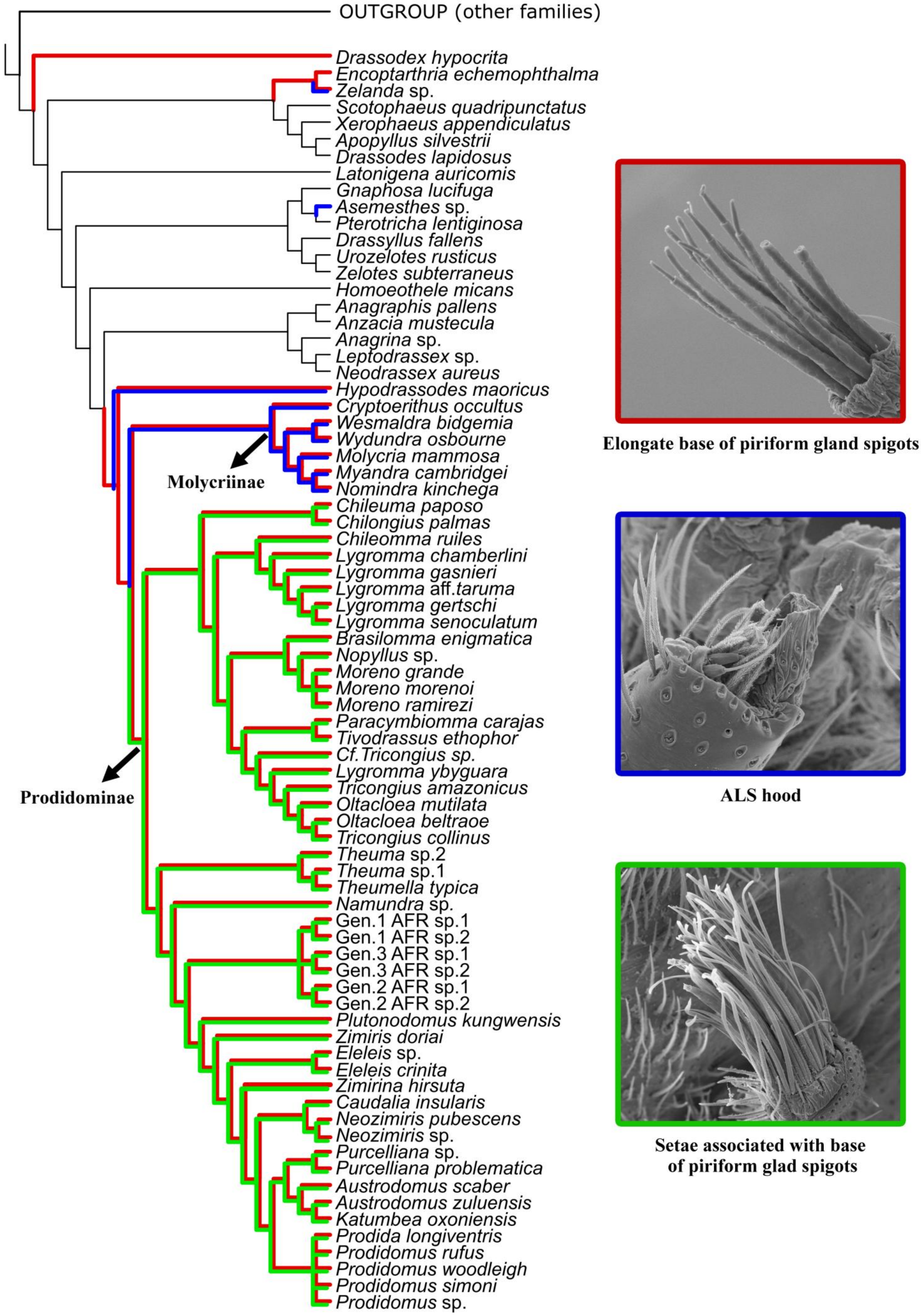


Fig. 9 Evolution of elongation of piriform spigots base, the presence of setae associated with these spigots and presence of ALS hood on the Gnaphosidae. Mapping on the working phylogenetic hypothesis.

The advanced position of the ALS in Molyriinae is the most notable characteristic of the group, although this characteristic (in different degrees of advance) can also be found in other genera (i.e. *Zimiris*, *Theuma*, *Theumella* and *Namundra*). This advance is probably related to the expansion and/or reduction of opisthosomal segments. It is known that the spinnerets are located on segments 4 (anterior spinnerets) and 5 (posterior spinnerets). The current posterior positioning of spinnerets on most spiders is due to the expansion of opisthosomal segment 3 and the reduction of the body segments posterior to opisthosomal segment 5 (Pechmann *et al.* 2010). Therefore, it is probable that the condition observed in Molycriinae and other genera is the result of the expansion of segment 4 and reduction of segment 3. In addition, all genera that have this advance of the spinnerets also show elongate ALS, however, this elongation is also observed in spiders with ALS not advanced. Hilbrant (2008) observed that the elongation of spinnerets can be associated to the expression of gene AP-2, since this gene can be expressed in different ways in opisthosomal segments 4 and 5. The author observed that in *Cupiennius salei* (Keyserling, 1877) the gene is strongly expressed in segment 5 and temporarily expressed in segment 4, and consequently the posterior spinnerets are longer than the anterior. Thus, it is possible to suggest that the more prevalent expression of gene AP-2 in segment 4 could be related to the longer anterior spinnerets. Nevertheless, more morphological and genomic studies are needed to elucidate the development of spinnerets.

PRODIDOMINAE

Much has been speculated about Prodidominae spiders but only recently, representatives of this subfamily were included in phylogenetic analyses (Ramirez 2014; Wheeler *et al.* 2016; Fernández *et al.* 2018; Azevedo *et al.* 2018). Azevedo *et al.*

(2018) performed the most recent analysis including ten genera. The authors used mainly Neotropical species, and suggested that the inclusion of *Zimiris* and other Australian genera would not challenge the monophyly of the group. In addition, the authors also suggested that a careful examination African Prodidomidae fauna could be interesting.

In this study, we provide the most complete phylogenetic analysis for Prodidominae with representatives of 31 genera. The subfamily was not recovered as monophyletic, and thus, it is here redefined to include all genera that share an incomplete distal article of the ALS with patches of long setae around the piriform gland spigots (Fig. 29). In addition to these patches of setae, the subfamily also shares the presence of large protrusion between the coxae IV with erect setae and unsclerotized margin (Figs 17I–N). Other characteristics related to the spinnerets include the major ampullate gland spigots located in a well-defined conical article with setae (a characteristic also observed in *Angraphis* and *Zelanda*) and PMS with cylindrical gland spigots mixed with aciniforms and minor ampullates (Figs 29H, I, 30E, F, L). *Anagrina* arose sister to Leptodrassinae and was therefore removed from Prodidominae and considered an unplaced genus in Gnaphosidae. As suggested by Azevedo *et al.* (2018), the inclusion of *Zimiris* did not influence the monophyly of Prodidominae and it arises nestled within the subfamily.

Platnick *et al.* (2005) observed in some Prodidominae genera a peculiar mechanism formed by several claw teeth appressed together and used to move the tenant setae, the claw tuft clasper (CTC). Ramirez (2014) observed this structure in representatives of several other families and in other genera of Gnaphosidae. The author identified a monophyletic group based on the presence of this structure, which he named CTC clade. However, Azevedo *et al.* (2018) did not recover the CTC clade as monophyletic, and justified this result with differences in the interpretation of homology of the claw tuft clasper. He divided the clasper into three independent structures located at the base of the tarsal claw, a classic clasper, a folded clasper and a solid clasper, taking into consideration the structural composition. The presence of both the solid clasper and the classic clasper in *Chilongius,* observed by the authors and confirmed in our study, strengthen the hypothesis of them being independent structures, although no other species in our dataset shows this condition. In our study, we propose a fourth type of clasper, comprising a thin flexible single clasper present in the genus *Zimiris* and in the African genera *Theuma*, *Namundra* and possibly *Theumella* (Fig. 10).

According Ramirez (2014), the claw tuft clasper appeared only once, while Azevedo *et al.* (2018) suggested that this mechanism evolved several times independently. Our results corroborate those of Azevedo *et al.* (2018), and within clade 57 the solid clasper evolved at least twice and the flexible single clasper appeared three times. The classic clasper evolved once in clade 38, as suggested by Platnick *et al.* (2005) and corroborated by Azevedo *et al.* (2018). In addition, we observed that the number of teeth in the classic clasper of legs I–II differs among genera. The Chilean genera *Chileumma* and *Chilongius* have four teeth forming the clasper, while the other genera can have two or three teeth.

Ramirez (2014) also suggested that the emergence of the claw tuft clasper was associated to the emergence of the basal ribs on the tenent setae. This correlation was not confirmed by Azevedo *et al.* (2018). Nevertheless, the authors suggest that the evolution of the ribs on the basal section of the tenent setae could be a pre-adaptation to the evolution of a clasper. We did not observe a direct correlation between these two structures, but observed a correlation between the claw tuft clasper and the insertion of the tenent setae, at least in Prodidominae. Clade 38 has the classic clasper associated to the claw tuft bases packed together, with the bases of the tenent setae (in this case with ribs) very close to one another (Figs 24A–D). This condition enables the classic clasper to fit in all the base of tenent setae, since this type of clasper has the tip slightly curved, allowing better movement of the claw tuft. The remaining Prodidominae (clade 57) have the solid clasper and the flexible single clasper, and both are associated to the presence of a claw tuft plate, in which the tenent setae are inserted in individual sockets (Figs 24E–I). The flexible single clasper apparently has a fit mechanism different from those of the species with classic clasper. Possibly, when the claw moves forward and then returns to its initial position, the space between the flexible single clasper and the claw base work as a notch to move the tenent setae. Perhaps something similar occurs in those species that have a folded clasper. The solid clasper is quite homoplastic and showed small morphological variation within our dataset. Perhaps a more detailed examination of claws in these genera can indicate other homologies within the morphological condition of solid clasper.

Our results show that Prodidominae is divided into two well-supported clades, one including exclusively Neotropical genera (clade 38), a grouping that was previously suggested by other authors (Platnick *et al*. 2005; Azevedo *et al*. 2018), and the other, including predominantly African genera (clade 57).

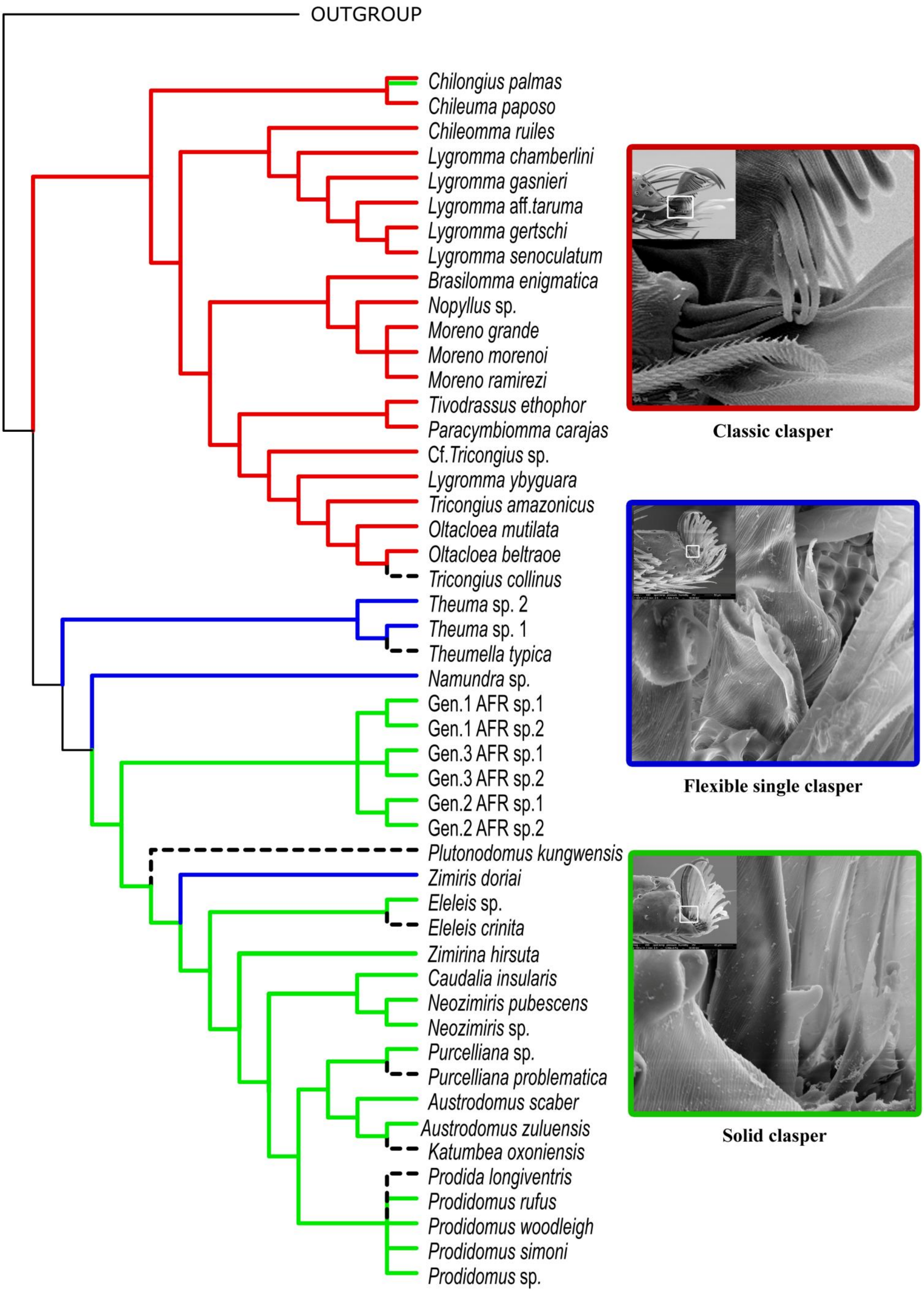


Fig 10. Morphology different of claw tuft clasper found in Prodidominae. Mapping on the working phylogenetic hypothesis. Dashed lines indicates missing data.

NEOTROPICAL PRODIDOMINAE

Clade 38 is composed exclusively by Neotropical genera and is supported by the presence of a claw tuft classic clasper. In addition, the clade also shares the presence of post epigastric invaginations (Figs 19K, 25E) and highly convoluted copulatory ducts (Fig. 35F). Platnick & Baehr (2006) included these genera in the former subfamily Theuminae, but this group was not recovered in our analysis, since *Theuma* and *Theumella* are more related to other Prodidominae genera. We tested forcing the monophyly of Theuminae but results indicated that this hypothesis has low support.

Within clade 38, the Chilean *Chileumma* and *Chilongius* arise sister to each other under all tested parameters. These results corroborate those obtained by Azevedo *et al.* (2018), who recovered the group, supported by several homoplastic synapomorphies, such as the presence of an epigynal atrium (Fig. 34J) and fertilization ducts well advanced from the epigastric furrow (Fig. 35K). The Chilean *Chileomma,* that was not included in Azevedo *et al.* (2018), arises sister to a clade including all *Lygromma* representatives except *L. ybyguara* (clade 41). This relationship was recovered under fewer parameters (K=7–10, 15), supported by the mesal orientation of the claw tuft of tenent setae (Fig. 24B). Our results contradict Platnick *et al.* (2005), who suggested that the Chilean fauna (*Chilongius, Chileumma* and *Chileomma*) was entirely distinct from the other Neotropical genera, as usually happens in other groups of spiders.

Lygromma was not recovered as monophyletic, since *L. ybyguara* arose more closely related to *Tricongius* and *Oltacloea*. Thus, *Lygromma* is here redefined to include species that have a ventral tibial apophysis (Fig. 32K) and eyes (when present) with PME-PLE and PLE-ALE very close, almost touching (Figs 15G, 16D). We tested the constrained monophyly of *Lygromma* + *L. ybyguara*, but the results were weakly supported.

Oltacloea and *Tricongius* were also not recovered as monophyletic in this study (clade 54). *Oltacloea beltraoe* Brescovit & Ramos, 2003 arises sister to *T. collinus* Simon, 1893, both sister to *O. multilata* Mello-Leitão, 1940, with T. *amazonicus* Platnick & Hofer, 1990 at the base of the clade. The relationship between these four species is supported by the presence of a hyaline median apophysis and absence of spines on femur I. Based on this result, we here consider *Oltacloea* a junior synonym of *Tricongius*. The genus is characterized by eyes widely separated with AME-AME distance shorter than AME-ALE, absence of spines on femur I, RTA single and cymbium with a bunch of thick setae on the ventral-terminal part (Fig. 33E).

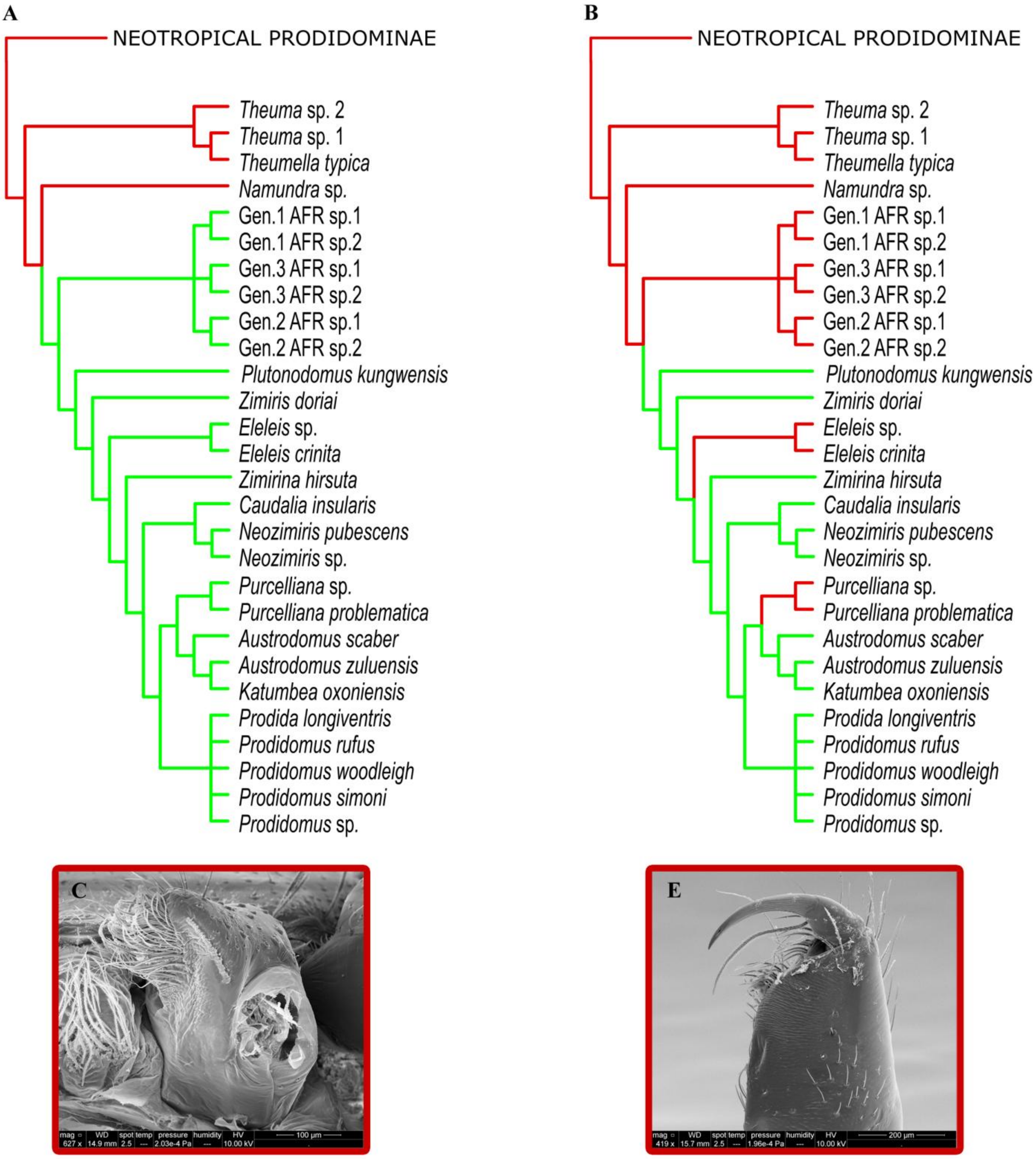
Lygromma ybyguara arose sister to *Tricongius*. Considered a troglobitic species, it was assigned to *Lygromma* based solely on the absence of eyes (Rheims & Brescovit 2004), a trait shared by two other cavernicolous species, *L. anops* Peck & Shear, 1987 and *L. gertshi* Platnick & Shadab, 1976. As pointed out by Rodrigues *et al.* (2018), the reduction or absence of eyes is a character usually related to subterraneous environments that can vary within the same genus, especially those that include subterranean and epigean representatives. In our analysis, we included four eyeless cavernicolous species (*Brasilomma enigmatica*, *Plutonodomus kungwensis* Cooke, 1964, *L. gertschi* and *L. ybyguara*) and no relationship was recovered between them. Although *L. ybyguara* arises sister to *Tricongius*, we decided not to transfer it to this well-established genus nor to a new genus. The species is known solely from the male holotype and obtaining the female and more specimens to examine with SEM might yield additional characters to better define the species. It is here considered *insertae sedis*.

Tivodrassus and *Paracymbiomma* arose sister to each other supported by the presence of a paracymbium (Fig. 32G). These results corroborate the suggestion of Rodrigues *et al.* (2018), who first pointed out the presence and similarity of this structure in both genera.

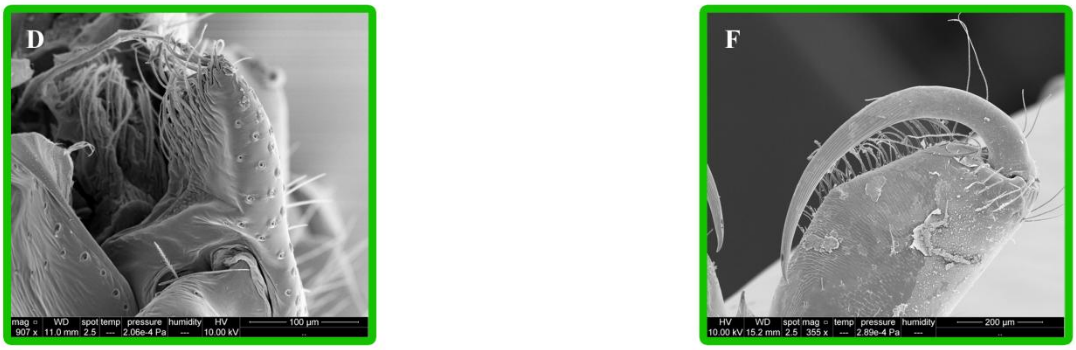
OTHER PRODIDOMINAE

Clade 57 arises sister to the Neotropical Prodidominae (clade 38) and is composed predominantly of African genera, with the exception of the Neotropical *Neozimiris* and *Caudalia*. *Prodidomus*, *Zimirina* and *Zimiris* are present in Africa but occur also in other biogeographic regions. In our analysis, we used *Zimirina hirsute* Cooke, 1964 from Canary Islands, *Zimiris doriai* (a synantropic species introduced in several countries around the World) and four species of *Prodidomus*, two African, one Australian and one synantropic species. All other genera are exclusively Afrotropical. This clade is supported by several homoplastic synapomorphies, such the presence of dense claw tuft located in a well delimited plate with the tenent setae inserted in individual sockets (Figs 24G–I), absence of claw teeth (Figs 24E–I), except *Neozimiris* with reduced teeth, and piriform gland spigots inserted in well defined base (Fig. 29F).

Some genera in this clade show losses or reduction of several structures that are observed in other Prodidominae, such as the thoracic fovea, scales, serrula, cheliceral boss, teeth of chelicerae,shaft serrula of cheliceral fang and female palpal claw. Many of these losses are probably associated to a change in feeding habits and prey capture. Spiders with cheliceral teeth mash up their prey and the serrula is used to cut it. In contrast, the absence of these structures indicates that these spiders inflict only a small wound on their prey, while the digestive fluid is pumped and the dissolving tissue is gradually sucked out (Foelix 2011). Perhaps, the elongation of the cheliceral fang observed in some of these genera might be associated to the loss of the serrula and reduction or loss of cheliceral teeth (Figs 11, 12). As the spider does not need to smash and macerate the prey, the elongation of cheliceral fang allows the spider a longer range to insert the fang in the prey, maintaining a safe distance from it. However, behavioral studies will be necessary to better explain the absence of these structures in some Prodidominae.

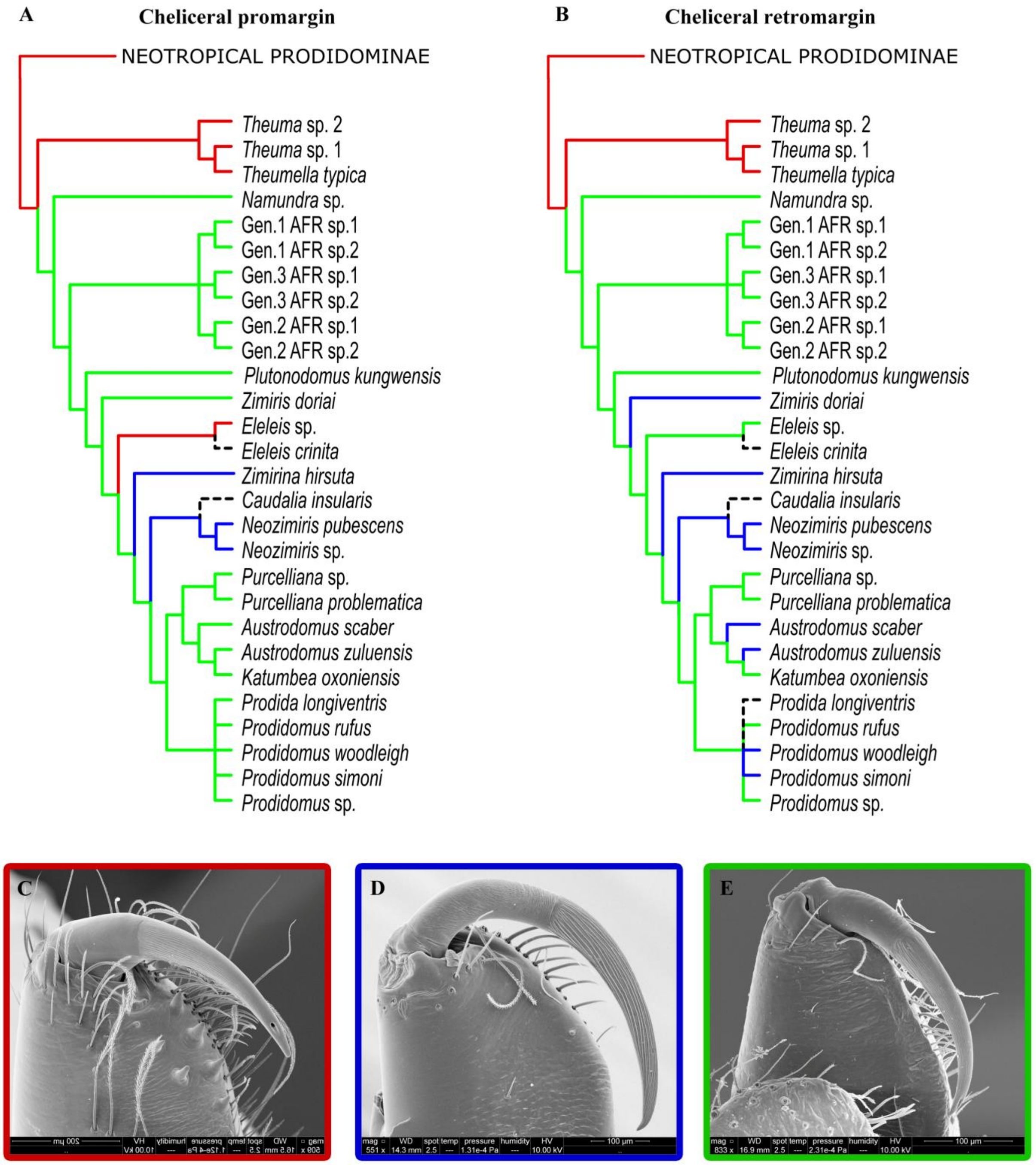


Serrula present **Chelicerae normal**



Serrula absent **Chelicerae elongated**

Fig. 11. Evolution of characters of occurrence of serrula and cheliceral fang size in Prodidominae. A) Mapping of presence and absence of serrula; B) Mapping of size of cheliceral fang; C) *Theuma* sp.; D) *Prodidomus woodleigh*; E) *Namundra* sp.; F) *Zimiris doriai*.



Teeth normal **Teeth reduced** **Teeth absent**

Fig. 12. Evolution of characters of teeth in Prodidominae. A) Mapping of teeth of cheliceral promargin; B) Mapping of teeth of cheliceral retromargin; C) *Theuma* sp.; D) *Prodidomus woodleigh*; E) *Purcelliana*.

The female palpal claw morphology also shows several differences in this clade. The palps are appendages that resemble legs, but are not used for locomotion. In females, they often play a role during prey capture, when they constantly touch and manipulate the prey (Foelix 2011). In our analysis we recovered a monophyletic group (clade 61) that has the female palp with chemosensory setae in a well-defined truncate patch, which is associated to a reduced or absent claw. Our results indicate a transformation sequence from a well-defined claw, to a reduced claw to the absence of a claw (Fig. 13), as already observed by Ramirez (2014). The reduction or absence of female palpal claw might be related to a possible change in feeding habits and prey capture these spiders.

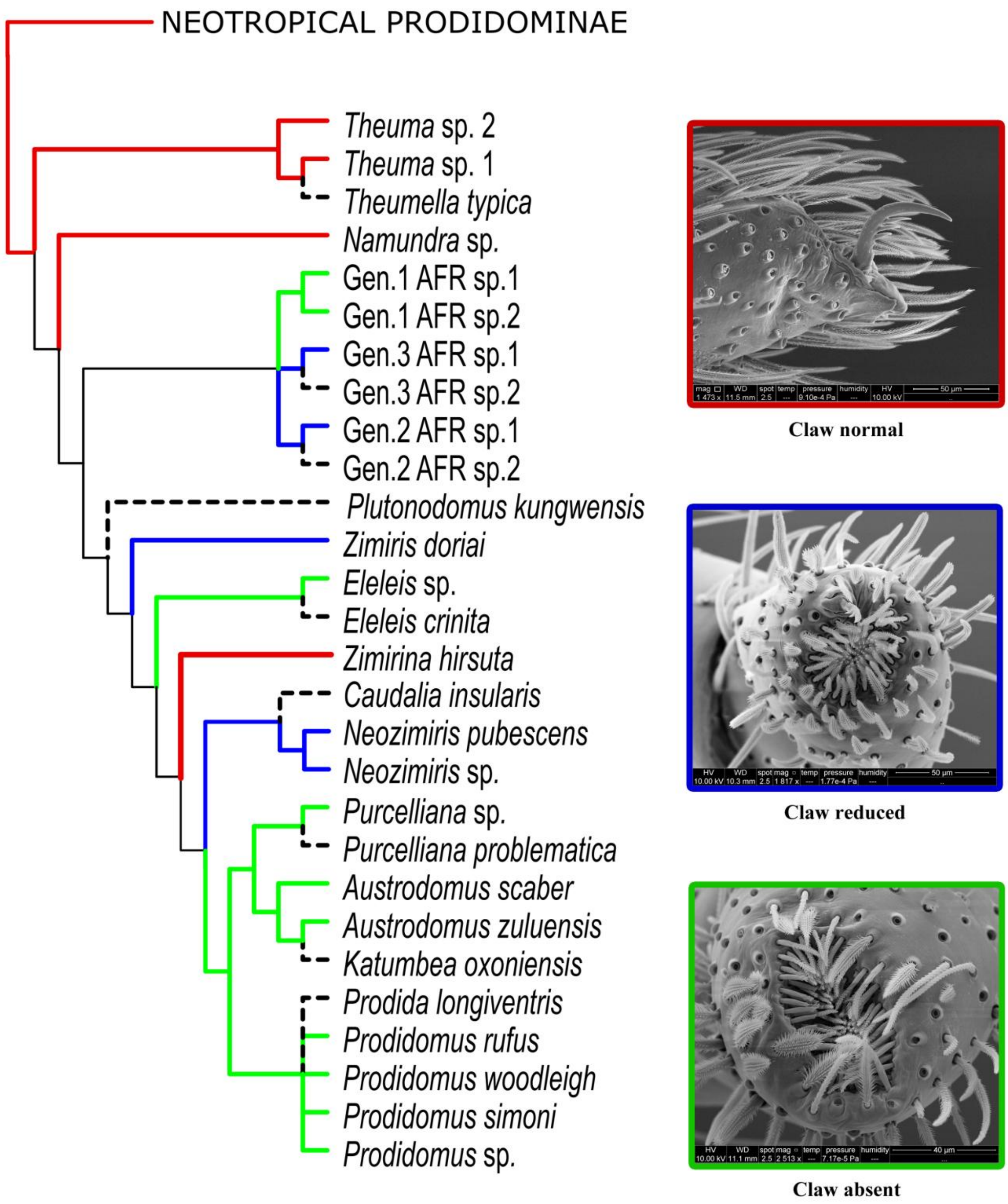


Fig. 13. Evolution of female palpal claw in Prodidominae. Mapping on the working phylogenetic hypothesis. Dashed lines indicates missing data.

Theuma was not recovered as monophyletic. It arises within a well-supported clade including *Theumella*, supported mainly by thin and conical protrusion between the coxae IV (Fig. 17L). Although both genera seem to be closely related, we refrain from making any taxonomical changes to their status until further studies are carried out and more species are examined. *Theuma* is a large and very abundant genus in southern Africa. Much of the diversity is still unknown and of the 26 known species, only five are known from males and females (World Spider Catalog, 2018). *Theumella* was here represented solely by a male holotype, and we were not able to examine the specimen with SEM.

Zimiris is a genus considered of interest within Prodidominae because it has the morphology of spinnerets similar to Molycriinae, (Deeleman-Reinhold 2001; Platnick & Penney 2004; Wheeler *et al.* 2016; Azevedo *et al.* 2018) even though it was never included in a phylogenetic analysis. Deeleman-Reinhold (2001) suggested a relationship between *Zimiris* and Molycriinae, based on the position of the ALS (Figs 27D, K). However, Platnick & Penney (2004) observed several characters shared with Prodidominae, such as procurved posterior eye row, enlarged chelicerae with elongated fangs, and piriform gland spigot surrounded by a cluster of sockets (which the authors presumed were insertions of setae). Thus, the authors concluded that *Zimiris* belonged in Prodidominae and that the advanced ALS was acquired independently. In our analysis, we recovered *Zimiris* within Prodidominae and confirmed that the ALS position was acquired independently in Molycriinae, as suggested by Platnick & Penney (2004). In addition, the authors suggested that the presence of enlarged and darkened setae found at the base of the claw tufts would be diagnostic for the genus. However, we observed that other genera of Prodidominae share this characteristic with *Zimiris* (Fig. 20H).

Caudalia and *Neozimiris* are the only exclusively Neotropical genera in clade 57. We recovered both genera closely related in several analyses under implied weighting and with high support values (clade 72), with a single homoplastic synapomorphy, the patella similar to tibia size (Fig. 19A). However, as we analyzed only the female holotype of *Caudalia*, we preferred not to make any taxonomic decision until more material is examined. Alayón (1980) had already noted the close relationship between these genera and suggested that both showed structural similarities with *Austrodomus*. However, our results indicate that *Austrodomus* is more related to other African genera. In addition, Cooke (1977) also suggested that *Zimirina* could be junior synonym of *Neozimiris*. In our study, none of the analyses under implied weighting recovered this relationship, although this hypothesis was supported in the analysis under equal weighting.

Prodidomus and *Prodida* were recovered in our analysis as a polytomy. *Prodida* is a genus comprised by only two species and restricted to the Philippines and the Seychelles Islands, while *Prodidomus* is a widely distributed genus with 53 species characterized by the presence of massive PLS, much thicker than the anterior spinnerets (Figs 27L, 31J). Deeleman-Reinhold (2001) observed that *Prodida* shared with *Prodidomus* characters such as the diverging chelicerae and endites with pointed distal margin. She also described the spinnerets of *Prodida*, as having ALS anterior-posteriorly compressed, PMS small and laterally compressed, PLS with basal segment more massive than in ALS and with atypical spigots. We observed that all these characters are also present in *Prodidomus*, including the atypical spigots (spigots with shafts widened at the tip). Thus, although only the female holotype of *Prodida longiventris* was scored in this study, which the epigyne is lost, the presence mainly of PLS massive in genus, allows us to determine that *Prodida* is junior synonymous of *Prodidomus*.

Purcelliana, *Austrodomus* and *Katumbea* arose as a monophyletic group, supported by the presence of simple vRTA (clade 75). The male of *Purcelliana problematica* and the female of *Austrodomus scaber* were originally described as

Prodidomus scaber, by Purcell, 1904. Although the specimens were collected together, Cooke (1964) observed that both show characters that separate them from *Prodidomus*. Thus, the author proposed a new genus to allocate the male specimen and placed the female in *Austrodomus*. Nevertheless, he stated that the examination of additional material was the needed to elucidate the limits these genera. Our results corroborate Cooke's (1964) hypothesis, and both genera arose as distinct but closely related. *Purcelliana* was recovered monophyletic (clade 76) supported by several homoplastic synapomorphies, such as the presence of clavate setae over the entire body (Figs 14P, 19M). *Austrodomus* was not recovered as monophyletic, since *Katumbea* arose more related to *A. zuluensis* Lawrence, 1947, by the presence of primary spermathecae conspicuous and copulatory ducts wider close the copulatory opening (clade 77). Thus, although we have studied only the type species of *Katumbea*, we here propose *Katumbea* as junior-synonym of *Austrodomus*. This taxonomic decision is based on the high support of the clade and the combination of unique characters shared by their representatives, such longer patellae (Fig. 19A), anterior margin of sternum rounded (Fig. 17M) and elongated chelicerae, as well as on the similarities of female genitalia of *Katumbea* and the *A. zuluensis*, type species of genus.

Although our results have elucidated several issues involving Prodidominae spiders, some genera remain controversial and need further studies. *Theuma* and *Prodidomus,* for example, are abundant genera that deserve a taxonomic revision to better define their taxonomic limits. The monotypic genera *Caudalia*, *Plutonodomus*, *Theumella* and the species *L. ybyguara* are known from only one sex and only the holotype was examined. Perhaps, the study of additional material of these species will help to have a better taxonomic and phylogentic definition of these groups.

TAXONOMY

SUBFAMILY MOLYCRIINAE SIMON, 1897 **subfamily revalidated**

Myandriinae Simon, 1897: 23.

Molycriinae Platnick, 1990: 36.

Prodidominae Azevedo *et al.*, 2018: 35.

Type genus: *Molycriia* Simon 1887

Current composition: *Cryptoerithus* Rainbow, 1915; *Molycriia*; *Myandra* Simon 1887; *Nomindra* Platnick & Shadab, 2006; *Wesmaldra* Platnick & Shadab, 2006; *Wydundra* Platnick & Shadab, 2006.

Diagnosis: ALS extremely elongated situated far in advance of the posterior spinnerets, piriform gland spigots elongated with retractile area and presence of an apical hood in the basal article.

SUBFAMILY PRODIDOMINAE SIMON, 1884

Prodidomidae Simon, 1884: 302.

Prodidominae Platnick & Shadab 1976: 3.

Prodidomidae Platnick, 1990: 4.

Prodidominae Azevedo *et al.* 2018: 24.

Type genus: *Prodidomus* Hentz, 1847

Current composition: *Austrodomus* Lawrence, 1947; *Brasilomma* Brescovit, Ferreira & Rheims, 2012; *Caudalia* Alayon, 1980; *Chileomma* Platnick et al., 2005; *Chileuma* Platnick *et al.*, 2005; *Chilongius* Platnick *et al.*, 2005; *Eleleis* Simon, 1893; *Lygromma* Simon, 1893; *Lygrommatoides* Strand, 1918; *Moreno* Mello-Leitão, 1940; *Namundra* Platnick & Bird, 2007; *Neozimiris* Simon, 1903; *Nopyllus* Ott, 2014; *Paracymbiomma*

Rodrigues, Cizauskas & Rheims; *Plutonodomus* Cooke, 1964; *Prodidomus*; *Purcelliana* Cooke, 1964; *Theuma* Simon, 1893; *Theumella* Strand, 1906; *Tivodrassus* Chamberlin & Ivie, 1936; *Tricongius* Simon, 1893; *Zimirina* Dalmas, 1919; *Zimiris* Simon, 1882.

Diagnosis: ALS with patches of long setae around the piriform gland spigots and presence of large protrusion between the coxae IV with erect setae and unsclerotized margin.

GENUS *TRICONGIUS* SIMON, 1893

Tricongius Simon, 1893: 453.

Oltacloea Mello-Leitão, 1940; 254. (type species by original designation *O. mutilata* Birabén). **New synonymy.**

Type species: *Tricongius collinus* Simon, 1893

Current composition: *Tricongius amazonicus* Platnick & Hofer, 1990; *T. beltraoe* (Brescovit & Ramos, 2003) **comb. nov.**; *T. collinus*; *T. mutilata* (Mello-Leitão, 1940) **comb. nov.**; *T. ribaslangei* (Bonaldo & Brescovit, 1997) **comb. nov. Misplaced species**: *T. granadensis* Mello-Leitão, 1941.

Diagnosis: Carapace slightly elevated at cephalic region, almost flattend, eyes widely separated with AME smaller than ALE and AME-AME distance shorter than AME-ALE, sternum with anterior margin narrow, less than half to maximum width sternum.

GENUS *AUSTRODOMUS* LAWRENCE, 1947

Prodidomus Purcell, 1904: 172.

Austrodomus Lawrence, 1947: 10.

Katumbea Cooke, 1964: 281. (type species by monotypy *K. oxoniensis* Cooke). **New synonymy.**

Type species: *Austrodomus zuluensis* Lawrence, 1947

Current composition: *Austrodomus oxoniensis* (Cooke, 1964) **comb. nov.**; *A. scaber* (Purcell, 1904); *A. zuluensis*.

Diagnosis: Presence of elongated patellae I and anterior margin of sternum rounded; male palp with two RTA, conductor hyaline and laminar extension tegular; female with fertilization ducts well advanced from the epigastric furrow.

GENUS *PRODIDOMUS* HENTZ, 1847

Prodidomus Hentz, 1987: 466.

Hyltonia Birabén, 1954: 13.

Prodida Dalmas, 1919: 324. (type species by monotypy *P. longiventris* Dalmas). **New synonymy.**

Type species: *Prodidomus rufus* Hentz 1847

Current composition: *Prodidomus longivetris* (Dalmas, 1919) **comb. nov.**; *P. stella* (Saaristo, 2002) **comb. nov.**. For complete composition see https://wsc.nmbe.ch/specieslist/2459 (World Spider Catalog, 2018).

Diagnosis: Presence of PLS massive, much thicker than the anterior spinnerets.

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SUPPORTING INFORMATION

List of vouchers

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Cf. *Tricongius* sp. ARGENTINA, Missiones, Parque Nacional Iguazu, Salto macuco, 26.XII.1990, S. & J. Peck leg., 2♂ 4♀ (AMNH).

Chileomma ruiles Platnick, Shadab & Sorkin, 2005. CHILE, Maule, Cauquenes, Reserva Nacional Los Ruiles, 25.II.1992, Platnick et al. leg., 1♂ 1♀ (AMNH). SCORING REFERENCES: Platnick *et al.* (2005).

Chileuma paposo Platnick, Shadab & Sorkin, 2005. CHILE, Antofogasta, 6 Km E paposo, 12.X.1992, Platnick et al. leg., 4♂ 4♀ (AMNH); 1♂ 1♀ (AMNH). SCORING REFERENCES: Azevedo *et al.* (2018); Platnick *et al.* (2005).

Chilongius palmas Platnick, Shadab & Sorkin, 2005. CHILE, Valparaiso, Provincia de Quillota, Palmas de Ocoa, Parque Nacional La Campana, 21.XII.1984, R. Calderón leg., 1♂ 1♀ (AMNH); 30.XI.1984, 1♀ (AMNH); 19.VII.1985, 1♂ (AMNH). SCORING REFERENCES: Azevedo *et al.* (2018); Platnick *et al.* (2005).

Cithaeron praedonius O. Pickard-Cambridge, 1872. BRAZIL: Rio Grande do Norte, Mossoró, 19.XII.2007, U.M. Maia leg., 1♀ (IBSP 91670); São Paulo, São Paulo, 21.VI.2001, E.J. Gomes leg., 1♀ (IBSP 28458). SCORING REFERENCES: Azevedo *et al.* (2018).

Cryptoerithus occultus Rainbow, 1915. AUSTRALIA, Western Australia, Carnarvon, 113°40`30"E 24°24`47"S, 30.IX.1994, N. McKenzie & J. Rolfe leg., 1♂ (WAM 44954); Dalwallinu, 116°35`35"E 29°59`06"S, 22.V.1996, M. Harvey & J.

Waldock leg., 1♀ (WAM 45138); Upper Gascoyne, 115°25`33"E 25°07`08"S, 17.VIII.1994, A. Sampeyl leg., 3♂ 3♀ (WAM 44950). SCORING REFERENCES: Azevedo *et al.* (2018); Platnick & Baehr (2006).

Drassodes lapidosus (Walckenaer, 1802). GERMANY, Windbruch, 7.VI. 1992, Biord leg., 3♂ 1♀ (IBSP 15352). SCORING REFERENCES: Murphy (2007).

Drassodex hypocrita (Simon, 1878); SWITZERLAND, Visp/Saas-Fee, Topo Kreuzboden, 2400m-2600m, J. Wunderlich leg., 3♂ 2♀ (SMF 61584). SCORING REFERENCES: Murphy (2007).

Drassyllus fallens Chamberlin, 1922. UNITED STATES OF AMERICA, Pennsylvania, 15.VI.1967, B. Vogel leg., 2♂ 2♀ (AMNH); New York, Nassau, Sea Cliff, 1♂ 7♀ (MCZ 15985). SCORING REFERENCES: Azevedo *et al.* (2018); Murphy (2007).

Eleleis crinita Simon, 1893. SOUTH AFRICA, Western Cape, Cape Town, 1♀ (MNHN 14700).

Eleleis sp. SOUTH AFRICA, Limpopo, Little Leigh (Western Soutpansberg), 22°56' 54.6''S 29°52'10.59''E, 20.III.2006, D. Spengler leg., 1♀ (ARC.LNR 2009/1702); Tuinplaas, Springbokvlakte, 24°53′60″S 28°43′48″E, 09.I.2002, M.V. Jaarsveld leg., 1♂ (ARC.LNR 2002/751); 17.X.2002, 1♂ 1♀ (ARC.LNR 2003/473).

Encoptarthria echemophthalma (Simon, 1908); AUSTRALIA, Queensland, Toowoomba, 26.88334° 151.9333°, VIII.1974, G.R. and S.R. Monteith leg., 2♂ (QMB 28159); Scenic Rim, 28° 152.6167°, X.1975, G.R. and S.R. Monteith leg., 2♀ (QMB 28346).

Falconina gracilis (Keyserling, 1891). BRAZIL: São Paulo, Jaboticabal, III-IV.2004, F.J. Cividanes leg., 2♂ 2♀ (IBSP 55876). SCORING REFERENCES: Ramirez (2014); Ramirez (http://www.morphbank.net/myCollection/?id=799618).

Galianoella sp. BRAZIL: Mato Grosso, Nossa Senhora do Livramento, Pantanal de Poconé, Faz. Retiro Novo, 16°15'–17°54' S 56°36'–57°56' W, I.2004 – III.2005, L.D. Battirola leg., 2♂ (IBSP 125954); 1♀ (IBSP 125949); 1♀ (IBSP 125941).

Gen.1 AFR sp.1. CONGO, Albert National Park (Virunga National Park), sect. Sud, Katare, Rég. Rutshuru Alt. 1250 m, 22.II.1995, G.F. De Witte leg., 1♂ (RMCA 233076); sect. Tshiaberimu, riv. Musavaki, affl. Talya Nord, Alt. 2720 m, 00° 10’N 29° 35’E, 15–21.IV.1955, P. Vanschuytbroeck & R. Fonteyn leg., 1♀ (RMCA 236899).

Gen.1 AFR sp.2. CONGO, Albert National Park (Virunga National Park), sect. Ruwenzori, Kyandolire, 00°20’N 029°49’E, 24–25.X.1952, P. Vanschuytbroeck & J. Kekenbosch leg., 1♂ 1♀ (RMCA 232924); 17.X.1952, 3♀ (RMCA 232896); 1♂ (RMCA 234201).

Gen.2 AFR sp.1. CONGO, Mayombe, Bas-Congo (Luki forest reserve), 05°38’S 13°04’E, 3-14.X.2006, D. De Bakker & J.P. Michiels leg., 2♂ (RMCA 219931); 13-23.IX.2007, 1♀ (RMCA 222702).

Gen.2 AFR sp.2. CONGO, Langa Langa, 02°28’N 21°27’E, 17.VI.2009, D. De Bakker leg., 3♀ (RMCA 228139).

Gen.3 AFR sp.1 **sp. nov.** NIGERIA, Ibadan, [7°23'47"N 3°55'E], 01.IV.1973, A. Russell-Smith leg., 14♂ 3♀ (RMCA 245546).

Gen.3 AFR sp.2 **sp. nov.** IVORY COAST, Touba, 09° 43’N 07° 24’W, 18.VI.1995, A. Russell-Smith leg., 1♂ (RMCA 227287); Bouaké, WARDA site, 07°41'N 005°02'W, 09.IX.1995, A. Russell-Smith leg., 1♀ (RMCA 227202).

Gnaphosa lucifuga (Walckenaer, 1802); AUSTRIA, Lower Austria, Kremsland, Durnstein, 1965, J. Wunderlich leg., 1♂ 1♀ (SMF 61548); SPAIN, Palencia, Fuentes de Nava, Laguna de la Nava, VII.1996, 2♂ (SMF 40952). SCORING REFERENCES: Murphy (2007).

Hemicloea sundevalli Thorell, 1870. AUSTRALIA, Queensland, Brisbane, 27°34'0.01"S 152°55'59.88"E, 26.II.1894, 1♂ (QMB 26457); 27°29'0.02"S 152°57'0.00"E, 1.I.1896, 3♀ (QMB 26454). SCORING REFERENCES: Azevedo *et al.* (2018); Murphy (2007).

Homoeothele micans Simon, 1908. AUSTRALIA, Western Australia, Menzies, 121°07'E 29°54'S, 5.V.1984, E. Nielsen and E. Edwards leg., 1♂ (WAM 49936); Australia, Western Australia, Kellerberrin, 117°44'E 31°30'S, 14.XI.1988, D. Mitchell leg., 1♀ (WAM 50092). SCORING REFERENCES: Murphy (2007).

Hypodrassodes maoricus (Dalmas, 1917). SCORING REFERENCES: Azevedo *et al.* (2018); Murphy (2007).

Latonigena auricomis Simon, 1893. BRAZIL, Rio Grande do Sul, Porto Alegre, Jardim Botânico, [30° 3'6.45"S 51°10'35.94"W], 17.XII.2010, J. Heydrich leg., 1♂ (MCN 47741); 8.XII.1993, 1♀ (MCN 24490); XI.1993, 1♀ (MCN 24672). SCORING REFERENCES: Azevedo *et al.* (2018).

Leptodrassex sp. SOUTH AFRICA, Free State, Bloemfontein, Botanical Gardens, 29°3'12.26"S 26°12'41.90"E, 27-16.X-XI.2009, C. Haddad leg., 1♂ 1♀ (NMBA 13987); Theunissen, Erfenisdam Nature Reserve, 28°50'12.44"S 26°3'11.56"E, 28-01.VI-IX.2006, C. Haddad et al. leg., 1♂ (NMBA 13380); Brandfort, Amanzi Private Game Res, 28°35'S 26°26'E, 25.X.2011, C. Haddad leg., 2♀ (NMBA 16439).

Lygromma aff. taruma. COLOMBIA, Cundinamarca, Mosquera, [4°42'33.07"N, 74°13'48.36"W], 9.III.2002, M. Zabrysky *et al.* leg., 4♂ 2♀ (ICN-AR 2101).

Lygromma chamberlini Gertsch, 1941. COLOMBIA, Magdalena, Ciénaga Grande de Santa Marta, 10°52'00"S 74°25'00"W, 12.VI.1985, H.G. Muller leg., 1♂ 1♀ (SMF 35062); PANAMA, Canal Zone, Barro Colorado Island, 09° 9'7.57"N 79°50'47.33"W, VI-VIII.1949, J.B. Zetek leg., 1♂ (MCZ 78854). REFERENCES: Azevedo *et al.* (2018).

Lygromma gasnieri Brescovit & Höfer, 1993. BRAZIL, Pará, Juruti, Mutum, 2°36'44.7"S 56°11'39.2"W, 13.II.2007, N.F. Lo Man Hung & J.A.P. Barreiros leg., 1♂ (MPEG 24711); Melgaço, FLONA de Caxiuanã, Estação Científica Ferreira Penna, 1°44'18.02"S 51°27'48.01"W, 21-31.X.2003, Equipe MPEG leg., 1♀ (MPEG 24719); Amazonas, 1♀ (MPEG 24710); Manaus, Reserva Ducke, III.1992, (IBSP 8215).

Lygromma gertschi Platnick & Shadab, 1976. JAMAICA, St. Ann Parish, Douglas Castle, Falling Cave, [18°11'14.86"N, 77°16'19.06"W], 18.VIII.1974, S. Peck and J. Peck leg., 1♂ 1♀ (AMNH 325474).

Lygromma senoculatum Simon, 1893. VENEZUELA, Distrito Federal, Caracas, Catuche Forest, [10°31'35.01"N, 66°54'25.30"W], E. Simon leg., 2♂ 1♀ (MNHN 14550).

Lygromma ybyguara Rheims & Brescovit, 2004. BAZIL, Minas Gerais, Cordisburgom, Gruta de Maquiné, 19° 07.21'S 44°21.04'W, 15.XII.2002, B.C. Cabral leg., 1♂ (UNB 306).

Micaria fulgens (Walckenaer, 1802). BELGIUM, As, 1958.VI.12, J. Kekenbosh leg., 1♂ (IRSN). SCORING REFERENCES: Ramirez (2014); Ramirez (http://www.morphbank.net/myCollection/?id=799648).

Molycria mammosa (O. Pickard-Cambridge, 1874). AUSTRALIA, Walcha, Carrai SF, Gravel Pit., 152°16’24’’E 31°0’19’’S, XI.1998, E. Tasker leg., 1♂ 1♀ (AM

120315); New South Wales, Western edge Golf Course, 159°5’1.17"E 31°33’11.38’’S, 28.V.2003 - 7.VI.2003, I. Hutton & K. Lees leg., 1♂ (AM 90367); 1♀ (AM 90371). SCORING REFERENCES: Platnick & Baehr (2006).

Moreno grande Platnick, Shadab & Sorkin, 2005. CHILE, Coquimbo, Elqui, 6 km S Cruz Grande, 7.X.1992, Platnick et al. leg., 1♂ 1♀ (AMNH). SCORING REFERENCES: Azevedo *et al.* (2018).

Moreno morenoi Mello-Leitão, 1940. ARGENTINA, Buenos Aires, Sierra de La Ventana, Cerro Negro, 29.IX-2.X.1972, M.E. Galiano leg., 1♀ (MACN 18097).

Moreno ramirezi Platnick, Shadab & Sorkin, 2005. BRAZIL, Góias, Mineiros, Parque Nacional das Emas, 18°5'50.01"S 52°56'20.93"W, 10.V.2006, M. Ueraha Prado leg., 1♂ (IBSP 80022); Rio Grande do Sul, Derrubadas, Parque Estadual do Turvo, I.2002, 1♂ (IBSP 136490); 27°00'-27°20'S 53°40'-54°10'W, 11-18.I.2002, Equipe Biota leg., 1♀ (IBSP 149358); Mato Grosso do Sul, Corumbá, 19°0'35.43"S 57°39'12.09"W, 2003, V.L. Ferreira leg., 1♀ (PUCRS 18165).

Myandra cambridgei Simon, 1887. AUSTRALIA, New South Wales, Jerilderie, Stock reserve on E half of Morundah Rd opp Farm 170, 145°59' 40.142"E 34°54' 1.552"S, 3.XII.1998, L. Wilkie leg., 11♂ (AM 67571); Coleambally Irrigation Area: Farm 606 off Gilberts Rd, 146°0’44.74’’E 34°58’2.90’’S, 25.XI.2004, L. Wilkie leg., 1♀ (AM 113751); Murrumbidgee, About 500m south of Coleambally township, 145°52’29.07’’E 34°48’45.40’’S, 23.XI.2004, L. Wilkie leg., 1♀ (AM 113774). SCORING REFERENCES: Platnick & Baehr (2006).

Namundra spp. NAMIBIA, Damaraland, Klein Gai-As, 14°03’00’’E 20°48’60’’S, 05.VIII.1985, E. Griffin leg., 1♀ (SMN 41689); Kaokoland, Okokatuwo - NW, 12.V.1991, E. Griffin leg., 1♀ (SMN 42568); ANGOLA, Namibe, Lubango: 43 km SSW, 13°07’19.30’’E 15°02’25.6’’S, 14.I.2006, T.L. & C.Bird leg., 1♀ (SMN

45984); Namibe 92 km NNE, 12°24’56.98’’E 14°30’43.3’’S, 13.I.2006, T.L. & C.Bird leg., 1♀ (SMN 46810). SCORING REFERENCES: Platnick & Bird (2007).

Neodrassex aureus Ott, 2012. BRAZIL, Rio Grande do Sul, Triunfo, Parque Copesul de Proteção Ambiental, 6.I.2005, R. Ott et al. leg., 1♀ (MCN 38256).

Neozimiris pubenscens (Bankz, 1898). MEXICO, Baja California Sur, La Paz, VII.1990, T. Jackson leg., 1♀ (AMNH); Baja California, Isla Cedros, 14.III.1945, B.F. Osorio Tfall leg., 1♀ (AMNH); Isla Ceralbo, El Mostrador, 22.III.1953, B. Firstman leg., 1♂ (AMNH); UNITED STATES, California, San Diego, Borrego Springs, 27.III.1960, W.J. Gertsch et.al. leg., 1♂ (AMNH). SCORING REFERENCES: Azevedo *et al.* (2018); Ramirez (2014).

Neozimiris sp. BRAZIL, Ceará, Crato, Floresta Nacional do Araripe, [7°18'21.06"S 39°27'38.32"W], 22.IV.2012, R. Azevedo leg., 1♂ (MPEG 24470); Sitio do Fundão, V.2016, 1♂ (IBSP); 1♀ (IBSP); Piauí, Picos, Valparaíso, 07°04'01.3"S 41°20'19.3"W, 22-24.II.2012, I.L.F. Magalhaes et al. leg., 1♀ (IBSP 165375).

Nomindra kinchega Platnick & Baehr, 2006. AUSTRALIA, Queensland, Quilpie, 26°4'21.61"S 143°27'18.72"E, X.1995, 3♂ (QMB 67729); 26°4'59.99"S 143°27'0.00"E, X.1995, 3♀ (QMB 67738). SCORING REFERENCES: Platnick & Baehr (2006).

Nopyllus sp. BRAZIL, São Paulo, Salesópolis, Estação Biológica de Boracéia, 23°39'10"S 45°53'20"W, 09.XI.2005, M. Uheara-Prado leg., 1♂ (IBSP 143254); 28.III.2006, M. Uheara-Prado leg., 1♀ (IBSP 141907); 12.I.2006, M. Uheara-Prado leg., 1♀ (IBSP 143249).

Paracymbiomma carajas **gen. nov.** BRAZIL, Pará, Parauapebas (FLONA Carajás), 06°01'32"S 50°16'29"W, 04.IX-06.X.2014, Equipe Carste leg., 2♀ (IBSP 186289); 06°01'59"S 50°09'22"W, 19.II-04.III.2010, R. Andrade & I. Cizauskas et al. leg., 1♀ (IBSP 174164); 06°06'12"S 50°08'07"W, 14.III-04.IV.2010, I. Cizauskas et al. leg., 1♂ (IBSP 174162); 06°02'37"S 50°13'09"W, 03-17.IV.2013, Equipe Carst leg., 1♂ (IBSP 183736); 06°04'28"S 50°11'18"W, 10-19.III.2011, C.A.R. Souza et al. leg., 1♂ (IBSP 174165).

Phrurolithus festivus (C. L. Koch, 1835). GERMANY: Nordhein-Westfalen, SE Koln, NSG Wahner Heid, 15–29.V.1994, P. Jager leg., 4♂ (IBSP 71357); 2♀ (IBSP 71341). SCORING REFERENCES: Azevedo *et al.* (2018); Ramirez (2014); Ramirez (http://www.morphbank.net/myCollection/?id=799674).

Platyoides walteri (Karsch, 1887). SOUTH AFRICA: Nelspruit, Embuleni Nature Reserve Badplaas, III.2001, A.J. Santos leg., 1♀ and 1imm. (IBSP 28109). SCORING REFERENCES: Azevedo *et al.* (2018); Ramirez (2014); Ramirez (http://www.morphbank.net/myCollection/?id=799677).

Plutonodomus kungwensis Cooke, 1964. TANZANIA, Kasoge, Kungwe-Mahali Mts., Lake Tanganyika, 29.VII.1959, J. Cooke leg., 1♀ (OUMNH).

Prodidomus longiventris Dalmas, PHILIPPINES, Island Tayabas, M. Mazzaredo leg., 1♀ (MNHN 13478).

Prodidomus rufus Hentz, 1847. UNITED STATES, Texas, San Antonio, 18.XI.1939, W. Keller leg., 1♀ (AMNH); Denton, 04.XII.1946, S.E. Jones leg., 1♂ (AMNH). SCORING REFERENCES: Azevedo *et al.* (2018).

Prodidomus simoni (Berland, 1903). SOUTH AFRICA, Limpopo, Roedtan, Tuinplaas, Springbokvlakte, 24°36`S, 29°04`48"E, 11.VI.2002, M. Jaarsveld leg., 1♂ (ARC.LNR 2003/755); 07.V.2002, 1♂ (ARC.LNR 2003/756); Western Cape, Gamkaberg Nature Reserve, Landsekloof, 33°18’36’’S, 21°42`36"E, 15.IV.2007, W. Wagenaar leg., 1♀ (ARC.LNR 2009/5833); Anysberg Nature Reserve, 33°31’48’’S, 20°45`36"E, C. Haddad & R. Lyle leg., 1♀ (ARC.LNR 2007/3785).

Prodidomus sp. NAMIBIA, Namib desert, 43 km. E S E of Swakopmund, 23°00’00’’S, 15°00`00"E, 12.VI.2013, D. Jacobs & C. Deschodt leg., 3♂ (ARC.LNR 2013/5431); 68 km. E of Walvis Bay, 14.II.2012, 1♀ (ARC.LNR 2013/5465).

Prodidomus woodleigh Platnick & Baehr, 2006. AUSTRALIA, Western Australia, Carnarvon, 113°27`41"E, 24°13`27"S, 21.VIII.1994, P. West leg., 2♂ 1♀ (WAM 45007); 113°44`41"E 24°24`50"S, 20.VIII.1994, A. Sampeyl leg., 1♂ 3♀ (WAM 45000).

Pterotricha lentiginosa (C. L. Koch, 1837). GREECE, Creta, [35°10'13.89"N 24°52'50.34"E], J. Wunderlich leg., 2♂ 3♀ (SMF 61646). SCORING REFERENCES: Murphy (2007).

Purcelliana problematica Cooke, 1964. SOUTH AFRICA, Western Cape, Prince Albert, IX.11896., W.F. Purcell leg., 1♂ (SAMC 3916).

Purcelliana sp. NAMIBIA, Karossfontein, Etosha National Park, 19°21'S 14°31'E, 13.V-16.VI.1986, E. Griffin leg., 2♂ (SMN 39427); Kamaseb, Etosha National Park, 19°04'S 16°41'E, 26.III-04.V.1988, E. Griffin leg., 3♂ (SMN 41144); 08.VIII.-14.IX.1987, E. Griffin leg., 2♀ (SMN 40697); Dorstland, Etosha National Park, 18°46'S 14°44'E, 04.VIII-13.IX.1987, E. Griffin leg., 2♀ (SMN 40596).

Scotophaeus quadripunctatus (Linnaeus, 1758). GERMANY, Baden-Wurttemberg, Heidelberg, J. Wunderlich leg., 1♂ (SMF 61632); Berlim, Pfaueninsel, J. Wunderlich leg., 2♀ (SMF 61631). SCORING REFERENCES: Murphy (2007).

Teminius insularis (Lucas, 1857). BRAZIL: Paraná, Fênix, Parque Estadual de Vila Rica do Espírito Santo, 26.XII.2012 – 01.I.2003, Equipe Embrapa leg., 2♂ 2♀ (IBSP 124286); Paraíba, I.1983, R.R. da Silva leg., 2♂ 1♀ (IBSP 4137). SCORING REFERENCES: Ramirez (2014); Ramirez (http://www.morphbank.net/myCollection/?id=799744).

Theuma sp.1. SOUTH AFRICA, Free State, Bethulie, Tussen die Riviere Nature Reserve, 15.X.2008, L. Lotz & C. Haddad leg., 4♂ 2♀ (NMBA 12759); 14.X.2008, L. Lotz & C. Haddad leg., 2♂ 1♀ (NMBA 12701); 13-17.X.2008, L. Lotz & C. Haddad leg., 3♂ (NMBA 12610).

Theuma sp.2. NAMIBIA, Desert Namibia, 07.VI.2013, D Jacobs & C Deschodt leg., 4♂ 3♀ (ARC.LNR 2014/2151).

Theumella typica Strand, 1906. ETHIOPIA, 1955, 1♂ (MNHN 9466).

Tivodrassus ethophor Chamberlin & Ivie, 1936. MEXICO, Hidalgo, 5 mi. N Encarnacion, 28.VII.1966, J. & W. Ivie leg., 1♀ (AMNH); 6.4 mi. S Tenango de Doria, 24-28.VII.1969, S. & J. Peck leg., 1♂ (AMNH); Oaxaca, 07.VI.1971, S.B. Peck leg., 4♂ 3♀ (MCZ 78843). SCORING REFERENCES: Azevedo *et al.* (2018).

Tricongius amazonicus Platnick & Höfer, 1990. BRAZIL, Amazonas, Manaus, Igapó Tarumã/Mirím, 11.IX.1987, H. Hofer leg., 1♂ (MCN 19962); 1♂ (MCN 19963); 10.III.1987, 1♀ (INPA 39); 23.X.1987, 1♀ (AMNH); 04.IX.1987, 1♂ (AMNH).

Tricongius beltraoae (Brescovit & Ramos, 2003). BRAZIL, Bahia, Central, Toca Santo Euzébio, 28.II-06.III.2003, F. Cunha & E.F. Ramos leg., 1♂ (IBSP); 2-8.VIII.2003, 1j (IBSP); Jussara, Toca da Esperança, 18-25.VII.2002, F. Cunha & E.F. Ramos leg., 1♀ (IBSP). SCORING REFERENCES: Azevedo *et al.* (2018).

Tricongius collinus Simon, 1893. VENEZUELA, Caracas, 1♂ 1♀ (MNHN 6099). SCORING REFERENCES: Azevedo *et al.* (2018).

Tricongius mutilata (Mello-Leitão, 1940). ARGENTINA, San Juan, Valle de la Luna, 1981, P.A. Goloboff leg., 1♀ (MACN 8283).

Urozelotes rusticus (L. Koch, 1872). PERU, Lima, Cañete, Valle de Mala, Santa Enriqueta, 7.XI.1997, M. A. Benamu-Pino leg., 1♂ 1♀ (IBSP 14907); CHILE, Antofagasta, 1989, 5♂ 4♀ (IBSP 4650). SCORING REFERENCES: Azevedo *et al.* (2018); Murphy (2007).

Vectius niger (Simon, 1880); BRAZIL, Minas Gerais, Belo Horizonte, Estação Ecológica da UFMG, V-X.1999, G. Machado leg., 1♂ 1♀ (IBSP 27292). Maranhão, Caxias, Reserva Ecológica Inhamum, 11.VIII.2005, F.S. Reis leg., 1♂ (IBSP 122473). SCORING REFERENCES: Azevedo *et al.* (2018); Ramirez (2014); Ramirez (http://www.morphbank.net/myCollection/?id=799765).

Wesmaldra bidgemia Platnick & Baehr, 2006. AUSTRALIA, Western Australia, Upper Gascoyne, 115°22`48"E 25°05`18"S, 17.VIII.2004, A. Sampeyl leg., 8♂ 3♀ (WAM 45565). SCORING REFERENCES: Platnick & Baehr (2006).

Wydundra osbourne Platnick & Baehr, 2006. AUSTRALIA, Osbourne, Osbourne Mines, XII.1996, L. Nicholson leg., 2♀ (QMB 83819). SCORING REFERENCES: Platnick & Baehr (2006).

Xerophaeus appendiculatus Purcell, 1907. SOUTH AFRICA, Florisbad, IX.1983, Mus. Staff leg., 10♂ 2♀ (NMBA 446).

Xiruana gracilipes (Keyserling, 1891). BRAZIL: Rio Grande do Sul, Santana do Livramento, Rincão da Bolsa, 29.XI.2003, A.J. Bitencourt leg., 1♂ (IBSP 84898); São Paulo, São Paulo, 28.III.2014, J.L. Chavari & R. Indicatti leg., 1♀ (IBSP 166120). SCORING REFERENCES: Ramirez (2014); Ramirez (http://www.morphbank.net/myCollection/?id=799769).

Zelanda sp. SCORING REFERENCES: Azevedo *et al.* (2018).

Zelotes subterraneus (C. L. Koch, 1833). Germany, Windbruch, 20.VIII.1991, Biord leg., 1♂ 1♀ (15342); Nordhein-Westfalen, 27.IV.1994, P. Jager leg., 1♂ (IBSP 71394). SCORING REFERENCES: Azevedo *et al.* (2018); Murphy (2007).

Zimirina hirsuta Cooke, 1964. SPAIN, Island Canary, Fuerteventura, Santa Inés, I.1999, J. Wunderlich leg., 2♂ 1♀ (SMF 62629); Jandia, Costa calma, 2♂ 3♀ (SMF 61685).

Zimiris doriai Simon, 1882. BRAZIL, Bahia, Salvador, Cabula, 14.IX.2006, L. Almeida leg., 1♂ (IBSP 70242); Amazonas, Manaus, 11.VIII.1992, M.E. Oliveira leg., 1♀ (IBSP 23705); Conjunto Petro, 1994, 1♂ (IBSP 14501); Sergipe, Aracajú, IX.1981, 1♀ (IBSP 7516).

List of characters

Characters with '(F)' were scored for females and characters with '(M)' for males.

PROSOMA

Carapace

The carapace can have different types of setae. The clavate setae are stout tactile setae that can be distributed throughout the body. In our dataset the presence of these setae was coded separately for carapace and abdomen (chars 7, 8 153 and 154). These setae also show different sizes throughout the body. The holotype of *E. crinita* Simon, does not have visible setae on the carapace, however, the original description clearly mentions the presence these long clavate setae (Simon 1893). In addition, it is possible to see the stout insertions of these setae on the carapace. Scales (plumose setae and squamose setae) are another type of setae with small sockets, parallel to the cuticular surface (Ramirez 2014). Plumose setae are scales with cylindrical shafts and lateral appendages, while squamose setae are flattened scales that show a wide morphological diversity. Morphology of scales follows Azevedo *et al.* (2018). Scale morphology was coded independently for carapace, abdomen, legs and anterior lateral spinnerets. All figures in plate 13 are scales from abdomen, but in order to identify the characters, we indicate these figures for the first character mentioned, in this case the carapace.

0. **Carapace, dorsal, fovea: (Azevedo *et al.* 2018, char. 50):** 0= absent (Figs 1H, N–P); 1= present (Figs 1A–G, I–M).

1. **Carapace, dorsal, anterior margin shape (Azevedo *et al.* 2018, char. 322):** 0= with a moderate cephalic constriction and a convex anterior margin (Figs 14I–M); 1= without a cephalic constriction and a straight to concave anterior margin (Figs 14N–O). Azevedo *et al.* (2018) defined this character using morphometric data and coded *Neozimiris pubenscens* as having no constriction. In our dataset, some species share this condition with *N. pubenscens*, and were coded them similarly**.**

2. **Carapace, dorsal, posterior margin shape:** 0= truncated (Figs 14B, E); 1= notched (Figs 14F, K, L).

3. **Carapace, flatness (Azevedo *et al.* 2018, char. 51):** 0= domed or slightly flattened (Fig. 15A); 1= extremely flat, straight dorsal profile (Fig. 15B).

4. **Carapace, anterior, clypeus, margin profile in frontal view (Azevedo *et al.* 2018, char. 37):** 0= straight or slightly curved (Figs 15G–I); 1= produced in a median lobe anteriorly (Fig. 15D); 2= strongly curved, forming an arch (Fig. 15F).

5. **Carapace, anterior, chilum (Azevedo et *al.* 2018, char. 35):** 0= absent; 1= present (Figs 15E, H).

6. **Carapace, anterior, chilum, configuration (Azevedo et *al.* 2018, char. 36):** 0= single median sclerite (Fig. 15E); 1= paired isolated sclerites (Fig. 15H).

7. **Carapace, surface, clavate setae:** 0= absent; 1= present (Figs 14O, P). The holotype of *E. crinita* Simon, does not have visible setae on the carapace, however, the original description clearly mentions the presence these long clavate setae (Simon

1893). In addition, it is possible to see the stout insertions of these setae on the carapace.

8. **Carapace, surface, clavate setae, size:** 0= all similar sized (Fig. 14P); 1= variable size (Fig. 14O).

9. **Carapace, surface, plumose setae (scales) (Azevedo *et al.* 2018, char. 26):** 0= absent; 1= present (Figs 26A, B).

10. **Carapace, surface, plumose setae, appendages (brachia) arrangement (Azevedo *et al.* 2018, char. 27):** 0= only on proximal part (Fig. 26A); 1= reaching terminal half (Fig. 26B)**.**

11. **Carapace, surface, squamose setae (Azevedo *et al.* 2018, char. 29):** 0= absent; 1= present (Figs 26C–L).

12. **Carapace, surface, squamose setae, lateroventral appendages (Azevedo *et al.* 2018, char. 30):** 0= absent; 1= present (Figs 26C, E, F).

13. **Carapace, surface, squamose setae, dorsolateral spines (Azevedo *et al.* 2018, char. 31):** 0= absent; 1= present (Figs 26D, H).

14. **Carapace, surface, squamose setae, dorsolateral spines, type (Azevedo *et al.* 2018, char. 32):** 0= on both sides (Fig. 26D); 1= on one side (Fig. 26H).

15. **Carapace, surface, squamose setae, number of axes (shafts) (Azevedo *et al.* 2018, char. 33):** 0= zero (Fig. 26H); 1= one (Fig. 26C); 2= two (Fig. 26J).

Eyes

The occurrence of eyes was not scored in our dataset, since their presence or absence can be the result of different selective pressures, such as adaptations for life in subterranean environments (Rodrigues *et al.* 2018). Two cavernicolous species, *Brasilomma enigmatica* and *Plutonodomus kungwensis* do not have eyes and were coded non-applicable (-) for all eye characters (chars 16–28). *Chileomma ruiles* and

Lygromma gasnieri do not have AME and were coded non-applicable (-) for characters 17, 24 and 25.

16. Eyes, posterior eye row, shape: (Azevedo *et al.* 2018, char. 324): 0= procurved (Figs 14N–P, 16C); 1= straight to recurved (Figs 14A, B, K, M). Azevedo *et al.* (2018) used morphometric data to define the limits of the posterior eye row curvature, and determined two states, “procurved” and “straight to recurved”. Since the extreme condition, defined by the authors as “procuverd”, was observed in some Prodidominae, we choose to use this character, even without a morphometric analysis. We scored according to Azevedo *et al.* (2018) for the same terminal taxa. The authors used the same method to define the limits of the anterior eye row curvature in frontal view, however the results were not significant. For this reason, we did not score the anterior eye row curvature for our dataset.

17. Eyes, anterior eyes row, interdistances: 0= AME-AME longer or equal to AME-ALE (Figs 15E, F); 1= AME-AME smaller than AME-ALE (Fig. 15D).

18. Eyes, PME, lens curvature (Ramirez 2014, char. 19): 0= convex (Fig. 16E); 1= flattened (Fig. 16F).

19. Eyes, PME, lens limits (Azevedo *et al.* 2018, char. 42): 0= lens raised from surrounding cuticle (Figs 16C, D); 1= lens not raised, totally flat (Ramirez 2014, figs 10C, E).

20. Eyes, PME-PME distance (Azevedo *et al.* 2018, char. 47): 0= separated (Figs 14L–N); 1= close, almost touching (Figs 14J, K).

21. Eyes, PME-PLE distance: 0= separated (Figs 14A–D); 1= close, almost touching (Figs 14L, N–P, 16C, D).

22. Eyes, ALE-ALE distance: 0= separated (Figs 15H, I, 16A, B); 1= close, almost touching (Figs 15G, 16D).

23. Eyes, ALE-PLE distance: 0= separated (Figs 15D, E, 16A, E); 1= close, almost touching (Figs 14N–P, 15F, G, 16C, D, F).

24. Eyes, AME, size relative to ALE (Azevedo *et al.* 2018, char. 48, mod.): 0= as large as or larger than ALE (Figs 15I, 16A); 1= smaller than ALE (15H, 16B).

25. Eyes, AME, black surrounds (Azevedo *et al.* 2018, char. 39): 0= absent (Fig. 15E); 1= present (Fig. 15F). As described by Azevedo *et al.* (2018), the black surrounds are only considered present when they are connected.

26. Eyes, ALE, tapetum symmetry axis (Azevedo *et al.* 2018, char. 38): 0= vertical or oblique down to external; 1= horizontal.

27. Eyes, PME, tapeta, symmetry axes (Azevedo *et al.* 2018, char. 44): 0= parallel to each other; 1= orthogonal to each other (Fig. 15C).

28. Eyes, PLE and PME, tapeta axes orthogonal (Azevedo *et al.* 2018, char. 41): 0= absent; 1= present.

Mouthparts

29. Endites, distal margin, width relative to basal margin: 0= wider or similar to basal margin, distal margin truncated (Figs 16G, I); 1= smaller than basal margin, distal margin pointed (Fig. 16H).

30. Endites, ventral surface, oblique depression (Azevedo et *al.*, 2018, char. 209): 0= absent; 1= present (Figs 16G–I). This is a traditional character for the former superfamily Gnaphosoidea. The depressions are sometimes difficult to observe under the stereomicroscope but with SEM it is possible to have a better definition.

31. Endites, prolateral edge, longitudinal groove (Azevedo *et al.* 2018, char. 207): 0= absent; 1= present (Fig. 16G).

32. Endites, dorsal, branched setae (Azevedo *et al.* 2018, char. 206): 0= absent; 1= present (Fig. 16L).

33. Endites, serrula (Azevedo *et al.* 2018, char. 208): 0= absent (Fig. 16K); 1= present (Fig. 16J).

Sternum

Sternum characters were not scored considering their shape or proportion, as in other studies (Ramirez 2014; Azevedo *et al.* 2018). Instead, we scored the morphology of each margin independently, since their differences are easily observed.

34. Sternum, anterior margin, shape: 0= truncate (Figs 17C–E); 1= rounded (Figs 17M–O).

35. Sternum, anterior margin, size relative to maximum width: 0= more than half (Fig. 17J); 1= equal or less than half (Fig. 17K).

36. Sternum, posterior margin, shape: 0= truncated (Fig. 17A); 1= pointed (Figs 17B–P).

37. Sternum, posterior margin, large protrusion with erect setae between coxae IV: 0= absent (Figs 17B–F); 1= present (Figs 17G–P). This character was commonly used to characterize the former subfamily Theuminae. Here, this protrusion with erect setae is present in all members of the ingroup, except *Nomindra kinchega*. *Leptodrassex* sp. and *Neodrassex aureus,* that have this protrusion but without the erect setae, scored 0.

38. Sternum, posterior margin, protrusion, sclerotization marginal: 0= unsclerotized (Figs 17I–N); 1= sclerotized (Fig. 17G, H). Molycriinae have the protrusion margins sclerotized, while most Prodidominae have the margins unsclerotized. *Namundra* sp. and *Zimiris doriai* have the protrusion margins slightly sclerotized, scored 1.

39. Sternum, posterior margin, protrusion, size: 0= wide (Figs 17I–K); 1= narrow (Fig. 17L). Usually the protrusion of the sternum is large and robust. However, the African *Theuma* sp.1, *Theuma* sp.2 and *Theumella typica* have this protrusion narrow and elongate.

40. Sternum, intercoxal extensions (Azevedo *et al.* 2018, char. 54): 0= absent; 1= present (Figs 17C, L).

41. Sternum, precoxal triangles (Azevedo *et al.* 2018, char. 56): 0= absent; 1= present (Figs 17G, H, O).

42. Sternum, precoxal triangles fused to sternum (Azevedo *et al.* 2018, char. 57): 0= absent; 1= present.

Chelicerae

The morphology of cheliceral setae (chars 49–54) follows Ramirez (2014). The projections of the cheliceral margins were coded according to Azevedo *et al.* (2018), where all projections are considered homologous. The authors established homology for each tooth, since Ramirez (2014) showed that to code only teeth numbers can be very incongruent in the analysis. We did not evaluate the homology of teeth due to the difficulty in determining its limits, and did not code teeth numbers because of instability caused in the analysis. In our dataset, only the occurrence and the morphology of teeth were considered. We considered a reduced tooth when the margins of the chelicerae have a small protuberance instead of a well defined tooth (chars 57, 60).

43. Chelicerae, paturon, boss: (Azevedo *et al.* 2018, char. 7): 0= absent; 1= present (Fig. 15A).

44. Chelicerae, paturon, promarginal depression: 0= absent; 1= present (Fig. 18A).

45. Chelicerae, fang, shaft serrula (Azevedo *et al.* 2018, char. 58): 0= absent; 1= present (Fig. 18D).

46. Chelicerae, fang, venon gland opening size: 0= small, tiny opening (Fig. 18B); 1= large, wide opening forming a canal (Fig. 18C).

47. Chelicerae, fang, length (Azevedo *et al.* 2018, char. 60): 0= normal (Fig. 18A); 1= elongated, with tip almost reaching paturon base (Fig. 18E).

48. Chelicerae, paturon, anterior surface, tuft of macrosetae (Azevedo *et al.* 2018, char. 63): 0= absent; 1= present.

49. Chelicerae, paturon, promargin, whisker setae (Azevedo *et al.* 2018, char. 70): 0= absent; 1= present (Fig. 18F).

50. Chelicerae, paturon, promargin, escort setae (Azevedo *et al.* 2018, char. 71): 0= absent; 1= present (Fig. 18F).

51. Chelicerae, paturon, promargin, rake setae (Azevedo *et al.* 2018, char. 69): 0= absent; 1= present (Fig. 18F).

52. Chelicerae, paturon, retromargin, whisker setae (Azevedo *et al.* 2018, char. 84): 0= absent; 1= present (Fig. 18E).

53. Chelicerae, paturon, retromargin, escort setae (Azevedo *et al.* 2018, char. 83): 0= absent; 1= present (Fig. 18E).

54. Chelicerae, paturon, promargin, rake setae (Azevedo *et al.* 2018, char. 82): 0= absent; 1= present.

55. Chelicerae, paturon, retromargin, projections (Azevedo *et al.* 2018, char. 80): 0= absent; 1= present (Figs 18A, I).

56. Chelicerae, paturon, retromargin, projections type (Azevedo *et al.* 2018, char. 81): 0= teeth (Figs 18B, H); 1= serrated keel (Fig. 18I).

57. Chelicerae, paturon, retromargin, teeth: 0= normal, well defined teeth (Fig. 5B); 1= reduced to small protuberance (Fig. 18H).

58. Chelicerae, paturon, promargin, projections: 0= absent; 1= present.

59. Chelicerae, paturon, promargin, projections type: 0= teeth; 1= serrated keel; 2= translucent lamina.

60. Chelicerae, paturon, retromargin, teeth: 0= normal; 1= reduced

61. Chelicerae, paturon, shape (Azevedo *et al.* 2018, char. 93): 0= conical, longer than wide (Fig. 15E); 1= rounded, as long as wide (Fig. 15D).

Legs

62. Legs, orientation (Azevedo *et al.* 2018, char. 130): 0= prograde; 1= laterigrade.

63. Leg IV, trochanter, length relative to trochanter III (Azevedo *et al.* 2018, char. 204): 0= similar to trochanter III; 1= longer than trochanter III (Fig. 19J).

64. Legs I-II, patellae, indentation (Azevedo *et al.* 2018, char. 168): 0= absent; 1= present (Fig. 20I).

65. Leg I-II, femur, dorsal, macrosetae (Ramírez 2014, char. 146, mod.): 0= absent; 1= present.

66. Legs I-II, tarsus, ventral, macrosetae (Ramirez 2014, char. 152, mod.): 0= absent; 1= present (Fig. 20J).

67. Leg I, ventral, macrosetae with apical tenent surface (Ramirez 2014, char. 155): 0= absent; 1= present (Fig. 20L).

68. Legs, metatarsus, dorsal, stopper with setae: 0= absent; 1= present (Fig. 20G).

69. Leg I, patella, length relative to tibia: 0= short, less than tibia length (Fig. 19B); 1= long, similar to tibia length (Fig. 19A).

70. Legs I–II, trochanters, distal rim (Azevedo *et al.* 2018, char. 174): 0= straight (Fig. 19E); 1= shallow indentation (Fig. 19F); 2= notched (Fig. 19G).

71. Legs III–IV, trochanters, distal rim (Azevedo *et al.* 2018, char. 193): 0= straight; 1= shallow indentation; 2= notched.

72. Legs I–II, tibia and metatarsus, ventral, parallel row of macrosetae (Azevedo *et al.* 2018, char. 182): 0 absent; 1= present (Fig. 20K).

73. Leg III, tarsus, ventral, paired row of macrosetae (Azevedo *et al.* 2018, char. 189): 0= absent; 1= present.

74. Leg IV, tarsi, ventral, paired row of macrosetae (Azevedo *et al.* 2018, char. 198): 0= absent; 1= present.

75. Legs III–IV, metatarsi, distal, preening bush (Azevedo *et al.* 2018, char. 183): 0= absent; 1= present (Fig. 19C).

76. Legs III–IV, metatarsi, distal, preening comb (Azevedo *et al.* 2018, char. 184): 0= absent; 1= present (Fig. 19D).

77. Legs, surface, plumose setae (Azevedo *et al.* 2018, char. 120): 0= absent; 1= present.

78. Legs, surface, plumose setae, appendages (brachiae) arrangement (Azevedo *et al.* 2018, char. 121): 0= only on proximal part; 1= reaching terminal half.

79. Legs, surface, squamose setae (Azevedo *et al.* 2018, char. 123): 0= absent; 1= present.

80. Legs, surface, squamose setae, lateroventral appendages (Azevedo *et al.* 2018, char. 124): 0= absent; 1= present.

81. Legs, surface, squamose setae, dorsolateral spines (Azevedo *et al.* 2018, char. 125): 0= absent; 1= present.

82. Legs, surface, squamose setae, dorsolateral spines, arrangement (Azevedo *et al.* 2018, char. 127): 0= on both sides; 1= only on one side.

83. Legs, surface, squamose setae, number of axes (shafts) (Azevedo *et al.* 2018, char. 128): 0= zero; 1: one; 2: two.

84. Legs I–II, tarsus, ventral, scopulae of tenent setae (Azevedo *et al.* 2018, char. 171): 0= absent; 1= present (Figs 20A–E).

85. Legs I–II, tarsus, ventral, scopulae of tenent setae, density (Azevedo *et al.* 2018, char. 172): 0= sparse (Fig. 20C); 1= dense (Fig. 20B).

86. Legs I–II, tarsus, ventral, scopulae of tenent setae, type (Azevedo *et al.* 2018, char. 173): 0= continuous (Azevedo *et al.* 2018, fig. 22F); 1= divided (Azevedo *et al.* 2018, fig. 22A, E).

87. Legs I–II, metatarsus, ventral, scopulae of tenent setae (Azevedo *et al.* 2018, char. 162): 0= absent; 1= present (Fig. 20A).

88. Legs I–II, metatarsus, ventral, scopulae of tenent setae, density (Azevedo *et al.* 2018, char. 163): 0= sparse; 1= dense.

89. Legs I–II, metatarsus, ventral, scopulae of tenent setae, longitudinal extension (Azevedo *et al.* 2018, char. 164): 0= restricted to distal part; 1= reaching proximal third (Fig. 20A).

90. Legs I–II, metatarsus, ventral, scopulae of tenent setae, type (Azevedo *et al.* 2018, char. 165): 0= continuous; 1= divided.

91. Legs I–II, tibia, ventral, scopulae of tenent setae: 0= absent; 1= present (Fig. 20A). Azevedo *et al.* (2018) coded scopula of tenent setae only on tarsus and metatarsus of legs I–II. Here we observe some species that also show scopula on tibia I–II.

92. **Legs I–II, tibia, ventral, scopulae of tenent setae, density:** 0= sparse; 1= dense.

93. **Legs I–II, tibia, ventral, scopulae of tenent setae, longitudinal extension:** 0= restricted to distal part (Fig. 20A); 1= reaching proximal third.

94. **Legs I–II, tibia, ventral, scopulae of tenent setae, type:** 0= continuous; 1= divided; 2= only on prolateral side.

95. **Leg III, tarsus, ventral, scopulae of tenent setae (Azevedo *et al.* 2018, char. 190):** 0= absent; 1= present.

96. **Leg III, tarsus, ventral, scopulae of tenent setae, density (Azevedo *et al.* 2018, char. 191):** 0= sparse; 1= dense.

97. **Leg III, tarsus, ventral, scopulae of tenent setae, type (Azevedo *et al.* 2018, char. 192):** 0= continuous; 1= divided.

98. **Leg III, metatarsus, ventral, scopulae of tenent setae (Azevedo *et al.* 2018, char. 185):** 0= absent; 1= present.

99. **Leg III, metatarsus, ventral, scopulae of tenent setae, density (Azevedo *et al.* 2018, char. 186):** 0= sparse; 1= dense.

100. **Leg III, metatarsus, ventral, scopulae of tenent setae, longitudinal extension (Azevedo *et al.* 2018, char. 187):** 0= restricted to distal part; 1= reaching proximal third.

101. **Leg III, metatarsus, ventral, scopulae of tenent setae, type (Azevedo *et al.* 2018, char. 188):** 0= continuous; 1= divided; 2= only on prolateral side.

102. **Leg IV, tarsus, ventral, scopulae of tenent setae (Azevedo *et al.* 2018, char. 200):** 0= absent; 1= present.

103. **Leg IV, tarsus, ventral, scopulae of tenent setae, density (Azevedo *et al.* 2018, char. 201):** 0= sparse; 1= dense.

104. Leg IV, tarsus, ventral, scopulae of tenent setae, type (Azevedo *et al.* 2018, char. 202): 0= continuous; 1= divided.

105. Leg IV, metatarsus, ventral, scopulae of tenent setae (Azevedo *et al.* 2018, char. 194): 0= absent; 1= present.

106.Leg IV, metatarsus, ventral, scopulae of tenent setae, setae, longitudinal extension (Azevedo *et al.* 2018, char. 196): 0= restricted to distal part; 1= reaching proximal third.

107. Leg IV, metatarsus, ventral, scopulae of tenent setae, type (Azevedo *et al.* 2018, char. 197): 0= continuous; 1= divided; 2= only on prolateral side.

108. Legs I–II, scopula of tenent setae, socket indented (Ramirez 2018, char. 162): 0= absent (Fig. 20E); 1= present (Fig. 20D).

109. Legs I–II, tarsus, pseudosegmentation (Azevedo *et al.* 2018, char. 175): 0= absent; 1= present (Fig. 20F).

110. Leg III, tarsus, pseudosegmentation (Azevedo *et al.* 2018, char. 176): 0= absent; 1= present.

111. Leg IV (F), tarsus, pseudosegmentation (Azevedo *et al.* 2018, char. 177): 0= absent; 1= present.

112. Leg IV (M), tarsus, pseudosegmentation (Azevedo *et al.* 2018, char. 178): 0= absent; 1= present.

113. Legs, tarsus, pseudosegmentation, dorsal extension (Azevedo *et al.* 2018, char. 179): 0= absent; 1= present.

114. Legs, tarsus, pseudosegmentation, longitudinal extension (Azevedo *et al.* 2018, char. 180): 0= only on terminal half (Fig. 20F); 1= reaching proximal.

115. Legs, tarsus, pseudosegmentation, type (Azevedo *et al.* 2018, char. 181): 0= rings; 1= cracked (Fig. 20F).

116. Legs, tarsus, trichobothria, proximal and distal plate limit (Ramirez 2014, char. 176): 0= well differentiated (Figs 21A–L); 1= not well differentiated (Ramirez 2014, fig. 94D).

117. Legs, tarsus, trichobothria, proximal plate (Ramirez 2014, char. 178): 0= smooth (Fig. 21A); 1= with transverse ridges (Figs 21B–L).

118. Legs, tarsus, trichobothria, distal plate (Ramirez 2014, char. 182): 0= smooth, distal plate is continuous with the surrounding cuticle, or slightly elevated (Fig. 21C); 1= distal plate embedded below transverse ridge (Figs 21A, B); 2= distal ridge continuous in a closed alveolus (Fig. 21E).

119. Legs, tarsus, trichobothria, proximal and distal plates medial differentiation (Ramirez 2014, char. 177): 0= hood entire, differentiated (Fig. 21F); 1= hood not differentiated medially (Fig. 21B).

120. Legs, tarsus, trichobothria, setae base thickness (Ramirez 2014, char. 183): 0= thin (Figs 21A–C); 1= thickened as a basal bulb (Figs 21G, H, K, L).

121. Legs, tarsus, tarsal organ, opening, shape (Azevedo *et al.* 2018, char. 154): 0= round to oval (Figs 22B, I, K); 1= teardrop or keyhole (Figs 22D, F, H, J).

122. Legs, tarsus, tarsal organ, capsule elevation (Azevedo *et al.* 2018, char. 150): 0= absent, the capsule is contiguous with surrounding cuticle, not clearly differentiated (Figs 22A, B); 1= present, the capsule is elevated (Figs 22C, D).

123. Legs, tarsus, tarsal organ, capsule, marginal sulci (Azevedo *et al.* 2018, char. 151): 0= absent; 1= present (Fig. 22D).

124. Legs, tarsus, tarsal organ, capsule, texture (Azevedo *et al.* 2018, char. 152): 0= same as surrounding cuticle (Figs 22A–C); 1= different (Fig. 22F).

125.Legs, tarsus, tarsal organ, opening, rim, type (Azevedo *et al.* 2018, char. 153): 0= depressed; 1= elevated (Fig. 22C).

126.Legs, tarsus, cuticle, texture (Azevedo *et al.* 2018, char. 149, modified): 0= smooth (Figs 21A, B); 1= fingerprint (Figs 21D, E); 2= rough (Fig. 21I). This character was established by Ramirez (2014) and modified by Azevedo *et al.* (2008) who defined two states, "smooth to rugose" and "fingerprint". Here we further modify this character defining three separate states.

127.Legs, tarsus, apical, claw tuft (Azevedo *et al.* 2018, char. 138): 0= absent (Fig. 23A); 1= present (Figs 23B–I, 24A–I).

128. Legs, tarsi, apical, claw tuft, density: 0= sparse (Figs 24A–D); 1= dense (Figs 24G–I).

129. Legs, tarsus, apical, claw tuft, insertion (Azevedo *et al.* 2018, char. 140): 0= continuous with lateral cuticle (Figs 24A–D); 1= well delimited plate (Figs 24E–I).

130. Legs, tarsus, distal, ventral, claw slit suture (CSS) (Azevedo *et al.* 2018, char. 147): 0= absent; 1= present (Figs 23I, 24C).

131. Legs, tarsus, distal, claw slit suture complete, forming onychium (podotarsite) (Azevedo *et al.* 2018, char. 148): 0= absent (Fig. 24C); 1= present (Figs 23F–I). This terminology was proposed by *Labarque* et al. (2017) to define the structure delimited by an arthrodial membrane in place of the slit suture that extends forming an additional joint. Coded only for terminals with claw slit suture.

132. Legs, tarsus, apical, claws, dorsal scales (velvety texture) (Azevedo *et al.* 2018, char. 137): 0= absent (Fig. 23C); 1= present (Figs 24F, G).

133. Legs, tarsus, apical, claws, classic clasper (Azevedo *et al.* 2018, char. 131): 0= absent; 1= present, claw tuft clasping mechanism of teeth appressed together (Figs 24A–D). The characters involving the claw tuft clasping mechanism were defined considering the hypothesis of multiple homologies of Azevedo *et al.* (2018).

134.Legs, tarsus I–II, apical, claws, classic clasper, teeth number: 0= two (Fig. 24C); 1= three (Fig. 24D); 2= four.

135. Legs, tarsus, apical, claws, folded clasper (Azevedo *et al.* 2018, char. 132): 0= absent; 1= present, claw tuft clasping mechanism formed by a developed basal fold (Azevedo *et al.* 2018, fig. 4A).

136. Legs, tarsus, apical, claws, pointed solid clasper (Azevedo *et al.* 2018, char. 133): 0= absent; 1= present, claw tuft clasping mechanism formed by solid projection of basal fold (Figs 24F-G).

137. Legs, tarsus, apical, claws, flexible single clasper: 0= absent; 1= present, claw tuft clasping mechanism formed by single projection of basal fold (Fig. 24H, I). This new claw tuft clasping mechanism was observed in *Namundra* sp. and *Zimiris doriai*. In *Namundra* sp. this clasper arises laterally from the base of the claw, while in *Z. doriai* the clasper arises ventrally from the base of the claw.

138. Legs, tarsus, apical, claws, teeth (Azevedo *et al.* 2018, char. 134): 0= absent (Figs 24E–I); 1= present (Figs 24A–D).

139. Legs I–II, tarsus, apical, claws, teeth, size (Azevedo *et al.* 2018, char. 135): 0= reduced, teeth shorter than superior tooth (Azevedo *et al.* 2018, figs 5E, F); 1= normal, teeth longer than half superior tooth length (Figs 23A–C).

140. Legs, tarsus, apical, claws, teeth tip: 0= pointed (Fig. 23B); 1= truncate (Figs 23H, I).

141. Legs, tarsus, apical, claw tuft, seta, tenent surface, orientation (Azevedo *et al.* 2018, char. 144): 0= facing ventrally (Fig. 23C); 1= facing mesally (Fig. 23B).

142. Legs, tarsus, apical, claw tuft, seta, basal section, shape (Azevedo *et al.* 2018, char. 142): 0= Basal section nearly cylindrical or flattened without folds (Fig. 23C, D); 1= Basal section with folds or ribs (Fig. 24C).

143. Legs, tarsus, apical, claw tuft, seta, base, packing (Azevedo *et al.* 2018, char. 143): 0= Bases inserted in individual sockets (Figs 24E–I); 1= Bases packed together (Figs 24A–D).

144. Legs, tarsus, apical, modified ventral setae: 0= absent; 1= present (Fig. 20H). These modified setae are larger tactile setae located on ventro-apical tarsus. Platnick & Penney (2004) already had observed these setae in *Zimiris*.

ABDOMEN

145. Abdomen, ventral, internally invaginated postepigastric sclerites (Azevedo *et al.* 2018, char. 19): 0= absent; 1= present (Figs 19K, 25E).

146. Abdomen, pedicel, ventral, anterior margin, shape (Azevedo *et al.* 2018, char. 7): 0= pointed (Fig. 19H); 1= truncate (Fig. 19I).

147. Abdomen, antero-dorsal tuft of setae (Azevedo *et al.* 2018, char. 1): 0= absent; 1= present (Fig. 19L).

148. Abdomen (M), dorsal, scutum (Azevedo *et al.* 2018, char. 22): 0= absent; 1= present (Fig. 19L).

149. Abdomen (M), dorsal, scutum, size (Azevedo *et al.* 2018, char. 23): 0= small, limited to anterior half of abdomen; 1= large, extending beyond anterior half of abdomen.

150. Abdomen (M), ventral, epiandrum, epiandrous spigots (Azevedo *et al.* 2018, char. 24): 0= absent; 1= present (Fig. 25A).

151. Abdomen (M), ventral, epiandrum, epiandrous spigots, arrangement (Azevedo *et al.* 2018, char. 25): 0= dispersed (Ramirez 2014, fig. 103A); 1= two groups in separated cavities (Fig. 25A); 2= two groups in single cavity.

152. Abdomen, openings of posterior respiratory system, position (Ramirez 2014, char. 221): 0= very close to spinnerets (Figs 25B, D); 1= slightly separated from spinnerets (Fig. 27A); 2= well advanced, closer to epigastrium (Fig. 25C). The openings of posterior respiratory system are usually located close to spinnerets, except in many Anyphaenidae genera, in which they are well advanced. Here we observe the well advanced condition of the opening in *Namundra* sp. and *Zimiris doriai*. Apparently the advance of the opening is associated to the advance of the ALS in these genera. All Molycriinae evaluated here have the ALS advanced but the openings of posterior respiratory system are close to posterior spinnerets, scored 0.

153. Abdomen, surface, clavate setae: 0= absent; 1= present (Figs 19M, 25F).

154. Abdomen, surface, clavate setae, arrangement: 0= dorsal and ventral; 1= only ventral.

155.Abdomen, surface, plumose setae (Azevedo *et al.* 2018, char. 9): 0= absent; 1= present.

156. Abdomen, surface, plumose setae, appendages (brachia) arrangement (Azevedo *et al.* 2018, char. 10): 0= only on proximal part; 1= reaching terminal half.

157. Abdomen, surface, squamose setae (Azevedo *et al.* 2018, char. 12): 0= absent; 1= present.

158. Abdomen, surface, squamose setae, lateroventral appendages (Azevedo *et al.* 2018, char. 13): 0= absent; 1= present.

159. Abdomen, surface, squamose setae, dorsolateral spines (Azevedo *et al.* 2018, char. 14): 0= absent; 1= present.

160. Abdomen, surface, squamose setae, dorsolateral spines, arrangement (Azevedo *et al.* 2018, char. 16): 0= on both sides; 1= only on one side.

161. Abdomen, surface, squamose setae, number of axes (shafts) (Azevedo *et al.* 2018, char. 17): 0= zero; 1: one; 2: two.

162. Abdomen, ventral, posterior, colulus (Azevedo *et al.* 2018, char. 320): 0= absent; 1= present.

Spinnerets

163. Spinnerets, ALS, length relative to width: 0= longer than wide (Fig. 27E); 1= approximately equal or wider than long (Fig. 27I).

164. Spinnerets, ALS, length relative to abdomen length (Azevedo *et al.* 2018, char. 277, mod.): 0= less than 22% to abdomen (Fig. 27A); 1= more than 22% to abdomen (Figs 27B–D). This character was originally proposed by Platnick & Baher (2006) to characterize the greatly elongated anterior lateral spinnerets of the former Molycriinae.

165. Spinnerets, ALS, anteroposterior position (Azevedo *et al.* 2018, char. 278, mod.): 0= close to PMS and PLS (Fig. 27F); 1= slightly advanced from PMS and PLS (Fig. 27K); 2= extremely advanced from PMS and PLS (Figs 27C, D, J). This is also a character proposed by Platnick & Baher (2006) to characterize the position of ALS in the former Molycriinae. We modified the character and included one additional state, since some species have the ALS slightly advanced. We considered this new condition as ALS separated from the spinnerets but still located on the distal third of the abdomen.

166. Spinnerets, ALS, distance between them in relation to their diameter (Azevedo *et al.* 2018, char. 276): 0= contiguous to separated by less one ALS diameter (Figs 27E–G); 1= separated by approximately one ALS diameter or more (Figs 27H, I).

167. Spinnerets, ALS, sclerotizaton close to base: 0= absent; 1= present (Fig. 27H).

168.Spinnerets, long and erect setae between ALS and posterior spinnerets: 0= absent; 1= present (Figs 27G, K).

169. Spinnerets, ALS, surface, plumose setae: 0= absent; 1= present. Azevedo *et al.* (2018) described the scales for carapace, legs and abdomen. We identified that some species also have scales on ALS. All species with scales on ALS also had them in other parts.

170. Spinnerets, ALS, surface, plumose setae, appendages (brachia) arrangement: 0= only on proximal part; 1= reaching terminal half.

171. Spinnerets, ALS, surface, squamose setae: 0= absent; 1= present.

172. Spinnerets, ALS, surface, squamose setae, lateroventral appendages: 0= absent; 1= present.

173. Spinneres, ALS, surface, squamose setae, dorsolateral spines: 0= absent; 1= present.

174. Spinnerets, ALS, surface, squamose setae, dorsolateral spines, arrangement: 0= on both sides; 1= only on one side.

175. Spinnerets, ALS, surface, squamose setae, number of axes (shafts): 0= zero; 1: one; 2: two.

176.Spinnerets (M), ALS, piriform gland spigots (Ramirez 2014, char. 300): 0= absent; 1= present (Figs 28A, C, D, 29A, D, E).

177. Spinnerets (F), ALS, piriform gland spigots (Ramirez 2014, char. 301): 0= absent; 1= present (Figs 28E–G, 29F, J, L).

178. Spinnerets, ALS, piriform gland spigots, central spigot with plumose base (Ramirez 2014, char. 270): 0= absent; 1= present (Fig. 29C). Character proposed by

Ramirez (2014) to show the morphology of one central piriform spigot found in *Lygromma*. In *Lygromma gasnieri*, used in our dataset, we observed three central piriform spigots, scored 1. This condition is not observed in all species of *Lygromma* (*pers. obs.*) and a more detailed examination of the genus is necessary to elucidate this condition.

179. Spinnerets, base spigot, insertion articulation, type (Azevedo *et al.* 2018, char. 319): 0= simple; 1= insertion annulate, flexible (Figs 29K, 30G).

180. Spinnerets, ALS, piriform gland spigots, texture of base (Ramirez 2014, char. 261, mod.): 0= longitudinal ridges (Fig. 29E); 1= concentric ridges (Figs 29B, C); 2= smooth (Fig. 29H); 3= imbricate (Fig. 28J); 4= cracked (Fig. 29I). We modified this character proposed by Ramirez (2014) to include other states.

181. Spinnerets, ALS, piriform gland spigots, shaft fused to base (Azevedo *et al.* 2018, char. 287): 0= transition with a well-defined change in curvature (Figs 28C, D); 1= transition on a continuous curvature, only a superficial marking (Figs 28A, B, E).

182. Spinnerets, ALS, piriform gland spigots, insertion: 0= insertion simple, continuous with cuticle (Fig. 28C); 1= on well-defined base (Fig. 29F). A well-defined base is determined when enough aligned plumose setae are on the outside margin of each piriform gland spigot, giving the base a "wagon wheel" appearance when the setae fall off (Platnick 1990).

183. Spinnerets (F), ALS, piriform gland spigots, position (Azevedo *et al.* 2018, char. 302): 0= only on the edge (Fig. 28A); 1= on the edge and in the middle of the spinneret (Fig. 29K).

184. Spinnerets, ALS, distal article (Azevedo *et al.* 2018, char. 273): 0= completely sclerotized ring; 1= incomplete ring (Figs 28A, B, 29D, G).

185. Spinnerets, ALS, distal article, incomplete ring, type (Azevedo *et al.* 2018, char. 274): 0= located in the anterior margin (Figs 28A, B); 1= patches of setae at the base of the gland spigots (Figs 29A–L).

186. Spinnerets, ALS, piriform gland spigots, base length: 0= moderately short (Figs 29D, E); 1= extremely elongated (Figs 29J–L). Applicable only to taxa with ALS piriform gland spigots associated to plumose setae.

187. Spinnerets, ALS, spinning field, inflatable membrane (Azevedo *et al.* 2018, char. 281): 0= absent; 1= present (Figs 29G, K).

188. Spinnerets, ALS, piriform gland spigots, base length relative to shaft (Azevedo *et al.* 2018, char. 283): 0= shorter than or as short as (Figs 28A–E); 1= longer (Figs 28F–K).

189. Spinnerets, ALS, piriform gland spigots, base width in relation to major ampullate gland spigots (Azevedo *et al.* 2018, char. 284): 0= about the same; 1= greatly widened (Figs 28B, C, 29D, L).

190. Spinnerets, ALS, piriform gland spigots, length relative to the major ampullate gland spigots (Azevedo *et al.* 2018, char. 285): 0= shorter or about the same; 1= longer (Fig. 28B, 29H).

191. Spinnerets, ALS, piriform gland spigots, shaft width relative to base (Azevedo *et al.* 2018, char. 288): 0= narrower (Figs 28C, D); 1= as wide as base, with broad openings (Figs 28A, B, E).

192. Spinnerets, ALS, major ampullate gland spigots field, conical setae-bearing projection (Azevedo *et al.* 2018, char. 282): 0= field on a flat or slightly domed area (Figs 28B, C); 1= field on a conical, well-defined, setae-bearing article (Figs 29D, H, I).

193. Spinnerets, ALS, major ampullate gland spigots field, conical setae-bearing projection, length: 0= short (Figs 29D, E); 1= extremely elongated (Figs 29I, K, L).

194. Spinnerets (M), ALS, major ampulate gland, number (Ramirez 2014, char. 258): 0= one (Fig. 29D); 1= one plus nubbin or tartipore (Fig. 28C); 2= two (Figs 29B, E, H).

195. Spinnerets (F), ALS, major ampullate gland, number (Ramirez 2014, char. 253): 0= one; 1= one plus nubbin or tartipore; 2= two.

196. Spinnerets (F), ALS, major ampullate gland, shaft sizes (Ramírez 2014, char. 254, mod.): 0= diferent sizes (Fig. 29E); 1= similar sized (Fig. 29H).

197. Spinnerets, major ampullate and aciniform gland spigots, shaft, shape (Azevedo *et al.* 2018, char. 318): 0= cylindrical or tapering (Fig. 30F); 1= clavate, widened at the tip (Figs 30H, I).

198.Spinnerets (F), ALS, spinning field, furrow between major ampullate and piriform gland spigots (Azevedo *et al.* 2018, char. 303): 0**=** absent; 1= present.

199. Spinnerets (M), ALS, spinning field, furrow between major ampullate and piriform gland spigots (Azevedo *et al.* 2018, char. 304): 0= absent; 1= present.

200. Spinnerets, ALS, dorsal hood: 0= absent; 1= present (Figs 28E, F, H, L). The hood of the dorsoapical extension of ALS is probably used to protect the piriform spigots tips. All species with this structure have elongate piriform spigots without associated setae, except *Asemesthes* sp. that has a hood and piriform spigots ono elongate.

201. Spinnerets, **PMS insertion:** 0= directly on cuticle; 1= high on a cuticular base (Fig. 24B).

202. Spinnerets (F), PMS, aciniform gland spigots (Azevedo *et al.* 2018, char. 310): 0= absent; 1= present (Fig. 30B, E, J).

203. Spinnerets (M), PMS, aciniform gland spigots (Azevedo *et al.* 2018, char. 311): 0= absent; 1= present.

204. Spinnerets (F), PMS, minor ampulatte gland spigots (Azevedo *et al.* 2018, char. 316): 0= absent; 1= present (Figs 30F, L).

205. Spinnerets (M), PMS, minor ampulatte gland spigots (Azevedo *et al.* 2018, char. 317): 0= absent; 1= present.

206. Spinnerets (F), PMS, cylindrical gland spigots (Azevedo *et al.* 2018, char. 312): 0= absent; 1= present (Figs 30A–E).

207. Spinnerets, PMS, aciniform gland spigot, arrangement: 0= scattered (Figs 30E, J); 1= clustered (Fig. 30K).

208. Spinnerets (F), PMS, cylindrical gland spigots, forming separated field (Azevedo *et al.* 2018, char. 314): 0= absent; 1= present, the cylindrical spigots are not mixed with other spigots (Figs 30A, C).

209. Spinnerets, PMS-PLS, claviform setae (Azevedo *et al.* 2018, char. 290): 0= absent; 1= present (Figs 31J, K).

210. Spinnerets (F), PLS, aciniform gland spigots (Azevedo *et al.* 2018, char. 305): 0= absent; 1= present (Figs 31A, C, E).

211. Spinnerets (M), PLS, aciniform gland spigots (Azevedo *et al.* 2018, char. 306): 0= absent; 1= present.

212. Spinnerets (F), PLS, minor ampulatte gland spigots (Azevedo *et al.* 2018, char. 308): 0= absent; 1= present (Figs 31F, H, L).

213. Spinnerets (M), PLS, minor ampulatte gland spigots (Azevedo *et al.* 2018, char. 309): 0= absent; 1= present.

214. Spinnerets (F), PLS, cylindrical gland spigots (Azevedo *et al.* 2018, char. 307): 0= absent; 1= present (Figs 31B, D, G).

215. Spinnerets, **massive PLS:** 0= absent; 1= present (Figs 27L, 31J).

FEMALE PALP

216. Female palp, tarsus, dorsal, chemosensory setae, distribution (Azevedo *et al.* 2018, char. 210): 0= scattered (Fig. 32A); 1= in a defined patch (Fig. 32C).

217. Female palp, tarsus, dorsal, chemosensory patch, configuration (Azevedo *et al.* 2018, char. 211): 0= on dorsoapical surface; 1= on apical truncation (Figs 32C–E).

218.Female palp, tarsus, terminal, claw (Azevedo *et al.* 2018, char. 213): 0= absent (Fig. 32C); 1= present (Figs 32E, F).

219. Female palp, tarsus, terminal, claw, teeth (Azevedo *et al.* 2018, char. 214): 0= absent; 1= present (Figs 32E, F).

220. Female palp, tarsus, terminal, claw, type (Azevedo *et al.* 2018, char. 215): 0= normal, well defined (Fig. 32F); 1= reduced (Fig. 32E). We consider the claw reduced when it is small, poorly formed (with or without teeth) and inserted on the basal margin of the apical truncated patch. Probably, some of them are nonfunctional.

221. Female palp, femur, lateroventral row of long and strong spines (Platnick & Baehr 2006, char. 10): 0= absent (Figs 32B, C); 1= present (Fig. 32A).

GENITALIA

Male Palp

222. Palp, femur, ventral median apophysis (Ramirez 2014, char. 306): 0= absent; 1= present.

223. Palp, tibia, size: 0= short, less than cymbium length; 1= long, equal or longer than cymbium length (Azevedo *et al.* 2018, fig. 21C).

224. Palp, tibia, RTA (Azevedo *et al.* 2018, char. 261): 0= absent; 1= present (Figs 32G–K). We consider any apophysis located retrolaterally on the tibia an RTA, regardless if the position is distal, basal or displaced to a dorsal or ventral position. Only *Gallianoela* sp. does not have and RTA. *Wesmaldra bidgemia* was described as not having an RTA, but we consider the slight retrolateral projection on tibia as RTA, scored 1.

225. Palp, tibia, RTA numbers: 0= one (Figs 32G–I); 1= two (Fig. 32J). Some species have two RTA and here we separated them into ventral RTA (vRTA) and dorsal RTA (dRTA). We considered the dRTA present on all species of our dataset, except *Gallianoela* sp., and therefore the vRTA was considered an extra apophysis.

226. Palp, tibia, vRTA conformation: 0= simple; 1= bifid (Fig. 32J).

227. Palp, tibia, dRTA position: 0= apical; 1= median.

228. Palp, tibia, dRTA conformation: 0= simple (Fig. 32G); 1= bifid (Fig. 32I).

229. Palp, tibia, RTA sclerotization (Ramirez 2014, char. 315): 0= all sclerotized; 1= with membranous area (Ramirez 2014, fig. 145A).

230. Palp, tibia, VTA (Azevedo *et al.* 2018, char. 266): 0= absent; 1= present (Fig. 32K).

231. Palp, tibia, DTA (Azevedo *et al.* 2018, char. 268): 0= absent; 1= present (Fig. 32L).

232. Palp, cymbium, apical, conformation (Ramirez 2014, char. 325): 0= elongate, extending beyond distal margin of alveolus (Figs 33G, H); 1= short, wide, not extending beyond distal margin of alveolus (Fig. 33K).

233.Palp, cymbium, apical, ventral groove (Ramirez 2014, char. 323): 0= absent; 1= present (Fig. 33B). This is a conductor-like structure proposed by Ramirez (1995) to characterize some Anyphaenidae spiders. In this dataset, only *Xiruana gracilipes* and *Asemesthes* sp. have ventral grooved cymbium.

234. Palp, cymbium, retromedian process (Azevedo *et al.* 2018, char. 254): 0= absent; 1= present (Fig. 33H).

235. Palp, cymbium, retromedian process, type (Azevedo *et al.* 2018, char. 255): 0= without incision; 1= with incision, forming a conductor-like canal (Fig. 33H).

236. Palp, cymbium, retrobasal process (paracymbium) (Azevedo *et al.* 2018, char. 256): 0= absent; 1= present (Fig. 32G).

237. Palp, cymbium, ventral, terminal, bunch of thick setae (Azevedo *et al.* 2018, char. 257): 0= absent; 1= present (Figs 33J–L).

238.Palp, cymbium, dorsal, terminal, chemosensory patch (Azevedo *et al.* 2018, char. 252): 0= absent; 1= present (Figs 33G, J).

239. Palp, cymbium, dorsal, trichobothria (Azevedo *et al.* 2018, char. 253): 0= absent; 1= present.

240. Palp, copulatory bulb, median apophysis (Azevedo *et al.* 2018, char. 234): 0= absent (Figs 33I, K, L); 1= present (Figs 33E–H).

241. Palp, copulatory bulb, median apophysis, numerous small spines (granulation) (Azevedo *et al.* 2018, char. 236): 0= absent; 1= present (Fig. 33B).

242. Palp, copulatory bulb, median apophysis, sclerotization (Azevedo *et al.* 2018, char. 237): 0= completely sclerotized (Fig. 33A, B); 1= partially sclerotized (Fig. 33C); 2= not sclerotized.

243. Palp, copulatory bulb, median apophysis, shape (Azevedo *et al.* 2018, char. 238): 0= elongate (Fig. 33E); 1= rounded, or irregularly shaped, but approximately as long as wide (Fig. 33B).

244. Palp, copulatory bulb, median apophysis, terminal hook (Azevedo *et al.* 2018, char. 239): 0= absent (Figs 33B, C); 1= present (Figs 33E, J).

245. Palp, copulatory bulb, conductor (Azevedo *et al.* 2018, char. 216): 0= absent (Figs 33B, C); 1= present (Figs 33I, K).

246.Palp, copulatory bulb, conductor, sclerotization (Azevedo *et al.* 2018, char. 217): 0= hyaline (Fig. 33I); 1= sclerotized (Fig. 33G).

247. Palp, copulatory bulb, conductor, shape (Azevedo *et al.* 2018, char. 218): 0= robust, rounded, folds; 1= simple, thin, elongated.

248. Palp, copulatory bulb, embolus, insertion on tegulum in unexpanded bulb (Azevedo *et al.* 2018, char. 225): 0= retrolateral (Figs 33G, K); 1= prolateral (Figs 33H, I).

249. Palp, copulatory bulb, embolus in relation to tegulum (Azevedo *et al.* 2018, char. 219): 0= embolus fused to tegulum; 1= embolus articulated, not fused to tegulum.

250. Palp, copulatory bulb, embolus, embolar base proximal projection (Azevedo *et al.* 2018, char. 221): 0= absent; 1= present (Azevedo *et al.* 2018, fig. 15F).

251. Palp, copulatory bulb, embolus, embolar locking lobe (Azevedo *et al.* 2018, char. 223): 0= absent; 1= present (Azevedo *et al.* 2018, fig. 21G).

252. Palp, copulatory bulb, embolus, shape (Azevedo *et al.* 2018, char. 228): 0= robust with folds (Fig. 33A); 1= tubular, simple, thin, elongated (Figs 33D–L).

253. Palp, copulatory bulb, tegulum, distal tegular spine-like process (Azevedo *et al.* 2018, char. 247): 0= absent; 1= present (Fig. 33D). Sclerotized process found in some Molycriinae. Same as terminal apophysis in Platnick & Baehr (2006).

254. Palp, copulatory bulb, tegulum, laminar extension: 0= absent; 1= present (Fig. 33I).

255. Palp, copulatory bulb, tegulum, proximal part, covered by subtegulum (Azevedo *et al.* 2018, char. 248): 0= absent; 1= present (Fig. 33B).

256. Palp, copulatory bulb, terminal apophysis (Azevedo *et al.* 2018, char. 249): 0= absent; 1= present (Azevedo *et al.* 208, fig. 23A).

257. Palp, copulatory bulb, tegular excavation (embolus accommodation): 0= absent; 1= present (Figs 33F, G, K). Some Prodidominae have a groove in the tegulum that accommodates the embolus.

Epigyne

258. Epigyne, posterior extension (Ramirez 2014, char. 367): 0= not extending much beyond the epigastric furrow; 1= evidently projecting posteriorly.

259. Epigyne, posterior notched: 0= absent; 1= present (Figs 34I, K, L).

260. Epigyne, **posterior hood:** 0= absent; 1= present (Figs 34G, H). The epyginal plate has a sclerotized structure, here termed posterior hood, that is not homologous to the hood formed by the anterior fold.

261. Epigyne, anterior fold (Azevedo *et al.* 2018, char. 96): 0= absent; 1= present (Fig. 34D, E).

262. Epigyne, anterior fold, posterior extension forming a secondary lateral fold (Azevedo *et al.* 2018, char. 97): 0= absent; 1= present (Fig. 34E).

263. Epigyne, anterior fold, hood (Azevedo *et al.* 2018, char. 98): 0= absent; 1= present (Figs 34A, C).

264. Epigyne, lateral folds (Azevedo *et al.* 2018, char. 100): 0= absent, the epigyne is an undivided plate (Figs 34F); 1= present, there are sutures or furrows delimiting the epigynal fields (Figs 34A, G).

265. Epigyne, lateral folds, type (Azevedo *et al.* 2018, char. 101): 0= suture (Fig. 34G); 1= furrow (Fig. 34A).

266. Epigyne, median field, septum (Azevedo *et al.* 2018, char. 103): 0= absent; 1= present (Fig. 34B).

267. Epigyne, median field, plate surface, atrium (Azevedo *et al.* 2018, char. 104): 0= absent, median field on same plane as lateral field; 1= present, there is an excavation on the median field (Figs 34J).

268. Epigyne, vulva, primary spermathecae (Azevedo *et al.* 2018, char. 111): 0= inconspicuous (Figs 35F, I); 1= conspicuous (Figs 35A–C). The primary spermathecae is the receptacle to which the fertilization duct is connected. Usually this structure is well-defined in the vulva, but some species do not have this spermathecae distinct, the copulatory duct is continuous.

269. Epigyne, vulva, primary spermathecae, position (Azevedo *et al.* 2018, char. 112): 0= paramedian, separated by less than half of the epigyne width (Fig. 35G); 1= lateral, separated by more than half of the epigyne width (Fig. 35H).

270. Epigyne, vulva primary spermathecae, shape (Azevedo *et al.* 2018, char. 119): 0= rounded (Fig. 35L); 1= elongated; 2= reniform (Fig. 35K).

271. Epigyne, vulva, secondary spermathecae (Azevedo *et al.* 2018, char. 114): 0= absent (Figs 35G, I); 1= present (Fig. 35A–F). The secondary spermathecae is a receptacle with glandular pores. This spermathecae can be a blind sac or reduced to a patch of gland pores, usually emerging from the copulatory ducts, but can also emerge from the primary spermathecae.

272. Epigyne, vulva, secondary spermatheca, location (Azevedo *et al.* 2018, char. 115): 0= copulatory duct (Figs 35A, H, J); 1= spermathecae (Fig. 35B).

273. Epigyne, vulva, secondary spermatheca, well defined lumen (Azevedo *et al.* 2018, char. 116): 0= absent, reduced to a patch of gland pores in the copulatory duct or in the primary spermathecae (Figs 35B, H); 1= present, a blind sac with well-defined lumen (Figs 35C, J, K).

274. Epigyne, vulva, secondary spermathecae, size relative to primary spermathecae (Azevedo *et al.* 2018, char. 117): 0= smaller (Figs 35A–C); 1= as large as (Fig. 35J); 2= larger.

275. Epigyne, vulva, secondary spermathecae, long duct (at least two times the spermathecae diameter) (Azevedo *et al.* 2018, char. 118): 0= absent; 1= present (Figs 35F, K).

276. Epigyne, vulva, secondary spermathecae, position: 0= closer to copulatory opening (Fig. 35L); 1= closer to primary spermathecae (Fig. 35D); 2= approximately median, between PS and CO (Fig. 35A).

277. Epigyne, vulva, copulatory ducts, shape (Azevedo *et al.* 2018, char. 106): 0= highly convoluted (Fig. 35F); 1= spiral; 2= curved or with some curls (Fig. 35I).

278. Epigyne, vulva, copulatory ducts, sclerotization (Azevedo *et al.* 2018, char. 107): 0= completely sclerotized (Figs 35A, I); 1= partially not sclerotized (Figs 35F, H).

279. Epigyne, vulva, copulatory ducts, width: 0= similar width along the ducts (Fig. 35J); 1= wider closest to the copulatory opening (Fig. 35H); 2= wider closest to the PS.

280. Epigyne, vulva, fertilization duct, position (Azevedo *et al.* 2018, char. 110): 0= posterior, close to the epigastric furrow (Figs 35G, H); 1= well advanced from the epigastric furrow (Fig. 35K).

281. Epigyne, vulva, fertilization duct, direction (Azevedo *et al.* 2018, char. 109): 0= ventrally directed (Fig. 35G); 1= posteriorly directed (Fig. 35B).

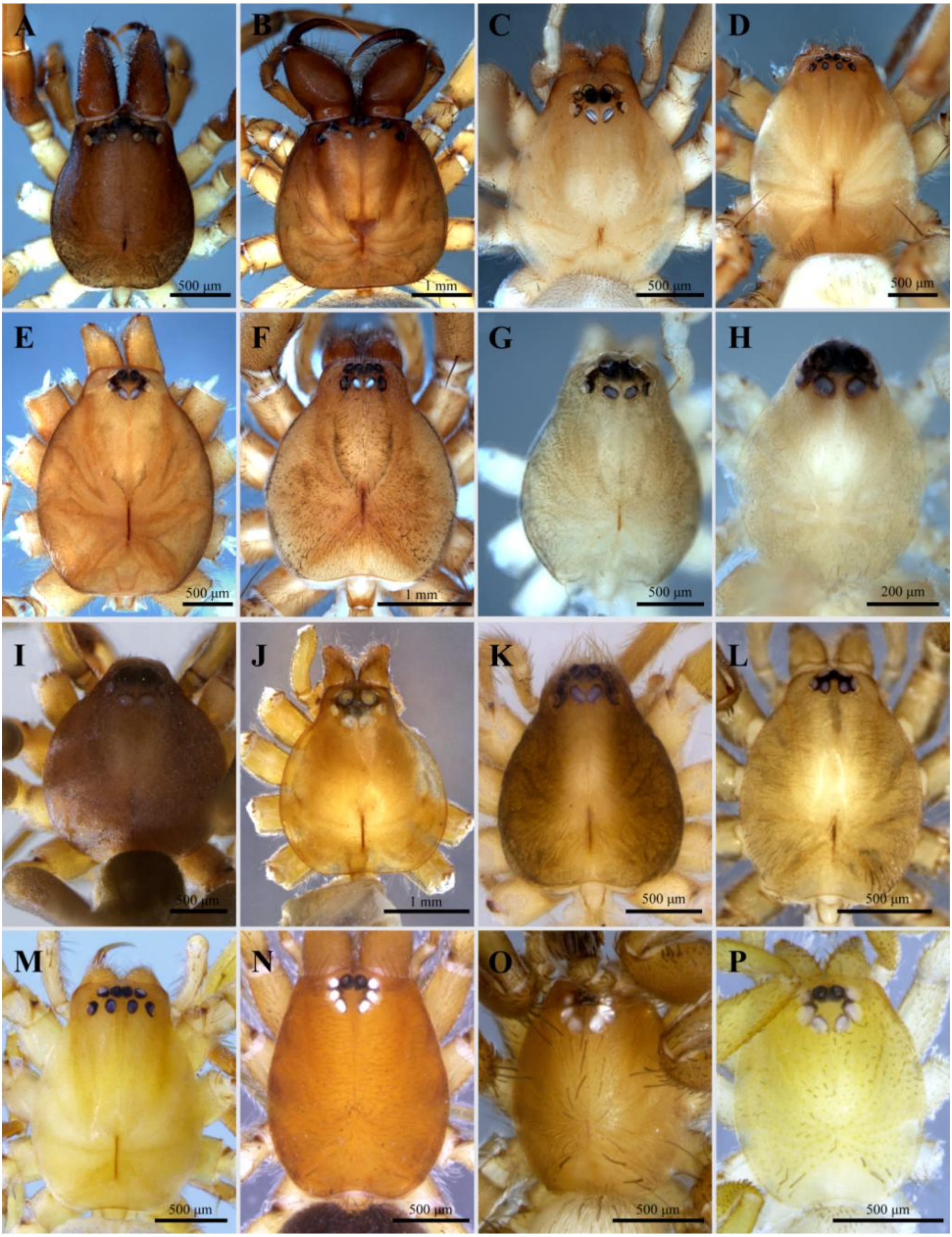

Fig. 14. Carapace, dorsal view. **A)** *Gallianoela* sp., male; **B)** *Platyoides walteri,* female; **C)** *Cithaeron praedonius*, female; **D)** *Anagraphis pallens*, female; **E)** *Encoptharthria echemophthalma*, female; **F)** *Pterotricha lentiginosa*, female; **G)** *Homoeothele micans*, male; **H)** *Leptodrassex* sp., female; **I)** *Molycria mammosa*, male; **J)** *Wydundra osbourne*, female; **K)** *Namundra* sp., female; **L)** *Lygromma gasnieri*, male; **M)** *Theuma* sp.2, female; **N)** *Prodidomus sp.*, male; **O)** *Eleleis* sp., female; **P)** *Purcelliana problematica*, male.

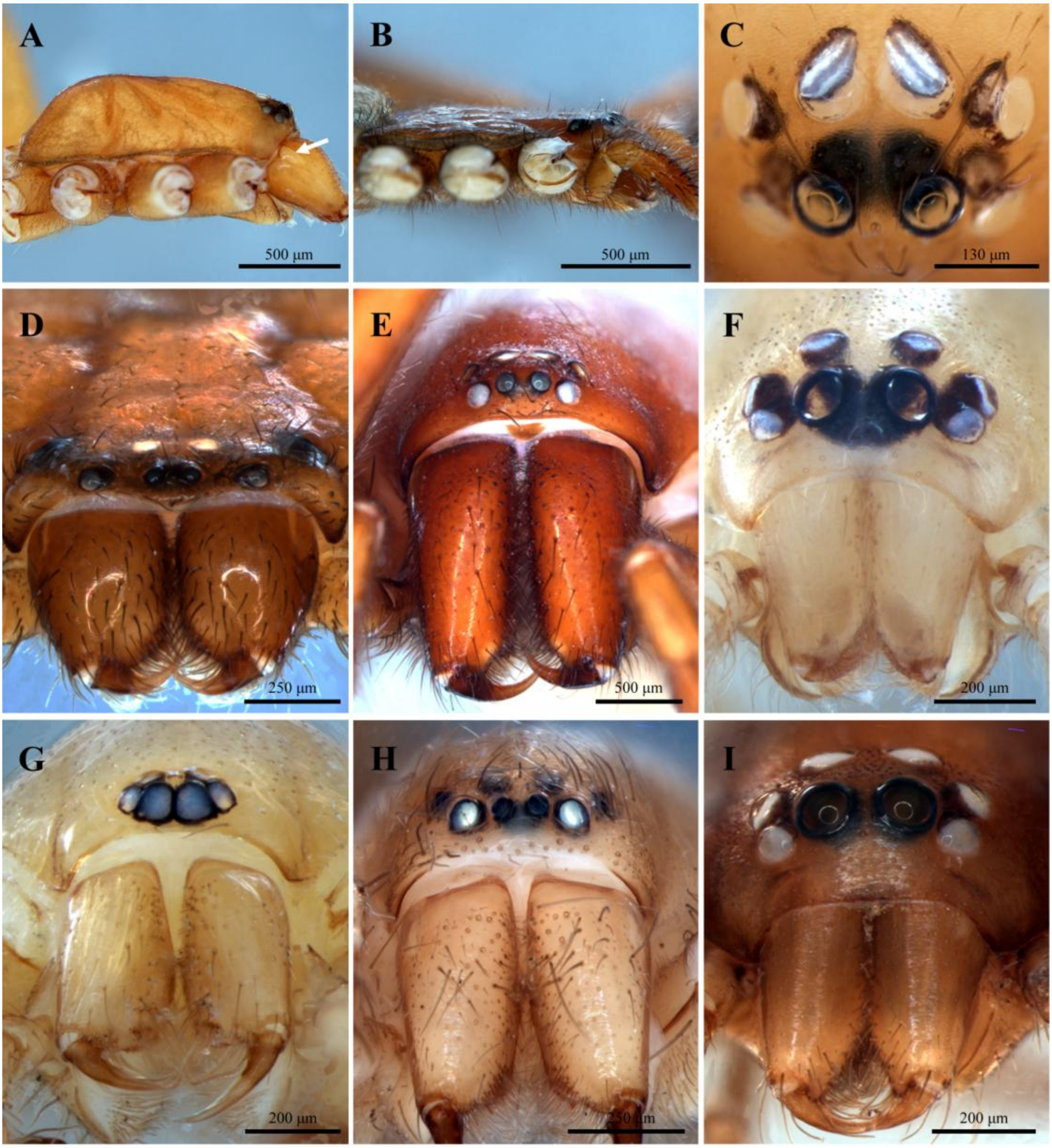

Fig. 15. Carapace, lateral view. **A)** *Encoptharthria echemophthalma*, female, arrow to cheliceral boss; **B)** *Vectius niger*, female. Eyes. **C)** *Cithaeron praedonius*, female, detail of PME tapetum; **D)** *Vectius niger*, female, frontal; **E)** *Urozelotes rusticus*, male, frontal; **F)** *Neodrassex aureus*, female, frontal; **G)** *Lygromma gasnieri*, male, frontal; **H)** *Theuma* sp.2, male, frontal; **I)** *Molycria mammosa*, female, frontal.

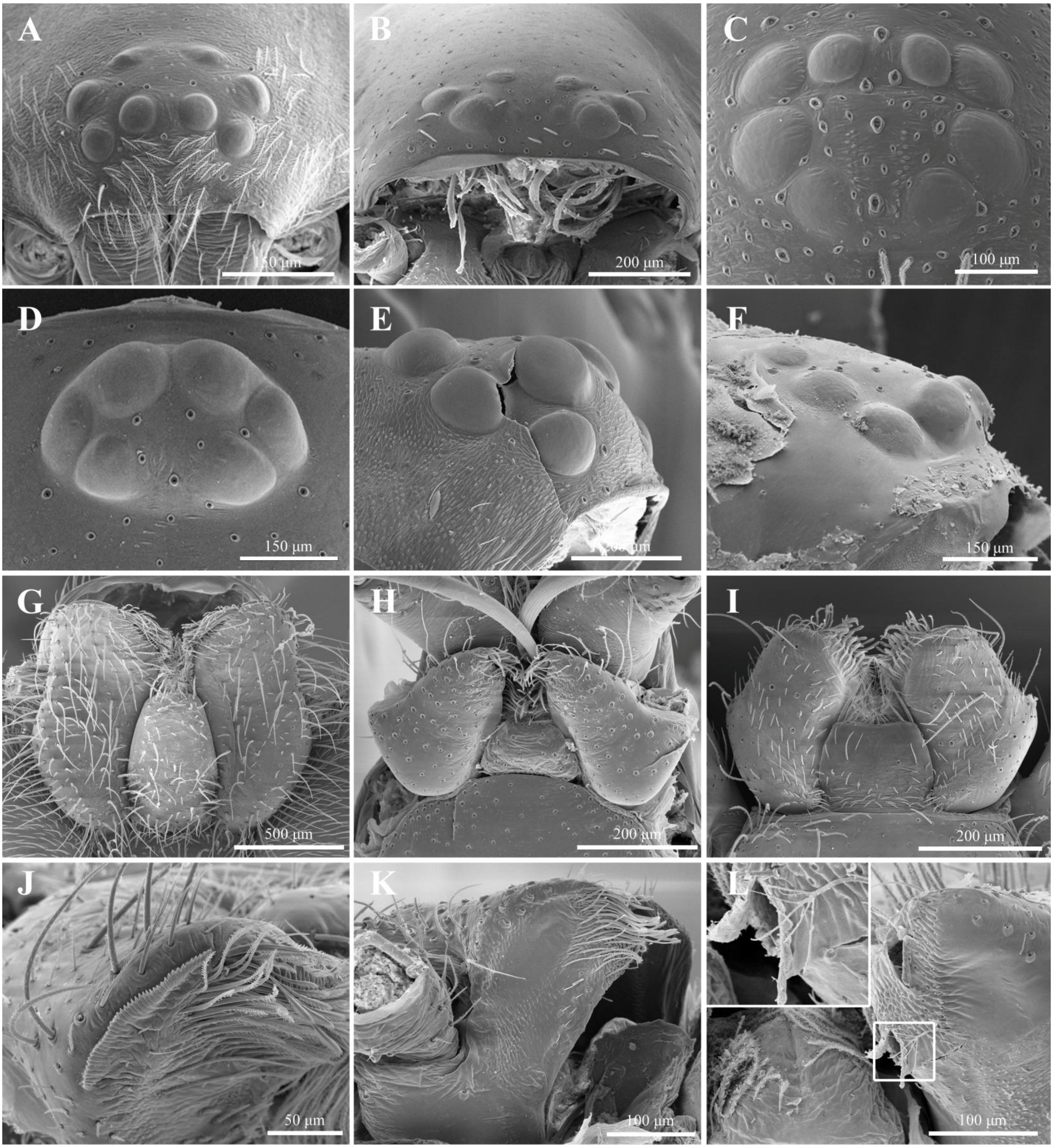

Fig. 16. Eyes. **A)** *Myandra cambridgei*, male, frontal; **B)** *Paracymbiomma carajas*, male, frontal; **C)** *Eleleis* sp., male, dorsal; **D)** *Lygromma gasnieri*, male, dorsal; **E)** *Wesmaldra bidgemia*, female, lateral; **F)** *Zimiris doriai*, female, lateral. Endites: **G)** *Latonigena auricomis*, female, ventral; **H)** *Austrodomus scaber*, female, ventral; **I)** *Lygromma gasnieri*, female, ventral; **J)** same, dorsal, detail serrula; **K)** *Purcelliana* sp., female, dorsal; **L)** *Zimiris doriai*, female, dorsal, detail of branched setae.

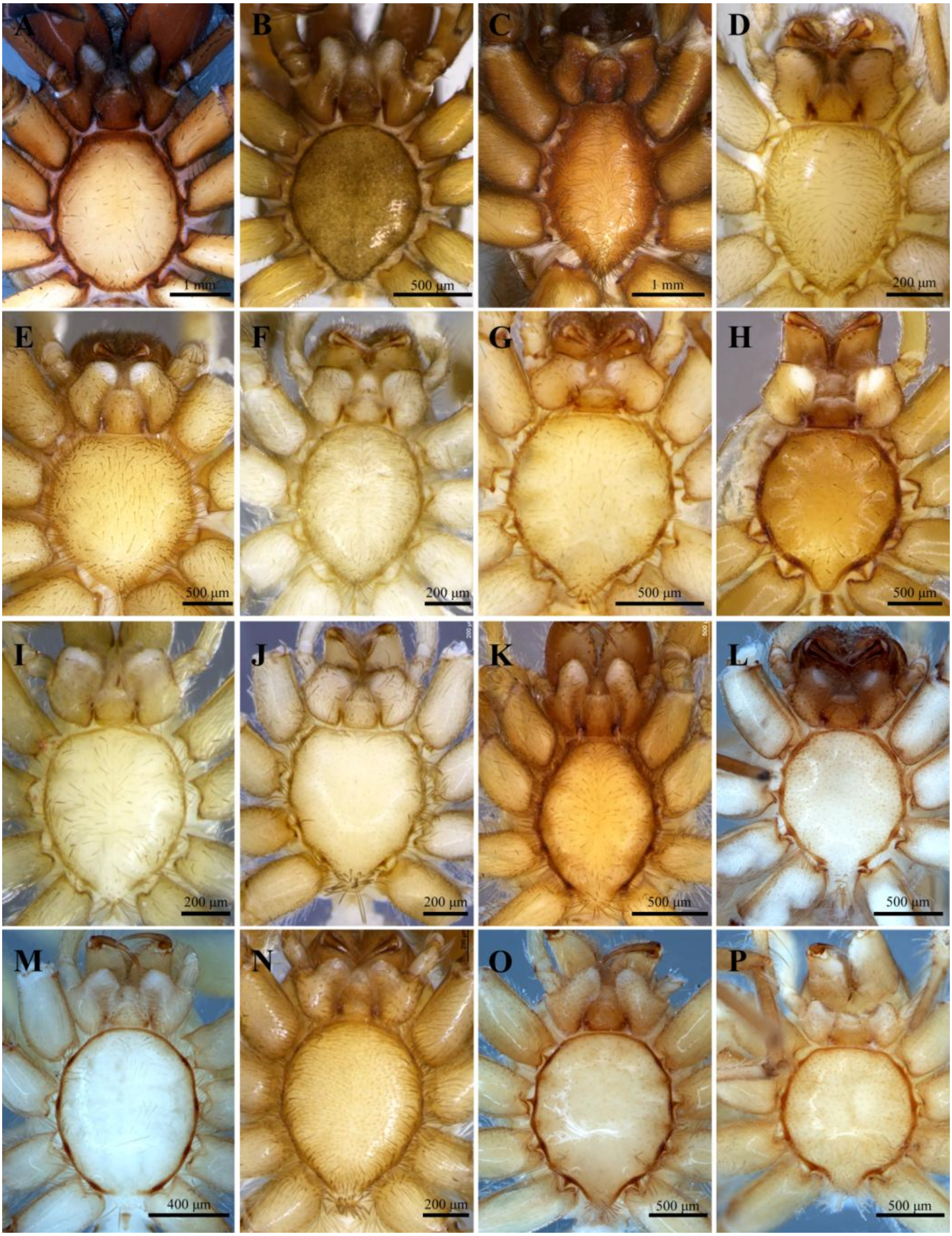

Fig. 17. Sternum. **A)** *Platyoides walteri*, female; **B)** *Gallianoela* sp., male; **C)** *Scotophaeus quadripunctatus*, male; **D)** *Anzacia mustecula*, female; **E)** *Pterotricha lentiginosa*, female; **F)** *Homoeothele micans*, male; **G)** *Wesmaldra bidgemia*, female; **H)** *Wydundra osbourne*, female; **I)** *Nopyllus* sp., male; **J)** *Lygromma gasnieri*, female; **K)** *Oltacloea beltraoe*, male; **L)** *Theuma* sp.1, male; **M)** *Austrodomus zuluensis*, female; **N)** *Eleleis* sp., female; **O)** *Zimiris doriai*, female; **P)** *Namundra* sp., female.

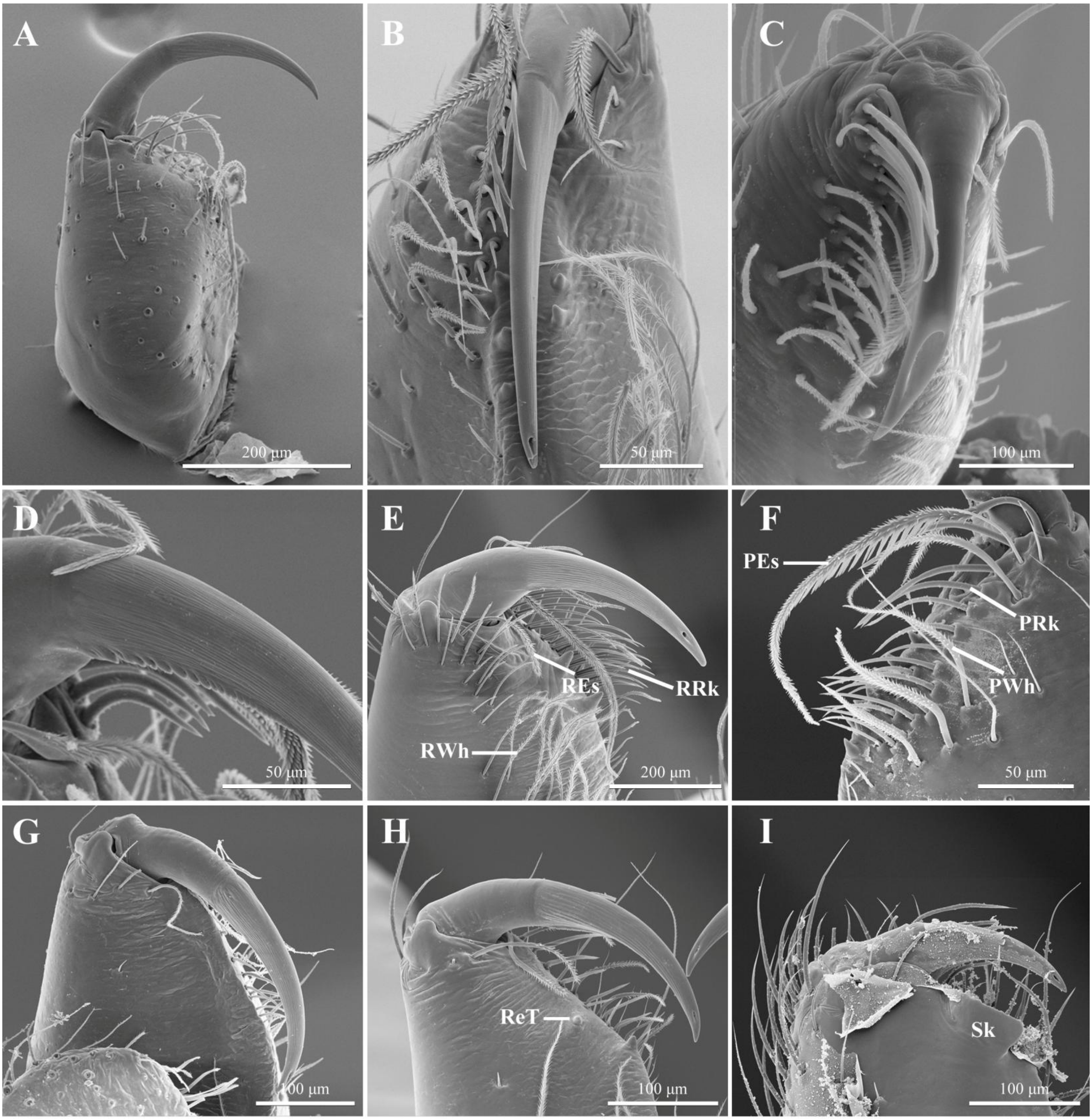

Fig. 18. Chelicerae. **A)** *Neozimiris* sp, male, promargin; **B)** *Nopyllus* sp., male, frontal; **C)** *Myandra cambridgei*, male, frontal: **D)** *Lygromma gasnieri*, male, fang shaft serrula; **E)** *Theuma* sp.2, male, retromargin; **F)** *Paracymbiomma carajas*, male, promargin; **G)** *Purcelliana* sp., female, retromargin; **H)** *Eleleis* sp., male, retromargin; **I)** *Asemesthes* sp., male, retromargin. PEs, promarginal escort seta; PRk, promarginal rake seta; PWh, promarginal whisker seta; REs, retromarginal escort seta; RRk, retromarginal rake seta; RWh, retromarginal whisker seta; ReT, reduced tooth; Sk, serrated keel.

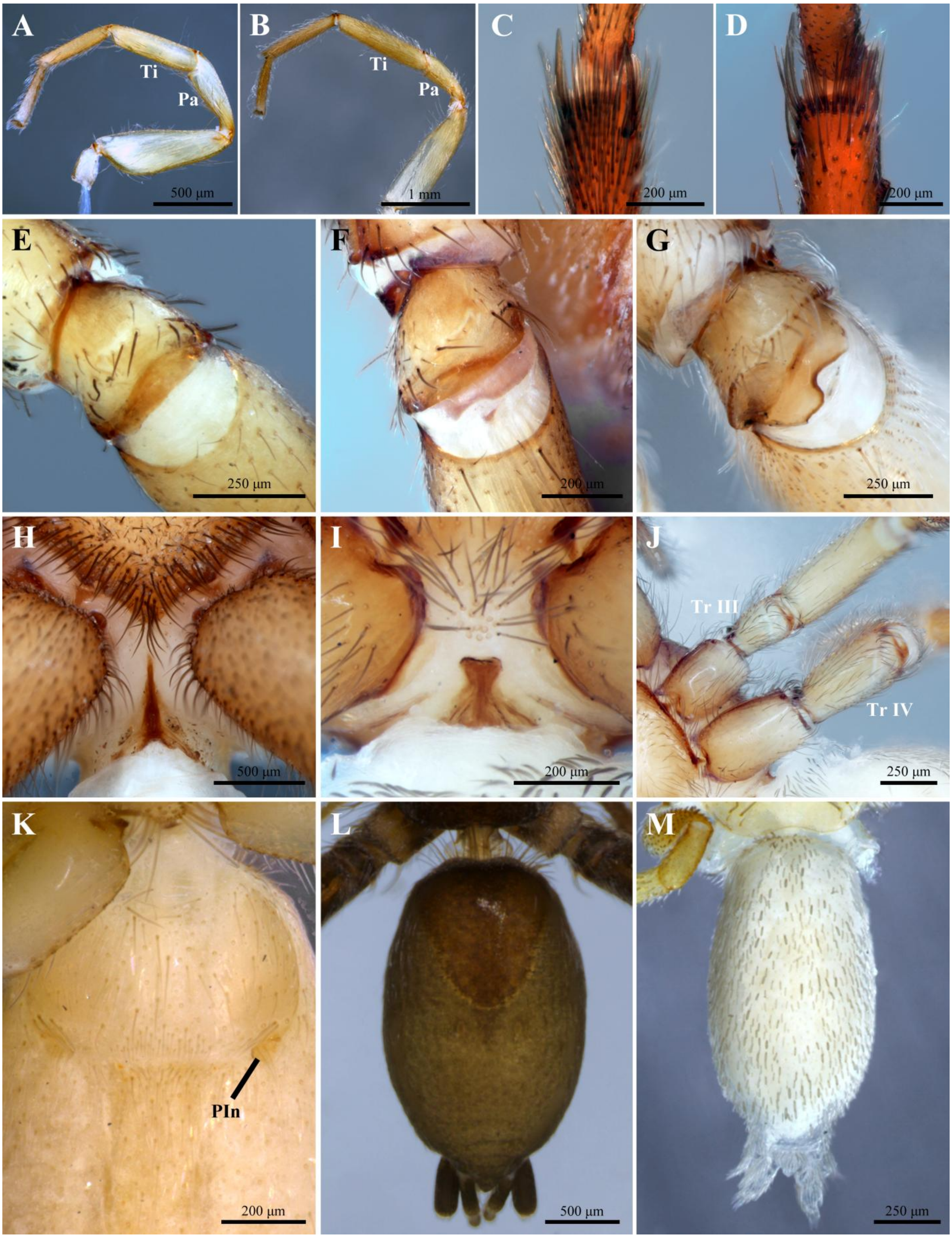

Fig. 19. A) *Austrodomus scaber*, female, leg I, prolateral; **B)** *Namundra* sp., female, leg I, retrolateral; **C)** *Falconina gracilis*, male, metatarsus I, ventral; **D)** *Urozelotes rusticus*, male, metatarsus I, ventral; **E)** *Gallionela* sp., male, trochanter I, ventral; **F)** *Falconina gracilis*, male, trochanter I, ventral; **G)** *Xiruana gracilipes*, female, trochanter I, ventral; **H)** *Pterotricha lentiginosa*, female, pedicel, ventral; **I)** *Prodidomus simoni*, female, pedicel, ventral; **J)** same, trochanter III-IV, ventral; **K)** *Paracymbiomma carajas*, male, abdomen, ventral, detail postepigastric invaginations; **L)** *Apopyllus silvestrii*, male, abdomen, dorsal; **M)** *Purcelliana problematica*, male, abdomen, dorsal. Pa, patella; Pin, postepigastric invaginations; Ti, tibia; Tr, trochanter.

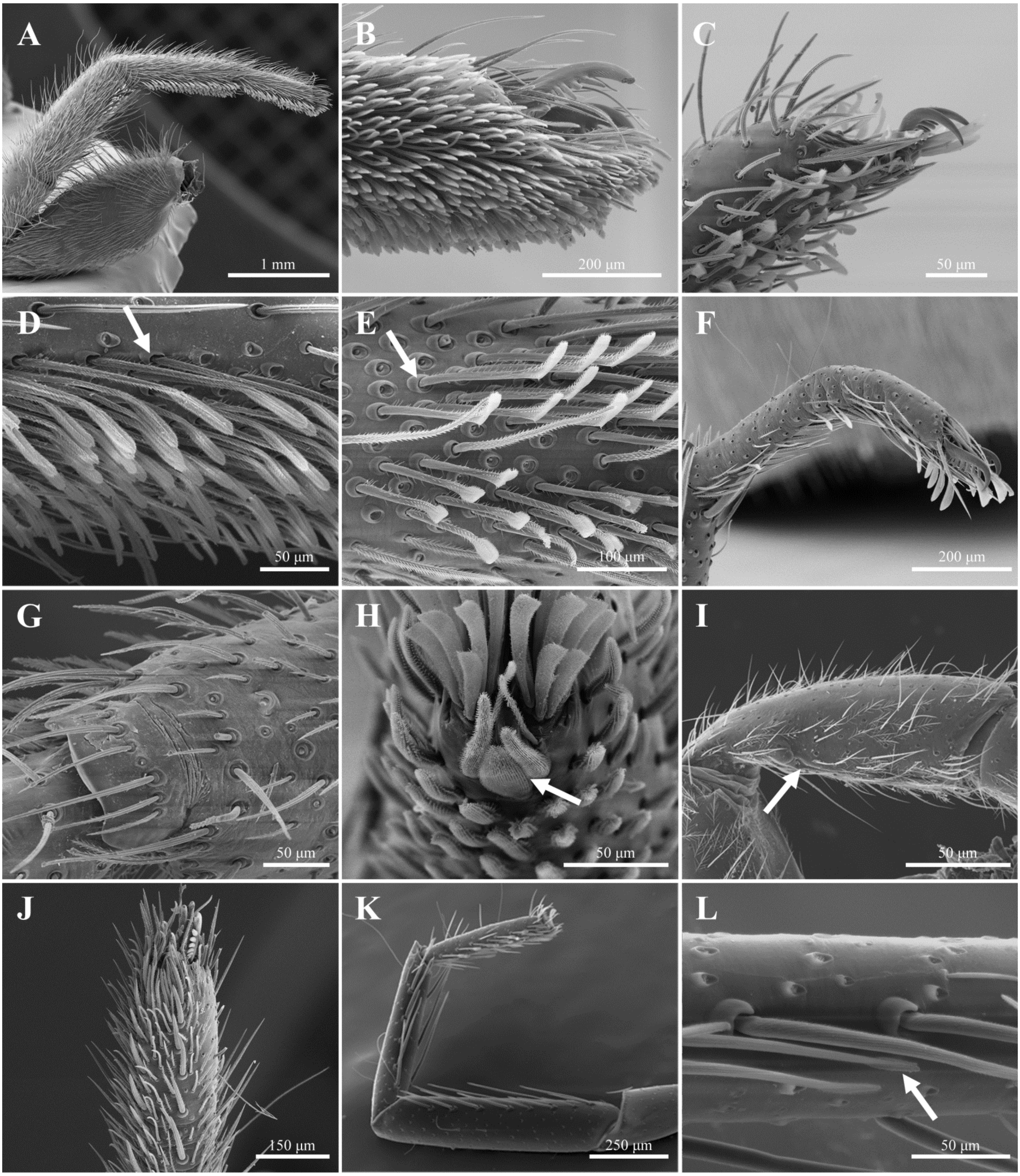

Fig. 20. **A)** *Latonigena auricomis*, female, leg I, prolateral; **B)** *Scotophaeus quadripunctatus* sp., female, tarsus I; **C)** *Tricongius beltraoe*, male, tarsus I; **D)** *Theuma* sp.1, male, tarsus I, scopulae, arrow to socket of tenent setae; **E)** *Theuma* sp.2, male, tarsus I, scopulae, arrow to socket of tenent setae; **F)** *Apopyllus silvestrii*, male, tarsus II; **G)** *Zelotes subterraneus*, male, stopper metatarsus I; **H)** *Eleleis sp.*, male, tarsus I, arrow to modified ventral setae; **I)** *Anagrina sp.*, male, patella I, arrow to indentation; **J)** *Pterotricha lentiginosa*, male, tarsus I; **K)** *Chileomma ruiles*, female, leg II; **L)** same, metatarsus II, arrow to macrosetae with apical tenent surface.

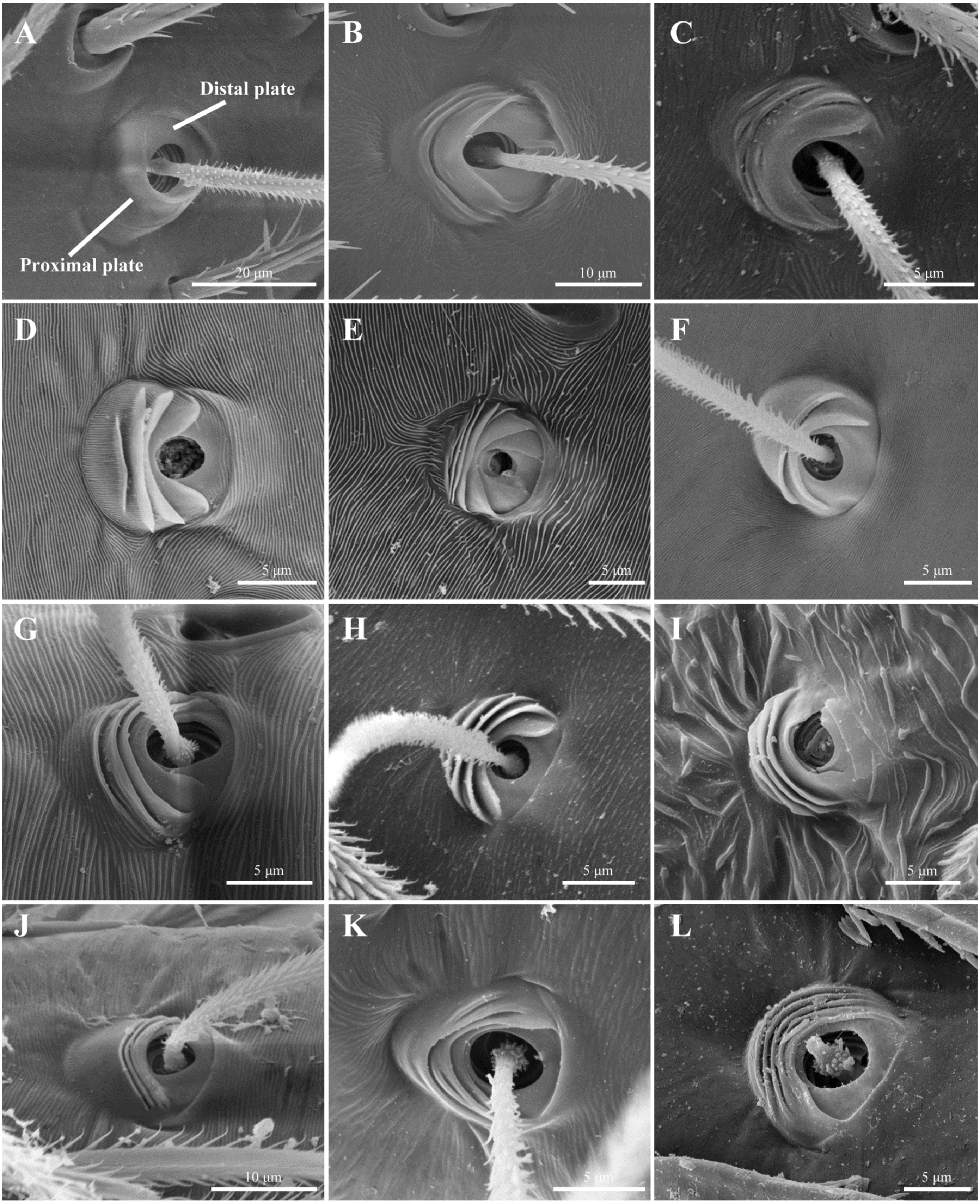

Fig. 21. Trichobotria. **A)** *Pterotricha lentiginosa*, male; **B)** *Latonigena auricomis*, female; **C)** *Asemesthes* sp., male; **D)** *Nopyllus* sp., male; **E)** *Lygromma gasnieri*, male; **F)** *Theuma* sp.2, male; **G)** *Austrodomus scaber*, male; **H)** *Eleleis* sp., male; **I)** *Purcelliana* sp., male; **J)** *Namundra* sp., female; **K)** *Myandra cambridgei*, female; **L)** *Wydundra osbourne*, female.

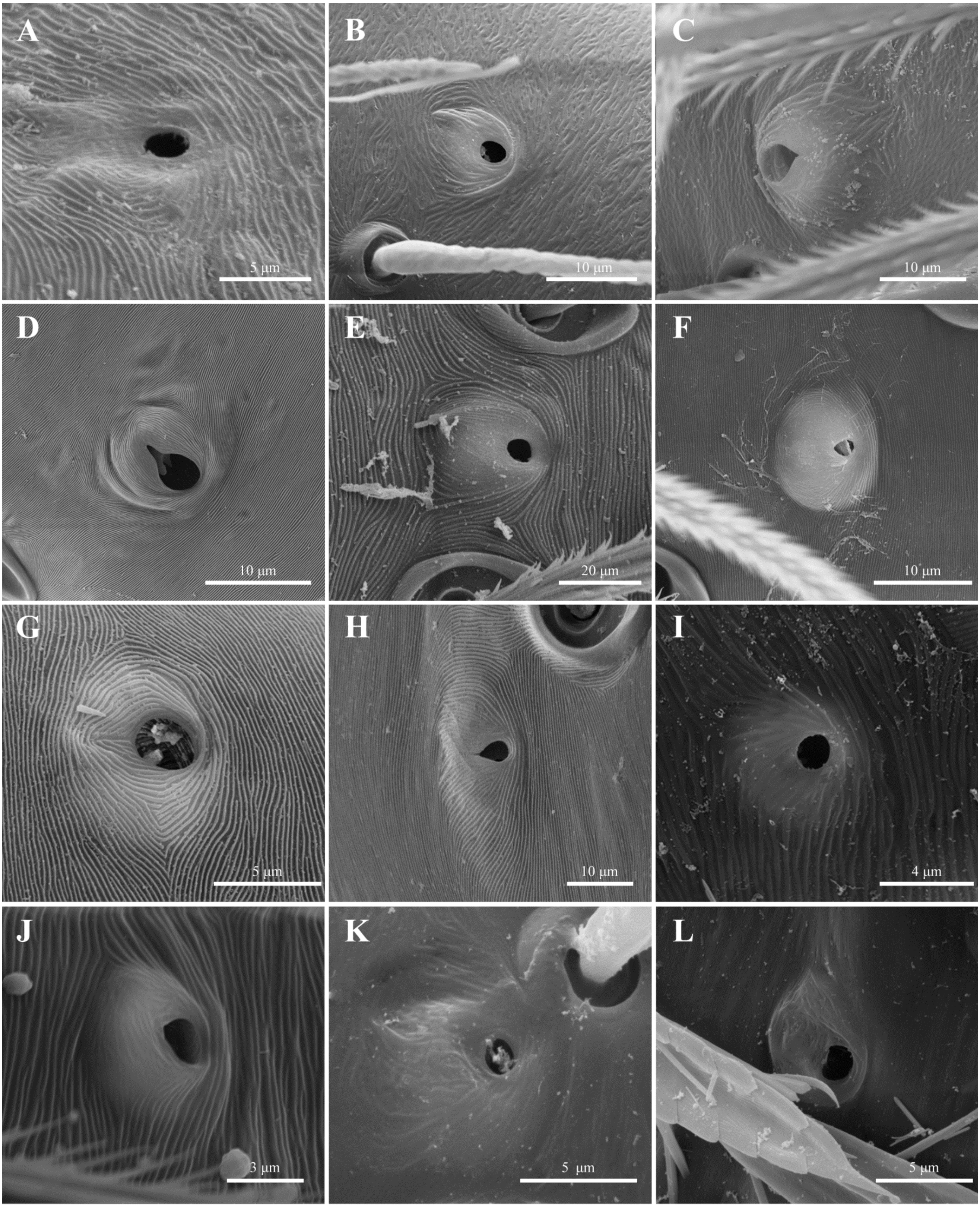

Fig. 22. Tarsal organ. **A)** *Hemicloeae sundevalli*, female; **B)** *Asemesthes* sp., male; **C)** *Latonigena auricomis*, female; **D)** *Nopyllus* sp., male; **E)** *Tricongius amazonicus*, female; **F)** *Theuma* sp.2, male; **G)** Gen.1 AFR. sp.1, male; **H)** *Neozimiris* sp., female; **I)** *Zimirina hirsuta*, female; **J)** *Namundra* sp., female; **K)** *Myandra cambridgei*, female; **L)** *Wesmaldra bidgemia*, male.

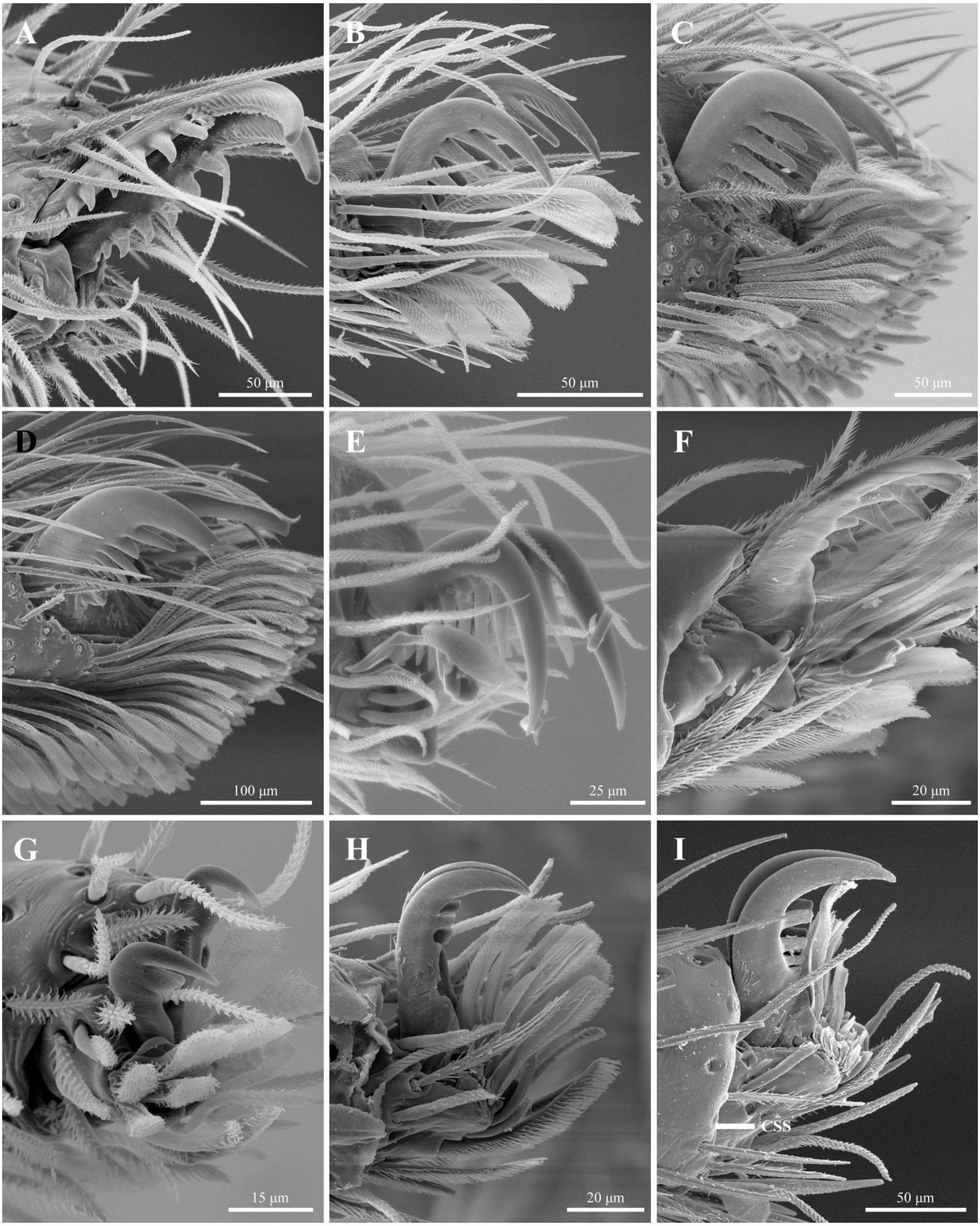

Fig. 23. Claws, leg I. **A)** *Urozelotes rusticus*, male; **B)** *Asemesthes* sp., male; **C)** *Xerophaeus appendiculatus*, male; **D)** *Scotophaeus quadripunctatus*, female; **E)** *Anagrina sp.*, female; **F)** *Cryptoerithus occultus*, female; **G)** *Myandra cambridgei*, female; **H)** *Wesmaldra bidgemia*, male; **I)** *Wydundra osbourne*, female. CSS, claw slit suture.

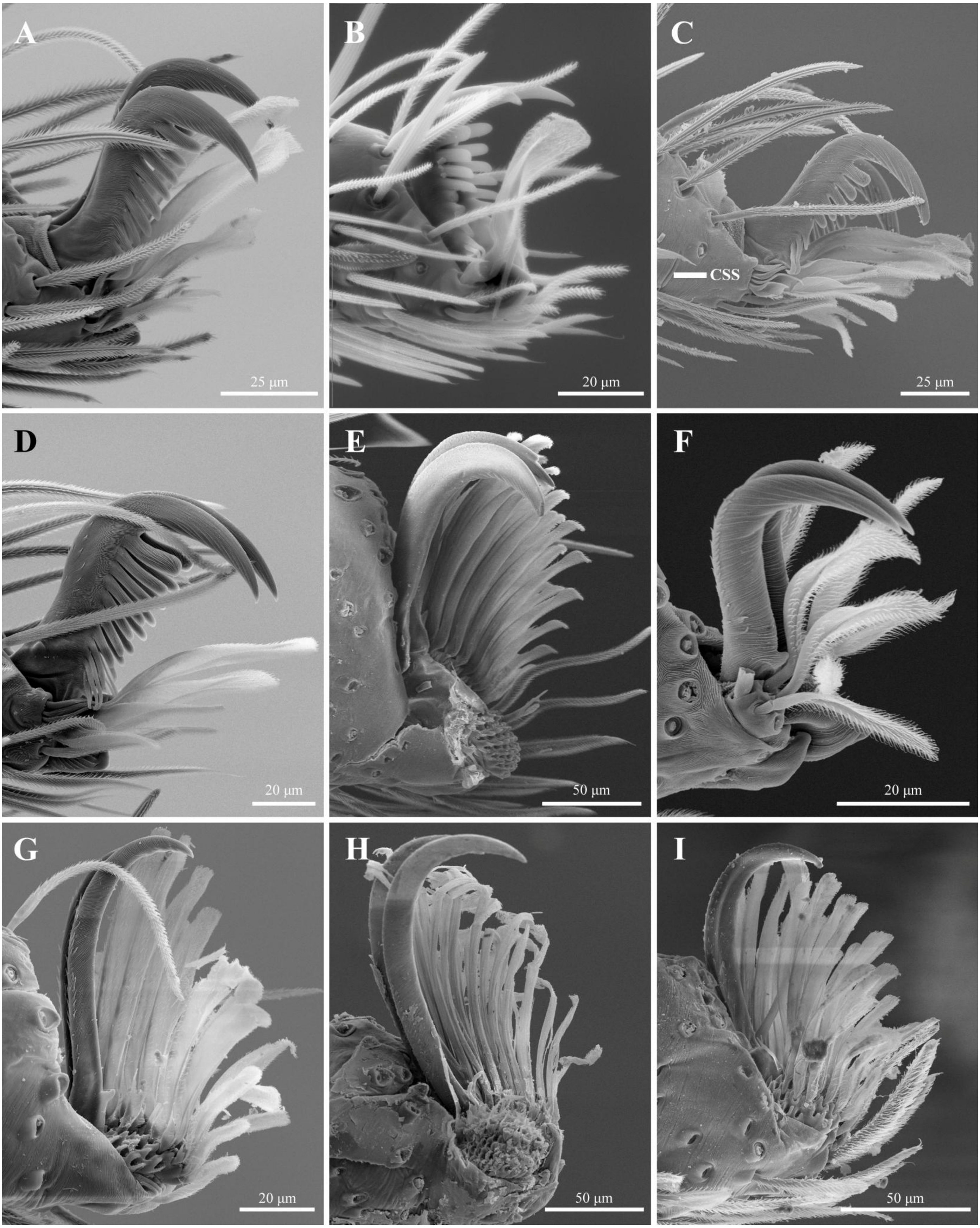

Fig. 24. Claws, leg I. **A)** *Nopyllus* sp., male, leg I; **B)** *Chileomma ruiles*, male, leg II; **C)** *Tricongius amazonicus*, female, leg I; **D)** *Paracymbiomma carajas*, male, leg II; **E)** *Theuma* sp.1, male, leg I; **F)** Gen.1 AFR. sp.1, male, leg I; **G)** *Zimirina hirsuta*, male, leg I; **H)** *Zimiris doriai*, female, leg I; **I)** *Namundra* sp., female, leg I. CSS, claw slit suture.

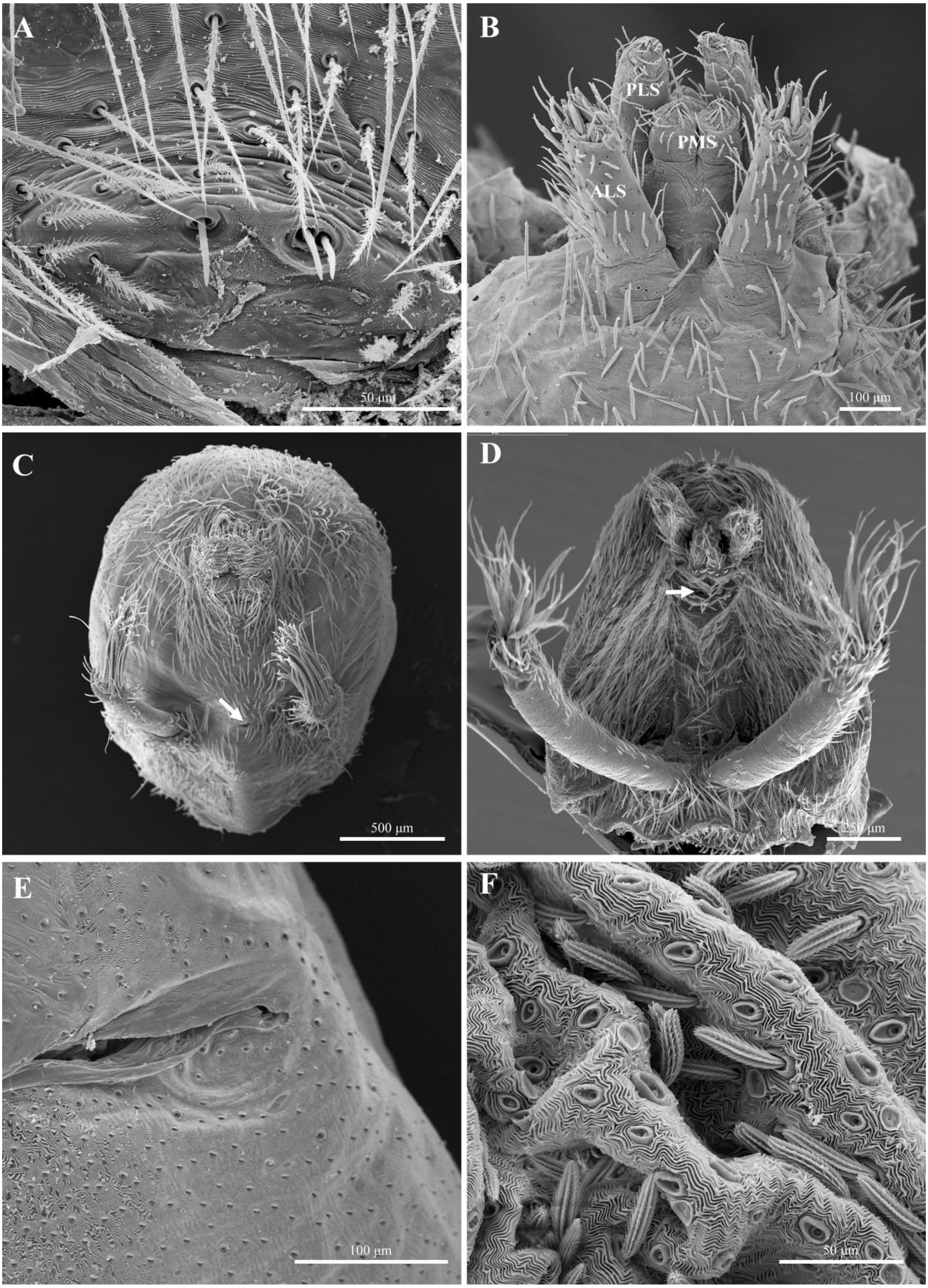

Fig. 25. **A)** *Leptodrassex* sp., male, abdomen, epiandrous spigots; **B)** *Tricongius amazonicus*, female, spinnerets; **C)** *Namundra* sp., female, abdomen, arrow to tracheal spiracle; **D)** *Molycria mammosa*, female, abdomen, arrow to tracheal spiracle; **E)** *Lygromma gasnieri*, female, abdomen, postepigastric invagination; **F)** *Purcelliana* sp., male, abdomen, clavate setae. ALS, anterior lateral spinnerets; PLS, posterior lateral spinnerets; PMS, posterior median spinnerets.

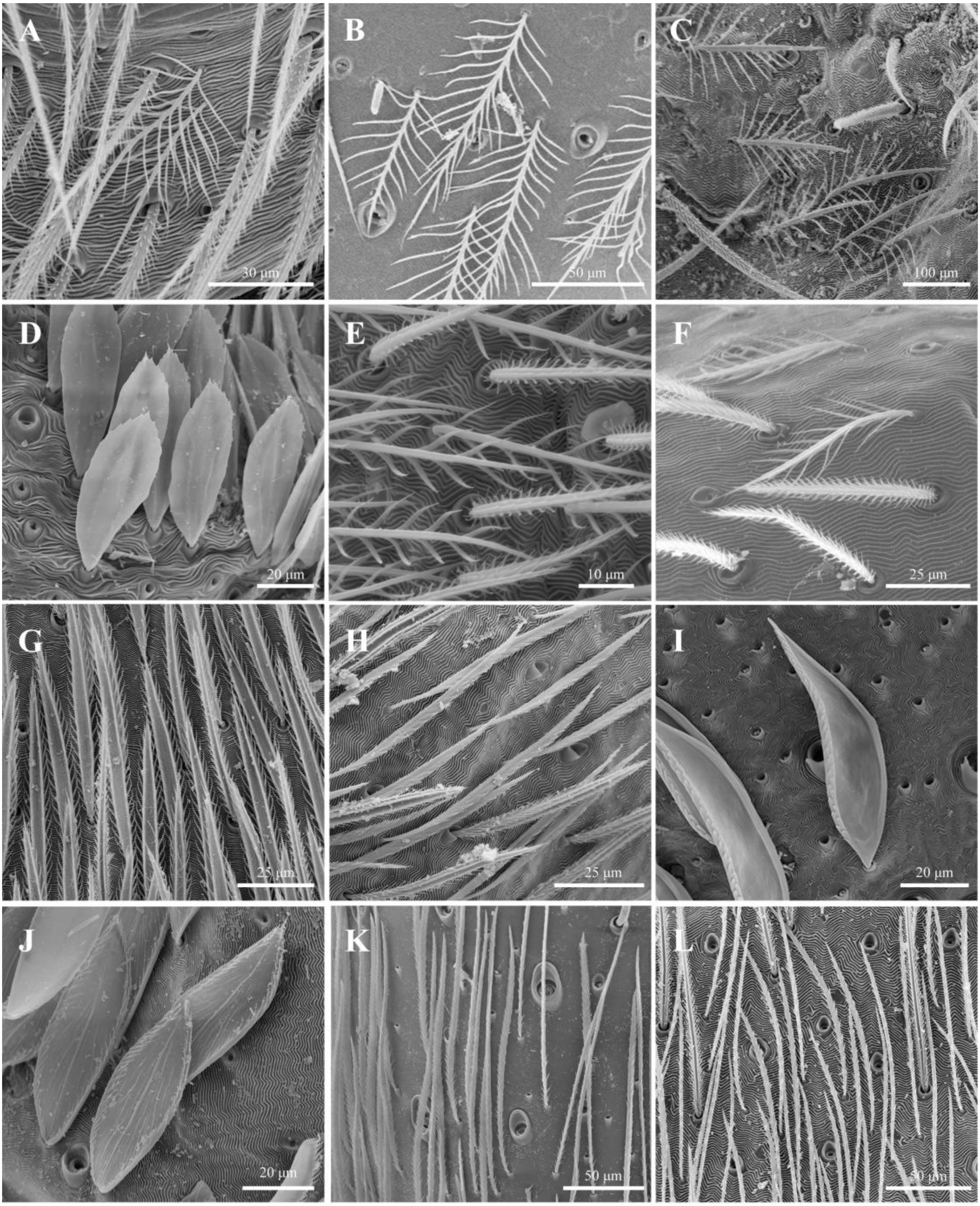

Fig. 26. Plumose and squamose setae, abdomen. **A)** *Apopyllus silvestrii*, female; **B)** *Asemesthes* sp., male; **C)** *Cryptoerithus occultus*, female; **D)** *Wesmaldra bidgemia*, male; **E)** *Myandra cambridgei*, female; **F)** *Nomindra kinchega*, female; **G)** *Tricongius beltraoe*, male; **H)** *Moreno ramirezi*, male; **I)** *Paracymbiomma carajas*, male; **J)** *Lygromma gasnieri*, male; **K)** *Theuma* sp.1, male; **L)** *Namundra* sp., female.

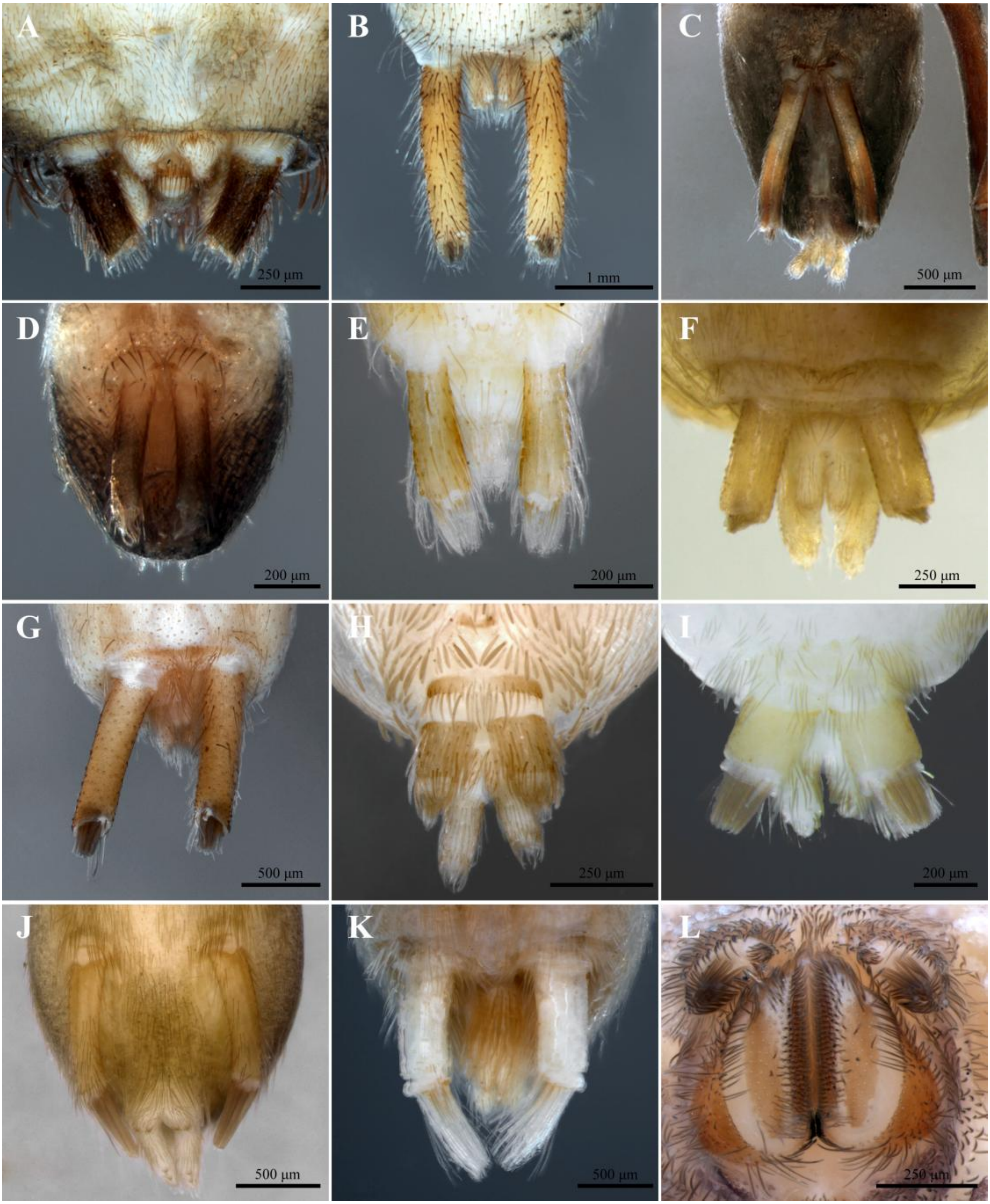

Fig. 27. Spinnerets, ventral (except figure L). **A)** *Vectius niger*, female; **B)** *Pterotricha lentiginosa*, female; **C)** *Molycria mammosa*, female; **D)** *Myandra cambridgei*, female; **E)** *Lygromma gasnieri*, male; **F)** *Chilongius palmas*, female; **G)** *Theuma* sp.1, male; **H)** *Eleleis* sp., female; **I)** *Austrodomus zuluensis*, female; **J)** *Namundra* sp., female; **K)** *Zimiris doriai*, female; **L)** *Prodidomus simoni*, female, apical.

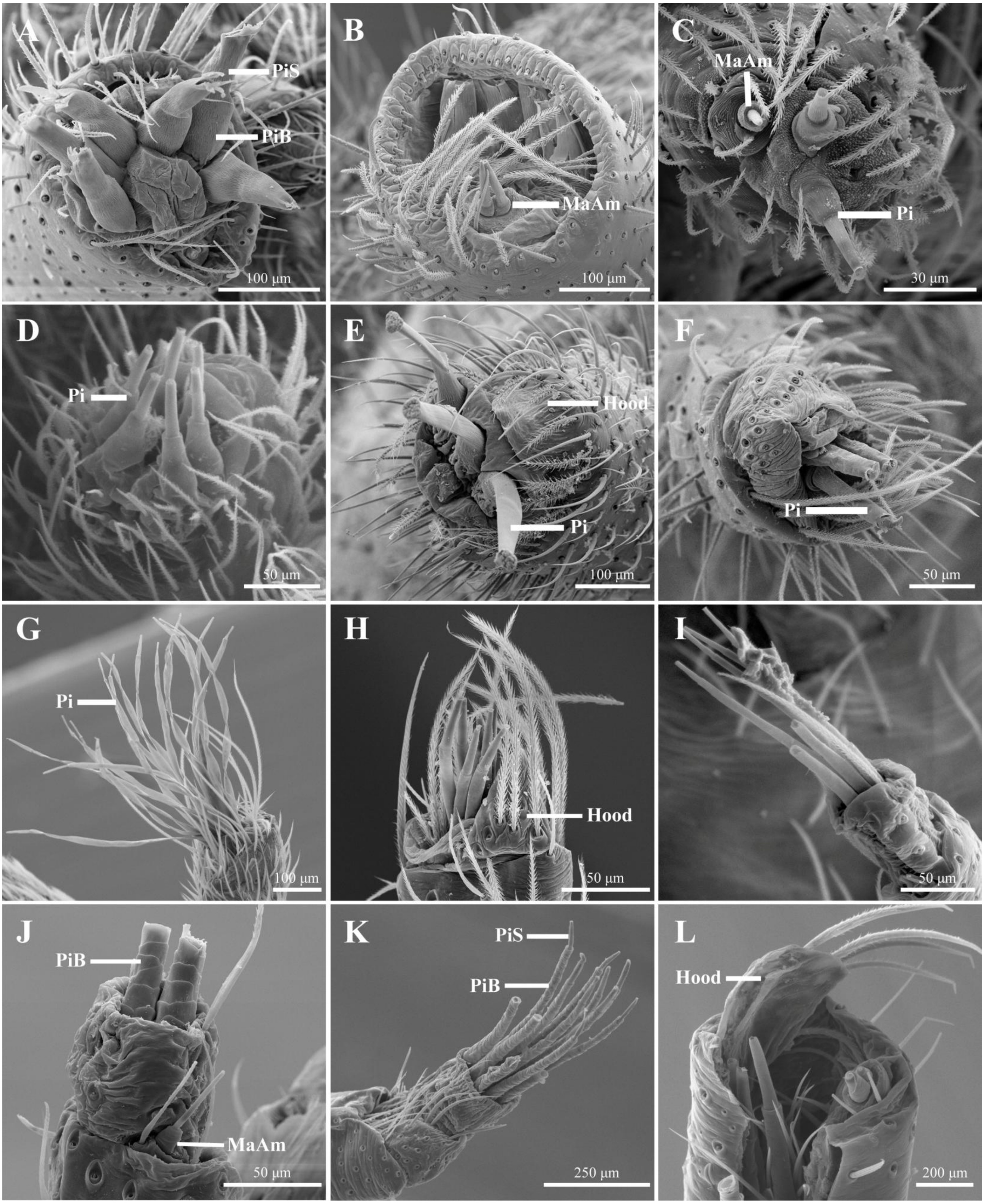

Fig. 28. Spinnerets, ALS. **A)** *Urozelotes rusticus*, male; **B)** *Latonigena auricomis*, female; **C)** *Leptodrassex* sp., male; **D)** *Anagrina* sp., male; **E)** *Asemesthes* sp., female; **F)** *Cryptoerithus occultus*, female; **G)** *Molycrina mammosa*, female; **H)** *Myandra cambridgei*, male; **I)** *Nomindra kinchega*, female; **J)** *Wesmaldra bidgemia*, male; **K)** *Wydundra osbourne*, female; **L)** same, detail of hood. MaAm, major ampullate gland spigots; Pi, piriform gland spigots; PiB, piriform spigot base; PiS, piriform spigot shaft.

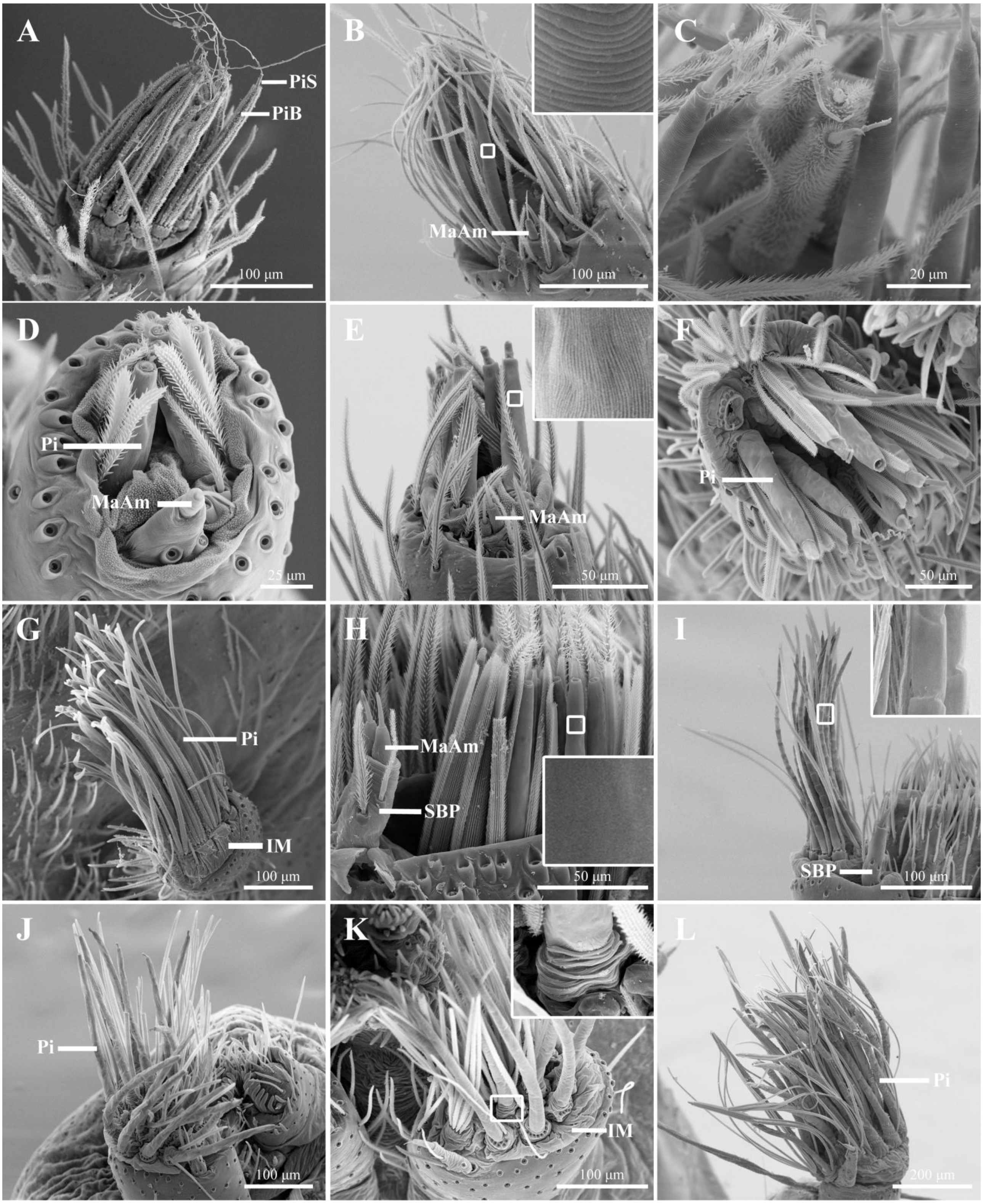

Fig. 29. Spinnerets, ALS. **A)** *Lygromma gasnieri*, male; **B)** same, female, detail texture of base of piriform gland spigots; **C)** same, central spigot with plumose base; **D)** *Nopyllus* sp., male; **E)** *Tricongius beltraoe*, male, detail texture of base of piriform gland spigots; **F)** *Theuma* sp.2, female; **G)** *Namundra* sp., female; **H)** *Eleleis* sp., male, detail texture of base of piriform gland spigots; **I)** Gen.2 AFR. sp.1, female, detail texture of base of piriform gland spigots; **J)** *Neozimiris* sp., female; **K)** *Zimirina hirsuta*, female, detail insertion annulate of piriform gland spigots; **L)** *Zimiris doriai*, female. IM, inflatable membrane; MaAm, major ampullate gland spigots; Pi, piriform gland spigots; PiB, piriform spigot base; PiS, piriform spigot shaft; SBP, setae bearing projection.

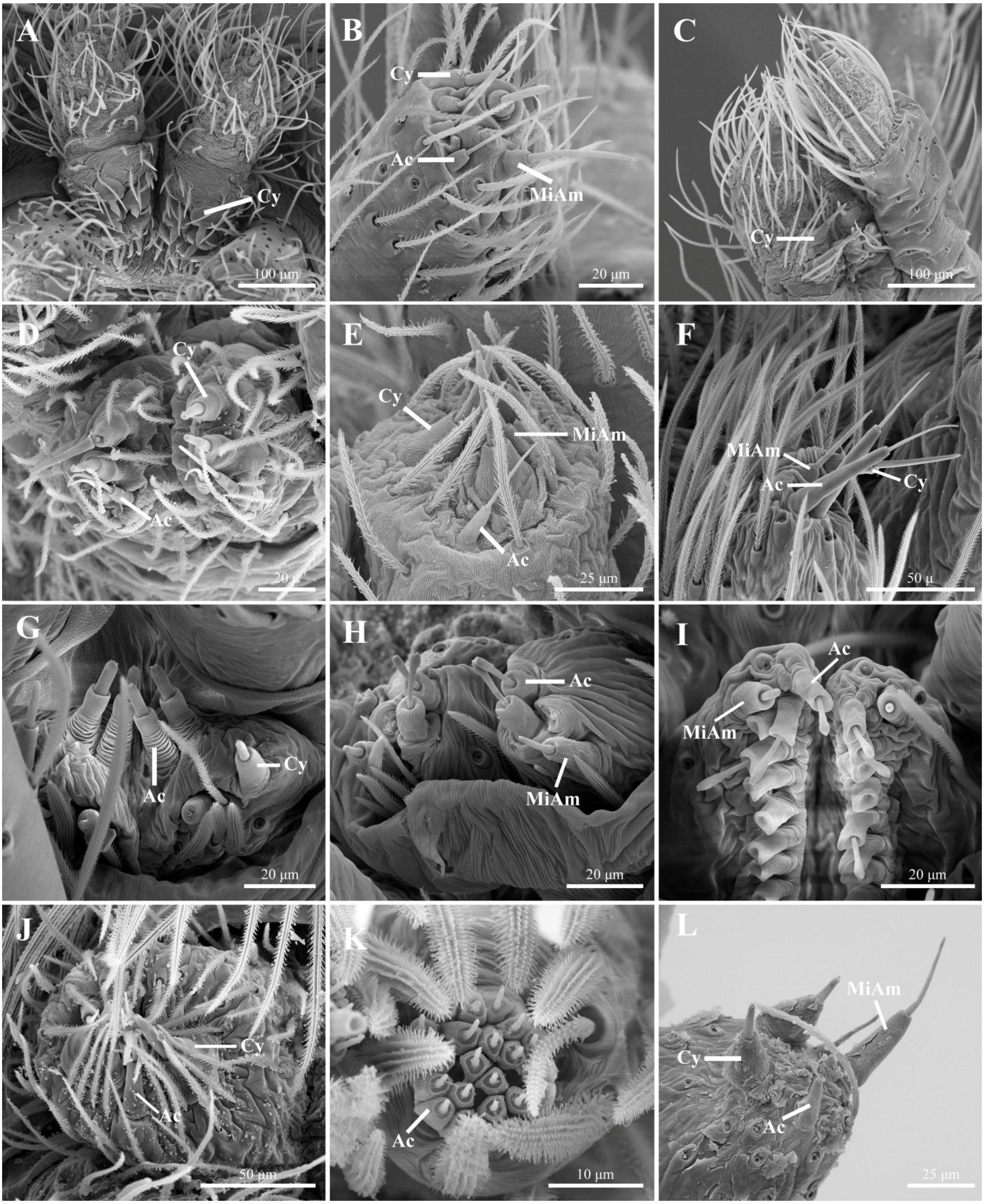

Fig. 30. Spinnerets, PMS, female. **A)** *Apopyllus silvestrii*; **B)** *Leptodrassex* sp.; **C)** *Cryptoerithus occultus*; **D)** *Myandra cambridgei*; **E)** *Tricongius amazonicus*; **F)** *Theuma* sp.1; **G)** *Neozimiris* sp.; **H)** *Austrodomus scaber*; **I)** *Prodidomus wooldleigh*; **J)** *Namundra* sp.; **K)** *Zimirina hirsuta*; **L)** *Zimiris doriai*. Ac, aciniform gland spigot; MiAm, minor ampullate gland spigot; Cy, cylindrical gland spigot.

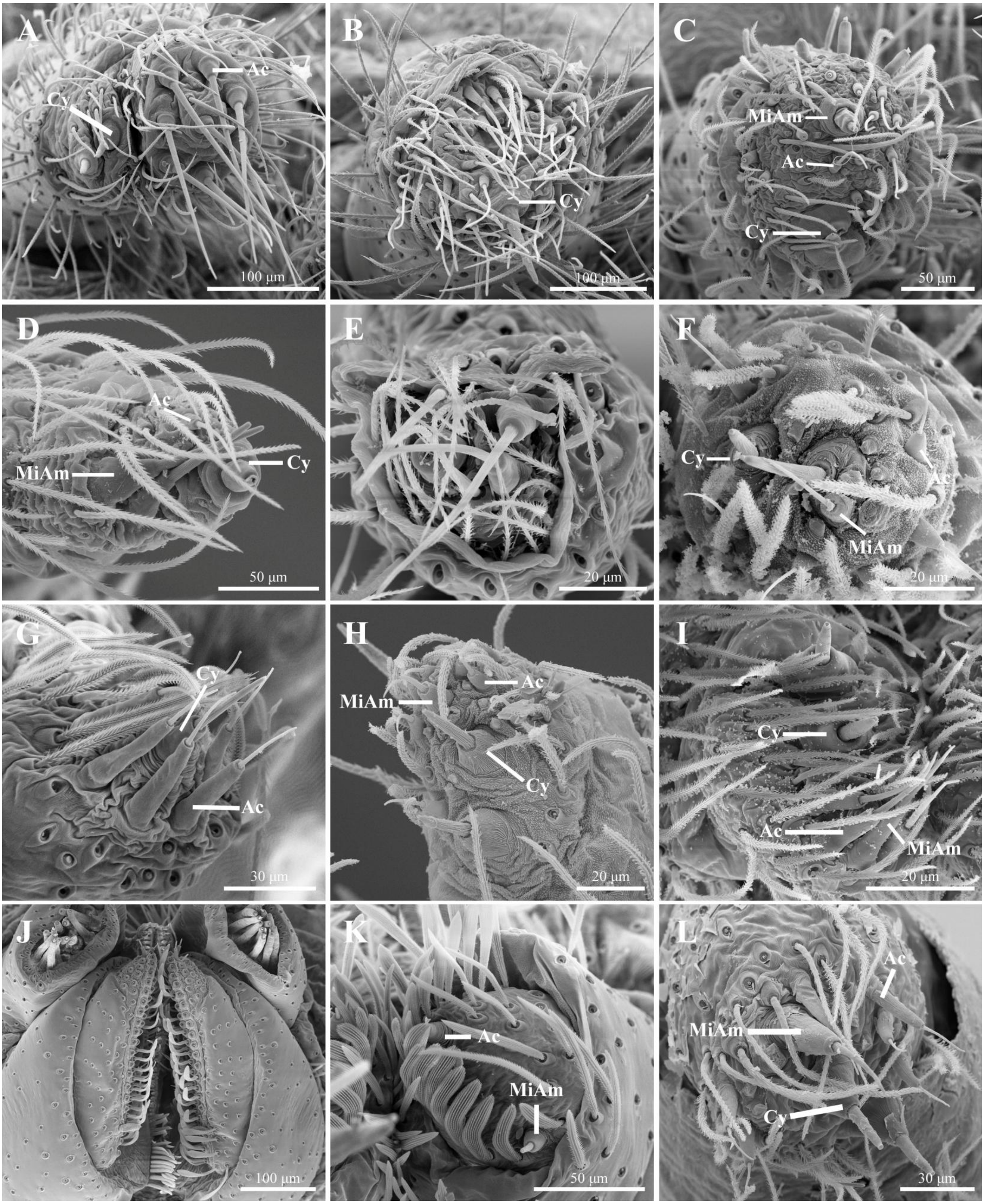

Fig. 31. Spinnerets, PLS, female. **A)** *Asemesthes* sp.; **B)** *Latonigena auricomis*; **C)** *Apopyllus silvestrii*; **D)** *Cryptoerithus occultus*; **E)** *Wesmaldra bidgemia*; **F)** *Lygromma gasnieri*; **G)** *Theuma* sp.1; **H)** *Tricongius amazonicus*; **I)** *Namundra* sp.; **J)** *Prodidomus wooldleigh*; **K)** *Neozimiris* sp.; **L)** *Zimiris doriai*. Ac, aciniform gland spigot; MiAm, minor ampullate gland spigot; Cy, cylindrical gland spigot.

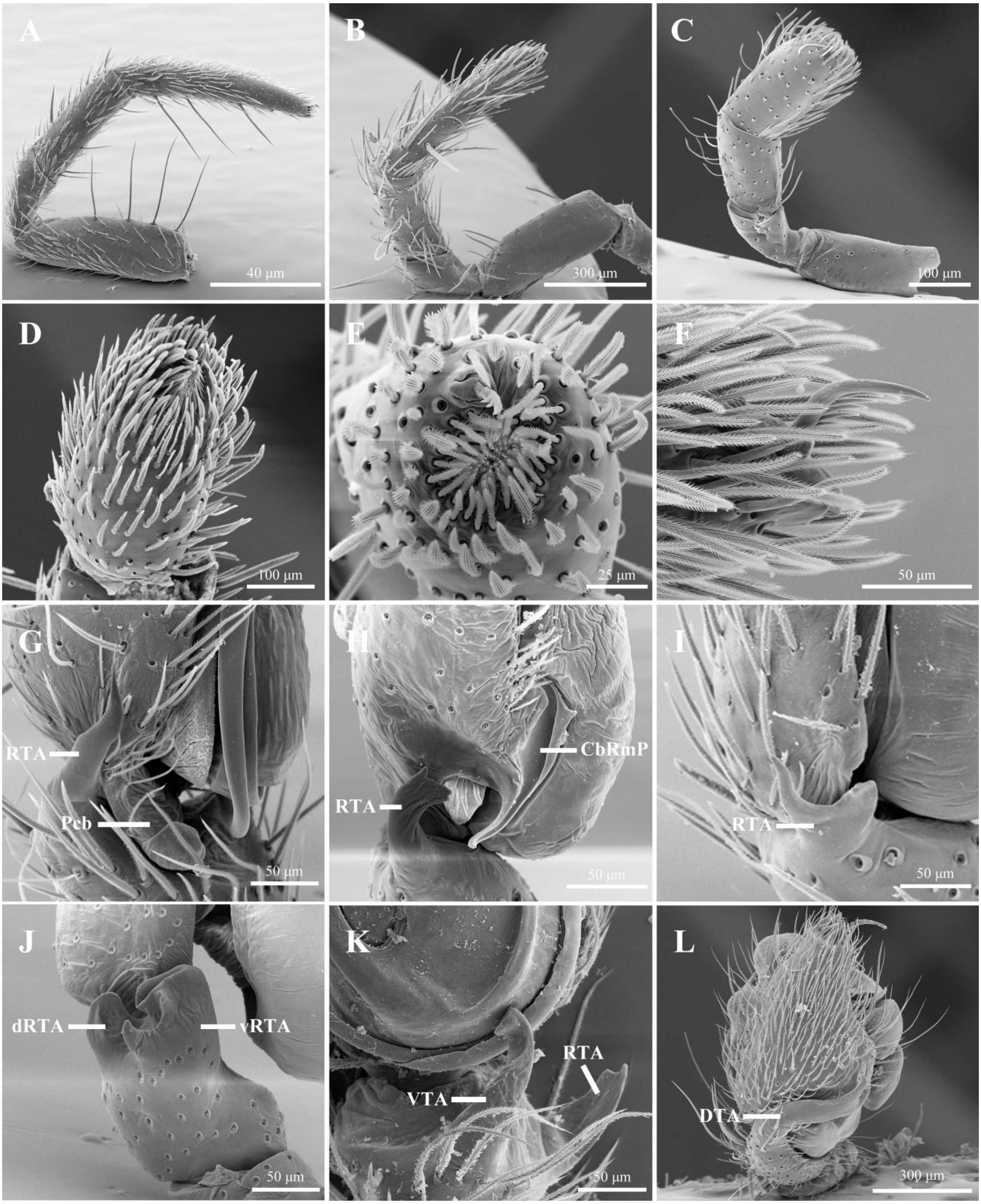

Fig. 32. Female pedipalp. **A)** *Wesmaldra bidgemia*, retrolateral; **B)** *Namundra* sp., retrolateral; **C)** Gen.2 AFR. sp.1, retrolateral; **D)** *Eleleis* sp., tarsus; **E)** *Neozimiris* sp., tarsus; **F)** *Theuma* sp.2, tarsus. Male palp, RTA. **G)** *Paracymbiomma carajas*; **H)** *Zimirina hirsuta*; **I)** *Moreno ramirezi*; **J)** *Prodidomus wooldleigh*; **K)** *Lygromma gasnieri*; **L)** *Asemesthes* sp. CbRmP, cymbial retromedian process; dRTA, dorsal retrolateral tibial apophysis; DTA, dorsal tibial apophysis; Pcb, paracymbium; RTA, retrolateral tibial apophysis; vRTA, ventral retrolateral tibial apophysis; VTA, ventral tibial apophysis.

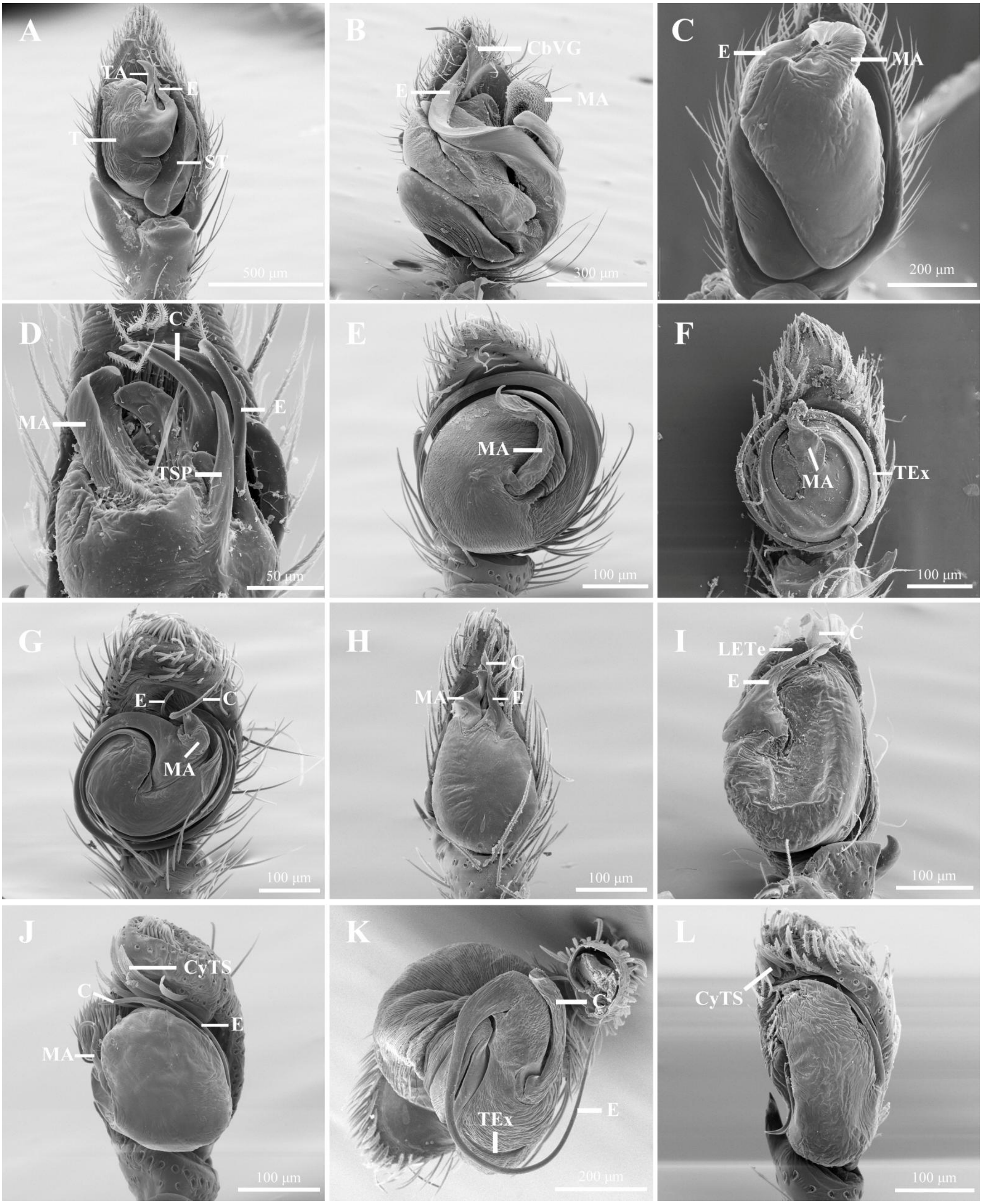

Fig. 33. Male palp, ventral. **A)** *Urozelotes rusticus*; **B)** *Asemesthes* sp.; **C)** *Anagrina* sp.; **D)** *Myandra cambridgei*; **E)** *Tricongius beltraoe*; **F)** *Lygromma gasnieri*; **G)** *Paracymbiomma carajas*; **H)** *Moreno ramirezi*; **I)** *Austrodomus scaber*; **J)** *Neozimiris* sp.; **K)** *Eleleis* sp.; **L)** *Zimirina hirsuta*. C, conductor; CbTS, cymbial thick setae; CbVG, cymbial ventral groove; E, embolus; LETe, laminar extension of tegulum; MA, median apophysis; T, tegulum; TA, terminal apophysis; TEx, tegular excavation; TSP, tegular spine-like process.

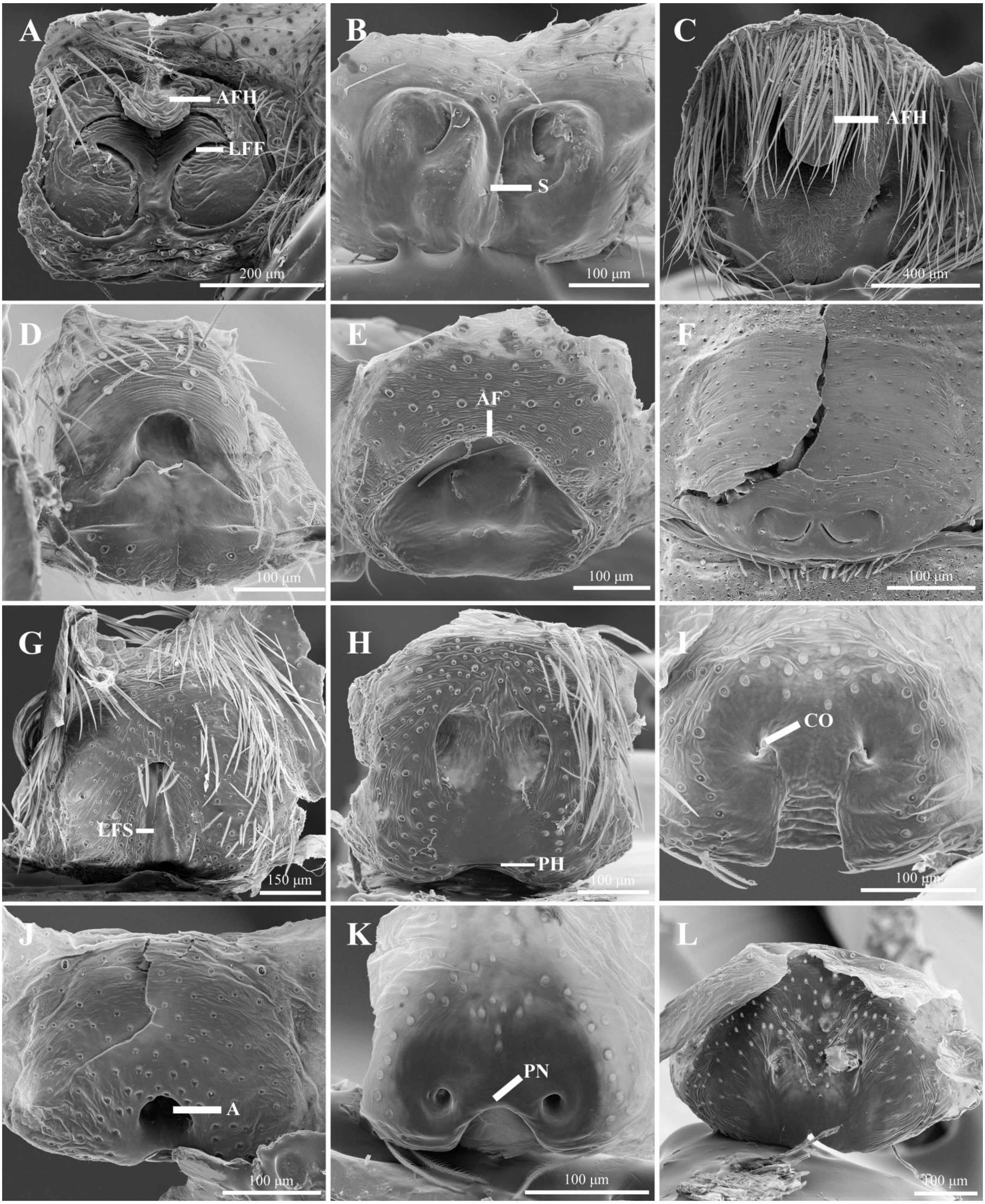

Fig. 34. Female epigyne. **A)** *Asemesthes* sp.; **B)** *Leptodrassex* sp.; **C)** *Xerophaeus appendiculatus*; **D)** *Myandra cambridgei*; **E)** *Wesmaldra bidgemia*; **F)** *Lygromma gasnieri*; **G)** *Theuma* sp.1; **H)** *Theuma* sp.2; **I)** *Purcelliana* sp.; **J)** *Eleleis* sp.; **K)** *Zimirina hirsuta*; **L)** *Zimiris doriai*. A, atrium; AF, anterior fold; AFH, anterior fold hood; CO, copulatory opening; LFF, lateral fold furrow; LFS, lateral fold suture; PH, posterior hood; PN, posterior notched; S, septum.

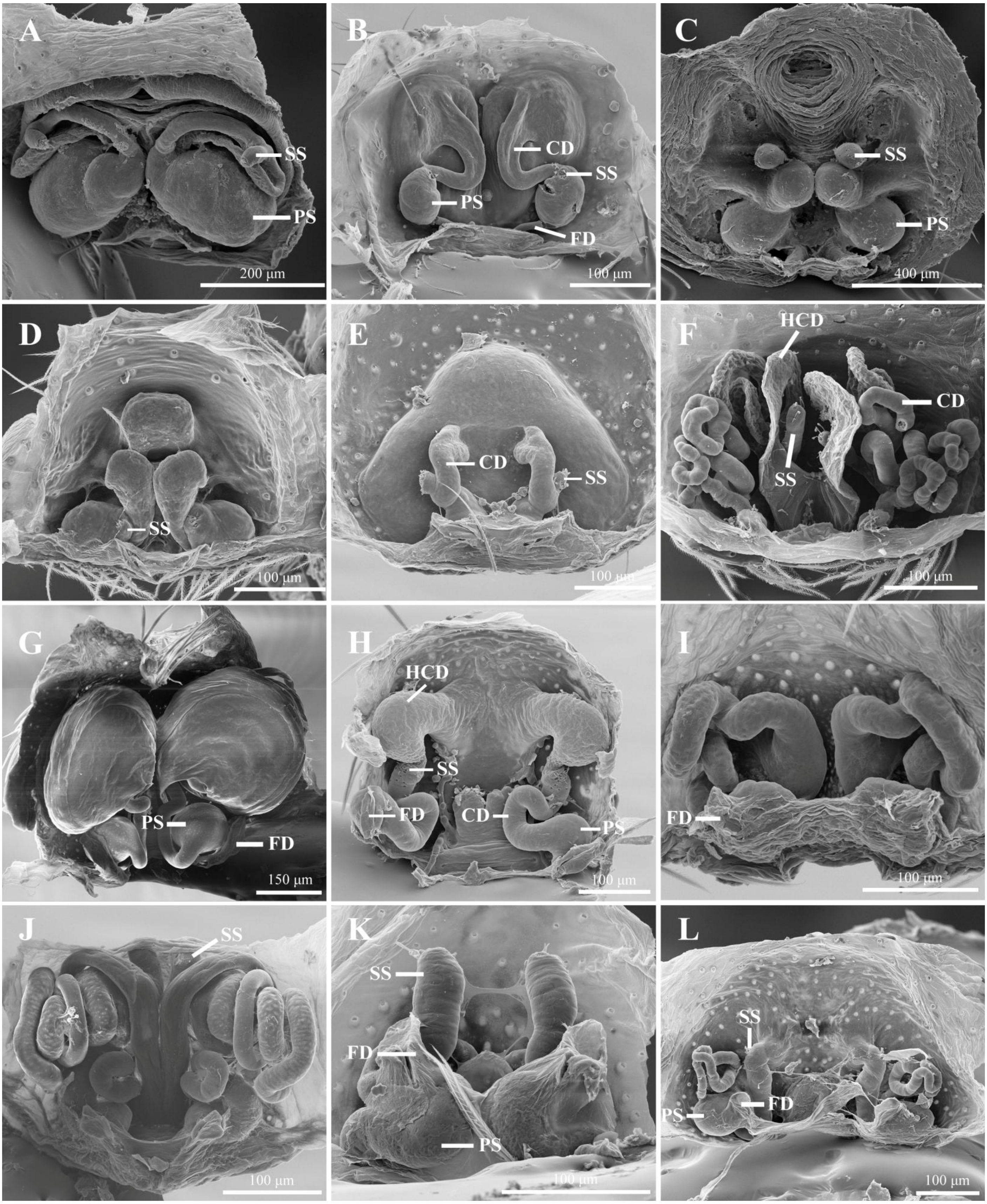

Fig. 35. Female vulva. **A)** *Asemesthes* sp.; **B)** *Leptodrassex* sp.; **C)** *Xerophaeus appendiculatus*; **D)** *Myandra cambridgei*; **E)** *Wesmaldra bidgemia*; **F)** *Paracymbiomma carajas*; **G)** *Theuma* sp.1; **H)** *Theuma* sp.2; **I)** *Purcelliana* sp.; **J)** *Eleleis* sp.; **K)** *Zimirina hirsuta*; **L)** *Zimiris doriai*. CD, copulatory duct; FD, fertilization duct; HCD, hyaline duct copulatory; PS, primary spermathecae; SS, secondary spermathecae.

MATRIX

TAXON/CHARACTER	0	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
Xiruana gracilipes	1	1	1	0	0	1	0	0	-	0	-	1	0	?	?	?	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	1	1
Teminius insularis	1	1	1	0	0	1	0	0	-	?	?	?	?	?	?	?	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	-	-	1	1	0	1	0	1	0	0	0	1	1
Falconina gracilis	1	1	1	0	0	1	1	0	-	0	-	0	-	-	-	-	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	1	0
Gallianoela sp.	1	1	1	0	1	1	0	0	-	0	-	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	?	1	1	-	1	0	-	-	0	1	1	1	1	1	0	0	0	0	0
Cithaeron praedonius	1	1	1	0	0	1	0	0	-	0	-	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	1	1	0	1	0	0	0	1	1
Lampona cylindrata	1	1	0	0	0	1	0	0	-	1	0	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	0	1
Phrurolithus festivus	1	1	0	0	0	0	-	0	-	0	-	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	?	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	1	1
Platyoides walteri	1	1	0	1	1	0	-	0	-	0	-	1	0	0	-	0	1	1	1	1	0	0	0	0	0	0	?	1	?	0	1	0	0	1	0	1	0	0	-	-	0	1	1	0	1	1	0	1	0	0	0
Anagraphis pallens	1	1	1	0	0	1	0	0	-	0	-	1	1	0	-	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	1	1	0	1	0	0	0	1	1
Anzacia mustecula	1	1	1	0	0	1	0	0	-	0	-	1	1	0	-	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	?	1	0	0	1	0	-	-	0	1	1	1	0	1	0	0	0	1	1
Apopyllus silvestrii	1	1	1	0	0	1	0	0	-	1	0	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	0	1	0	1	0	0	0	1	1
Asemesthes sp.	1	1	1	0	0	0	-	0	-	1	1	0	-	-	-	-	1	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	?	1	0	0	1	0	-	-	0	1	0	1	0	1	0	0	1	0	0
Drassodes lapidosus	1	1	1	0	0	1	0	0	-	1	0	0	-	-	-	-	1	0	1	0	0	0	0	0	1	1	0	1	0	0	1	0	?	1	0	0	1	0	-	-	1	1	0	1	0	1	0	0	0	1	1
Drassodex hypocrita	1	1	1	0	0	1	0	0	-	1	0	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	?	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	1	1
Drassyllus fallens	1	1	1	0	0	1	0	0	-	0	-	0	-	-	-	-	1	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	0	1	0	1	0	0	0	1	1
Encoptarthria echemophthalma	1	1	0	0	0	1	0	0	-	1	0	0	-	-	-	-	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	?	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	1	1
Gnaphosa lucifuga	1	1	1	0	0	1	0	0	-	0	-	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	0	1	0	1	0	0	1	1	0
Hemicloea sundevalli	0	1	0	1	1	1	0	0	-	1	0	0	-	-	-	-	1	1	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	1	0	0	-	-	0	1	1	1	0	1	0	0	0	1	1
Homoeothele micans	1	1	1	0	0	1	0	0	-	0	-	1	1	?	?	?	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	?	1	0	0	1	0	-	-	0	1	1	1	0	1	0	0	0	?	1
Hypodrassodes maoricus	1	1	?	0	0	1	0	0	-	0	-	1	1	1	?	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	1	1	?	1	?	0	0	1	1
Latonigena auricomis	1	1	1	0	0	1	?	0	-	1	1	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	1	0	-	-	1	1	1	1	0	1	0	0	0	1	1
Leptodrassex sp.	1	1	1	0	2	0	-	0	-	0	-	1	1	?	?	?	1	0	1	0	0	0	0	1	0	1	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	1	1	0	1	0	0	0	1	1
Micaria fulgens	1	1	1	0	0	1	0	0	-	0	-	?	?	?	?	?	1	0	1	0	0	0	0	0	0	0	?	1	0	0	1	0	?	1	0	0	1	0	-	-	0	1	1	1	0	1	0	0	0	1	1
Neodrassex aureus	1	1	1	0	2	0	-	0	-	0	-	1	1	?	?	?	1	0	1	0	0	0	0	1	0	1	0	1	0	0	1	0	?	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	1	1
Nopyllus sp.	1	1	1	0	0	0	-	0	-	0	-	1	0	?	?	?	1	0	1	0	0	0	0	0	1	1	0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Pterotricha lentiginosa	1	1	1	0	0	1	0	0	-	1	1	0	-	-	-	-	1	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	0	1	0	1	0	0	1	0	0
Scotophaeus quadripunctatus	1	1	1	0	0	1	0	0	-	1	0	1	0	1	0	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	1	0	-	-	1	1	0	1	0	1	0	0	0	1	1
Urozelotes rusticus	1	1	0	0	0	1	0	0	-	0	-	0	-	-	-	-	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	1	1	0	1	0	1	0	0	0	1	0
Vectius niger	0	1	1	1	1	0	-	0	-	0	-	0	-	-	-	-	1	1	1	1	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	-	-	0	1	1	1	0	0	0	0	1	1	0
Xerophaeus appendiculatus	1	1	1	0	0	1	0	0	-	1	0	1	1	1	0	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	1	1	1	1	0	1	0	0	0	1	1
Zelanda sp.	1	1	?	0	0	1	0	0	-	1	0	0	-	-	-	-	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	1	1	?	1	?	0	0	1	1
Zelotes subterraneus	1	1	0	0	0	1	0	0	-	0	-	0	-	-	-	-	1	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	-	-	0	1	0	1	0	1	0	0	0	1	1
Anagrina sp.	1	1	1	0	0	1	?	0	-	?	?	?	?	?	?	?	1	0	1	0	0	0	0	0	1	1	?	?	?	0	1	0	?	1	0	0	1	0	-	-	0	1	0	1	0	1	0	0	0	1	1
Austrodomus scaber	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	0	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Austrodomus zuluensis	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	?	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Brasilomma enigmatica	1	1	1	0	0	?	?	0	-	0	-	0	-	-	?	-	-	-	-	0	-	-	-	-	-	-	-	-	-	0	1	0	?	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Caudalia insularis	0	0	1	0	0	?	?	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	?	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Cf. Tricongius sp.	1	1	1	0	0	1	0	0	-	0	-	1	0	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	?	1	0	0	1	1	0	0	0	0	-	1	0	1	0	0	0	1	1
Chileomma ruiles	1	1	1	0	0	1	0	0	-	0	-	?	?	?	?	?	1	-	0	0	0	0	0	0	-	-	0	1	0	0	1	0	?	1	0	0	1	1	0	0	1	1	1	1	0	1	0	0	0	1	1
Chileuma paposo	1	1	1	0	0	1	0	0	-	0	-	1	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Chilongius palmas	1	1	1	0	0	1	0	0	-	0	-	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	1	0	0	1	1	1	1	0	1	0	0	0	1	1
Cryptoerithus occultus	1	1	1	0	0	0	-	0	-	0	-	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	1	1	1	0	0	1	1	1	0	1	0	0	0	1	1
Eleleis crinita	0	0	1	0	0	?	?	1	1	?	?	?	?	?	?	?	0	0	1	0	0	1	0	1	0	1	?	?	?	1	1	0	?	0	1	0	1	1	0	0	0	1	1	0	?	?	?	0	0	?	?
Eleleis sp.	0	0	1	0	0	0	-	1	1	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	0	0	1	-	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1

MATRIX (cont.)

TAXON/CHARACTER	0	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
Gen.1 AFR sp.1	0	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1
Gen.1 AFR sp.2	0	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	?	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1
Gen.2 AFR sp.1	0	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1
Gen.2 AFR sp.2	0	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	?	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1
Gen.3 AFR sp.1	0	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1
Gen.3 AFR sp.2	0	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	?	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1
Katumbea oxoniensis	0	0	1	0	0	?	?	0	-	?	?	?	?	?	?	?	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	?	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	?	?
Lygromma aff. *taruma*	1	1	1	0	0	0	-	0	-	0	-	1	?	?	?	?	1	-	0	0	0	1	1	1	-	-	0	1	0	0	1	0	?	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Lygromma chamberlini	1	1	1	0	0	0	-	0	-	0	-	?	?	?	?	?	1	-	0	0	0	1	0	1	-	-	?	1	0	0	1	0	0	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Lygromma gasnieri	1	1	1	0	0	0	-	0	-	0	-	?	?	?	?	?	1	-	0	0	0	1	1	1	-	-	0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Lygromma gertschi	1	1	0	0	0	1	0	0	-	?	?	?	?	?	?	?	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	0	?	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Lygromma senoculatum	1	1	1	0	0	?	?	0	-	?	?	?	?	?	?	?	1	-	0	0	0	1	1	1	-	-	0	1	0	0	1	0	?	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Lygromma ybyguara	1	1	0	0	0	?	?	0	-	0	-	?	?	?	?	?	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	0	?	1	0	1	1	1	0	0	0	1	1	1	0	?	0	0	0	1	1
Molycria mammosa	1	1	1	0	0	1	0	0	-	?	?	?	?	?	?	?	0	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	?	1	0	0	1	1	1	0	1	1	1	1	0	1	1	0	0	1	1
Moreno grande	1	1	1	0	0	0	-	1	0	0	-	1	0	1	?	?	1	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Moreno morenoi	1	1	1	0	0	0	-	1	0	0	-	1	0	1	?	?	1	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	?	0	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Moreno ramirezi	1	1	1	0	0	0	-	1	0	0	-	1	0	1	?	?	1	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Myandra cambridgei	0	1	1	0	0	1	0	0	-	0	-	1	1	0	-	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	?	1	0	0	1	1	1	0	0	1	1	1	0	1	1	0	0	1	1
Namundra sp.	1	1	1	0	0	0	-	0	-	0	-	1	1	1	0	0	1	0	1	0	1	0	0	0	1	0	0	1	0	0	1	0	1	1	0	0	1	1	1	0	0	1	1	1	0	0	0	0	0	1	1
Neozimiris pubescens	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	0	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Neozimiris sp.	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	0	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Nomindra kinchega	0	1	1	0	0	1	0	0	-	?	?	?	?	?	?	?	0	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	?	1	0	0	0	1	1	0	0	1	1	1	0	1	1	0	0	1	1
Oltacloea beltraoe	1	1	0	0	0	0	-	0	-	0	-	0	-	-	-	-	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	0	?	1	0	1	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1
Oltacloea mutilata	1	1	0	0	0	0	-	0	-	?	?	?	?	?	?	?	1	1	1	0	0	0	0	0	1	1	?	?	?	0	1	0	?	1	0	1	1	1	0	0	0	1	1	1	0	1	0	0	0	?	1
Paracymbiomma carajas	1	1	1	0	0	1	0	0	-	0	-	1	0	1	1	2	1	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	1	0	0	1	1	1	1	0	1	0	0	0	1	1
Plutonodomus kungwensis	0	1	1	0	0	?	?	0	-	?	?	?	?	?	?	?	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	0	?	0	1	-	1	1	0	0	0	1	1	0	?	?	?	1	0	?	?
Prodida longiventris	0	1	1	0	0	0	-	0	-	?	?	?	?	?	?	?	0	0	1	0	0	1	0	1	0	0	0	1	1	1	1	0	?	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	?	?
Prodidomus rufus	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	0	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Prodidomus simoni	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	?	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Prodidomus woodleigh	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	0	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Prodidomus sp.	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	?	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Purcelliana problematica	0	1	1	0	0	?	?	1	0	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	1	?	0	0	-	1	1	0	0	0	1	1	?	?	0	0	0	0	?	1
Purcelliana sp.	0	1	1	0	0	?	?	1	0	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	1	0	0	0	-	1	1	0	0	0	1	1	0	0	0	0	0	0	1	1
Theuma sp.1	1	1	1	0	0	1	1	0	-	0	-	1	1	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	?	1	0	0	1	1	0	1	1	1	0	1	0	1	0	0	0	1	1
Theuma sp.2	1	1	1	0	0	1	1	0	-	0	-	1	1	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	0	0	1	1	0	1	1	1	1	1	0	1	0	0	0	1	1
Theumella typica	1	1	1	0	0	?	?	0	-	?	?	?	?	?	?	?	1	0	0	0	0	0	0	0	0	0	?	?	?	0	1	0	?	1	0	0	1	1	0	1	0	1	1	?	0	1	?	0	0	1	1
Tivodrassus ethophor	1	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	1	0	1	0	0	0	0	0	1	1	0	1	0	0	1	0	0	1	0	0	1	1	0	0	1	1	1	1	0	1	0	0	0	1	1
Tricongius collinus	1	1	0	0	0	?	?	0	-	?	?	?	?	?	?	?	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	?	?	1	0	1	1	1	0	0	?	0	?	1	0	1	0	0	0	?	?
Tricongius amazonicus	1	1	1	0	0	0	-	0	-	0	-	?	?	?	?	?	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	0	?	1	0	1	1	1	0	0	1	1	1	1	0	1	0	0	0	1	1
Wesmaldra bidgemia	1	1	1	0	0	1	0	0	-	0	-	1	1	0	-	2	0	0	0	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	1	1	1	0	0	1	1	1	0	1	0	0	0	1	1
Wydundra osbourne	1	1	1	0	0	1	0	0	-	0	-	1	1	0	-	?	0	0	0	0	1	0	0	0	0	1	0	1	0	0	1	0	?	1	0	0	1	1	1	0	1	1	1	1	0	1	0	0	0	1	1
Zimirina hirsuta	0	0	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	0	0	0	1	-	1	1	0	0	0	1	1	0	1	0	0	1	0	1	1
Zimiris doriai	0	1	1	0	0	0	-	0	-	0	-	0	-	-	-	-	0	0	1	0	0	1	0	1	0	0	0	1	1	1	1	0	1	0	1	-	1	1	1	0	0	1	1	0	1	0	0	1	0	1	1

MATRIX (cont.)

TAXON/CHARACTER	51	52	53	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
Xiruana gracilipes	1	1	1	1	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	2	1	0	0	0	0	0	0	-	1	0	1	1	0	1	1	0	1	1	1	0	0	-	-	-	1	0	1	0	-	-
Teminius insularis	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	2	1	0	0	0	0	0	-	1	?	?	?	?	1	1	0	1	1	1	1	1	0	1	1	1	0	1	0	-	-
Falconina gracilis	0	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1	0	0	1	0	1	0	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Gallianoela sp.	1	1	0	0	1	0	0	0	-	-	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Cithaeron praedonius	1	1	1	0	0	-	-	0	-	-	0	0	0	1	1	0	?	0	0	0	0	0	0	0	0	0	0	-	1	1	1	0	0	1	1	0	1	0	1	1	0	-	-	-	1	0	1	1	0	1
Lampona cylindrata	1	1	1	0	0	-	-	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	-	-	-	-	1	1	0	1	1	1	0	1	0	0	1	1	1	1	0	-	-
Phrurolithus festivus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Platyoides walteri	1	0	1	1	0	-	-	1	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	-	1	0	0	-	0	1	0	1	1	0	1	1	0	-	-	-	0	-	-	0	-	-
Anagraphis pallens	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-	1	1	0	-	1	1	1	1	1	0	1	1	1	0	0	1	0	-	-	0	-	-
Anzacia mustecula	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	-	1	1	0	-	1	1	0	1	1	0	1	1	0	-	-	-	1	0	1	0	-	-
Apopyllus silvestrii	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	1	1	0	0	0	0	0	1	0	0	-	-	-	-	1	1	1	1	1	1	1	0	-	-	-	1	0	1	1	0	0
Asemesthes sp.	1	1	0	0	1	1	-	1	0	0	0	0	0	1	1	1	0	1	0	0	1	0	1	1	0	0	1	1	0	-	-	-	-	1	0	1	1	0	0	1	0	-	-	-	1	0	1	0	-	-
Drassodes lapidosus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	2	2	0	0	0	0	0	1	0	0	-	-	-	-	1	1	0	1	1	1	1	0	-	-	-	1	1	1	1	0	0
Drassodex hypocrita	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	-	-	-	-	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	-	-
Drassyllus fallens	1	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Encoptarthria echemophthalma	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	2	1	0	0	0	1	0	1	0	0	-	-	-	-	1	0	1	1	0	1	1	0	-	-	-	0	-	-	0	-	-
Gnaphosa lucifuga	1	1	0	0	1	1	-	1	1	-	0	0	0	1	1	0	0	1	0	0	0	0	1	1	0	0	0	-	0	-	-	-	-	1	0	1	1	1	0	1	0	-	-	-	0	-	-	0	-	-
Hemicloea sundevalli	0	1	1	0	1	0	0	1	0	0	1	1	1	1	1	0	?	0	0	0	0	0	0	0	0	0	1	0	0	-	-	-	-	1	1	0	1	1	1	0	0	-	-	-	0	-	-	0	-	-
Homoeothele micans	1	?	?	?	1	0	0	1	0	0	0	0	0	1	1	1	?	0	0	0	0	0	0	0	0	0	0	-	1	1	1	0	2	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Hypodrassodes maoricus	1	1	1	0	1	0	0	1	0	0	0	0	?	1	1	?	?	?	?	2	2	0	0	0	1	0	0	-	1	1	1	0	2	1	1	0	1	1	1	0	?	?	?	?	1	1	1	0	-	-
Latonigena auricomis	1	1	1	0	0	-	-	1	2	-	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	-	-	-	-	1	1	0	1	1	1	0	1	0	0	1	1	0	1	0	-	-
Leptodrassex sp.	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	1	0	0	1	0	1	0	-	-	-	0	-	-	-	1	0	1	0	-	-
Micaria fulgens	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	?	0	0	0	0	0	?	0	0	0	-	1	1	1	0	2	1	1	?	1	0	1	?	1	0	1	1	?	?	?	?	?	?
Neodrassex aureus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	0	0	0	0	-	-	0	-	-	-	0	-	-	-	1	0	1	0	-	-
Nopyllus sp.	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Pterotricha lentiginosa	1	1	0	0	1	1	-	1	0	0	0	0	0	1	1	1	0	1	0	0	1	0	1	1	0	0	1	1	0	-	-	-	-	1	1	1	1	1	1	1	0	-	-	-	0	-	-	0	-	-
Scotophaeus quadripunctatus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	-	-	-	-	1	1	0	1	1	1	0	1	0	0	1	1	1	0	0	-	-
Urozelotes rusticus	1	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	-	0	-	-	-	-	1	0	1	1	0	1	1	0	-	-	-	0	-	-	0	-	-
Vectius niger	0	1	1	0	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Xerophaeus appendiculatus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	1	0	0	-	-	-	-	1	1	0	1	1	1	0	1	0	0	1	1	1	1	1	0	1
Zelanda sp.	1	1	1	0	1	0	0	?	?	?	0	0	?	1	?	?	?	?	?	1	1	0	0	0	0	0	1	0	0	-	-	-	-	1	1	0	1	1	1	0	?	?	?	?	1	1	1	0	-	-
Zelotes subterraneus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	-	0	-	-	-	-	1	0	0	1	0	0	1	0	-	-	-	0	-	-	0	-	-
Anagrina sp.	1	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	?	0	?	?	0	0	1	1	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	?	?	?	?	?	?
Austrodomus scaber	1	0	1	1	1	0	1	0	-	-	0	0	1	1	0	0	-	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Austrodomus zuluensis	1	?	1	?	1	0	1	0	-	-	0	0	1	1	0	0	-	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Brasilomma enigmatica	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Caudalia insularis	1	?	1	?	1	0	?	1	0	?	0	0	1	1	0	0	-	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Cf. Tricongius sp.	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	-	0	-	-	-	-	1	0	1	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Chileomma ruiles	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	-	0	-	-	-	-	1	0	1	0	-	-	-	0	-	-	-	1	1	0	0	-	-
Chileuma paposo	0	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	0	0	0	1	1	0	1	1	1	0	1	0	1	0	1	1	1	1	1	1
Chilongius palmas	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	0	0	0	1	0	1	1	0	0	1	0	-	-	-	1	0	1	0	-	-
Cryptoerithus occultus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	2	0	0	0	0	0	0	-	1	1	1	0	0	1	0	1	1	0	1	1	0	-	-	-	1	0	1	0	-	-
Eleleis crinita	?	?	?	?	?	?	?	?	?	?	0	0	0	?	0	0	?	?	0	0	0	?	?	?	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Eleleis sp.	1	1	1	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	?	?	?	?	0	-	-	0	-	-

MATRIX (cont.)

TAXON/CHARACTER	51	52	53	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
Gen.1 AFR sp.1	1	1	1	0	0	-	-	0	-	-	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Gen.1 AFR sp.2	1	1	1	0	0	-	-	0	-	-	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Gen.2 AFR sp.1	1	1	1	0	0	-	-	0	-	-	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Gen.2 AFR sp.2	1	1	1	0	0	-	-	0	-	-	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Gen.3 AFR sp.1	1	1	1	0	0	-	-	0	-	-	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Gen.3 AFR sp.2	1	1	1	0	0	-	-	0	-	-	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Katumbea oxoniensis	?	?	?	?	0	-	-	0	-	-	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	?	?	?	?	?	?	?	0	-	-	0	-	-	-	?	?	?	?	0	-	-	0	-	-
Lygromma aff. *taruma*	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	-	1	0	1	0	?	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Lygromma chamberlini	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	?	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	1	0	1	1	0	1	1	0	-	-	-	1	0	1	1	0	1
Lygromma gasnieri	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	-	1	0	1	0	1	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Lygromma gertschi	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	-	1	0	1	?	?	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Lygromma senoculatum	1	1	1	0	1	0	0	1	0	0	0	0	0	?	1	0	?	0	0	0	0	0	0	0	0	0	?	?	?	?	?	?	?	0	-	-	0	-	-	-	0	-	-	-	0	?	?	?	?	?
Lygromma ybyguara	1	1	1	0	1	0	0	1	0	0	0	0	?	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	1	0	1	1	0	1	1	1	0	0	1	?	?	?	?	?	?
Molycria mammosa	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	-	1	1	0	-	0	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Moreno grande	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	?	0	0	0	0	1	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Moreno morenoi	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	?	0	0	0	0	1	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Moreno ramirezi	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Myandra cambridgei	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	0	-	1	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Namundra sp.	1	0	1	0	0	-	-	0	-	-	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	1	0	0	1	1	0	1	1	1	0	1	1	0	0	1	0	1	1	0	1
Neozimiris pubescens	1	1	1	0	1	0	1	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Neozimiris sp.	1	1	1	0	1	0	1	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Nomindra kinchega	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	0	-	1	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Oltacloea beltraoe	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	1	0	0	1	0	1	1	1	0	0	1	0	-	-	0	-	-
Oltacloea mutilata	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	?	?	0	0	0	0	0	0	0	0	?	?	?	?	?	?	?	1	0	0	1	0	1	1	?	?	?	?	0	-	-	0	-	-
Paracymbiomma carajas	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	0	1	1	2	1	0	1	1	0	1	1	0	-	-	-	0	-	-	0	-	-
Plutonodomus kungwensis	?	?	?	?	0	-	-	0	-	-	0	0	1	1	0	0	0	0	1	0	0	?	?	?	0	0	?	?	?	?	?	?	?	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Prodida longiventris	?	?	?	?	?	?	?	0	-	-	0	0	?	1	0	0	?	0	0	0	0	0	0	0	0	0	?	?	?	?	?	?	?	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Prodidomus rufus	1	1	0	0	0	-	-	0	-	-	0	0	1	1	0	0	-	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Prodidomus simoni	1	1	0	0	1	0	1	0	-	-	0	0	1	1	0	0	-	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Prodidomus woodleigh	1	1	0	0	1	0	1	0	-	-	0	0	1	1	0	0	-	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Prodidomus sp.	1	1	0	0	0	-	-	0	-	-	0	0	1	1	0	0	-	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Purcelliana problematica	?	?	1	?	0	-	-	0	-	-	0	0	1	1	0	0	0	?	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Purcelliana sp.	1	0	1	0	0	-	-	0	-	-	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Theuma sp.1	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1
Theuma sp.2	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1
Theumella typica	1	?	1	?	1	0	0	1	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Tivodrassus ethophor	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	-	0	-	-	-	-	1	0	1	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Tricongius collinus	?	?	?	?	?	?	?	1	0	0	0	0	0	1	0	?	?	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Tricongius amazonicus	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	-	0	0	0	0	0	-	0	-	-	-	-	1	0	1	1	0	0	1	0	-	-	-	0	-	-	0	-	-
Wesmaldra bidgemia	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	2	0	0	0	0	0	0	-	1	1	0	-	2	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Wydundra osbourne	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	2	0	0	0	0	0	0	-	1	1	0	-	2	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Zimirina hirsuta	1	1	1	0	1	0	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	0	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-
Zimiris doriai	1	1	1	0	1	0	1	0	-	-	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	-	-	1	1	1	1	1	1	0	1	1	0	2	1	1	1	1	1	1

MATRIX (cont.)

TAXON/CHARACTER	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
Xiruana gracilipes	-	1	0	1	0	-	-	0	0	0	0	0	-	-	-	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	-	1	0	-	0
Teminius insularis	-	1	1	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0	-	0	0	-	0
Falconina gracilis	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	2	0	1	0	0	0	0	0	0	1	1	1	0	-	0	0	-	0
Gallianoela sp.	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	1	0	2	-	1	0	0	0	0	0	0	0	-	-	0	-	-	-	-	-
Cithaeron praedonius	1	1	0	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	1	0	1	0	0	?	0	1	1	0	0	-	0	0	-	0
Lampona cylindrata	-	1	1	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	0	1	0	1	0	0	0	0	1	1	0	0	-	0	0	-	0
Phrurolithus festivus	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	?	0	1	0	0	0	0	1	0	?	1	1	0	?	?	?
Platyoides walteri	-	0	-	-	0	-	-	0	0	0	0	0	-	-	-	0	1	1	0	1	0	1	0	0	0	0	0	-	-	0	-	0	-	-	-
Anagraphis pallens	-	0	-	-	0	-	-	1	0	0	1	1	0	0	1	0	1	1	0	1	0	0	0	0	0	1	0	-	-	0	-	0	0	-	0
Anzacia mustecula	-	1	0	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	0	1	0	0	1	1	1	0	1	0	0	0	-	0	0	-	0
Apopyllus silvestrii	2	1	0	1	1	0	2	0	0	1	1	1	0	0	1	0	1	1	0	1	0	1	1	0	1	0	1	0	0	0	-	0	0	-	0
Asemesthes sp.	-	1	0	1	0	-	-	0	0	0	0	0	-	-	-	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	-	0	0	-	0
Drassodes lapidosus	2	1	1	0	1	0	2	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	1	0	0	-	0	0	-	0
Drassodex hypocrita	-	1	1	0	0	-	-	0	0	0	0	0	-	-	-	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	-	0	0	-	0
Drassyllus fallens	-	-	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	0	0	?	1	1	1	1	1	0	0	-	-	0	-	0	0	-	0
Encoptarthria echemophthalma	-	0	-	-	0	-	-	1	0	0	0	0	-	-	-	0	1	1	0	0	0	1	0	1	0	1	1	0	0	0	-	0	0	-	0
Gnaphosa lucifuga	-	0	-	-	0	-	-	0	0	0	0	0	-	-	-	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	-	0	0	-	0
Hemicloea sundevalli	-	0	-	-	0	-	-	0	0	0	0	0	-	-	-	0	0	0	1	?	0	0	0	0	0	0	1	0	0	0	-	0	0	-	0
Homoeothele micans	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	0	0	?	?	?	?	?	?	0	1	0	0	0	-	1	0	-	0
Hypodrassodes maoricus	-	1	1	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	0	?	0	1	0	0	0	1	1	?	0	0	-	0	0	-	0
Latonigena auricomis	-	0	-	-	0	-	-	0	0	0	0	0	-	-	-	0	1	1	1	0	0	1	1	0	1	0	1	1	0	0	-	0	0	-	0
Leptodrassex sp.	-	1	0	1	0	-	-	0	0	0	0	1	0	0	1	0	1	1	0	0	0	1	0	0	0	1	1	0	0	0	-	0	?	?	?
Micaria fulgens	?	?	?	?	?	?	?	0	0	1	1	1	?	0	?	0	1	0	0	1	0	1	0	0	?	0	1	0	0	1	0	0	0	-	0
Neodrassex aureus	-	1	0	1	0	-	-	?	0	0	0	1	0	0	1	0	1	1	1	1	0	1	0	0	0	1	1	0	0	0	-	1	0	-	0
Nopyllus sp.	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	1	1	1	0	0	0	1	1	0	0	0	-	1	1	-	0
Pterotricha lentiginosa	-	0	-	-	0	-	-	0	1	1	1	1	0	0	1	0	0	1	0	0	?	?	?	?	?	0	0	-	-	0	-	0	-	-	-
Scotophaeus quadripunctatus	-	1	1	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	1	?	0	1	0	0	1	0	1	1	0	0	-	0	0	-	0
Urozelotes rusticus	-	0	-	-	0	-	-	0	0	0	0	0	-	-	-	0	1	0	0	?	1	1	0	0	1	0	0	-	-	0	-	0	0	-	0
Vectius niger	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	1	0	1	1	1	0	1	0	0	0	0	0	-	-	0	-	0	0	-	0
Xerophaeus appendiculatus	1	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	1	1	0	1	0	1	0	0	1	0	1	1	0	0	-	0	0	-	0
Zelanda sp.	-	1	1	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	0	?	0	1	0	0	0	1	1	?	0	0	-	0	0	-	0
Zelotes subterraneus	-	0	-	-	0	-	-	0	0	0	0	0	-	-	-	0	1	0	0	?	1	1	0	1	1	0	1	0	0	0	-	0	0	-	0
Anagrina sp.	?	?	?	?	?	?	?	?	0	0	0	0	-	-	-	0	1	0	0	1	0	1	0	0	0	1	1	0	0	0	-	0	0	-	0
Austrodomus scaber	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	1	0	0	0	0	0	1	1	1	1	0	-	1	0	-	0
Austrodomus zuluensis	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	?	?	?	?	0	-	0
Brasilomma enigmatica	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	0	?	?	?	?	?	1	1	0	0	1	0	1	1	1	0
Caudalia insularis	-	0	-	-	0	-	-	-	0	0	0	-	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	?	?	?	?	0	-	0
Cf. Tricongius sp.	-	0	-	-	0	-	-	1	0	0	0	0	-	-	-	0	1	1	1	1	1	0	0	0	1	0	1	0	0	1	0	0	1	0	0
Chileomma ruiles	-	1	0	1	0	-	-	1	0	0	0	0	-	-	-	0	1	1	1	0	1	1	0	0	0	1	1	0	0	1	0	0	1	1	0
Chileuma paposo	1	1	0	1	1	1	1	0	0	0	0	0	-	-	-	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	0	1	2	0
Chilongius palmas	-	1	0	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	1	1	1	1	0	0	0	1	1	0	0	1	0	0	1	2	0
Cryptoerithus occultus	-	1	0	1	0	-	-	0	0	0	0	0	-	-	-	0	1	1	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	-	0
Eleleis crinita	?	?	?	?	?	?	?	?	0	0	0	-	-	-	-	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Eleleis sp.	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0	-	1	0	-	0

MATRIX (cont.)

TAXON/CHARACTER	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
Gen.1 AFR sp.1	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	0	0	1	0	0	0	1	1	0	1	0	-	1	0	-	0
Gen.1 AFR sp.2	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	?	?	0	-	0
Gen.2 AFR sp.1	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	0	0	1	0	0	0	1	1	0	1	0	-	1	0	-	0
Gen.2 AFR sp.2	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	?	?	0	-	0
Gen.3 AFR sp.1	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	0	0	1	0	0	0	1	1	0	1	0	-	1	0	-	0
Gen.3 AFR sp.2	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	?	?	0	-	0
Katumbea oxoniensis	-	0	-	-	0	-	-	-	0	0	0	-	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	?	?	?	?	?	?	?
Lygromma aff. *taruma*	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	1	1	0	?	?	0	?	1	0	0
Lygromma chamberlini	1	1	0	1	1	0	1	1	0	0	0	0	-	-	-	0	1	1	1	?	1	1	0	0	0	1	1	0	0	1	0	0	1	?	0
Lygromma gasnieri	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	2	0	1	1	1	1	0	1	1	1	0	0	1	0	1	1	1	0
Lygromma gertschi	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	0	0	1	0	0
Lygromma senoculatum	?	?	?	?	?	?	?	?	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	0	?	1	0	0
Lygromma ybyguara	?	0	-	-	0	-	-	?	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	0	?	1	0	0
Molycria mammosa	-	0	-	-	0	-	-	-	0	1	1	1	1	0	1	0	1	1	0	1	0	1	0	0	0	0	1	0	0	1	1	1	0	-	0
Moreno grande	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	?	1	0	0	0	0	1	1	0	0	0	-	1	1	?	0
Moreno morenoi	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	?	?	1	?	0
Moreno ramirezi	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	1	1	0	0	0	0	1	1	0	0	1	0	1	1	1	0
Myandra cambridgei	-	0	-	-	0	-	-	-	0	1	1	1	1	0	1	0	1	1	1	1	0	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Namundra sp.	1	0	0	1	1	1	1	0	0	0	0	-	-	-	-	0	1	1	1	0	1	1	0	0	0	1	1	1	1	0	-	1	0	-	0
Neozimiris pubescens	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	1	1	1	0	0	0	1	1	1	1	0	-	1	0	-	0
Neozimiris sp.	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	1	1	1	0	0	0	1	1	1	1	0	-	1	0	-	0
Nomindra kinchega	-	0	-	-	0	-	-	-	0	1	1	1	1	0	1	0	1	1	1	?	0	0	0	0	0	0	1	0	0	1	1	?	?	?	?
Oltacloea beltraoe	-	0	-	-	0	-	-	1	0	0	0	0	-	-	-	0	1	1	0	1	?	?	?	?	?	1	1	0	0	1	0	1	1	1	0
Oltacloea mutilata	-	0	-	-	0	-	-	?	1	1	1	?	1	1	0	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	?	?	1	?	0
Paracymbiomma carajas	-	0	-	-	0	-	-	1	0	0	0	0	-	-	-	0	1	1	1	1	1	1	0	0	0	1	1	0	0	1	0	1	1	1	0
Plutonodomus kungwensis	-	0	-	-	0	-	-	-	0	0	?	-	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	?	?	?	?	?	?	?
Prodida longiventris	-	0	-	-	0	-	-	-	0	0	?	-	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	?	?	?	?	?	?	?
Prodidomus rufus	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	?	0	1	0	0	0	1	1	1	1	0	-	1	0	-	0
Prodidomus simoni	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	1	0	0	1	0	-	0
Prodidomus woodleigh	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	0	1	0	1	0	0	0	1	1	1	1	0	-	1	0	-	0
Prodidomus sp.	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	1	?	0	?	0	-	0
Purcelliana problematica	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	?	?	?	?	?	?	?	?	?	?	?	1	1	?	?	?	?	?	?	?
Purcelliana sp.	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	?	0	1	0	0	0	2	1	1	1	0	-	1	0	-	0
Theuma sp.1	0	-	-	-	0	-	-	1	0	0	0	0	-	-	-	0	1	1	0	1	1	1	0	1	0	1	1	1	1	0	-	1	0	-	0
Theuma sp.2	0	1	0	1	1	1	1	0	0	0	0	0	-	-	-	0	1	1	0	1	1	1	0	1	0	1	1	1	1	0	-	1	0	-	0
Theumella typica	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Tivodrassus ethophor	-	0	-	-	0	-	-	0	0	0	0	0	-	-	-	0	1	1	1	1	1	1	0	0	0	1	1	0	0	1	1	1	1	1	0
Tricongius collinus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	0	?	?	?	?	?	?	?
Tricongius amazonicus	-	0	-	-	0	-	-	1	0	0	0	0	-	-	-	0	1	1	0	?	0	1	0	0	0	1	1	0	0	1	0	1	1	0	0
Wesmaldra bidgemia	-	0	-	-	0	-	-	-	0	1	1	1	0	0	1	0	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	0	-	0
Wydundra osbourne	-	0	-	-	0	-	-	-	0	0	1	1	0	0	1	0	1	1	1	1	?	?	?	?	?	0	1	0	0	1	1	0	0	-	0
Zimirina hirsuta	-	0	-	-	0	-	-	-	0	0	0	0	-	-	-	0	1	1	1	?	0	1	0	0	0	1	1	1	1	0	-	1	0	-	0
Zimiris doriai	1	0	0	1	1	1	1	1	0	0	0	0	-	-	-	0	1	1	1	1	0	1	0	0	0	1	1	1	1	0	-	1	0	-	0

MATRIX (cont.)

TAXON/CHARACTER	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170
Xiruana gracilipes	0	0	1	1	0	1	0	0	0	0	0	1	0	-	0	-	2	0	-	0	-	1	0	1	1	0	1	0	0	0	0	0	0	0	-
Teminius insularis	0	0	1	1	0	0	0	0	0	0	0	1	0	-	1	1	0	0	-	0	-	1	?	?	?	?	1	0	0	0	1	0	0	0	-
Falconina gracilis	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	-	1	0	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Gallianoela sp.	-	-	1	1	0	-	-	-	0	0	1	1	1	0	1	1	0	0	-	0	-	0	-	-	-	-	0	1	0	0	0	0	0	0	-
Cithaeron praedonius	1	0	1	1	0	0	0	0	0	0	1	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	0	0	0	0	0	0	0	-
Lampona cylindrata	0	0	1	0	0	0	0	0	0	1	1	0	1	1	1	2	0	0	-	1	0	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Phrurolithus festivus	?	0	0	-	-	0	0	1	0	0	0	0	1	1	1	1	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	0	0	0	-
Platyoides walteri	-	-	1	1	0	-	-	-	0	0	1	0	0	-	1	1	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	0	0	0	-
Anagraphis pallens	0	0	1	1	0	-	-	-	0	1	0	1	0	-	1	1	0	0	-	0	-	1	1	0	-	1	1	0	0	0	1	0	0	0	-
Anzacia mustecula	1	0	1	1	0	0	1	1	0	0	0	1	0	-	1	1	0	0	-	0	-	1	1	0	-	1	1	0	0	0	1	0	0	0	-
Apopyllus silvestrii	1	0	1	1	0	0	1	0	0	1	0	1	1	1	1	1	0	0	-	1	0	1	0	1	1	2	1	0	0	0	1	0	0	0	-
Asemesthes sp.	1	0	1	1	0	1	1	0	0	0	0	1	0	-	?	?	0	0	-	1	1	0	-	-	-	-	1	0	0	0	1	0	0	1	1
Drassodes lapidosus	1	0	1	1	0	0	1	0	0	0	0	1	0	-	1	1	0	0	-	1	0	1	1	?	?	2	1	0	0	0	1	0	0	1	0
Drassodex hypocrita	0	0	1	1	0	0	0	0	0	0	0	1	0	-	1	1	0	0	-	1	0	0	-	-	-	-	1	0	0	0	0	0	0	0	-
Drassyllus fallens	0	0	1	1	0	-	-	-	0	1	0	1	1	1	1	1	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Encoptarthria echemophthalma	1	0	1	1	0	0	0	1	0	0	0	1	1	0	?	?	0	0	-	1	0	0	-	-	-	-	1	0	0	0	1	0	0	1	0
Gnaphosa lucifuga	0	0	1	1	0	0	0	0	0	0	0	1	0	-	1	1	0	0	-	0	-	1	0	1	0	0	1	0	0	0	1	0	0	0	-
Hemicloea sundevalli	0	0	1	1	0	0	0	0	0	0	1	0	0	-	?	?	0	0	-	1	0	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Homoeothele micans	1	0	1	1	0	0	0	1	0	0	0	1	0	-	?	?	0	0	-	0	-	1	1	1	0	?	1	0	0	0	1	0	0	0	-
Hypodrassodes maoricus	0	0	1	1	?	0	1	1	?	0	0	1	0	-	0	-	0	0	-	0	-	1	1	1	0	2	1	0	0	0	1	?	0	0	-
Latonigena auricomis	?	0	1	1	0	0	0	0	0	0	0	1	1	1	?	?	0	0	-	1	1	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Leptodrassex sp.	?	?	1	1	0	0	0	?	0	0	0	1	0	-	1	1	0	0	-	0	-	1	1	1	0	0	1	0	0	0	1	0	0	0	-
Micaria fulgens	1	0	1	1	0	0	1	1	1	0	0	0	0	-	1	1	0	0	-	0	-	1	0	1	0	?	1	0	0	0	0	0	0	0	-
Neodrassex aureus	0	0	1	1	0	0	0	0	0	0	0	1	0	-	1	1	0	0	-	0	-	1	1	1	0	0	1	0	0	0	1	0	0	0	-
Nopyllus sp.	0	0	1	1	0	0	1	1	0	1	0	1	0	-	0	-	0	0	-	0	-	1	0	?	?	?	1	0	0	0	1	0	0	0	-
Pterotricha lentiginosa	-	-	1	1	0	-	-	-	0	0	0	1	1	0	1	1	0	0	-	1	1	0	-	-	-	-	1	0	1	0	1	0	0	1	1
Scotophaeus quadripunctatus	1	0	1	1	0	0	0	0	0	0	0	1	1	1	?	?	0	0	-	1	0	1	0	1	0	2	1	0	0	0	1	0	0	1	0
Urozelotes rusticus	0	0	1	1	0	-	-	-	0	1	0	1	1	0	1	1	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Vectius niger	0	0	1	1	0	-	-	-	0	0	1	0	0	-	1	1	1	0	-	0	-	0	-	-	-	-	0	0	0	0	1	0	0	0	-
Xerophaeus appendiculatus	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	-	0	0	-	1	0	1	0	1	0	2	1	0	0	0	1	0	0	1	0
Zelanda sp.	0	0	1	1	?	0	1	0	?	0	0	1	1	1	?	?	?	0	-	1	0	0	-	-	-	-	1	0	0	0	1	?	0	1	0
Zelotes subterraneus	0	0	1	1	0	0	0	0	0	1	0	1	1	1	1	1	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Anagrina sp.	1	0	1	1	0	0	1	0	0	1	0	1	1	0	?	?	0	0	-	1	1	0	-	-	-	-	1	0	0	0	0	0	0	0	-
Austrodomus scaber	1	0	0	-	-	0	1	0	1	0	1	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	1	0	0	-
Austrodomus zuluensis	1	0	0	-	-	0	?	?	1	0	1	0	-	-	-	-	0	0	-	-	-	0	-	-	-	-	1	1	0	0	0	1	0	0	-
Brasilomma enigmatica	0	0	1	1	0	0	1	1	0	1	1	1	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Caudalia insularis	1	0	0	-	-	0	?	?	1	0	1	0	-	-	-	-	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	1	0	0	-
Cf. Tricongius sp.	0	0	1	1	0	1	1	1	0	1	1	1	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Chileomma ruiles	0	0	1	1	0	1	1	1	0	1	1	1	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Chileuma paposo	0	0	0	-	-	0	1	1	0	1	1	1	0	-	0	-	0	0	-	0	-	1	0	1	0	0	1	0	0	0	1	0	0	0	-
Chilongius palmas	0	0	1	1	0	0	1	1	0	1	1	1	0	-	0	-	0	0	-	0	-	1	0	1	0	0	1	0	0	0	1	0	0	0	-
Cryptoerithus occultus	1	0	1	1	0	0	1	1	0	0	0	1	0	-	0	-	0	1	1	0	-	1	1	1	0	0	1	0	1	1	0	0	0	0	-
Eleleis crinita	?	?	?	?	?	?	?	?	?	0	1	?	-	-	-	-	?	1	?	?	?	?	?	?	?	?	1	1	0	0	0	1	0	?	?
Eleleis sp.	1	0	0	-	-	0	1	0	1	0	1	0	0	-	?	?	0	1	0	0	-	0	-	-	-	-	1	1	0	0	0	1	0	0	-

MATRIX (cont.)

TAXON/CHARACTER	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170
Gen.1 AFR sp.1	1	0	0	-	-	0	1	0	0	0	1	1	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	1	0	0	-
Gen.1 AFR sp.2	1	0	0	-	-	0	?	0	0	0	1	1	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	0	0	0	0	1	0	0	-
Gen.2 AFR sp.1	1	0	0	-	-	0	1	0	0	0	1	1	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	1	0	0	1	1	0	0	-
Gen.2 AFR sp.2	1	0	0	-	-	0	?	0	0	0	1	?	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	1	0	0	1	1	0	0	-
Gen.3 AFR sp.1	1	0	0	-	-	0	1	0	0	0	1	1	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	1	0	0	-
Gen.3 AFR sp.2	1	0	0	-	-	0	?	0	0	0	1	1	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	1	0	0	-
Katumbea oxoniensis	?	?	0	-	-	?	?	?	?	0	1	0	-	-	-	-	0	0	-	?	?	?	?	?	?	?	1	1	0	0	0	1	0	?	?
Lygromma aff. *taruma*	0	0	1	1	0	1	?	?	0	1	1	1	1	0	?	?	0	0	-	0	-	1	0	1	1	1	1	0	0	0	1	0	0	0	-
Lygromma chamberlini	0	0	1	1	0	1	1	1	0	1	1	1	1	0	0	-	0	0	-	0	-	1	0	1	0	?	1	0	0	0	1	0	0	0	-
Lygromma gasnieri	0	0	1	1	0	1	1	1	0	1	1	1	1	0	0	-	0	0	-	0	-	1	0	1	0	1	1	0	0	0	1	0	0	0	-
Lygromma gertschi	0	0	0	-	-	?	?	1	0	1	1	1	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Lygromma senoculatum	0	0	1	1	0	?	?	?	0	1	1	1	0	-	?	?	0	0	-	?	?	?	?	?	?	?	1	0	0	0	1	0	0	0	-
Lygromma ybyguara	0	0	1	1	0	0	?	?	0	1	1	1	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	0	0	0	1	0	0	0	-
Molycria mammosa	1	0	1	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0	-	0	-	1	1	0	-	1	0	0	1	2	0	1	0	0	-
Moreno grande	0	0	1	1	0	0	1	?	0	1	1	1	0	-	0	-	0	1	0	0	-	1	0	1	0	0	1	0	0	0	1	0	0	0	-
Moreno morenoi	0	0	1	1	0	?	?	?	0	1	1	1	0	-	?	?	0	1	0	?	?	?	?	?	?	?	1	0	0	0	1	0	0	?	?
Moreno ramirezi	0	0	1	1	0	0	1	1	0	1	1	1	0	-	0	-	0	1	0	0	-	1	0	1	1	0	1	0	0	0	1	0	0	0	-
Myandra cambridgei	1	0	1	1	1	0	1	1	0	0	1	0	1	1	0	-	0	0	-	0	-	1	1	0	-	1	0	0	1	2	0	0	0	0	-
Namundra sp.	0	1	0	-	-	0	1	0	0	0	1	1	0	-	-	-	2	0	-	0	-	1	1	1	0	0	0	0	1	2	1	1	0	0	-
Neozimiris pubescens	1	0	1	0	0	0	1	0	1	0	1	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	1	0	0	-
Neozimiris sp.	1	0	1	0	0	0	1	0	1	0	1	0	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	1	0	0	-
Nomindra kinchega	?	?	?	?	?	?	1	1	0	0	1	0	1	0	?	?	0	0	-	1	1	1	1	0	-	1	0	0	1	2	0	0	0	0	-
Oltacloea beltraoe	0	0	1	1	0	0	1	1	0	1	1	1	0	-	0	-	0	0	-	0	-	1	1	0	-	2	1	0	0	0	1	0	0	0	-
Oltacloea mutilata	0	0	0	-	-	?	?	?	0	1	1	1	?	?	?	?	0	0	-	?	?	?	?	?	?	?	1	0	0	0	1	?	0	?	?
Paracymbiomma carajas	0	0	1	1	0	0	1	1	0	1	1	1	0	-	0	-	0	0	-	0	-	1	0	1	1	2	1	0	0	0	1	0	0	0	-
Plutonodomus kungwensis	?	?	0	-	-	-	?	?	?	0	1	0	-	-	-	-	0	0	-	?	?	?	?	?	?	?	1	0	0	0	1	1	0	0	-
Prodida longiventris	?	?	0	-	-	-	?	?	?	0	1	?	-	-	-	-	0	0	-	?	?	?	?	?	?	?	1	1	0	0	0	?	0	?	?
Prodidomus rufus	1	0	0	-	-	0	1	0	1	0	1	0	0	-	0	-	0	0	-	0	-	1	0	1	0	2	1	1	0	0	0	?	0	0	-
Prodidomus simoni	1	0	0	-	-	0	1	0	1	0	1	0	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	0	0	0	-
Prodidomus woodleigh	1	0	0	-	-	0	1	0	1	0	1	0	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	0	0	0	-
Prodidomus sp.	1	0	0	-	-	0	1	0	1	0	1	0	0	-	?	?	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	0	0	0	-
Purcelliana problematica	?	?	0	-	-	?	?	?	1	0	1	0	0	-	?	?	0	1	0	0	-	0	-	-	-	-	1	1	0	0	0	0	0	0	-
Purcelliana sp.	1	0	0	-	-	0	1	0	1	0	1	0	0	-	?	?	0	1	0	0	-	0	-	-	-	-	1	1	0	0	0	0	0	0	-
Theuma sp.1	0	1	0	-	-	0	1	0	0	0	1	1	0	-	0	-	0	0	-	0	-	1	1	1	0	0	1	0	0	1	1	1	1	0	-
Theuma sp.2	0	1	0	-	-	0	1	0	0	0	1	1	0	-	0	-	0	0	-	0	-	1	1	1	1	0	1	0	0	0	1	1	0	0	-
Theumella typica	?	?	?	?	?	?	?	?	?	0	1	1	0	-	?	?	0	0	-	?	?	?	?	?	?	?	1	0	0	1	1	0	1	?	?
Tivodrassus ethophor	0	0	1	1	0	1	1	1	0	1	1	1	1	1	0	-	0	0	-	0	-	1	1	1	0	2	1	0	0	0	1	0	0	0	-
Tricongius collinus	?	?	1	1	0	?	?	?	0	?	?	1	?	?	?	?	?	0	-	?	?	?	?	?	?	?	1	0	0	0	1	?	0	?	?
Tricongius amazonicus	0	0	1	1	0	0	1	1	0	1	1	1	0	-	?	?	0	0	-	0	-	1	1	0	-	2	1	0	0	0	1	0	0	0	-
Wesmaldra bidgemia	1	0	1	1	1	0	1	1	0	0	1	0	1	0	?	?	0	0	-	0	-	1	0	1	0	2	0	0	1	2	0	1	0	0	-
Wydundra osbourne	1	0	1	1	1	0	1	1	0	0	1	0	1	0	?	?	0	0	-	0	-	1	1	?	?	?	0	0	1	2	1	1	0	0	-
Zimirina hirsuta	1	0	0	-	-	0	1	0	1	0	1	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	1	1	0	0	0	1	0	0	-
Zimiris doriai	0	1	0	-	-	0	1	0	1	0	1	1	0	-	?	?	2	0	-	0	-	0	-	-	-	-	0	0	0	1	1	1	1	0	-

MATRIX (cont.)

TAXON/CHARACTER	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205
Xiruana gracilipes	0	-	-	-	-	1	1	0	0	0	0	0	1	0	-	-	0	0	0	0	0	0	-	1	1	-	0	0	0	0	0	1	1	1	1
Teminius insularis	0	-	-	-	-	1	1	0	0	0	0	0	1	0	-	-	0	0	0	0	0	0	-	2	2	1	0	0	0	0	0	1	1	1	1
Falconina gracilis	0	-	-	-	-	1	1	0	0	0	0	0	1	0	-	-	0	0	0	0	0	0	-	2	2	1	0	0	0	0	0	1	1	1	1
Gallianoela sp.	0	-	-	-	-	0	0	-	0	-	-	0	-	0	-	-	0	-	-	-	-	0	-	2	2	0	0	-	-	0	0	0	0	1	1
Cithaeron praedonius	0	-	-	-	-	1	1	0	0	0	0	0	1	1	0	-	?	0	0	0	0	0	-	0	2	1	0	1	0	0	0	1	1	1	1
Lampona cylindrata	0	-	-	-	-	1	1	0	0	0	0	0	1	1	0	-	0	0	0	0	0	0	-	2	2	1	0	1	1	0	0	1	1	1	1
Phrurolithus festivus	0	-	-	-	-	1	1	0	0	0	0	0	1	0	-	-	0	0	0	0	0	0	-	0	2	0	0	1	1	0	0	0	1	1	1
Platyoides walteri	0	-	-	-	-	1	1	0	0	0	0	0	1	1	0	-	1	0	0	0	1	0	-	1	2	1	0	1	1	0	0	1	1	1	1
Anagraphis pallens	1	1	0	-	1	1	1	0	0	0	0	0	0	1	0	-	1	0	1	1	1	1	0	1	2	1	0	1	1	0	0	1	1	1	1
Anzacia mustecula	0	-	-	-	-	1	1	0	0	?	?	0	0	1	0	-	1	0	1	1	1	0	-	?	?	?	0	?	?	0	0	1	1	1	1
Apopyllus silvestrii	0	-	-	-	-	1	1	0	0	0	1	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	1	1	0	0	1	1	1	1
Asemesthes sp.	0	-	-	-	-	1	1	0	0	0	1	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	1	1	1	0	1	1	1	1
Drassodes lapidosus	0	-	-	-	-	1	1	0	0	?	0	0	0	1	0	-	1	0	1	1	1	0	-	2	2	1	0	?	?	0	0	1	1	1	1
Drassodex hypocrita	0	-	-	-	-	1	1	0	0	?	0	0	1	1	0	-	1	1	1	1	1	0	-	2	2	1	0	?	?	0	0	1	1	1	1
Drassyllus fallens	0	-	-	-	-	1	1	0	0	?	1	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	1	1	0	0	1	1	1	1
Encoptarthria echemophthalma	0	-	-	-	-	1	1	0	0	?	0	0	0	1	0	-	1	1	1	1	0	0	-	2	2	1	0	1	1	0	0	1	1	1	1
Gnaphosa lucifuga	0	-	-	-	-	1	1	0	0	?	1	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	1	1	0	0	1	1	1	1
Hemicloea sundevalli	0	-	-	-	-	1	1	0	0	?	0	0	0	1	0	-	1	0	0	0	1	0	-	1	2	1	0	1	?	0	0	1	1	1	1
Homoeothele micans	0	-	-	-	-	1	1	0	0	?	0	0	0	1	0	-	1	0	1	1	1	0	-	2	2	0	0	?	?	?	0	1	1	1	1
Hypodrassodes maoricus	1	1	1	0	2	1	1	0	0	0	0	0	1	1	0	-	1	1	1	1	0	0	-	1	1	-	0	1	1	1	0	1	1	1	1
Latonigena auricomis	0	-	-	-	-	1	1	0	0	0	1	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	1	1	0	0	1	1	1	1
Leptodrassex sp.	0	-	-	-	-	1	1	0	0	0	0	0	0	1	0	-	1	0	1	0	0	0	-	1	2	0	0	1	1	0	0	1	1	1	1
Micaria fulgens	0	-	-	-	-	0	1	0	0	0	0	0	1	1	0	-	1	0	0	0	0	0	-	0	2	1	0	1	-	0	0	1	1	1	1
Neodrassex aureus	0	-	-	-	-	1	1	0	0	?	?	0	0	1	0	-	1	0	1	1	0	0	-	1	2	1	0	?	?	0	0	1	1	1	1
Nopyllus sp.	0	-	-	-	-	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0	0	?	?	0	?	1	0	0	?	1	1	1
Pterotricha lentiginosa	0	-	-	-	-	1	1	0	0	?	1	0	0	1	0	-	1	0	1	1	1	0	-	2	2	1	0	?	?	0	0	1	1	1	1
Scotophaeus quadripunctatus	0	-	-	-	-	1	1	0	0	?	0	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	?	?	0	0	1	1	1	1
Urozelotes rusticus	0	-	-	-	-	1	1	0	0	0	1	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	1	1	0	0	1	1	1	1
Vectius niger	0	-	-	-	-	1	1	0	0	0	0	0	0	1	0	-	1	0	0	0	1	0	-	1	1	1	0	1	1	0	0	1	0	1	1
Xerophaeus appendiculatus	0	-	-	-	-	1	1	0	0	?	0	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	?	?	0	0	1	1	1	1
Zelanda sp.	0	-	-	-	-	1	1	0	0	0	0	0	0	1	0	-	1	1	1	1	0	1	0	1	1	-	0	1	1	1	0	1	?	1	?
Zelotes subterraneus	0	-	-	-	-	1	1	0	0	?	1	0	0	1	0	-	1	0	1	1	1	0	-	1	2	1	0	?	?	0	0	1	1	1	1
Anagrina sp.	0	-	-	-	-	1	1	0	0	0	0	0	1	1	0	-	1	0	1	1	0	0	-	1	2	0	0	1	1	0	0	1	1	1	1
Austrodomus scaber	0	-	-	-	-	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	2	2	0	1	1	1	0	0	1	1	1	1
Austrodomus zuluensis	0	-	-	-	-	-	1	?	?	?	0	1	?	1	1	1	1	1	1	1	0	1	1	-	2	0	?	1	1	0	0	?	-	?	-
Brasilomma enigmatica	0	-	-	-	-	1	1	0	0	?	0	?	?	1	1	0	1	1	1	1	0	1	0	0	0	-	0	?	?	0	0	1	1	1	1
Caudalia insularis	0	-	-	-	-	-	1	?	?	?	0	?	?	1	1	1	1	1	1	1	0	1	1	-	2	0	?	1	1	0	0	?	-	?	-
Cf. Tricongius sp.	0	-	-	-	-	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0	0	1	0	0	?	1	0	1	1	1	1	1
Chileomma ruiles	0	-	-	-	-	1	1	0	0	?	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	-	0	?	?	0	0	1	1	1	1
Chileuma paposo	0	-	-	-	-	1	1	0	0	2	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	-	0	1	1	0	1	1	1	1	1
Chilongius palmas	0	-	-	-	-	1	1	0	0	2	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	-	0	1	1	0	1	1	1	1	1
Cryptoerithus occultus	0	-	-	-	-	1	1	0	0	0	0	0	0	1	0	-	1	1	1	1	0	0	-	0	2	1	0	1	1	1	0	1	1	1	1
Eleleis crinita	?	?	?	?	?	-	1	?	?	?	?	?	?	?	1	1	?	1	1	1	?	1	?	-	?	?	?	?	-	0	0	?	-	?	-
Eleleis sp.	0	-	-	-	-	1	1	0	1	2	0	1	1	1	1	1	1	1	1	1	0	1	1	2	2	1	0	1	1	0	0	1	1	1	1

MATRIX (cont.)

TAXON/CHARACTER	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205
Gen.1 AFR sp.1	0	-	-	-	-	1	1	0	1	4	0	1	1	1	1	1	1	1	1	1	0	1	1	0	2	1	0	1	1	0	0	1	1	1	1
Gen.1 AFR sp.2	0	-	-	-	-	1	1	0	?	?	0	?	1	1	1	1	1	1	1	1	0	1	1	0	2	1	0	1	1	0	0	1	1	1	1
Gen.2 AFR sp.1	0	-	-	-	-	1	1	0	1	4	0	1	1	1	1	1	1	1	1	1	0	1	1	0	2	1	0	1	1	0	0	1	1	1	1
Gen.2 AFR sp.2	0	-	-	-	-	1	1	0	?	?	0	?	1	1	1	1	1	1	1	1	0	1	1	0	2	1	0	1	1	0	0	1	1	1	1
Gen.3 AFR sp.1	0	-	-	-	-	1	1	0	1	4	0	1	1	1	1	1	1	1	1	1	0	1	1	0	2	1	0	1	1	0	0	1	1	1	1
Gen.3 AFR sp.2	0	-	-	-	-	1	1	0	?	?	0	?	1	1	1	1	1	1	1	1	0	1	1	0	2	1	0	1	1	0	0	1	1	1	1
Katumbea oxoniensis	?	?	?	?	?	-	1	?	?	?	0	?	?	?	1	1	?	1	1	1	?	1	1	-	?	?	?	1	-	0	0	?	-	?	-
Lygromma aff. *taruma*	0	-	-	-	-	1	1	1	?	?	0	1	1	1	1	1	1	1	1	1	0	1	0	2	2	0	0	1	1	0	0	1	1	1	1
Lygromma chamberlini	0	-	-	-	-	1	1	?	0	?	0	1	1	1	1	1	1	1	1	1	0	1	0	0	2	?	?	1	1	0	1	1	1	1	1
Lygromma gasnieri	0	-	-	-	-	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	0	0	2	0	0	1	1	0	1	1	1	1	1
Lygromma gertschi	0	-	-	-	-	1	1	?	?	?	0	?	1	1	1	1	1	1	1	1	0	1	1	0	0	-	0	1	1	0	0	1	1	1	1
Lygromma senoculatum	0	-	-	-	-	1	1	?	?	?	0	?	?	1	1	1	1	1	1	1	0	1	0	?	?	?	0	1	1	0	?	1	1	1	1
Lygromma ybyguara	0	-	-	-	-	1	1	0	?	?	0	0	0	1	1	1	1	1	1	1	0	1	0	2	?	?	0	?	1	0	0	?	1	?	1
Molycria mammosa	1	1	0	-	1	1	1	0	0	2	0	0	1	1	0	-	1	1	1	1	0	0	-	0	2	1	0	1	1	1	0	1	1	0	1
Moreno grande	0	-	-	-	-	1	1	0	0	0	0	?	0	1	1	0	1	1	1	1	0	1	0	0	2	0	0	1	1	0	0	1	1	1	1
Moreno morenoi	?	?	?	?	?	1	1	?	?	?	?	?	?	?	1	0	?	?	?	?	?	1	0	?	?	?	?	?	?	0	0	?	?	?	?
Moreno ramirezi	0	-	-	-	-	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0	2	?	?	0	?	1	0	0	1	1	1	1
Myandra cambridgei	0	-	-	-	-	1	1	0	0	1	0	0	1	1	0	-	1	1	1	1	0	0	-	0	2	1	0	1	1	1	0	1	1	0	1
Namundra sp.	0	-	-	-	-	1	1	0	?	2	0	1	1	1	1	1	1	1	1	1	0	1	1	-	2	1	0	1	-	0	0	1	-	0	-
Neozimiris pubescens	0	-	-	-	-	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	-	0	1	1	0	0	1	1	1	1
Neozimiris sp.	0	-	-	-	-	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	-	0	1	1	0	0	1	1	1	1
Nomindra kinchega	0	-	-	-	-	1	1	0	0	?	0	0	1	1	0	-	1	1	1	1	0	0	-	?	2	1	0	1	?	1	0	1	?	0	?
Oltacloea beltraoe	0	-	-	-	-	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	-	0	2	0	0	1	1	0	1	1	1	1	1
Oltacloea mutilata	?	?	?	?	?	1	1	?	?	?	?	?	?	?	1	0	?	?	?	?	?	1	-	?	?	?	?	?	?	0	1	?	?	?	?
Paracymbiomma carajas	0	-	-	-	-	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0	0	2	1	0	1	1	0	0	1	1	1	1
Plutonodomus kungwensis	0	-	-	-	-	-	1	?	?	?	?	?	?	1	1	1	1	1	1	1	0	1	1	-	?	?	?	?	-	0	0	?	-	?	-
Prodida longiventris	?	?	?	?	?	-	1	?	?	?	?	?	1	1	1	1	1	1	1	1	0	?	?	-	?	?	?	?	-	0	0	?	-	?	-
Prodidomus rufus	0	-	-	-	-	1	1	0	1	?	0	1	1	1	1	1	1	1	1	1	0	1	1	1	2	1	1	1	1	0	0	1	1	1	1
Prodidomus simoni	0	-	-	-	-	1	1	?	?	?	0	?	1	1	1	1	1	1	1	1	0	1	1	1	2	0	1	1	1	0	0	1	1	1	1
Prodidomus woodleigh	0	-	-	-	-	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	?	2	0	1	1	1	0	0	1	1	1	1
Prodidomus sp.	0	-	-	-	-	1	1	?	?	?	0	?	1	1	1	1	1	1	1	1	0	1	1	?	2	1	1	1	1	0	0	1	1	1	1
Purcelliana problematica	0	-	-	-	-	1	-	?	?	?	?	?	-	?	1	1	?	1	1	1	0	1	1	?	-	-	?	-	?	0	0	-	?	-	?
Purcelliana sp.	0	-	-	-	-	1	1	0	1	0	0	?	1	1	1	1	1	1	1	1	0	1	1	2	?	?	1	1	1	0	0	1	1	?	?
Theuma sp.1	1	1	1	0	0	1	1	0	0	2	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	-	0	1	1	0	0	1	1	1	1
Theuma sp.2	1	1	1	1	0	1	1	0	0	2	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	-	0	1	1	0	0	1	1	1	1
Theumella typica	?	?	?	?	?	1	-	?	?	?	?	?	?	?	1	1	?	1	1	1	0	1	0	?	?	?	?	?	?	?	?	-	?	-	?
Tivodrassus ethophor	0	-	-	-	-	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	1	1	-	0	1	1	0	0	1	1	1	1
Tricongius collinus	?	?	?	?	?	1	1	?	?	?	?	?	?	?	1	0	?	?	?	?	?	?	?	?	?	?	?	?	?	0	?	?	?	?	?
Tricongius amazonicus	0	-	-	-	-	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0	0	0	-	0	1	1	0	1	1	1	1	1
Wesmaldra bidgemia	1	0	1	0	2	1	1	0	0	3	0	0	1	1	0	-	1	1	1	1	0	0	-	0	2	0	0	1	1	1	0	1	1	?	1
Wydundra osbourne	1	1	?	?	?	1	1	0	0	3	0	0	1	1	0	-	1	1	1	1	0	-	-	-	2	0	0	1	?	1	0	1	?	1	?
Zimirina hirsuta	0	-	-	-	-	1	1	0	1	2	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	-	0	1	1	0	0	1	1	0	0
Zimiris doriai	0	-	-	-	-	1	1	0	1	2	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	-	0	1	1	0	0	1	1	1	1

MATRIX (cont.)

TAXON/CHARACTER	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
Xiruana gracilipes	0	0	-	0	1	1	1	1	0	0	0	-	1	1	0	0	0	0	1	1	1	1	0	0	0	1	0	1	0	-	0	0	1	0	1
Teminius insularis	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	1	1	0	-	0	0	1	0	0	0	0	0	-	0	0	0	0	1
Falconina gracilis	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	1	0	0	0	0	0	-	0	0	1	0	1
Gallianoela sp.	1	-	1	0	0	0	1	1	1	0	0	-	1	1	0	0	1	0	0	-	-	-	-	-	0	0	1	0	0	-	0	0	0	1	0
Cithaeron praedonius	1	0	1	0	1	1	1	1	0	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Lampona cylindrata	1	0	1	0	1	1	1	1	1	0	1	0	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	1	0	0
Phrurolithus festivus	1	0	1	0	0	0	0	1	1	0	0	-	1	0	0	0	1	0	1	0	-	0	0	1	0	0	0	0	0	-	0	1	0	0	0
Platyoides walteri	1	0	1	0	1	1	1	0	1	0	0	-	1	?	?	0	0	0	1	0	-	0	0	0	0	0	1	0	0	-	0	0	0	0	1
Anagraphis pallens	1	0	0	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	0	0	1
Anzacia mustecula	1	0	?	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Apopyllus silvestrii	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Asemesthes sp.	1	0	1	0	1	1	1	?	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	1	0	1	0	-	0	0	1	0	1
Drassodes lapidosus	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	1	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Drassodex hypocrita	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	1	1	0	-	0	1	0	0	0	0	0	0	-	0	0	0	0	1
Drassyllus fallens	1	?	1	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Encoptarthria echemophthalma	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Gnaphosa lucifuga	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Hemicloea sundevalli	1	0	0	0	1	1	1	1	1	0	0	-	1	0	-	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	0	0	1
Homoeothele micans	0	?	-	0	1	1	1	1	0	0	0	-	1	?	?	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Hypodrassodes maoricus	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	?	0	0	1	0	-	0	0	?	0	0	0	0	0	-	0	?	0	0	1
Latonigena auricomis	1	0	1	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	0
Leptodrassex sp.	1	0	0	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	0	0	1
Micaria fulgens	1	0	1	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Neodrassex aureus	1	0	?	0	1	?	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Nopyllus sp.	?	0	?	0	1	1	?	1	?	0	-	-	-	-	-	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	0	0	0
Pterotricha lentiginosa	1	0	1	0	1	1	1	?	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Scotophaeus quadripunctatus	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Urozelotes rusticus	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Vectius niger	1	0	1	0	1	0	0	0	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	1	0	0	-	0	0	0	0	1
Xerophaeus appendiculatus	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Zelanda sp.	1	0	1	0	1	1	1	?	?	0	0	-	1	1	0	?	0	0	1	0	-	0	0	?	0	0	0	0	0	-	0	?	0	0	1
Zelotes subterraneus	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	1	0	0	-	0	0	0	0	1
Anagrina sp.	1	0	0	0	1	1	1	1	1	0	0	-	?	?	?	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	1
Austrodomus scaber	0	0	-	1	0	0	1	1	0	0	1	1	0	-	-	0	0	0	1	1	0	0	0	0	0	0	0	0	0	-	0	0	1	0	0
Austrodomus zuluensis	?	?	?	1	?	-	?	-	?	0	1	1	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brasilomma enigmatica	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Caudalia insularis	?	?	?	1	?	-	?	-	?	0	1	1	?	?	?	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cf. Tricongius sp.	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	0	?	1
Chileomma ruiles	1	0	0	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Chileuma paposo	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	1	1	0	-	0	0	0	0	0	0	0	0	-	0	0	1	0	1
Chilongius palmas	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	1	1	0	-	0	0	0	0	0	0	0	0	-	0	0	1	1	1
Cryptoerithus occultus	1	0	1	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	1	0	1
Eleleis crinita	?	?	?	?	?	-	?	-	?	0	1	1	?	?	?	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleleis sp.	1	0	0	0	1	1	1	1	0	0	1	1	0	-	-	0	0	0	1	0	-	0	0	0	0	0	1	0	0	-	0	1	1	1	0

MATRIX (cont.)

TAXON/CHARACTER	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
Gen.1 AFR sp.1	1	0	0	0	1	1	1	1	1	0	1	1	1	0	1	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	1	1	0
Gen.1 AFR sp.2	1	0	0	0	1	1	?	1	1	0	1	1	?	?	?	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	1	?	0
Gen.2 AFR sp.1	1	0	0	0	1	1	1	1	1	0	1	1	0	-	-	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	1	1	0
Gen.2 AFR sp.2	1	0	0	0	1	1	?	1	1	0	1	1	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gen.3 AFR sp.1	1	0	0	0	1	1	?	1	1	0	1	1	1	0	1	0	0	0	1	0	-	0	0	0	1	0	0	0	0	-	0	0	1	1	0
Gen.3 AFR sp.2	1	0	0	0	1	1	?	1	1	0	1	1	?	?	?	0	0	0	1	0	-	0	0	0	1	0	0	0	0	-	0	0	1	?	0
Katumbea oxoniensis	?	?	?	?	?	-	?	-	?	0	1	1	?	?	?	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lygromma aff. *taruma*	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	1	0	0	0	0	-	0	0	0	?	1
Lygromma chamberlini	1	1	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	1	0	0	0	0	-	0	0	1	0	1
Lygromma gasnieri	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	1	0	0	0	0	-	0	0	0	?	1
Lygromma gertschi	1	0	0	0	1	1	1	1	1	0	0	-	1	0	0	0	0	1	1	0	-	0	0	0	1	0	0	0	0	-	0	0	0	?	1
Lygromma senoculatum	1	0	0	0	1	1	1	1	1	0	0	-	1	?	?	0	0	0	1	0	-	0	0	0	1	0	0	0	0	-	0	0	0	?	1
Lygromma ybyguara	?	0	0	0	?	1	?	1	?	0	-	-	-	-	-	-	0	1	1	0	-	0	0	0	0	0	0	0	0	-	0	1	1	?	1
Molycria mammosa	1	0	0	0	1	1	0	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Moreno grande	1	0	0	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	1	0	1
Moreno morenoi	?	0	0	?	?	?	?	?	?	0	0	-	1	1	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moreno ramirezi	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	0	0	1	0	1
Myandra cambridgei	1	0	0	0	1	?	0	?	1	0	0	-	1	0	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Namundra sp.	1	0	0	0	1	-	0	-	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Neozimiris pubescens	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	1	1	1	1
Neozimiris sp.	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	1	0	-	0	0	0	0	1	0	0	0	-	0	1	1	1	1
Nomindra kinchega	1	0	0	0	1	-	0	-	1	0	0	-	?	?	?	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Oltacloea beltraoe	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	1	1	1	1
Oltacloea mutilata	?	0	0	0	?	?	?	?	?	0	0	-	?	?	?	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	1	?	?	1
Paracymbiomma carajas	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	1	0	1	1	1
Plutonodomus kungwensis	?	?	?	?	?	-	?	-	?	0	1	1	?	?	?	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prodida longiventris	?	?	?	?	?	-	?	-	?	1	1	1	?	?	?	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prodidomus rufus	0	0	-	1	1	1	1	1	0	1	1	1	0	-	-	0	0	0	1	1	1	0	0	0	0	0	0	0	0	-	0	0	1	0	0
Prodidomus simoni	0	0	-	1	1	1	1	1	0	1	1	1	0	-	-	0	0	0	1	1	0	0	0	0	0	0	1	0	0	-	0	0	1	0	0
Prodidomus woodleigh	0	0	-	1	1	1	1	1	0	1	1	1	0	-	-	0	0	0	1	1	1	0	0	0	0	0	1	0	0	-	0	0	1	1	0
Prodidomus sp.	0	0	-	1	1	1	1	1	0	1	1	1	0	-	-	0	0	0	1	1	1	0	0	0	0	0	0	0	0	-	0	0	1	1	0
Purcelliana problematica	-	?	-	1	-	?	-	?	-	0	-	-	-	-	-	-	0	0	1	1	0	0	0	0	0	0	0	0	0	-	0	0	1	?	0
Purcelliana sp.	?	0	-	1	0	0	1	1	0	0	1	1	0	-	-	0	0	0	1	1	0	0	0	0	0	0	0	0	0	-	0	0	1	1	0
Theuma sp.1	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	1	0	0	0	1	1	0
Theuma sp.2	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	1	1	1	0
Theumella typica	-	?	?	?	-	?	-	?	-	0	-	-	-	-	-	-	0	0	1	0	-	0	0	0	0	0	0	0	1	0	0	1	1	1	1
Tivodrassus ethophor	1	0	0	0	1	1	1	1	1	0	0	-	1	0	0	0	0	0	1	0	-	0	1	0	0	0	0	0	0	-	1	0	1	1	1
Tricongius collinus	?	?	0	?	?	?	?	?	?	0	0	-	?	?	?	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	1	1	?	1
Tricongius amazonicus	1	0	0	0	1	1	1	1	1	0	0	-	1	1	0	-	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	1	1	?	1
Wesmaldra bidgemia	?	0	?	0	?	1	?	1	?	0	0	-	1	1	0	1	0	0	1	0	-	0	0	-	0	0	0	0	0	-	0	0	0	?	1
Wydundra osbourne	1	0	1	0	1	?	1	?	1	0	0	-	1	1	0	1	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	0	0	?	1
Zimirina hirsuta	0	1	-	0	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	0	-	0	0	0	0	0	0	0	1	1	0	1	1	1	0
Zimiris doriai	1	0	0	0	1	1	1	1	1	0	1	1	1	0	1	0	0	0	1	0	-	0	0	0	0	0	0	0	0	-	0	1	1	?	0

MATRIX (cont.)

TAXON/CHARACTER	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281
Xiruana gracilipes	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	1	0	0	1	0	1	0	0	2	2	0	0	0	0
Teminius insularis	0	0	0	1	1	-	-	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	0	2	1	0	1	0	0	0	2	0	0	0	0
Falconina gracilis	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	-	-	0	-	0	1	1	0	0	1	0	1	0	0	1	2	0	0	1	0
Gallianoela sp.	-	-	-	-	0	-	-	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	0	1	0	1	2	0	0	1	0	0
Cithaeron praedonius	0	1	1	0	0	-	-	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	-	0	0	0	-	-	1	0	1	-	0	?	0	0	0	0	0
Lampona cylindrata	-	-	-	-	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	1	1	0	1	0	2	0	0	0	0
Phrurolithus festivus	-	-	-	-	1	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	-	-	0	-	0	0	1	0	1	1	0	1	1	0	?	2	0	0	1	0
Platyoides walteri	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	1	0	1	2	0	0	2	0	0	0	0
Anagraphis pallens	0	0	1	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	1	1	0	0	1	1	0	1	0	1	0	1	2	2	0	0	1	0
Anzacia mustecula	0	0	0	1	1	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	1	1	0	1	0	1	2	0	?	2	0	0	0	0
Apopyllus silvestrii	0	1	0	1	0	-	-	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	1	0	1	0	0	1	0	0	0	0	0
Asemesthes sp.	1	0	1	0	0	-	-	1	1	0	0	1	0	0	1	1	0	0	0	0	1	1	1	1	1	0	0	1	0	0	1	0	1	0	0	2	2	0	0	0	0
Drassodes lapidosus	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	1	1	0	1	0	1	2	0	0	2	0	0	0	0
Drassodex hypocrita	0	0	0	1	0	-	-	1	1	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	-	1	1	0	1	-	0	?	1	0	0	0	0
Drassyllus fallens	0	0	1	1	0	-	-	1	1	0	0	1	0	0	1	1	0	0	0	0	1	0	1	1	1	0	1	1	0	0	1	0	1	0	0	?	2	0	0	0	0
Encoptarthria echemophthalma	0	0	0	1	1	0	1	1	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	1	0	2	1	0	1	0	1	2	2	0	0	0	1
Gnaphosa lucifuga	0	1	0	1	0	-	-	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0
Hemicloea sundevalli	0	1	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1	0	0	1	1	0	-	0	1	2	0	?	0	0
Homoeothele micans	0	0	0	1	1	0	1	0	0	?	?	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	1	0	1	2	0	2	2	0	0	0	0
Hypodrassodes maoricus	0	0	0	1	1	0	1	1	1	0	0	1	0	0	1	0	?	0	0	0	1	1	1	1	1	0	0	1	1	0	1	0	1	1	0	2	2	0	0	0	0
Latonigena auricomis	-	-	-	-	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	0	1	0	1	1	0	1	0	0	0	2	0	0	0	0
Leptodrassex sp.	0	0	0	1	0	-	-	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	-	1	0	1	1	0	1	1	0	-	0	1	2	0	0	0	1
Micaria fulgens	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	0	1	1	2	1	0	1	0	1	0	2	0	0	0	0
Neodrassex aureus	0	0	0	1	0	-	-	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	-	1	1	1	1	1	1	1	0	-	0	1	2	0	0	0	1
Nopyllus sp.	-	-	-	-	1	-	-	0	0	0	0	1	0	0	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Pterotricha lentiginosa	0	0	0	1	1	1	0	1	1	0	1	1	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	1	1	2	1	0	1	0	0	0	2	0	?	0	0
Scotophaeus quadripunctatus	0	0	0	1	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	1	1	0	1	0	0	2	2	0	?	0	0
Urozelotes rusticus	1	0	1	1	0	-	-	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	1	0	0	1	0	0	1	0	1	0	0	0	2	0	0	0	0
Vectius niger	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	1	0	0	0	0	1	2	0	0	0	0
Xerophaeus appendiculatus	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	1	0	1	0	1	0	0	2	2	0	0	0	0
Zelanda sp.	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	1	?	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0	1	0	1	1	2	0	1	1	0
Zelotes subterraneus	1	0	1	1	0	-	-	1	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	1	1	0	0	1	0	0	1	0	1	0	0	0	2	0	0	0	0
Anagrina sp.	0	1	1	0	0	-	-	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	-	0	0	1	1	0	1	0	1	0	0	?	2	0	0	0	0
Austrodomus scaber	-	-	-	-	1	0	1	1	0	0	0	1	0	1	0	0	0	0	1	0	0	-	-	0	-	0	0	0	-	-	0	-	-	-	-	-	0	0	0	1	0
Austrodomus zuluensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	-	-	0	-	0	0	1	1	2	0	-	-	-	-	-	0	0	1	1	0
Brasilomma enigmatica	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	0	0	-	-	0	-	-	-	-	-	0	0	1	0	0
Caudalia insularis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	-	-	0	-	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Cf. Tricongius sp.	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	?	?	?	1	1	1	0	0	-	-	1	0	1	-	0	0	2	?	0	0	0
Chileomma ruiles	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	-	-	1	?	0	1	0	-	-	?	?	?	-	?	?	0	1	?	?	?
Chileuma paposo	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	-	-	1	1	0	1	0	-	-	1	0	1	-	0	0	0	1	1	1	0
Chilongius palmas	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	1	0	-	-	1	0	1	-	0	?	0	1	?	1	0
Cryptoerithus occultus	0	0	0	1	1	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	-	-	?	?	?	?	?	?	2	0	?	0	1
Eleleis crinita	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	?	?	?	?	?	0	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Eleleis sp.	-	-	-	-	1	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	-	-	0	-	0	1	1	1	0	1	0	1	1	0	0	0	1	0	0	0

MATRIX (cont.)

TAXON/CHARACTER	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281
Gen.1 AFR sp.1	-	-	-	-	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	1	1	1	0	1	0	0	2	0	0	2	0	0
Gen.1 AFR sp.2	-	-	-	-	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	1	1	1	0	1	0	0	2	0	0	2	0	0
Gen.2 AFR sp.1	-	-	-	-	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	1	0	1	0	1	0	0	1	0	0	2	0	0
Gen.2 AFR sp.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	-	0	0	1	1	0	1	0	1	0	0	1	0	0	2	0	0
Gen.3 AFR sp.1	-	-	-	-	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	1	0	1	1	0	1	0	1	0	0	0	0	0	1	0	0
Gen.3 AFR sp.2	-	-	-	-	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	1	1	0	1	0	1	0	0	0	0	0	1	0	0
Katumbea oxoniensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	-	-	0	-	0	0	1	1	2	0	-	-	-	-	-	0	0	1	1	0
Lygromma aff. *taruma*	0	0	0	1	0	-	-	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	0	0	-	-	1	0	1	-	1	2	0	0	0	0	0
Lygromma chamberlini	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	1	1	0	0	0	-	-	1	0	1	-	1	0	0	1	1	0	0
Lygromma gasnieri	0	0	0	1	0	-	-	1	0	0	0	1	0	0	0	0	1	0	0	0	0	-	-	1	1	0	0	1	1	0	1	0	1	0	1	2	0	0	1	0	0
Lygromma gertschi	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	0	0	-	-	0	-	-	-	-	-	0	0	0	0	0
Lygromma senoculatum	0	0	0	1	0	-	-	0	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	0	1	1	1	?	?	?	?	?	?	0	0	0	0	0
Lygromma ybyguara	0	0	1	0	0	-	-	0	0	0	0	1	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molycria mammosa	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	-	0	1	1	0	0	1	1	1	0	0	1	2	0	0	0	0
Moreno grande	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	1	1	0	0	0	-	-	1	0	1	-	1	0	0	1	1	0	0
Moreno morenoi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	-	-	?	?	0	0	0	-	-	1	0	1	-	1	0	0	1	1	0	0
Moreno ramirezi	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	1	1	0	0	0	-	-	1	0	1	-	1	0	0	1	1	0	0
Myandra cambridgei	0	0	0	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	-	0	1	0	-	-	1	0	1	-	0	1	2	0	0	0	0
Namundra sp.	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	?	0	0	1	0	0	?	?	?	?	?	?	2	0	0	0	0
Neozimiris pubescens	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	1	1	0	0	1	1	2	1	0	1	1	0	0	2	0	0	1	0
Neozimiris sp.	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	1	1	0	0	1	0	0	1	0	1	1	0	0	2	0	0	1	0
Nomindra kinchega	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	-	0	1	0	-	-	1	0	1	-	0	1	2	0	0	0	0
Oltacloea beltraoe	0	2	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	-	-	1	0	1	-	0	0	0	0	0	0	0
Oltacloea mutilata	0	2	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	1	1	0	0	0	-	-	1	0	1	-	0	2	0	1	0	0	0
Paracymbiomma carajas	0	1	0	1	1	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	-	-	1	?	0	1	0	-	-	1	0	1	-	1	2	0	1	0	0	0
Plutonodomus kungwensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	-	-	0	-	0	0	0	-	-	1	0	1	-	1	2	2	0	0	0	0
Prodida longiventris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Prodidomus rufus	-	-	-	-	0	-	-	1	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	1	1	0	0	-	-	?	?	?	-	?	?	0	1	1	0	0
Prodidomus simoni	-	-	-	-	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	-	0	-	0	0	0	-	-	0	-	-	-	-	-	0	0	0	0	0
Prodidomus woodleigh	-	-	-	-	1	0	1	1	0	0	0	1	0	1	0	0	0	0	1	0	0	-	-	1	?	0	0	0	-	-	0	-	-	-	-	-	0	0	0	0	0
Prodidomus sp.	-	-	-	-	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	-	-	0	-	0	0	0	-	-	0	-	-	-	-	-	0	0	0	0	0
Purcelliana problematica	-	-	-	-	1	0	1	1	0	0	0	1	0	1	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Purcelliana sp.	-	-	-	-	1	0	1	1	0	0	0	1	0	1	0	0	0	0	1	0	0	-	-	1	0	0	0	0	-	-	0	-	-	-	-	-	0	0	0	1	0
Theuma sp.1	-	-	-	-	0	-	-	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	-	-	-	-	-	0	1	0	0	0
Theuma sp.2	-	-	-	-	0	-	-	1	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	-	0	1	1	1	0	1	0	0	0	0	2	2	1	1	0	0
Theumella typica	0	0	0	0	0	-	-	1	0	0	0	1	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tivodrassus ethophor	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	1	1	0	0	0	-	0	0	-	0	0	0	-	-	1	0	1	-	1	?	0	1	1	0	0
Tricongius collinus	0	2	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	-	-	1	0	1	-	0	0	0	0	0	0	0
Tricongius amazonicus	0	2	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	-	0	1	1	0	0	0	-	-	?	?	?	-	?	?	0	0	0	0	0
Wesmaldra bidgemia	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	-	0	1	1	0	0	1	0	1	0	0	2	2	0	0	0	0
Wydundra osbourne	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1	0	0	1	0	1	0	0	2	2	0	0	0	0
Zimirina hirsuta	-	-	-	-	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	-	-	1	1	0	0	1	0	2	1	0	1	0	1	0	2	0	0	1	0
Zimiris doriai	-	-	-	-	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	-	-	1	1	0	0	1	1	0	1	0	1	0	0	0	2	0	0	1	0

CHAPTER 2

An overview of the African genera of Prodidominae spiders: descriptions and remarks (Araneae; Gnaphosidae)

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Abstract. A taxonomic revision of exclusively African genera is provided. *Austrodomus* Lawrence is revised. The type species *A. zuluensis* Lawrence, 1947 and *A. oxoniensis* (Cooke, 1964) are redescribed, the male of *A. scaber* (Purcell, 1904) is described for the first time and one new species, *A. gamsberg* **sp. nov.** (♂) is described from Namibia. *Eleleis* Simon is revised: the type species, *E. crinita* Simon, 1893, is redescribed and eight new species are described, *E. limpopo* **sp. nov.** (♂♀) from South Africa and Zambia, *E. okavango* **sp. nov.** (♂♀) from Botswana and Namibia, *E. etosha* **sp. nov.** (♂♀), *E. himba* **sp. nov.** (♂) and *E. luderitz* **sp. nov.** (♀) from Namibia, *E. leleupis* **sp. nov.** (♂) and *E. haddadi* **sp. nov.** (♀) from South Africa and *E. solitaria* **sp. nov.** (♀) from Cape Verde. *Purcelliana* Cooke is revised: the type species, *P. problematica* Cooke, 1964 is redescribed and three new species are described, *P. kamaseb* **sp. nov.** (♂♀) and *P. khabus* **sp. nov.** (♂♀) from Namibia and *P. cederbergis* **sp. nov.** (♂) from South Africa. *Plutonodomus* Cooke and *Theumella* Strand are redescribed based only on their type species, *P. kungwensis* Cooke, 1964 and *T. typica*. In addition, three new genera are described: *Kikongo* **gen. nov.** to include *K. ruwenzori* **sp. nov.** (♂♀) and *K.buta* **sp. nov.** (♂♀) from Congo and *K. rutshuru* **sp. nov.** (♂♀)

from Congo and Kenya; *Kituba* **gen. nov.** to include *K. mayombensis* **sp. nov.** (♂♀) and *K. langalanga* **sp. nov.** (♀) from Congo; and *Yoruba* **gen. nov.** to include *Y. ibadanus* **sp. nov.** (♂♀) from Nigeria and *Y. toubensis* **sp. nov.** (♂♀) from Ivory Coast. Distribution maps are provided for genera included in this study and an identification key is provided for all thirteen genera of Prodidominae recorded in Africa.

Keywords: Afrotropical region**,** taxonomy**,** spiders, new species

Introduction

Prodidominae Simon, 1884 was recently reestablished as subfamily of Gnaphosidae Pocock, 1898 (Azevedo *et al.* 2018). It is characterized by having the incomplete distal article of the anterior lateral spinnerets composed of patches of setae closely associated to the piriform gland spigots, with their base longer than the shaft (Platnick 1990; Azevedo *et al.* 2018). In a recent cladistic analysis of Prodidominae genera, the subfamily was redefined to include 25 genera of small to medium-sized spiders distributed worldwide (Rodrigues & Rheims, in prep, chapter 1). Of these, ten genera are recorded from Africa (*Austrodomus* Lawrence, 1947, *Eleleis* Simon, 1893, *Namundra* Platnick & Bird, 2007, *Plutonodomus* Cooke, 1964, *Prodidomus* Hentz, 1847, *Purcelliana* Cooke, 1964, *Theuma* Simon, 1893, *Theumella* Strand, 1906, *Zimirina* Dalmas, 1919 and *Zimiris* Simon, 1882), seven of which occur exclusively in the region (World Spider Catalog, 2018). Only *Prodidomus, Zimirina* and *Zimiris* are recorded outside the African continent. *Prodidomus* is distributed in all biogeographic regions and is the most diverse genus of the subfamily with 53 species. *Zimirina* is predominantly Palaeartic with records in northern Africa and southern Europe, and only one of the 15 species, *Z. transvaalica* Dalmas, 1919, is recorded from South Africa.

Zimiris comprises two species, with *Z. doriai* Simon, 1882 being synantropic, with Cincuntropical distribution (World Spider Catalog, 2018).

Prodidominae spiders gained attention only recently, with more than half of the known species being described in last 15 years. However, most studies including descriptions of African Prodidominae are old with poor descriptions and illustrations (Purcell 1904, 1907; Dalmas 1919; Tucker 1923; Lawerence 1927, 1947; Cooke 1964). Only *Namundra* is relatively recent (Platnick & Bird, 2007), with four species described from Namibia and Angola (World Spider Catalog, 2018). In the most comprehensive study of the family Prodidomidae (currently Prodidominae), Cooke (1964) provided an identification key that included nine African genera. Nevertheless, the descriptions and illustrations are poor, probably limited by the resources available at the time.

When examining the type specimens and additional material of several African genera from different collections, we observed a great inconsistency in the identification of this material, even at genus level. Thus, in order to improve and clarify the taxonomic limits of these genera, we made an effort to revise some of the African genera, as well as to describe new species and genera.

Of the ten genera known from Africa, *Theuma*, *Namundra*, *Prodidomus*, *Zimirina* and *Zimiris* were not included in this revision. *Theuma* is a large and very abundant genus in southern Africa and merits a separate revision. It is currently comprised of 26 species, the most recent described by Lawrence (1947). Only five species are known from both sexes and two were described based on juveniles. In addition, the preliminary examination of 16 type specimens suggests that some of them are not congeneric with the type species, *T. walteri* (Simon, 1889), and should be placed in new genera. *Namundra* was recently described with excellent descriptions and illustrations (Platnick & Bird 2007). Also, the type specimens were not examined and an insufficient amount of material belonging to this genus was studied. *Prodidomus*, *Zimirina* and *Zimiris* were not revised, since they have wide distribution ranges and are not exclusively African, thus should be treated separately in a more comprehensive manner.

In view of the above, the aim of this study is to revise the poorly known African genera *Austrodomus, Eleleis, Plutonodomus, Purcelliana* and *Theumella*, and describe three new genera, *Kikongo* **gen. nov.,** *Kituba* **gen. nov.** and *Yoruba* **gen. nov**. In addition, we include an identification key to all Prodidominae recorded in the African region and updated maps with their current distribution.

MATERIAL AND METHODS

The examined material is deposited in the following institutions (acronyms and curators in parentheses): Agricultural Research Council, National Collection of Arachnida, Petroria, South Africa (ARC.LNR, R. Lyle); Iziko South African Museum, Cape Town, South Africa (SAMC [SAM], D. Larson); Museum National d'Histoire Naturelle, Paris, France (MNHN, C. Rollard); National Museum Bloemfontein, South Africa (NMBA, L. Lotz); National Museum of Namibia, Windhoek, Namibia (NMNW [SMN], B. Muramba); Oxford University Museum of Natural History, Oxford, United Kingdom (OUMNH, Z.M. Simmons); Royal Museum of Central Africa, Tervuren, Belgium (RMCA, D. Van den Spiegel).

Morphological observations and illustrations were made under a Leica MZ165C stereomicroscope with camera lucida. Format of descriptions follow Rodrigues *et al*. (2018) and terminology follows Platnick & Shadab (1976), Ramirez (2014) and Rodrigues *et al*. (2018). Only characters differing from the generic pattern are mentioned in the species description. All measurements are in millimeters. The number and arrangement of spines are expressed according to Petrunkevitch (1925). Leg measurements are listed as: total length (femur, patella, tibia, metatarsus, tarsus). Leg measurements of *A. zuluensis* Lawrence, 1947 and *Plutonodomus kungwensis* Cooke, 1964 follows Cooke (1964). For visualization of internal structures of the female genitalia, the epigyne was detached from the body and digested with contact lens cleaner enzyme Ultrazime®. Compound digital photographs were taken using a DFC295 camera mounted in a Leica M205A stereomicroscope. Extended focal range images were composed with the program Leica Application Suite version 3.3.0. Scanning electron micrographs (SEM) were taken with a FEI Quanta 250 scanning electron microscope from the Laboratório de Biologia Celular at the Instituto Butantan. For SEM preparations, the specimen was selected and cleaned with brushes or with ultrasonic cleaner. Then the material was dissected and dehydrated through a series of graded ethanol (80% to 100%), critical-point dried, fixed on metal stubs with adhesive copper tape and sputter coated with gold.

Geographical coordinates of collection localities were obtained from the labels or georeferenced approximately using Google Earth (and are given in square brackets). Distribution maps were prepared on SimpleMappr (Shorthouse, 2010).

Abbreviations used throughout the text follow Ramirez (2014), Azevedo *et al.* (2018) and Rodrigues *et al.* (2018): **A**—atrium; **Ac**—aciniform gland spigot; **ALS**—anterior lateral spinnerets; **C**—conductor; **CbRP**—cymbyal retrolateral process; **CD**—copulatory duct; **CO**—copulatory opening; **Cy**—cylindrical gland spigot; **dRTA**—dorsal retrolateral tibial apophysis; **E**—embolus; **FD**—fertilization duct; **LETe**—laminar extension of tegulum; **MA**—median apophysis; **MaAm**—major ampullate gland spigot; **MiAm**—minor ampullate gland spigot; **Pi**—piriform gland spigots; **PLS**—posterior lateral spinnerets; **PMD**—posterior median depression; **PMEx**—

posterior median excavation; **PMS**—posterior median spinnerets; **PS**—primary spermathecae; **RTA**—retrolateral tibial apophysis; **TeP**—tegular projection; **vRTA**—ventral retrolateral tibial apophysis; **VTA**—ventral tibial apophysis; **SS**—secondary spermathecae.

TAXONOMY

KEY TO AFRICAN GENERA OF PRODIDOMINAE

1 – Eyes absent (Fig. 35C).. *Plutonodomus*

- Eyes present (Figs 1D, E).. 2

2(1) – Posterior eye row straight or slightly curved (Fig. 1D)....................................... 3

- Posterior eye row notably procuverd (Fig. 1E)... 6

3(2) – Spinnerets with ALS long and well advanced anteriorly (Fig. 1G)...... *Namundra*

- Spinnerets with ALS close to posterior spinnerets or slightly distant (Fig. 1F).......... 4

4(3) – Presence of long and erect setae between ALS and posterior spinnerets (Fig. 37H).. 5

- Absence of long and erect setae between ALS and posterior spinnerets.......... .... *Theuma* (in part)

5(4) –AME more or equal than ALE (Fig. 37D) .... *Theumella*

- AME smaller than ALE.. *Theuma* (in part)

6(5) –Spinnerets with PLS extremely massive and truncate (Fig. 1H).........*Prodidomus*

- Spinnerets with PLS normal 7

7(6) – Spinnerets with ALS advanced anteriorly, separated from the other spinnerets (Fig. 1F)…. .... *Zimiris*

- Spinnerets with ALS normal, close to the other spinnerets (Fig. 1I).......................... 8

8(7) – Occurrence of clavate setae along the body (Figs 1A, B) 9

- Normal setae along the body. 10

9(8) – Clavate setae short and similar sized (Fig. 1B) .... *Purcelliana*

- Clavate setae of different size, mainly on carapace and legs (Fig. 1A) ....*Eleleis*

10(7) – Patella I long, length similar to tibia length (Fig. 1C)…..................................11

- Patella I short, length less than tibia length. ....*Zimirina*

11(10) – ALS wider than long or as wide as long (Fig. 2F) 12

- ALS longer than wide (Figs 1F, G)..13

12(10) – PMS-PLS with claviform setae (Fig. 2F) ....*Austrodomus*

- PMS-PLS without claviform setae... *Kituba* **gen. nov.**

12(10) – Males with filiform embolus and small hyaline conductor; female epigyne with wide C-shaped copulatory openings and vulva with secondary spermathecae rounded (Figs 55A–E) ....*Kikongo* **gen. nov.**

- Males with embolus robust and long and laminar conductor partially sclerotized; female epigyne with wide copulatory opening located medially, vulva with proximal part of copulatory ducts enlarged and secondary spermathecae reduced to a small lump (Figs 62A–E)... *Yoruba* **gen. nov.**

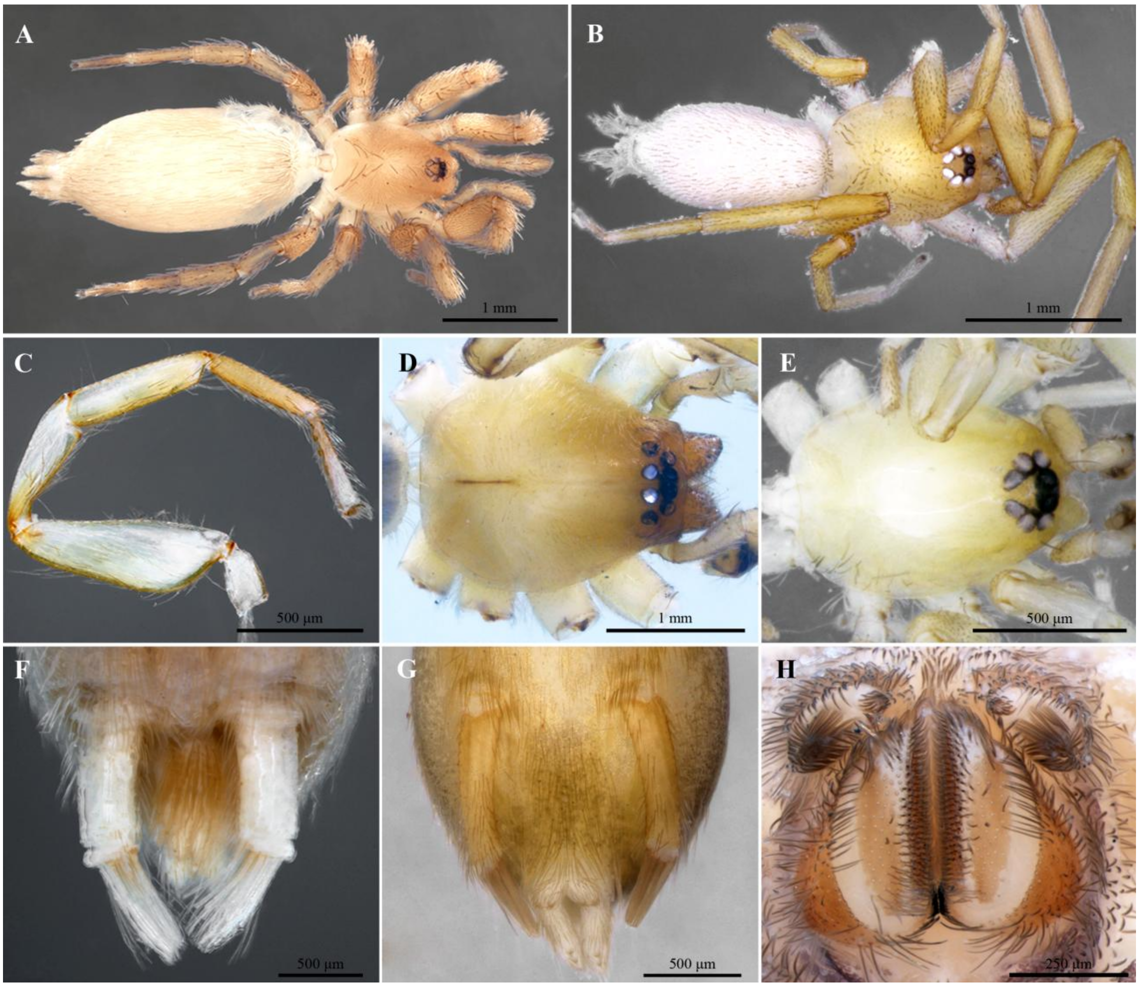

FIGURE 1. (A) *Eleleis solitaria* **sp. nov.**, female, habitus, dorsal view; (B) *Purcelliana problematica*, male, habitus, dorsal view; (C) *Austrodomus scaber*, female, leg I; (D) *Theuma* sp., male, carapace, dorsal view; (E) *Zimirina hirsuta*, male, carapace, dorsal view; (F) *Zimiris doriai*, female, spinnerets, ventral view; (H) *Namundra* sp., female, spinnerets, ventral view; (H) *Prodidomus simoni*, female, spinnerets, apical view.

Genus *Austrodomus* Lawrence, 1947

Austrodomus Lawrence, 1947: 10. (Type species by monotypy, *Austrodomus zuluensis* Lawrence, 1947). Cooke, 1964: 264.

Katumbea Cooke, 1964 (Type species by monotypy, *Katumbea oxoniensis* Cooke, 1964). Rodrigues & Rheims (in prep, chapter 1) (Syn.)

Diagnosis. Species of *Austrodomus* are distinguished from those of other Prodidominae genera by the male palp with wide embolar base with large membranous area and hyaline conductor (Figs 8B, 9B); female epigyne with inverted U-shaped positioning ridges and small, posterior, triangular or C-shaped pocket-like structures pointing towards each other (Figs 7A, D, 8D); vulva with proximal part of copulatory ducts enlarged with swollen pouch-like area (Figs 7B, E, 8E).

Description. Total length of males 1.66–2.5 and females 2.04–5.34. Carapace and legs yellow, and abdomen grayish (Figs 2A, B). Carapace longer than wide, oval (Figs 2A, B). Fovea absent. Eight eyes; posterior eye row strongly procurved (Figs 2A, B, 3A), anterior eye row approximately straight (Figs 2C, 3C); PME and PLE irregular; AME dark (Fig. 2C); interdistance contiguous of AME–ALE, PME–PLE, ALE–PLE. Chilum absent. Chelicerae large (0.31–0.52), without boss, generally projected ventrally (Figs 3A–D); retromargin with one reduced tooth (Fig. 3F), except *A. oxoniensis* apparently toothless; long fang without shaft serrula (Figs 3D–F). Endites convergent anteriorly, with few hairs on internal margin, pointed distal margin, serrula absent (Fig. 3D); labium approximately wider than long (Fig. 3D). Sternum longer than wide, anterior margin rounded, rebordered anteriorly and laterally; posterior region strongly protruding between coxae IV with numerous long and erect setae (Figs 2D, 3B); intercoxal setae present; precoxal triangles present (Fig. 2D). Pedicel with anterior region truncate (Fig. 2D). Leg formula 4123. Legs III and IV with spines in femur, tibia and metatarsus, only *A. oxoniensis* with one dorsal spine in femur I. Patella I larger than the others, length similar to tibia I. Trichobothria present on dorsal tibia, metatarsi and tarsi, arranged in two rows; bothrium with four ridges on proximal plate (Fig. 4C). Tarsal organ capsulate with rounded opening, located dorsally and distally on tarsi. Two smooth claws (Figs 4A, B); dense claw tufts of tenent setae inserted in a well-delimited plate (Fig. 4A, B); tarsus with modified apical ventral setae (Fig. 4D); presence of solid claw tuft clasper. Abdomen oval, longer than wide (Figs 2A, B); without scales; dorsum of abdomen anteriorly without curved setae. Six spinnerets; ALS as long as wide, contiguous (Figs 2E, F), piriform gland spigots elongated with associated setae (Figs 5A, C), major ampular gland spigot field on a conical and well-defined structure (Fig. 5D), males and females with two major ampular gland spigots (Figs 5A, D); PLS and PMS short, PLS larger than PMS (Figs 5B, C); PMS-PLS with claviform setae (Fig. 5B); PLS in males and females apparently with only one minor ampular gland spigot (Figs 5B, E), without aciniform gland spigots and cylindrical gland spigot; PMS in males with apparently two aciniform gland spigots and one minor ampular gland spigot, females with two aciniform gland spigots and one minor ampular gland spigot (Fig. 5F). Female palp: tarsus truncated with apical chemosensory patch without claw (Figs 4E, F). Male palp: femur unmodified; tibia short, less than half cymbium length. Two RTAs, vRTA robust and dRTA with wide base, distally pointed; cymbium with apical scopula; bulb ovoid with a tegular laminar extension at distal part; sperm duct wide; embolus arising prolaterally at 9 o'clock position; conductor hyaline arising at 12 o'clock position (Figs 6A–D, 8B, C, 9B, C). Epigyne: epigynal plate with paired copulatory openings located medially (Figs 6E, 7A, D, 8D). Vulva: copulatory ducts convoluted laterally; secondary spermathecae absent; primary spermathecae conspicuous, rounded, located laterally to copulatory opening, except *A. scaber* with inconspicuous primary spermathecae; fertilization ducts laterad (Figs 6F, 7B, E).

Distribution. Namibia, South Africa and Tanzania (Fig. 10).

Composition. Four species: *Austrodomus gamsberg* **sp. nov.**, *A. oxoniensis* (Cooke, 1964), *A. scaber* (Purcell, 1904) and *A. zuluensis* Lawrence, 1947.

FIGURE 2. *Austrodomus scaber*, female. (A) habitus, dorsal view. *A. zuluensis*, female. (B) habitus, dorsal view; (C) chelicerae, frontal view; (D) sternum and endites; (E) spinnerets, lateral view; (F) spinnerets, ventral view.

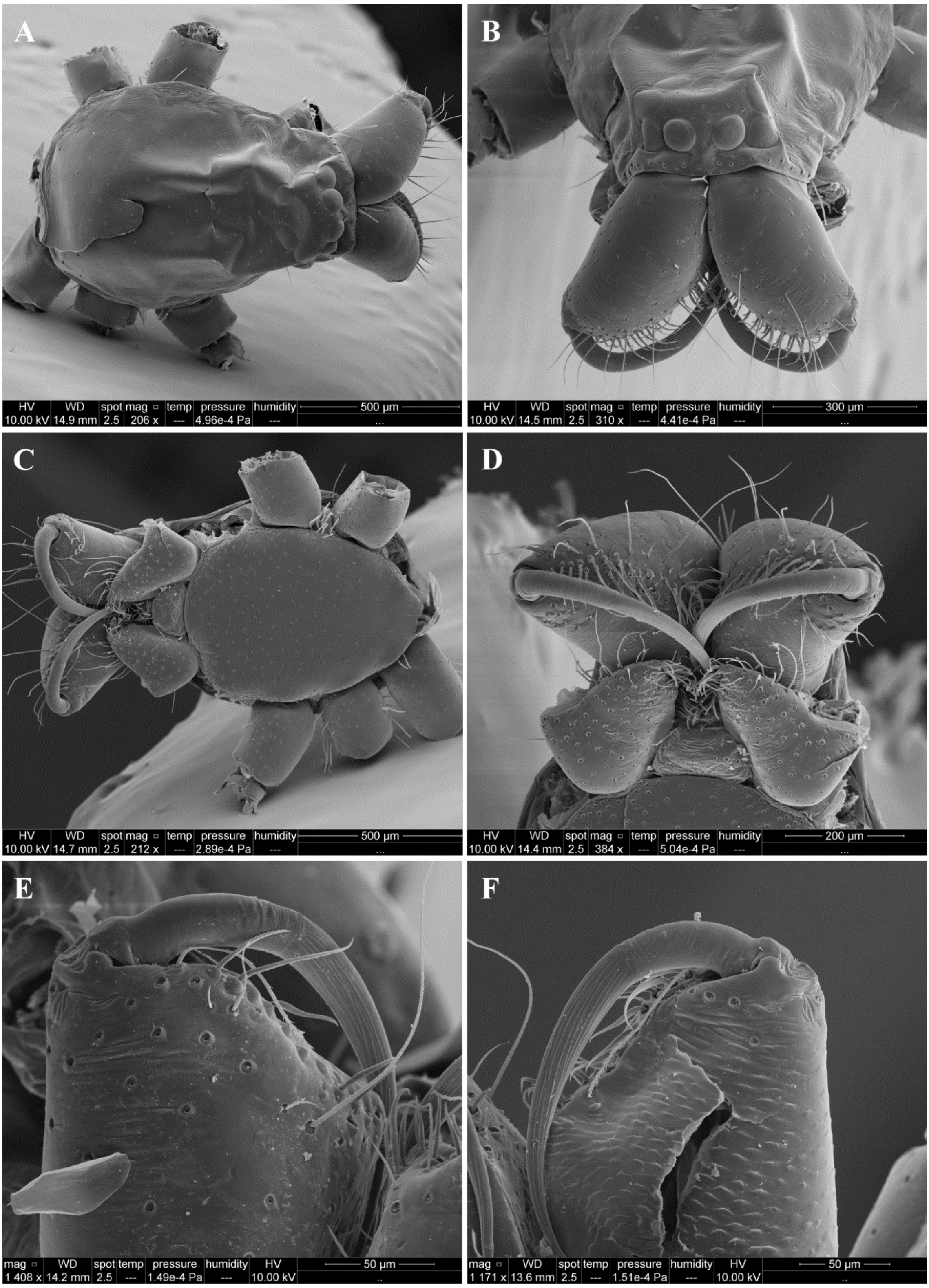

FIGURE 3. *Austrodomus scaber*, female. (A) carapace, dorsal view; (B) carapace, frontal view; (C) sternum; (D) endites, ventral view; (E) chelicerae, promargin; (F) chelicerae, retromargin.

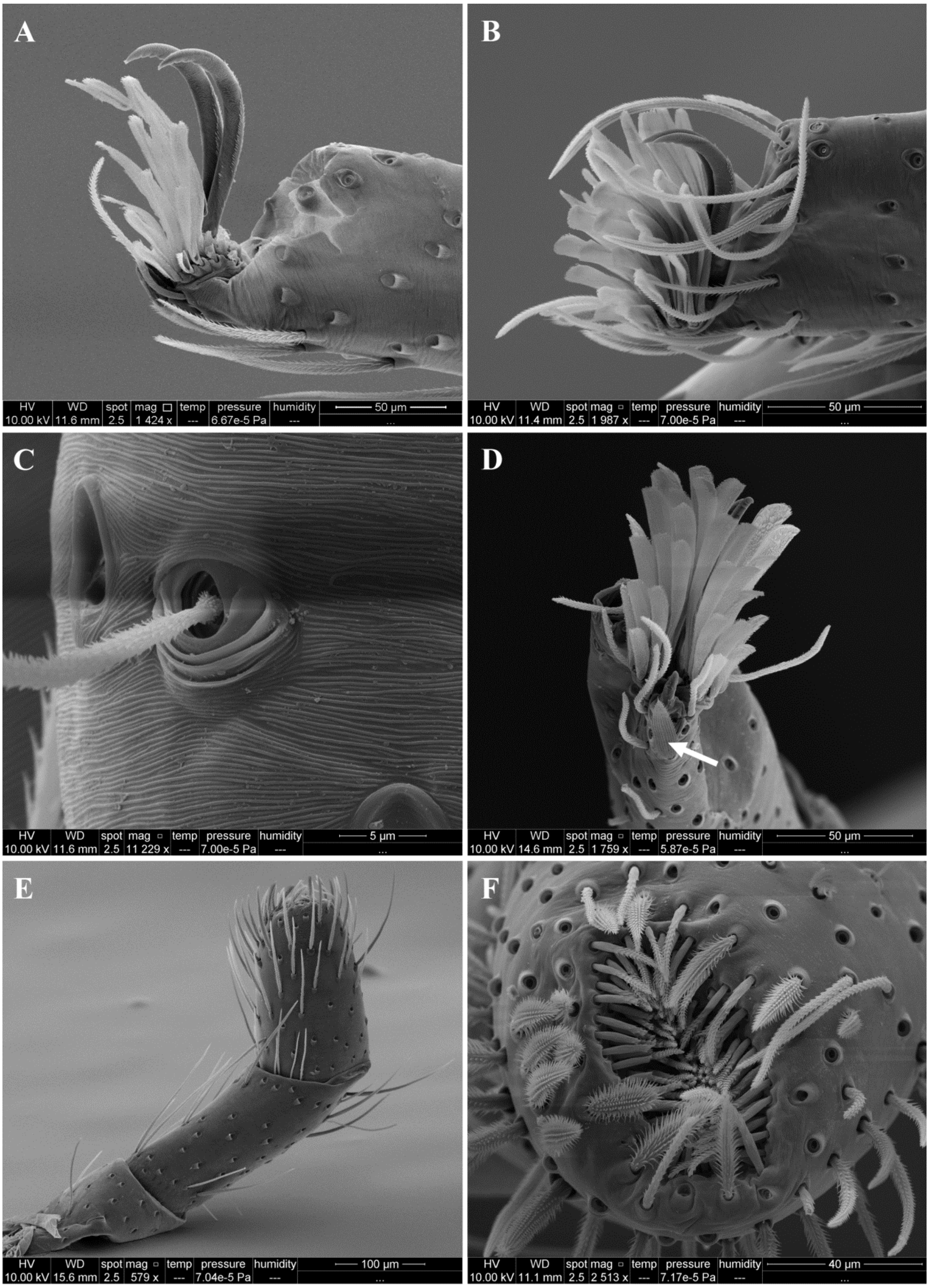

FIGURE 4. *Austrodomus scaber*, female. (A) tarsus IV, claw, retrolateral view; (B) tarsus IV, claw, retrolateral view; (C) same, trichobothria (D) tarsus I, ventro-apical, arrow to modified setae; (E) female palp, retrolateral view; (F) same, tarsus, view frontal.

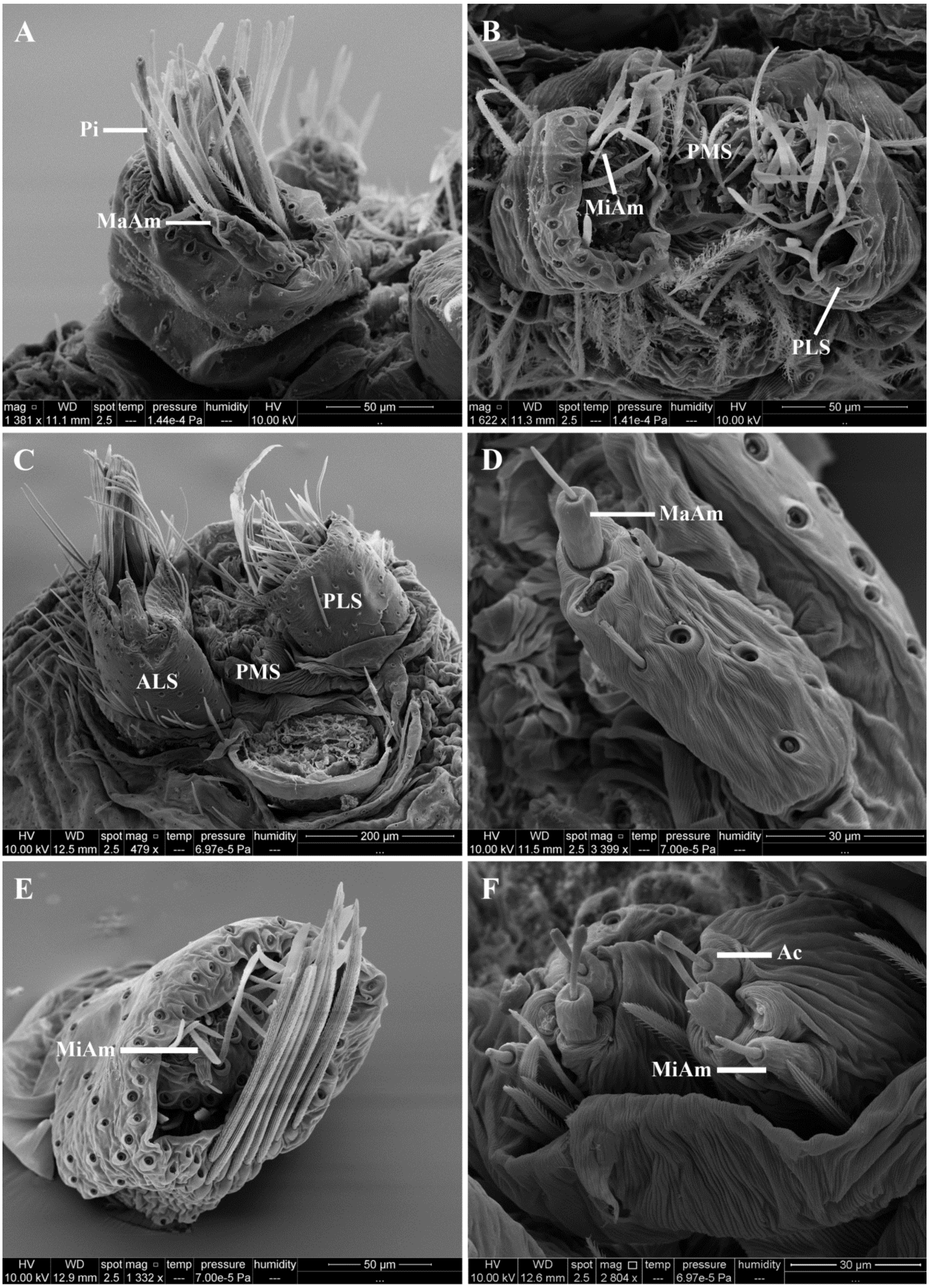

FIGURE 5. *Austrodomus scaber*, spinnerets, male. (A) ALS; (B) PMS and PLS. Spinnerets, female. (C) ventral view; (D) ALS, major ampullar gland spigots; (E) PLS; (F) PMS. Ac—aciniform gland spigots; ALS—anterior lateral spinnerets; MiAm—cylindrical gland spigots; MaAm—major ampular gland spigots; MiAm—minor ampular gland spigots; Pi—piriform gland spigots; PLS—posterior lateral spinnerets; PMS—posterior median spinnerets.

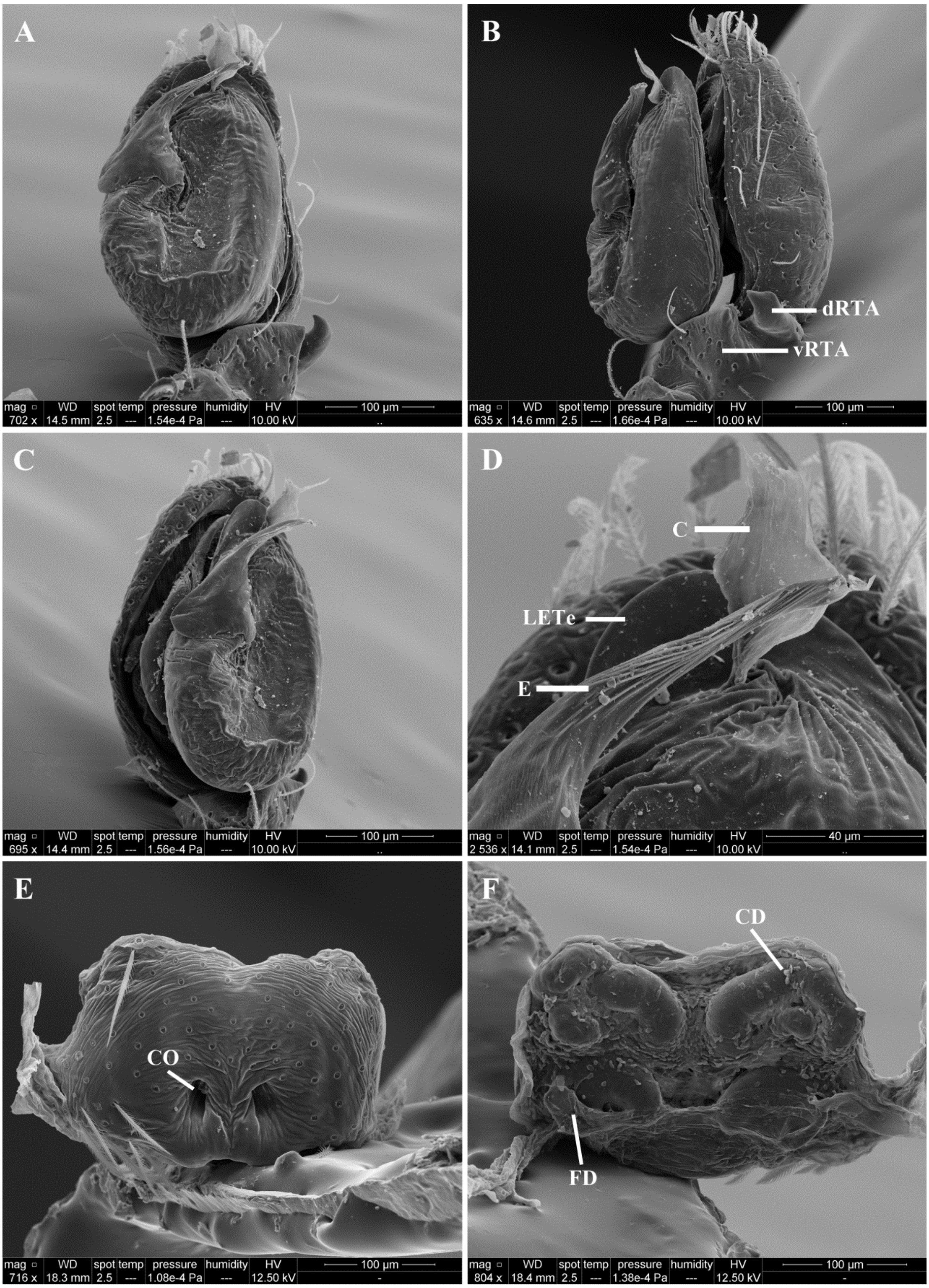

FIGURE 6. *Austrodomus scaber* **sp. nov.**, male. (A) palp, ventral view; (B) same, retrolateral view; (C) same, dorso-prolateral view; (D) same, detail bulb ventro-paical. Female. (E) epigyne, ventral view; (F) vulva, dorsal view. C—conductor; CD—copulatory duct; CO—copulatory opening; dRTA—dorsal retrolateral tibial apophysis; E—embolus; FD—fertilization duct; LETe—laminar extension of tegulum; vRTA—ventral retrolateral tibial apophysis.

Austrodomus zuluensis **Lawrence, 1947**

Figs 2B–F, 7A–C, 10

Austrodomus zuluensis Lawrence, 1947: 10, figs 3A–D (holotype female from Umfolosi Drift, Zululand, [27°54'4.96"S 31°26'42.76"E], South Africa, lost); Cooke, 1964: 264, fig. 13.

Remarks. This species was redescribed based on two females collected close to the type locality. The species was identified as *A. zuluensis* based on previous descriptions and illustrations (Lawrence 1947; Cooke 1964). Although the holotype was considered lost by Cooke (1964), we prefer not to designate a neotype for *A. zuluensis* to avoid future taxonomic inconsistency, since the holotype was not confirmed as destroyed and therefore, can still be found.

Diagnosis. Females of *Austrodomus zuluensis* resemble those of *A. scaber* in having the posterior margin of the epigynal plate sinuous without posterior projections (present in *A. oxoniensis*) (Figs 7A, 8D), but differ by the vulva with laterally convoluted part of copulatory ducts slender, less than 1/3 of proximal part width (almost the same width in *A. scaber*) and by the presence of a well-defined primary spermathecae (absent in *A. scaber*) (Fig. 7B).

Description. Female (ARC.LNR 2008/4287). Total length: 3.9. Carapace 1.3 long, 0.97 wide; Abdomen 2.45 long, 1.57 wide; Sternum 0.94 long, 0.69 wide; Spinnerets ALS 0.29 long, 0.24 wide. Eye diameters: AME 0.08, ALE 0.07, PME 0.1, PLE 0.09; interdistances: AME–AME 0.04, PME–PME 0.03. Chelicerae 0.36 long. Leg measurements: I: 4.38 (1.20, 0.84, 0.88, 0.72, 0.74); II: 3.30 (0.96, 0.60, 0.64, 0.58, 0.52); III: 2.80 (0.72, 0.42, 0.52, 0.54, 0.60); IV: (1.24, 0.70, -, -, -). Leg spination: III – tibia v0-0-2; metatarsus v0-0-2. Epigyne: copulatory openings large, separated from each other by their width (Fig. 7A). Vulva: proximal part of copulatory ducts running almost parallel to each other (Fig. 7B).

Male. Unknown.

Variation. Total length (2 females): 2.95–3.90.

Distribution. South Africa and Mozambique (Fig. 10).

Material examined. South Africa: KwaZulu-Natal, Ndumo Game Reserve, 26°32'39.98"S 32°09'16.59"E, 1 female, 13 June 2005, C. Haddad leg., (ARC.LNR 2008/4287). Mozambique: Inhaca Island, 26°01’S 032°54’E, 1 female, 16–30 October 1993, T. Steyn leg. (RMCA 215986).

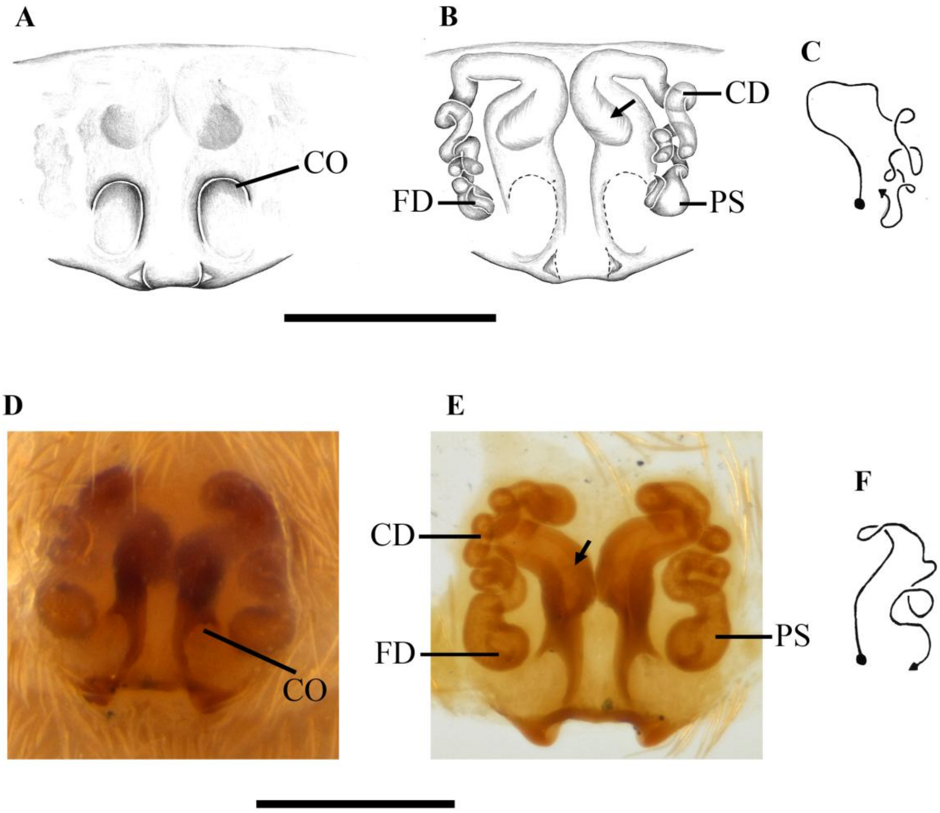

FIGURE 7. *Austrodomus zuluensis.* Female: (A) epigyne, ventral view; (B) vulva, dorsal view, arrow to swollen pouch-like area; (C) vulva, schematic course of internal duct system. *A. oxoniensis* **com. nov**. Female: (D) epigyne, ventral view; (E) vulva, dorsal view, arrow to swollen pouch-like area; (F) vulva, schematic course of internal duct system. CD—copulatory duct; CO—copulatory opening; FD—fertilization duct; PS—primary spermathecae. Scale bars: 0.25 mm.

Austrodomus oxoniensis (Cooke, 1964)

Figs 7D–F, 10

Katumbea oxoniensis Cooke, 1964: 281, figs 9, 51, 59 (holotype female from Lake Tanganyika, Katumbi, Kungwe-Mahali Mts., Kigoma, Tanzania, [5°59'55.74"S,29°47'24.40"E], deposited in OUMNH, examined). Rodrigues & Rheims (in prep, chapter 1).

Diagnosis. Females of *Austrodomus oxoniensis* are distinguished from those of the other species of the genus in having the posterior margin of the epigynal plate bearing paired triangular projections with triangular pocket-like structures (Figs 7D, E).

Description. Female. Total length: 3.5. Carapace 1.42 long, 0.9 wide; Abdomen 1.93 long, 1.35 wide; Sternum 0.8 long, 0.65 wide; Spinnerets ALS 0.23 long, 0.25 wide. Eye diameters: AME 0.06, ALE 0.07, PME 0.8, PLE 0.09; interdistances: AME–AME 0.02 PME–PME 0.03. Chelicerae 0.35 long. Leg measurements: I: 3.45 (0.93, 0.7, 0.7, 0.58, 0.54); II: 2.83 (0.80, 0.52, 0.55, 0.5, 0.46); III: 2.5 (0.7, 0.4, 0.5, 0.48, 0.42); IV: 3.89 (1.0, 0.6, 0.93, 0.76, 0.60). Leg spination: I – femur d0-1-0; II – femur d0-1-0. III – tibia v1p-0-0; metatarsus p0-0-1, v0-0-1. IV –tibia v0-0-2; metatarsus p0-0-1, v0-0-1. Epigyne: copulatory openings large, separated from each other by their width (Fig. 7D). Vulva: proximal part of copulatory ducts diverging anteriorly; lateral convoluted part of copulatory ducts slender, 1/3 of proximal part width (Fig. 7E, F).

Male. Unknown.

Distribution. Tanzania, only known from the type locality (Fig. 10).

Austrodomus scaber (Purcell, 1904)

Figs 1C, 2A, 3A–F, 4A–F, 5A–F, 6A–F, 8A–F, 10

Prodidomus scaber Purcell, 1904: 172, pl. 11, figs 41, 42 (Female holotype from Prince Albert, Western Cape, [33°13'36.57"S,22°2'8.57"E], South Africa, deposited in SAM 3016, examined).

Austrodomus scaber Cooke, 1964: 264, figs 32, 37, 60 (only female; male = *Purcelliana problematica* Cooke, 1964).

Diagnosis. Males of *Austrodomus scaber* differ from those of *A. gamsberg* **sp. nov.** by the palp with embolus with distal half slender and tapering (Figs 6A, C, 8A, B). Females resemble those of *A. zuluensis* in having the posterior margin of the epigynal plate sinuous without posterior projections (Figs 7A, 8D), but differ by the vulva with laterally convoluted part of copulatory ducts with almost the same width as the proximal part (1/3 of the width in *A. zuluensis*) and by the inconspicuous spermathecae (well-defined in *A. zuluensis*) (Fig. 8E).

Description. Male (ARC.LNR 2013/5520). Total length: 2.3. Carapace 1.07 long, 0.77 wide; Abdomen 1.22 long, 0.75 wide; Sternum 0.77 long, 0.53 wide; Spinnerets ALS 0.11 long, 0.13 wide. Eye diameters: AME 0.08, ALE 0.09, PME 0.08, PLE 0.09; interdistances: AME–AME 0.05, PME–PME 0.05. Chelicerae 0.43 long. Leg formula 4123; measurements: I: 3.83 (1.06, 0.70, 0.75, 0.78, 0.54); II: 3.04 (0.80, 0.58, 0.58, 0.61, 0.48); III: 2.54 (0.69, 0.34, 0.56, 0.51, 0.44); IV: 4.30 (1.18, 0.61, 1.03, 0.85, 0.64). Leg spination: III – femur d1-1-0; tibia v0-1r-1r, r0-1-0; metatarsus v0-0-1, r1-1-1. IV – femur d1-1-0; tibia v2-2-2; metatarsus v2-2-1. Palp: femur with one dorsal spine; vRTA subrectangular in ventral view (Fig. 8B); dRTA truncated in retrolateral view (Fig. 8C); conductor triangular (Fig. 8B).

Female. (ARC.LNR 2013/5520). Total length: 2.81. Carapace 1.25 long, 0.82 wide; Abdomen 1.45 long, 1.15 wide; Sternum 0.86 long, 0.62 wide; Spinnerets ALS 0.25 long, 0.22 wide. Eye diameters: AME 0.09, ALE 0.08, PME 0.09, PLE 0.09; interdistances: AME–AME 0.04, PME–PME 0.07. Chelicerae 0.52 long. Leg measurements: I: 3.60 (1.0, 0.69, 0.73, 0.64, 0.55); II: 3.0 (0.88, 0.54, 0.60, 0.55, 0.44); III: 2.66 (0.73, 0.44, 0.56, 0.49, 0.45); IV: 4.16 (1.08, 0.58, 1.06, 0.83, 0.63). Leg formula 4123. Leg spination: III – femur d0-1-0; tibia v2-1r-1r, r0-1-0; metatarsus v0-0-2, r0-1-1. IV – femur d1-1-0; tibia v1r-2-2, r0-1-0; metatarsus v1r-1r-2. Epigyne:

copulatory openings small, slightly larger than posterior pouch-like structures, separated from each other by half their width (Fig. 8D).

Variation. Total length (5 males): 1.66–2.50; (5 females): 2.4–5.34.

Distribution. South Africa and Namibia (Fig. 10).

Other material examined. Namibia: Damaraland, Hobatere - 3.2 km from gate, 19°19'S 14°26'60"E, 3 female, 7–11 May 1991, E. Griffin leg. (SMN 42623); Etosha National Park, 19°04'60"S 16°40'59.9"E, Kamaseb, 2 males, 8 August–14 September 1987, E. Griffin leg. (SMN 40696); Sprokieswoud, 19°04'60"S 15°37'E, 1 male and 1 female, 24 March–10 May 1988, E. Griffin leg. (SMN 40996); Karossfontein, 19°21'S 14°30'59.76"E, 1 male and 1 female, 5 August–13 September 1987, E. Griffin leg. (SMN 40634); Namib Desert 57 km., 57 Km E of Walvis Bay, 23°S 15°E, 1 male and 2 female, 12 June 2013, D. Jacobs & C. Deschodt leg. (ARC-LNR 2013/5520); 1 female, 14 February 2012 (ARC-LNR 2013/5491); 61 km. E of Walvis Bay, 23°S 15°E, 1 female, (ARC-LNR 2013/5536); 48 km. E S E of Swakopmund, 23°S 15°E, 1 male and 1 female, 7 June 2013, D. Jacobs & C. Deschodt leg. (ARC-LNR 2014/2092); 1 female, 14 February 2012 (ARC-LNR 2013/5430); Luderitz, Orange River, 5 km E of Rosh Pinah Water Affairs, 28°03'56"S 16°54'24"E, 1 male, 13 October 1984, E. Griffin leg. (SMN 42857); Diamond Area 1, 27°20'S 16°09'E, 1 female, 14 August 1983, E. Griffin leg. (SMN 36803). South Africa: Northern Cape, Augrabies National Park, 28°39'36"S 20°25'12"E, 1 female, 15 February 2007, E. le Roux leg. (ARC-LNR 2008/3258); Limpopo, Vhembi Biosphere Nwanedi Game Res. NWA 3, 22°38'45.9"S 30°23'55.68"E, 1 female, 4 December 2012, C. Schoeman leg. (ARC-LNR 2015/337); Little Leigh (Western Soutpansberg), 22°56'54.6"S 29°52'10.59"E, 1 female, 23 November 2005, F. Mbedzi leg. (ARC-LNR 2009/1701); Lajuma Mountain Retreat, Farm Lajuma, Soutpansberg West, 1 female, 15 January 1999, S. Foord leg. (ARC-LNR 99/9).

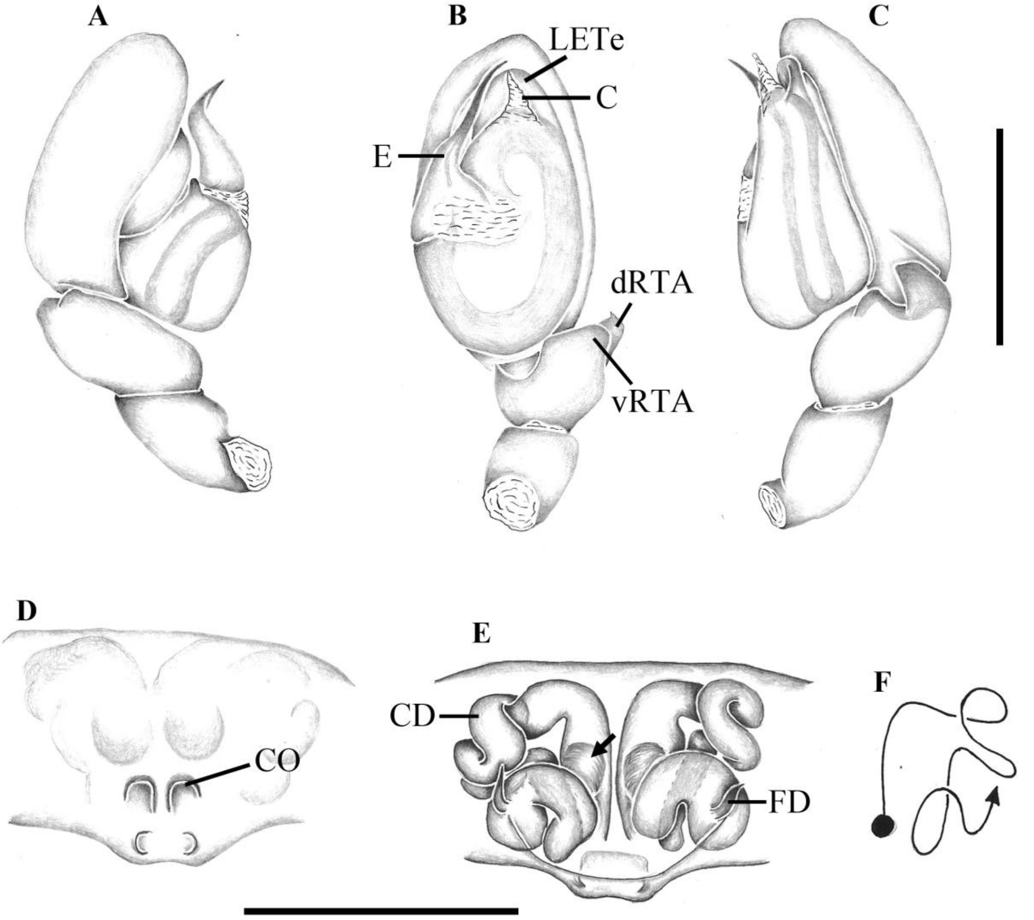

FIGURE 8. *Austrodomus scaber*. Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view, arrow to swollen pouch-like area; (F) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; dRTA—dorsal retrolateral tibial apophisys; E—embolus; FD—fertilization duct; LETe—laminar extension of tegulum; vRTA—ventral retrolateral tibial apophisys. Scale bars: 0.25 mm.

Austrodomus gamsberg **sp. nov.**

Figs 9A–C, 10

Type Material. Male holotype from Namibia, Windhoek, Gamsberg Plateau, 23°20'03"S 16°14'22.2"E, 19 March 2005, T.L & C. Bird leg., deposited in SMN 46156.

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. Males of *Austrodomus gamsberg* **sp. nov.** differ from *A. scaber* by the palp with embolus with distal half robust and ventrally bent in the middle (Figs 9A, B).

Description. Male. Total length: 2.03. Carapace 0.98 long, 0.76 wide; Abdomen 1.08 long, 0.66 wide; Sternum 0.74 long, 0.52 wide; Spinnerets ALS 0.18 long, 0.14 wide. Eye diameters: AME 0.06, ALE 0.06, PME 0.04, PLE 0.06; interdistances: AME–AME 0.04, PME–PME 0.04. Chelicerae 0.31 long. Leg formula 4123; measurements: I: 3.09 (0.95, 0.58, 0.56, 0.55, 0.45); II: 2.34 (0.70, 0.40, 0.45, 0.42, 0.37); III: 1.92 (0.55, 0.31, 0.37, 0.35, 0.34); IV: 3.12 (0.86, 0.42, 0.70, 0.64, 0.50). Leg spination: III – femur d0-1-0; tibia v0-0-1r; metatarsus v0-0-1, r0-0-1. IV – femur d1-1-0; tibia v1r-1r-2; metatarsus v2-2-1, r0-0-1. Palp: femur without spine; vRTA subrectangular in ventral view; dRTA with tapered tip and directed ventrally in retrolateral view; conductor triangular with wide base (Figs 9A–C).

Female. Unknown.

Distribution. Namibia, only known from the type locality (Fig.10).

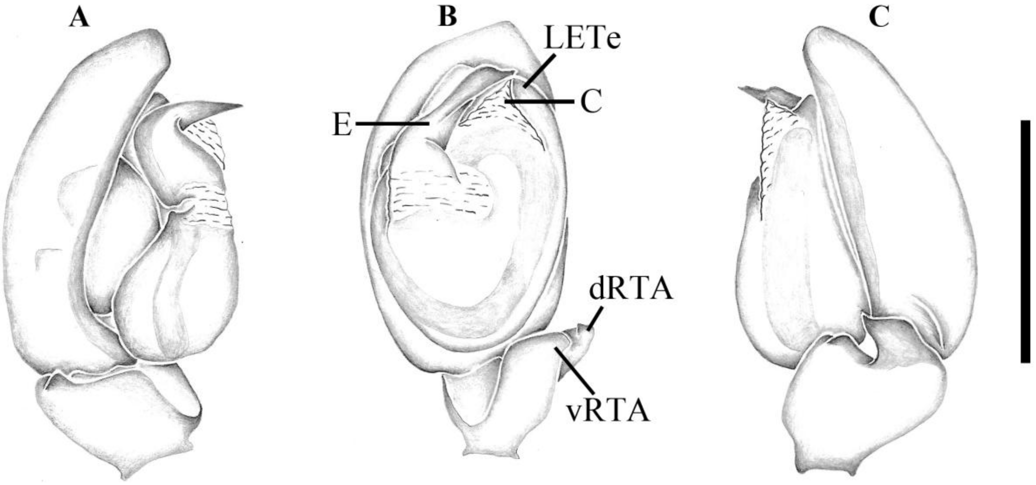

FIGURE 9. *Austrodomus gamsberg* **sp. nov.** Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. C—conductor; dRTA—dorsal retrolateral tibial apophisys; E—embolus; LETe—laminar extension of tegulum; vRTA—ventral retrolateral tibial apophisys. Scale bars: 0.25 mm.

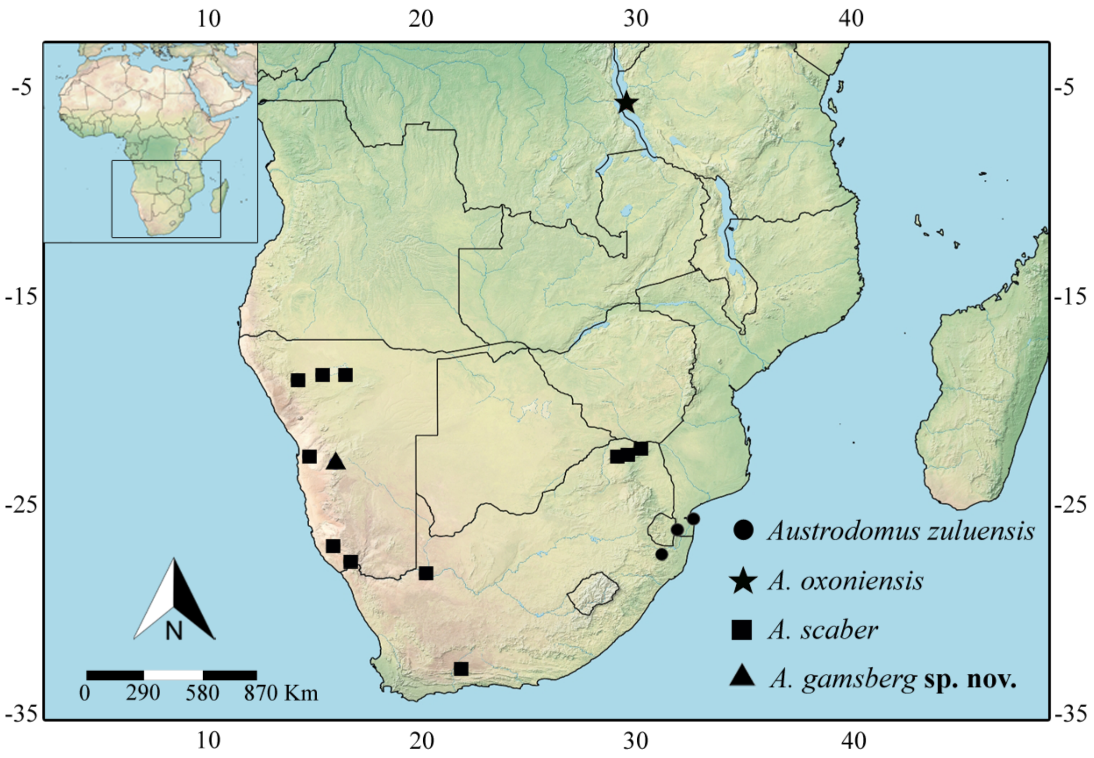

FIGURE 10. Known distribution records of species of *Austrodomus* from Namibia, South Africa and Tanzania**.**

Genus *Eleleis* Simon, 1893

Eleleis Simon, 1893: 22 (Type species by monotypy, *Eleleis crinita* Simon, 1893). Dalmas, 1919: 337.

Diagnosis. Species of *Eleleis* are distinguished from those of other Prodidominae genera by the presence of different sized clavate setae over the entire body, except chelicerae and spinnerets (Figs 11D, E, 12A, F); carapace bearing few long and oblique clavate setae (Figs. 11A, D, F), legs with clavate setae resembling spines (Fig. 15C); and posterior region of abdomen with large and robust clavate setae (Figs 11E, G).

Description. Total length males 1.72–3.90 and females 1.98–3.72. Carapace longer than wide, slightly narrow at cephalic region, almost oval (Figs 11D, F). Fovea absent. Very long and oblique clavate setae on thoracic area (Figs 11A, D, F, 14A). Eight eyes; posterior eye row strongly procuverd, anterior eye row approximately straight (Figs 13B, 14A); PME and PLE irregular; AME dark; AME–ALE, PME–PLE, ALE–PLE contiguous. Chilum absent. Chelicerae relatively small (0.19–0.51) without boss; one reduced retromarginal tooth and one normal promarginal tooth (Fig. 14E), except in *E. haddadi* **sp. nov.** and *E. solitaria* **sp. nov.** that apparently lack teeth; fang with shaft serrula. Endites slightly convergent anteriorly (Figs 13C, 14B), with few setae on internal margin; serrula absent (Fig. 14D); labium approximately as long as wide. Sternum longer than wide, anterior margin straight, rebordered anteriorly and laterally (Figs 13C, 14B); posterior region strongly protruding between coxae IV with numerous long and erect setae (Figs 13C, 14C); intercoxal setae absent; precoxal triangles present. Pedicel with anterior region truncate. Leg formula 4123. All species with legs covered with clavate setae resembling spines, except *E. etosha*, which has spines on all legs (Fig. 12C). Trichobothria present on dorsal tibia, metatarsi and tarsi, arranged in two rows (Fig. 15C); bothrium with five ridges on proximal plate (Fig. 15E). Tarsal organ capsulate with oval opening, located dorso-distally on tarsi. Two smooth claws (Figs 15A, B); claw tufts composed of slightly widened tenent setae inserted in a well delimited plate; tarsus with modified apical ventral setae (Fig. 15D); presence of solid claw tuft clasper. Abdomen oval, longer than wide (Figs 12A–H); absence of scales; presence of clavate setae (Figs 12A, 16A); large and robust clavate setae on posterior region of abdomen (Figs 11B, C, E, G); dorsum of abdomen without posteriorly curved setae (Figs 12G, H). Six spinnerets; ALS longer than wide, separated from each other by less than their diameter (Figs 13D); piriform gland spigots elongated with associated setae (Figs 16B, D); major ampular gland spigot field on a conical and well-defined structure (Fig. 16D), male and female with two major ampular gland spigot (Fig. 16D); PLS and PMS conical and short, PLS larger than PMS (Fig. 16B); PLS in male with one minor ampular gland spigot and apparently seven aciniform gland spigots, females with seven aciniform gland spigots, one cylindrical gland spigots and apparently one minor ampular gland spigot (Fig. 16E); PMS in male with one minor ampular gland spigot and three aciniform gland spigots, females apparently with one minor ampular gland spigot, four aciniform gland spigots and one cylindrical gland spigots (Fig. 16F). Female palp: tarsus truncated with apical chemosensory patch, without claw (Fig. 15F). Male palp: femur unmodified, without spines; tibia short less than 1/3 cymbyum length, RTA single with curved tip (Fig. 17B); cymbium slightly extended apically with apical scopula; presence of thick setae in ventro-apical region of cymbium (Fig. 17A); bulb ovoid; tegulum with median excavation to accommodate the embolus (Fig. 17A), except in *E. leleupis* **sp. nov.,** with prolateral excavation; reservoir visible ventrally; embolus filiform and arising retrolaterally at 1 o'clock position (Fig. 21B), except in *E. leleupis* **sp. nov.** where it arises at 5 o'clock position (Fig. 21E); conductor slightly sclerotized (Fig. 17C). Epigyne: epigynal plate with median atrium bearing the copulatory openings and posterior-median excavation, close to epigastric furrow (Figs 17D, 18D). Vulva: copulatory ducts strongly convoluted (Fig. 22E), except *E. haddadi* **sp. nov.** and *E. solitaria* **sp. nov.** with few folds (Figs 22B, H), median part of duct enlarged forming a bulb from which a secondary spermathecae arises (Figs 17E, F, 18E, 19E), except *E. haddadi* **sp. nov.** with bulb of copulatory duct close to copulatory opening and apparently without secondary spermathecae (Fig. 22B); secondary spermathecae small (Figs 17E, F); primary spermathecae rounded and separated from each other by more than their diameter (Figs 23A, G), except *E. luderitz* **sp. nov.** in which they are separated by less than their diameter (Fig. 23E); fertilization ducts laterad (Figs 17E, 19E).

Distribution. Botswana, Cape Verde, Namibia, South Africa and Zambia (Figs 24, 25).

Composition. Nine species: *Eleleis crinita* Simon, *E. etosha* **sp. nov.,** *E. haddadi* **sp. nov.**, *E. himba* **sp. nov.**, *E. leleupis* **sp. nov.,** *E. limpopo* **sp. nov.**, *E. luderitz* **sp. nov.**, *E. okavango* **sp. nov.**, *E. solitaria* **sp. nov.**

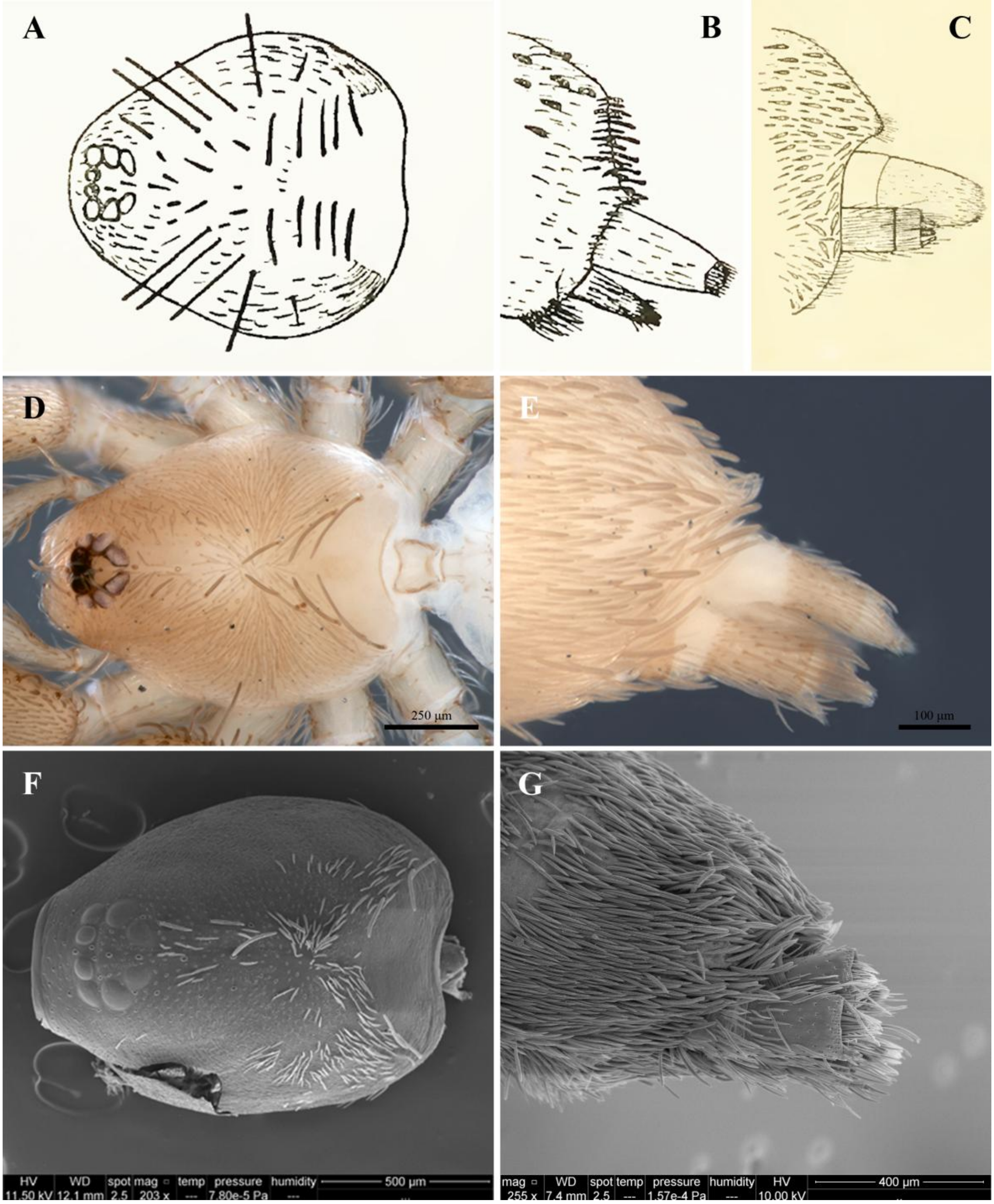

FIGURE 11. *Eleleis crinita*, female. (A) carapace, dorsal view; (B) spinnerets, lateral view; (C) same. *E. solitaria* **sp. nov.,** female. (D) carapace, dorsal view; (E) spinnerets, lateral view. *E. limpopo* **sp. nov.,** male. (F) carapace, dorsal view; (G) spinnerets, lateral view. Figures A and B from Dalmas (1919); figure C from Simon (1893).

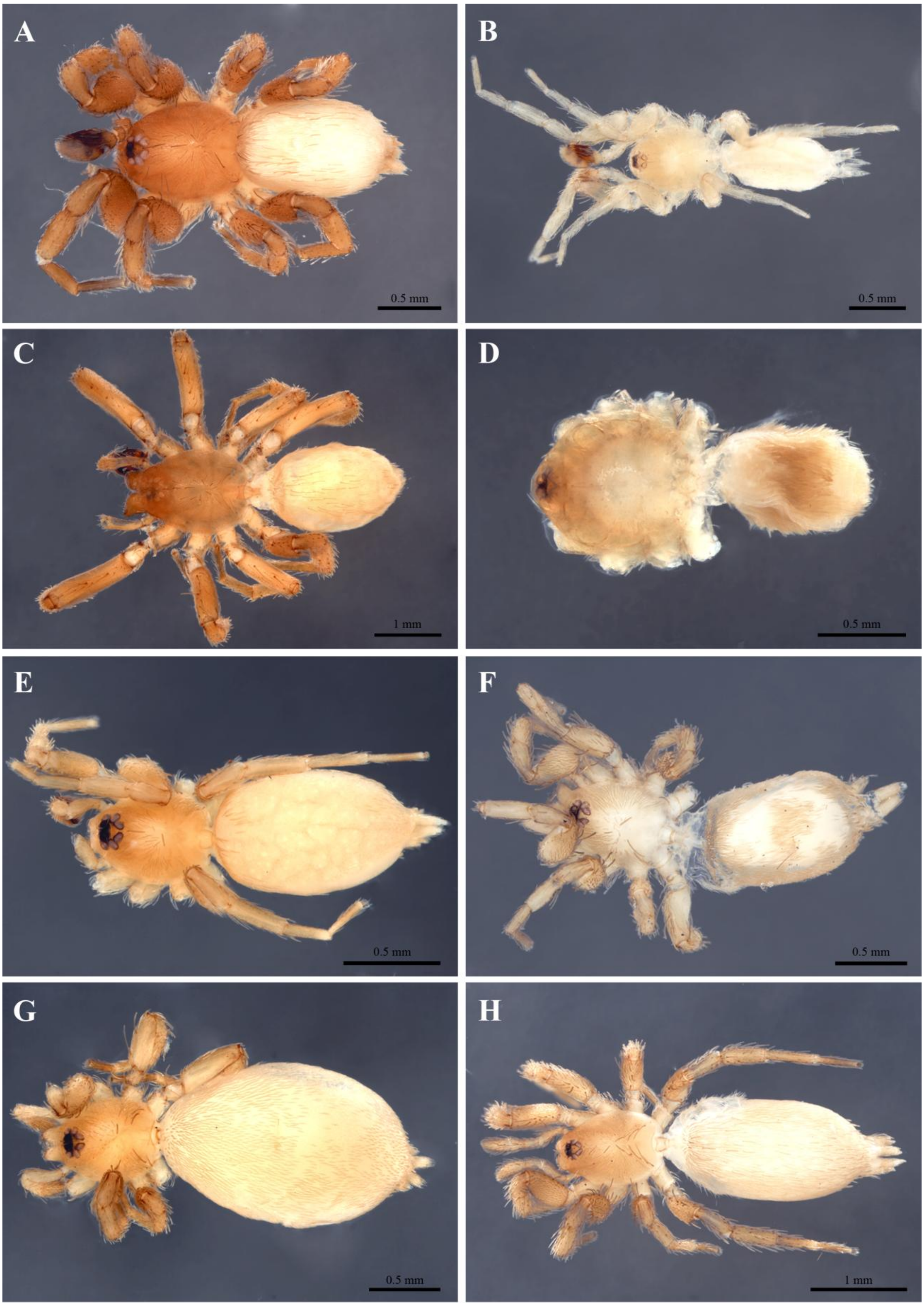

FIGURE 12. Habitus, dorsal view. (A) *Eleleis limpopo* **sp. nov.**, male. (B) *E. okavango* **sp. nov.**, male; (C) *E. etosha* **sp. nov.**, male; (D) *E. himba* **sp. nov.**, male; (E) *E. leleupis* **sp. nov.**, male; (F) *E. haddadi* **sp. nov.**, female; (G) *E. luderitz* **sp. nov.**, female; (H) *E. solitaria* **sp. nov.**, female.

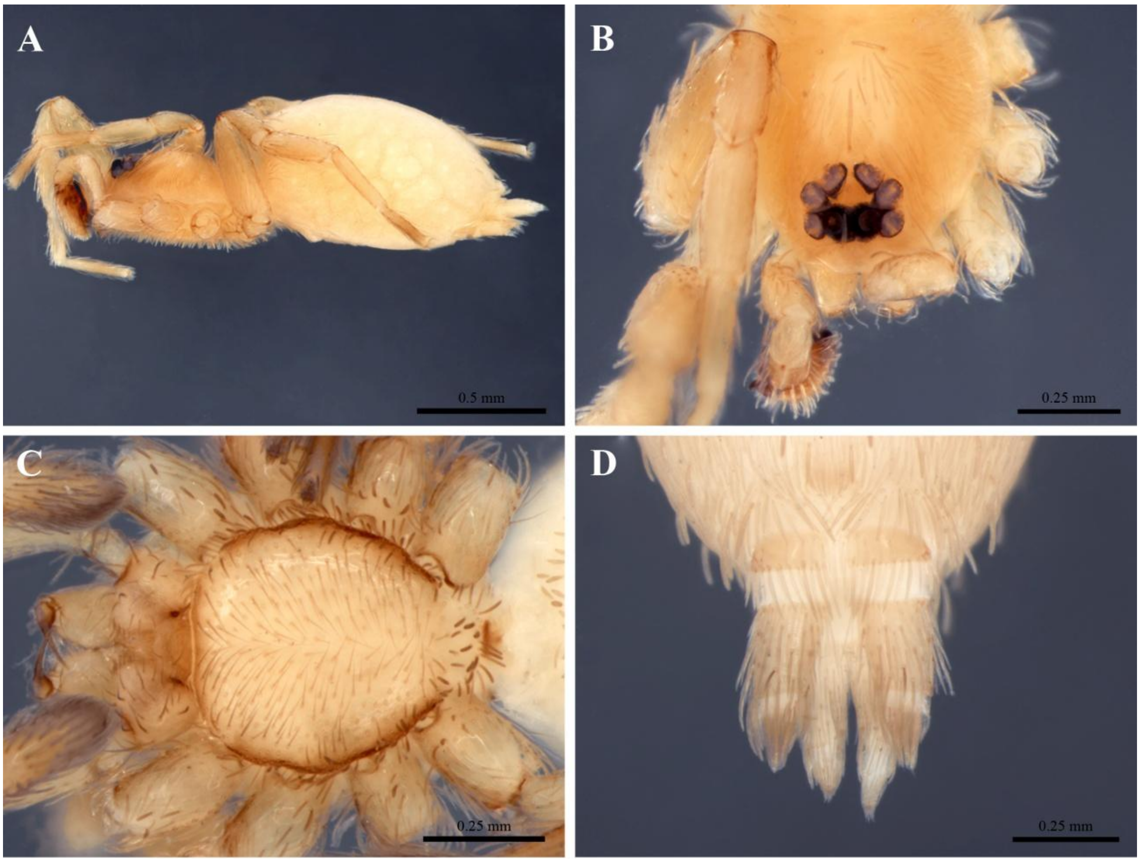

FIGURE 13. *Eleleis leleupis* **sp. nov.**, male. (A) habitus, lateral view; (B) eyes, dorsal view. *E. luderitz*, female. (C) sternum and endites (D) spinnerets, ventral view.

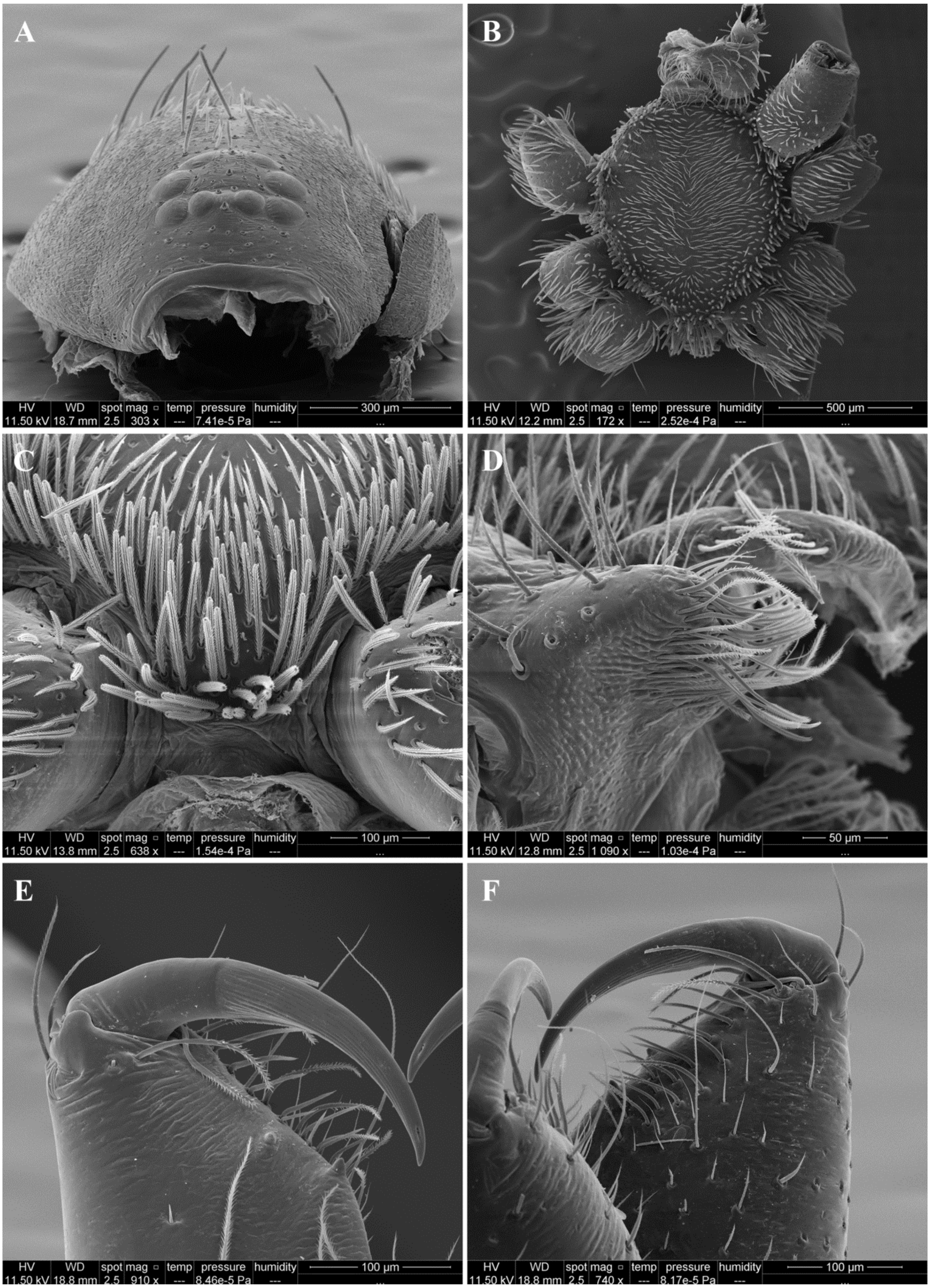

FIGURE 14. *Eleleis limpopo* **sp. nov.**, male. (A) carapace, frontal view; (B) sternum; (C) same, protrusion between coxae IV; (D) endites, dorsal view; (E) chelicerae, retromargin; (F) chelicerae, promargin.

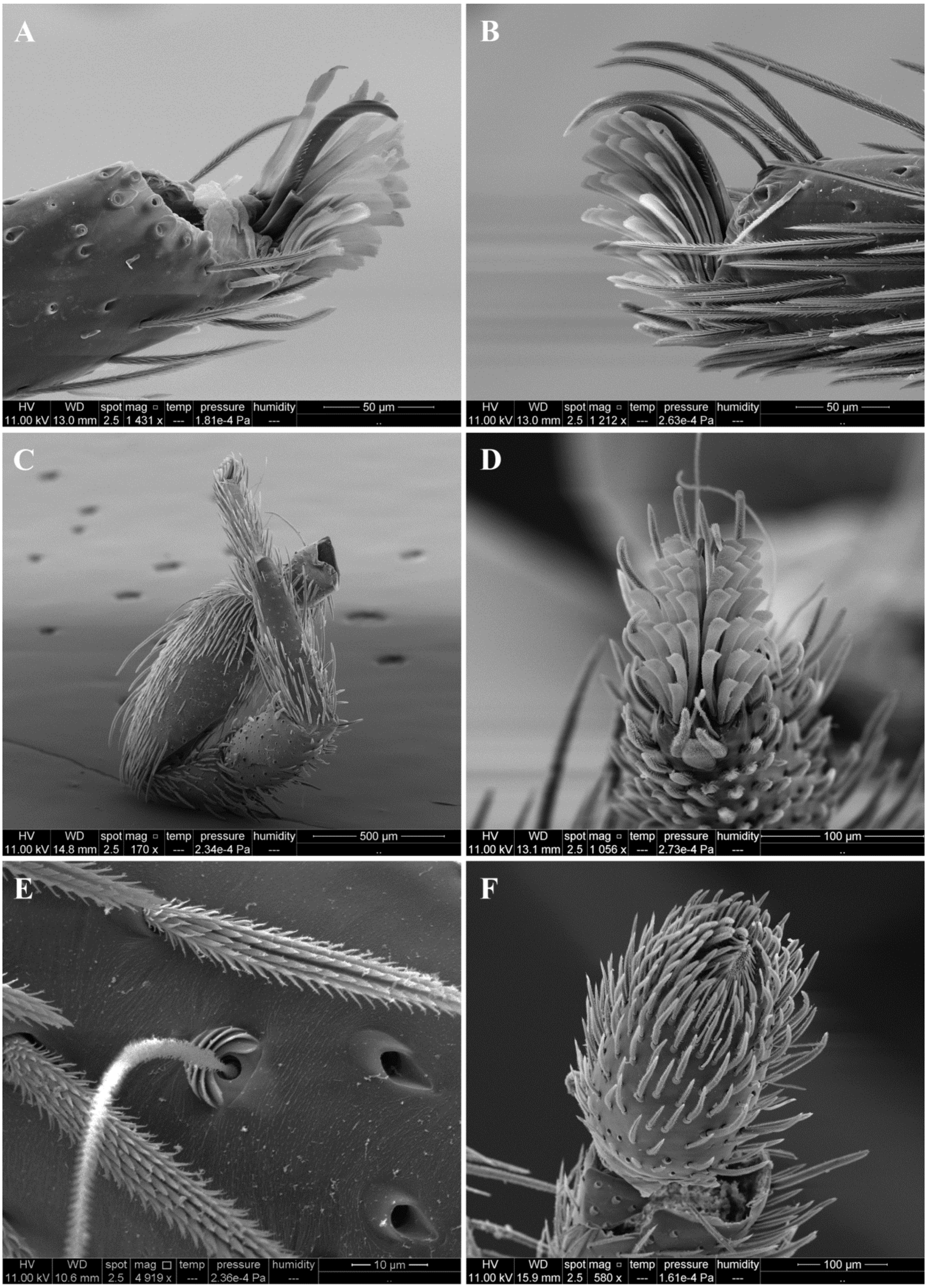

FIGURE 15. *Eleleis limpopo* **sp. nov.**, male. (A) tarsus I, claw, retrolateral view; (B) tarsus IV, claw, retrolateral view; (C) leg IV; (D) tarsus IV, ventro-apical, arrow to modified setae; (E) same, trichobothria; (F) female palp, tarsus, frontal view

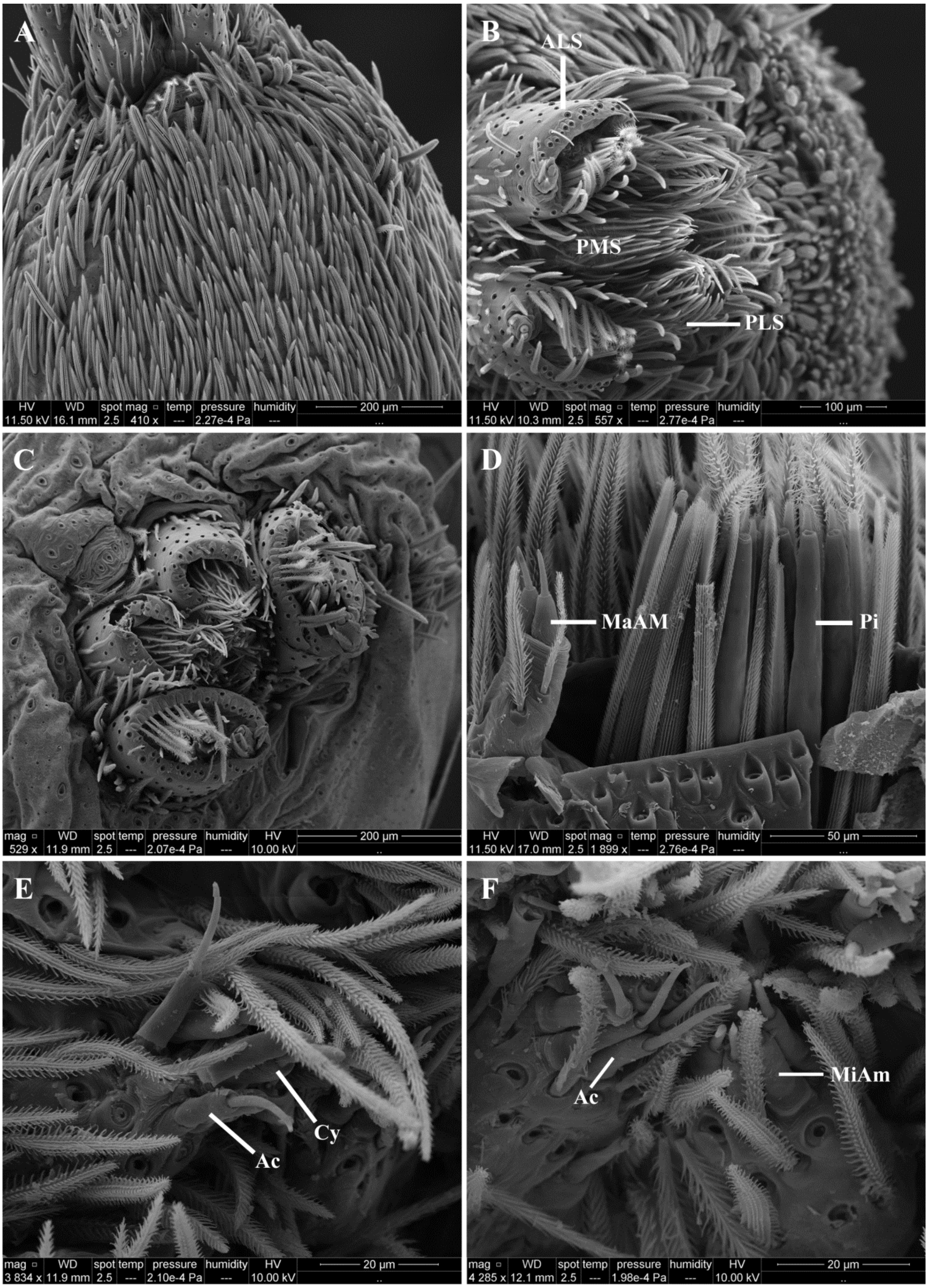

FIGURE 16. *Eleleis limpopo* **sp. nov.**, male. (A) abdomen, dorsal view; (B) spinnerets apical view. Female, spinnerets. (C) apical view; (D) ALS; (E) PLS; (F) PMS. ALS—anterior lateral spinnerets; MaAm—major ampular gland spigots; MiAm—minor ampular gland spigots; Pi—piriform gland spigots; PLS—posterior lateral spinnerets; PMS—posterior median spinnerets.

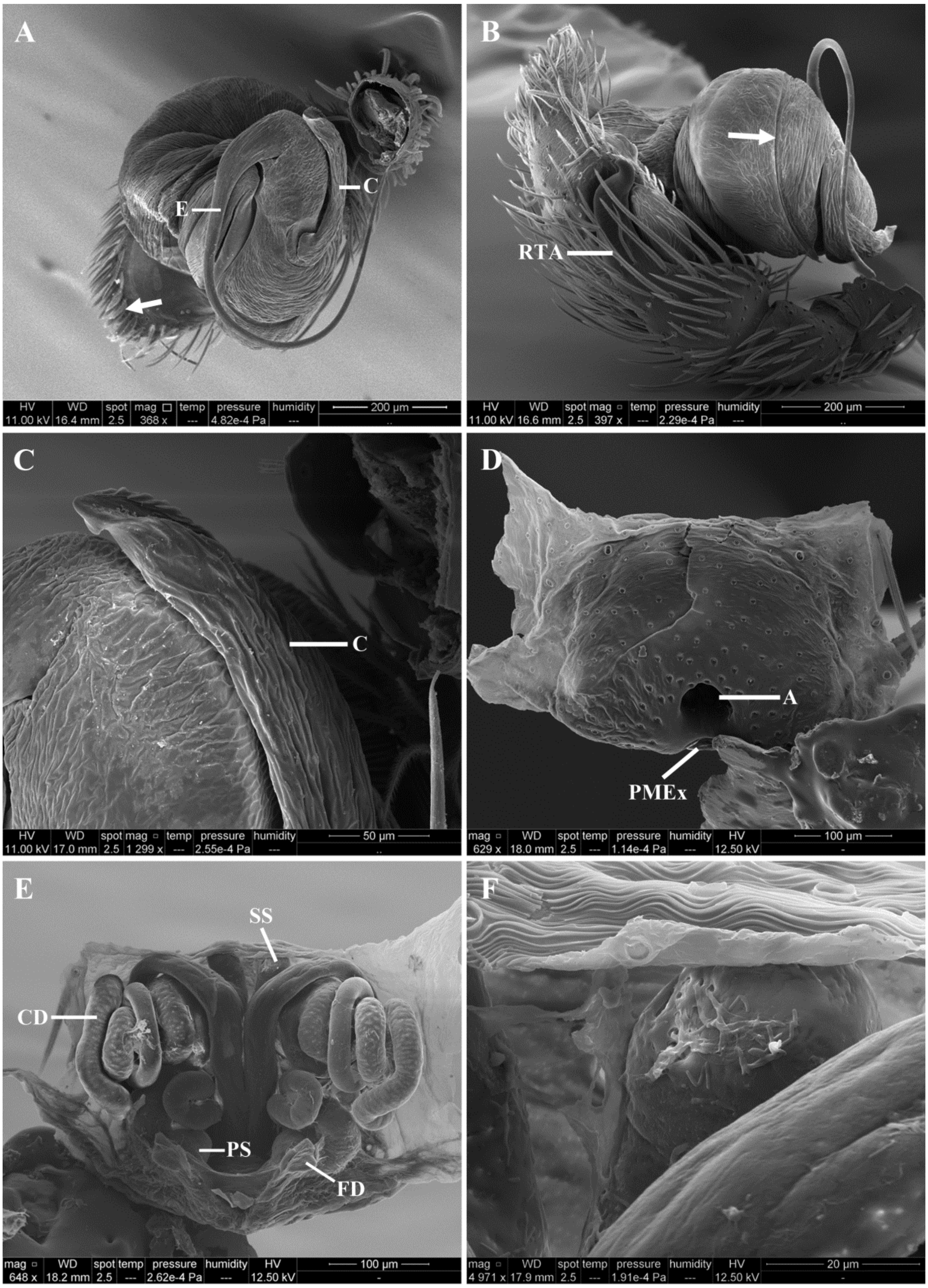

FIGURE 17. *Eleleis limpopo* **sp. nov.**, male. (A) palp, ventral view, arrow to bunch of thick setae on ventral cymbium; (B) same, retrolateral view, arrow to tegular excavation; (C) same, detail conductor. Female. (D) epigyne, ventral view; (E) epigyne, dorsal view; (F) vulva, detail secondary spermathecae. A—atrium; C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; PMEx—posterior median excavation; PS—primary spermathecae; RTA—retrolateral tibial apophysis; SS—secondary spermathecae.

Eleleis crinita **Simon, 1893**

Figs 11A–C, 18A–H and 24

Eleleis crinita Simon, 1893: 22, figs 301, 302 (holotype female from Cape Colony, [33°55'29.36"S,18°25'26.07"E], South Africa, Simon leg., deposited in MNHN 14700, examined); Dalmas, 1919: 338, figs 21, 35.

Remarks. The holotype of *Eleleis crinita* Simon, is very poorly preserved. Nevertheless, it can be used to define the genus by the illustrations and original description. The female epigyne is not well defined, but the median atrium and posterior-median excavation are clearly visible. None of the specimens examined in this study could be assigned to *E. crinita* and thus, the type species continues represented solely by holotype.

Diagnosis. Females of *Eleleis crinita* differ from those of the other species of the genus by the epigyne with posterior-median excavation at least two times wider than long and larger than the median atrium (Figs 18G, H).

Description. Female. Original coloration lost due to poor preservation of the specimen. Total length: 2.32. Carapace 0.75 long, 0.66 wide; abdomen 1.42 long, 0.9 wide; sternum 0.58 long, 0.55 wide; spinnerets ALS 0.18 long, 0.11 wide. Eye diameters: AME 0.03; ALE 0.04; PLE 0.07; PME 0.05; interdistances: AME–AME 0.04; PME–PME 0.055. Chelicerae 0.26 long. Legs measurements: I: 2.12 (0.59, 0.38, 0.42, 0.37, 0.36); II: 1.83 (0.53, 0.28, 0.33, 0.33, 0.36); IV: 2.22 (0.57, 0.35, 0.46, 0.44, 0.40). Epigyne: epyginal plate wider than long; median atrium elliptical, slightly wider than long, smaller than posterior-median exacavation (Fig. 18G). Vulva: laterally convoluted copulatory duct; primary and secondary spermathecae barely visible (Fig. 18H).

Male. Unknown.

Distribution. South Africa, only known from the type locality (Fig. 24).

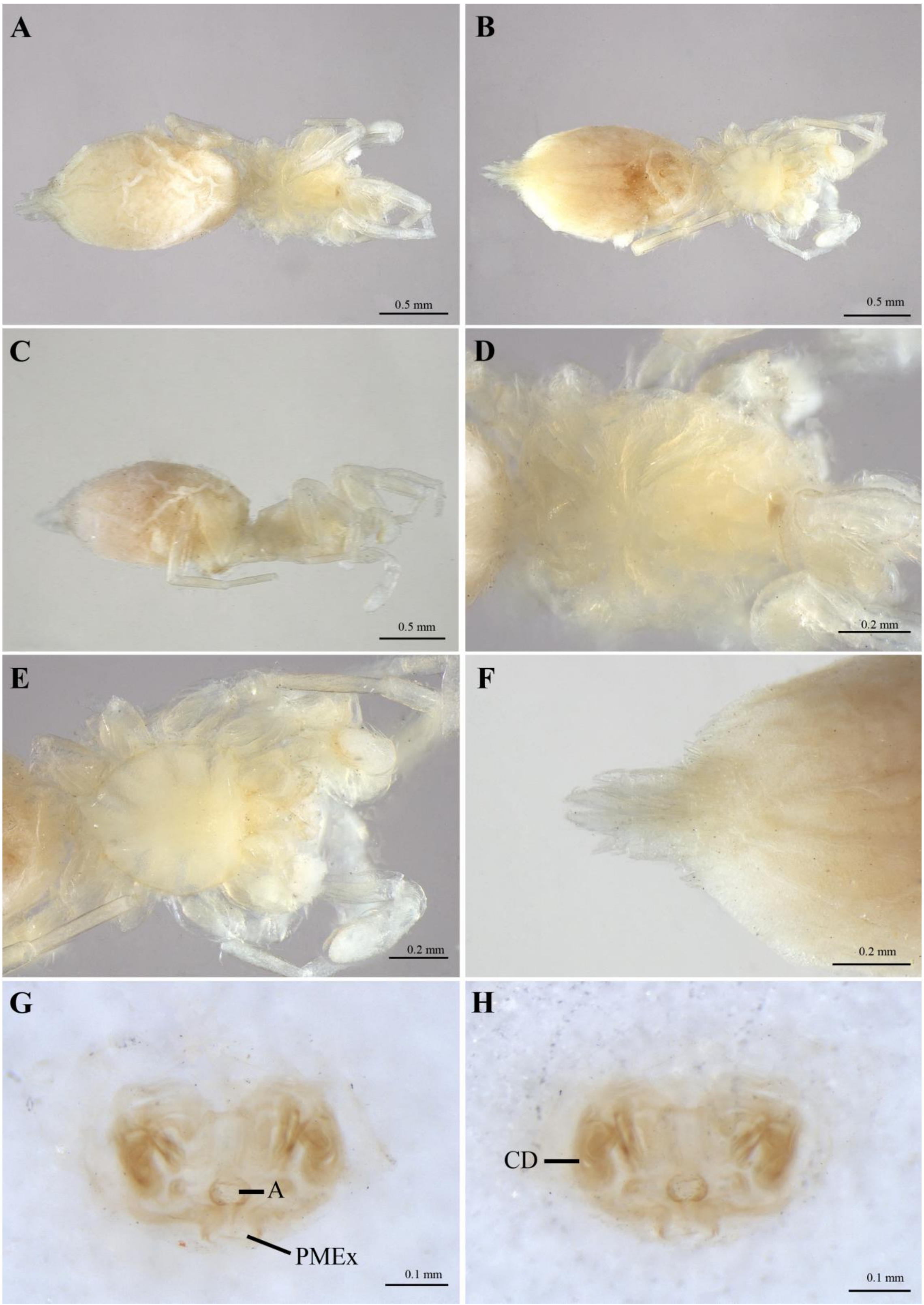

FIGURE 18. *Eleleis crinita,* female: (A) habitus, dorsal view; (B) habitus, ventral view; (C) habitus, lateral view; (D) carapace, dorsal view; (E) sternum and endites; (F) spinnerets, ventral view; (G) epigyne, ventral view; (H) vulva, dorsal view. A—atrium; CD—copulatory duct; PMEx—posterior median excavation.

Eleleis limpopo sp. nov.

Figs 11F, G, 12A, 14A–F, 15A–F, 16A–F, 17A–F, 19A–F and 24

Type Material. Male holotype from South Africa, Limpopo, Tuinplaas, Springbokvlakte, 24°53′60″S 28°43′48″E, 09 January 2002, M.V. Jaarsveld leg., deposited in ARC.LNR 2002/751. Paratypes with same locality and collect of holotype: 1 female, 11 January 2001 (ARC.LNR 2002/752); 1 male and 1 female, 17 October 2002 (ARC.LNR 2003/473); 2 male, 24 July 2002 (ARC.LNR 2003/715).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. *Eleleis limpopo* **sp. nov.** differs from other species by the strong brown coloration of carapace and legs (Fig. 12A). The males are distinguished by the RTA, subdistally bent ventrally, with tip pointing upwards in retrolateral view (Fig. 19C) and the females by the median atrium smaller than the posterior median excavation, slightly wider than long (Fig. 19D).

Description. Male (ARC.LNR 2002/751). Total length: 2.75. Carapace 1.24 long, 1.1 wide; Abdomen 1.52 long, 1.08 wide; Sternum 0.87 long, 0.69 wide; Spinnerets ALS 0.24 long, 0.14 wide. Eye diameters: AME 0.06, ALE 0.06, PME 0.06, PLE 0.1; interdistances: AME–AME 0.02, PME–PME 0.03. Chelicerae 0.39 long. Leg measurements: I: 3.13 (0.98, 0.55, 0.61, 0.50, 0.49); II: 2.68 (0.81, 0.45, 0.50, 0.49, 0.43); III: 2.30 (0.73, 0.35, 0.36, 0.44, 0.42); IV: 3.19 (0.94, 0.53, 0.63, 0.63, 0.48). Palp: tegular excavation to accommodate the embolus on posterior third of tegulum (Fig. 19B).

Female (ARC.LNR 2002/752). Total length: 3.72. Carapace 1.24 long, 1.08 wide; Abdomen 2.3 long, 1.35 wide; Sternum 0.90 long, 0.72 wide; Spinnerets ALS 0.22 long, 0.16 wide. Eye diameters: AME 0.06, ALE 0.06, PME 0.08, PLE 0.1;

interdistances: AME–AME 0.02, PME–PME 0.04. Chelicerae 0.47 long. Leg measurements: I: 3.36 (1.05, 0.60, 0.63, 0.56, 0.53); II: 2.74 (0.88, 0.45, 0.50, 0.49, 0.43); III: 2.44 (0.73, 0.38, 0.44, 0.53, 0.38); IV: 3.38 (1.00, 0.55, 0.68, 0.65, 0.50). Epigyne: atrium with anterior margin strongly sclerotized; posterior median excavation strongly sclerotized, 1.5 times longer than wide. Vulva: proximal part of ducts straight, running anteriorly; secondary spermathecae arising posteriorly from bulbous region of duct; fertilization ducts arising medialy from primary spermathecae (Figs 19D–F).

Variation. Total length (5 males): 2.63–3.13; (5 females): 2.44–3.72.

Distribution. South Africa and Zambia (Fig. 24).

Other material examined. South Africa: Limpopo, Tuinplaas, Springbokvlakte, 24°53′60″S 28°43′48″E, 1 male, 11 October 2001, M.V. Jaarsveld leg. (ARC.LNR 2003/203); 1 male (ARC.LNR 2003/427); 1 male, 13 September 2001 (ARC.LNR 2002/750); 1 male, 24 July 2002 (ARC.LNR 2003/429); 1 male, 7 November 2001 (ARC.LNR 2003/886); 1 male, 17 September 2002 (ARC.LNR 2003/829); 1 male, 11 June 2002 (ARC.LNR 2003/476); 2 male, 7 May 2002 (ARC.LNR 2003/474); 1 female, 16 October 2002 (ARC.LNR 2003/475); 1 female, 17 October 2002 (ARC.LNR 2003/828); Little Leigh, Western Soutpansberg, 22°56′54.6″S 29°52′10.596″E, 1 female, 20 March 2006, D. Spengler leg. (ARC.LNR 2009/1702); Gauteng, Irene, Irene Gem Village Field, 25°52′5.988″S 28°13′3.972"E, 1 male, 06 September 2013, P. Webb leg. (ARC.LNR 2014/2209); Mpumalanga, Marble Hall, 24°57′36″S 29°17′24″E, 1 male, 15 April 2003, M. Mellet leg. (ARC.LNR 2004/1215). Zambia: Choma Wildlives Game Farm, Hunters Camp, 17°13′48″S 26°52′12″E, 1 male, 03 December 2006, C. Haddad *et al.* (ARC.LNR 2007/475).

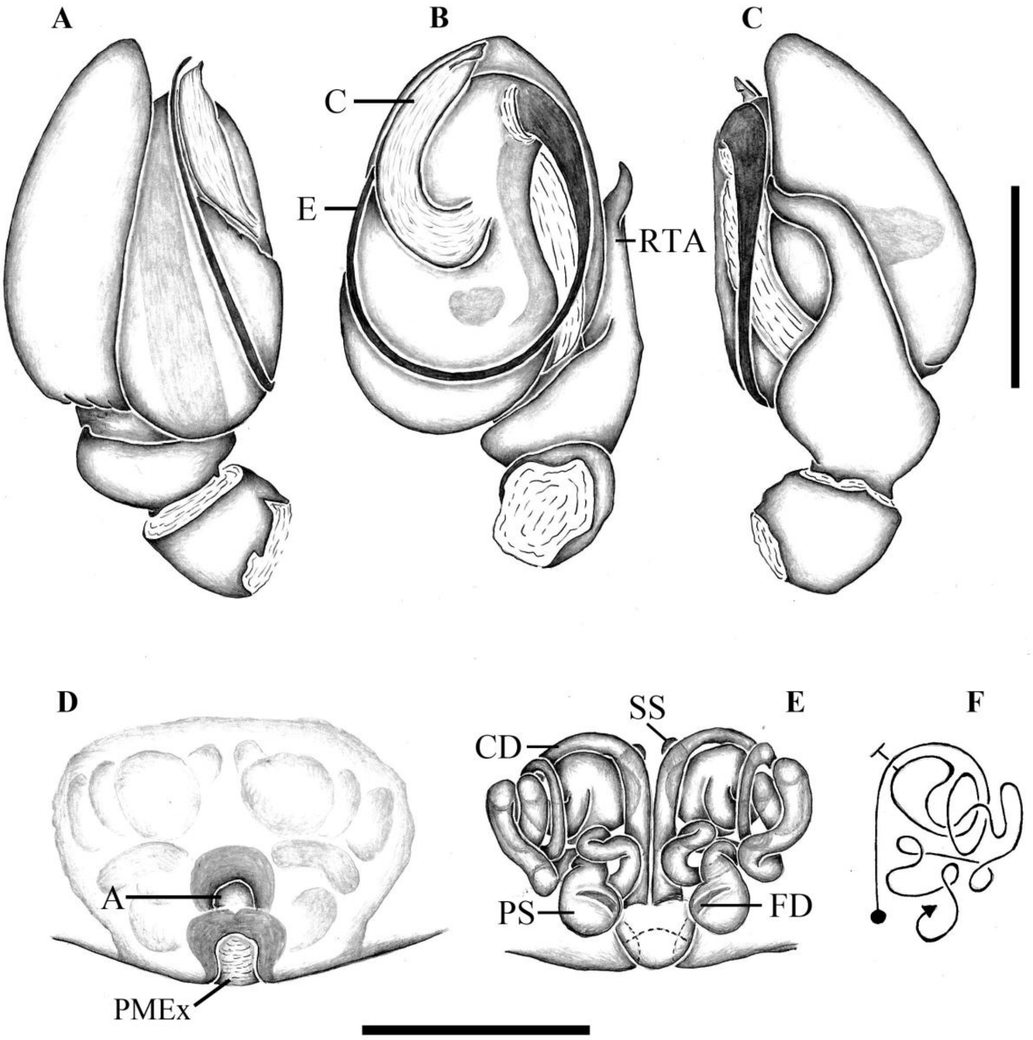

FIGURE 19. *Eleleis limpopo* **sp. nov**. Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. A—atrium; C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; PMEx—posterior median excavation; PS—primary spermathecae; RTA—retrolateral tibial apophysis; SS—secondary spermathecae. Scale bars: 0.25 mm.

Eleleis okavango sp. nov.

Figs 12B, 20A–F and 24

Type Material. Male holotype from Botswana, Okavango delta, Shorobe lagoon, 19°30’S 023°00’E, 01 November 1975, A. Russell-Smith leg., deposited in RMCA

236855. Paratypes: 5 males and 1 female with same data of holotype; Namibia, Etosha National Park, Andoni, 18°30'S 16°45'E, 4 males, 19 May–20 June 1986 (SMN 39452); Dorstland, 18°40'S 14°44'E, 1 female, 10 February–20 March 1987 (SMN 40002).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. Males of *Eleleis okavango* **sp. nov.** are distinguished from those of the remaining species by the RTA subdistally curved with twisted tip in retrolateral view (Fig. 20C); females are distinguished by the median atrium subtriangular, slightly longer than wide and by the posterior median excavation with lateral margins converging posteriorly (Fig. 20D).

Description. Male (RMCA 236855). Total length: 2.1. Carapace 0.85 long, 0.67 wide; Abdomen 1.1 long, 0.55 wide; Sternum 0.66 long, 0.54 wide; Spinnerets ALS 0.21 long, 0.10 wide. Eye diameters: AME 0.04, ALE 0.04, PME 0.05, PLE 0.06; interdistances: AME–AME 0.029, PME–PME 0.016. Chelicerae 0.266 long. Leg measurements: I: 2.28 (0.68, 0.42, 0.44, 0.38, 0.36); II: 1.75 (0.54, 0.29, 0.32, 0.31, 0.29); III: 1.57 (0.45, 0.25, 0.28, 0.31, 0.28); IV: 2.32 (0.67, 0.37, 0.46, 0.44, 0.38). Palp: tegular excavation on median region of the tegulum (Fig. 20B).

Female (RMCA 236855). Total length: 2.2. Carapace 0.9 long, 0.66 wide; Abdomen 1.13 long, 0.70 wide; Sternum 0.68 long, 0.50 wide; Spinnerets ALS 0.12 long, 0.10 wide. Eye diameters: AME 0.04, ALE 0.04, PME 0.06, PLE 0.06; interdistances: AME–AME 0.03, PME–PME 0.02. Chelicerae 0.23 long. Leg measurements: II: 1.82 (0.55, 0.34, 0.31, 0.29, 0.33); III: 1.69 (0.48, 0.29, 0.28, 0.34, 0.30). Epigyne: atrium with anterior margin strongly sclerotized; posterior median excavation strongly sclerotized; atrium smaller than posterior median excavation (Fig.

20D). Vulva: proximal part of duct straight, running anteriorly; fertilization ducts arising medialy from primary spermathecae (Fig. 20E).

Variation. Total length (5 males): 1.72–2.25; (5 females): 2.05–3.10. The specimens from Namibia and South Africa are generally darker.

Distribution. Botswana and Namibia (Fig. 24).

Other material examined. Namibia: Etosha National Park, S of Mushare, 18° 37’S 16° 53’E, 1 female, 10 August–14 September 1987, E. Griffin leg. (SMN 40674); 1 female, 14 October–14 November 1986, E. Griffin leg. (SMN 39785); Karossfontein, 19°21’S 14°31’E, 1 male, 23 March–27 April 1988, E. Griffin leg. (SMN 41032); Okaukuejo/Duikersdrink, 19°04’S 14°43’E, 1 male, 8 October–14 November 1986, E. Griffin leg. (SMN 39800).

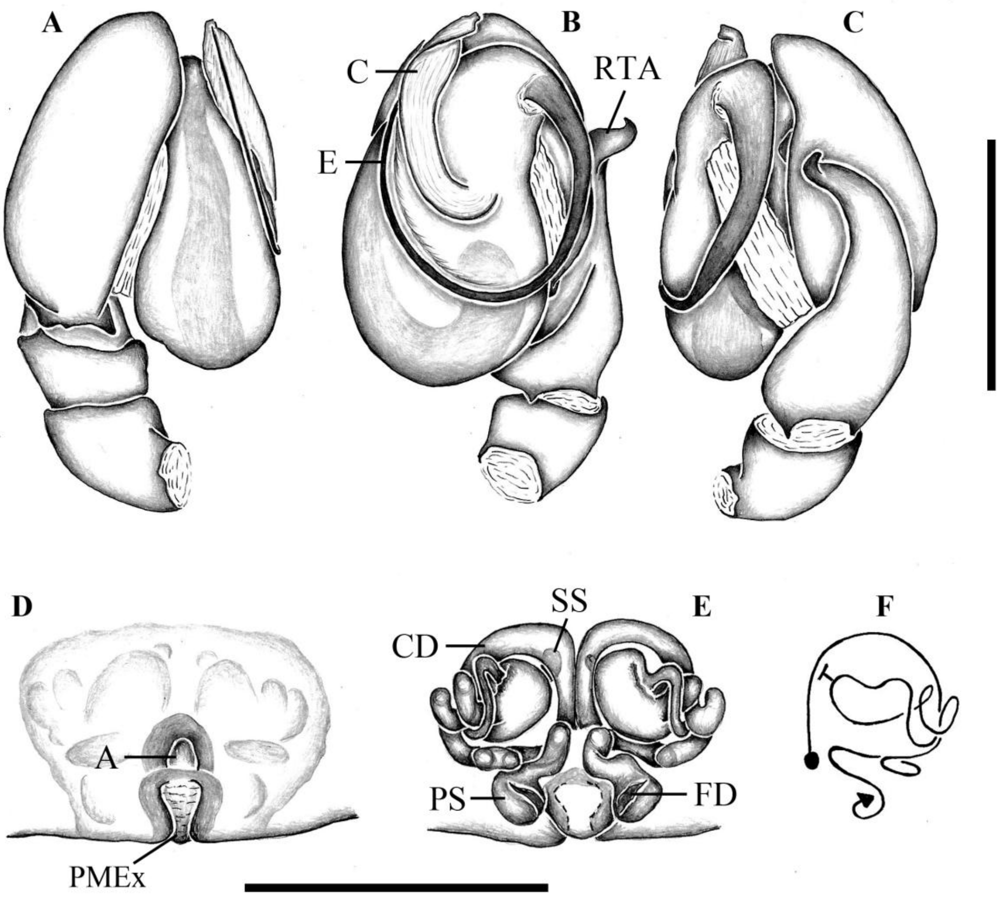

FIGURE 20. *Eleleis okavango* **sp. nov**. Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. A—atrium; C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; PMEx—posterior median excavation; PS—primary spermathecae; RTA—retrolateral tibial apophysis; SS—secondary spermathecae. Scale bars: 0.25 mm.

Eleleis etosha sp. nov.

Figs 12C, 21A–F and 25

Type Material. Male holotype from Namibia, Etosha National Park, Kamaseb, 19°14’S 15°47’E, 08 August–14 September 1987, E. Griffin leg., deposited in SMN 40708. Paratypes: Etosha National Park, Helio, 19°03’S 16°29’E, 1 male and 1 female, 14 February–23 March 1987, E. Griffin leg. (SMN 40157); Duikersdrink, 19°04’S

14°43’E, 1 female, 10 February–20 March 1987, E. Griffin leg. (SMN 39960); Karossfontein, 19°21’S 14°31’E, 1 male, 05 August–13 September 1987, E. Griffin leg. (SMN 40635); Swakopmund, Rössing – Lower Ostrich Gorge, 22°30’S 14°58’E, 1 male, 23 October–19 November 1984, J. Irish leg. (SMN 38427); 1 female, 14 January–11 February 1985, J. Irish leg. (SMN 38592).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. *Eleleis etosha* **sp. nov.** is distinguished from other species by the presence of spines on legs (Fig. 12C). Males are distinguished by the RTA mostly straight and ventrally bent distally in retrolateral view (Fig. 21C) and females by the anterior atrium bullet-shaped, more than 2 times longer than wide and much larger than the posterior median excavation (Fig. 21D).

Description. Male (SMN 40708). Total length: 3.9. Carapace 1.6 long, 1.35 wide; Abdomen 2.2 long, 1.37 wide; Sternum 1.12 long, 0.87 wide; Spinnerets ALS 0.31 long, 0.19 wide. Eye diameters: AME 0.08, ALE 0.07, PME 0.08, PLE 0.09; interdistances: AME–AME 0.05, PME–PME 0.10. Chelicerae 0.51 long. Leg measurements: I: 4.66 (1.42, 0.81, 0.94, 0.80, 0.69); II: 3.94 (1.13, 0.69, 0.75, 0.72, 0.66); III: 3.45 (1.02, 0.55, 0.63, 0.67, 0.59); IV: 4.72 (1.34, 0.69, 0.97, 1.00, 0.72). Leg spination: I – femur d1-1-0. II – d1-1-0. III – femur d1-1-0; tibia v0-1r-1r, r0-0-1; metatarsus r0-0-1. IV – femur d1-1-1; tibia v0-1r-1r, r0-0-1; metatarsus r0-0-1. Palp: tegular escavation located medially on tegulum (Fig. 21B).

Female (SMN 40157). Total length: 2.9. Carapace 1.12 long, 0.95 wide; Abdomen 1.55 long, 0.80 wide; Sternum 0.82 long, 0.65 wide; Spinnerets ALS 0.26 long, 0.18 wide. Eye diameters: AME 0.04, ALE 0.05, PME 0.05, PLE 0.05; interdistances: AME–AME 0.04, PME–PME 0.06. Chelicerae 0.41 long. Leg measurements: I: 2.93 (0.90, 0.50, 0.60, 0.48, 0.45); II: 2.46 (0.75, 0.39, 0.49, 0.44, 0.40); III: 2.18 (0.63, 0.35, 0.38, 0.44, 0.39); IV: 3.13 (0.89, 0.48, 0.63, 0.61, 0.53). Leg spination: I – femur d1-1-0. II – d1-1-0. III – femur d1-1-0. IV – femur d1-1-1; tibia v0-1r-1r. Epigyne: atrium with anterior margin sclerotized; posterior median excavation rounded, as long as wide (Fig. 21D). Vulva: proximal part of duct running anteriorly, parallel to each other; fertilization ducts arising medialy from primary spermathecae (Fig. 21E).

Variation. Total length (5 males): 1.90–3.90; (5 females): 1.98–2.90.

Distribution. Namibia (Fig. 25).

Other material examined. Namibia: Etosha National Park, Andoni, 18°31'S 16°46'E, 1 female, 27 March–28 April 1988, E. Griffin leg. (SMN 40868); Karossfontein, 19°21'S 14°31'E, 1 male, 23 March–27 April 1988, E. Griffin leg. (SMN 41034); Damaraland, Hobatere Camp site, 1 female, 23–30 April 1996, E. Griffin leg. (SMN 43534); Swakopmund, Rössing - Panner Gorge, 22°29'S 15°01'E, 1 male, 27 September–22 October 1984, J. Irish leg. (SMN 38341).

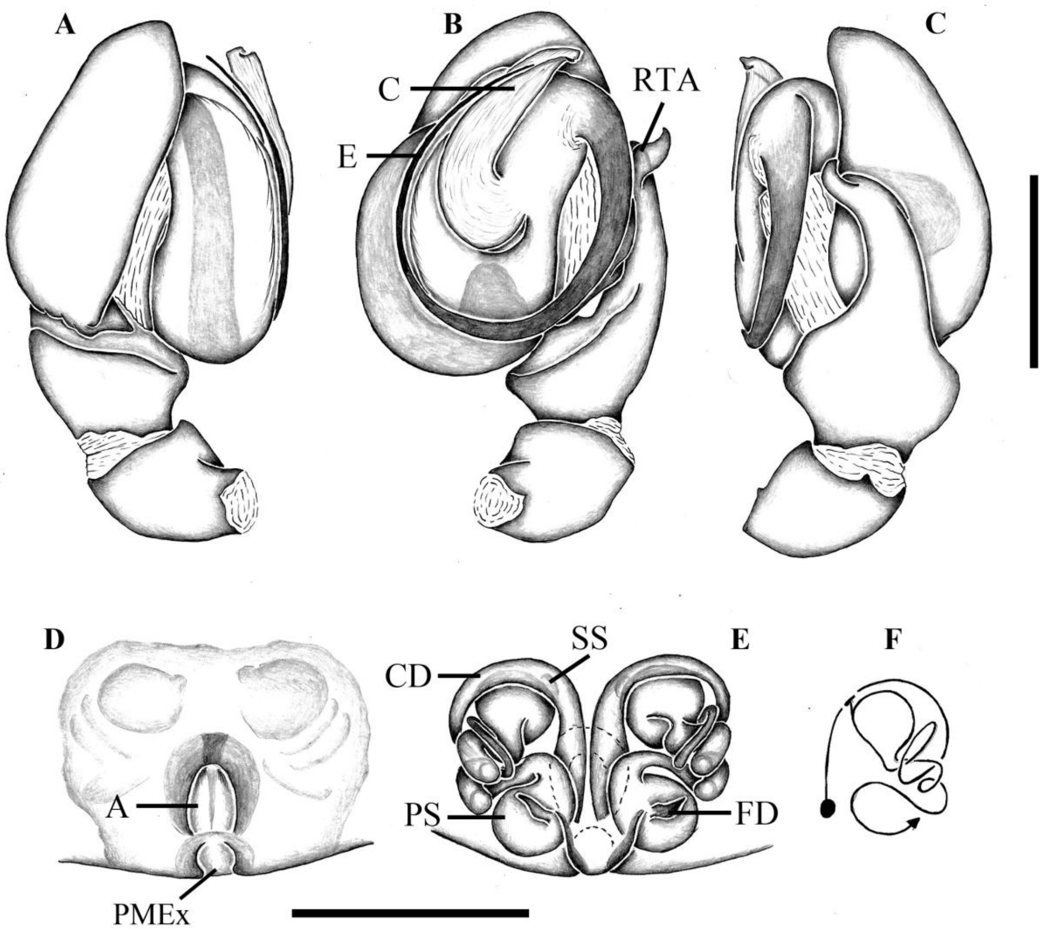

FIGURE 21. *Eleleis etosha* **sp. nov**. Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. A—atrium; C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; PMEx—posterior median excavation; PS—primary spermathecae; RTA—retrolateral tibial apophysis; SS—secondary spermathecae. Scale bars: 0.25 mm.

Eleleis himba **sp. nov.**

Figs 12D, 22A–C and 25

Type Material. Male holotype from Namibia, Kaokoland, Kunene region, 17°37’S 12°12’E, 13–16 October 1988, E. Griffin leg., deposited in SMN 40838.

Etymology. The specific name refers to the most represented ethnic group from Kaokoland (actual name Kunene), type locality, noun in apposition.

Diagnosis. Males of *Eleleis himba* **sp. nov.** are distinguished from those of the other species of the genus by the palp with RTA mostly straight, with tip curved posteriorly in retrolateral view and by the tegular excavation located very close to conductor (Figs 22B, C).

Description. Male. Total length: 2.04. Carapace 0.92 long, 0.79 wide; Abdomen 1.05 long, 0.61 wide; Sternum 0.66 long, 0.56 wide; Spinnerets ALS 0.15 long, 0.10 wide. Eye diameters: AME 0.06, ALE 0.04, PME 0.06, PLE 0.05; interdistances: AME–AME 0.02, PME–PME 0.04. Chelicerae 0.29 long. Leg measurements: II: 2.60 (0.77, 0.41, 0.51, 0.46, 0.45); III: 2.28 (0.67, 0.24, 0.44, 0.48, 0.45); IV: 3.34 (0.94, 0.46, 0.73, 0.66, 0.55).

Female. Unknown.

Distribution. Namibia, only known from the type locality (Fig. 25).

***Eleleis leleupis* sp. nov.**

Figs. 12E, 13A, B, 22D–F and 24

Type Material. Male holotype from South Africa, Cape Province, Clanwilliam, Cederberg, 32°21’S 019°10’E, July 1962, N. Leleup leg., deposited in RMCA 131978.

Etymology. The specific name is a patronym in honor of N. Leleup, collector of the holotype.

Diagnosis. Males of *Eleleis leleupis* **sp. nov.** are distinguished from those of the other species of the genus by having a median apophysis and conductor twisted around each other, at 12 o’clock position, and by the embolus arising at 5 o’clock position (Figs 22D–F).

Description. Male. Total length: 1.84. Carapace 0.64 long, 0.53 wide; Abdomen 1.15 long, 0.74 wide; Sternum 0.51 long, 0.45 wide; Spinnerets ALS 0.11 long, 0.87 wide. Eye diameters: AME 0.04, ALE 0.05, PME 0.06, PLE 0.05; interdistances: AME–AME 0.02, PME–PME 0.02. Chelicerae 0.21 long. Leg measurements: I: 1.87 (0.57, 0.31, 0.35, 0.31, 0.33); II: 1.59 (0.48, 0.25, 0.30, 0.27, 0.29); III: 1.43 (0.41, 0.22, 0.24, 0.29, 0.27); IV: 1.96 (0.54, 0.30, 0.40, 0.38, 0.34). Palp: RTA short and sinuous in retrolateral view; tegular excavation prolateral; conductor with sinuous tip (Figs 22D–F).

Female. Unknown.

Distribution. South Africa, only known from the type locality (Fig. 24).

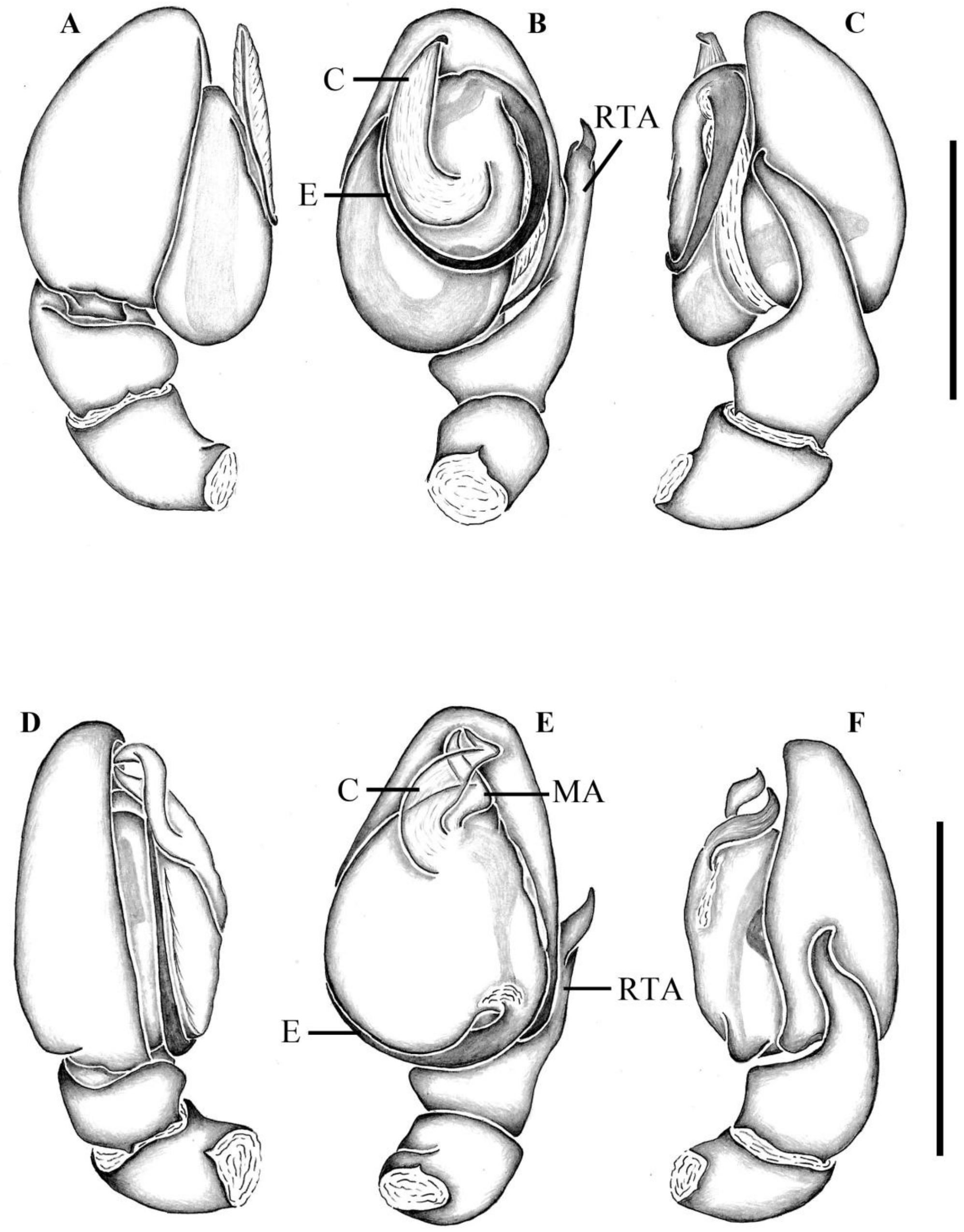

FIGURE 22. *Eleleis himba* **sp. nov.**. Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. *E. leleupis* **sp. nov.**. Male palp: (D) prolateral view; (E) ventral view; (F) retrolateral view. C—conductor; E—embolus; MA—median apophysis; RTA—retrolateral tibial apophisys. Scale bars: 0.25 mm.

Eleleis haddadi sp. nov.

Figs 12F, 23A–C and 24

Type Material. Female holotype from South Africa, Free State, Clocolan, Mpetsane Conservation Estate, Spitskoppen Retreat, 28°55′12″S 27°34′48″E, 08 March 2007, C. Haddad leg., deposited in ARC.LNR 2007/1708.

Etymology. The specific name is a patronym in honor of the arachnologist Charles Haddad, from the University of the Free State, Bloemfontein, South Africa, who collected the holotype.

Diagnosis. Females of *Eleleis haddadi* **sp. nov.** differ from those of other species of the genus by the epigyne with atrium subrectangular, more than two times wider than long and larger than the posterior median excavation (Fig. 23A); and by the vulva with bulbous part of copulatory ducts at copulatory openings (Fig. 23B).

Description. Female. Total length: 2.06. Carapace 0.72 long, 0.64 wide; Abdomen 1.25 long, 0.80 wide; Sternum 0.65 long, 0.44 wide; Spinnerets ALS 0.19 long, 0.14 wide. Eye diameters: AME 0.04, ALE 0.06, PME 0.06, PLE 0.07; interdistances: AME–AME 0.03, PME–PME 0.04. Chelicerae 0.191 long. Leg measurements: I: 2.07 (0.62, 0.35, 0.42, 0.34, 0.34); II: 1.76 (0.53, 0.31, 0.33, 0.30, 0.29); III: 1.63 (0.45, 0.26, 0.28, 0.33, 0.31); IV: 2.13 (0.59, 0.35, 0.44, 0.40, 0.35). Epigyne: posterior median excavation two times longer than wide, smaller than median atrium (Fig. 23A). Vulva: secondary spermathecae apparently absent; bulbous part of duct laterad; fertilization ducts arising posteriorly from primary spermathecae (Fig. 23B).

Male. Unknown.

Distribution. South Africa, only known from the type locality (Fig. 24).

Eleleis luderitz sp. nov.

Figs. 12G, 13C, D, 23D–F and 25

Type Material. Female holotype from Namibia, Diamond Area 1, E of Grosse Bucht, Lüderitz peninsula, 26°43’S 15°07’E, 10 September 1989, E. Griffin leg., deposited in SMN 41732.

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. Females of *Eleleis luderitz* **sp. nov.** differ from those of the other species of the genus by the epigyne with a transversal groove between the small atrium and the larger, pentagonal posterior median excavation (Figs 23D).

Description. Female (holotype). Total length: 2.84. Carapace 0.78 long, 0.69 wide; Abdomen 1.95 long, 1.35 wide; Sternum 0.61 long, 0.55 wide; Spinnerets ALS 0.18 long, 0.14 wide. Eye diameters: AME 0.06, ALE 0.05, PME 0.06, PLE 0.06; interdistances: AME–AME 0.03, PME–PME 0.02. Chelicerae 0.22 long. Leg measurements: I: 2.16 (0.64, 0.35, 0.44, 0.36, 0.37); II: 1.93 (0.44, 0.36, 0.54, 0.30, 0.29); III: 1.65 (0.46, 0.28, 0.25, 0.35, 0.31); IV: 2.36 (0.62, 0.36, 0.56, 0.44, 0.38). Vulva: proximal part of ducts running anteriorly, parallel to each other; secondary spermathecae arising posteriorly from bulbous part of copulatory duct; fertilization ducts arising medially from primary spermathecae (Fig. 23E).

Male. Unknown.

Distribution. Namibia, only known from the type locality (Fig. 25).

Eleleis solitaria sp. nov.

Figs 1A, 11D, E, 12G, 23G–I and 25

Type Material. Female holotype from Cape Verde, St Vicent Island, Mindelo, 16°53’N 024°59’W, 11 November 1998, W. Tavernier leg., deposited in RMCA 208392.

Etymology. The specific name is a Latin adjective meaning “alone”, in reference to the isolated distribution of the species.

Diagnosis. Females of *Eleleis solitaria* **sp. nov.** differ from those of the other species of the genus by the median atrium large and round, larger than the posterior median excavation (Fig. 23G).

Description. Female. Total length: 3.03. Carapace 0.95 long, 0.77 wide; Abdomen 1.90 long, 1.02 wide; Sternum 0.71 long, 0.56 wide; Spinnerets ALS 0.21 long, 0.14 wide. Eye diameters: AME 0.04, ALE 0.04, PME 0.06, PLE 0.06; interdistances: AME–AME 0.029, PME–PME 0.020. Chelicerae 0.29 long. Leg measurements: I: 2.52 (0.74, 0.40, 0.56, 0.42, 0.40); II: 2.13 (0.62, 0.37, 0.39, 0.40, 0.35); III: 1.85 (0.56, 0.30, 0.33, 0.38, 0.31); IV: 2.56 (0.74, 0.41, 0.46, 0.52, 0.43). Epigyne: posterior median excavation three times longer than wide with lateral margins converging posteriorly (Fig. 23G). Vulva: copulatory ducts with few folds; proximal part of duct laterad; secondary spermathecae arising posteriorly from reniform bulbous part of copulatory duct; fertilization ducts arising posteriorly from primary spermathecae (Fig. 23H).

Male. Unknown.

Distribution. Cape Verde, only known from the type locality (Fig. 25).

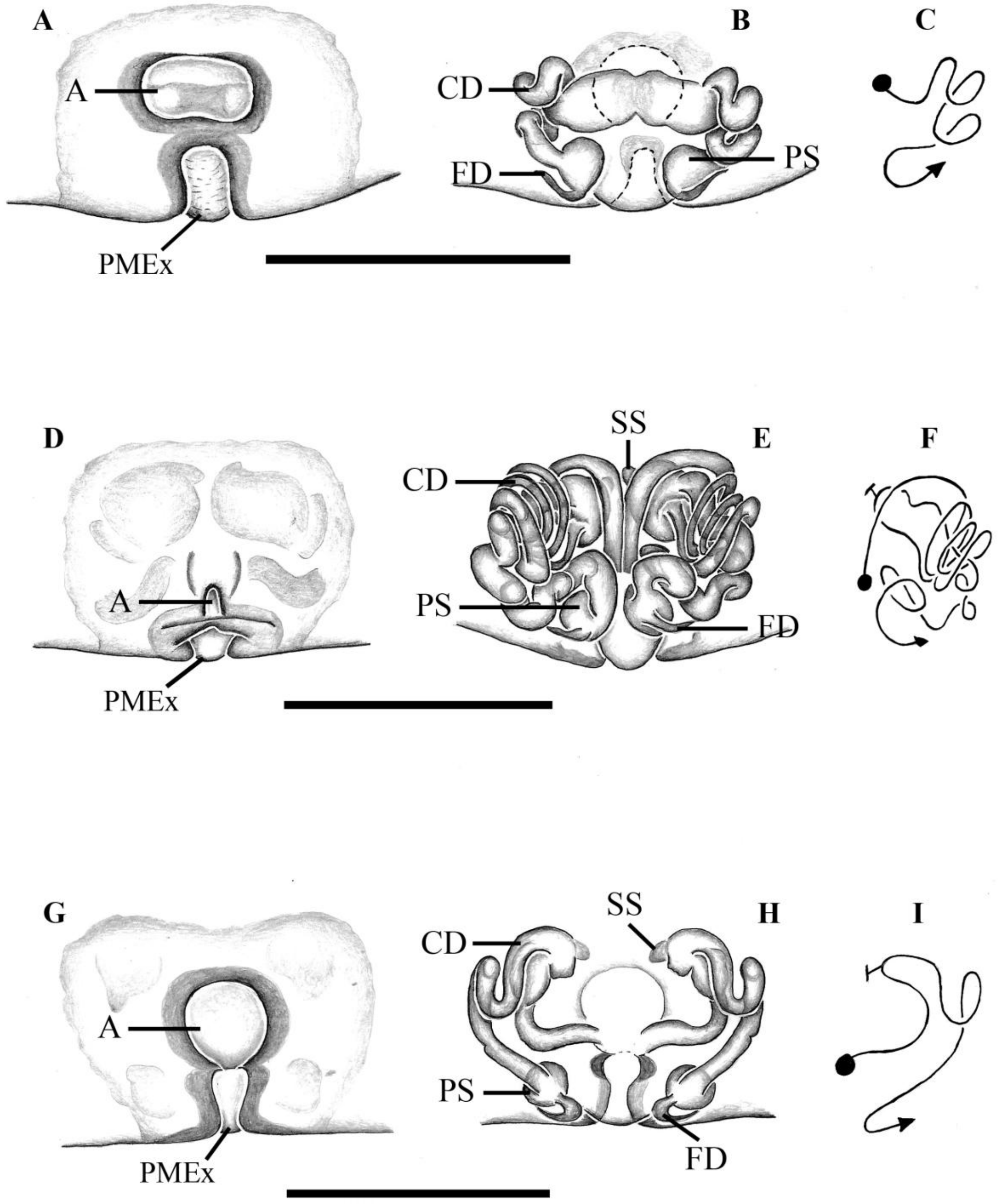

FIGURE 23. *Eleleis haddadi* **sp. nov.** Female: (A) epigyne, ventral view; (B) vulva, dorsal view; (C) vulva, schematic course of internal duct system. *E. luderitz* **sp. nov.** Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. *E. solitaria* **sp. nov.** Female: (G) epigyne, ventral view; (H) vulva, dorsal view; (I) vulva, schematic course of internal duct system. A—atrium; CD—copulatory duct; FD—fertilization duct; PMEx—posterior median excavation; PS—primary spermathecae; SS—secondary spermathecae. Scale bars: 0.25 mm.

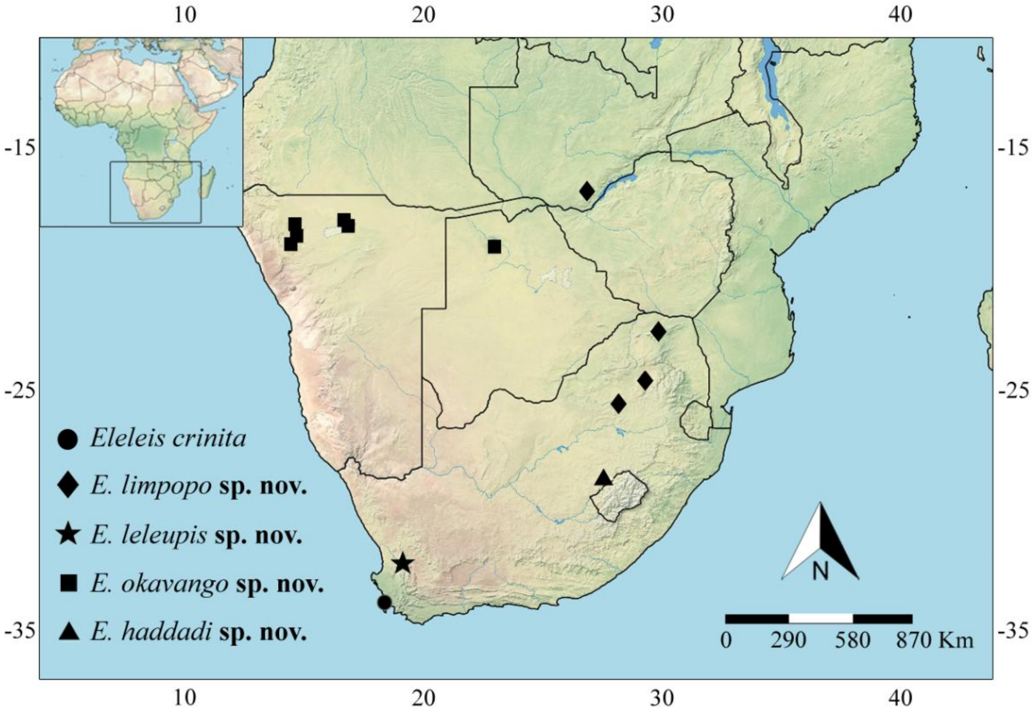

FIGURE 24. Known distribution records of species of *Eleleis crinita*, *E. limpopo* **sp. nov.**, *E. leleupis* **sp. nov.**, *E. okavango* **sp. nov.** and *E. haddadi* **sp. nov.** from Africa**.**

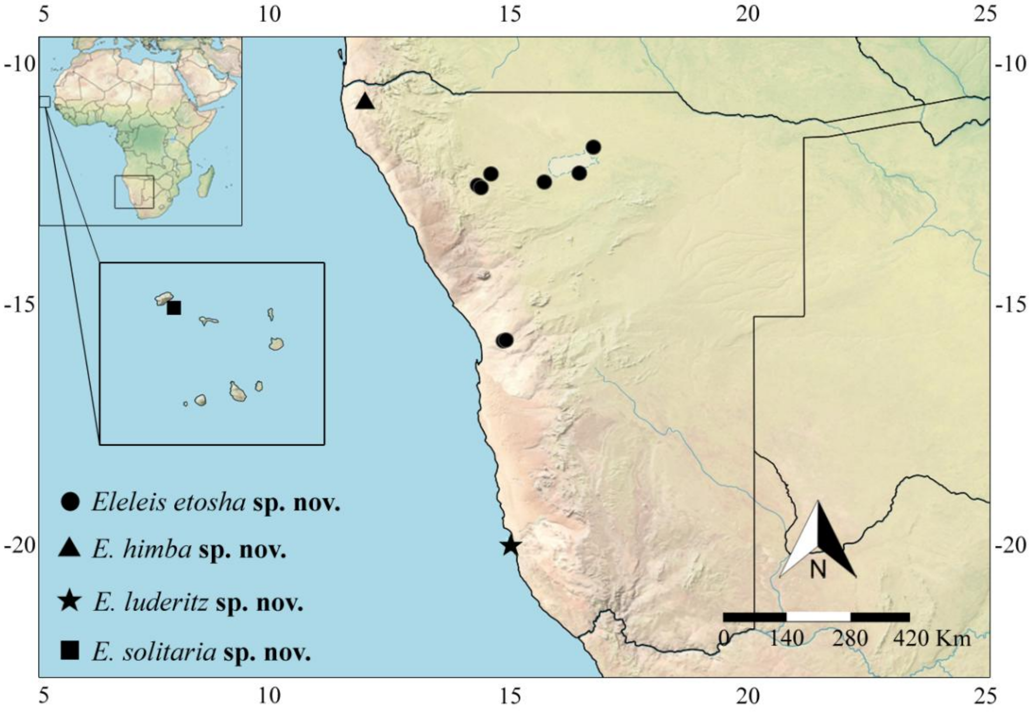

FIGURE 25. Known distribution records of species of *E. etosha* **sp. nov.**, *E. himba* **sp. nov.**, *E. luderitz* **sp. nov.** and *E. solitaria* **sp. nov.** from Africa**.**

Genus *Purcelliana* Cooke, 1964

Purcelliana Cooke, 1964: 282, figs 47, 52, 64 (Type species by monotypy, *Purcelliana problematica* Cooke, 1964).

Diagnosis. Species of *Purcelliana* are distinguished from those of other Prodidominae genera by the presence of short clavate setae on carapace, chelicerae, legs and abdomen (Figs 26A, C–E) and by having legs I markedly longer than the other legs (Fig. 26B). Males are distinguished by the short embolus arising from tegulum at 10 o'clock position (Figs 30A–D, 31B, E, 32B) and females by the epygine with pair of V-shaped copulatory openings and a triangular posterior median depression (32E, 33D).

Description. Total length of males 1.68–3.3 and females 1.92–3.76. Carapace approximately as wide as long, slightly narrow at cephalic region (Figs 26A, B). Fovea absent. Eight eyes; posterior eye row strongly procurved, anterior eye row approximately straight (Figs 26A, D, E); PME and PLE irregular; AME dark; AME–ALE, PME–PLE, ALE–PLE contiguous. Chilum absent. Chelicerae relatively small (0.23–0.6) without boss (Fig. 26D); without teeth (Figs 27D, E); long fang without shaft serrula (Fig. 27E, F); dorsal surface of paturon with clavate setae erect, resembling spines (Fig. 26D). Endites anteriorly convergent, with few hairs on internal margin, distal margin smaller than basal margin, longitudinal groove in prolateral edge and serrula absent (Figs 26D, 27C, D); labium approximately as wide as long (Figs 26D, 27C). Sternum longer than wide, anterior margin straight, rebordered anteriorly and laterally; posterior region strongly protruding between coxae IV with numerous long and erect setae (Fig. 26F); intercoxal setae present; precoxal triangles present. Pedicel with anterior region truncate. Leg formula 1423. Legs without spines, except the ventral tarsus with clustered clavate setae, resembling spines. Trichobothria present on dorsal tibia, metatarsi and tarsi, arranged in two rows; bothrium with three ridges on proximal plate (Fig. 28C). Tarsal organ capsulate with rounded opening, located dorsally and distally on tarsi (Fig. 28D). Two smooth claws (Fig. 28A); dense claw tufts of tenent setae inserted in a well-delimited plate; presence of solid claw tuft clasper (Fig. 28B). Abdomen oval, longer than wide (Figs 26A, B); dorsum of abdomen anteriorly without curved setae. Six spinnerets; ALS as long as wide, slightly separated, almost contiguous (Figs 26E, F, 29A, B, E), piriform gland spigots elongated with associated setae (Figs 29B, C), major ampular gland spigot field on a conical and well-defined structure (Fig. 29C), male with one major ampular gland spigot and female with two; PLS and PMS short, PLS larger than PMS (Fig. 26F); PMS–PLS with claviform setae (Fig. 29D); PLS in male and females apparently only with one minor ampular gland spigot (Figs 29D, F), without aciniform gland spigots and cylindrical gland spigot; PMS with apparently two aciniform gland spigots. Female palp: tarsus truncated with apical chemosensory patch without claw (Figs 28E, F). Male palp: femur unmodified, without spines; tibia short, less than half cymbium length. Two RTAs, vRTA stright and dRTA pointing retrolaterally; cymbium with apical scopula (Fig. 30B); bulb ovoid with a tegular laminar extension in distal part (Fig. 30D); sperm duct with terminal part narrow (Figs 32B, 33A); embolus insertion fused to tegulum (Figs 30A, D, 31A, D, 32A); conductor small and hyaline arising at 12 o’clock position (Figs 30D, 32B, 33A). Vulva: copulatory ducts convoluted; secondary spermathecae absent; primary spermathecae inconspicuous; fertilization ducts laterad (Figs 32F, 33E).

Distribution. South of Africa: Namibia and South Africa (Fig. 34).

Composition. Four species: *Purcelliana cederbergis* **sp. nov.,** *P. kamaseb* **sp. nov.,** *P. khabus* **sp. nov.** and *P. problematica* Cooke, 1964.

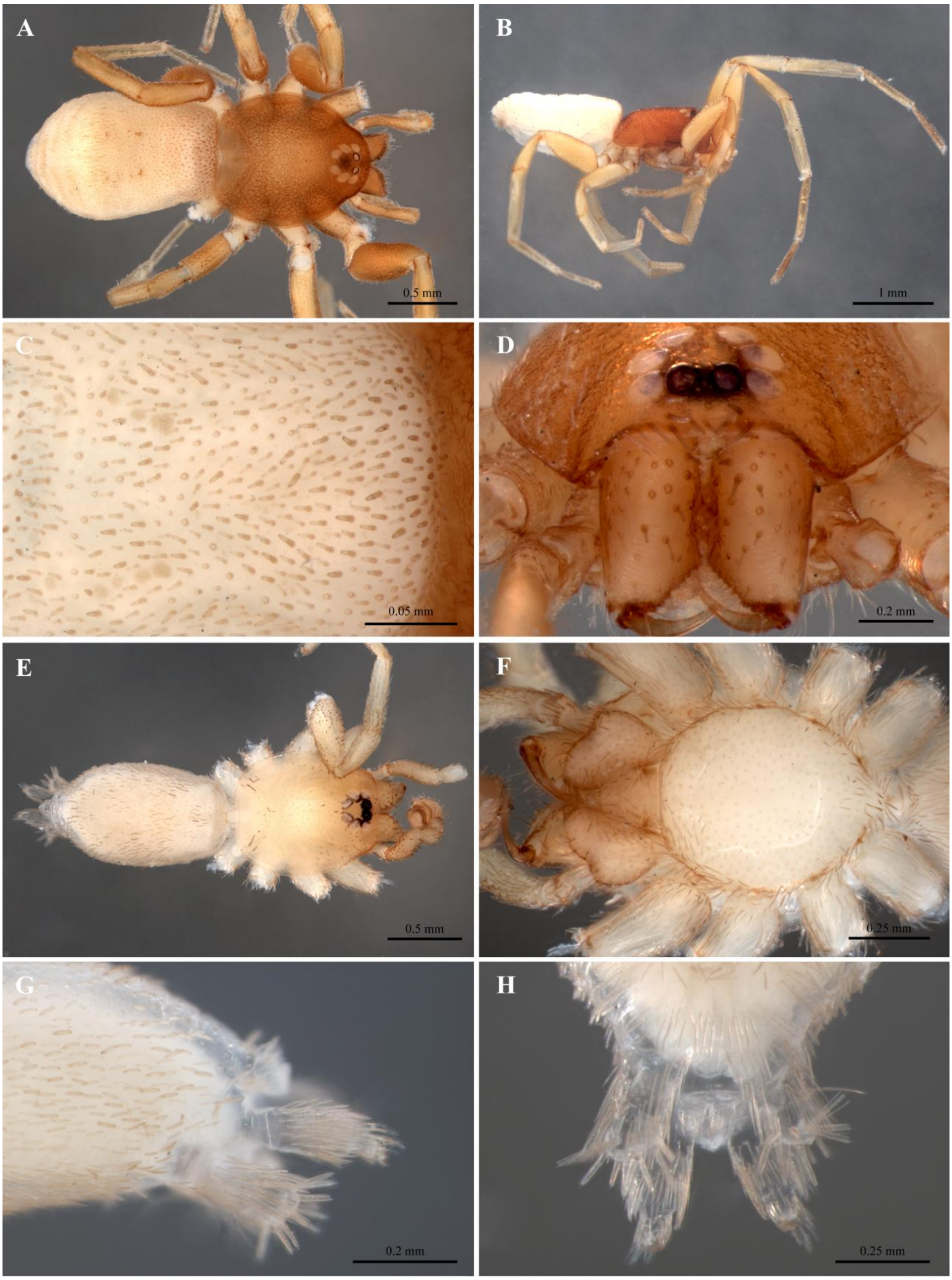

FIGURE 26. *Purcelliana kamaseb* **sp. nov.**, female. (A) habitus, dorsal view; (B) habitus, lateral view; (C) abdomen, dorsal view, detail clavate setae. *P. cederbergis* **sp. nov.,** male. (D) chelicerae, frontal view. *P. problematica*, male. (E) habitus, dorsal view; (F) sternum and endites; (G) spinnerets, lateral view; (H) spinnerets, ventral view.

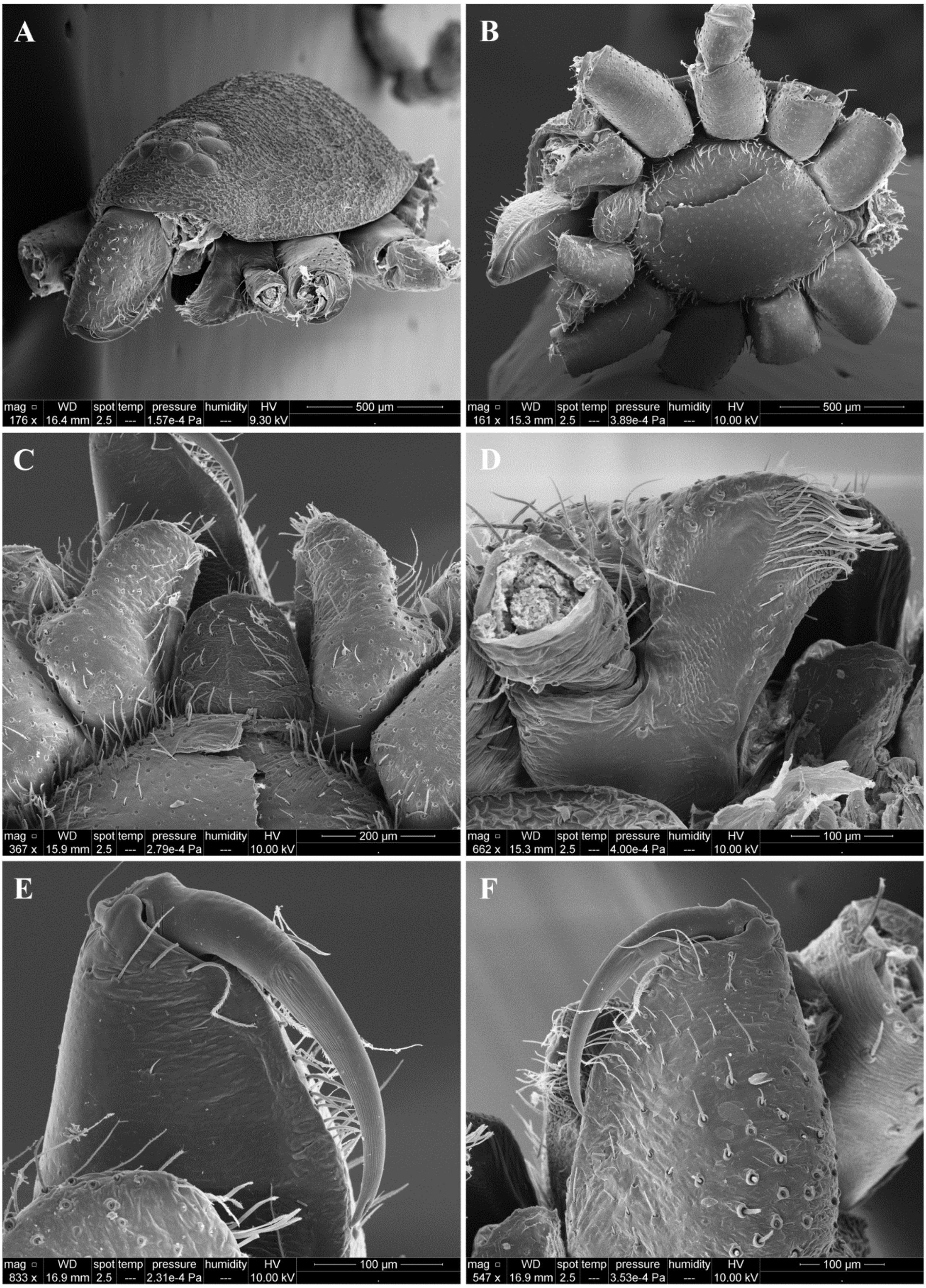

FIGURE 27. *Purcelliana etosha* **sp. nov.**, male. (A) carapace, retro-dorsal view; (B) sternum; (C) endites, ventral view; (D) endites, dorsal view; (E) chelicerae, retromargin; (F) chelicerae, promargin.

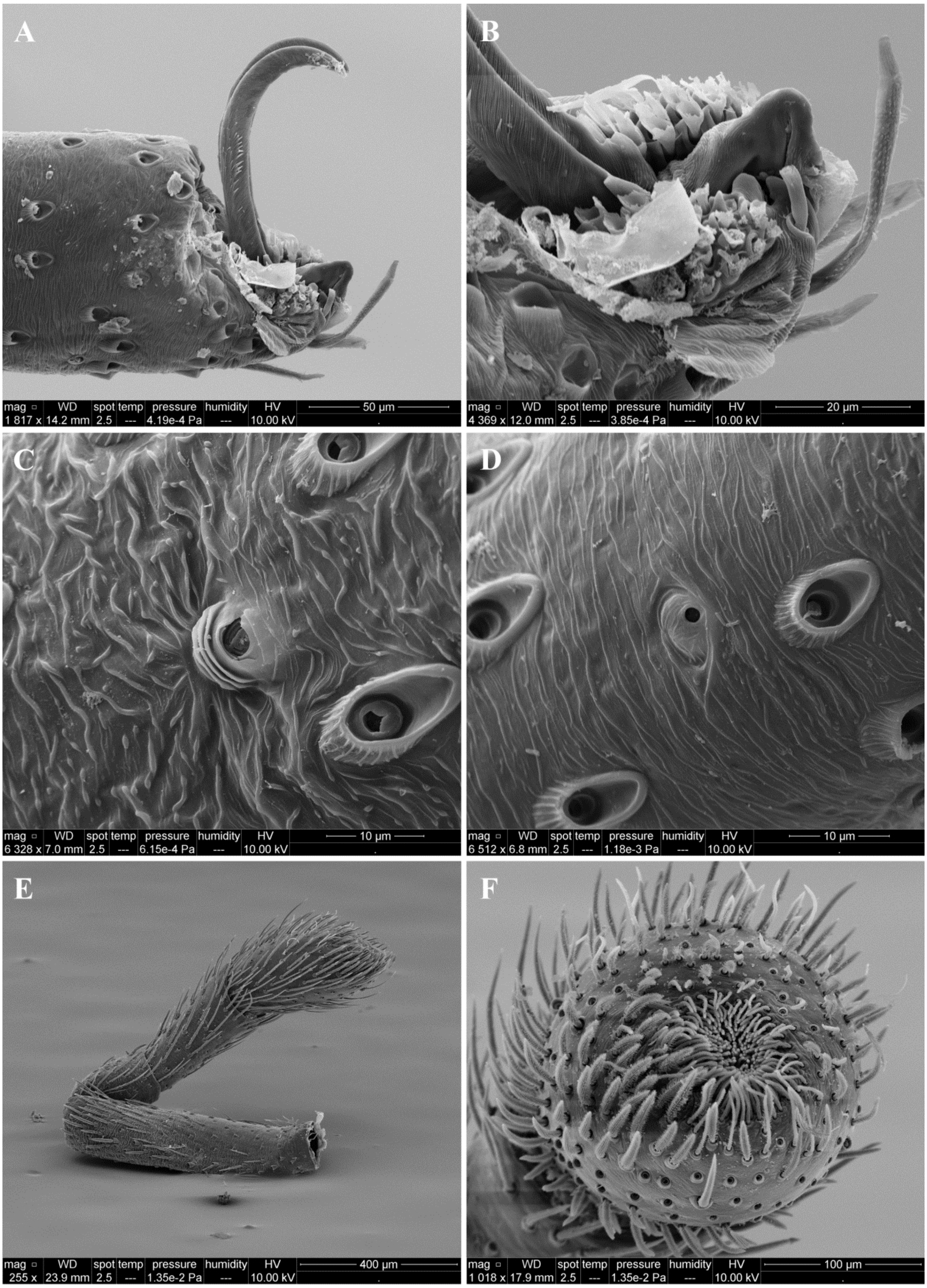

FIGURE 28. *Purcelliana etosha* **sp. nov.**, male. (A) tarsus I, claw, retrolateral view; (B) same, detail solid claw tutf clasper; (C) tarsus I, trichobothria (D) same, tarsal organ. Female. (E) female palp, retrolateral view; (F) same, tarsus, view frontal. CTC—claw tuft clasper.

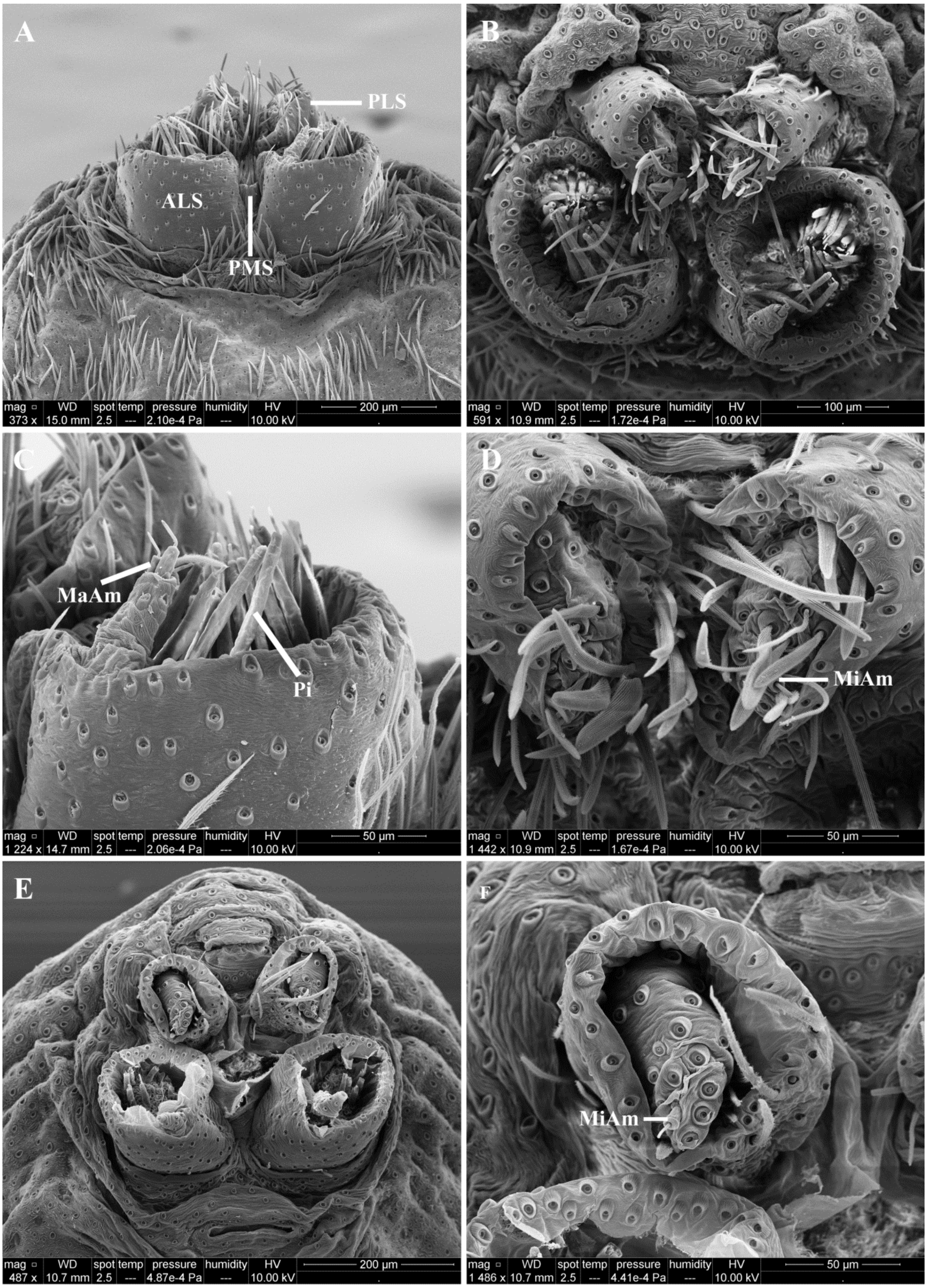

FIGURE 29. *Purcelliana etosha* **sp. nov.**, spinnerets, female. (A) ventral view; (B) apical view; (C) ALS, ventral view; (D) PMS, apical view. Male. (E) apical view; (F) PLS, apical view. ALS—anterior lateral spinnerets; MaAm—major ampular gland spigots; MiAm—minor ampular gland spigots; Pi—piriform gland spigots; PLS—posterior lateral spinnerets; PMS—posterior median spinnerets.

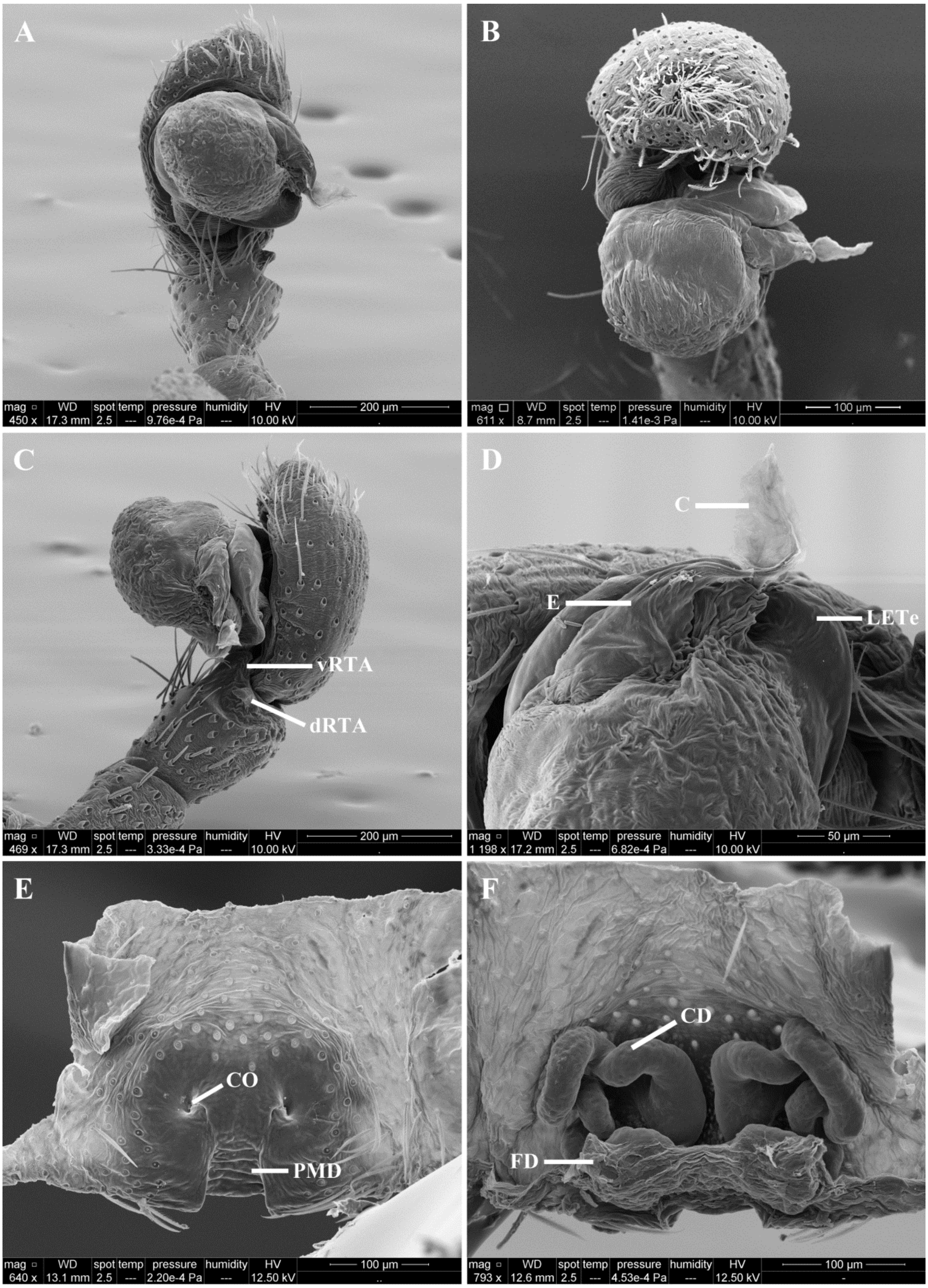

FIGURE 30. *Purcelliana etosha* **sp. nov.**, male. (A) palp, ventral view; (B) same, apical view; (C) same, retrolateral view; (D) same, ventral view, detail bulb. Female. (E) epigyne, ventral view; (F) vulva, dorsal view. C—conductor; CD—copulatory duct; CO—copulatory opening; dRTA—dorsal retrolateral tibial apophysis; E—embolus; FD—fertilization duct; LETe—laminar extension of tegulum; PMD—posterior median depression; vRTA—ventral retrolateral tibial apophysis.

Purcelliana problematica **Cooke, 1964**

Figs 1B, 26E–H, 31A–C and 34

Purcelliana problematica Cooke, 1964: 282, figs 47, 52, 64 (Holotype male from Prince Albert, Western Cape, [33°13'36.57"S,22°2'8.57"E], South Africa, deposited in SAM 3916, examined).

Remarks. As observed by Cooke (1964), the holotype is poorly preserved, but it is possible to identify the diagnostic characters for the genus in the specimen. In addition, obtaining additional material allowed us to complement the description of genus, as well as that of *P. problematica*.

Diagnosis. Males of *Purcelliana problematica* resemble those of *P. cederbergis* **sp. nov.** by male palp with embolus mostly straight (Figs 31B, E), but are distinguished by the presence of a median, distally rounded tegular projection (absent in *P. cederbergis* **sp. nov.)** and by the embolus slender and tapering (laminar and robust in *P. cederbergis* **sp. nov.)** (Figs 31A, B).

Description. Male (ARC.LNR 2008/670). Carapace and legs pale yellow, abdomen gray (Fig. 26E). Total length: 2.42. Carapace 1.05 long, 0.90 wide; Abdomen 1.37 long, 0.72 wide; Sternum 0.77 long, 0.63 wide; Spinnerets ALS 0.17 long, 0.13 wide. Eye diameters: AME 0.05, ALE 0.04, PME 0.07, PLE 0.09; interdistances: AME–AME 0.05, PME–PME 0.04. Chelicerae 0.44 long. Leg measurements: I: 3.84 (1.04, 0.59, 0.90, 0.74, 0.58); II: 2.83 (0.80, 0.44, 0.59, 0.54, 0.46); III: 2.38 (0.65, 0.38, 0.45, 0.46, 0.44); IV: 3.46 (0.94, 0.50, 0.80, 0.70, 0.53). Palp: vRTA truncated, smaller than dRTA tip curved ventrally conductor hyaline, laminar, distally widened (Figs 31A–C).

Female. Unknown.

Distribution. South Africa (Fig. 34).

Material examined. South Africa: Western Cape, Anysberg Nature Reserve, 33°31′48″S 20°45′36″E, 1 male, 24 September 2005, C. Haddad & R. Lyle leg. (ARC.LNR 2008/670).

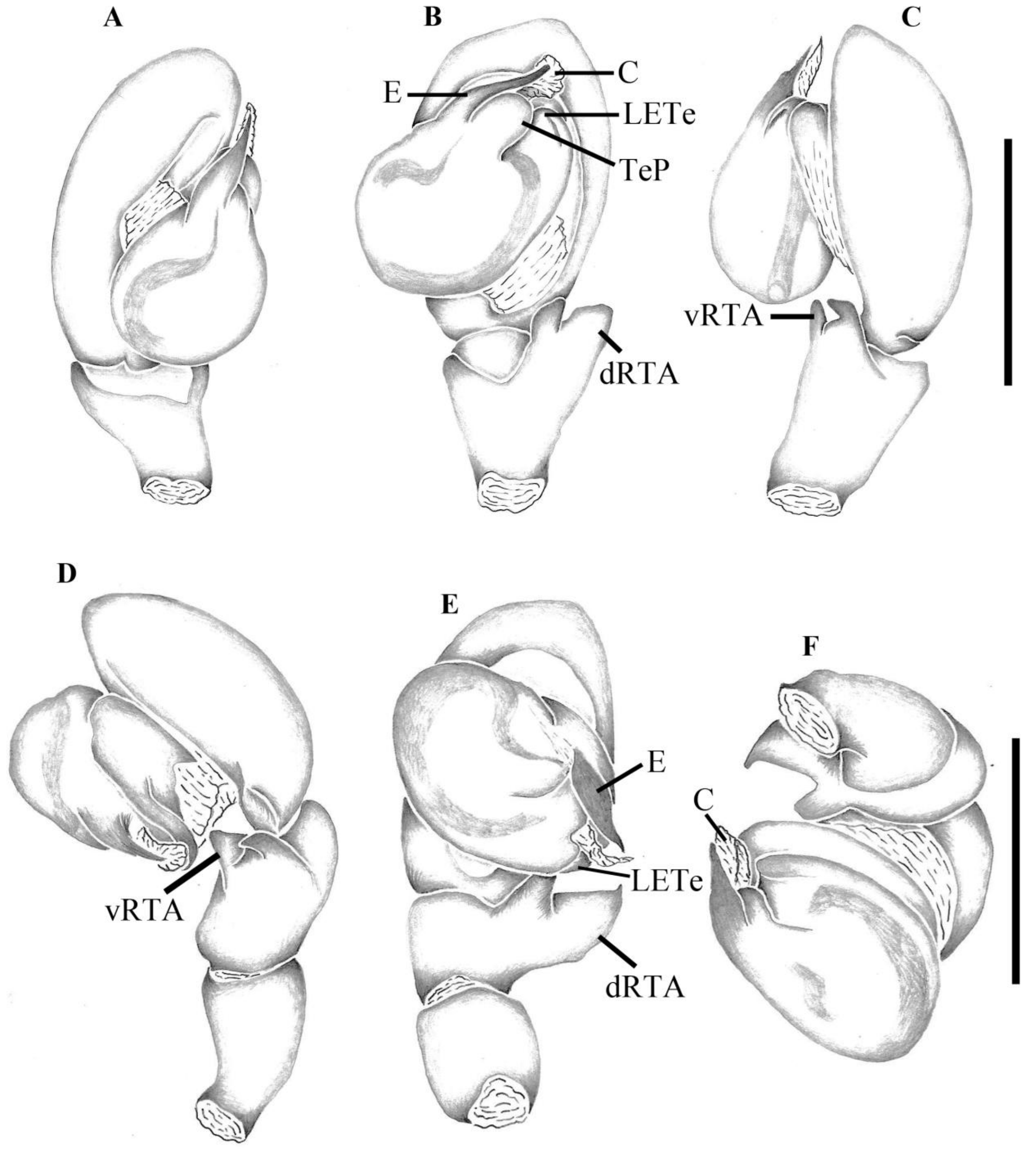

FIGURE 31. *Purcelliana problematica.* Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. *P. cederbergis* **sp. nov**. Male palp: (D) retrolateral view, bulb rotated (prolateral view); (E) ventral view, bulb rotated; (F) basal view, bulb rotated (retro-ventral view). C—conductor; dRTA—dorsal retrolateral tibial apophisys; E—embolus; LETe—laminar extension of tegulum; TeP—tegular projection; vRTA—ventral retrolateral tibial apophisys. Scale bars: 0.25 mm.

***Purcelliana cederbergis* sp. nov.**

Figs 26D, 31D–F and 34

Type Material. Male holotype from South Africa, Western Cape, Cederberg, Wupperthal, 32°16.674'S 19°13.157'E, 1 October 2009, E. Nortje & S. Kritzinger-Klopper leg., deposited in ARC.LNR 2012/2014.

Etymology. The specific name refers to the type locality, adjective.

Diagnosis. Males of *Purcelliana cederbergis* **sp. nov.** resemble those of *P. problematica* by the palp with embolus mostly straight (Figs 31B, E), but are distinguished by the lack of the median tegular projection (present in *P. problematica*), embolus laminar and robust (tapering in *P. problematica*) and dRTA massive, gently curved ventrally (Figs 31D–F).

Description. Male (holotype). Carapace and legs orange, abdomen gray. Total length: 2.12. Carapace 0.95 long, 0.82 wide; Abdomen 1.06 long, 0.67 wide; Sternum 0.67 long, 0.54 wide; Spinnerets ALS 0.13 long, 0.11 wide. Eye diameters: AME 0.06, ALE 0.06, PME 0.08, PLE 0.06; interdistances: AME–AME 0.03, PME–PME 0.02. Chelicerae 0.31 long. Leg measurements: II: 2.71 (0.70, 0.39, 0.54, 0.49, 0.59); III: 2.16 (0.55, 0.35, 0.42, 0.46, 0.38); IV: 3.04 (0.81, 0.40, 0.75, 0.60, 0.48). Palp: vRTA smaller than dRTA; embolus distally sinuous; conductor narrow (Figs 31D–F).

Female. Unknown.

Distribution. South Africa, only known from the type locality (Fig. 34).

Purcelliana kamaseb **sp. nov.**

Figs 26A–C, 27A–F, 28A–F, 29A–F, 30A–F, 32A–G and 34

Type Material. Male holotype from Namibia, Kamaseb, Etosha National Park, 19°04'S 16°41'E, 26 March– 4 May 1988, E. Griffin leg., deposited in SMN 41144.

Paratypes: 2 males from same data of holotype; 2 female from same locality of holotype, 8 August– 14 September 1987, E. Griffin leg., (SMN 49697).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. *Purcelliana kamaseb* **sp. nov.** resembles *P. khabus* **sp. nov.** in having the carapace reddish brown, strongly rugose (Figs 26A, B, 27A) and by the male palp with embolus curved retrolaterally (Figs 32B, 33B). The males are distinguished by the palps with vRTA pointed in ventral view and truncate in retrolateral view (rounded in *P. khabus*) and by the dRTA ventrally bent (dorsally bent in *P. khabus*) (Figs 32B, D); females are distinguished by the epigyne with V-shaped copulatory openings diverging (converging in *P. khabus*) and by the posterior-median depression with longitudinal grooves (absent in *P. khabus*) (Figs 30E, 32E). Both males and females are markedly larger that those of *P. khabus*.

Description. Male (SMN 41144). Carapace reddish, legs orange and abdomen pale yellow (Fig. 26A, B). Total length: 3.3. Carapace 1.31 long, 1.43 wide; Abdomen 1.90 long, 1.15 wide; Sternum 0.96 long, 0.8 wide; Spinnerets ALS 0.08 long, 0.1 wide. Eye diameters: AME 0.09, ALE 0.1, PME 0.1, PLE 0.13; interdistances: AME–AME 0.06, PME–PME 0.08. Chelicerae 0.26 long. Leg measurements: I: 5.55 (1.44, 0.97, 1.25, 1.03, 0.86); II: 3.86 (1.08, 0.61, 0.86, 0.72, 0.59); III: 3.28 (0.98, 0.47, 0.63, 0.66, 0.55); IV: 4.97 (1.39, 0.75, 1.09, 0.98, 0.75). Palp: conductor distally widened (Figs 32A–D).

Female (SMN 49697). Total length: 3.52. Carapace 1.5 long, 1.47 wide; Abdomen 2.15 long, 1.15 wide; Sternum 1.1 long, 0.86 wide; Spinnerets ALS 0.16 long, 0.15 wide. Eye diameters: AME 0.09, ALE 0.1, PME 0.09, PLE 0.11; interdistances: AME–AME 0.06, PME–PME 0.08. Chelicerae 0.6 long. Leg measurements: I: 6.03 (1.64, 1.08, 1.34, 1.06, 0.91); II: 4.44 (1.25, 0.73, 0.92, 0.83, 0.7); III: 3.84 (1.09, 0.64, 0.78, 0.80, 0.53); IV: 5.58 (1.47, 0.98, 1.28, 1.0, 0.84).

Variation. Total length (4 males): 2.4–3.3; (3 females): 3.28–3.76.

Distribution. Etosha National Park, Namibia (Fig. 34).

Other material examined. Namibia: Karossfontein, Etosha National Park, 19°21'S 14°31'E, 2 male, 13 May–16 June 1986, E. Griffin leg. (SMN 39427); Dorstland, Etosha National Park, 18°46'S 14°44'E, 2 female, 4 August–13 September 1987, E. Griffin leg. (SMN 40596).

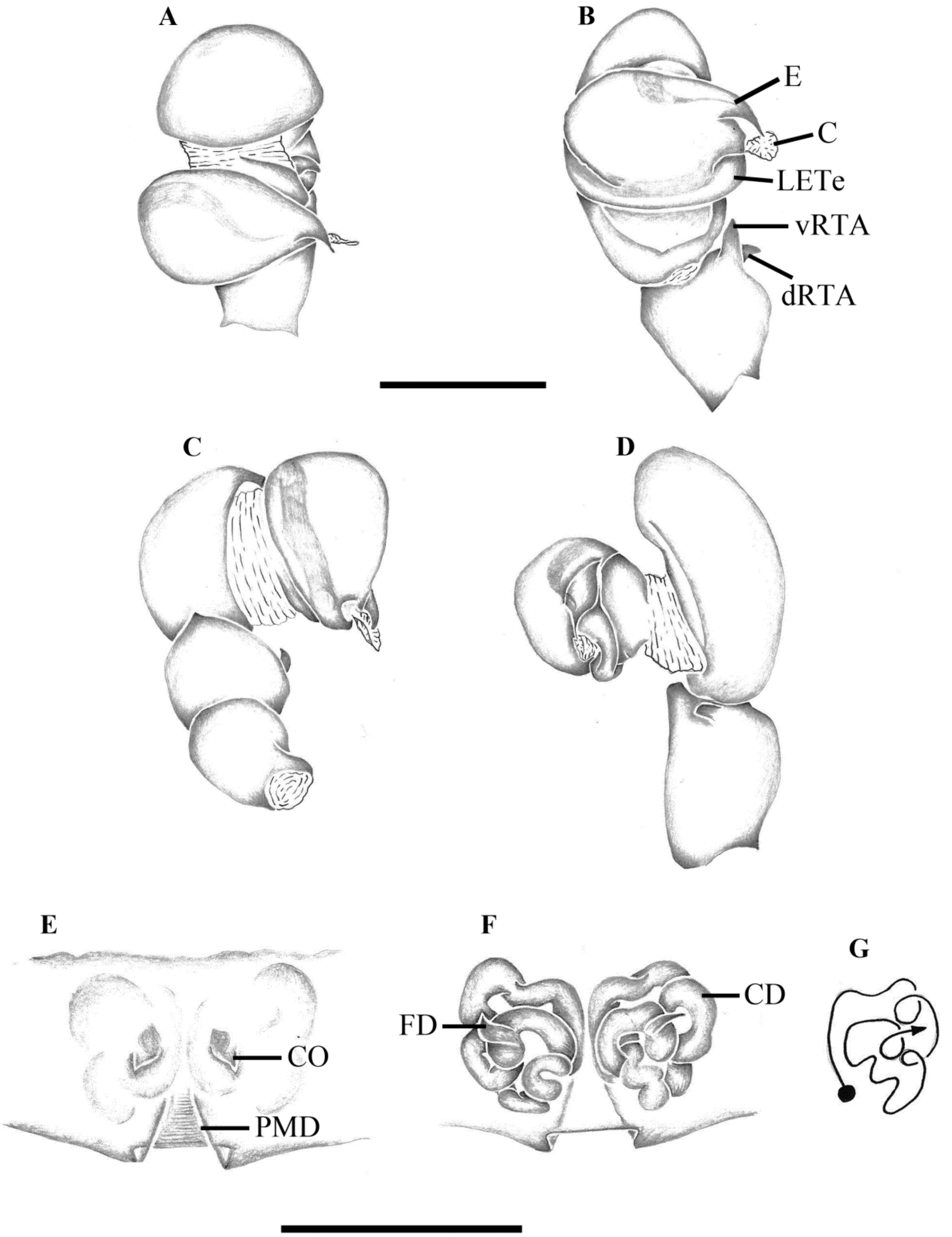

FIGURE 32. *Purcelliana kamaseb* **sp. nov.** Male palp: (A) apical view, bulb rotated (prolateral view); (B) ventral view, bulb rotated; (C) prolatero-basal view, bulb rotated (retrolateral view); (D) retrolateral view, bulb rotated (apical view). Female: (E) epigyne, ventral view, arrow to triangular posterior depression; (F) vulva, dorsal view; (G) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; dRTA—dorsal retrolateral tibial apophisys; E—embolus; FD—fertilization duct; LETe—laminar extension of tegulum; PMD—posterior median depression; vRTA—ventral retrolateral tibial apophisys. Scale bars: 0.25 mm.

***Purcelliana khabus* sp. nov.**

Figs 33A–F and 34

Type Material. Male holotype from Namibia, Keetmanshoop, Khabus 146, 26°17'S 18°14'E, 7 December 1987– 17 January 1988, N. Olivier leg., deposited in SMN 40749. Paratypes: 1 male from same locality of holotype, 28°18'S 18°13'E, 14 April 1988, N. Olivier leg., (SMN 42020); 1 female from Namibia, Mariental, Berseba 170, 25°12'S 18°03'E, 7–29 November 1992, E. Marais leg., (SMN 42879).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. *Purcelliana khabus* **sp. nov.** resembles *P. kamaseb* **sp. nov.** in having the carapace reddish brown, strongly rugose (Figs 26A, B, 27A) and by the male palp with embolus curved retrolaterally (Figs 32B, 33B). The males are distinguished by the palps with vRTA rounded in ventral view (pointed in *P. kamaseb*) and by the dRTA bent dorsally (ventrally in *P. kamaseb*) (Figs 33B, C); females are distinguished by epigyne with V-shaped copulatory openings converging (divergeing in *P. kamaseb*) and by the posterior-median depression without longitudinal grooves (present in *P. kamaseb*) (Fig. 33D). Both males and females are markedly smaller that those of *P. kamaseb*.

Description. Male (SMN 40749). Carapace reddish, legs orange and abdomen pale yellow. Total length: 1.68. Carapace 0.72 long, 0.71 wide; Abdomen 0.82 long, 0.51 wide; Sternum 0.56 long, 0.44 wide; Spinnerets ALS 0.08 long, 0.07 wide. Eye diameters: AME 0.05, ALE 0.06, PME 0.06, PLE 0.08; interdistances: AME–AME 0.03, PME–PME 0.05. Chelicerae 0.24 long. Leg measurements: I: 2.56 (0.67, 0.40, 0.63, 0.44, 0.40); II: 1.72 (0.48, 0.22, 0.39, 0.31, 0.32); III: 1.53 (0.44, 0.25, 0.30, 0.27, 0.27); IV: 2.4 (0.67, 0.38, 0.53, 0.51, 0.32). Palp: conductor distally widened; vRTA larger than dRTA (Figs 33A–C).

Female (SMN 42879). Total length: 1.92. Carapace 0.83 long, 0.75 wide; Abdomen 1.03 long, 0.6 wide; Sternum 0.64 long, 0.48 wide; Spinnerets ALS 0.08 long, 0.06 wide. Eye diameters: AME 0.06, ALE 0.05, PME 0.06, PLE 0.07; interdistances: AME–AME 0.04, PME–PME 0.03, AME–ALE contiguous, PME–PLE contiguous, ALE–PLE contiguous. Chelicerae 0.23 long. Leg measurements: I: 2.76 (0.71, 0.49, 0.62, 0.48, 0.46); II: 2.1 (0.59, 0.36, 0.44, 0.38, 0.33); III: 1.82 (0.52, 0.28, 0.39, 0.34, 0.29); IV: 2.67 (0.7, 0.4, 0.6, 0.54, 0.43).

Variation. Total length (2 males): 1.68–1.9.

Distribution: Namibia (Fig. 34).

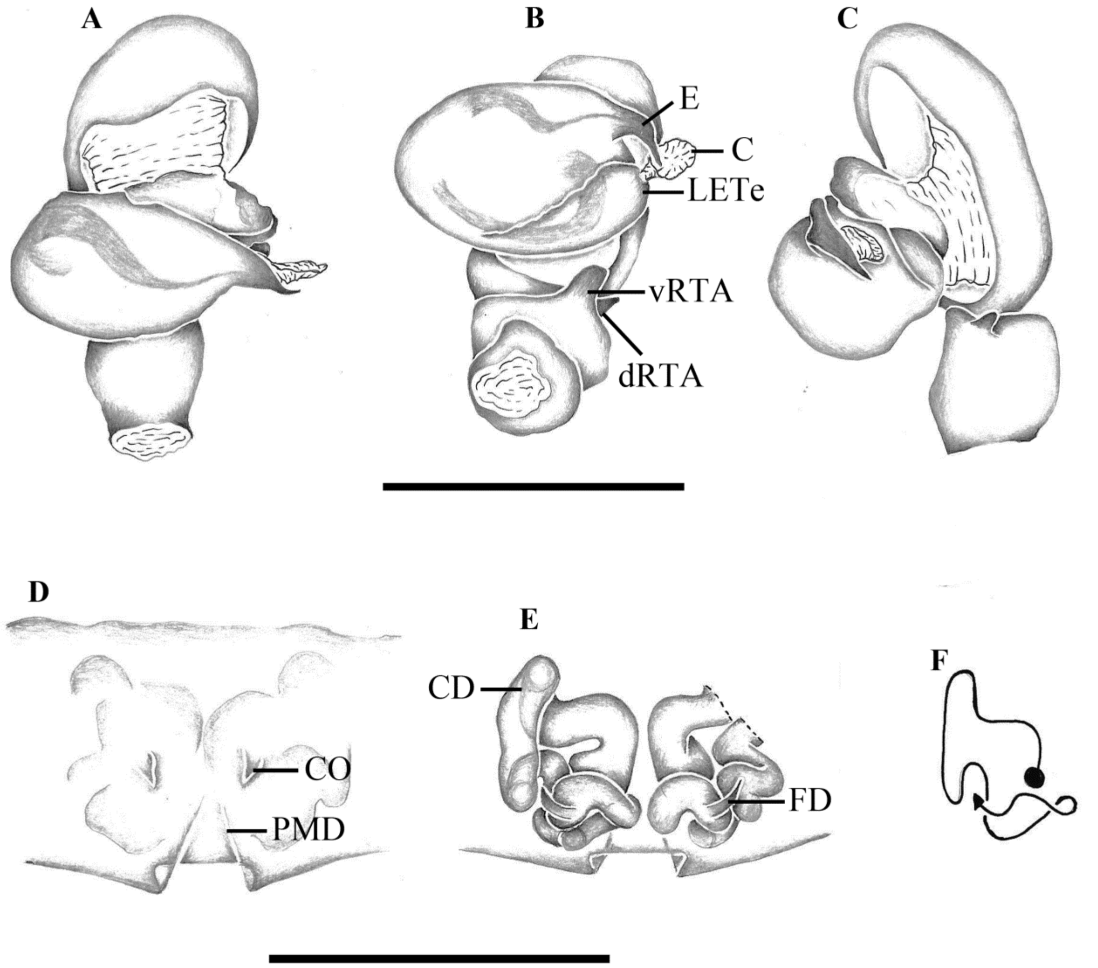

FIGURE 33. *Purcelliana khabus* **sp. nov.** Male palp: (A) apical view, bulb rotated (prolateral view); (B) ventro-basal view, bulb rotated (ventral view); (C) retrolateral view, bulb rotated (apical view). Female: (D) epigyne, ventral view, arrow to triangular posterior depression; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; dRTA—dorsal retrolateral tibial apophisys; E—embolus; FD—fertilization duct; LETe—laminar extension of tegulum; PMD—posterior median depression; vRTA—ventral retrolateral tibial apophisys. Scale bars: 0.25 mm.

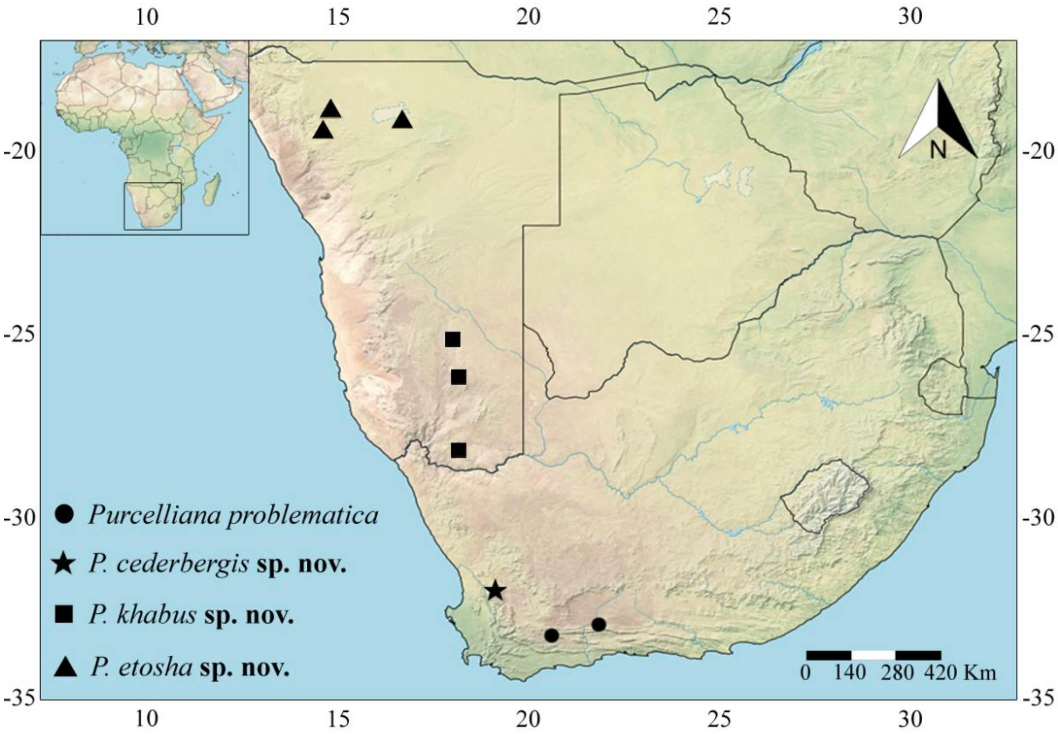

FIGURE 34. Known distribution records of species of *Purcelliana* from Namibia and South Africa**.**

Genus *Plutonodomus* Cooke, 1964

Plutonodomus Cooke, 1964: 280, figs 34, 53–57 (Type species by monotypy, *Plutonodomus kungwensis* Cooke, 1964).

Remarks. *Plutonodomus* is the only known African Prodidominae genus that shows adaptations to a subterraneous environment. The specimen was collected in a termite nest (*Microtermes* sp.) at the edge of a gallery forest (Cooke, 1964). *Plutonodomus kungwensis* is known solely from a female holotype and no additional material belonging to this species was examined in this study. Thus, despite sharing several traits with other African genera (Rodrigues & Rheims, in prep, chapter 1) we prefer to keep it as a separate genus until the male is discovered and more material is collected, enabling a more detailed study.

Diagnosis and description. See *Plutonodomus kungwensis.*

Composition. Monotypic: *P. kungwensis* Cooke.

Distribution. Kungwe-Mahali Mts., Tanzania (Fig. 36).

Plutonodomus kungwensis Cooke, 1964

Figs 35A–G, 36

Plutonodomus kungwensis, 1964: 280 (holotype female from Kungwe-Mahali Mts., Kasoge, Tanzania, [6°7'15.43"S,29°44'3.55"E], deposited in OUMNH, examined).

Diagnosis. The female of *Plutonodomus kungwensis* differs from those of other Prodimoninae by the combination of the following characters: absence of eyes (Fig. 35C), sternum with anterior margin rounded (Fig. 35D), smooth claws, epigyne with posterior C-shaped copulatory openings, facing away from each other, with a bell-like structure between them (Fig 35E).

Description. Total length: 1.55. Body pale yellow (Figs 35A–D). Carapace 0.69 long, 0.4 wide; carapace without anterior constriction (Fig. 35C). Fovea absent. Eyes absent. Chelicerae 0.15 long; apparently without tooth. Endites slightly convergent, wide distal margin, similar to basal margin (Fig. 35D); serrula absent; labium wider than long (Fig. 35D). Sternum 0.45 long, 0.38 wide; anterior margin rounded, rebordered anteriorly and laterally; posterior region strongly protruding between coxae IV with numerous long and erect setae (Fig. 35D); precoxal triangles present. Pedicel with anterior region truncate. Leg formula 4123. Leg measurements: I: 1.81 (0.5, 0.36, 0.35, 0.30, 0.30); II: 1.49 (0.44, 0.22, 0.30, 0.26, 0.27); III: 1.23 (0.35, 0.25, 0.16, 0.24, 0.23); IV: 1.92 (0.52, 0.31, 0.40, 0.36, 0.33). Leg spination: III – femur d1-0-0; tibia v1p-0-0. IV – femur d1-1-0, tibia p0-0-1, r1-0-1, v1p-0-1r. Patella I larger than the others, length similar to tibia I. Two smooth claws; apparently with dense claw tufts of tenent setae. Abdomen 0.9 long, 0.55 wide; abdomen oval (Figs 35A, B). Six spinnerets; ALS 0.09 long, 0.07 wide; ALS separated from each other by approximately their diameter (Fig. 35B); piriform gland spigots elongated with associated setae, major ampular gland spigot field on a conical and well-defined structure; PLS larger than PMS. Vulva: copulatory ducts slender between copulatory openings and secondary spermathecae; secondary spermathecae well defined; copulatory ducts between secondary spermathecae and primary spermathecae convoluted; primary spermathecae round (Figs 35E–G).

Male. Unknown.

Distribution. Tanzania, only known from the type locality (Fig. 36).

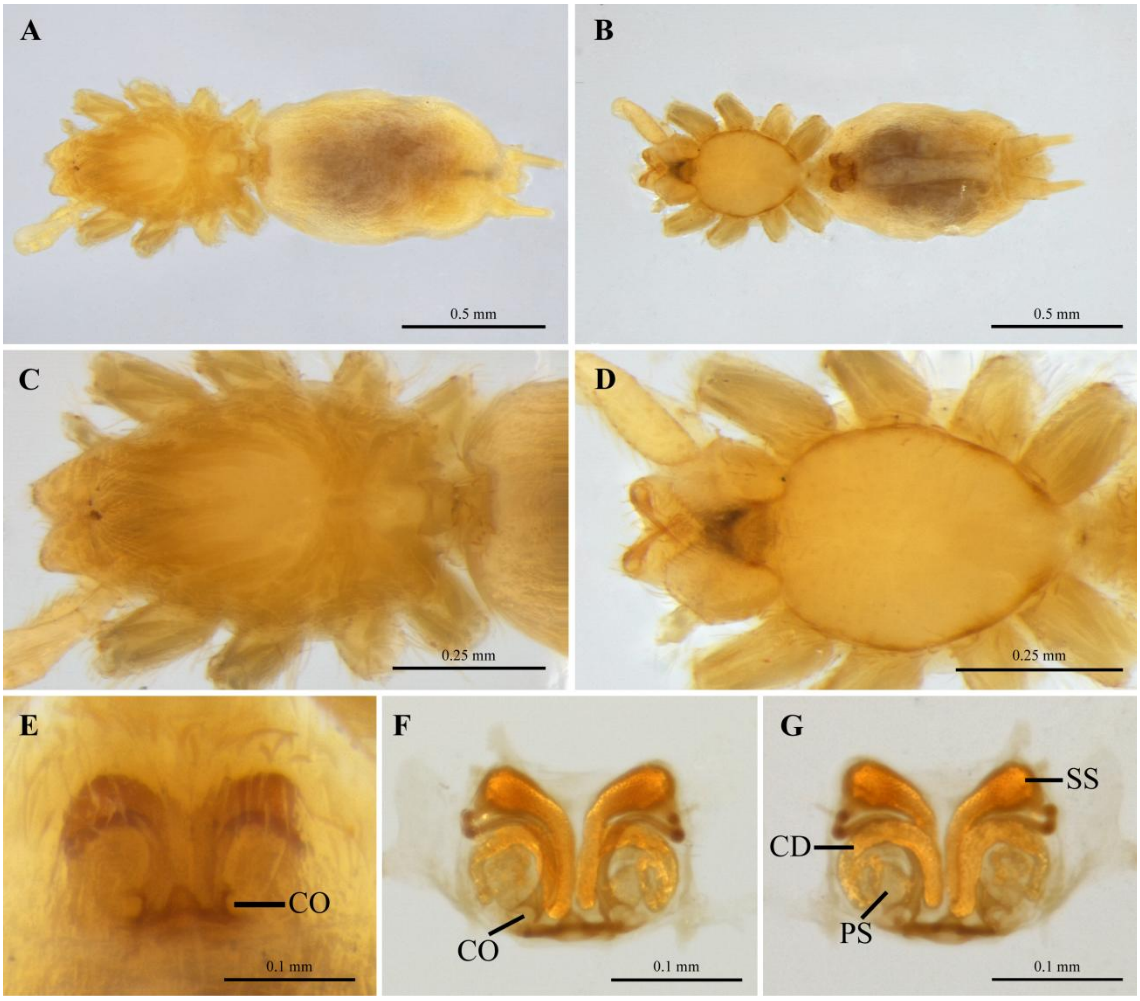

FIGURE 35. *Plutonodomus kungwensis*, female. (A) habitus, dorsal view; (B) habitus, ventral view; (C) carapace, dorsal view; (D) sternum and endites; (E) epigyne, not dissected; (F) epigyne, dissected; (G) Vulva, dorsal view. CD—copulatory duct; CO—copulatory opening; PS—primary spermathecae; SS—secondary spermathecae. Scale bars: 0.25 mm.

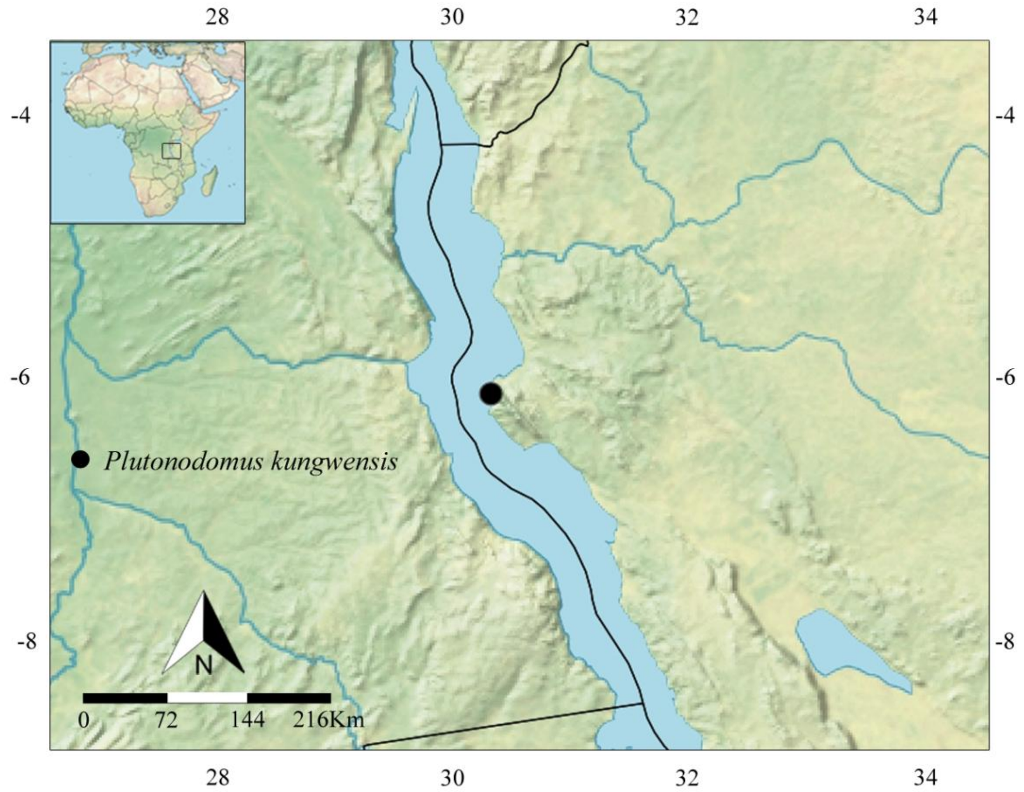

FIGURE 36. Known distribution records of species of *Plutonodomus* from Tanzania**.**

Genus *Theumella* Strand, 1906

Theumella Strand, 1906: 608 (Type species by original designation, *Theumella typica* Strand, 1906).

Remarks. Strand (1906) described *Theumella* to include two species, *T. typica* (only male) and *T. penicillata* (only female), both species from Ethiopia. Although the author opted to keep them as different species, the original description and distribution of the species leads us to believe that they are conspecific. However, we did not examine *T. penicillata* or any additional material to make a taxonomic decision on the matter. Thus, here we redescribed the genus based only on the type species, *T. typica*.

Diagnosis and description. See *Theumella typica.*

Composition. Two species: *Theumella penicillata* Strand, 1906 and *T. typica* Strand, 1906.

Distribution. Ethiopia (Fig. 39).

Theumella typica Strand, 1906

Figs 37A–H, 38A–D, 39

Theumella typica Strand, 1906: 608 (holotype male from Mane River, Oromia, Ethiopia, [5°43'24.27"N, 41°6'35.22"E], deposited in MNHN, examined).

Diagnosis. Males of *Theumella typica* are distinguished from those of the remaining Prodidominae genera by the palps with tibia bearing four strong prolateral spines and one retrolateral spine and by the subdistal, retrolateral, pointed projection, bearing many strong setae on the cymbium (Figs 38A–D).

Description. Total length: 5.8. Carapace and abdomen brown, sternum, mouthparts, spinnerets and probably legs pale brown (Figs 37A–H). Carapace 2.6 long, 2.3 wide; carapace with anterior constriction (Fig. 37A). Fovea present. Eight eyes; anterior and posterior eye row approximately straight (Figs 37A, D); PME irregular; AME dark (Fig. 37D); eye diameters: AME 0.1; ALE 0.11; PLE 0.12; PME 0.12; interdistances: AME–AME 0.11; AME–ALE 0.06; PLE–ALE 0.14; PME–PLE 0.16; PME–PME 0.07. Chelicerae 0.75 long; apparently with one retromarginal teeth and four promarginal teeth; fang with shaft serrula. Endites slightly convergent, wide distal margin, similar to basal margin (Fig. 37E); serrula present; labium longer than wide (Fig. 37E). Sternum 1.8 long, 1.3 wide; anterior margin truncated, rebordered anteriorly and laterally; thin and conical posterior region strongly protruding between coxae IV with numerous long and erect setae (Fig. 37F); precoxal triangles present. Pedicel with anterior region truncate. Abdomen 3.1 long, 2.1 wide; abdomen oval (Figs37A–C). Six spinnerets; ALS 1.1 long, 0.3 wide; ALS separated from each other by more than their diameter (Figs 37G, H); ALS slightly advanced anteriorly, separated to others spinnerets (Fig. 37H); piriform gland spigots elongated with associated setae, major ampular gland spigot field on a conical and well-defined structure; PLS larger than PMS. Male palp: femur with three dorsal spines, one median and two apical, one apical prolateral spine; robust tibia RTA single with tip curved ventrally; cymbium with apical scopula; thick setae present in ventro-apical region of cymbium; bulb ovoid; sperm duct poorly visible ventrally; tegular projection prolateral, here considered as median apophysis; embolus filiform arising at 1 o´clock position (Figs 38A–D).

Distribution. Ethiopia (Fig. 39).

Composition. Two species: *Theumella penicillata* and *T. typica*.

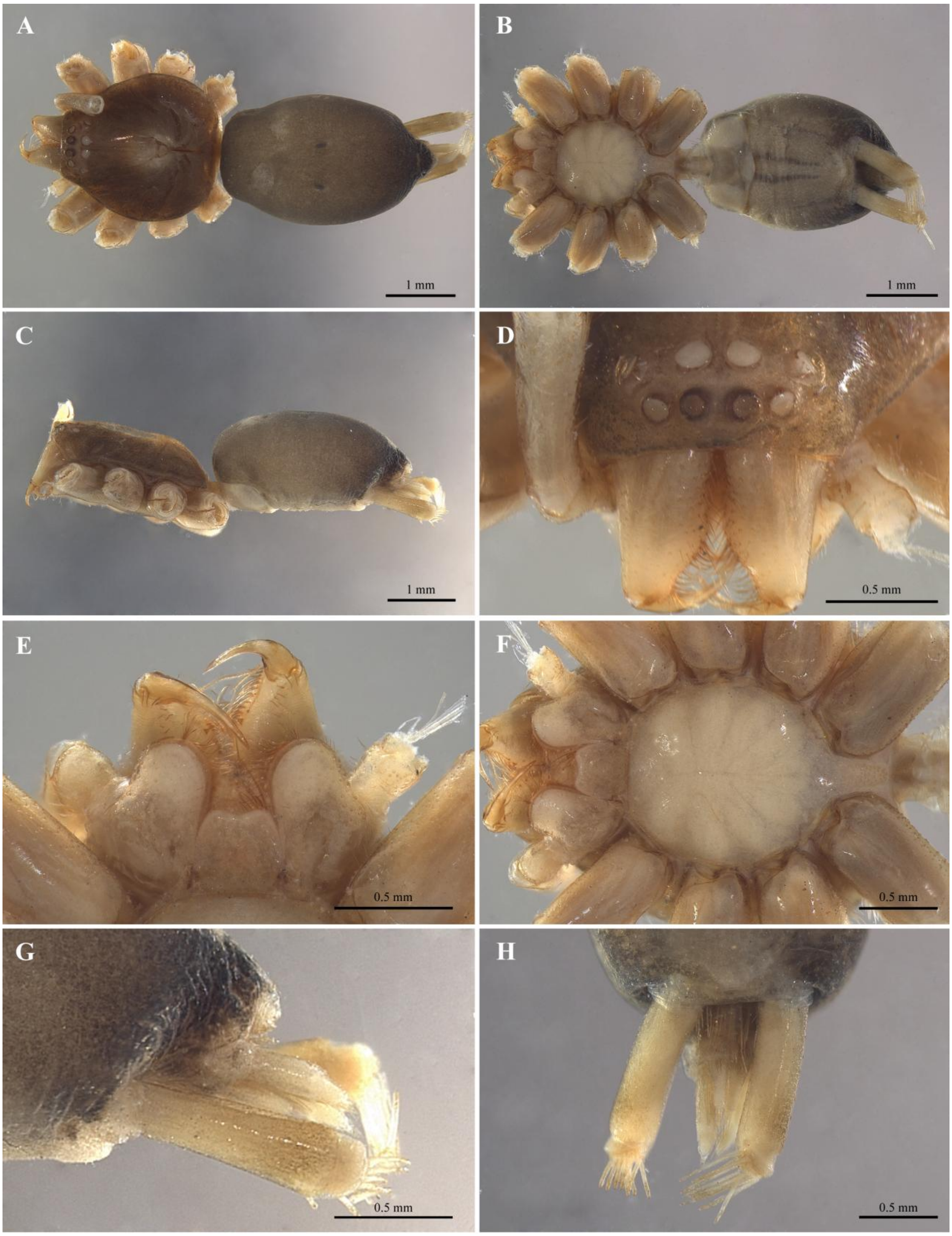

FIGURE 37. *Theumella typica*, male. (A) habitus, dorsal view; (B) habitus, ventral view; (C) habitus, lateral view; (D) eyes, frontal view; (E) endites; (F) sternum; (G) spinnerets, lateral view; (H) spinnerets, ventral view.

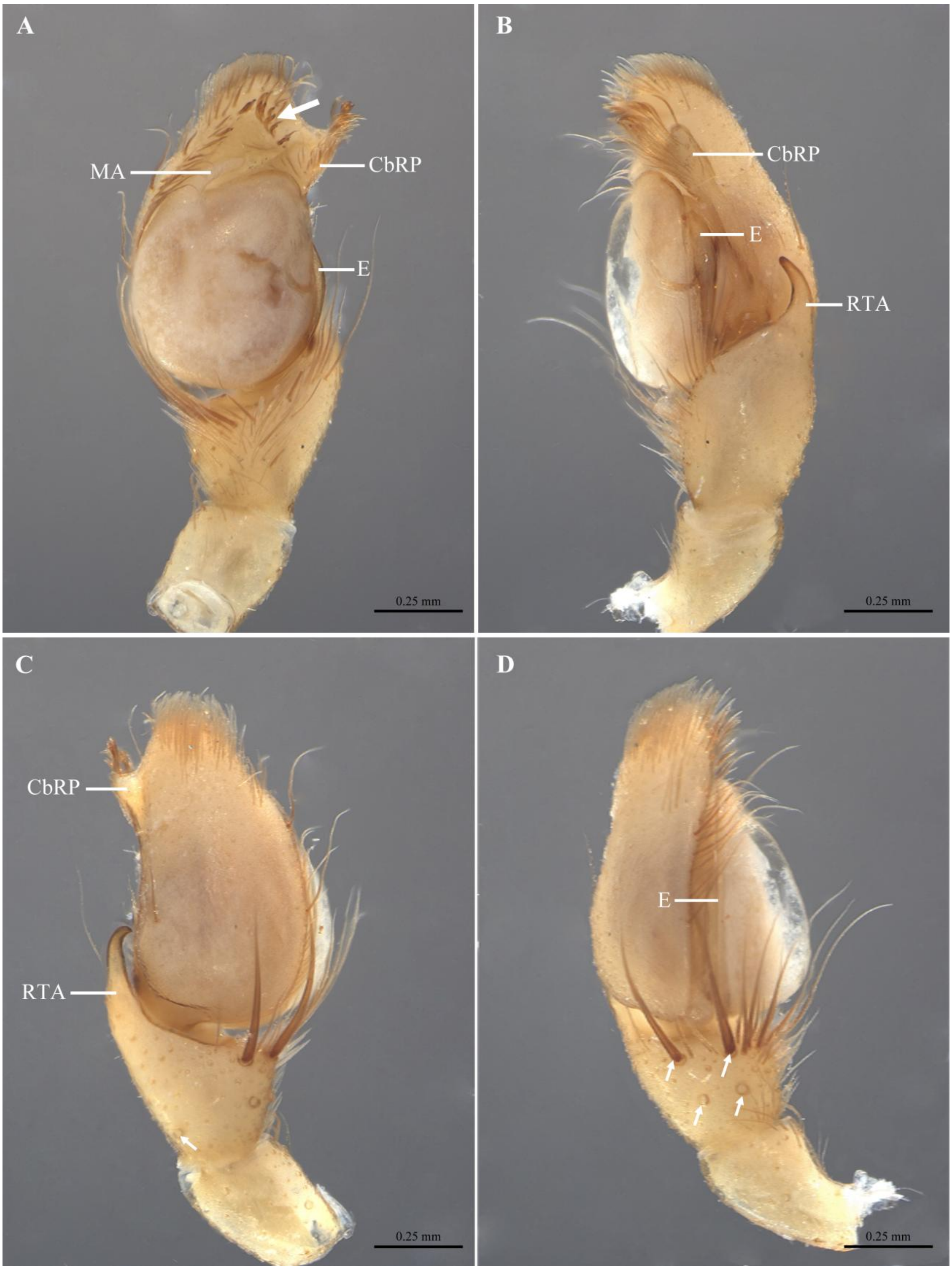

FIGURE 38. *Theumella typica*, male palp: (A) ventral view, arrow to bunch of thick setae on ventral cymbium; (B) retrolateral view; (C) dorsal view, arrow to strong retrolateral spine; (D) prolateral view, arrow to strong prolateral spines. CbRP—cymbyal retrolateral process; E—embolus; MA—median apophysis; RTA—ventral retrolateral tibial apophysis.

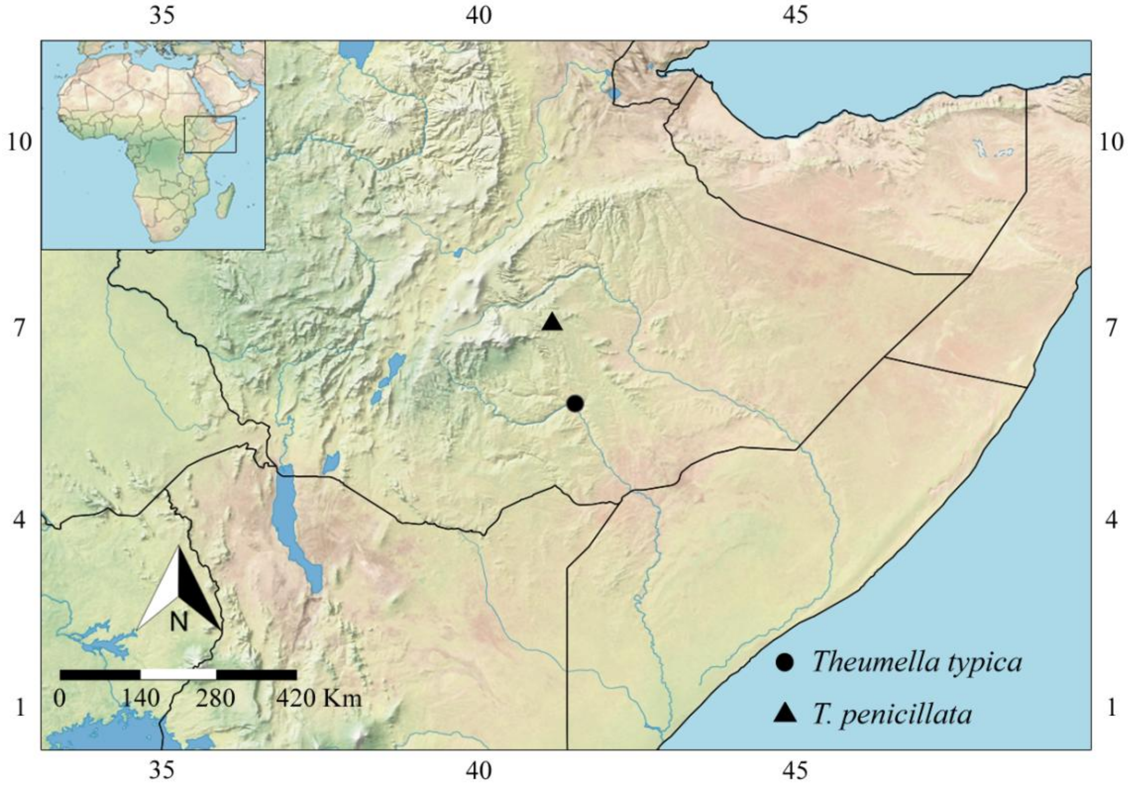

FIGURE 39. Known distribution records of species of *Theumella* from Ethiopia**.**

Kituba gen. nov.

Etymology. The generic name is a noun in apposition that refers to the Kituba language, a Kikongo-based language considered one of the official languages of the Democratic Republic of Congo. The gender is masculine.

Type species. *Kituba mayombensis* **sp. nov.** (original designation).

Diagnosis. Females are distinguished from those of other Prodidominae genera by the vulva with copulatory ducts slender and convoluted anteriorly and laterally with secondary spermathecae reduced to a small lump on the duct, connected to the round primary spermathecae by a thicker, widened duct (Figs 45E, 46B). For males diagnosis see *K. moyobensis*.

Description. Total length males 1.72–1.95 and females 1.58–2.32. Carapace longer than wide, slightly narrow at cephalic region, oval (Figs 40A, B, 41A). Fovea absent. Eight eyes, posterior row strongly procurved and anterior row approximately straight (Fig. 40C); PME and PLE irregular; AME dark; interdistance contiguous of AME–ALE, PME–PLE, ALE–PLE. Chilum absent. Chelicerae relatively small (0.22–0.29) without boss; without teeth (Figs 41D–F); fang with shaft serrula (Fig. 41F). Endites slightly converging anteriorly (Figs 40D, 41B), with few hairs on internal margin (Fig. 41C); serrula absent; labium longer than wide (Fig. 40D). Sternum longer than wide, anterior margin straight, rebordered anteriorly and laterally (Fig. 40D); posterior region strongly protruding between coxae IV with numerous long and erect setae; intercoxal setae present; precoxal triangles present. Pedicel with ventral sclerite triangular. Leg formula 4123. Spines present only on ventral and prolateral tibia and metatarsus III and IV. Patella I larger than the others. All tarsi and metatarsi without scopula. Trichobothria present on dorsal tibia, metatarsi and tarsi, arranged in two rows (Fig. 42A); bothrium with 2–3 ridges in proximal plate (Fig. 42C). Tarsal organ capsulate with oval opening, located dorsally and distally on tarsi (Fig. 42D). Two smooth claws (Fig. 42B); claw tufts composed of slightly widened tenent setae inserted in a well-delimited plate; presence of solid claw tuft clasper. Abdomen oval, longer than wide (Figs 40A, B); without scales; dorsum of abdomen anteriorly with long, dark, posteriorly curved setae. Six spinnerets; ALS slightly longer than wide, almost tubular, separated from each other by less than their diameter (Figs 40E, F, 43A), piriform gland spigots cracked and elongated with associated setae (Figs 43A, C, D), major ampular gland spigot field on a conical and well-defined structure (Fig. 43D), male with one major ampular gland spigot and female with two; PLS and PMS conical and short, PLS larger than PMS; PLS in male with one minor ampular gland spigot and three aciniform gland spigots (Fig. 43E), females apparently with one minor ampular gland spigot, three aciniform gland spigots and one cylindrical gland spigot (Fig. 43B); PMS in male with one minor ampular gland spigot and two aciniform gland spigots (Fig. 43F), females with one minor ampular gland spigot, two aciniform gland spigots and two cylindrical gland spigots (Fig. 43B). Female palp tarsus distally truncated with apical chemosensory patch, without claw (Figs 42E, F). Male palp: see *K. moyobensis*. Epigyne: copulatory openings posterior, close to epigastric furrow, with well-defined margins; copulatory ducts and primary spermatechae visible by transparency (Figs 45D, 46A). Vulva: secondary spermathecae reduced, emerging from duct at median part of vulva; rounded primary spermathecae; fertilization ducts laterad (Figs 45E, 46B).

Distribution. Congo: Mayombe and Langa-Langa (Fig. 47).

Composition. Two species: *Kituba mayombensis* **sp. nov.** and *K. langalanga* **sp. nov.**

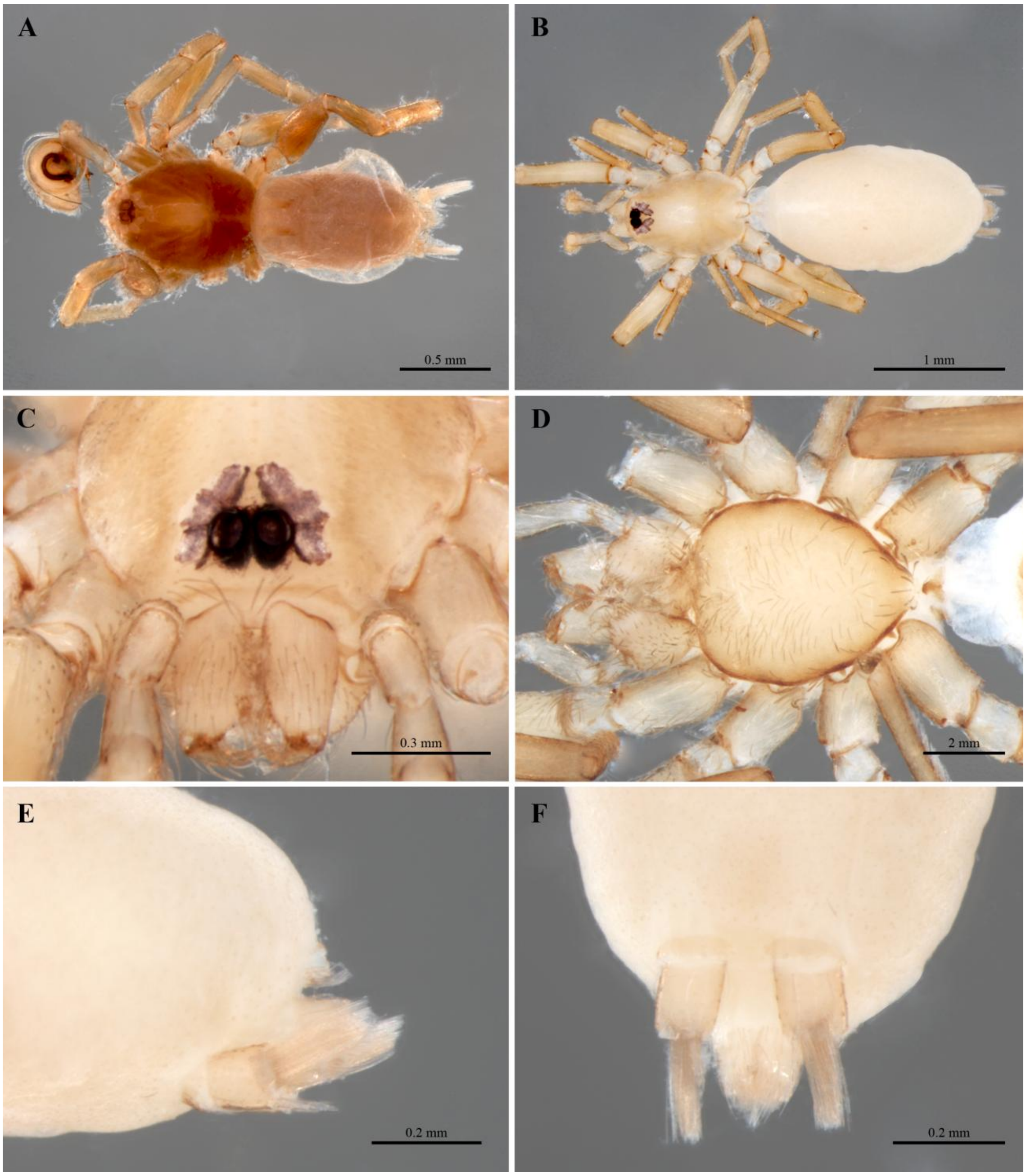

FIGURE 40. *Kituba mayombensis* **sp. nov.**, male: (A) habitus, dorsal view. *K. langalanga* **sp. nov.**, female: (B) habitus, dorsal view; (C) eyes, frontal view; (D) sternum and endites; (E) spinnerets, lateral view; (F) spinnerets, ventral view.

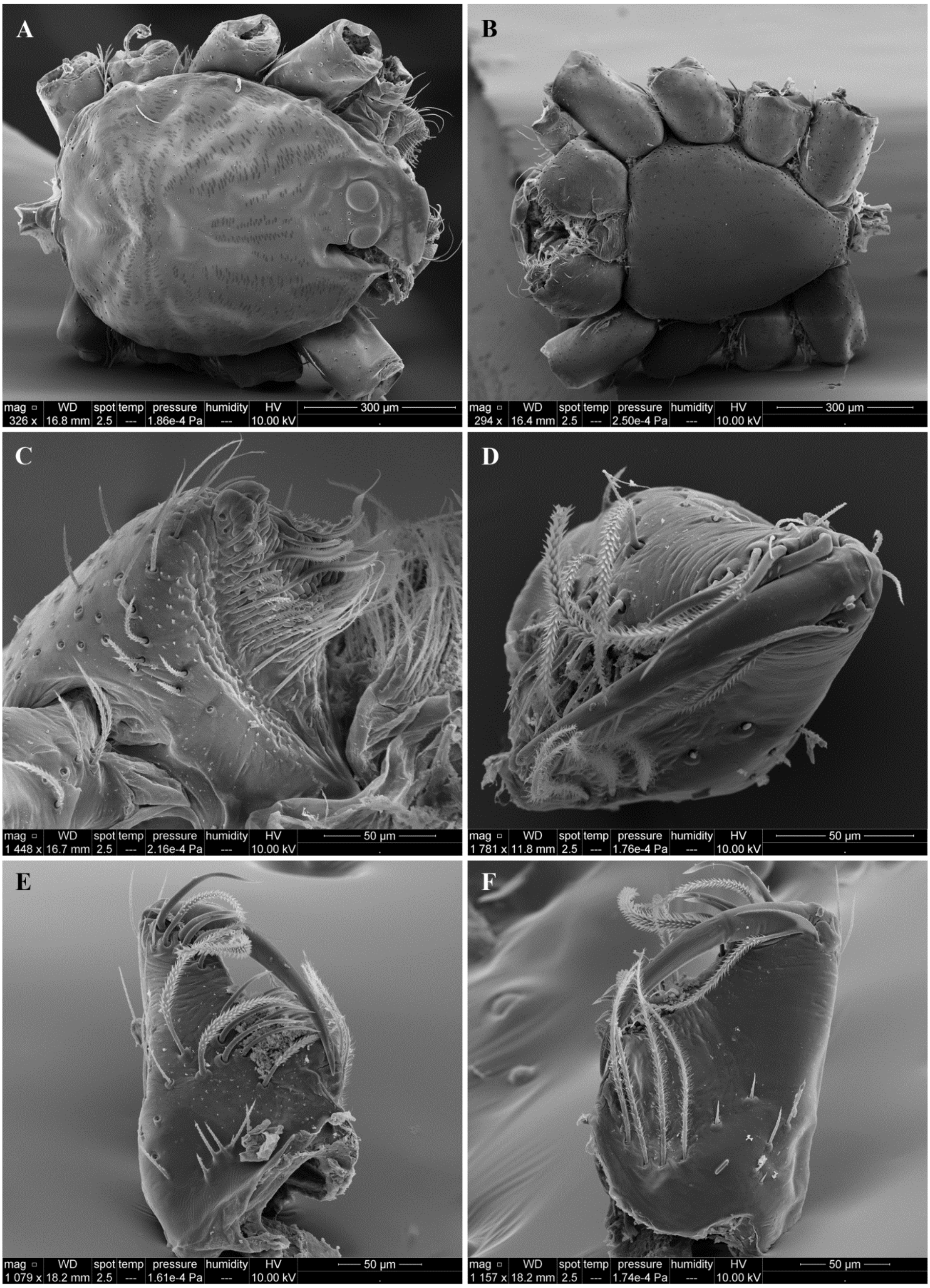

FIGURE 41. *Kituba mayombensis* **sp. nov.**, male. (A) carapace, dorsal view; (B) sternum; (C) endites, dorsal view; (D) chelicerae, retromargin; (E) chelicerae, promargin; (F) chelicerae, fang, shaft serrula.

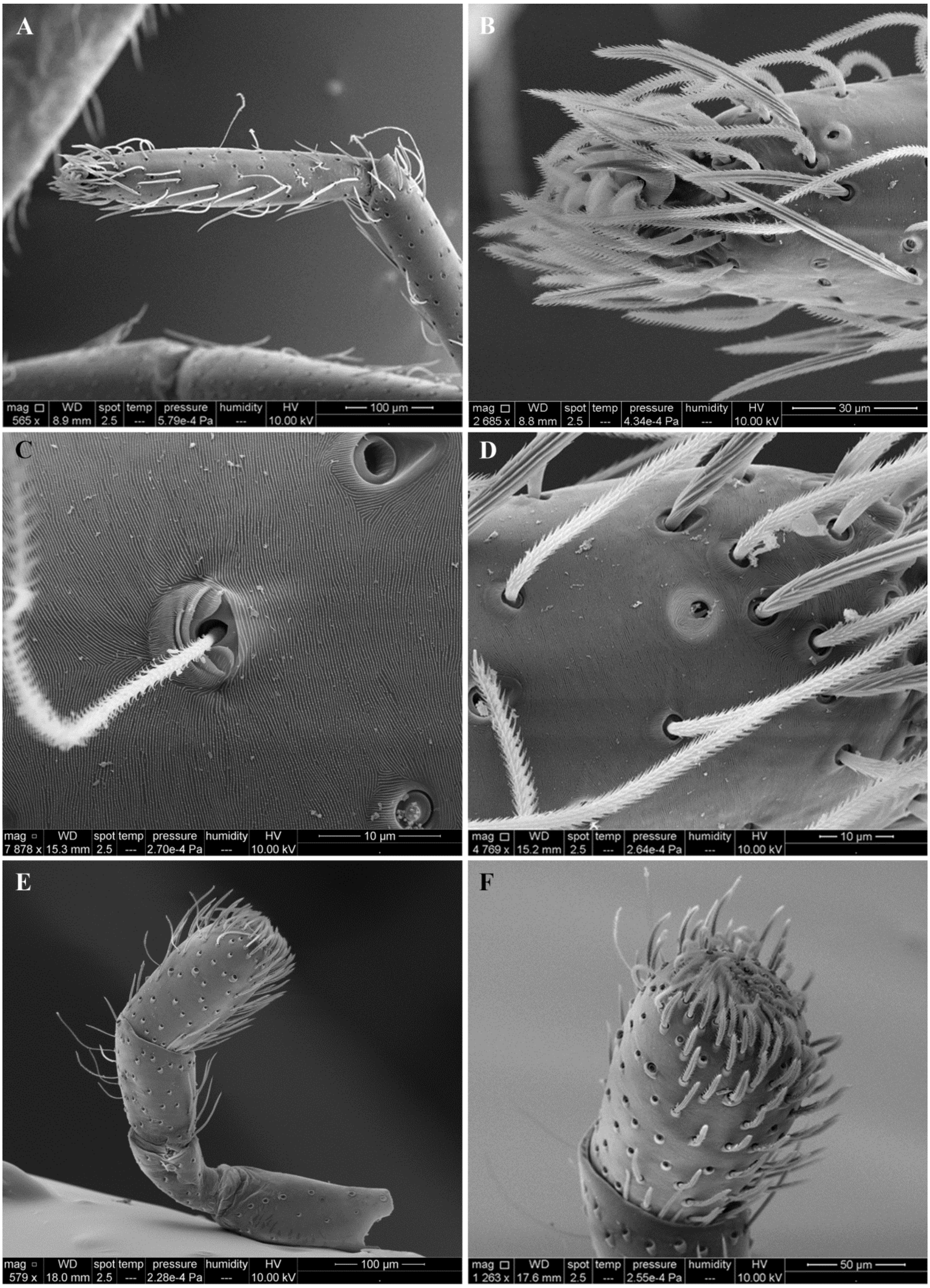

FIGURE 42. *Kituba mayombensis* **sp. nov.**, male: (A) tarsus I, dorsal view; (B) tarsus I, claw, retrolateral view; (C) tarsus I, trichobothria; (D) tarsus I, tarsal organ. *K. langalanga* **sp. nov.**, female: (E) pedipalp, retrolateral view; (F) pedipalp, chemosensory patch.

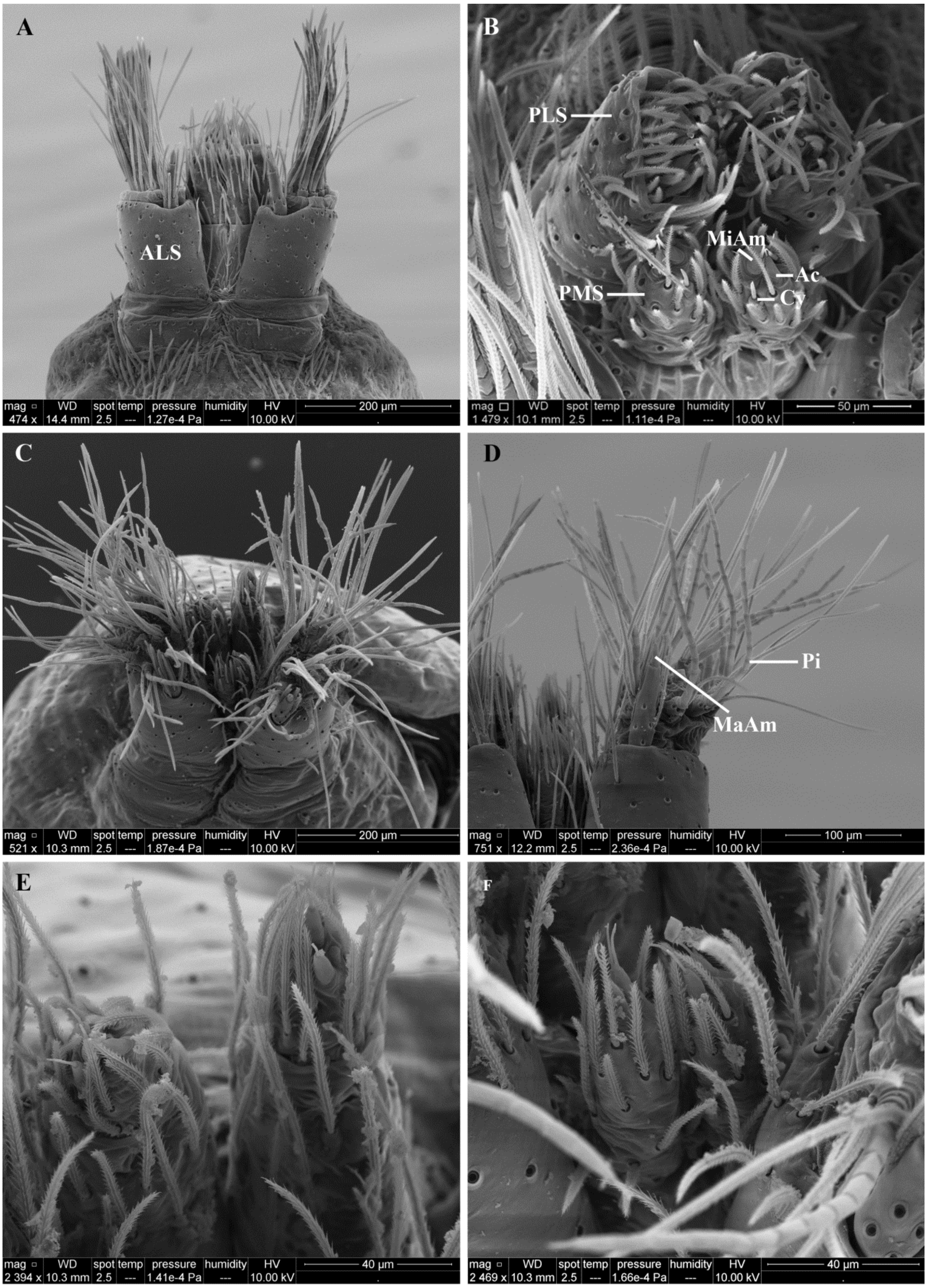

FIGURE 43. *Kituba langalanga* **sp. nov.**, female: (A) spinnerets, ventral view; (B) spinnerets, PMS and PLS. Male: (C) spinnerets, apical view; (D) spinnerets, ALS, piriform gland spigot; (E) spinnerets, PLS; (F) spinnerets, PMS. Ac—aciniform gland spigots; ALS—anterior lateral spinnerets; Cy—cylindrical gland spigots; MaAm—major ampular gland spigots; MiAm—minor ampular gland spigots; Pi—piriform gland spigots; PLS—posterior lateral spinnerets; PMS—posterior median spinnerets.

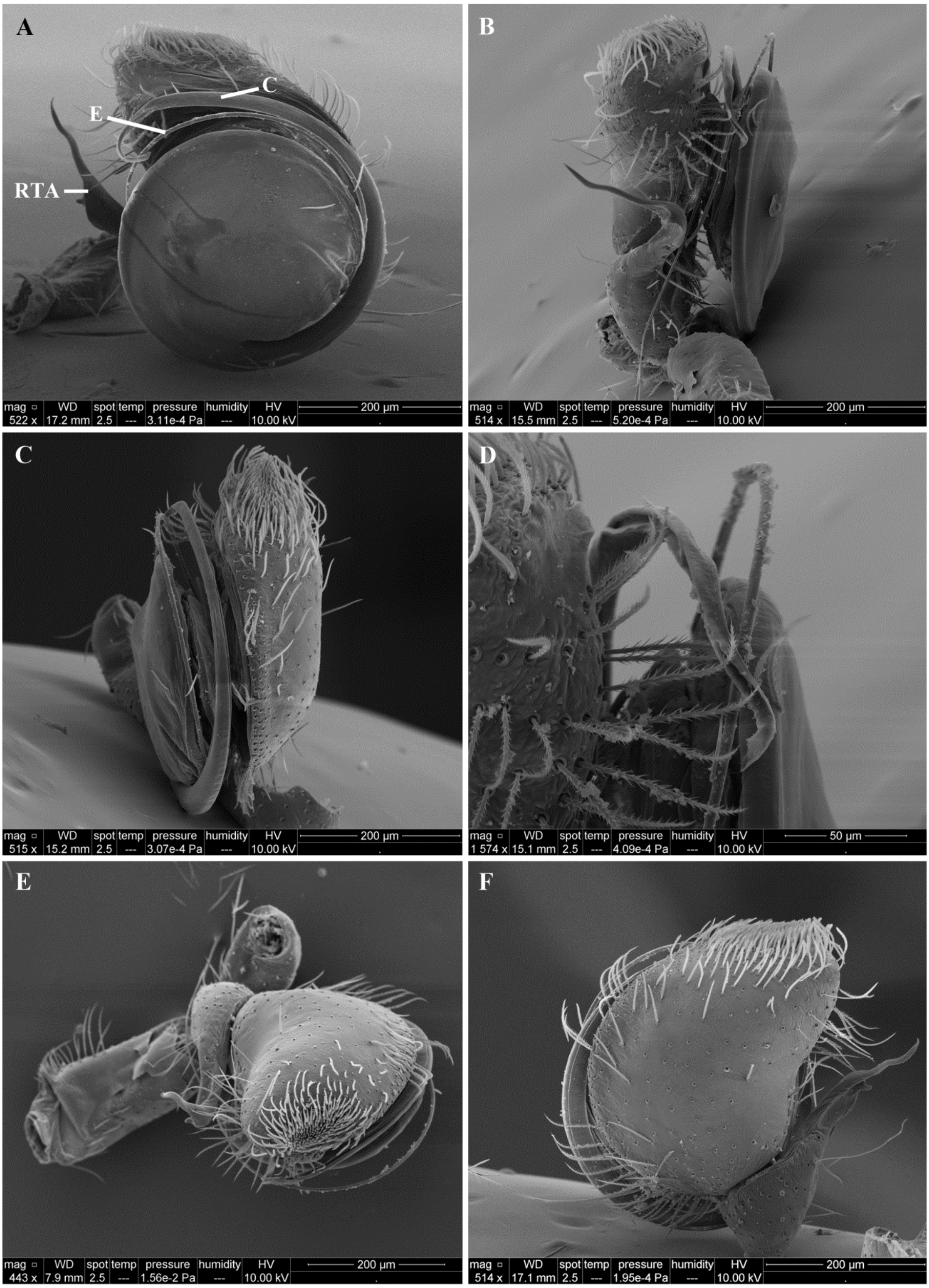

FIGURE 44. *Kituba mayombensis* **sp. nov.** Male palp: (A) ventral view; (B) retrolateral view; (C) prolatero-apical view; (D) detail conductor; (E) apical view; (F) dorsal view. C—conductor; E—embolus; RTA—retrolateral tibial apophysis.

Kituba mayombensis

Figs. 40A, 41A–F, 42A–D, 43C–F, 44A–F, 45A–E and 47

Type Material. Male holotype from Congo, Mayombe, Bas-Congo, Luki forest reserve, 05°38’S, 13°04’E, 14 November–02 October 2007, D. De Bakker & J.P. Michiels leg., deposited in RMCA 222770. Paratypes with same data as holotype: 1 male (RMCA 222538), 1 male (RMCA 222545) and 1 male (RMCA 222770); 2 males, 3–14 November 2006, (RMCA 219931); 1 female, 13 September–23 November 2007, (RMCA 222702).

Etymology. The specific name refers to the type locality, adjective.

Diagnosis. Males of *Kituba mayombensis* **sp. nov.** have the palps with the cymbium tilted retrolaterally (Figs 44F, 45B), embolus long and filiform curving twice around tegulum, conductor slightly sclerotized, long, curved little more than once around tegulum (Figs 44A, B, 45A–C). Females differ from *K. langalanga* **sp. nov** by the epigyne with posterior margin of epigynal plate surpassing the epigastric furrow and copulatory openings undersmall triangular hood-like ridges (Fig. 45D).

Description. Male (holotype). Carapace and legs orange, abdomen gray (Fig. 40A). Total length: 1.72. Carapace 0.74 long, 0.58 wide; Abdomen 0.94 long, 0.56 wide; Sternum 0.56 long, 0.46 wide; Spinnerets ALS 0.13 long, 0.12 wide. Eye diameters: AME 0.06, ALE 0.04, PME 0.04, PLE 0.03; interdistances: AME–AME 0.02, PME–PME 0.02. Chelicerae 0.23 long. Leg measurements: I: 2.49 (0.7, 0.52, 0.55, 0.42, 0.3); II: 2.09 (0.6, 0.36, 0.44, 0.39, 0.30); III: 1.86 (0.51, 0.29, 0.35, 0.35, 0.36); IV: 2.87 (0.74, 0.42, 0.68, 0.55, 0.48). Leg formula 4123. Leg spination: III – tibia v0-0-1p; metatarsus v0-0-1p. IV –tibia v0-1p-1p; metatarsus v1p-1p-1p. Palp: See description for the genus. Male palp: femur unmodified, without spines; tibia short with RTA long, tapering and dorsally curved with small medial triangular protrusion (Figs 44B, 45B, C); cymbium with dorso-distal scopula (Figs 44E, F); tegulum round (Fig. 44A, 45B); reservoir visible ventrally at the center of tegulum (Fig. 45B); embolus filiform arising dorsally from tegulum at 2 o´clock position (Figs 45A–C); conductor sheath-like, arising from tegulum at 7 o´clock position (Figs 44A–D, 45A–C).

Female (Paratype). Coloration pattern same the male. Total length: 1.58. Carapace 0.74 long, 0.55 wide; Abdomen 0.82 long, 0.6 wide; Sternum 0.54 long, 0.44 wide; Spinnerets ALS 0.12 long, 0.11 wide. Eye diameters: AME 0.04, ALE 0.03, PME 0.02, PLE 0.03; interdistances: AME–AME 0.04, PME–PME 0.02. Chelicerae 0.22 long. Leg measurements: I: 2.3 (0.64, 0.5, 0.5, 0.38, 0.28); II: 1.86 (0.52, 0.32, 0.39, 0.31, 0.32). Legs III and IV absent. Legs I and II with no spines. Vulva: copulatory ducts long and convoluted laterally and anteriorly from copulatory opening to secondary spermathecae; secondary spermathecae emerging as a small lump; copulatory duct between secondary and primary spermathecae thickened moderately straight (based on right side of vulva); primary spermathecae round; fertilization duct short, laterad (Fig. 45E).

Remark. The genitalia of the only female specimen available was damaged and broken (Figs 45D–E). However, what is left of the vulva clearly shows the reduced secondary spermathecae connected to the primary spermathecae by a thickened, wider duct, that is diagnostic for this genus.

Variation. Total length (5 males): 1.72–1.95.

Distribution. Only known from the type locality in Mayombe, Congo (Fig. 47).

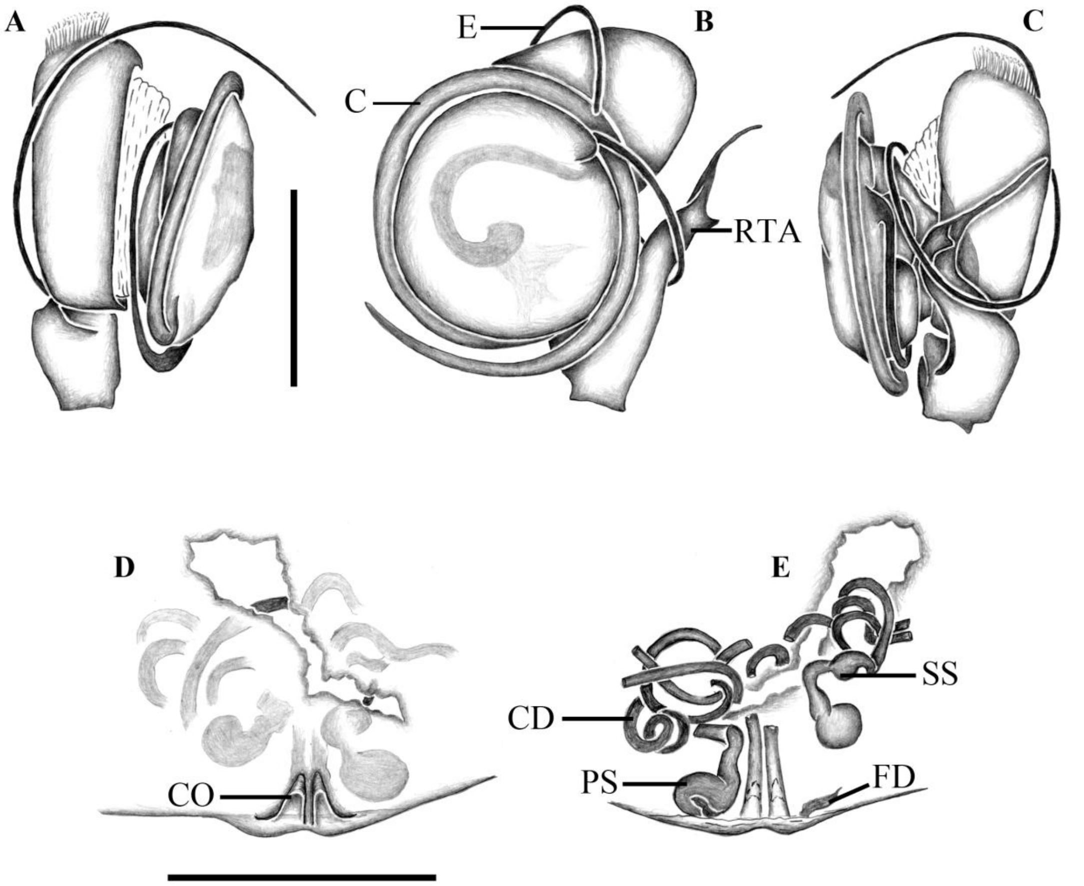

FIGURE 45. *Kituba mayombensis* **sp. nov.** Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view. C—conductor; CD—copulatory duct; CO—copulatory opening; E—embolus; FD—fertilization duct; PS—primary spermathecae; SS—secondary spermathecae; RTA—retrolateral tibial apophisys. Scale bars: 0.5 mm.

Kituba langalanga

Figs. 40B–F, 42E–F, 43A–B, 46A–C and 47

Type Material. Female holotype from Congo, Langa-Langa, 02° 28’N 21° 27’E, 17 June 2009, D. De Bakker leg., deposited in RMCA 228139. Two females paratypes with same data as holotype.

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. Females of *Kituba langalanga* **sp. nov.** differ from those of *K. mayombensis* **sp. nov.** by the epigyne with epigynal plate not surpassing the epigastric furrow and copulatory openings rounded with C-shaped sclerotized margins (Fig. 46A).

Description. Female (holotype). Carapace and legs yellow pale, abdomen slightly gray (Fig. 1B). Total length: 2.32. Carapace 0.8 long, 0.58 wide; Abdomen 1.5 long, 0.34 wide; Sternum 0.56 long, 0.46 wide; Spinnerets ALS 0.15 long, 0.13 wide. Eye diameters: AME 0.06, ALE 0.06, PME 0.04, PLE 0.06; interdistances: AME–AME 0.02, PME–PME 0.02. Chelicerae 0.29 long. Leg measurements: I: 2.36 (0.69, 0.5, 0.5, 0.4, 0.27); II: 1.77 (0.42, 0.3, 0.36, 0.35, 0.34); III: 1.66 (0.48, 0.25, 0.3, 0.34, 0.29); IV: 2.63 (0.7, 0.39, 0.6, 0.54, 0.4). Leg spination: III – tibia p0-1-0, v0-1p-1p; metatarsus p0-0-1. IV – tibia p0-0-1, r1-0-1, v1p-0-1; metatarsus v0-0-1p. Vulva: copulatory ducts long and convoluted laterally and anteriorly from copulatory opening to secondary spermathecae; secondary spermathecae emerging as a small bump; copulatory duct between secondary and primary spermathecae thickened moderately straight; primary spermathecae round; fertilization duct short, laterad (Figs 46B, C).

Male. Unknown.

Variation. Total length (3 females): 2.1–2.32.

Distribution. Congo, only known from the type locality (Fig. 47).

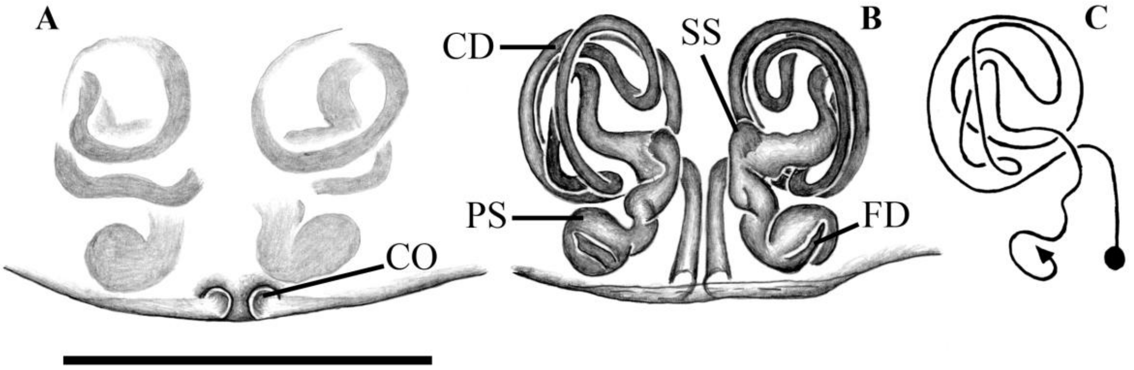

FIGURE 46. *Kituba langalanga* **sp. nov.** Female: (A) epigyne, ventral view; (B) vulva, dorsal view; (C) vulva, schematic course of internal duct system. CD—copulatory duct; CO—copulatory opening; FD—fertilization duct; PS—primary spermathecae; SS—secondary spermathecae. Scale bars: 0.5 mm.

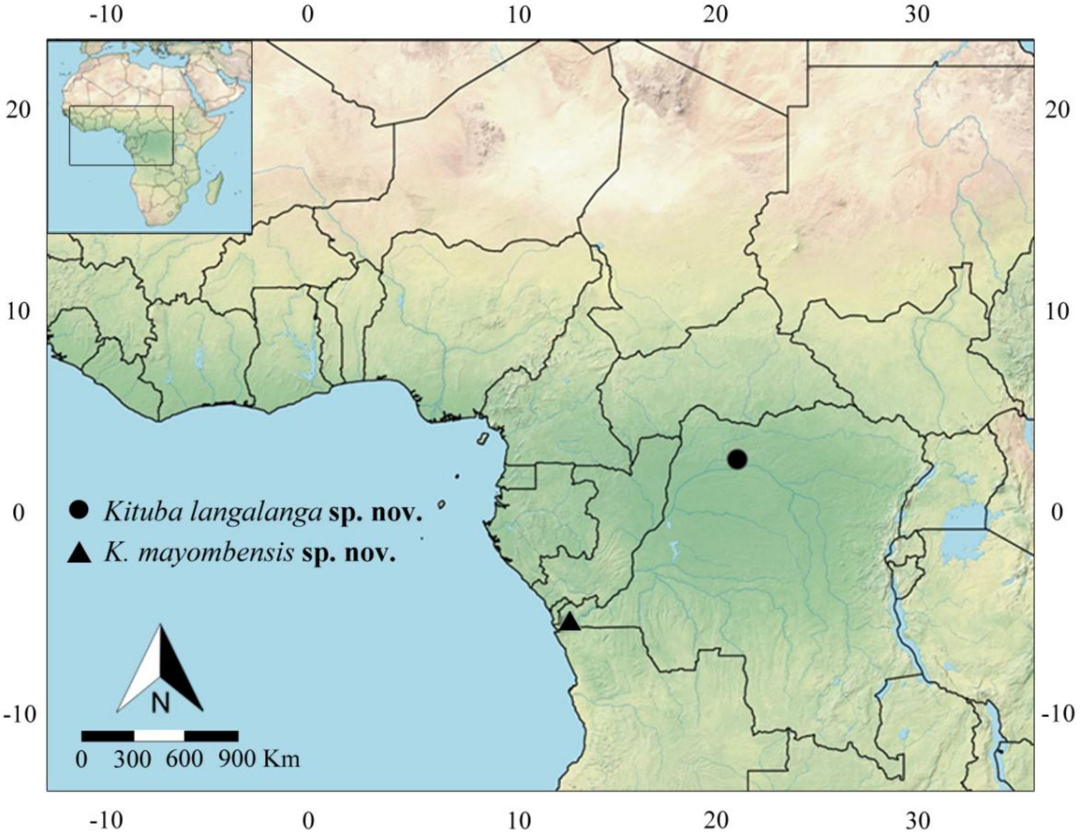

FIGURE 47. Known distribution records of species of *Kituba* **gen. nov.** from Congo.

***Kikongo* gen. nov.**

Etymology. The generic name is a noun in apposition that refers to the Kikongo language. According to the Constitution of the Democratic Republic of Congo, it is one of the national languages of the country. The gender is masculine.

Type species. *Kikongo ruwenzori* **sp. nov.** (original designation).

Diagnosis. Species of *Kikongo* **gen. nov**. are distinguished from those of other Prodidominae genera by male palp with cymbium robust (Figs 52E, 53A, 54A, 55A), alveolus completely covered by tegulum (Figs 52D, 53B, 54B, 55B), and hyaline conductor arising distally from tegulum, accommodating only the embolus tip (Figs 52F, 54B); female epigyne with wide, C-shaped copulatory openings (Figs 53D, 54D, 55D), vulva with secondary spermathecae rounded and first half of copulatory duct between secondary and primary spermathecae enlarged enlarged (Figs 53E, 54E, 55E).

Description. Total length of males 1.75–2.37 and females 1.7–2.46. Coloration pattern similar throughout the genus. Carapace longer than wide, slightly narrow at cephalic region, almost oval (Figs 48A, 49A). Fovea absent. Eight eyes; posterior eye row strongly procurved, anterior eye row approximately straight (Fig. 48C); PME and PLE irregular; AME dark; interdistance contiguous of AME–ALE, PME–PLE, ALE–PLE. Chilum absent. Chelicerae relatively small (0.22–0.31) without boss; without teeth (Figs 49D, E); fang with shaft serrula (Fig. 49F). Endites slightly convergent anteriorly (Figs 48D, 49B), with few hairs on internal margin (Fig 49C); serrula absent; labium longer than wide (Fig. 48D). Sternum longer than wide, anterior margin straight, rebordered anteriorly and laterally (Fig. 48D); posterior region strongly protruding between coxae IV with numerous long and erect setae; intercoxal setae present; precoxal triangles present. Pedicel with anterior region truncate. Leg formula 4123. All species with spines on femur I and II, and spines on femur, tibia and metatarsus III and IV. Patella I larger than the others, length similar to tibia I. All tarsi and metatarsus without scopulate. Trichobothria present on dorsal tibia, metatarsi and tarsi, arranged in two rows (Fig. 50B); bothrium with 5 ridges in proximal plate (Fig. 50E). Tarsal organ capsulate with oval opening, located dorsally and distally on tarsi (Fig. 50F). Two smooth claws (Fig. 50C); claw tufts composed of slightly widened tenent setae inserted in a well delimited plate; presence of solid claw tuft clasper (Figs 50C, D). Abdomen oval, longer than wide (Figs 48A, B); without scale; dorsum of abdomen anteriorly with long, dark, posteriorly curved setae. Six spinnerets; ALS longer than wide, separated from each other by less than their diameter (Figs 48E, F, 51A), piriform gland spigots cracked and elongated with associated setae (Figs 51A–D, 52A), major ampular gland spigot field on a conical and well-defined structure (Figs 48E, F, 51A, B), male and female with two major ampular gland spigots; PLS and PMS conical and short, PLS larger than PMS (Fig. 51A); PLS in male with one minor ampular gland spigot and four aciniform gland spigots (Fig. 52B), females with one minor ampular gland spigot, nine aciniform gland spigots and, apparently, one cylindrical gland spigot (Fig. 51E); PMS in male with one minor ampular gland spigot and three aciniform gland spigots (Fig. 52C), females with one minor ampular gland spigot, three aciniform gland spigots and two cylindrical gland spigots (Fig. 51F). Female palp: tarsus truncated with apical chemosensory patch and claw reduced to a nubbin (Fig. 50A). Male palp: femur unmodified, without spines; tibia short, less than half cymbium length, RTA single (Fig. 52E, 54C, 55C) and VTA absent, except in *K. buta* **sp. nov.** (Fig. 8B); cymbium robust with apical scopula (Figs 53A–C); alveolus not visible ventrally (Figs 54B, 55B); bulb ovoid, with distal part narrower than basal part (Figs 53B, 55B), except in *K. rutshuru* **sp. nov.** which has distal part wider than basal part (Fig. 54B); sperm duct with reservoir at the center of tegulum, with one retrolateral curve (Figs 53B, 54B, 55B); embolus long and slender arising prolaterally and fused to tegulum (Fig. 53B); conductor small and hyaline arising at 12 o’clock position (Figs 6B, 8B), except in *K. rutshuru* **sp. nov.** in which it is arising between 1–2 o’clock position (Fig. 54B). Epigyne: positioning ridge of copulatory opening C-shaped, well-defined; copulatory duct and secondary spermathecae visible ventrally (Figs 53D, 54D, 55D). Vulva: copulatory duct with curves, slender between copulatory opening and secondary spermathecae (Figs 53E, 54E, 55E); secondary spermathecae rounded (Fig. 54E); primary spermathecae lateral and separated from each other (Fig. 53E); fertilization ducts laterad (Fig. 55E).

Distribution. Central and East Africa: Congo and Kenya (Fig. 56).

Composition. Three species: *Kikongo ruwenzori* **sp. nov.**, *K. rutshuru* **sp. nov.** and *K.buta* **sp. nov.**

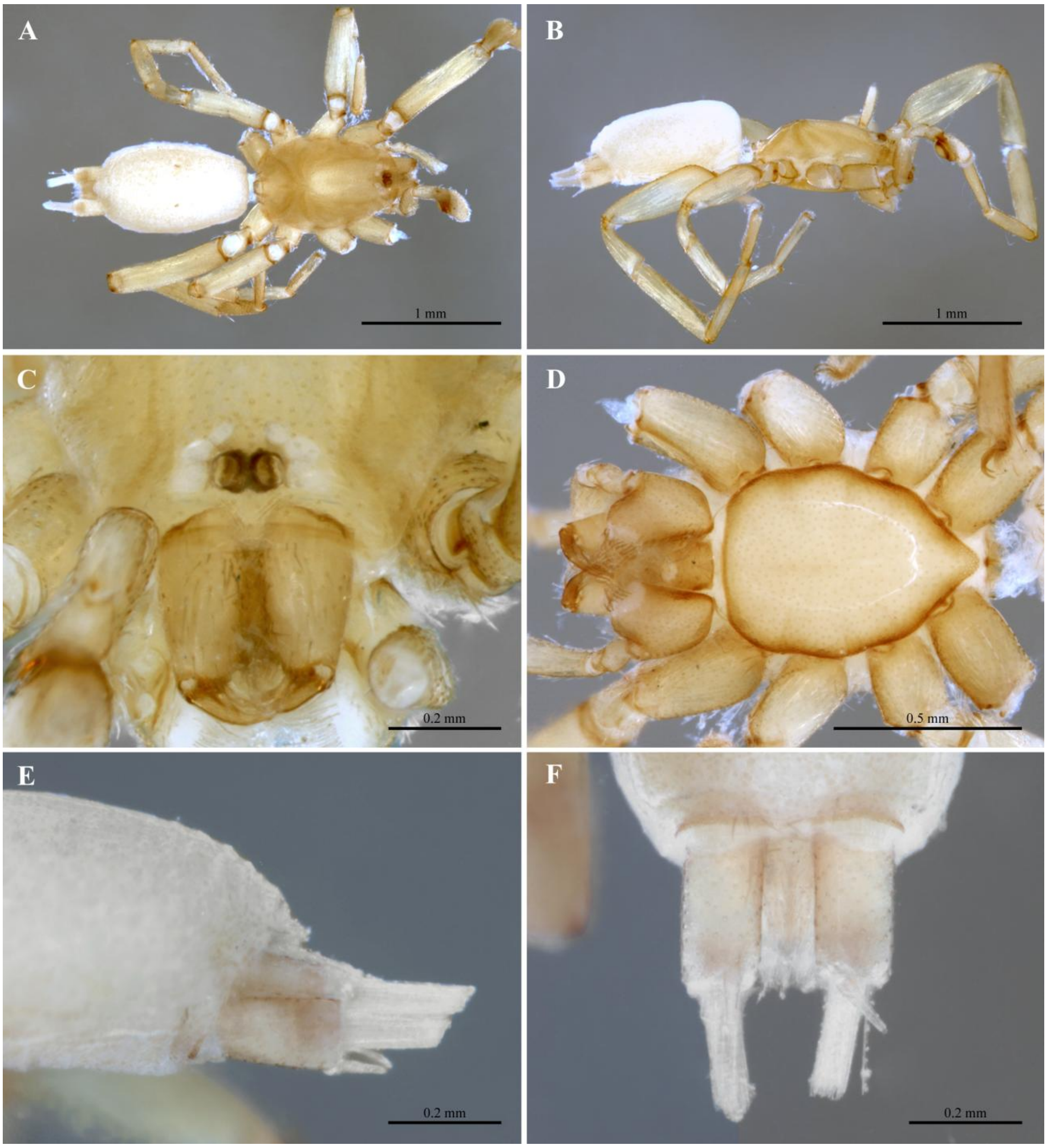

FIGURE 48. *Kikongo ruwenzori* **sp. nov.**, male. (A) habitus, dorsal view; (B) habitus, lateral view; (C) eyes, frontal view; (D) sternum and endites; (E) spinnerets, lateral view; (F) spinnerets, ventral view.

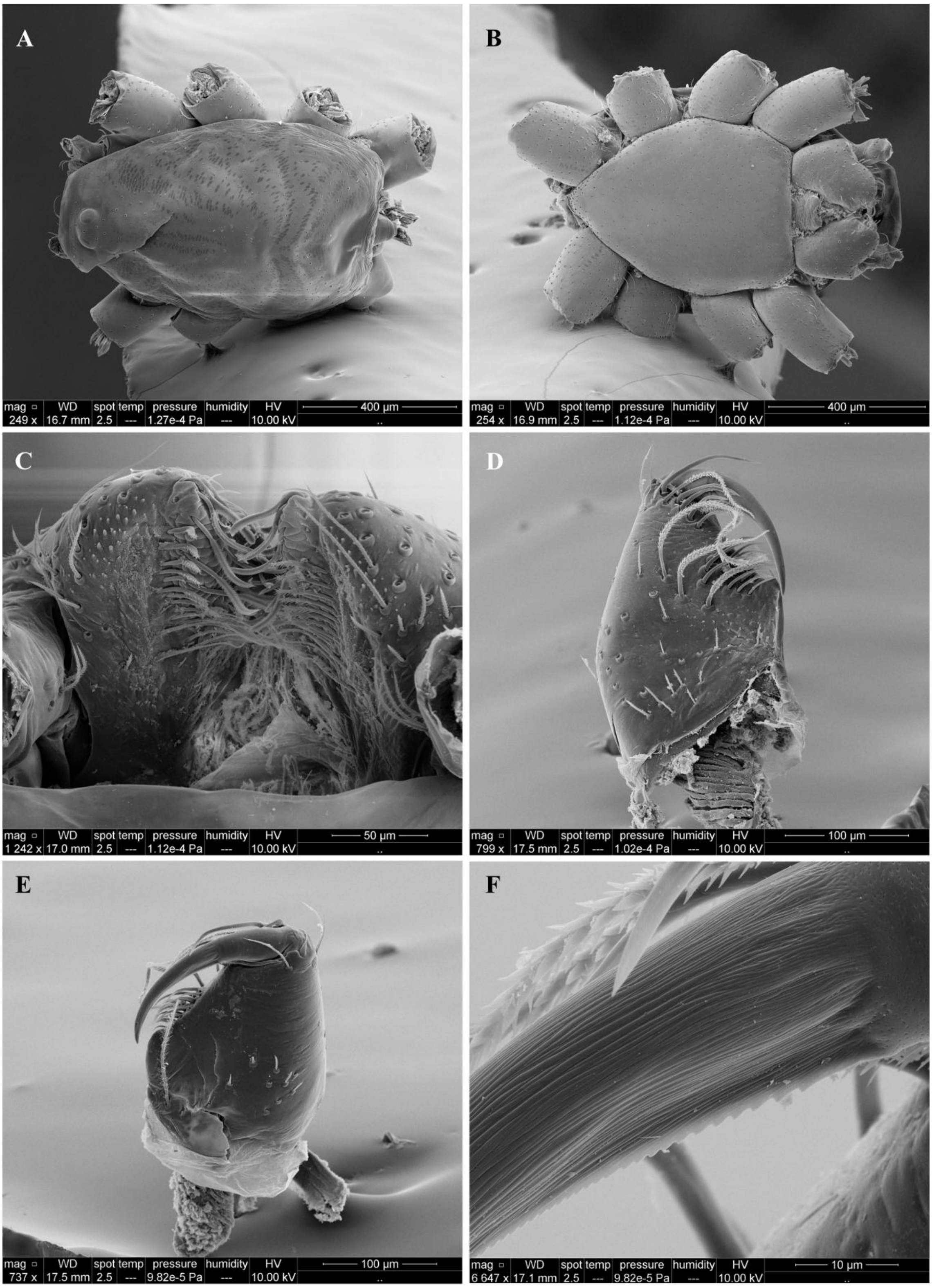

FIGURE 49. *Kikongo ruwenzori* **sp. nov.**, female. (A) carapace, dorsal view; (B) sternum; (C) endites, dorsal view; (D) chelicerae, promargin; (E) chelicerae, retromargin; (F) chelicerae, fang, shaft serrula.

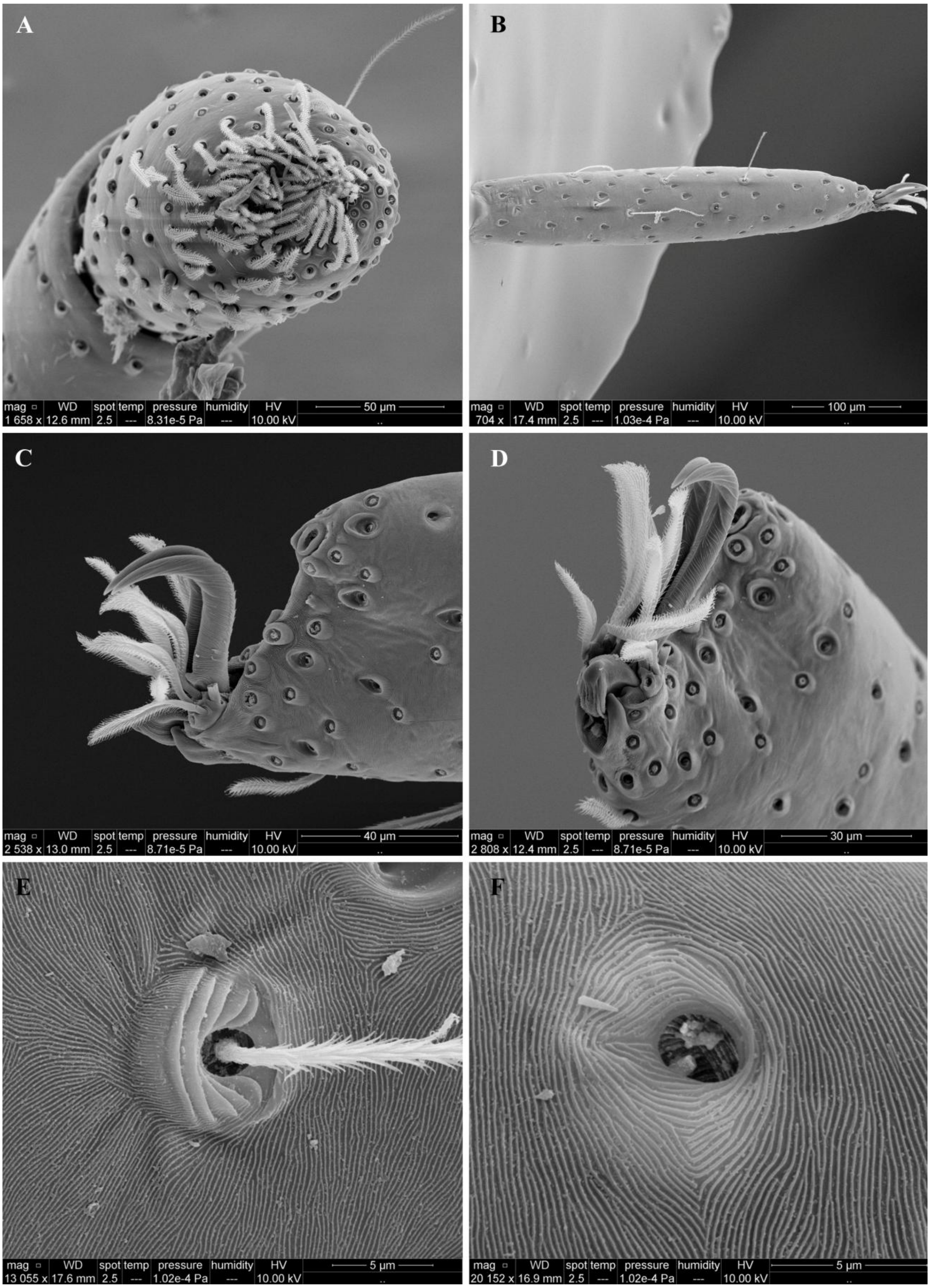

FIGURE 50. *Kikongo ruwenzori* **sp. nov.**, female. (A) pedipalp, chemosensory patch; (B) tarsus I, dorsal view; (C) tarsus I, claw, retrolateral view; (D) tarsus I, claw, frontal view; (E) tarsus I, trichobothria; (F) tarsus I, tarsal organ.

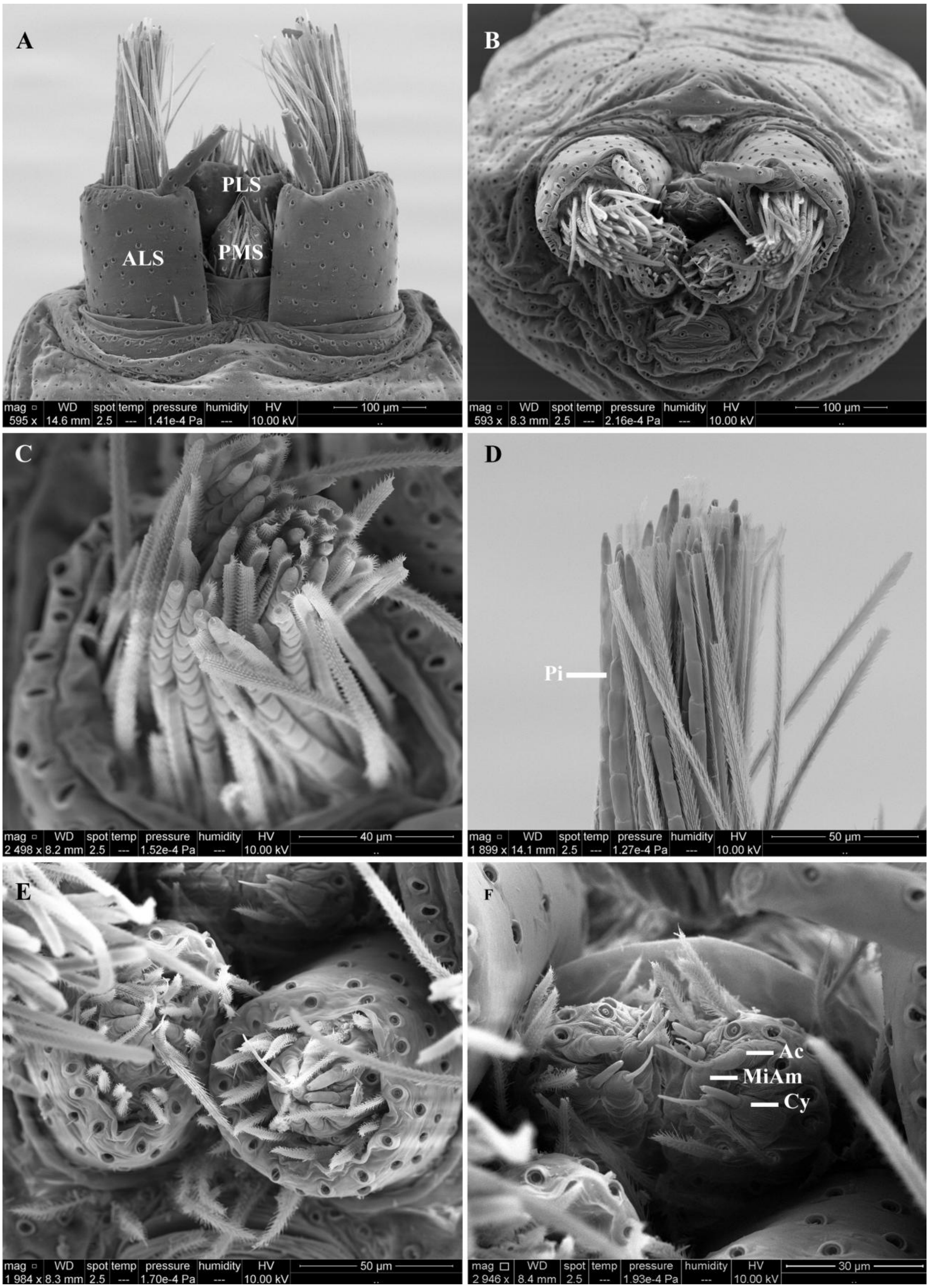

FIGURE 51. *Kikongo ruwenzori* **sp. nov.**, female. (A) spinnerets, ventral view; (B) spinnerets, apical view; (C) spinnerets, ALS, piriform gland spigots, apical view; (D) same, latral view; (E) spinnerets, PLS; (F) spinnerets, PMS. Ac—aciniform gland spigots; ALS—anterior lateral spinnerets; Cy—cylindrical gland spigots; MiAm—minor ampular gland spigots; Pi—piriform gland spigots; PLS—posterior lateral spinnerets; PMS—posterior median spinnerets.

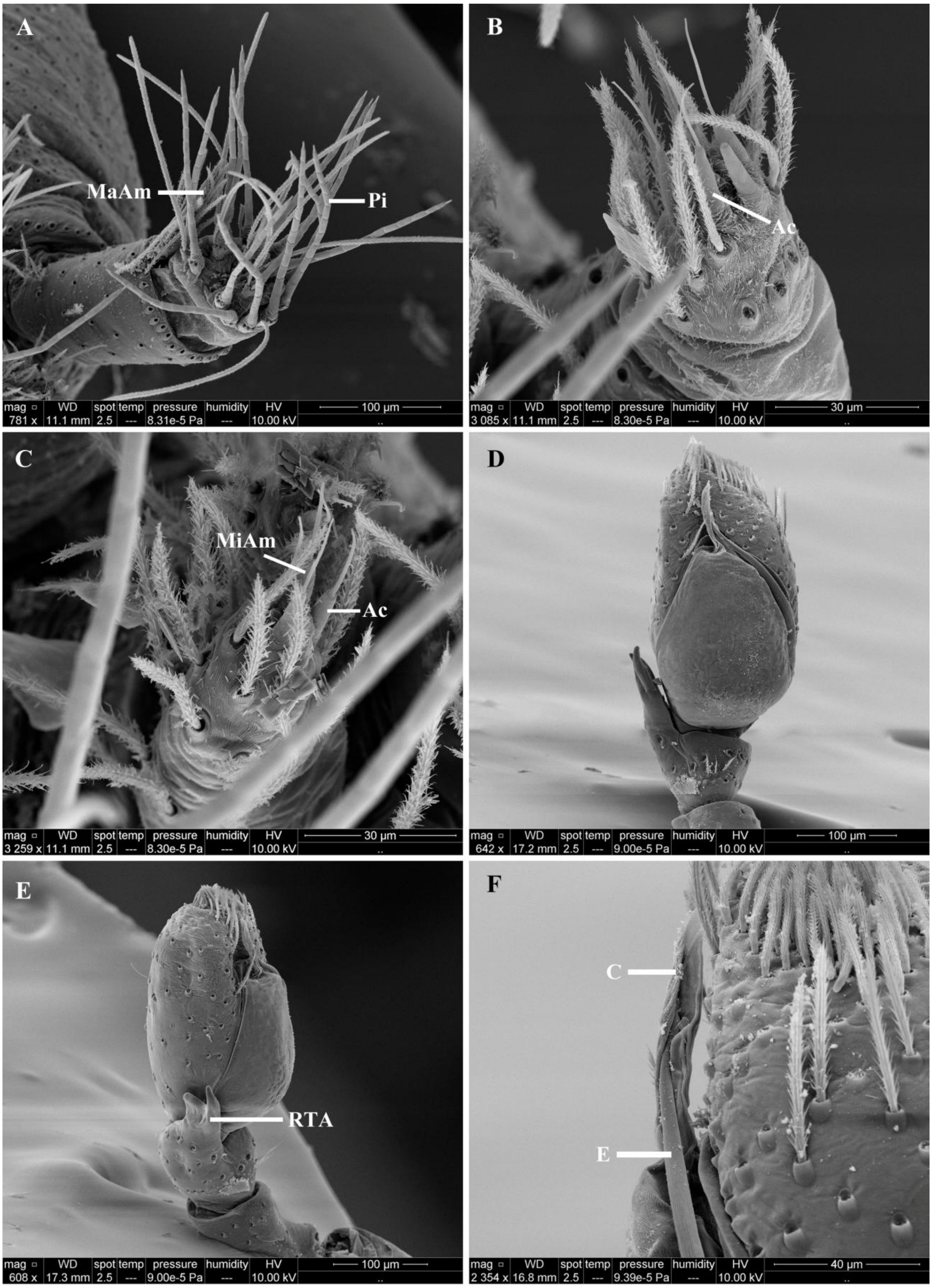

FIGURE 52. *Kikongo ruwenzori* **sp. nov.**, male. (A) spinnerets, ALS; (B) spinnerets, PLS; (C) spinnerets, PMS; (D) palp, ventral view; (E) palp, retrolateral view; (F) palp, detail conductor. Ac—aciniform gland spigots; C—conductor; E—embolus; MaAm—major ampular gland spigots; MiAm—minor ampular gland spigots; Pi—piriform gland spigots; RTA—retrolateral tibial apophysis.

Kikongo ruwenzori

Figs 48A–F, 49A–F, 50A–F, 51A–F, 52A–F, 53A–F and 56.

Type Material. Male holotype from Congo, Albert National Park [Virunga National Park], sect. Ruwenzori, Kalonge, gîte Ruwenzori, Alt. 2080 m, 00° 20’N 029° 49’E, 24–29 September 1952, P. Vanschuytbroeck & J. Kekenbosch leg., deposited in RMCA 233041. Paratypes: 1 male and 1 female from Congo, Albert National Park (Virunga National Park), sect. Ruwenzori, Kalonge, gîte Ruwenzori, Alt. 2210 m, 00° 20’N 029° 49’E, P. Vanschuytbroeck & J. Kekenbosch leg., (RMCA 223382); 1 male and 1 female from Congo, Albert National Park (Virunga National Park), sect. Ruwenzori, Kyandolire, camp des gardes, Alt. 1700 m, 00°20’N 029°49’E, 24–25 October 1952, P. Vanschuytbroeck & J. Kekenbosch leg., (RMCA 232924).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. Males of *K. ruwenzori* **sp. nov.** are distinguished from those of the other species by the palp with distally bifid RTA (Figs 52E, 53C); females differ by positioning ridges oblique and separated from each other, with an excavated are between the copulatory openings (Figs 53D).

Description. Male (holotype). Total length: 2.37. Carapace 1.09 long, 0.78 wide; Abdomen 1.15 long, 0.70 wide; Sternum 0.75 long, 0.56 wide; Spinnerets ALS 0.26 long, 0.14 wide. Eye diameters: AME 0.05, ALE 0.04, PME 0.03, PLE 0.04; interdistances: AME–AME 0.03, PME–PME 0.06. Chelicerae 0.3 long. Leg measurements: I: 3.42 (0.92, 0.72, 0.74, 0.54, 0.50); II: 2.46 (0.68, 0.40, 0.52, 0.44, 0.42); III: 2.43 (0.7, 0.35, 0.46, 0.44, 0.48); IV: 3.50 (0.95, 0.50, 0.80, 0.65, 0.60). Leg spination: I – femur d1-1-0; metatarsus v0-2-0. II – femur d1-1-0. III – femur d1-1-0; tibia v2-0-2, p1-0-1, r1-0-1; metatarsus v0-2-0, p0-0-1. IV – femur d1-1-0; tibia v1-1-1;

metatarsus v0-1-1. Palp: tegulum ovoid; proximal part of reservoir close to embolar base; embolar insertion between 8–9 o'clock position; embolus with distal part curved; conductor arising at 12 o'clock position (Figs 53A–C).

Female (Paratype). Total length: 2.187. Carapace 0.84 long, 0.59 wide; Abdomen 1.28 long, 0.70 wide; Sternum 0.62 long, 0.47 wide; Spinnerets ALS 0.25 long, 0.141 wide. Eye diameters: AME 0.037, ALE 0.033, PME 0.041, PLE 0.029; interdistances: AME–AME 0.029, PME–PME 0.033. Chelicerae 0.25 long. Leg measurements: I: 2.47 (0.65, 0.52, 0.54, 0.40, 0.36); II: 2.02 (0.60, 0.35, 0.40, 0.35, 0.32); III: 1.68 (0.48, 0.25, 0.31, 0.30, 0.34); IV: 2.64 (0.70, 0.34, 0.60, 0.54, 0.46). Leg spination: I – femur d1-0-0. II – femur d1-1-0; metatarsus v0-2-0. III – femur d1-1-0; tibia v1-0-1p; metatarsus v0-1p-0. IV – femur d1-1-0; tibia v1-1-1, p1-0-1; metatarsus v0-2-0, p0-0-1. Vulva: copulatory duct between copulatory opening and secondary spermathecae with only one curve, duct between the spermathecae with proximal and terminal part very close to each other and with twist at terminal part (close to primary spermathecae); primary spermathecae ovoid; fertilization duct anteriad (Figs 53E, F).

Variation. Total length (3 males): 1.75–2.37; (6 females): 1.7–2.32. In some females the secondary spermathecae are in parallel between them.

Distribution. Virunga National Park, Congo (Fig. 56).

Other material examined. Congo: Albert National Park (Virunga National Park), sect. Ruwenzori, Kyandolire, camp des gardes, Alt. 1700 m, 00° 20'N 029° 49'E, 1 male, 17 October 1952, P. Vanschuytbroeck & J. Kekenbosch leg. (RMCA 234201); 3 females (RMCA 232896); 00° 20'N 029° 50'E, 1 female, 24-25 October 1952, P. Vanschuytbroeck & J. Kekenbosch leg. (RMCA 233932); Mulaku, affl. g. Kakalari, Alt. 1750 m, 00° 20'N 029° 50'E, 1 female, 10 October 1952, P. Vanschuytbroeck & J. Kekenbosch leg. (RMCA 233983).

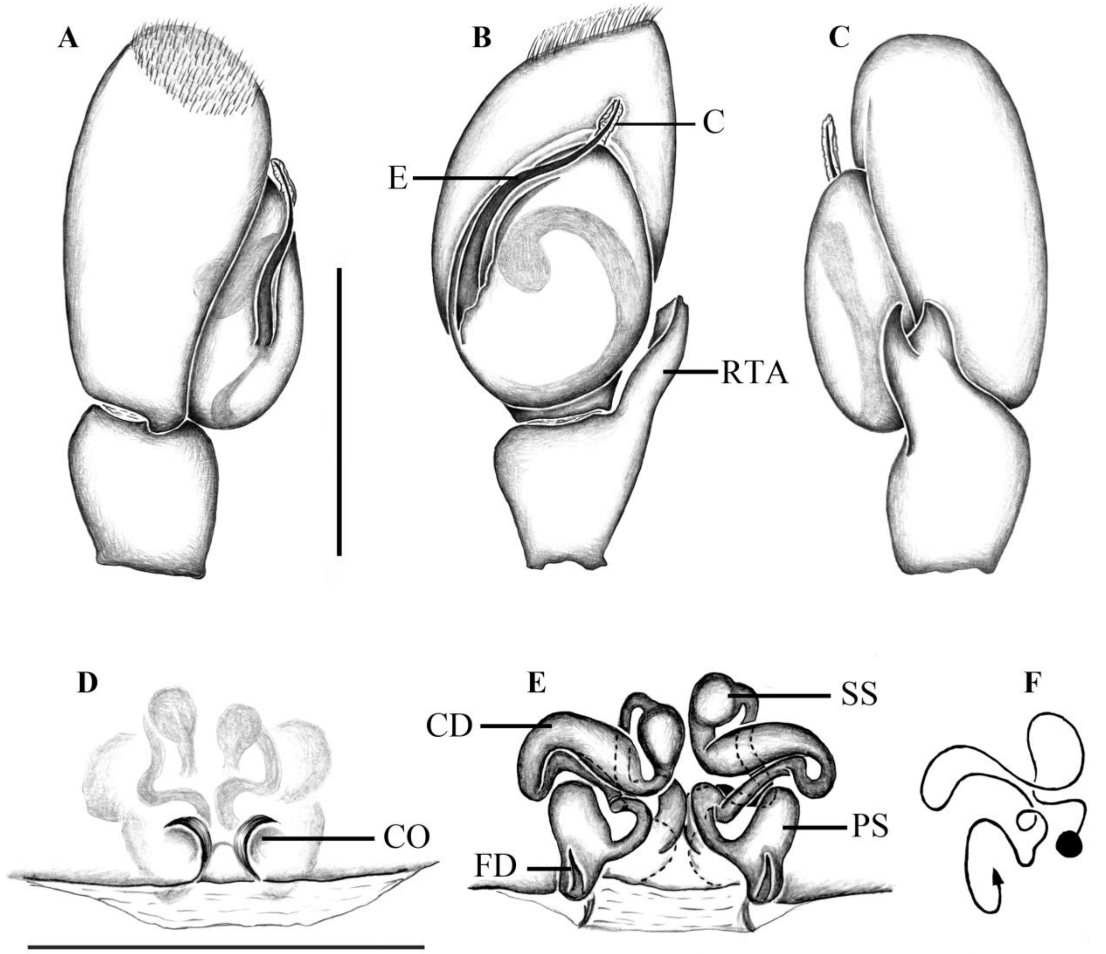

FIGURE 53. *Kikongo ruwenzori* **sp. nov.** Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; E—embolus; FD—fertilization duct; PS—primary spermathecae; SS—secondary spermathecae; RTA—retrolateral tibial apophisys. Scale bars: 0.5 mm.

Kikongo rutshuru

Figs 54A–F and 56

Type Material. Male holotype from Congo, Albert National Park (Virunga National Park), sect. Sud, Katare, Rég. Rutshuru Alt. 1250 m, 22 February 1995, G.F. De Witte leg., deposited in RMCA 233076. Paratypes: 1 female from Congo, Albert National Park (Virunga National Park), sect. Tshiaberimu, riv. Musavaki, affl. Talya

Nord, Alt. 2720 m, 00° 10'N 29° 35'E, 15–21 April 1955, P. Vanschuytbroeck & R. Fonteyn leg., (RMCA 236899); 1 male from Kenya, Forest Kakamega, 00° 13'N 34° 54'E, 14 September 2002, D. Shilabira Smith leg., (RMCA 220273); 1 male, 20 July 2002, D. Shilabira Smith leg. (RMCA 220238).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. Males of *K. rutshuru* **sp. nov.** are distinguished from those of the other species by tegulum robust with distal part widened, sperm duct far from embolar insertion and conductor arising between 1–2 o'clock position (Figs 54B, C); females differ by the positioning ridges close to each other, almost touching and copulatory duct enlarged close to copulatory opening (visible ventrally) (Figs 54D, E).

Description. Male (holotype). Total length: 2.25. Carapace 0.90 long, 0.75 wide; Abdomen 1.12 long, 0.66 wide; Sternum 0.62 long, 0.51 wide; Spinnerets ALS 0.25 long, 0.13 wide. Eye diameters: AME 0.06, ALE 0.04, PME 0.06, PLE 0.06; interdistances: AME–AME 0.02, PME–PME 0.04. Chelicerae 0.26 long. Leg measurements: IV: 3.2 (0.85, 0.46, 0.74, 0.64, 0.51). Leg spination: IV – femur d1-1-0; tibia v1r-0-2, p1-0-1, r0-0-1; metatarsus r0-0-1. Palp: single RTA with tip curving dorsally, tegulum robust with distal region larger than basal region, creating a large space between reservoir and embolus; embolar insertion between 6–7 o'clock position; embolus with distal part curved (Figs 54A–C).

Female (paratype). Total length: 2.46. Carapace 0.94 long, 0.78 wide; Abdomen 1.43 long, 0.84 wide; Sternum 0.72 long, 0.58 wide; Spinnerets ALS 0.26 long, 0.15 wide. Eye diameters: AME 0.04, ALE 0.03, PME 0.04, PLE 0.04; interdistances: AME–AME 0.04, PME–PME 0.04. Chelicerae 0.29 long. Leg measurements: I: 2.95 (0.77, 0.6, 0.62, 0.51, 0.45); II: 2.4 (0.66, 0.41, 0.49, 0.44, 0.4); III: 2.03 (0.56, 0.34, 0.4, 0.36, 0.37); IV: 3.32 (0.94, 0.48, 0.7, 0.64, 0.56). Leg spination: I – femur d1-1-0. II

– femur d1-1-0; tibia v0-2-0. III – femur d1-1-0; tibia v1p-0-1p, p1-0-1; metatarsus v0-2-0, p0-0-1. IV – femur d1-1-0; tibia v1p-2-2, p1-0-1, r1-0-1; metatarsus v1-1-1, p1-0-1, r0-0-1. Epigyne: positioning ridge directed anteriolly (Fig. 7D). Vulva: copulatory duct between copulatory opening and secondary spermathecae with three curves, duct between the spermathecae with proximal and terminal part far from each other and without twist at terminal part (close to primary spermathecae); primary spermathecae robust; fertilization duct antero-laterad (Figs 54E, F).

Variation. Total length (3 males): 1.84–2.25.

Distribution. Congo and Kenya (Fig. 56).

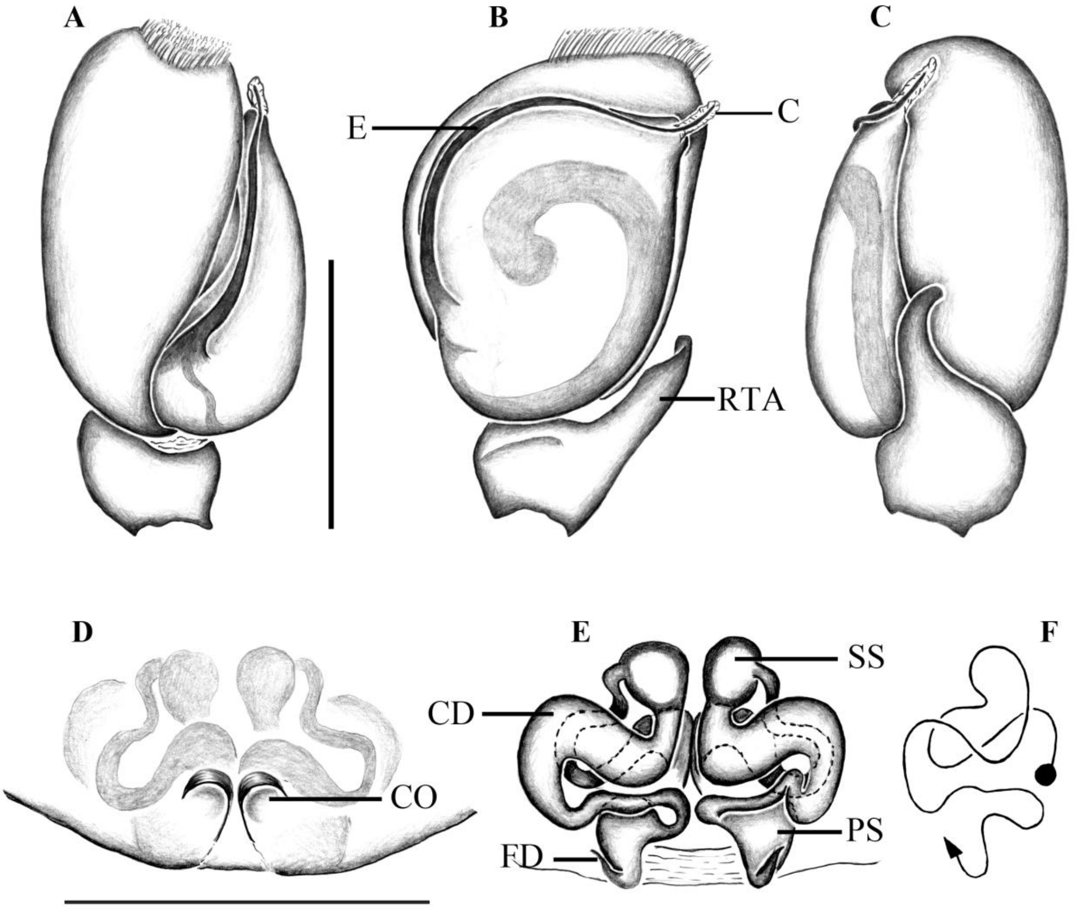

FIGURE 54. *Kikongo rutshuru* **sp. nov.** Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; E—embolus; FD—fertilization duct; PS—primary spermathecae; SS—secondary spermathecae; RTA—retrolateral tibial apophisys. Scale bars: 0.5 mm.

Kikongo buta

Figs 55A–F and 56

Type Material. Male holotype from Congo, Forest Buta, route Beni-Irumu-Bunia, Mbao, Alt. 1100 m, 00° 38’N 29° 30’E, December 1973–January 1974, M. Lejeune leg., deposited in RMCA 236900. Paratypes: 2 female from Congo, Forest Visik, Kivu, 00° 12’N 29° 15’E, 22 December 1971, M. Lejeune leg., (RMCA 140800); 1 female from Congo, Albert National Park (Virunga National Park), Mt. Hoyo, grotte Atshokabi, Alt. 1135 m, 01° 13’N 29° 49’E, 19 July 1955, P. Vanschuytbroeck leg. (RMCA 234181); 1 male from Congo, Albert National Park (Virunga National Park), massif Ruwenzori, riv. Kakalari, affl. Bombi, Alt. 1725 m, 00° 20’N 29° 50’E 06 April 1954, P. Vanschuytbroeck & H. Synave leg., (RMCA 233867); 1 male from Congo, Albert National Park (Virunga National Park), sect. Nord, ruiss. Katubu, affl. dr. de la Mukandwe, Alt 1200 m, [0° 2'24.00"S 29°22'48.00"E], 28 March 1953, P. Vanschuytbroeck & J. Kekenbosch leg., (RMCA 237633).

Etymology. The specific name refers to the type locality, noun in apposition.

Diagnosis. Males of *K. buta* **sp. nov.** are distinguished from those of the other species of the genus by the palps with VTA (Figs 55A–C); females differ by the positioning ridges contiguous resembling a mustache (Fig. 55D).

Description. Male (holotype). Total length: 2.32. Carapace 1.03 long, 0.79 wide; Abdomen 1.09 long, 0.70 wide; Sternum 0.68 long, 0.55 wide; Spinnerets ALS 0.21 long, 0.12 wide. Eye diameters: AME 0.04, ALE 0.03, PME 0.04, PLE 0.03; interdistances: AME–AME 0.02, PME–PME 0.05. Chelicerae 0.31 long. Leg measurements: I: 3.21 (0.89, 0.64, 0.66, 0.55, 0.47); II: 2.5 (0.66, 0.42, 0.54, 0.45, 0.43); III: 2.27 (0.6, 0.34, 0.46, 0.42, 0.45); IV: 3.33 (0.95, 0.46, 0.70, 0.66, 0.56). Leg spination: I – femur d1-1-0. II – femur d1-1-0. III – femur d1-1-0; tibia v1-0-1, p1-0-1; metatarsus v0-2-0, p1-0-1. IV – femur d1-1-0; tibia v1p-1p-2, p1-0-1, r1-0-1; metatarsus v1-1-0, p0-0-1, r0-1-0. Palp: single RTA with tip slightly truncated and ventrally bent; tegulum ovoid with distal region narrower than basal region; embolar insertion at 10 o’clock position; embolus with distal part straight; conductor arising between 12–1 o’clock position and directed retrolaterally (Figs 55A–C).

Female (paratype). Total length: 2.25. Carapace 0.76 long, 0.62 wide; Abdomen 1.39 long, 0.70 wide; Sternum 0.57 long, 0.47 wide; Spinnerets ALS 0.16 long, 0.11 wide. Eye diameters: AME 0.04, ALE 0.04, PME 0.03, PLE 0.03; interdistances: AME–AME 0.02, PME–PME 0.04. Chelicerae 0.220 long. Leg measurements: I: 2.52 (0.68, 0.52, 0.52, 0.44, 0.36); II: 1.93 (0.53, 0.32, 0.4, 0.35, 0.33); III: 1.71 (0.46, 0.24, 0.34, 0.33, 0.34); IV: 2.71 (0.75, 0.39, 0.60, 0.52, 0.45). Leg spination: I – femur d1-1-0. II – femur d1-1-0. III – femur d1-1-0; tibia p1-0-1; metatarsus v0-1-1, p0-0-1. IV – femur d1-1-0; tibia v1p-0-1p, p1-1-0, r1-0-1; metatarsus v0-1-1, p0-0-1, r0-0-1. Epigyne: positioning ridge directed posteriorly (Fig. 8D). Vulva: copulatory ducts between copulatory opening and secondary spermathecae with one curve, duct between the spermathecae with proximal and terminal part far from each other and without twist in terminal part (close to primary spermathecae); primary spermathecae rounded; duct fertilization directed diagonally. (Figs 55E, F).

Variation. Total length (4 males): 2.0–2.31; (3 females): 2.125–2.343.

Distribution. Congo (Fig. 56).

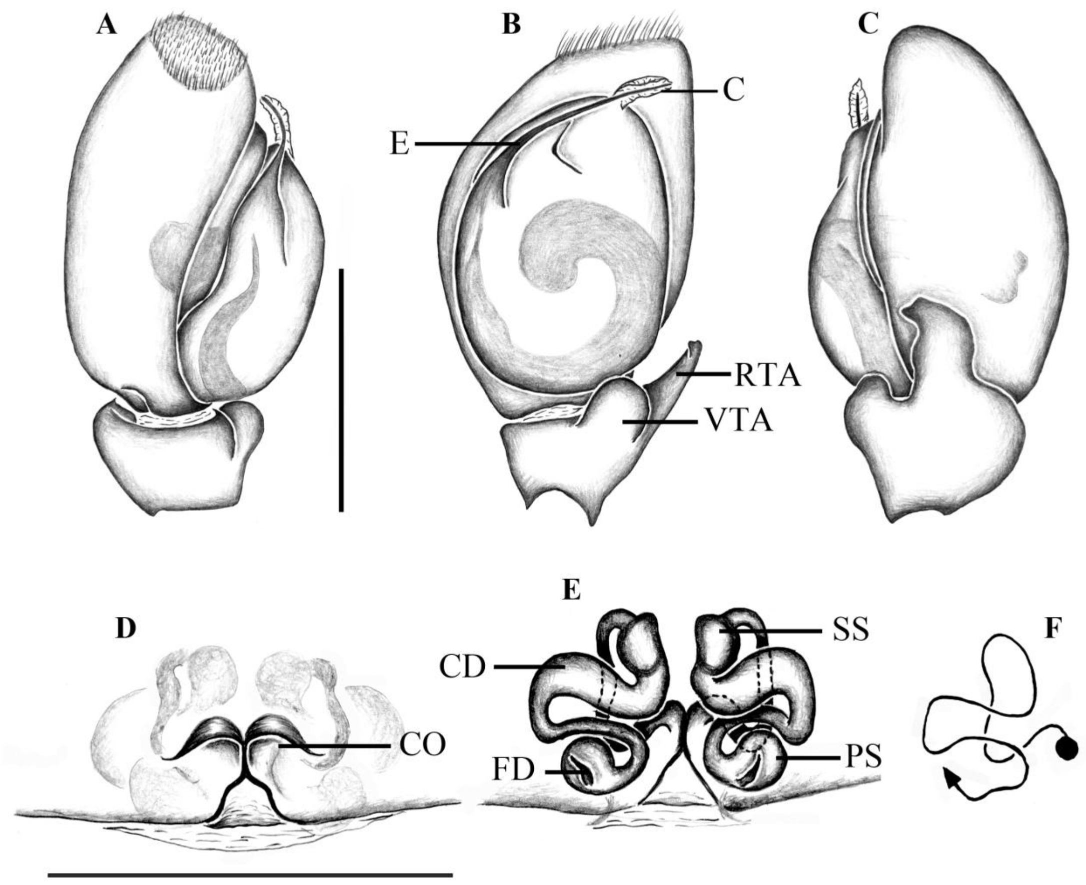

FIGURE 55. *Kikongo buta* **sp. nov.** Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; E—embolus; FD—fertilization duct; PS—primary spermathecae; SS—secondary spermathecae; RTA—retrolateral tibial apophisys; VTA—ventral tibial apophisys. Scale bars: 0.5 mm.

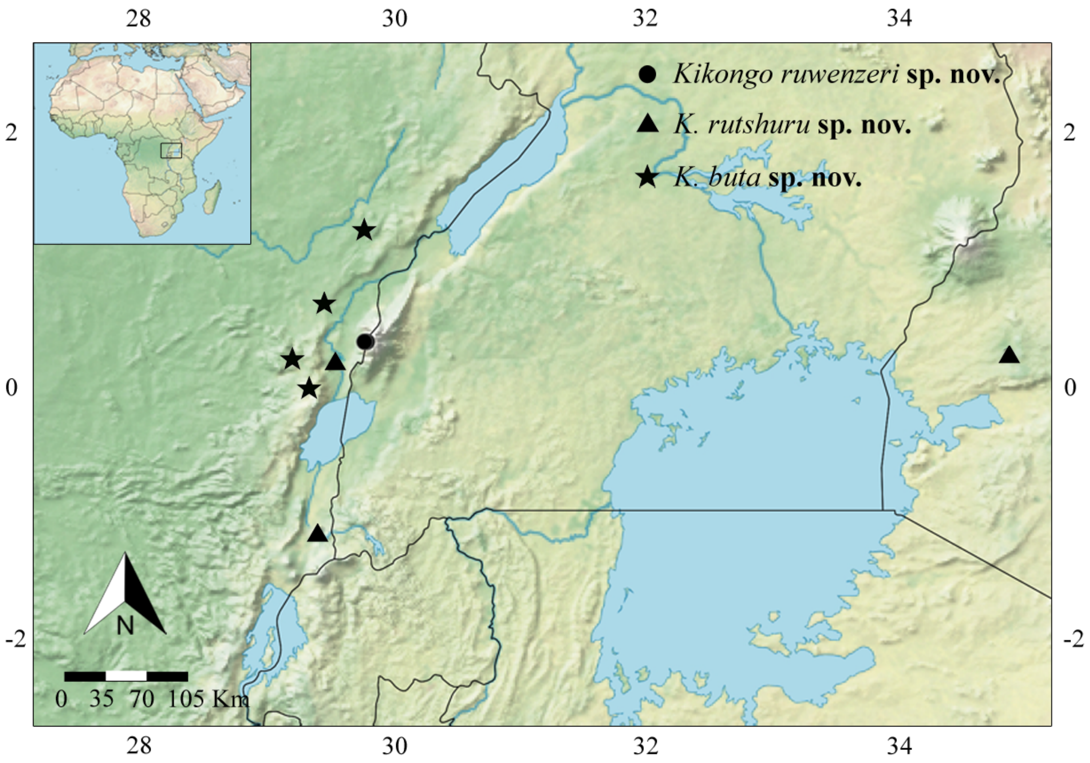

FIGURE 56. Known distribution records of species of *Kikongo* **gen. nov.** from Congo and Kenya**.**

Yoruba gen. nov.

Etymology. The generic name is a noun in apposition that refers to yoruba language, one of the official languages of the Nigeria and widely spoken in western Africa, where the new genus was registered. The gender is masculine.

Type species. *Yoruba ibadanus* (original designation).

Diagnosis. Species of *Yoruba* **gen. nov**. are distinguished from those of other Prodidominae genera by male palp with ventral tibial apophysis (Figs 61D, 62B, 63B), embolus robust with membranous base (Figs 62B, 63A) and long and laminar conductor with terminal part sclerotized (Figs 62B, 63A); female epigyne with wide copulatory opening located medially (Figs 62D, 63E); vulva with proximal part of copulatory ducts enlarged with small secondary spermathecae connected, terminal part of duct slender and convoluted laterally, close to primary spermathecae (Figs 62E, 63F).

Description. Total length males 1.97–2.4 and females 2.12–2.7. Carapace and legs pale yellow, and abdomen slightly gray (Figs 57A, B). Carapace longer than wide, slightly narrow at cephalic region, oval (Figs 57A, B). Fovea absent. Eight eyes, posterior row strongly procuverd and anterior row approximately straight (Figs 57C, 58A); PME and PLE irregular; AME dark; interdistance contiguous of AME–ALE, PME–PLE, ALE–PLE. Chilum absent. Chelicerae relatively small (0.22–0.27) without boss; without teeth (Figs 58D, E); fang with shaft serrula. Endites slightly convergent anteriorly fang with shaft serrula (Figs 57D, 58B), with few hairs on internal margin (Fig. 58C); serrula absent; labium longer than wide (Figs 57D, 58B). Sternum longer than wide, anterior margin straight, rebordered anteriorly and laterally (Fig. 57D); posterior region strongly protruding between coxae IV with numerous long and erect setae; intercoxal setae present; precoxal triangles present. Pedicel with ventral sclerite triangular. Leg formula 4123. Femur I and II with dorsal spines; legs III and IV with spines in femur, tibia and metatarsus. Patella I larger than the others, length similar to tibia I. All tarsi and metatarsus without scopulate. Trichobothria present on dorsal tibia, metatarsi and tarsi, arranged in two rows; bothrium with 3–4 ridges in proximal plate (Fig. 59D). Tarsal organ capsulate with oval opening, located dorsally and distally on tarsi (Fig. 59E). Two smooth claws (Fig. 59B); claw tufts composed of slightly widened tenent setae inserted in a well delimited plate; presence of solid claw tuft clasper (Figs 59B, C). Abdomen oval, longer than wide (Figs 57A, B); without scales; dorsum of abdomen anteriorly with long, dark, posteriorly curved setae. Six spinnerets; ALS longer than wide, separated from each other by less than their diameter (Figs 57E, F), piriform gland spigots cracked and elongated with associated setae (Figs 60A, B), major ampular gland spigot field on a conical and well-defined structure (Fig. 60C), male with one major ampular gland spigot and female with two; PLS and PMS conical and short, PLS larger than PMS (Figs 60A, 61A); PLS in male apparently with one minor ampular gland spigot and two aciniform gland spigots (Fig. 61B), females apparently with one minor ampular gland spigot, two aciniform gland spigots and one cylindrical gland spigots (Fig. 60E); PMS in male with one minor ampular gland spigot and one aciniform gland spigots (Fig. 61C), females apparently with one minor ampular gland spigot, one aciniform gland spigots and one cylindrical gland spigots (Fig. 60F). Female palp tarsus with chemosensory patch apical and truncad, without claw (Fig. 59F). Male palp: femur unmodified, with on dorsal median spines; tibia short with RTA and VTA single (Figs 61D, E); cymbium with apical scopula (Figs 62A, 63C); bulb ovoid (Fig. 63A); sperm duct visible ventrally with terminal part narrow; embolus arising prolaterally (Figs 61D, 62B, 63A); conductor with membranous base, slightly twisted and arising medially (Figs 62B, 63A). Vulva: enlarged copulatory ducts between copulatory opening and secondary spermathecae; secondary spermathecae small and positioned distally on duct; slender copulatory ducts between secondary spermathecae and primary spermathecae; primary spermathecae separated each other; fertilization ducts laterad (Figs 62E, 63F).

Distribution. Nigeria and Ivory Coast (Fig. 64).

Composition. Two species: *Yobura ibadanus* **gen. nov.** and *Y. toubensis* **gen. nov.**

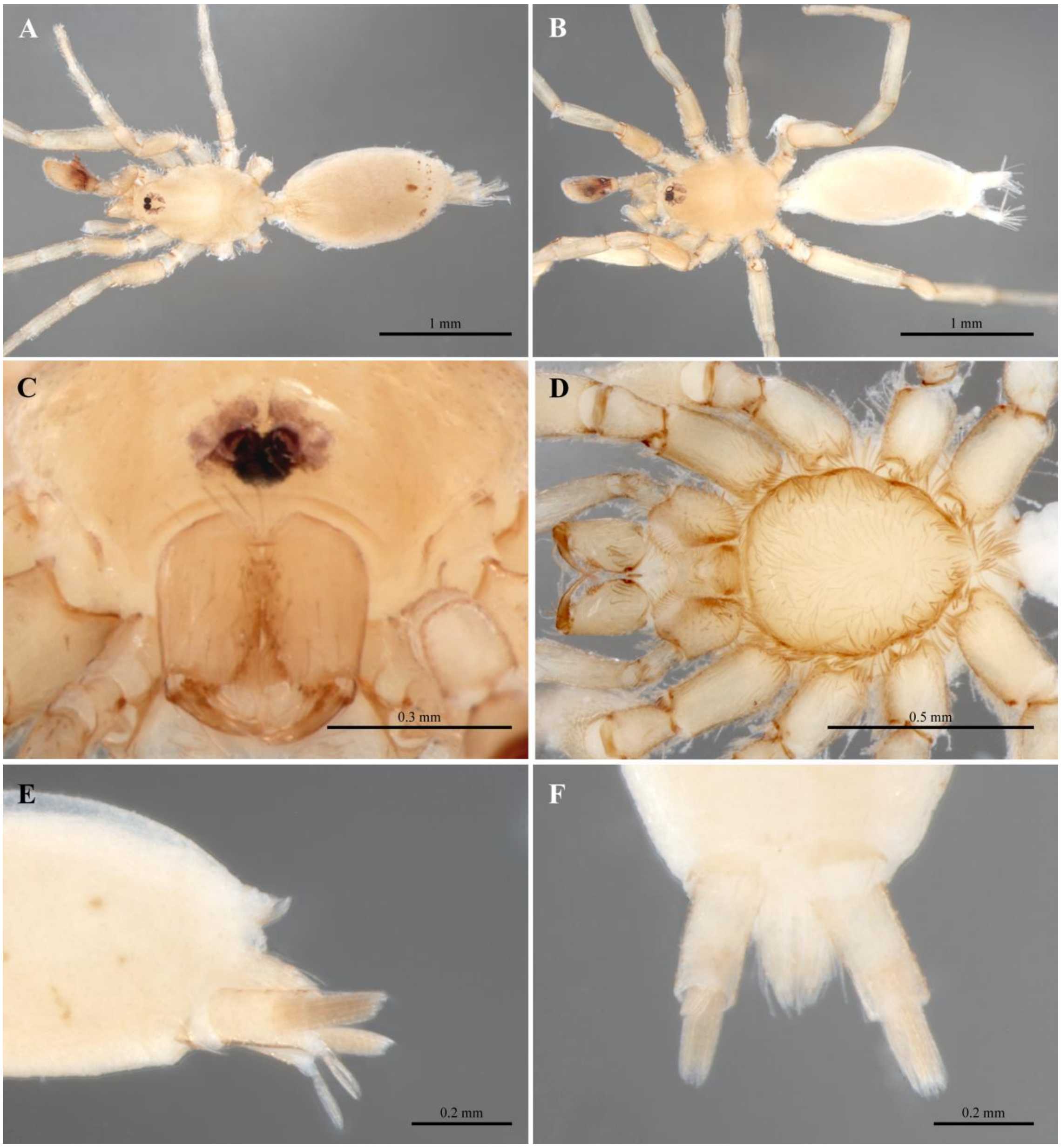

FIGURE 57. *Yoruba toubensis* **sp. nov.**, male: (A) habitus, dorsal view. *Y. ibadanus* **sp. nov.**, male: (B) habitus, dorsal view; (C) eyes, frontal view; (D) sternum and endites; (E) spinnerets, lateral view; (F) spinnerets, ventral view.

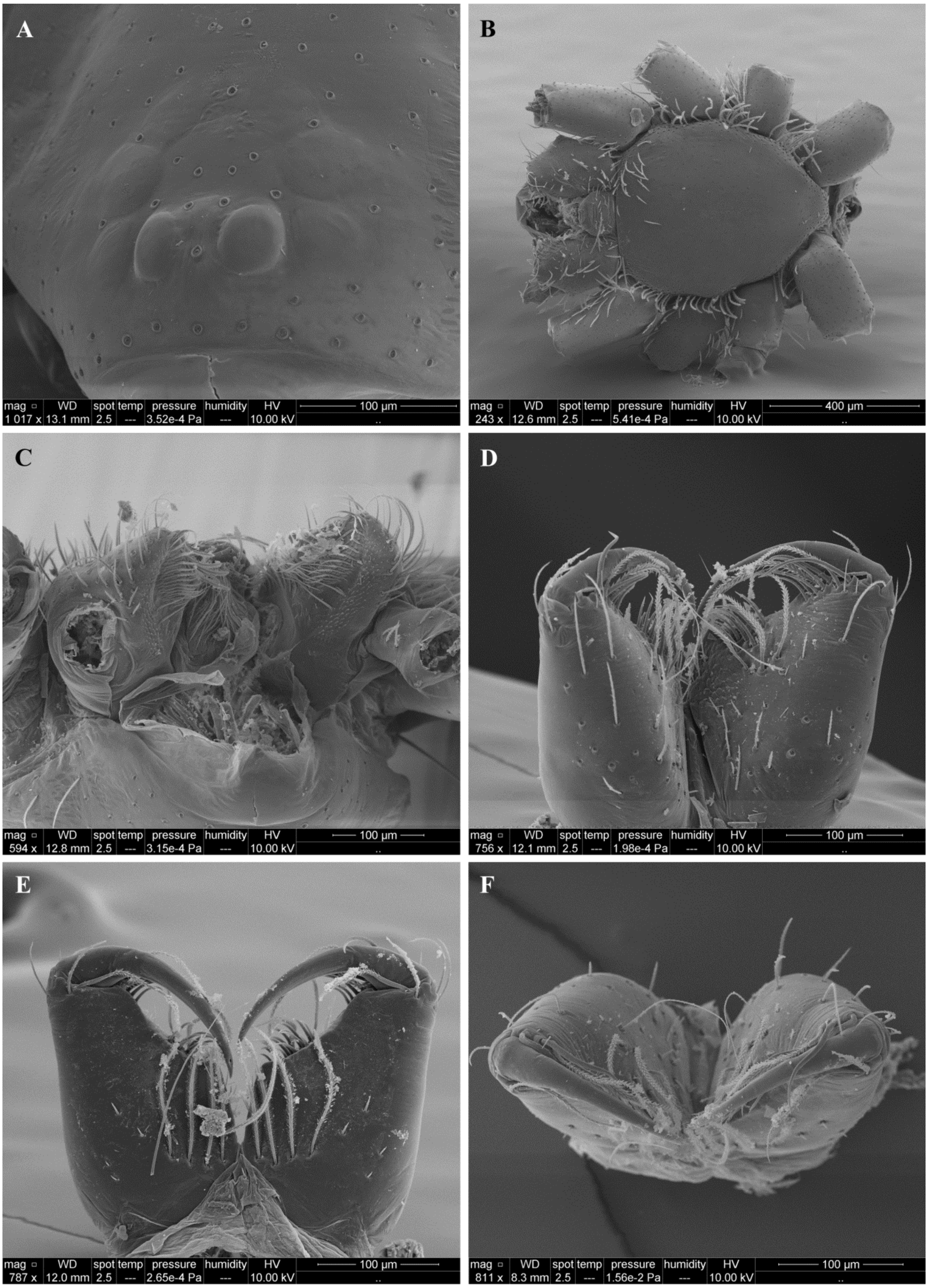

FIGURE 58. *Yoruba ibadanus* **sp. nov.**, male: (A) eyes, frontal view; (B) sternum; (C) endites, dorsal view; (D) chelicerae, promargin; (E) chelicerae, retromargin; (F) chelicerae, apical view.

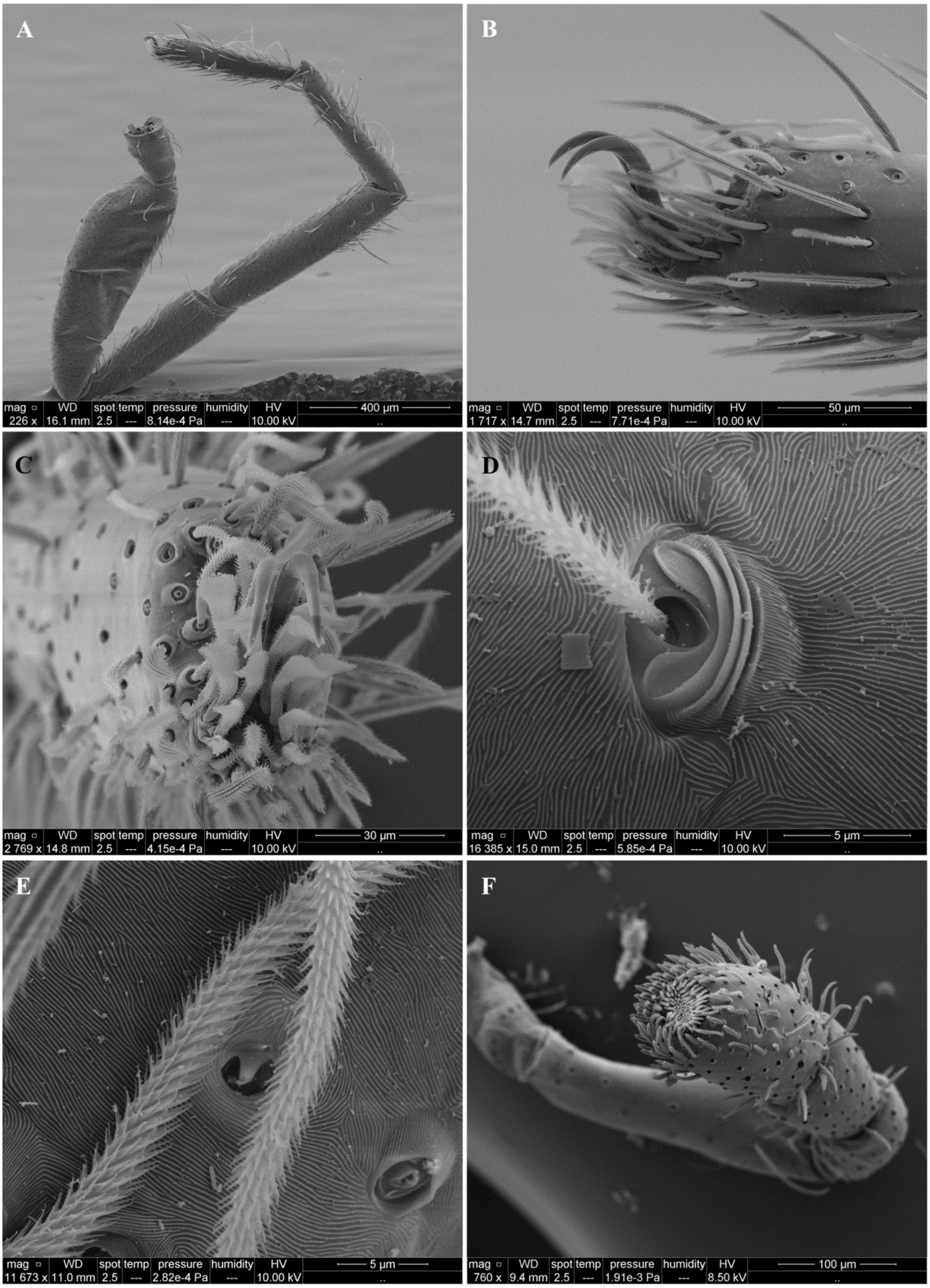

FIGURE 59. *Yoruba ibadanus* **sp. nov.**, male: (A) leg I, retrolateral view; (B) tarsus I, claw, retrolateral view; (C) tarsus I, claw, frontal view (D) tarsus I, trichobothria; (E) tarsus I, tarsal organ. Female: (F) pedipalp, chemosensory patch.

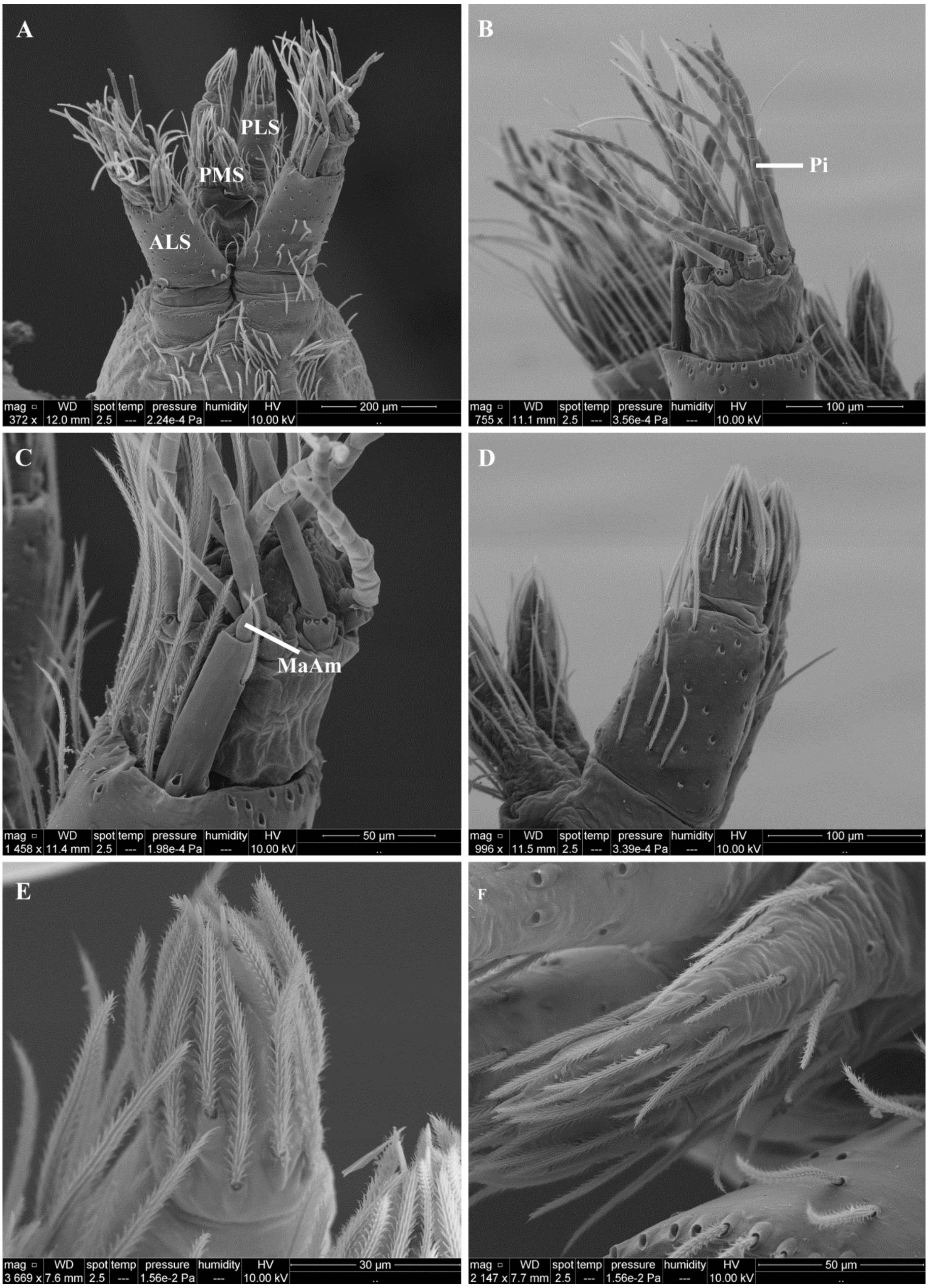

FIGURE 60. *Yoruba ibadanus* **sp. nov.**, female: (A) spinnerets, ventral view; (B) spinnerets, ALS, piriform gland spigot; (C) spinnerets, ALS, major ampullate gland spigot; (D) spinnerets, PLS, lateral view; (E) spinnerets, PLS; (F) spinnerets, PMS. ALS—anterior lateral spinnerets; MaAm—major ampular gland spigots; Pi—piriform gland spigots; PLS—posterior lateral spinnerets; PMS—posterior median spinnerets.

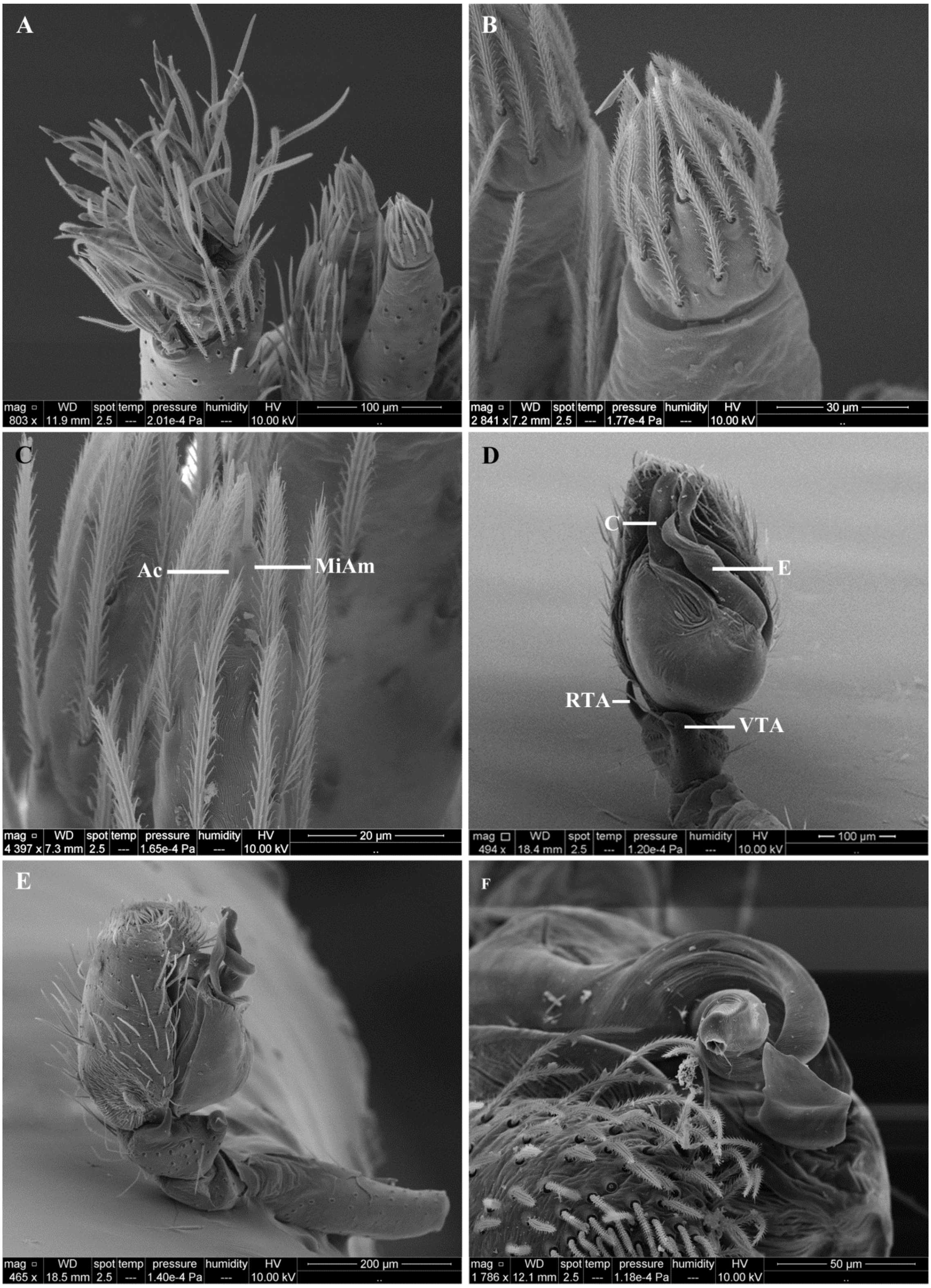

FIGURE 61. *Yoruba ibadanus* **sp. nov.**, male: (A) spinnerets; (B) spinnerets, PLS; (C) spinnerets, PMS; (D) palp, ventral view; (E) palp, retrolateral view; (F) palp, detail embolus, apical view. Ac—aciniform gland spigots; MiAm—minor ampullar gland spigots; C—conductor; E—embolus; RTA—retrolateral tibial apophisys; VTA—ventral tibial apophisys.

***Yoruba ibadanus* sp. nov.**

Figs. 57B–F, 58A–F, 59A–F, 60A–F, 61A–F, 62A–F and 64

Type Material. Male holotype from Nigeria, Ibadan, [7°23'47"N 3°55'E], 01 April 1973, A. Russell-Smith leg., deposited in RMCA 245546. Paratypes from the same vial as holotype: 13 males and 3 females.

Etymology. The specific name refers to the type locality, adjective.

Diagnosis. Males of *Yoruba ibadanus* **sp. nov.** are distinguished from *Y. toubensis* **sp. nov.** by screw-shaped embolus (laminar and without folds in *Y. toubensis* **sp. nov.**) and ventral tibial apophysis straight (pointing retrolaterally in ventral view in *Y. toubensis* **sp. nov.**) (Figs 61D, 62B, C); females differ of *Y. toubensis* **sp. nov.** by the presence of epigynal scape (absent in *Y. toubensis* **sp. nov.**) and slender copulatory ducts with proximal part turning behind the enlarged duct (Fig. 62E).

Description. Male (holotype). Total length: 2.78. Carapace 1.03 long, 0.7 wide; Abdomen 1.46 long, 0.68 wide; Sternum 0.68 long, 0.55 wide; Spinnerets ALS 0.22 long, 0.14 wide. Eye diameters: AME 0.05, ALE 0.045, PME 0.04, PLE 0.04; interdistances: AME–AME 0.03, PME–PME 0.02. Chelicerae 0.27 long. Leg measurements: I: 3.3 (0.9, 0.66, 0.68, 0.56, 0.5); II: 2.46 (0.7, 0.4, 0.51, 0.45, 0.4); III: 2.28 (0.58, 0.3, 0.5, 0.46, 0.44); IV: 3.38 (0.92, 0.49, 0.75, 0.66, 0.56). Leg spination: I – femur d1-0-0. II – femur d1-0-0. III – femur d1-1-0; tibia v1-0-1, r0-0-1, p0-0-1; metatarsus v2-0-1, r1-0-1, p0-0-1. IV – femur 1-1-0; tibia v1-2-2, r1-0-1, p1-0-1; metatarsus v1-1-2, p1-0-1, r0-1-0. Palp: RTA short and tapered; embolus arising from 9 o'clock position; arising from the center of tegulum (Figs 61D–F, 62A–C).

Female (Paratype). Total length: 2.21. Carapace 0.87 long, 0.62 wide; Abdomen 1.31 long, 0.78 wide; Sternum 0.62 long, 0.5 wide; Spinnerets ALS 0.2 long, 0.12 wide. Eye diameters: AME 0.04, ALE 0.03, PME 0.04, PLE 0.03; interdistances: AME–AME 0.01, PME–PME 0.02. Chelicerae 0.26 long. Leg measurements: I: 2.87 (0.78, 0.56, 0.59, 0.52, 0.42); II: 1.97 (0.55, 0.3, 0.4, 0.37, 0.35); III: 1.75 (0.47, 0.28, 0.36, 0.32, 0.32); IV: 3.01 (0.79, 0.45, 0.66, 0.6, 0.51). Leg spination: I – femur d1-1-0. II – femur d1-1-0. III – femur d1-1-0; tibia v0-1-1, p1-0-1; metatarsus v1-0-1, r0-1-0, p0-0-1. IV – femur 1-1-0; tibia v1p-1p-2, r1-0-1, p1-0-1; metatarsus v1-0-2, p0-0-1, r0-1-0. Vulva: enlarged part of copulatory ducts with constrictions and laterad; primary spermathecae rounded (Fig. 62E).

Variation. Total length (14 males): 1.97–2.40; (3 females): 2.12–2.7.

Distribution. Ibadan, Nigeria (Fig. 64).

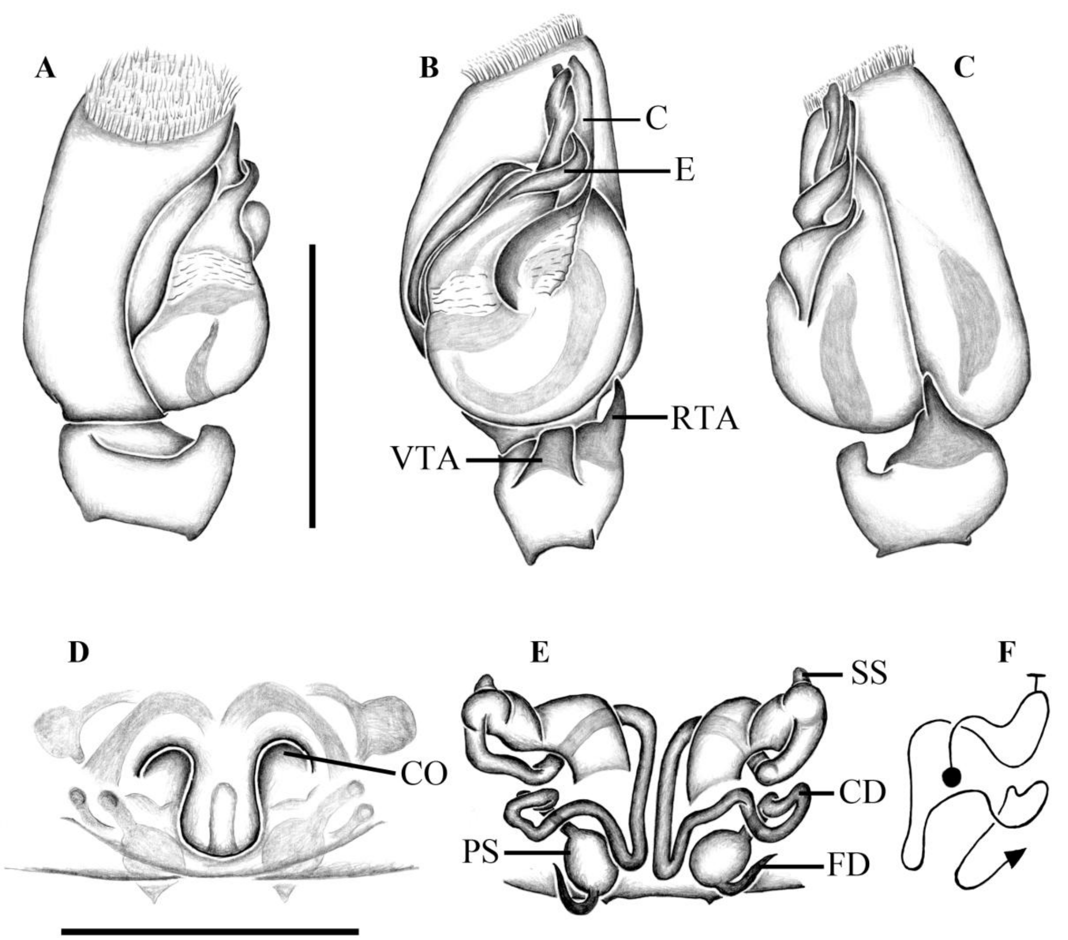

FIGURE 62. *Yoruba ibadanus* **sp. nov.** Male palp: (A) prolateral view; (B) ventral view; (C) retrolateral view. Female: (D) epigyne, ventral view; (E) vulva, dorsal view; (F) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; E—embolus; FD—fertilization duct; PS—primary spermathecae; SS—secondary spermathecae; RTA—retrolateral tibial apophisys; VTA—ventral tibial apophisys. Scale bars: 0.5 mm.

Yoruba toubensis **sp. nov.**

Figs. 57B, 63A–G and 64

Type Material. Male holotype from Ivory Coast, Touba, 09° 43’N 07° 24’W, 18 June 1995, A. Russell-Smith leg., deposited in RMCA 227287. Female paratype from Cote d'Ivoire, Bouaké, WARDA site, 07°41'N 005°02'W, 09 August 1995, A. Russell-Smith leg., deposited in RMCA 227202.

Etymology. The specific name refers to the type locality, adjective.

Diagnosis. Males of *Yoruba toubensis* **sp. nov.** are distinguished from those of *Y. ibadanus* **sp. nov.** by the palp with embolus laminar, without folds (screw-shaped in *Y. ibadanus* **sp. nov.**) and ventral tibial apophysis pointing retrolaterally in ventral view (straight in *Y. ibadanus* **sp. nov.**) (Figs 63A, D); females differ of *Y. ibadanus* **sp. nov.** by the epigyne lacking an epigynal scape (present in *Y. ibadanus* **sp. nov.**), copulatory openings with anterior part sclerotized, forming a hood (Figs 63E, F).

Description. Male (holotype). Total length: 2.37. Carapace 0.90 long, 0.61 wide; Abdomen 1.26 long, 0.70 wide; Sternum 0.67 long, 0.49 wide; Spinnerets ALS 0.19 long, 0.12 wide. Eye diameters: AME 0.04, ALE 0.03, PME 0.04, PLE 0.05; interdistances: AME–AME 0.02, PME–PME 0.03. Chelicerae 0.22 long. Leg measurements: I: 2.73 (0.76, 0.55, 0.55, 0.45, 0.42); II: 1.83 (0.46, 0.3, 0.36, 0.35, 0.36); III: 1.61 (0.44, 0.22, 0.32, 0.3, 0.33); IV: 2.86 (0.75, 0.45, 0.62, 0.55, 0.49). Leg spination: I – femur d1-1-0. II – femur d1-1-0. III – femur d1-1-0; tibia and metatarsus probably with spines, but not visible. IV – femur 1-1-0; tibia v1-1-2, r1-0-1, p1-0-0; metatarsus v0-0-1, p0-0-1. Palp: RTA tapered and directed apically; embolus arising 8 o'clock position; conductor arising close to center of tegulum (Figs 7A–D).

Female. (Paratype). Total length: 2.56. Carapace 1.0 long, 0.62 wide; Abdomen 1.33 long, 0.78 wide; Sternum 0.7 long, 0.55 wide; Spinnerets ALS 0.23 long, 0.13 wide. Eye diameters: AME 0.04, ALE 0.04, PME 0.04, PLE 0.05; interdistances: AME–AME 0.02, PME–PME 0.03, AME–ALE contiguous, PME–PLE contiguous, ALE–PLE contiguous. Chelicerae 0.270 long. Legs measurements: I: 2.7 (0.76, 0.52, 0.54, 0.46, 0.42); II: 2.31 (0.6, 0.4, 0.47, 0.44, 0.4); III: 1.89 (0.46, 0.3, 0.35, 0.42, 0.36); IV: 2.8 (0.74, 0.45, 0.6, 0.55, 0.46). Leg spination: I – femur d1-1-0. II – femur d1-1-0. III – femur d1-1-0; tibia v0-1p-1p, r0-1-1, p1-0-1; metatarsus v1-0-1, p0-0-1. IV

– femur 1-1-0; tibia v1p-2-2, r1-0-1, p1-0-1; metatarsus v1-0-1, r0-1-0, p0-0-1. Vulva: enlarged part of copulatory ducts slightly diverging from one another; primary spermathecae ovoid (Fig. 63F, G).

Distribution. Touba, Ivory Coast (Fig. 64).

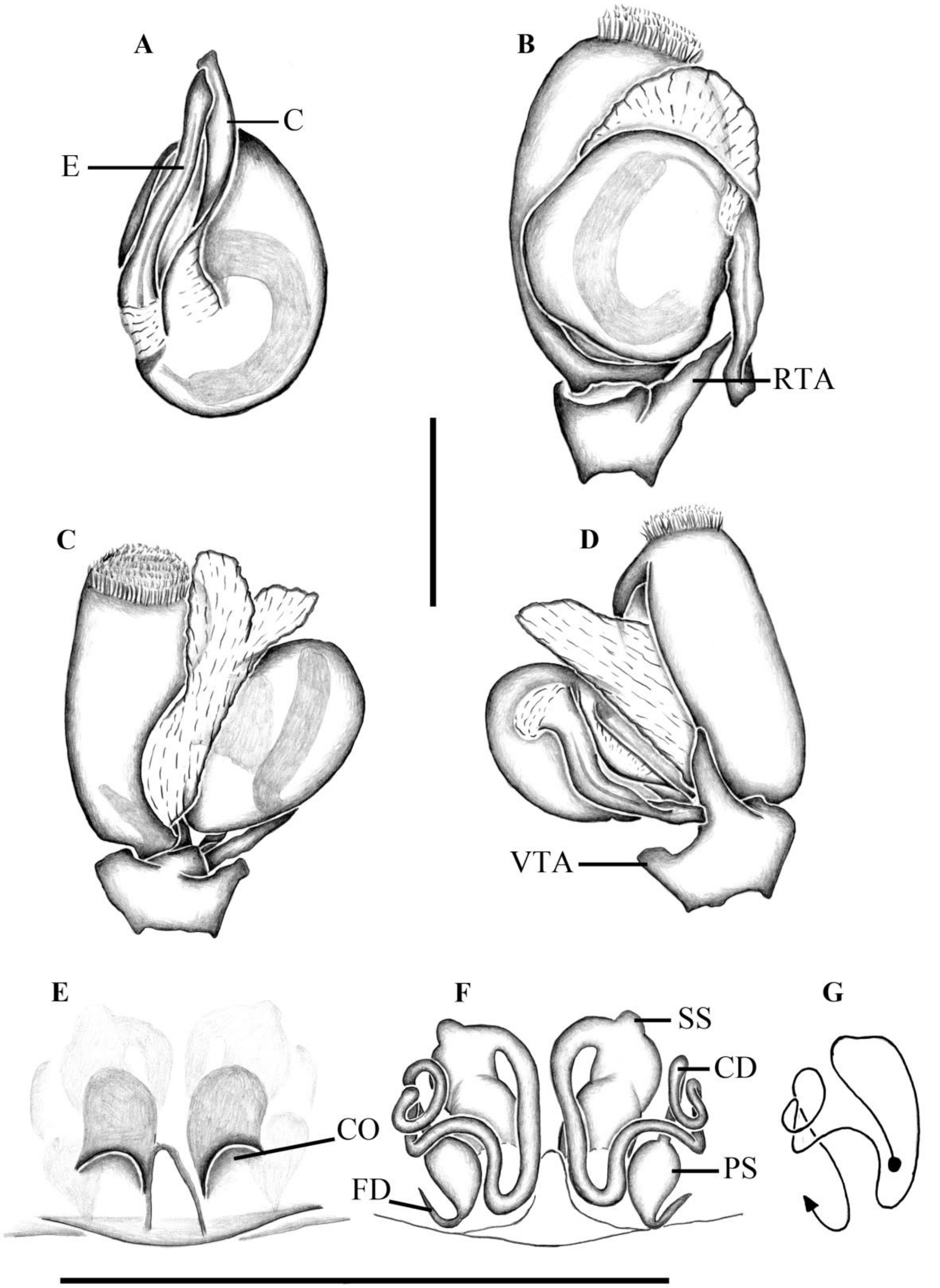

FIGURE 63. *Yoruba toubensis* **sp. nov.** Male palp: (A) bulb detached from cymbium, ventral view; (B) ventral view, bulb rotated; (C) prolateral view, bulb rotated (prolatero-basal view); (D) retrolateral view, bulb rotated (retro-distal view). Female: (E) epigyne, ventral view; (F) vulva, dorsal view; (G) vulva, schematic course of internal duct system. C—conductor; CD—copulatory duct; CO—copulatory opening; E—embolus; FD—fertilization duct; PS—primary spermathecae; SS—secondary spermathecae; RTA—retrolateral tibial apophisys; VTA—ventral tibial apophisys. Scale bars: 0.5 mm.

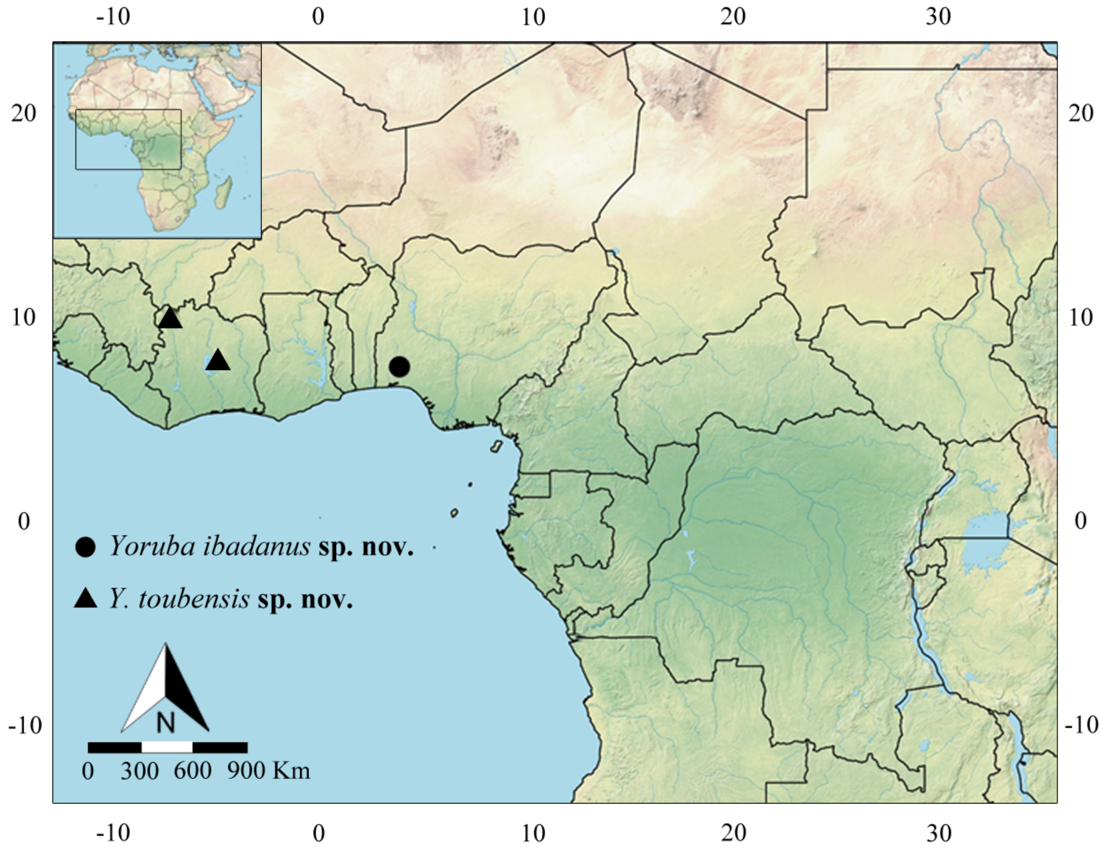

FIGURE 64. Known distribution records of species of *Yoruba* **gen. nov.** from Nigeria and Ivory Coast.

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CONCLUSÕES GERAIS

- A subfamília Prodidominae não foi recuperada como monofilética,
- *Anagrina* aparece como grupo-irmão de Leptodrassinae. O gênero é removido de Prodimoninae e considerado *incertae sedis*.
- Molycriinae é reestabelecida como subfamília e inclui seis gêneros: *Cryptoerithus* Rainbow, 1915, *Molycria* Simon, 1887, *Myandra* Simon, 1887, *Nomindra* Platnick & Baehr, 2006, *Wesmaldra* Platnick & Baehr, 2006 e *Wydundra* Platnick & Baehr, 2006. A subfamília é suportada pela presença de fiandeiras laterais anteriores afastadas das fiandeiras posteriores, fúsulos das glândulas piriformes das fiandeiras laterais anteriores extremamente alongados e sem cerdas associadas, artículo distal como uma área uma retrátil associado aos fúsulos das glândulas piriformes e fiandeiras laterais anteriores com "hood" apical.
- Prodidominae é redefinida para incluir somente os gêneros que possuem os fúsulos das glândulas piriformes das fiandeiras laterais anteriores extremamente alongados e associados a cerdas plumosas: *Austrodomus* Lawrence, 1947; *Brasilomma* Brescovit, Ferreira & Rheims, 2012; *Caudalia* Alayon, 1980; *Chileomma* Platnick et al., 2005; *Chileuma* Platnick *et al.*, 2005; *Chilongius* Platnick *et al.*, 2005; *Eleleis* Simon, 1893; *Lygromma* Simon, 1893; *Lygrommatoides* Strand, 1918; *Moreno* Mello-Leitão, 1940; *Neozimiris* Simon, 1903; *Nopyllus* Ott, 2014; *Paracymbiomma* Rodrigues, Cizauskas & Rheims; *Plutonodomus* Cooke, 1964; *Prodidomus* Hentz, 1847; *Purcelliana* Cooke, 1964; *Theuma* Simon, 1893; *Theumella* Strand, 1906; *Tivodrassus* Chamberlin & Ivie, 1936; *Tricongius* Simon, 1893; *Zimirina* Dalmas, 1919; *Zimiris* Simon, 1882.

- Prodidominae se divide em dois grandes clados: um composto exclusivamente por gêneros neotropicais e outro composto predominantemente por gêneros africanos.
- *Namundra* é removido de Molycriinae, e incluído em Prodidominae, onde aparece relacionado com os gêneros africanos.
- *Nopyllus* é incluído em Prodidominae.
- *Lygromma ybyguara* Rheims & Brescovit, 2004 é removida de *Lygromma* e considerada *insertae sedis*.
- *Oltacloea* Mello-Leitão, 1940 é considerado sinônimo-junior de *Tricongius* Simon, 1893.
- *Katumbea* Cooke, 1964 é considerado sinônimo-junior de *Austrodomus* Lawrence, 1947.
- *Prodida* Dalmas, 1919 é considerado sinônimo-junior de *Prodidomus* Hentz, 1847.
- Uma chave de identificação para gêneros africanos é apresentada.
- Sete espécies e três novos gêneros são descritos para África: *Kikongo* **gen. nov.** (*K. ruwenzori* **sp. nov.,** *K. rutshuru* **sp. nov.** and *K. buta* **sp. nov.**); *Kituba* **gen. nov.** (*K. mayombensis* **sp. nov.** and *K. langalanga* **sp. nov.**); *Yoruba* **gen. nov.** (*Y. ibadanus* **sp. nov.** and *Y. toubensis* **sp. nov.**).
- O gênero *Austrodomus* é revisado. *Austrodomus scaber* (Purcell, 1904) (♂♀), *A. oxoniensis* (Cooke, 1964) (♂♀) e *A. zuluensis* Lawrence, 1947 (♂) são redescritas, o macho de *A. scaber* é descrito pela primeira vez e *A. gamsberg* **sp. nov.** (♂) é descrita como nova.
- O gênero *Eleleis* é revisado. *Eleleis crinita* Simon, 1893 é redescrita e *E. etosha* **sp. nov.** (♂♀), *E. haddadi* **sp. nov.** (♀), *E. himba* **sp. nov.** (♂), *E. limpopo* **sp.

nov. (♂♀),*E. leleupis* **sp. nov.** (♂), *E. luderitz* **sp. nov.** (♀), *E. okavango* **sp. nov.** (♂♀) and *E. solitaria* **sp. nov.** (♀) são descritas como novas**.**

- O gênero *Purcelliana* é revisado *Purcelliana problematica* Cooke, 1964 é redescrita e *P. cederbergis* **sp. nov.** (♂), *P. kamaseb* **sp. nov.** (♂♀), *P. khabus* **sp. nov.** (♂♀) são descritas como novas.
- *Plutonodomus* e *Theumella* são redescritos e rediagnosticados baseados nas suas espécies tipo, *P. kungwensis* Cooke, 1964 and *T. typica*.

RESUMO

Prodidominae foi recentemente restabelecida como subfamília de Gnaphosidae, compreendendo 315 espécies distribuídas em 32 gêneros. Neste estudo, realizamos uma análise cladística incluindo 55 espécies de Prodidominae e 32 espécies de outros gêneros de Gnaphosidae e famílias relacionadas como grupos externos. A matriz é composta por 282 caracteres morfológicos e os dados foram analisados sob o critério de parcimônia, utilizando o TNT 1.5. Prodidominae não foi recuperado como monofilético. *Anagrina* aparece mais relacionada com Leptodrassinae, sendo removida de Prodidominae e considerada *incertae sedis*. *Cryptotoerithus* Rainbow, *Molycria* Simon, *Myandra* Simon, *Nomindra* Platnick & Baher, *Wesmaldra* Platnick & Baher e *Wydundra* Platnick & Baher aparecem como um grupo monofilético, caracterizado pela presença de ALS extremamente alongada situada longe das fiandeiras posteriores, fúsulos das glândulas piriformes alongados com área retrátil e presença de um capuz apical no artículo basal. Assim, restabelecemos Molycriinae como uma subfamília distinta dentro de Gnaphosidae, grupo-irmão de Prodidominae. Redefinimos os limites de Prodidominae para incluir os gêneros *Austrodomus* Lawrence, *Brasilomma* Brescovit, Ferreira & Reims, *Caudalia* Alayón, *Chileomma* Platnick, Shadab & Sorkin, *Chileuma* Platnick, Shadab & Sorkin, *Chilongius* Platnick, Shadab & Sorkin, *Eleleis* Simon, *Lygromma* Simon, *Lygrommatoides* Strand, *Moreno* Mello-Leitão, *Namundra* Platnick & Bird, *Neozimiris* Simon, *Nopyllus* Ott, *Paracymbiomma* Rodrigues, Cizauskas & Reims, *Plutonodomus* Cooke, *Prodidomus* Hentz, *Purcelliana* Cooke, *Theuma* Simon, *Theumella* Strand, *Tivodrassus* Chamberlin & Ivie, *Tricongius* Simon, *Zimirina* Dalmas e *Zimiris* Simon. As espécies desses gêneros compartilham a presença de fiandeiras laterais anteriores com longos fúsulos das glândulas piriformes associadas a cerdas plumosas e presença de uma grande protrusão entre coxas IV, com cerdas

eretas e margens não-esclerotizadas. Além disso, com base nos resultados da análise, propomos três novas sinonímias: *Oltacloea* Mello-Leitão, 1940 como sinônimo júnior de *Tricongius* Simon, 1893, *Prodida* Dalmas, 1919 como sinônimo júnior de *Prodidomus* Hentz, 1847 e *Katumbea* Cooke, 1964 como um sinônimo júnior de *Austrodomus* Lawrence, 1947. Removemos *L. ybyguara* Reims & Brescovit de *Lygromma* e o colocamos como *incertae sedis*. Além disso, realizamos uma revisão taxonômica de gêneros exclusivamente africanos. *Austrodomus* Lawrence, *Eleleis* Simon e *Purcelliana* Cooke são revisados. *Austrodomus zuluensis* Lawrence, 1947 e *A. oxoniensis* (Cooke, 1964) são redescritas, o macho de *A. scaber* (Purcell, 1904) é descrito pela primeira vez, e uma nova espécie, *A. gamsberg* **sp. nov.** (♂) é descrita para Namíbia. *Eleleis crinita* Simon, 1893 é redescrita e oito novas espécies são propostas: *E. limpopo* **sp. nov**. (♂♀) para África do Sul e Zâmbia, *E. okavango* **sp. nov.** (♂♀) para Botsuana e Namíbia, *E. etosha* **sp. nov**. (♂♀), *E. himba* **sp. nov.** (♂) e *E. luderitz* **sp. nov.** (♀) para Namíbia, *E. leleupis* **sp. nov**. (♂) e *E. haddadi* **sp. nov**. (♀) para África do Sul e *E. solitaria* **sp. nov.** (♀) para Cabo Verde. *Purcelliana problematica* Cooke, 1964 é redescrita e três novas espécies são propostas: *P. kamaseb* **sp. nov.** (♂♀) e *P. khabus* **sp. nov.** (♂♀) para Namíbia e *P. cederbergis* **sp. nov.** (♂) para África do Sul. *Plutonodomus* Cooke e *Theumella* Strand são redescritos com base apenas em suas espécies-tipo, *P. kungwensis* Cooke, 1964 e *T. typica*. Além disso, com base nos resultados da análise cladística de Prodidominae, três novos gêneros são descritos: *Kikongo* **gen. nov**. para incluir *K. ruwenzori* **sp. nov.** (♂♀) e *K.buta* **sp. nov**. (♂♀) do Congo e *K. rutshuru* **sp. nov**. (♂♀) do Congo e Quênia; *Kituba* **gen. nov**. para incluir *K. mayombensis* **sp. nov.** (♂♀) e *K. langalanga* **sp. nov.** (♀) do Congo; e *Yoruba* **gen. nov.** para incluir *Y. ibadanus* **sp. nov.** (♂♀) da Nigéria e *Y. toubensis* **sp. nov**. (♂♀) da Costa do Marfim. Mapas de distribuição são fornecidos para os gêneros africanos

incluídos neste estudo e uma chave de identificação é fornecida para todos os treze gêneros de Prodidominae registrados na África.

Palavras-chave: Filogenia, taxonomia, região Afrotropical, novas espécies

ABSTRACT

Prodidominae was recently reestablished as a subfamily of Gnaphosidae, comprising 315 species distributed in 32 genera. In this study, we conducted a cladistic analysis including 55 species of Prodidominae and 32 species of other Gnaphosidae genera and associated families as an outgroup. The matrix is composed of 282 morphological characters and the data was analyzed under the parsimony criterion, using TNT 1.5. Prodidominae was not recovered as monophyletic. *Anagrina* appears more related to Leptodrassinae, it is removed from Prodidominae and considered *incertae sedis*. *Cryptotoerithus* Rainbow, *Molycria* Simon, *Myandra* Simon, *Nomindra* Platnick & Baher, *Wesmaldra* Platnick & Baher and *Wydundra* Platnick & Baher arise as a monophyletic unit, characterized by the presence of ALS extremely elongated situated far in advance of the posterior spinnerets, piriform gland spigots elongated with retractile area and presence of an apical hood in the basal article. Thus, we reestablish Molycriinae as a distinct subfamily within Gnaphosidae, sister to Prodidominae. We redefine the limits of Prodidominae to include the genera *Austrodomus* Lawrence, *Brasilomma* Brescovit, Ferreira & Rheims, *Caudalia* Alayón, *Chileomma* Platnick, Shadab & Sorkin, *Chileuma* Platnick, Shadab & Sorkin, *Chilongius* Platnick, Shadab & Sorkin, *Eleleis* Simon, *Lygromma* Simon, *Lygrommatoides* Strand, *Moreno* Mello-Leitão, *Namundra* Platnick & Bird, *Neozimiris* Simon, *Nopyllus* Ott, *Paracymbiomma* Rodrigues, Cizauskas & Rheims, *Plutonodomus* Cooke, *Prodidomus* Hentz, *Purcelliana*

Cooke, *Theuma* Simon, *Theumella* Strand, *Tivodrassus* Chamberlin & Ivie, *Tricongius* Simon, *Zimirina* Dalmas and *Zimiris* Simon. Species of these genera share the presence of anterior lateral spinnerets with piriform gland spigots associated with patches of long setae and the presence of a large protrusion between coxae IV with erect setae and unsclerotized margins. In addition, based on the results of the analysis, we propose three new synonymies: *Oltacloea* Mello-Leitão, 1940 as a junior synonym of *Tricongius* Simon, 1893, *Prodida* Dalmas, 1919 as junior synonym of *Prodidomus* Hentz, 1847 and *Katumbea* Cooke, 1964 as a junior synonym of *Austrodomus* Lawrence, 1947. We remove *L. ybyguara* Rheims & Brescovit from *Lygromma* and place it as *incertae sedis*. In addition, we conduct a taxonomic revision of exclusively African genera. *Austrodomus* Lawrence, *Eleleis* Simon and *Purcelliana* Cooke are revised. *Austrodomus zuluensis* Lawrence, 1947 and *A. oxoniensis* (Cooke, 1964) are redescribed, the male of *A. scaber* (Purcell, 1904) is described for the first time and a new species, *A. gamsberg* **sp. nov.** (♂) is proposed from Namibia. *Eleleis crinita* Simon, 1893 is redescribed and eight new species are proposed, *E. limpopo* **sp. nov.** (♂♀) from South Africa and Zambia, *E. okavango* **sp. nov.** (♂♀) from Botswana and Namibia, *E. etosha* **sp. nov.** (♂♀), *E. himba* **sp. nov.** (♂) and *E. luderitz* **sp. nov.** (♀) from Namibia, *E. leleupis* **sp. nov.** (♂) and *E. haddadi* **sp. nov.** (♀) from South Africa and *E. solitaria* **sp. nov.** (♀) from Cape Verde. *Purcelliana problematica* Cooke, 1964 is redescribed and three new species are described, *P. kamaseb* **sp. nov.** (♂♀) and *P. khabus* **sp. nov.** (♂♀) from Namibia and *P. cederbergis* **sp. nov.** (♂) from South Africa. *Plutonodomus* Cooke and *Theumella* Strand are redescribed based only on their type species, *P. kungwensis* Cooke, 1964 and *T. typica*. In addition, based on the results of the cladistic analysis of Prodidominae three new genera are described: *Kikongo* **gen. nov.** to include *K. ruwenzori* **sp. nov.** (♂♀) and *K.buta* **sp. nov.** (♂♀) from Congo and

K. rutshuru **sp. nov.** (♂♀) from Congo and Kenya; *Kituba* **gen. nov.** to include *K. mayombensis* **sp. nov.** (♂♀) and *K. langalanga* **sp. nov.** (♀) from Congo; and *Yoruba* **gen. nov.** to include *Y. ibadanus* **sp. nov.** (♂♀) from Nigeria and *Y. toubensis* **sp. nov.** (♂♀) from Ivory Coast. Distribution maps are provided for genera included in this study and an identification key is provided for all thirteen genera of Prodidominae recorded in Africa.

Keywords: Phylogeny**,** taxonomy, Afrotropical region, new species

ATTACHMENT 1

Rodrigues, B. V. B., Cizauskas, I. & Rheims, C. A. (2018). Description of *Paracymbiomma* **gen. nov.**, a new genus of prodidomid spiders from the Neotropical region (Araneae: Prodidomidae) including a new troglobite species. *Zootaxa* **4514(3):** 301–331. doi:10.11646/zootaxa.4514.3.1

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Description of *Paracymbiomma* gen. nov., a new genus of prodidomid spiders from the Neotropical region (Araneae: Prodidomidae) including a new troglobite species

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Abstract

Paracymbiomma **gen. nov.** is proposed to include six new species from Brazil: *P. angelim* **sp. nov.** (♂ ♀) from São Paulo, *P. carajas* **sp. nov.** (♂ ♀), *P. bocaina* **sp. nov.** (♂ ♀) and *P. caecus* **sp. nov.** (♂ ♀) from Pará, *P. doisirmaos* **sp. nov.** (♂) from Pernambuco and *P. pauferrense* **sp. nov.** (♂) from Paraíba. The genus is included in Theuminae by having the sternum with posterior region without rebordered margins, strongly protruding between coxae IV and with numerous long and erect setae, and by the vulva with highly convoluted ducts. It can be distinguished from the other members of the subfamily by the male palp with paracymbium, single RTA, bulb with sclerotized conductor and partly sclerotized median apophysis, and by the female epigyne with posteromedian atrium and sclerotized margin, and vulva with copulatory ducts long, strongly convoluted laterally with proximal part (closest to copulatory openings) translucent. *Paracymbiomma carajas* **sp. nov.**, *P. bocaina* **sp. nov.** and *P. caecus* **sp. nov.** occur exclusively in ferruginous caves. We provide a discussion on specializations and adaptations of *Paracymbiomma* **gen. nov.** and other species of Prodidomidae to the subterranean environment.

Key words: Araneae, Brazil, taxonomy, subterranean species

Introduction

Prodidomidae includes small to medium-sized spiders distributed worldwide, characterized by the anterior lateral spinnerets with piriform gland spigots extremely elongated and closely associated to highly plumose setae (Platnick 1990). The family has gained notoriety only recently, with more than half of the known species described in the last fifteen years. It comprises 309 species distributed in 31 genera (World Spider Catalog 2018) and is divided into three subfamilies: Prodidominae Simon, Theuminae Platnick & Baehr, and Molycriinae Simon (Platnick & Baehr 2006).

Only nine genera are distributed exclusively in the Neotropical region: *Brasilomma* Brescovit, Ferreira & Rheims, 2012, *Caudalia* Alayón, 1980, *Chileomma* Platnick, Shadab & Sorkin, 2005, *Chileuma* Platnick, Shadab & Sorkin, 2005, *Chilongius* Platnick, Shadab & Sorkin, 2005, *Lygromma* Simon, 1893, *Moreno* Mello-Leitão, 1940, *Oltacloea* Mello-Leitão, 1940 and *Tricongius* Simon, 1893. The species are small and cryptic, making them difficult to collect, and thus rare in zoological collections.

Currently, four Neotropical species of Prodidomidae are considered subterranean. All show morphological characteristics usually treated as specializations to the underground environment, such as depigmentation, anophthalmia and appendage elongation. *Lygromma gertschi* Platnick & Shadab, 1976, is known from limestone caves in Jamaica, *L. anops* Peck & Shear, 1987, from volcanic caves in the Galapagos Islands, *L. ybyguara* Rheims & Brescovit, 2004, from a limestone cave in Brazil and *Brasilomma enigmatica* Brescovit, Ferreira & Rheims, 2012, from iron, limestone and quatizitic caves in Brazil.

Three species, herein described, were collected exclusively in ferruginous caves in Carajás National Forest,

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state of Pará, Brazil. These ferruginous caves are formed mainly by dissolution and erosion processes (Pinheiro & Maurity 1988; Maurity & Kotschoubey 1995) and, as mentioned by Piló & Auler (2009), are smaller when compared to other types of caves. They also show a higher richness when compared to other types of caves (Silva *et al.* 2011; Resende & Bichuette 2016). However, Jaffé *et al.* (2016) indicated that iron caves should be treated as components of a cave network immersed in the karst landscape. Speleological studies in caves of the Carajás National Forest region have been carried out for over 30 years (Pinheiro *et al.* 1985; Pinheiro & Maurity 1988; Maurity & Kotschoubey 1995; Atzingen & Crescêncio 1999; Cunha Jr. et al. 2007; Piló & Auler 2009; Prous *et al.* 2011; Jaffé *et al.* 2016; Jaffé *et al.* 2018). This area is considered one of the regions with the highest concentration of iron caves in Brazil, and one of the most important ferruginous areas in the country (Piló & Auler 2009).

In this paper we describe a new genus of Prodidomidae, *Paracymbiomma* **gen. nov.** to include six new species, all from Brazil, including three species collected exclusively in caves. The new genus is included in Theuminae by having the sternum strongly protruding between coxae IV with numerous long and erect setae, and by the vulva with highly convoluted ducts. Furthermore, the genus has a classic claw tuft clasper, a structure shared by Neotropical prodidomids (Azevedo *et al.* 2018), that resembles several closely spaced teeth and is probably used to move the tenent setae of the claw tuft (Ramirez 2014; Azevedo *et al.* 2018).

In addition to the descriptions, all species of *Paracymbiomma* **gen. nov.,** the cavernicolous species *B. enigmatica, L. gertschi*, *L. ybyguara* and the epigean species *L. gasnieri* Brescovit & Höfer, 1993, *L. taruma* Brescovit & Bonaldo, 1998, *L. volcan* Platnick & Shadab, 1981 and *L. tuxtla* Platnick, 1978 were evaluated for their adaptations and specializations to the subterranean environment, in order to determine if the cavernicolous species of *Paracymbiomma* **gen. nov.** can be considered troglobites.

Material and methods

The examined material is deposited in the collection of the Instituto Butantan, São Paulo (IBSP, curator: A. D. Brescovit). Morphological observations and illustrations were made under a Leica MZ165C stereomicroscope with a camera lucida. Format of descriptions follow Platnick & Baehr (2006) with modifications (all leg measurements and spine arrangements were included) and terminology follows Platnick & Shadab (1976) and Ramirez (2014). Only characters differing from the generic pattern are mentioned in the species description. The number and arrangement of spines are expressed according to Petrunkevitch (1925). Leg measurements are listed as: total length (femur, patella, tibia, metatarsus, tarsus). Positions of embolar insertion are given according to clock positions, based on the left palp in ventral view. Pictures were taken using a DFC295 camera mounted on a Leica M205A stereomicroscope. Extended focal range images were composed with Leica Application Suite, version 2.5.0. Scanning electron micrographs (SEM) were taken with a FEI Quanta 250 scanning electron microscope from the Laboratório de Biologia Celular at the Instituto Butantan. Material used for SEM was dehydrated through a series of graded ethanol (80% to 100%), dried by critical-point drying method, mounted on metal stubs and sputter coated with gold. Distribution maps were elaborated using the Geographic Information System (GIS) software program Quantum Gis version 2.8.2. Geographical coordinates of collection localities were obtained from the labels (and are given in parentheses) or georeferenced approximately using Google Earth (and are given in square brackets). Abbreviations used throughout the text follow Ramirez (2014): **A**—Atrium; **Ac**—aciniform gland spigot; **ALE**—Anterior lateral eye; **ALS**—Anterior lateral spinnerets; **AME**—Anterior median eye; **C**—Conductor; **CD**—Copulatory duct; **Cy**—cylindrical gland spigot; **d**—Dorsal; **E**—Embolus; **FD**—Fertilization duct; **lp**—Loop; **MA**—Median apophysis; **MaAm**—major ampullate gland spigot**; MiAm**—minor ampullate gland spigot; **p**—Prolateral; **Pcb**—Paracymbium; **PEs**— promarginal escort seta; **Pi**—piriform gland spigot; **PIn**—Postepigastric invaginations; **PLE**—Posterior lateral eye; **PLS**—Posterior lateral spinnerets; **PME**—Posterior median eye; **PMS**—Posterior median spinnerets; **r**—Retrolateral; **SS**—Secondary spermathecae; **Rk**—promarginal rake seta; **RTA**—Retrolateral tibial apophysis; **T**—Tegulum; **v**—Ventral; **Wh**—cheliceral whisker seta.

To test if cavernicolous species of *Paracybiomma* **gen. nov**. can be considered troglobites, we used a comparative method between all species of *Paracymbiomma* **gen. nov.** and species of other genera of Theuminae, including four epigean species (*L. gasnieri*, *L. taruma, L. volcan* and *L. tuxtla*), one non-troglobite cavernicolous species (*B. enigmatica*) and two troglobites species (*L. gertschi* and *L. ybyguara*). The status of the epigean species and of *L. gertschi* were based only on original descriptions and data labels, while the status of *B. enigmatica* was based on Trajano & Carvalho (2017) and *L. ybyguara* on Gallão & Bichuette (2018). In addition to the presence or absence of characteristics commonly associated to troglobite species, such as lack or reduction of eyes, depigmentation and restricted distribution, we evaluate appendage elongation in these species. For this, we compared the proportion of leg IV length/carapace length of males to determine which species could be considered troglobites. Leg IV was used because it is the longest appendage among the analyzed species. Only males were used because the females of some species are unknown. Measurements of all species were taken directly from the holotypes. The graph was prepared using PAST 3.20 software package.

Taxonomy

Paracymbiomma gen. nov.

Etymology. The generic name is a contraction of paracymbium and *Lygromma*, since the paracymbium is one of the diagnostic structures of the genus. Gender is neuter.

Type species. *Paracymbiomma angelim* (original designation).

Diagnosis. Species of *Paracymbiomma* **gen.nov**. are distinguished from those of other Prodidomidae genera by the combination of the following characters: male palp with paracymbium and RTA single (Figs 45, 54, 61), embolus long and filiform with curved tip (Figs 43, 47, 49, 61), conductor sclerotized (Figs 53, 55, 57) and median apophysis membranous with sclerotized tip (Figs 53, 49, 61, 69–74); female epigyne with posteromedian atrium and sclerotized margins (Figs. 51, 59, 63, 67), vulva with copulatory ducts long, strongly convoluted laterally with proximal part (closest to copulatory openings) translucent (Figs 52, 68); secondary spermathecae elongated (Figs 60, 64).

Description. Total length males 1.86–3.9 and females 2.25–4.15. Carapace and legs pale yellow, and abdomen weakly pigmented. Carapace longer than wide, narrower at cephalic region (Fig. 7). Fovea present as a narrow dark longitudinal line on posterior half of carapace (Figs 1–7). Eyes variable in number and size (Figs 13–18). Chilum present, entire (Fig. 8). Chelicerae relatively long (0.27–0.9) with a convex boss (Fig. 8); promargin with 1–4 teeth, retromargin with 3–6 teeth; one large promarginal escort setae at base of fang (Fig. 31); comb of whisker setae at cheliceral promargin near the base of fang on all females collected in caves (Fig. 20). Endites slightly convergent anteriorly (Fig. 9), with dense scopulae on internal margin; serrula present in single row (Fig. 21); labium longer than wide (Fig. 9). Sternum shield shaped, anteriorly straight, longer than wide, rebordered anteriorly and laterally; posterior region strongly protruding between coxae IV with numerous long and erect setae (Figs 10, 22, 33); precoxal triangles present (Fig. 10). Pedicel with ventral sclerite triangular. Leg formula 4123. Spination variable. All tarsi scopulate (Figs 23, 25). Trichobothria present on dorsal tibia, metatarsi and tarsi, arranged in two rows on tarsi (Fig. 25) and one on metatarsi (Fig. 34); bothrium with 5–9 deep ridges (Fig. 26). Tarsal organ capsulate with oval opening, located dorsally on tarsi. Two pectinate claws; tarsi I–II with long toothed claws, with 6–13 teeth (Figs. 27, 35) tarsi III–IV with short toothed claws, with 3–4 teeth (Fig. 36). Claw tufts composed of slightly widened tenent setae (Fig. 27); presence of classic claw tuft clasper (Figs 27, 35, 36) Abdomen oval, longer than wide, covered with sheet-shaped translucent scales (Figs 29, 30); sparse tactile hairs with several barbs present; dorsum of abdomen anteriorly with long, dark, posteriorly curved setae; postepigastric invaginations present (Figs 12, 37). Six spinnerets (Figs 11, 38, 39); ALS elongated (0.6–0.13), separated from each other by one diameter or more (Fig. 11), piriform gland spigots elongated with few associated setae (Fig. 40), male with one major ampullate gland spigot (Fig. 40) and female with two; PLS and PMS conical and short (Figs. 41, 42), PLS larger than PMS (Figs 11, 38); PLS in male with one minor ampular gland spigot and four aciniform gland spigots (Fig. 41), females apparently with one minor ampular gland spigot, five aciniform gland spigots and two cylindrical gland spigots; PMS in male with one minor ampular gland spigot and two aciniform gland spigots, females apparently with one minor ampular gland spigot, four aciniform gland spigots and two cylindrical gland spigots (Fig. 42). Female pedipalp with one pectinate claw with 6–8 teeth (Fig. 28). Male palp: tibia generally short, except in *P. caecus* **sp. nov.**, in which it is more elongated (Figs 65, 66, 74), RTA single, directed apically (Figs 54, 56); cymbium oval with apical scopula (Figs 62, 66), paracymbium present (Figs 43, 45, 54, 61); bulb rounded (Figs 53, 55, 69–72) or ovoid (Figs 61, 65, 73, 74); embolus long with curved tip and wide base, inserted between 9–12 o'clock position (Figs 55, 71), or 3 o'clock position (Figs 61, 74); conductor sclerotized, with curved tip, inserted prolaterally (Figs 47, 55, 70); median apopohysis inserted distally and with sclerotized tip(Figs 69–74). Epigyne: posterior margin of epigynal plate anteriorly curved (Figs 51, 67) or truncate (Fig. 59); conspicuous posteromedian atrium with well-defined margins (Figs 59, 63). Vulva: secondary spermathecae elongated (Figs 60, 64); fertilization ducts antero-lateral.

Distribution. Brazil: states of Pará (exclusively in ferruginous caves), Paraíba, Pernambuco, Bahia and São Paulo (Fig. 75).

Composition. Six species: *Paracymbiomma angelim* **sp. nov.;** *P. doisirmaos* **sp. nov.;** *P. pauferrense* **sp. nov.;** *P. carajas* **sp. nov.;** *P. bocaina* **sp. nov.;** *P. caecus* **sp. nov.** (Figs 1–6).

***Paracymbiomma angelim* sp. nov.**

Figs 1, 7, 8, 16, 31–45, 49–52, 71, 75

Type material. Male holotype from Brazil, São Paulo, Ubatuba (Fazenda Angelim), [23°24'5.55"S 45°3'51.26"W], 23–29 July 2001, C.A. Rheims *et. al.* leg., deposited in IBSP 211321. Paratypes with same data as holotype: 1 male (IBSP 211322), 1 male (IBSP 211320) and 1 female (IBSP 211323).

Etymology. The specific name is a noun in apposition and refers to the type locality.

Diagnosis. Males of *P. angelim* **sp. nov.** resemble those of *P. doisirmaos* **sp. nov.** and *P. bocaina* **sp. nov.** in having six eyes (Figs 14–16). They differ from *P. bocaina* **sp. nov.** in having PME completely formed and male palps with rounded tegulum (ovoid in *P. bocaina* **sp. nov.**), and from *P. doisirmaos* **sp. nov.** in having male palps with median apophysis hook-shaped (large and twisted at base in *P. doisirmaos* **sp. nov.**) and RTA with robust base and constricted tip (triangular, without constriction in *P. doisirmaos* **sp. nov.**) (Figs 49, 50); females are distinguished from those of the other known species of the genus by the epigyne with posterior margin of atrium semicircular forming a hood (Figs 51, 52).

Description. Male (holotype). Total length: 1.86. Carapace 0.80 long, 0.62 wide; abdomen 0.91 long, 0.55 wide; sternum 0.53 long, 0.47 wide; spinnerets ALS 0.21 long, 0.075 wide. Six eyes arranged in two triads. AME absent. Eye diameters and interdistances: ALE 0.048; PLE 0.035; PME 0.032; ALE–ALE 0.032; PLE–ALE contiguous; PME–ALE contiguous; PME–PLE 0.024; PME–PME 0.032. Chelicerae 0.27 long; 6 retromarginal teeth and 4 promarginal teeth. Leg formula 4123; measurements: I: 2.12 (0.58, 0.34, 0.47, 0.39, 0.34); II: 1.97 (0.56, 0.31, 0.41, 0.35, 0.34); III: 1.75 (0.35, 0.32, 0.34, 0.25, 0.49); IV: 2.36 (0.62, 0.32, 0.50, 0.48, 0.44). Leg spination: I – femur d1-1-0, p0-0-1; tibia v2-2-0; metatarsus v0-2-0.II – femur d1-1-0; tibia v1-1-0; metatarsus v0-1-0.III – femur d1-1-0; tibia d1p-1-0, p0-0-1, r0-0-1, v0-2-2; metatarsus p0-1-1, v0-2-3. IV – femur d1-1-1p; tibia d1-2-0, p0-1-1, r0-0-1, v1-2-2; metatarsus d0-1r-0,p1-0-1, r0-0-1, v0-1p-2. Palp: femur with two dorsal spines, one median and one posterior; embolar insertion between 9–12 o'clock position, near median apophysis (Figs 49, 50).

Female: (paratype). Total length: 2.25. Carapace 0.82 long, 0.65 wide; abdomen 1.12 long, 0.75 wide; sternum 0.57 long, 0.5 wide; spinnerets ALS 0.13 long, 0.083 wide. Six eyes arranged in two triads. AME absent. Eye diameters and interdistances: ALE 0.055; PLE 0.03; PME 0.03; ALE–ALE 0.04; PLE–ALE 0.01; PME–ALE 0.01; PME–PLE 0.02; PME–PME 0.032. Chelicerae 0.27 long; 6 retromarginal teeth and 3 promarginal teeth. Leg measurements: I: 2.13 (0.62, 0.35, 0.43, 0.38, 0.32; II: 2.01 (0.56, 0.34, 0.41, 0.38, 0.33); IV: 2.41 (0.68, 0.33, 0.50, 0.46, 0.44). Leg spination: I – femur d1-1-0, p0-0-1; tibia v2-2-0; metatarsus v0-1p-0. II – femur d1-1-0; tibia v1r-1r-0; metatarsus v0-1r-0. IV – femur d1-1-0; tibia d1-1-0, p0-1-1, r0-1-1, v1r-2-2; metatarsus p0-1-0, r0-1-0, v0-1r-2. Epigyne: posterior margin of epigynal plate anteriorly curved; copulatory duct visible ventrally as an anterior lateral S-shape (Fig. 51). Vulva: copulatory duct narrow throughout its entire length, with distal part of translucent duct with one loop; thin secondary spermathecae and distal part poorly defined (Fig. 52).

Variation. Total length (2 males): 1.86–1.87.

Distribution. São Paulo, Brazil (Fig. 75).

Other material examined. None.

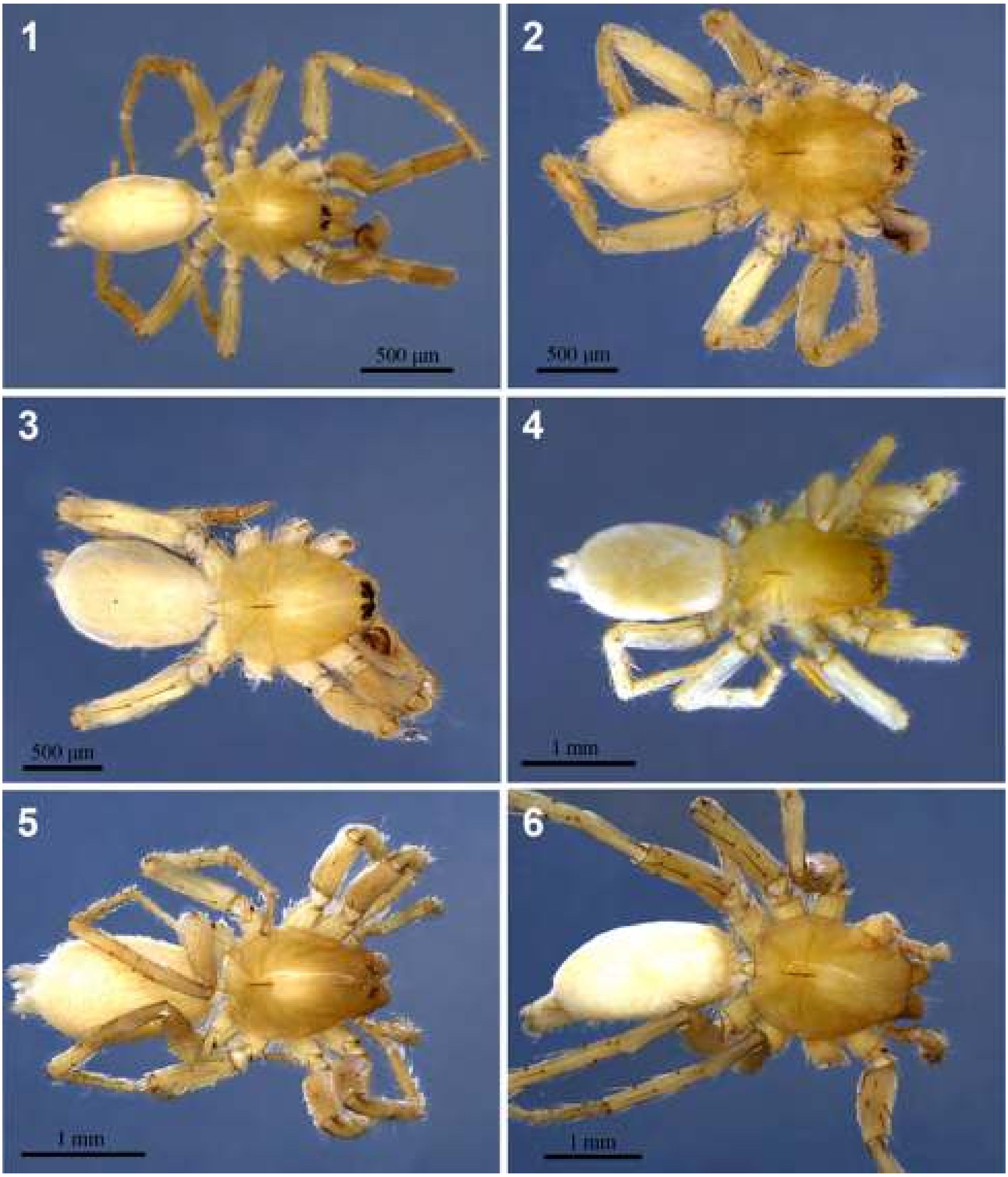
***Paracymbiomma doisirmaos* sp. nov.**

Figs 2, 15, 53, 54, 69, 75

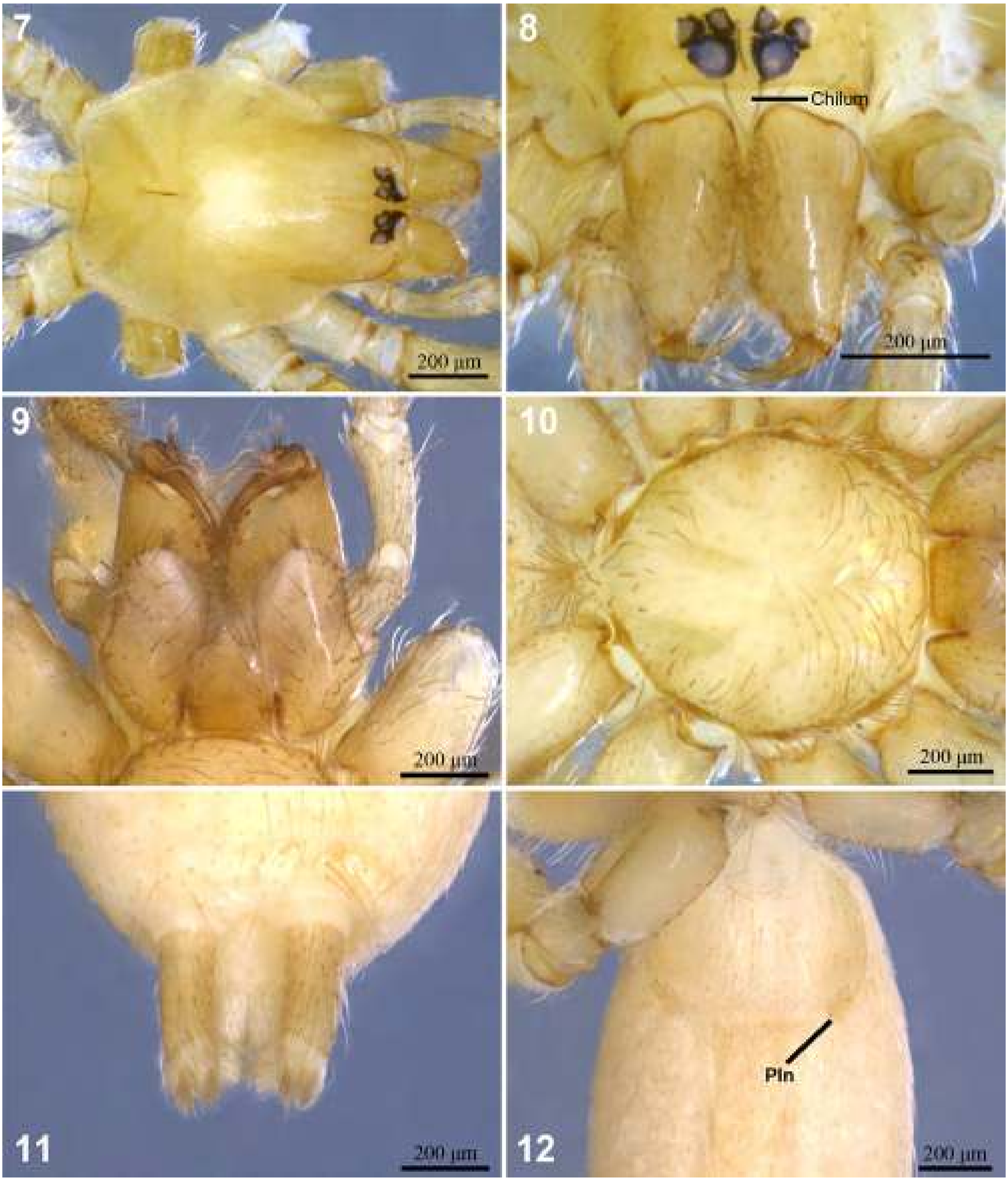
Type material. Male holotype from Brazil, Pernambuco, Recife (Horto Dois Irmãos), [08°03'00"S 34°59'17"W], 30 May–02 June 2001, Equipe Biota leg., deposited in IBSP 68673. Paratypes with same data as holotype: 2 males (IBSP 219463), 1 male (IBSP 68674) and 1 male (IBSP 68674).

Etymology. The specific name is a noun in apposition and refers to the type locality.

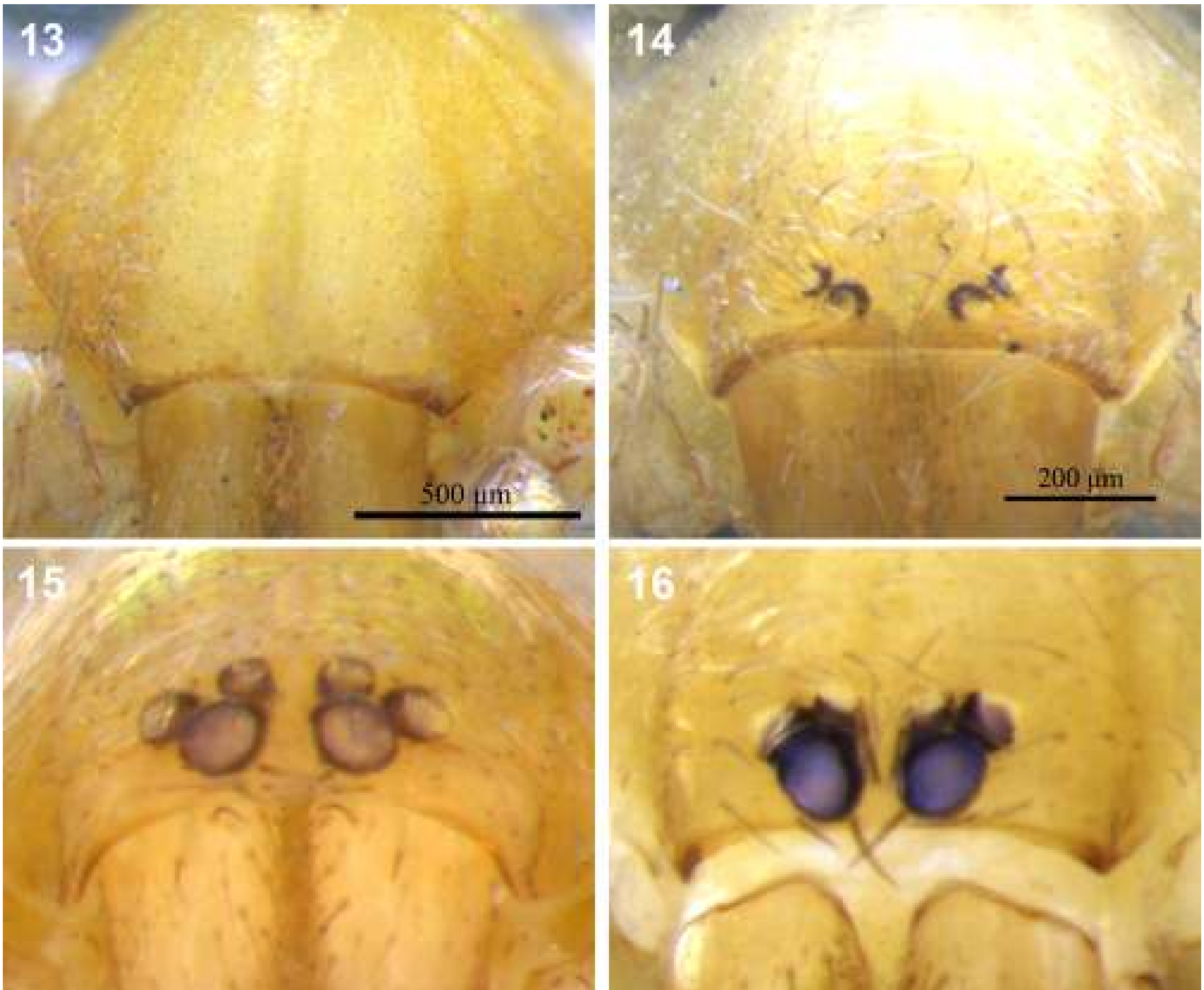
Diagnosis. Males of *P. doisirmaos* **sp.nov.** resemble those of *P. angelim* **sp. nov.** and *P. bocaina* **sp. nov.** in having six eyes (Figs 14–16). They differ from *P. bocaina* **sp. nov.** in having PME completely formed and male palp with rounded tegulum (ovoid in *P. bocaina* **sp. nov.**), and from *P. angelim* **sp. nov.** in having male palp with median apophysis large and twisted at base (hook-shaped in *P. angelim* **sp. nov.**) and triangular RTA without constricted tip (RTA with robust base and constricted tip in *P. angelim* **sp. nov.**) (Figs 53, 54).



FIGURES 1–6. *Paracymbiomma* **gen. nov.**, habitus, dorsal view: 1 *P. angelim* **sp. nov.**, male; 2 *P. doisirmaos* **sp. nov.**, male; 3 *P. pauferrense* **sp. nov.**, male; 4 *P. carajas* **sp. nov.**, female; 5 *P. bocaina* **sp. nov.**, female; 6 *P. caecus* **sp. nov.**, male.



FIGURES 7–12. *Paracymbioma* **gen. nov.**: 7–8 *P. angelim* sp. nov., female: 7 carapace, dorsal view; 8 chelicerae, dorsal view; 9–11 *P. carajas* **sp. nov.:** 9 mouthparts, ventral view; 10 sternum, ventral view; 11 spinnerets. 12 *P. bocaina* **sp. nov.,** male, postepigastric invaginations (PIn).



FIGURES 13–18. Eyes, frontal view: 13 *P. caecus* **sp. nov.,** male; 14 *P. bocaina* **sp. nov.**, female; 15 *P. doisirmaos* **sp. nov.,** male; 16 *P. angelim* **sp. nov.,** male; 17 *P. pauferrense* **sp. nov.,** male; 18 *P. carajas* **sp. nov.,** male.

Description. Male (holotype). Total length: 2.3. Carapace 0.97 long, 0.85 wide; abdomen 1.12 long, 0.7 wide; sternum 0.65 long, 0.55 wide; spinnerets 0.23 long, 0.09 wide. Six eyes arranged in two triads. AME absent. Eye diameters and interdistances: ALE 0.062; PLE 0.05; PME 0.041; ALE–ALE 0.058; PLE–ALE 0.020; PME–ALE 0.016; PME–PLE 0.033; PME–PME 0.062. Chelicerae 0.38 long; one retromarginal tooth and four promarginal teeth. Leg formula 4123; measurements: I: 2.89 (0.86, 0.45, 0.64, 0.5, 0.44); II: 2.7 (0.76, 0.44, 0.58, 0.48, 0.44); III: 2.28 (0.65, 0.32, 0.45, 0.42, 0.44); IV: 3.21 (0.86, 0.42, 0.70, 0.68, 0.55). Leg spination: I – femur d1-1-0, p0-0-1; tibia v2-2-0; metatarsus v2-0-0. II – femur d1-1-0; tibia v0-1r-1r; metatarsus v2-0-0. III – femur d1-1-0, p0-0-1; tibia d0-1-0, p0-1-1, r0-1-1, v0-2-2; metatarsus p0-1-1, r0-1-0, v2-0-3. IV – femur d1-1-2; tibia d0-1-0, p1-0-1, r0-1-1, v1p-2-2; metatarsus d0-1r-0, p1-0-1, r3-0-0, v1p-3-3. Palp: femur with three spines, two dorsal and one prolateral; median apophysis large and twisted at base, retrolaterally directed; embolar insertion between 9-12 o'clock position (Figs 53, 54).

Female: Unknown.

Variation. Total length (3 males): total 2.0–2.3.

Distribution. Pernambuco, Brazil (Fig. 75).

Other material examined. None.

Paracymbiomma pauferrense sp. nov.

Figs 3, 17, 55, 56, 70, 75

Type material. Male holotype from Brazil, Paraíba, Areia (Reserva da Mata do Pau-Ferro), (06°57'S 35°44'W), 26–29 September 1999, A.D. Brescovit *et.al.* leg., deposited in IBSP 67179.

Etymology. The specific name is an adjective and refers to the type locality (Reserva da Mata do Pau-Ferro).

Diagnosis. Males of *P. pauferrense* **sp. nov.** resemble those of *P. carajas* **sp. nov.** in having eight eyes (Figs 17, 18), but differ by the male palp with embolar insertion far from median apophysis and closer to tegulum center (embolar insertion at 12 o'clock position and close to median apophysis in *P. carajas* **sp. nov.**) and RTA with distal part distant from cymbium (Figs 55, 56).

Description. Male (holotype). Total length: 2.3. Carapace 1.05 long, 0.82 wide; abdomen 1.15 long, 0.75 wide; sternum 0.68 long, 0.57 wide; spinnerets 0.22 long, 0.09 wide. Eight eyes arranged in two rows, the anterior row straight, the posterior procurved. Eye diameters and interdistances: AME 0.020; ALE 0.062; PLE 0.041; PME 0.041; AME–AME 0.016; AME–ALE 0.012; PLE–ALE 0.020; PME–PLE 0.037; PME–PME 0.062. Chelicerae 0.37 long; one retromarginal tooth and four promarginal teeth. Leg measurements: I: 2.96 (0.82, 0.48, 0.66, 0.54, 0.46); II: 2.7 (0.76, 0.42, 0.58, 0.48, 0.46); IV: 3.22 (0.88, 0.40, 0.74, 0.66, 0.54). Leg spination: I – femur d1-1-0, p0-0-1; tibia v2p-2-2; metatarsus v2-0-0. II – femur d1-1-0; tibia v1-1-0; metatarsus v2-0-0. IV – femur d1-1-1, p0-0-1, r0-0-1; tibia d1-1-0, p1-1-0, r1-1-0, v1p-2-2; metatarsus p2-0-0, r1-0-1, v2-1p-3. Palp: femur with two dorsal posterior spines; tegulum rounded; small median apophysis, retrolaterally directed; embolar insertion between 9-12 o'clock positions (Figs 55, 56).

Female: Unknown.

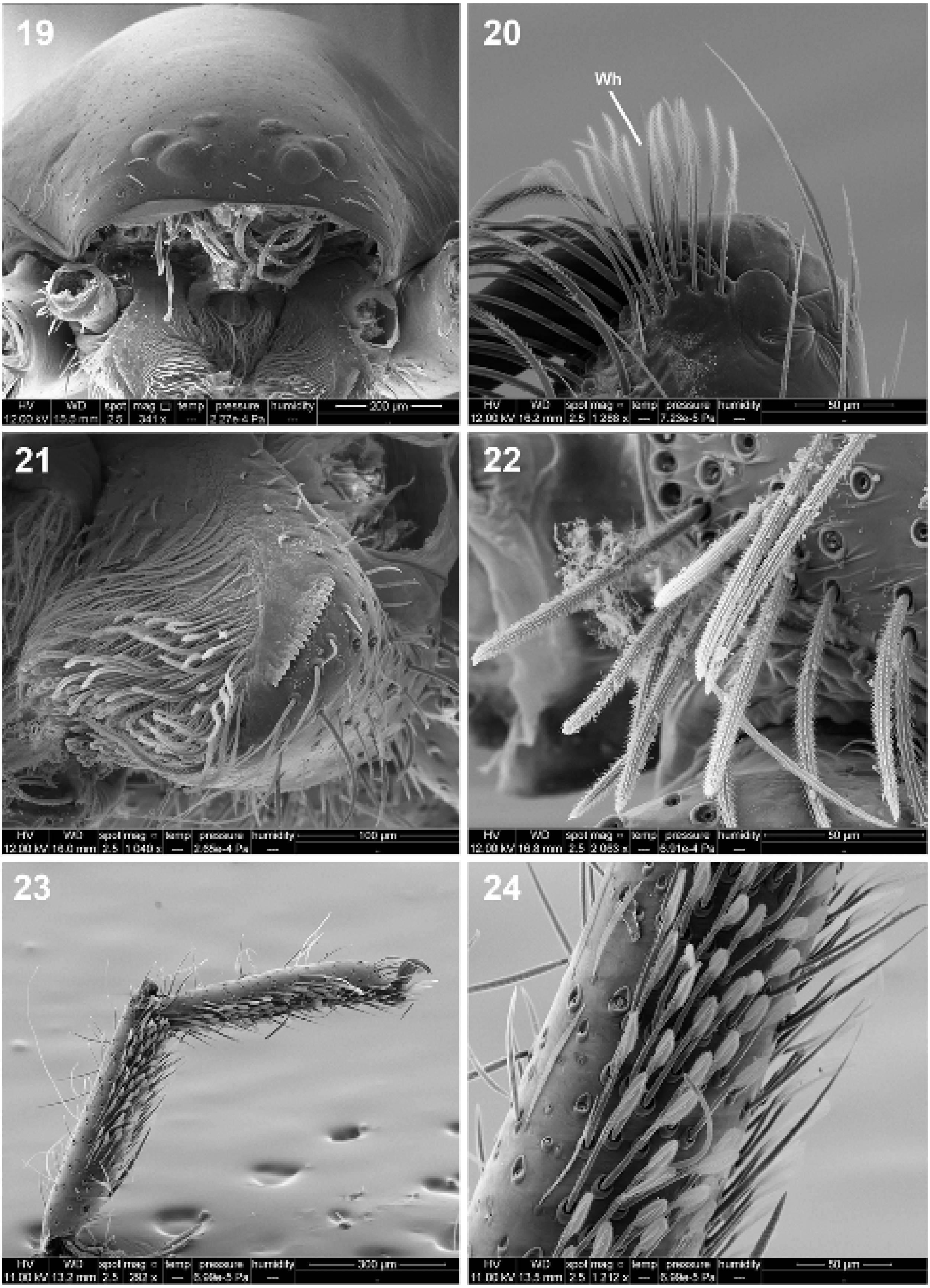
Distribution. Paraíba, Brazil (Fig. 75).

Other material examined. None.

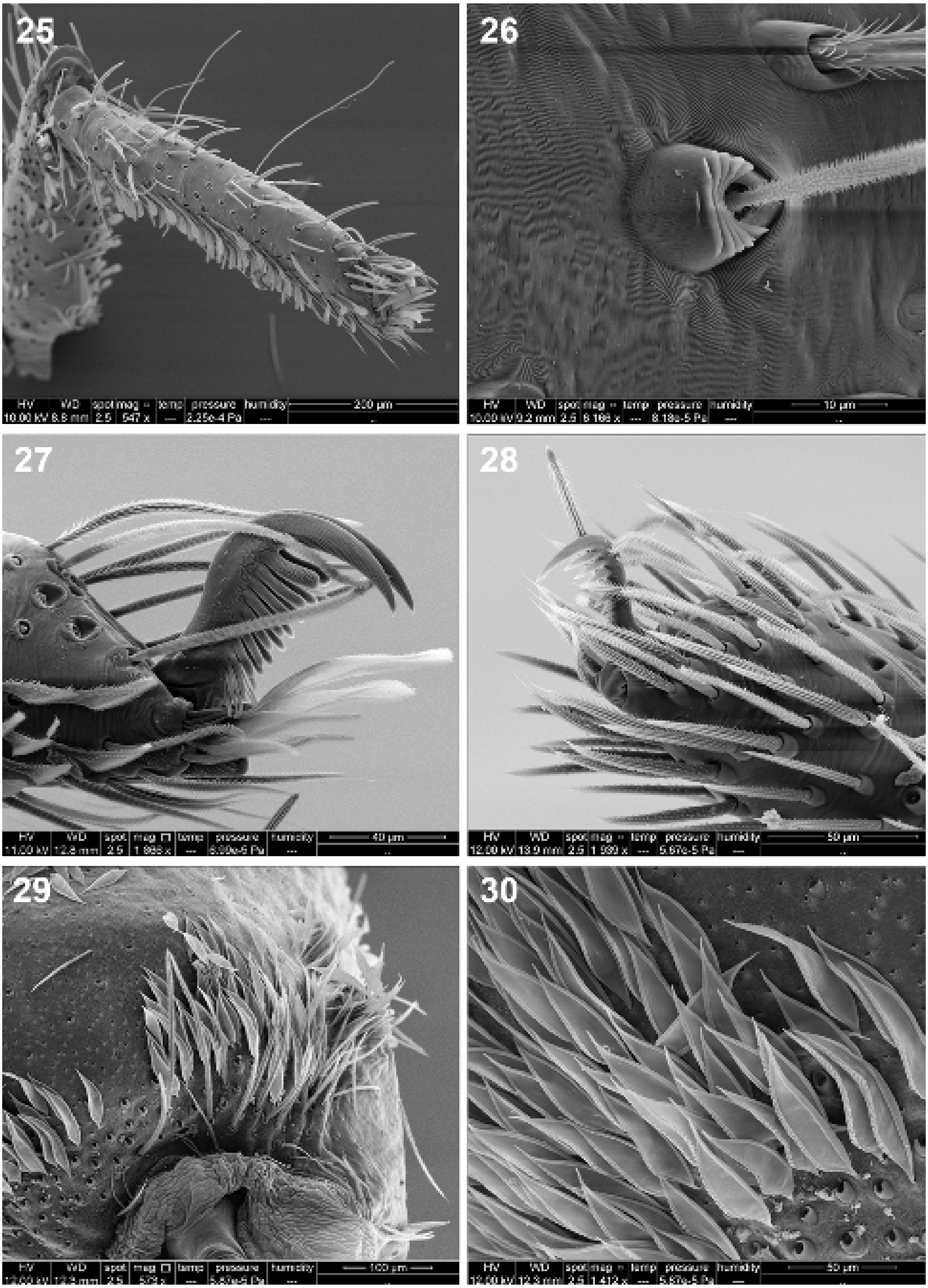
Paracymbiomma carajas sp. nov.

Figs 4, 9–11, 18–30, 46–48, 57–60, 72, 75, 80

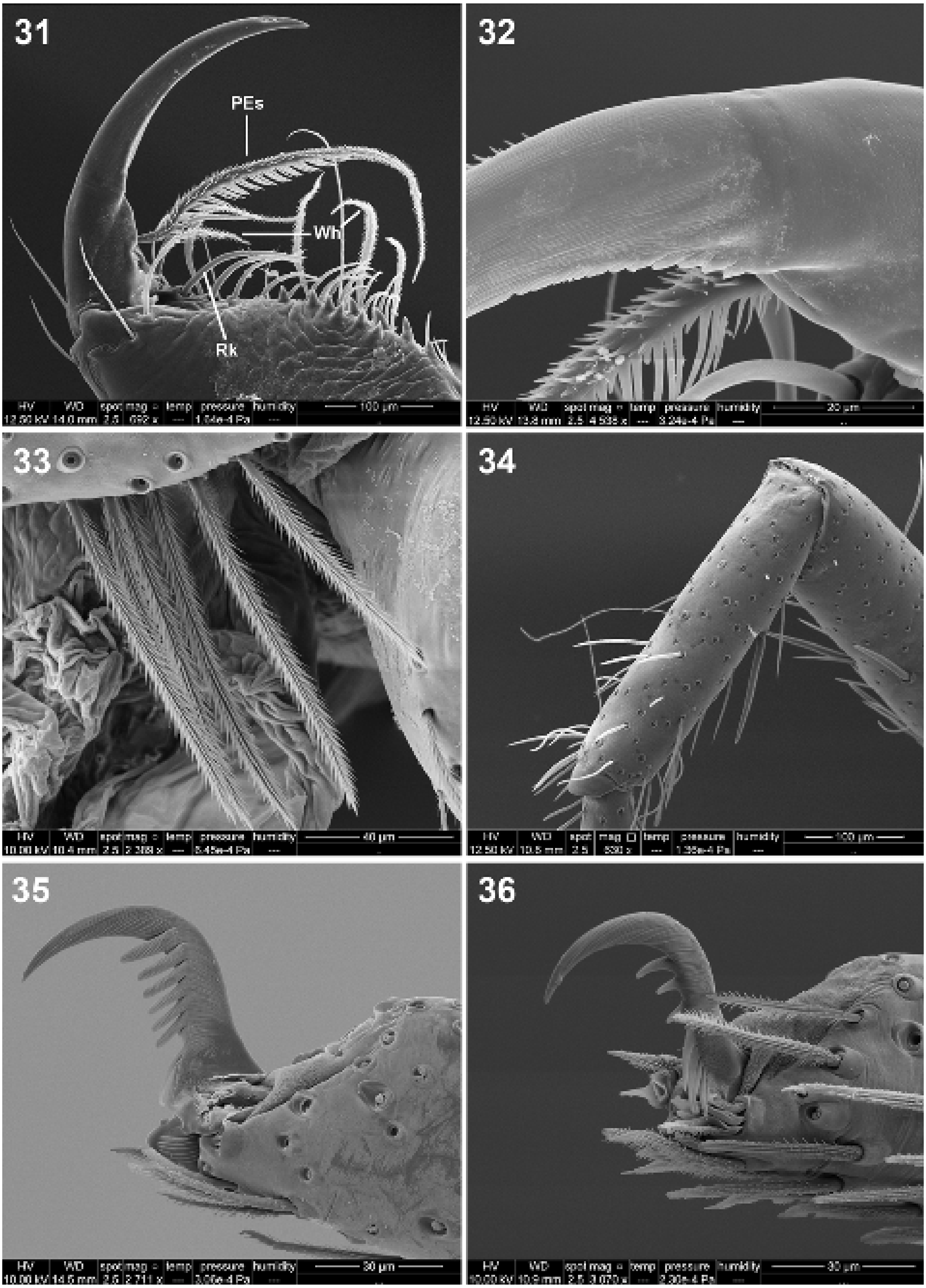
Type material. Male holotype from Brazil, Pará, Parauapebas (FLONA Carajás), Cave N5S-63/64/65, (06°06'12"S 50°08'07"W), 14 March–04 April 2010, I. Cizauskas *et al.* leg., deposited in IBSP 174162. Paratypes: 1 male from Brazil, Pará, Parauapebas (FLONA Carajás), Cave N3-0031, (06°02'37"S 50°13'09"W), 03–17 April 2013, Equipe Carst leg., (IBSP 183736); 1 female, Cave N4WS-61, (06°04'35"S 50°11'38"W), 18 November–01 December 2010, C.A.R. Souza *et al.* leg., (IBSP 183740); 1 female, Cave N5S-74, (06°06'02"S 50°08'05"W), 14 March–04 April 2010, I. Cizauskas et al. leg., (IBSP 174163); 1 female, Cave N3-0050, (06°02'38"S 50°13'10"W), 02–23 July 2013, Equipe Carst leg., (IBSP 183737).



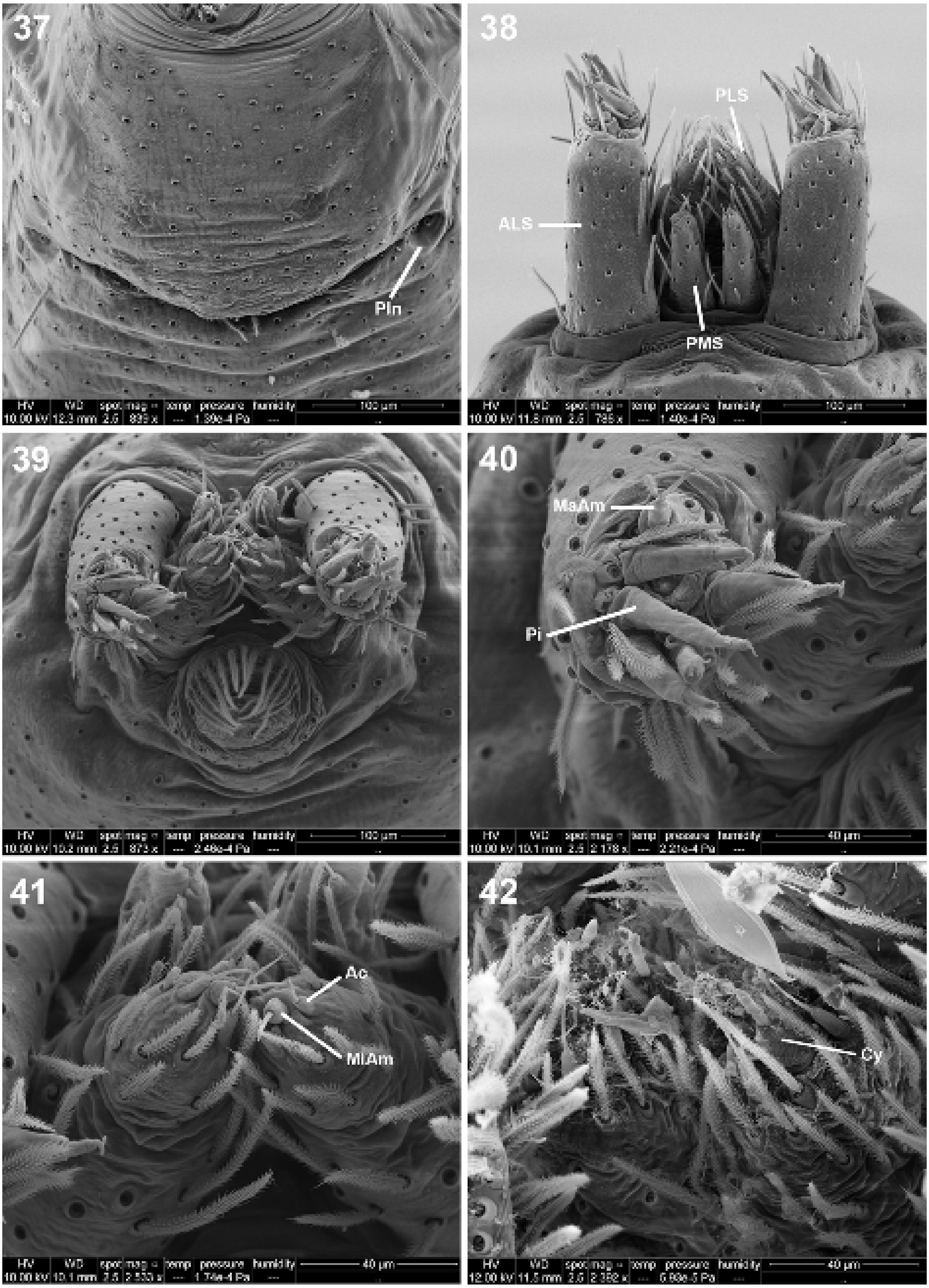
FIGURES 19–24. *P. carajas* **sp. nov.,** female: 19 Eyes, frontal view; 20 Whisker setae (Wh), cheliceral promargin; 21 Serrula, dorsal view; 22 Sternum, intercoxal setae; 23 Tarsus and metatarsus, prolateral view II; 24 Same, detail of metatarsus scopula.



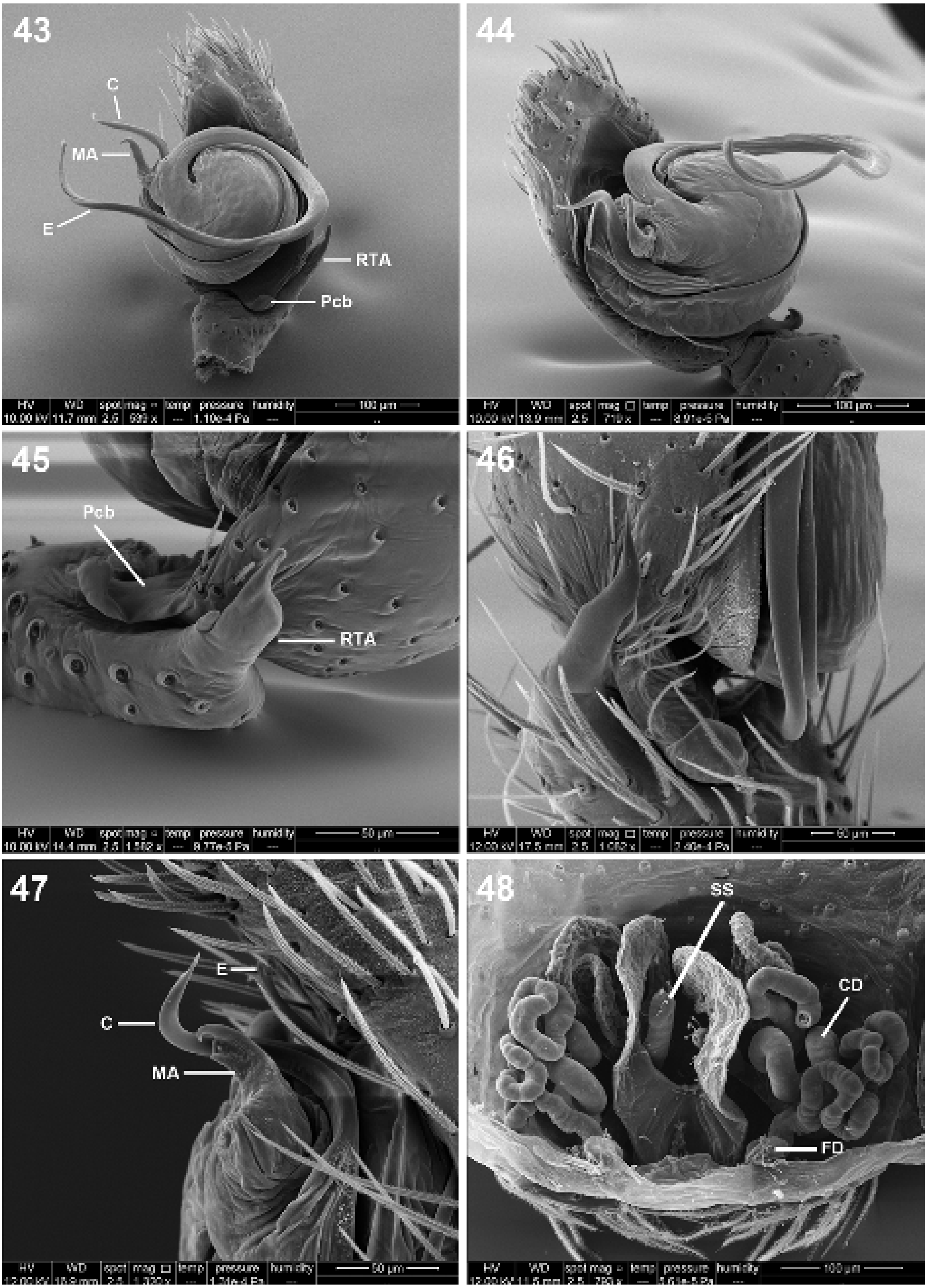
FIGURES 25–30. *P. carajas* **sp. nov.,** female: 25 Tarsus I, dorsal view; 26 Metatarsus IV, trichobothria; 27 Tarsus II, claws, prolateral view; 28 Pedipalp claw, prolateral view; 29 Abdomen, dorsal view; 30 Same, detail of sheet-shaped scales setae.



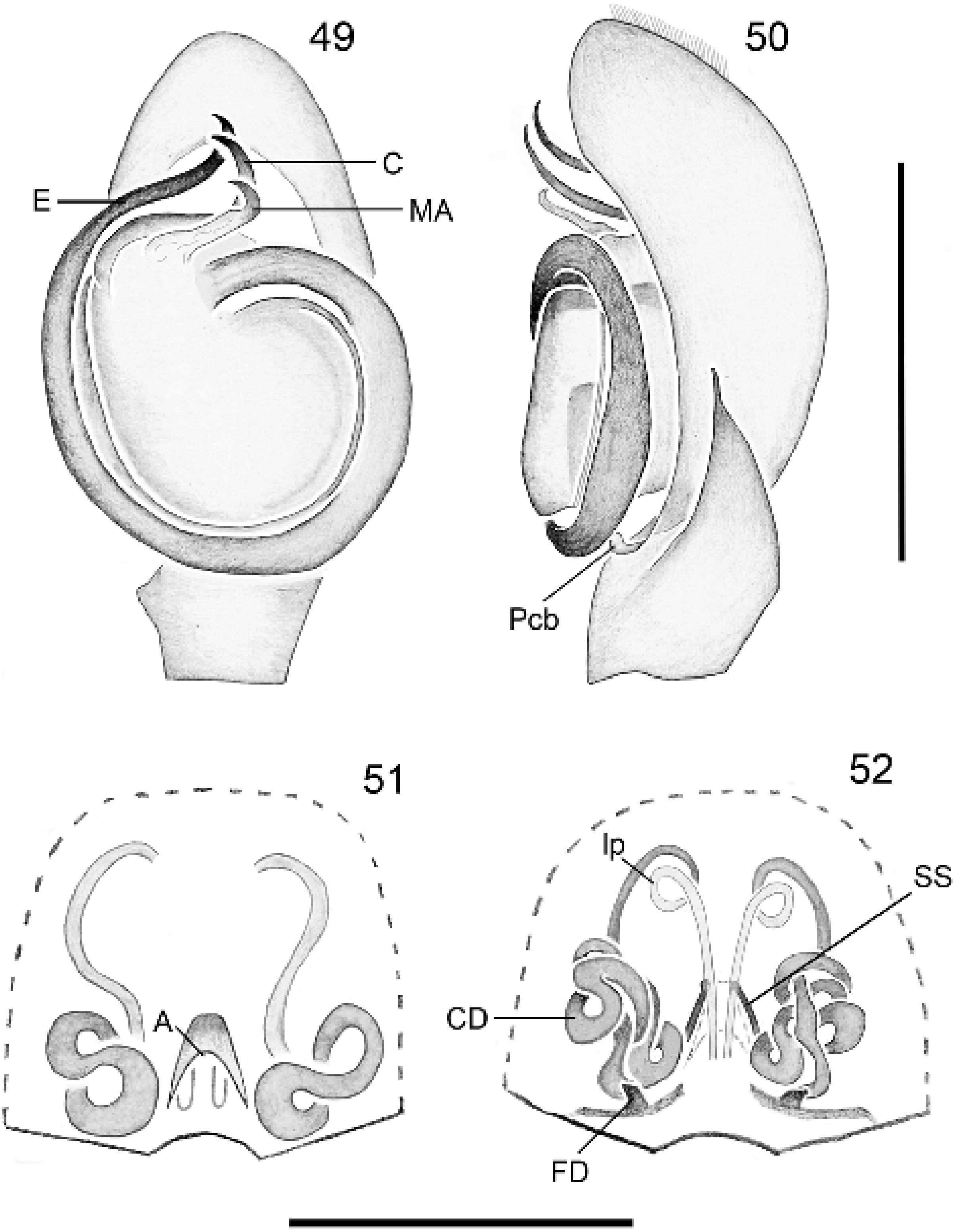
FIGURES 31–36. *P. angelim* **sp. nov.,** male: 31 Chelicerae, detail of teeth and promarginal escort setae, retromarginal view; 32 Fang shaft serrula, retrolateral view; 33 Sternum, intercoxal setae; 34 Metatarsus I, dorsal view; 35 Tarsus II, claw, prolateral view; 36 Tarsus IV, claw, prolateral view. PEs—promarginal escort seta; Rk—promarginal rake seta; Wh— cheliceral whisker seta.



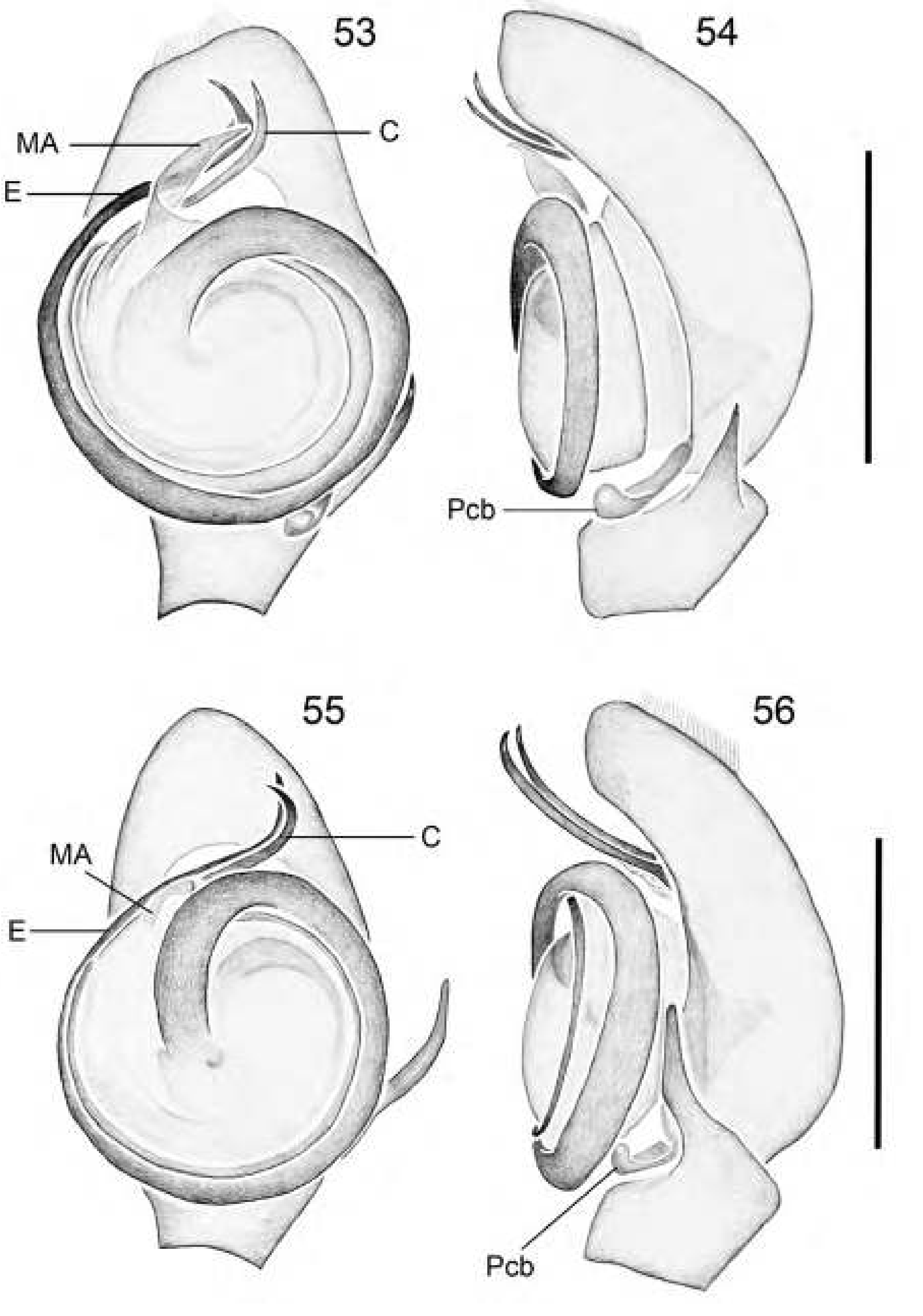
FIGURES 37–42. *P. angelim* **sp. nov.,** male: 37 Abdomen, detail of postepigastric invaginations (PIn), ventral view; 38 Spinnerets, ventral view; 39 Same, apical view; 40 Same, detail of ALS; 41 Same, detail PLS; 42 *P. carajas* **sp. nov.,** female: Detail PMS. Ac—aciniform gland spigot; Cy—cylindrical gland spigot; MaAm—major ampullate gland spigot**;** MiAm—minor ampullate gland spigot; Pi—piriform gland spigot**.**



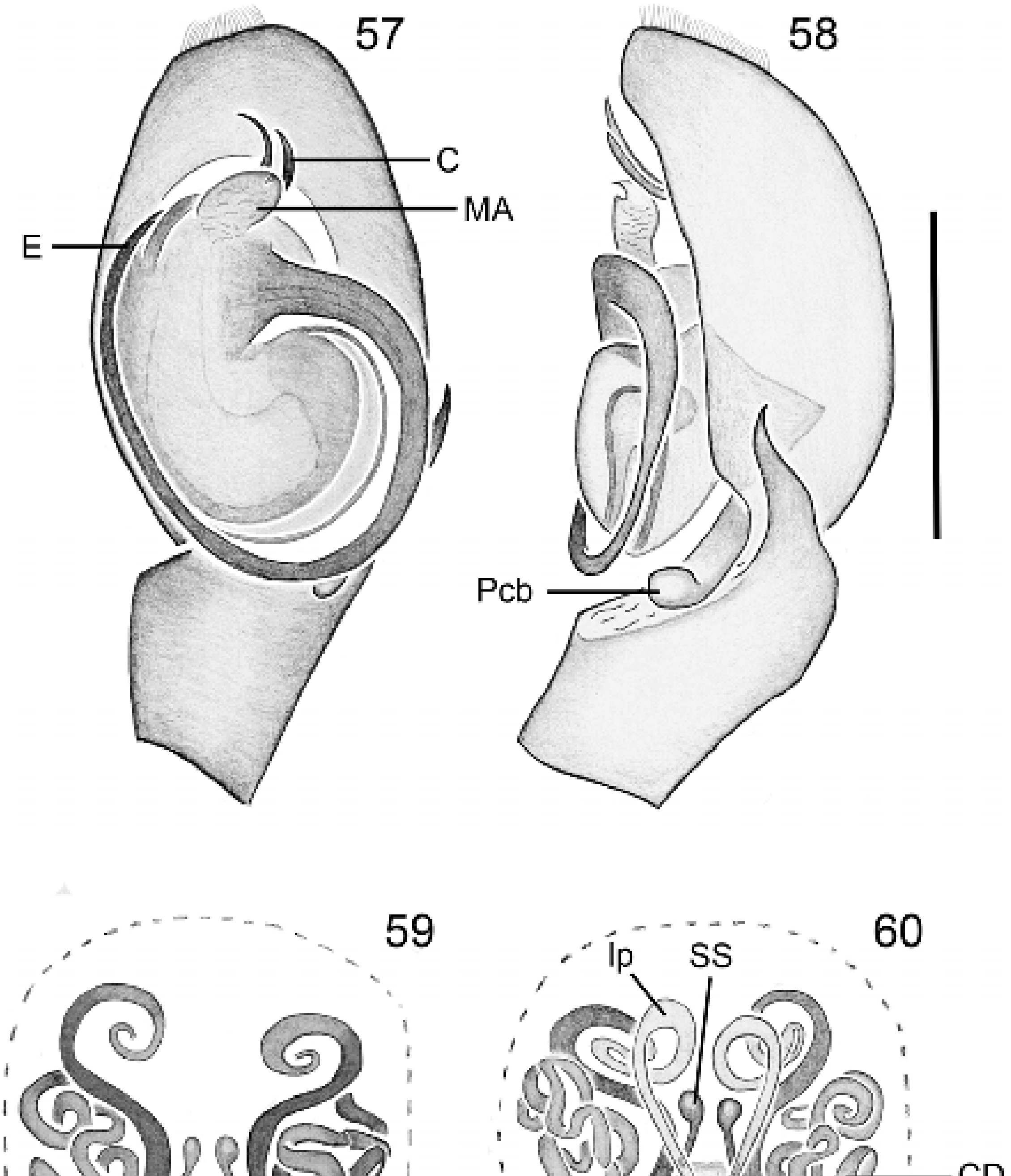
FIGURES 43–48. 43–45 *P. angelim* **sp. nov.,** male palp: 43 ventral view; 44 prolateral view; 45 detail of retrolateral tibial apophysis and paracymbium; 46–48 *P. carajas* **sp. nov.:** 46 Male, palp, detail of retrolateral tibial apophysis and paracymbium; 47 Same, detail of median apophysis and conductor; 48 female, epigynum, dorsal view. C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; MA—median apophysis; Pcb—paracymbium; RTA—retrolateral tibia apophysis; SS—secondary spermathecae.



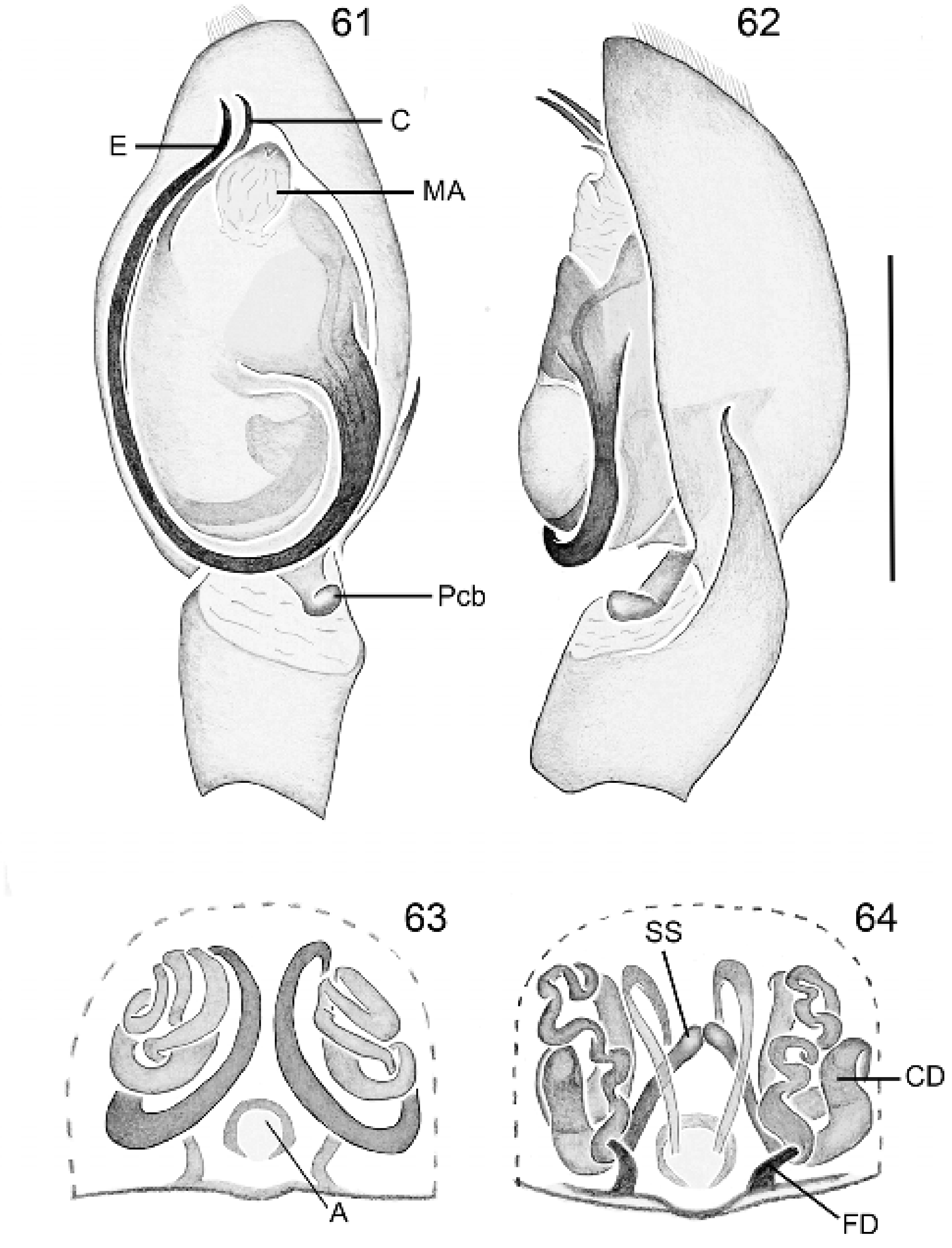
FIGURES 49–52. *P. angelim* **sp. nov.** 49–50 Male palp: 49 ventral view; 50 retrolateral view; 51–52 Female: 51 epigynum, ventral view; 52 vulva, dorsal view. C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; lp—loop; MA—median apophysis; Pcb—paracymbium; SS—secondary spermathecae. Scale bars: 0.25 mm.



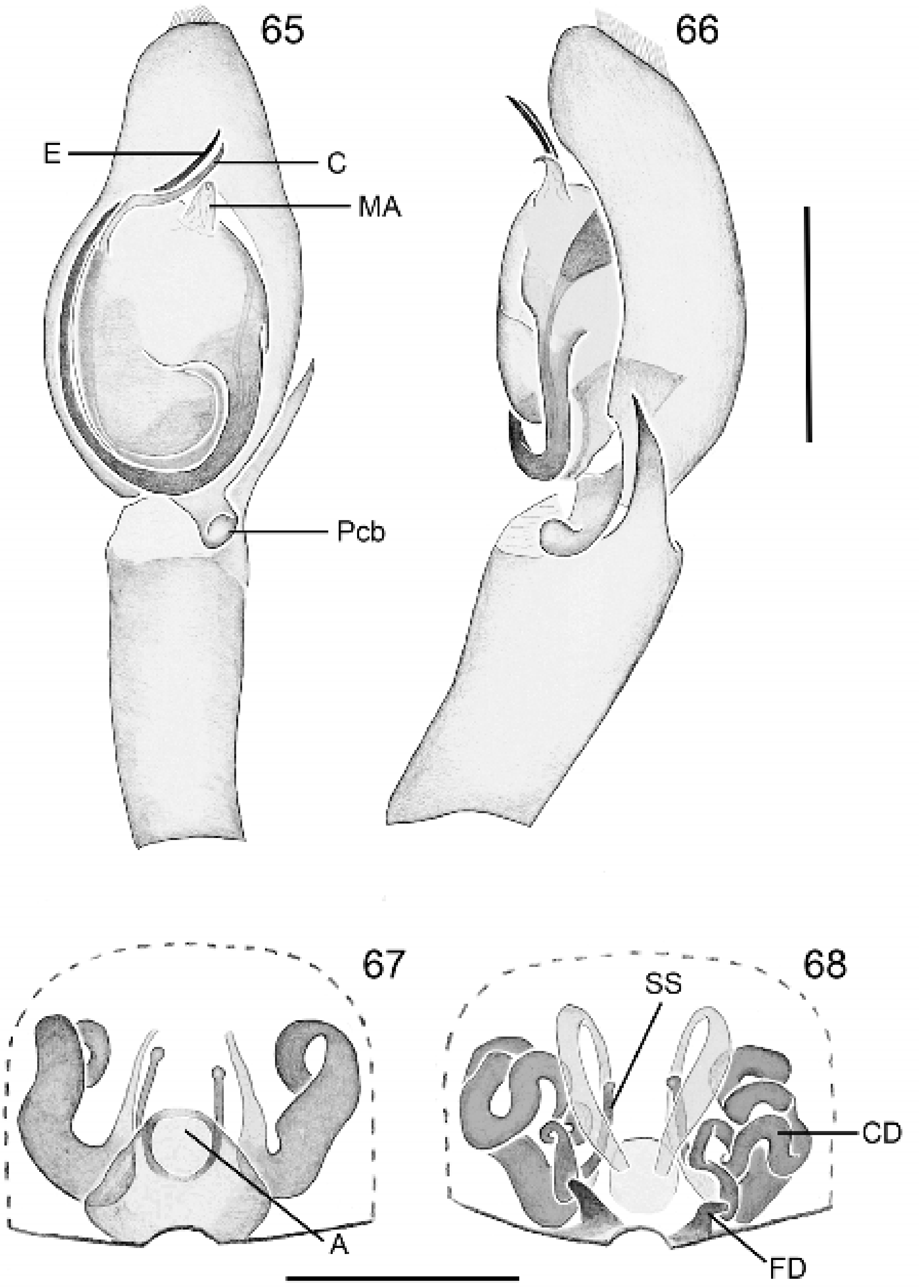
FIGURES 53–56. *P. doisirmaos* **sp. nov.** 53–54 Male palp: 53 ventral view; 54 retrolateral view. *P. pauferrense* **sp. nov.** 55–56 Male palp: 55 ventral view; 56 retrolateral view. C—conductor; E—embolus; MA—median apophysis; Pcb—paracymbium. Scale bars: 0.25 mm.



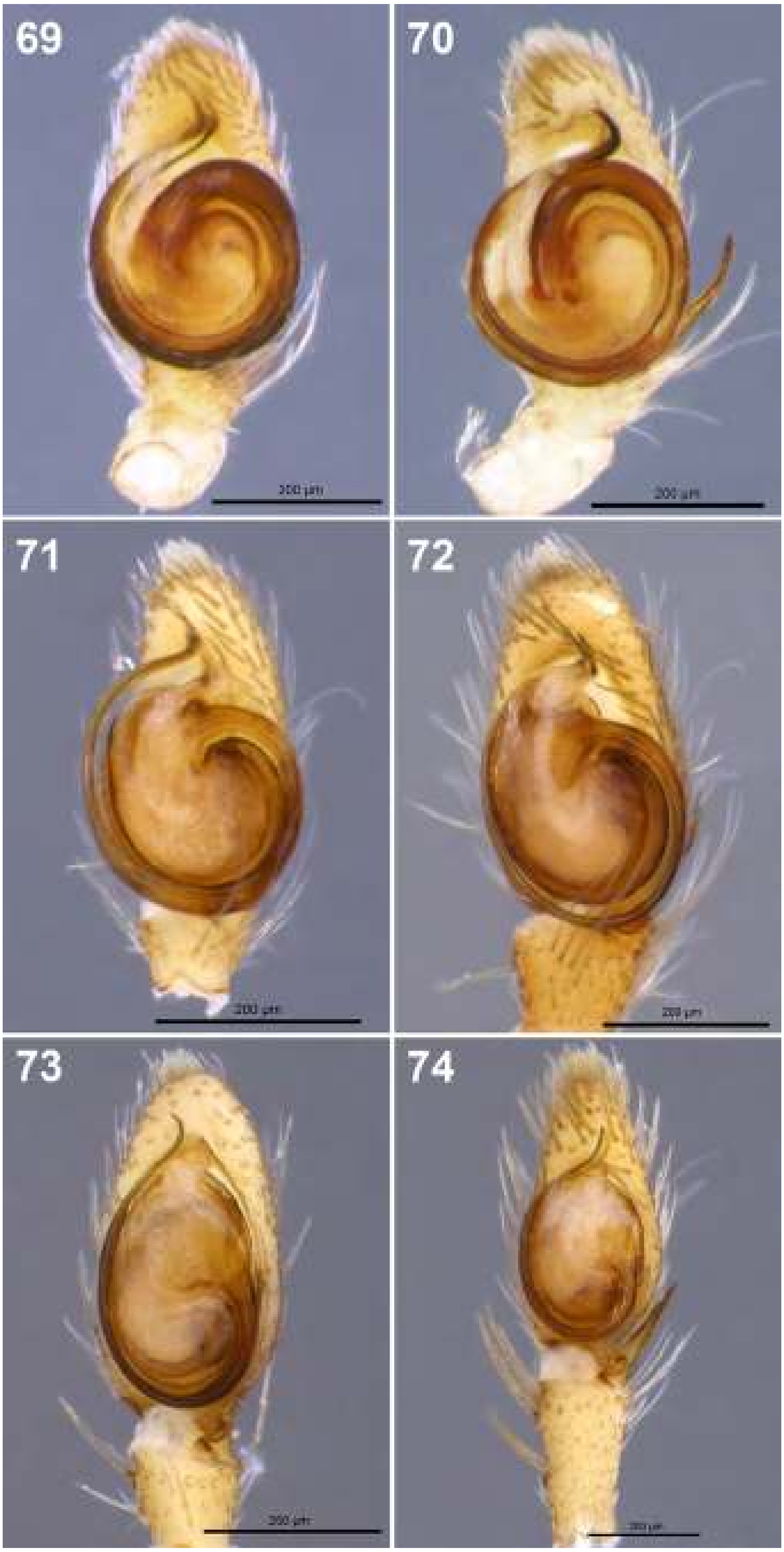
FIGURES 57–60. *P. carajas* **sp. nov.** 57–58 Male palp: 57 ventral view; 58 retrolateral view; 59–60 Female: 59 epigynum, ventral view; 60 vulva, dorsal view. C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; lp—loop; MA—median apophysis; Pcb—paracymbium; SS—secondary spermathecae. Scale bars: 0.25 mm.



FIGURES 61–64. *P. bocaina* **sp. nov.** 61–62 Male palp: 61 ventral view; 62 retrolateral view; 63–64 Female: 63 epigynum, ventral view; 64 vulva, dorsal view. C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; lp—loop; MA—median apophysis; Pcb—paracymbium; SS—secondary spermathecae. Scale bars: 0.25 mm.



FIGURES 65–68. *P. caecus* **sp. nov.** 65–66. Male palp: 65 ventral view; 66 retrolateral view; 67–68 Female: 67 epigynum, ventral view; 68 vulva, dorsal view. C—conductor; CD—copulatory duct; E—embolus; FD—fertilization duct; lp—loop; MA—median apophysis; Pcb—paracymbium; SS—secondary spermathecae. Scale bars: 0.25 mm.



FIGURES 69–74. Male palps, ventral view: 69 *P. doisirmaos* **sp. nov.;** 70 *P. pauferrense* **sp. nov.**; 71 *P. angelim* **sp. nov.;** 72 *P. carajas* **sp. nov.;** 73 *P. bocaina* **sp. nov.;** 74 *P. caecus* **sp. nov.**

Etymology. The specific name is a noun in apposition and refers to the type locality.

Diagnosis. Males of *P. carajas* **sp. nov.** resemble those of *P. pauferrense* **sp. nov.** in having eight eyes (Figs 17, 18), but differ by the male palp with embolar insertion at 12 o'clock position and close to median apophysis (embolar insertion far from median apohysis and near tegulum center in *P. pauferrense* **sp. nov.**), and median apophysis large with small hook in distal part (median apophysis small in *P. pauferrense* **sp. nov.**) (Figs 57, 58). Females are distinguished from those of the other known species of the genus by the epigyne with copulatory duct visible ventrally as lateral S-shapes and by the triangular atrium with sclerotized anterior and lateral margins (Figs 59, 60).

Description. Male (holotype). Total length: 3.5. Carapace 1.41 long, 1.16 wide; abdomen 1.65 long, 0.94 wide; sternum 0.88 long, 0.72 wide; spinnerets ALS 0.25 long, 0.12 wide. Six eyes arranged in two rows, the anterior row straight, the posterior procurved. AME reduced. Eye diameters and interdistances: AME 0.016; ALE 0.075; PLE 0.058; PME 0.05; AME–AME 0.008; AME–ALE 0.025; PLE–ALE 0.016; PME–PLE 0.062; PME–PME 0.062. Chelicerae 0.6 long; two retromarginal short teeth and three promarginal teeth. Leg formula 4123; measurements: I: 4.7 (1.3, 0.70, 1.1, 0.90, 0.70); II: 4.16 (1.16, 0.66, 0.91, 0.78, 0.66); III: 3.41 (0.94, 0.5, 0.63, 0.69, 0.66); IV: 4.79 (1.3, 0.65, 1.2, 0.96, 0.86). Leg formula 4123. Leg spination: I – femur d1-1-0, p0-0-1; tibia v2-2-0; metatarsus v2-0-0. II – femur d1-1-0, p0-0-1; tibia v1r-2-0; metatarsus v2-0-0. III – femur d1-1-0, p1-0-1, r0-1-1; tibia d0-1-0, p1-0-1, r1-0-1, v1p-2-2; metatarsus p1-0-1, r1-0-1, v2-0-2. IV – femur d1-1-0, p1-0-1, r0-0-1; tibia d1-1-0, p1-0-1, r1-0-1, v0-2-2; metatarsus p1-0-1, r1-0-1, v3-0-2. Palp: femur with four dorsal spines, one median and three posterior; RTA with tapered and curved tip; tegulum rounded; median apophysis retrolaterally directed; embolar insertion at 12 o'clock position (Figs 57, 58).

Female (Paratype). Total length: 2.8. Carapace 1.38 long, 1.03 wide; abdomen 1.34 long, 0.84 wide; sternum 0.84 long, 0.7 wide; spinnerets ALS 0.27 long, 0.11 wide. Six eyes arranged in two rows, the anterior row straight, the posterior procurved. AME reduced. Eye diameters and interdistances: AME 0.020; ALE 0.075; PLE 0.045; PME 0.05; AME–AME 0.041; AME–ALE 0.02; PLE–ALE 0.02; PME–PLE 0.066; PME–PME 0.066. Chelicerae 0.6 long; two retromarginal short teeth and three promarginal teeth. Leg formula 4123; measurements: I: 3.94 (1.16, 0.66, 0.88, 0.66, 0.59); II: 3.75 (1.09, 0.59, 0.78, 0.66, 0.63); III: 3.05 (0.84, 0.47, 0.55, 0.59, 0.59); IV: 4.31 (1.13, 0.59, 0.94, 0.88, 0.78). Leg spination: I – femur d1-1-0, p0-0-1; tibia v2-2-0; metatarsus v2-0-0. II – femur d1-1-0; tibia v1r-1r-0; metatarsus v2-0-0. III – femur d1-1-0, p0-0-1; tibia d0-1-0, p1-0-1, r0-0-1, v1p-2-2; metatarsus p1-0-1, v2-0-2. IV – femur d1-1-0, r0-0-1; tibia d1-1-0, p1-0-1, r1-0-1, v1p-2-2; metatarsus p1-0-1, r1-0-1, v3-0-2. Epigyne: posterior margin of epigynal plate truncate (Fig. 59). Vulva: copulatory duct narrow throughout its entire length with distal part of translucent duct with one loop; secondary spermathecae large with distal part well-defined (Fig. 60).

Variation. Total length (3 males): 3.0–3.5. (8 females): 2.35–3.1. In some specimens the copulatory ducts are poorly visible in ventral view.

Distribution. Pará, Brazil (Fig. 75).

Other material examined. Brazil. Pará: Parauapebas (FLONA Carajás), Cave N4WS-77, (06°04'28"S 50°11'18"W), 1 male, 10–19 May 2011, C.A.R. Souza *et al.* leg. (IBSP 174165); cave N4E-0083, (06°01'59"S 50°09'22"W), 1 female, 19 February–04 March 2010, R. Andrade & I. Cizauskas *et al.* leg. (IBSP 174164); cave N3-0066, (06°02'31"S 50°13'34"W), 02–23 August 2013, Equipe Carste leg. (IBSP 183738); cave PESE-004, (06°06'19"S 50°09'06"W), 01–09 June 2011, C. A. R. Souza & F. P. Franco *et al.* leg. (IBSP 183742); cave N4WS-01, (06°03'46"S 50°11'32"W), 18 November–01 December 2010, C. A. R. Souza & F. P. Franco *et al.* leg. (IBSP 183739); cave N5S-10, (06°06'20"S 50°7'53"W), 1 female, 14–23 October 2009, I. Cizauskas *et al.* leg.(IBSP 174161); cave N4WS-19, (06°04'35"S 50°11'37"W), 1 female, 01–09 June 2011, C.A.R. Souza *et al.* leg. (IBSP 183741); cave N1-0074, (06°06'16"S 50°16'49"W), 1 female (IBSP 186284); cave N1-0118, (06°00'40"S 50°18'53"W), 1 female (IBSP 186286); cave N1-0137, (06°01'32"S 50°16'29"W), 2 females (IBSP 186289); cave N1-0044, (06°01'13"S 50°16'40"W), 1 female (IBSP 186292); cave N1-0105, (06°00'36"S 50°18'8"W), 1 female (IBSP 186294); (Cristalino), Cave CRIS-18/19, (06°26'02"S 49°41'11"W), 1 female, 29 July–06 August 2008, R. Andrade *et al.* leg. (IBSP 174595); Canaã dos Carajás (Serra da Bocaína), Cave SB-226, (06°21'30"S 49°59'34"W), 1 female, 08–22 May 2013, Equipe Carste leg. (IBSP 183743); cave SB-31, (06°18'20"S 49°53'54"W), 29 August–27 September 2012, C. A. R. Souza & J. Mascarenhas *et al.* leg. (IBSP 174171).

Natural history. *Paracymbiomma carajas* **sp. nov.** was collected in 15 ferruginous caves distributed in different rock outcrops, for which the region of Serra Norte (FLONA de Carajás) is the main area of occurrence.

Specimens were collected in twilight (disphotic) zones, with high humidity. All specimens were found only on the floor of the caves. This species has a wide distribution range, and although it was not found outside the cave, it could also inhabit the canga, a characteristic vegetation that covers the ferruginous rock outcrops (Fig. 76).

Paracymbiomma bocaina sp. nov.

Figs 5, 12, 14, 61–64, 73, 75

Type material. Male holotype from Brazil, Pará, Canaã dos Carajás (FLONA Carajás), Cave S11-07, (06°27'20"S 50°14'30"W), 24 February–04 March 2010, I. Cizauskas *et. al.* leg., deposited in IBSP 174166. Paratypes: one male from same data of holotype (IBSP 199034); one female from Brazil, Pará, Canaã dos Carajás (Serra da Bocaína), Cave SB-72, (06°16'52"S 49°55'39"W), 29 August–27 September 2012, C.A.J. Souza *et al.* leg. (IBSP 174167).

Etymology. The specific name is a noun in apposition and refers to the locality of the paratype.

Diagnosis. Males of *P. bocaina* **sp. nov.** resemble those of *P. angelim* **sp. nov.** and *P. doisirmaos* **sp. nov.** in having six eyes (Figs 14–16). They differ by PME poorly developed, almost vestigial, palp with ovoid tegulum (rounded in *P. angelim* **sp. nov.** and in *P. doisirmaos* **sp. nov.**) and embolar insertion at 3 o'clock position (embolar insertion between 9-12 o'clock position in *P. angelim* **sp. nov.** and *P. doisirmaos* **sp. nov.)** (Figs 61, 62). Females resemble those of *P. caecus* **sp. nov.** by the epigyne with circular atrium and vulva with copulatory duct with thicker laterals and distal part of translucent duct without loop (Fig. 64). They are distinguished from the latter species by the presence of eyes and posterior margin of epigynal plate slightly recurved (procurved in *P. caecus* **sp. nov.**) (Figs 63, 64).

Description. Male (holotype). Total length: 3.25. Carapace 1.35 long, 1.05 wide; abdomen 1.6 long, 0.95 wide; sternum 0.82 long, 0.65 wide; spinnerets ALS 0.34 long, 0.12 wide. Six eyes. AME absent. PME reduced. Eyes diameters and interdistances: ALE 0.05; PLE 0.025; PME 0.016; ALE–ALE 0.11; PLE–ALE 0.016; PME–ALE 0.025; PME–PME 0.066. Chelicerae 0.51 long; 2 retromarginal short and sparse teeth and 3 promarginal teeth. Leg formula 4123; measurements: I: 4.1 (1.25, 0.6, 0.9, 0.7, 0.65); II: 3.7 (1.08, 0.55, 0.83, 0.68, 0.58); III: 3.3 (0.95, 0.45, 0.62, 0.65, 0.62); IV: 4.55 (1.2, 0.63, 1.03, 0.93, 0.78). Leg spination: I – femur d1-1-0, p0-1-0; tibia v2-2-0; metatarsus v2-0-0. II – femur d1-1-0, p0-0-1; tibiap0-0-1, v2-2-0; metatarsus v2-0-0. III – femur d2-1-3; tibia d0-1-0, p1-0-1, r1-0-1, v1p-2-2; metatarsus p1-0-1, r1-0-1; v1-0-2. IV – femur d2-1-3; tibia d1-1-0, p1-0-1, r1-0-1, v1p-2-2; metatarsus d1-0-0, p1-0-1, r1-0-1, v1-1-2. Palp: femur with four spines, three dorsal (one median and two posterior) and one posterior prolateral; RTA with tapered and curved tip; median apophysis large with small hook at distal part, apically directed; embolar insertion with reservoir ventral and visible retrolaterally (Figs 61, 62).

Female: (paratype). Total length: 2.9. Carapace 1.3 long, 0.95 wide; abdomen 1.5 long, 0.9 wide; sternum 0.8 long, 0.65 wide; spinnerets ALS 0.3 long, 0.1 wide. AME absents. PME reduced. Eyes diameters and interdistances: ALE 0.041; PLE 0.033; PME 0.016; ALE–ALE 0.15; PLE–ALE 0.025; PME–ALE 0.066; PME–PLE 0.083; PME–PME 0.083. Chelicerae 0.55 long; two retromarginal short and sparse teeth and three promarginal teeth. Leg formula 4123; measurements: I: 3.6 (1.03, 0.58, 0.80, 0.63, 0.58); II: 3.35 (0.93, 0.55, 0.70, 0.60, 0.58); III: 2.97 (0.85, 0.42, 0.57, 0.57, 0.55); IV: 4.15 (1.03, 0.58, 0.95, 0.88, 0.73). Leg spination: I – femur d1-1-0, p0-1-0; tibia v2-2-0; metatarsus v2-0-0. II – femur d1-1-0; tibia v1r-2-0; metatarsus v2-0-0. III – femur d2-1-1p; tibia p1-0-1, r0-0-1, v1p-2-2; metatarsus p1-0-0, v2-0-2. IV – femur d1-1-0, r0-0-1; tibia d1r-1-0, p1-0-1, r1-0-1, v1p-2-2; metatarsus p1-0-1, r2-0-0, v1p-2-1. Epigyne: copulatory duct ventrally visible with part of duct elongated and curved medially; atrium with sclerotized anterior and lateral margin (Fig. 63). Vulva: secondary spermathecae slightly oval, poorly defined on long thick stalk (Fig. 64).

Variation. Total length (2 males): 2.68–3.25.

Distribution. Pará, Brazil (Fig. 75).

Other material examined. None.

Natural history. *Paracymbiomma bocaina* **sp. nov.** was collected in two different caves distant approximately 40 km from each other. The male was collected in a paleo burrow (Fig. 77), an excavation of Plio-Pleistocene produced by large extinct mammals that used these structures for temporary or permanent inhabiting. They are structures of bioerosion and occur in the form of unobstructed galleries, allowing access to their interior

(Buchmann *et al.* 2016). The two specimens were located in disphotic zone with high humidity and, as for the other species, were collected on the cave floor. Differently from *P. carajas* **sp. nov**, *P. bocaina* **sp. nov.** shows morphological characteristics that can be associated to a restriction to the subterranean environment, such as a more prominent eye reduction.

Paracymbiomma caecus **sp. nov**

Figs 6, 13, 65–68, 74, 75

Type material. Male holotype from Brazil, Pará, Canaã dos Carajás (FLONA Carajás), Cave S11D-17, (06°23'56"S 50°21'23"W), 13–31 January 2010, I. Cizauskas *et. al.* leg., deposited in IBSP 174169. Paratype: one female from Brazil, Pará, Canaã dos Carajás (FLONA Carajás), Cave-0038 (CAV-38), (06°24'46"S 50°22'14"W), 22–28 September 2010, I. Cizauskas *et. al.* leg., deposited in (IBSP 174170).

Etymology. The specific name is a Latin adjective, *caecus* (blind), in reference to the absence of eyes in this species.

Diagnosis. *P. caecus* **sp. nov.** are distinguished from other congeners by the absence of eyes (Fig. 13); males resemble those of *P. bocaina* **sp. nov.** by the ovoid tegulum and embolar insertion at 3 o'clock position, but differ by the very long tibia, as long as cymbium length (Figs 65, 66); females resemble those of *P. bocaina* **sp. nov.** by the epigyne with circular atrium and vulva with copulatory duct with thicker laterals and distal part of translucent duct without loop, but are distinguished by posterior epigynal plate recurved (slightly procurved in *P. bocaina* **sp. nov.**) (Figs 67, 68).

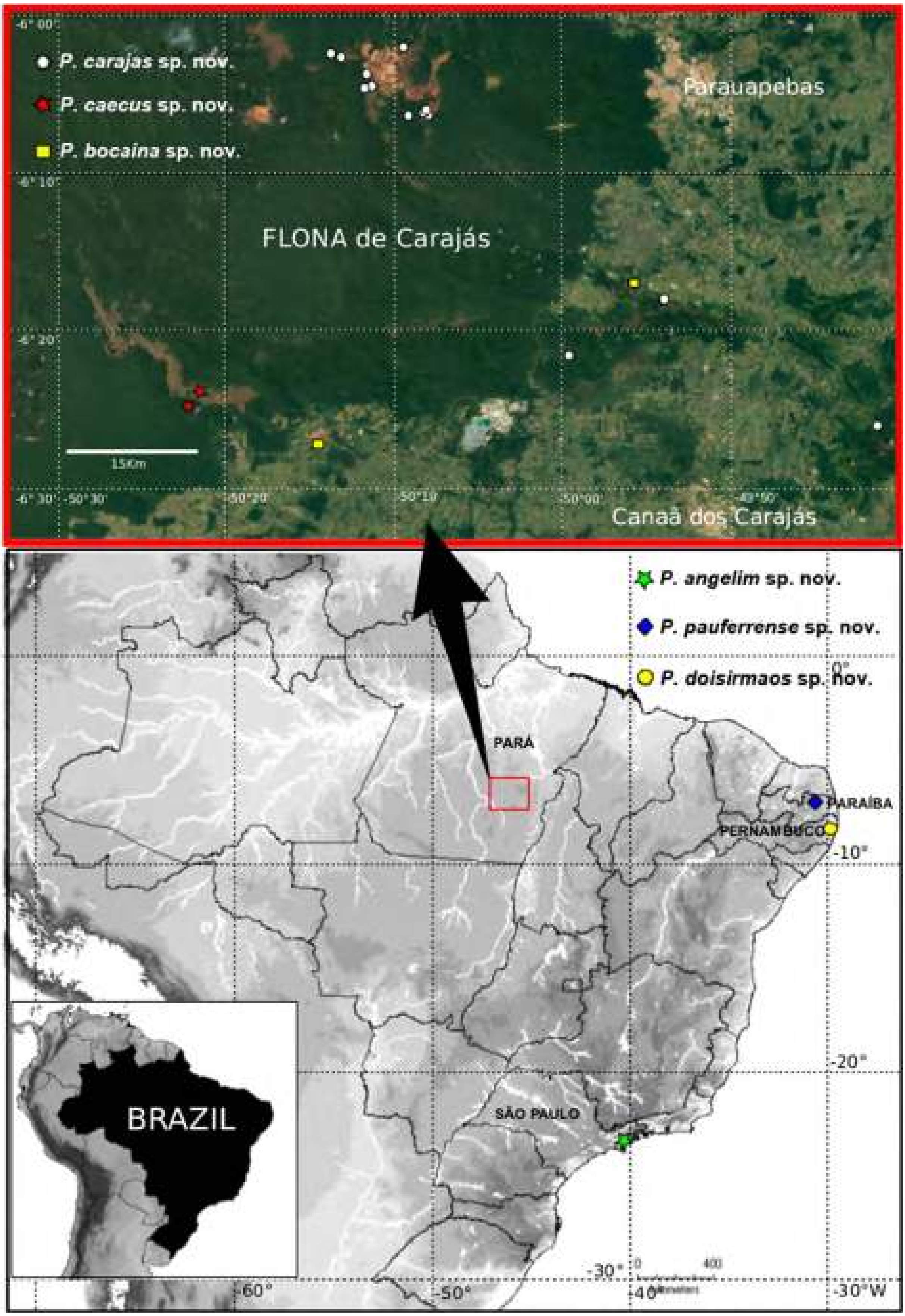
Description. Male (holotype). Total length: 3.9. Carapace 1.6 long, 1.35 wide; abdomen ALS 2.1 long, 1.05 wide; sternum 1.05 long, 0.8 wide; spinnerets 0.6 long, 0.2 wide. Eyes absent. Chelicerae 0.74 long; 2 retromarginal short and sparse teeth and 3 promarginal teeth. Leg formula 4123; measurements: I: 6.64 (1.64, 1.02, 1.6, 1.4, 0.98); II: 6.18 (1.6, 0.88, 1.5, 1.28, 0.92); III: 5.26 (1.4, 0.72, 1.12, 1.14, 0.88); IV: 7.08 (1.72, 0.84, 1.7, 1.7, 1.12). Leg spination: I (right leg) – femur d1-1-1, p0-1-1, r0-1-0; tibia v2-2-2; metatarsus v4-0-0. II – femur d1-1-0, p0-1-2, r0-1-1; tibia p0-0-1, v2-2-2; metatarsus v4-0-0. III – femur d1-1-1, p0-1-1, r0-1-1; tibia d1-0-0, p1-0-1, r1-0-1, v2-2-2; metatarsus d0-2-0; p0-1-1, r0-1-1, v2-0-2. IV – femur d1-1-1, p1-0-1, r1-0-1; tibia d1-1-0,p1-0-1, r1-0-1, v2-2-2; metatarsus p1-1-1, r2-0-1, v2-2-2. Palp: femur with five dorsal spines, one median and four posterior; RTA tapered; median apophysis conical with small hook at distal part, apically directed; embolar insertion with reservoir ventral and retrolaterally visible (Figs 65, 66).

Female: (paratype). Total length: 4.15. Carapace 1.9 long, 1.42 wide; abdomen 2.1 long, 1.25 wide; sternum 1.15 long, 0.85 wide; spinnerets ALS 0.4 long, 0.16 wide. Eyes absents. Chelicerae 0.9 long; 2 retromarginal short and sparse teeth and 3 promarginal teeth. Leg formula 4123; measurements: I: 5.98 (1.64, 0.9, 1.4, 1.16, 0.88); II: 5.76 (1.64, 0.88, 1.28, 1.12, 0.84); III: 5.32 (1.48, 0.76, 1.08, 1.12, 0.88); IV: 7.04 (1.84, 0.84, 1.64, 1.60, 1.12). Leg spination: I – femur d1-1-0, p0-1-1; tibia v2-2-2; metatarsus v4-0-0. II – femur d1-1-0; tibia v2-2-2; metatarsus v2-1r-0. III – femur d1-1-1, p1-0-1, r0-0-1; tibia d0-1-0, p1-0-1, r1-0-1, v2-2-1r; metatarsus p1-0-1, r1-0-1, v4-0-1. IV – femur d1-1-1, p0-0-1, r0-0-1; tibia d1-0-1, p1-0-1, r1-0-1, v2-2-1r; metatarsus p1-0-1, r1-0-1, v4-0-1. Epigyne: copulatory duct visible ventrally with lateral part much thicker than median part (Fig. 67); atrium with sclerotized lateral margin. Vulva: secondary spermathecae small, rounded, on long narrow stalk (Fig. 68).

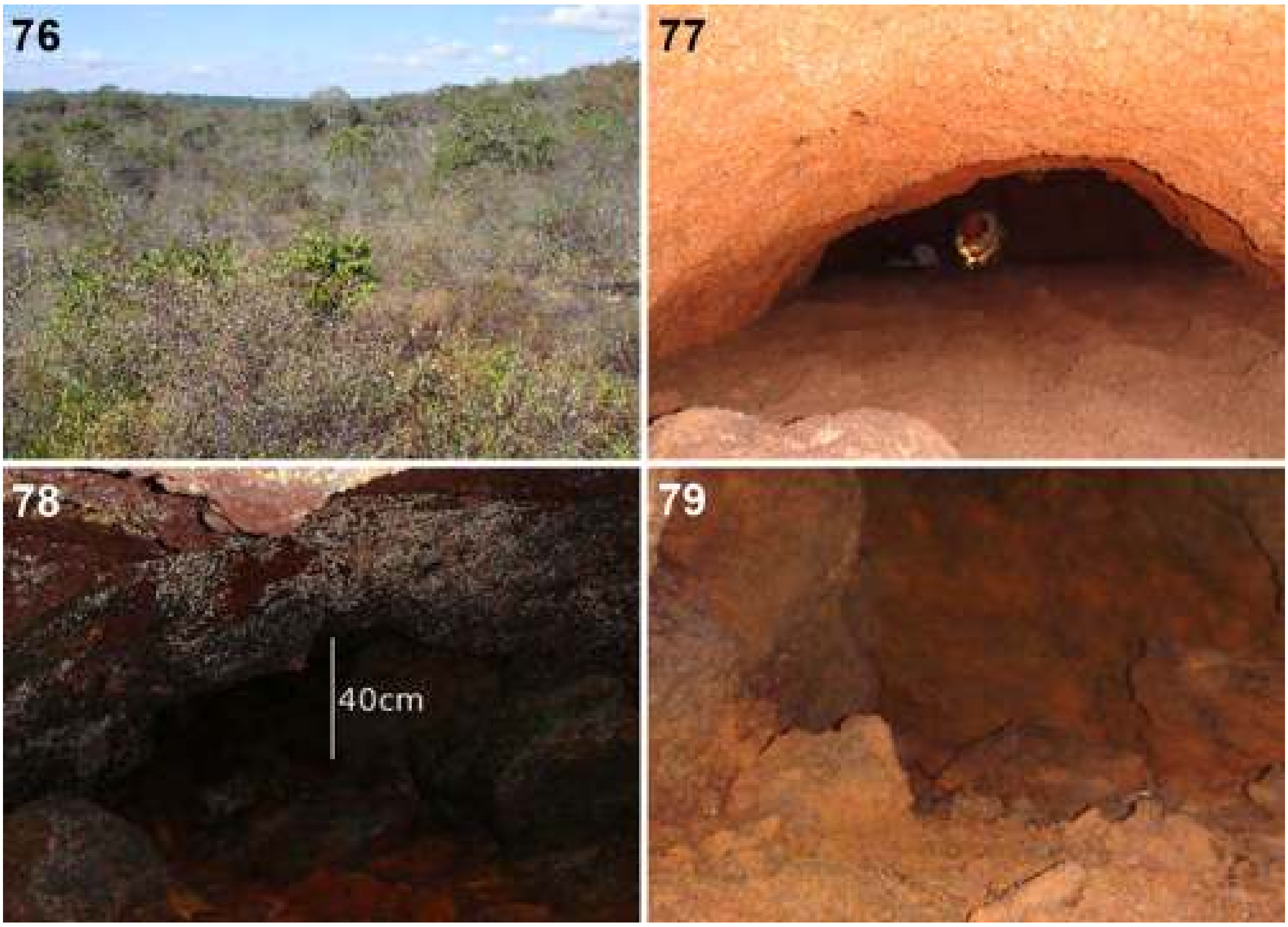
Distribution. Pará, Brazil (Fig. 75).

Other material examined. None.

Natural history. *Paracymbiomma caecus* **sp. nov.** was collected in two small caves distant approximately 2 km from each other with horizontal projection between 10 m and 20 m in the region of Serra Sul (FLONA de Carajas). The male was collected in the small twilight zone in the cave, accessed through a 40 cm diameter hole (Fig. 78). The specimens were collected in disphotic zone with high humidity (Fig. 79). Differently from *P. bocaina* **sp. nov.**, the specimens show a combination of morphological characteristics, such as eye loss, depigmentation and appendage elongation that suggest a restriction to the subterranean environment.



FIGURES 75. Known distribution records of species of *Paracymbiomma* gen. nov. from Brazil. In detail the distribution of caves species in Pará state.



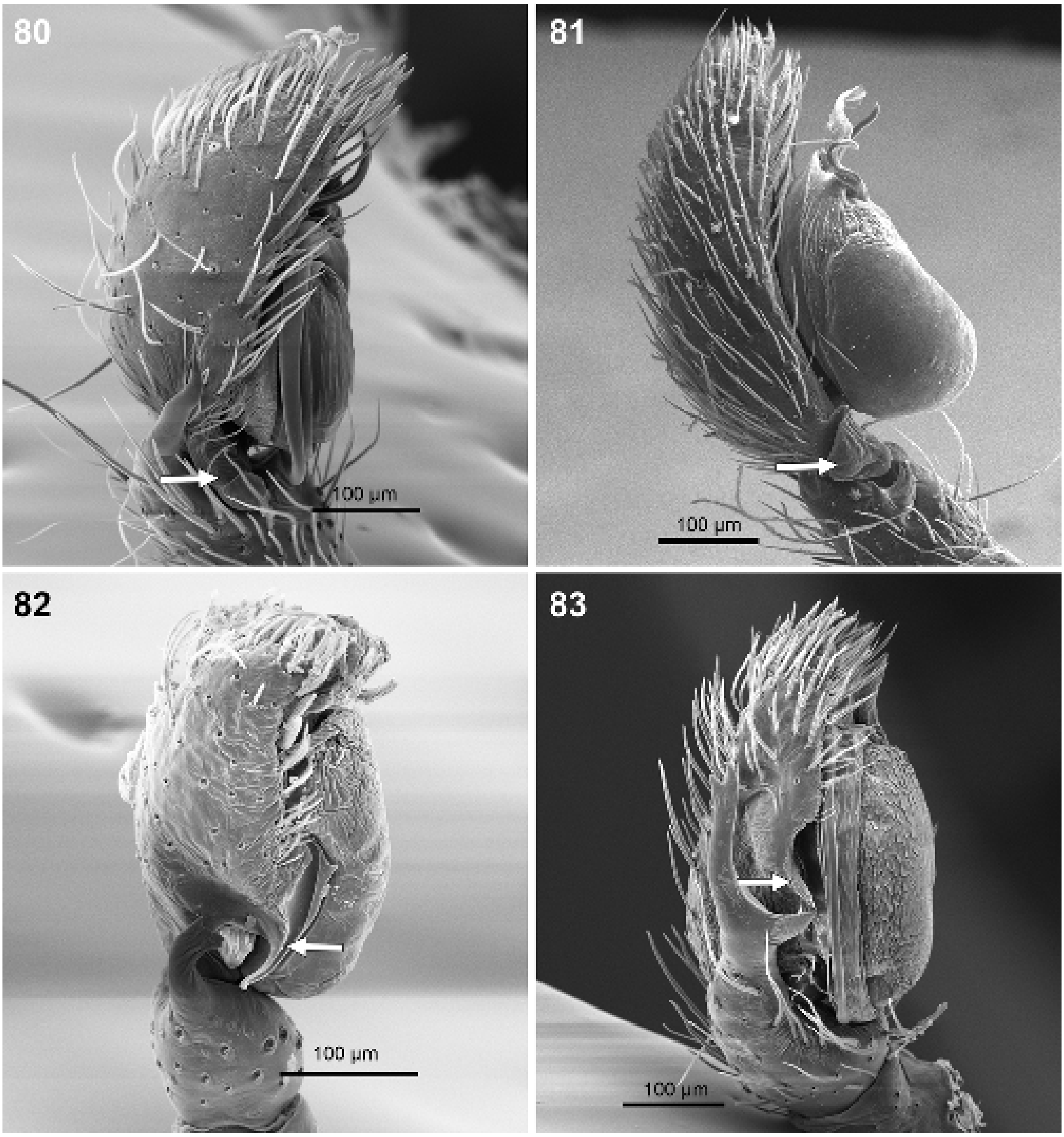
FIGURES 76–79. Ferruginous caves in Carajás National Forest: 76 Typical vegetation of ferruginous rock outcrops; 77 Paleoburrow; 78 Small entry to the disphotic area; 79 Characteristic floor of twilight areas with high humidity.

Discussion

The family Prodidomidae is currently composed of 31 genera, and *Paracymbiomma* **gen. nov**. is distinguished by the combination of presence of a paracymbium (Fig. 80) and a sclerotized conductor in the male palps.

Platnick & Shadab (1976) considered that *Tivodrassus* Chamberlin & Ivie, 1936, *Theuma* Simon, 1893 and *Zimirina* Dalmas, 1919, all have a paracymbium (Figs 81–83). However, we note that this structure in these genera has different positions and morphology. Griswold *et al.* (1998) defined the paracymbium as a basal, retrolateral and sclerotized structure on the cymbium, but concluded that its homology is very controversial in families of spiders. In Prodidomidae, *Theuma* and *Zimirina* have a grooved median retrolateral cymbial process (Figs 82, 83), similar to that observed in species belonging to other families (Ramirez 1995; Ramirez 2003; Brescovit & Lopardo 2008; Lopardo & Hormiga 2008; Lin & Li 2016) and that could function as a "cymbial conductor". Therefore, we do not consider it a paracymbium. On the other hand, the Neotropical genus *Tivodrassus* has a basal retrolateral cymbial process similar to that of *Paracymbiomma* **gen. nov.** (Fig. 81)**,** suggesting a possible relationship between these two genera.

Concerning the conductor, it is generally accepted that the function of this structure is to support the embolus, although the embolus can be supported by other structures such as the median apophysis (Levi 1961). Lehtinen (1967) stated that it is impossible to verify absolute homology between palpal structures in larger groups of spiders. Thus, he proposed that the term "conductor" should be used as homologous only in smaller, more restricted groups. Levi (1961) identified the conductor as a structure projecting from the base of the embolus on the ectal side of the tegulum, while Ramirez (2014) identified the structure as a tegular sclerite associated to the embolus on the prolateral ventral-apical region of the copulatory bulb. In Theuminae, several genera have a conductor associated to the embolus. However, *Paracymbiomma* **gen. nov.** is the only one that has this structure partly sclerotized and inserted in the prolateral region of the bulb, similar to that described by Ramirez (2014).



FIGURES 80–83. Males, palp retrolateral: 80 *Paracymbiomma carajas* sp. nov**.**, arrow to paracymbium; 81 *Tivodrassus etophor*, arrow to paracymbium; 82 *Zimirina hirsuta*, arrow to grooved median retrolateral cymbial process; 83 *Theuma* sp., arrow to grooved median retrolateral cymbial process. Photo 81, G.H. Azevedo.

Specializations for the subterranean environment: edaphomorphism or troglomorphism?

The Brazilian cave fauna is considered rich in relation to terrestrial invertebrates. Trajano & Bichuette (2010) and Gallão & Bichuette (2018) discussed the diversity of Brazilian subterranean invertebrates and listed, respectively, the subterranean troglomorphic taxa and the obligatory subterranean fauna, i.e., taxa with autapomorphies that can be associated to the subterranean way of life (Christiansen 2012). Currently, arachnids are among the best known terrestrial cave invertebrates in Brazil, with spiders being well represented (Trajano & Bichuette 2010; Gallão & Bichuette 2018).

To date, according Gallão & Bichuette (2018), only nine species of Brazilian spiders (the prodidomid *Lygromma ybyguara*, the diplurid *Harmonicon cerberus* Pedroso & Baptista, 2014, the pholcids *Metagonia diamantina* Machado, Ferreira & Brescovit, 2011 and *Metagonia potiguar* Ferreira, Souza, Machado & Brescovit, 2011, the thraphosid *Tmesiphantes hypogeus* Bertani, Bichuette & Pedroso, 2013, the ctenid *Isoctenus corymbus* Polotow, Brescovit & Pellegatti-Franco, 2005, the ochyroceratids *Speocera eleonorae* Baptista, 2003 and *Ochyrocera ibitipoca* Baptista, Gonzalez & Tourinho, 2008 and the symphytognathid *Anapistula guyri* Rheims & Brescovit, 2003) were considered exclusively subterranean and described as troglobite (see Trajano & Carvalho 2017 for an updated classification of subterranean organisms according to the Schiner-Racovitza system). This status was based on the presence of typical troglomorphic characteristics, such as eye reduction or loss, depigmentation and elongated appendages (Trajano & Bichuette 2010; Machado *et al.* 2011; Brescovit *et al.* 2012; Bertani *et al.* 2013; Pedroso & Baptista 2014; Brescovit *et al.* 2016). These traits are often considered strong evidence of the troglobitic status (Barr & Holsinger 1985; Holsinger 1988). However, according to some authors that study morphological adaptations in invertebrates (Desutter-Grandcolas 1997; Miller 2005; Arnedo *et al.* 2008; Ruzicka *et al.* 2013), these features do not indicate with certainty that a species is in fact a troglobite.

Trajano & Carvalho (2017) discussed the difficulties and pitfalls of the Schiner-Racovitza classification, highlighting the need for comparative studies and epigean (surface) samplings to verify the troglobitic condition based on the occurrence of troglomorphic traits, especially anophthalmy and depigmentation. These traits are also common to epigean taxa (i.e. palpigrads, diplurans, many diplopods, Geophilomorpha, some collembolans and Oniscoidea isopods) that occupy habitats that are ecologically similar to those found in caves, such as the deep soil. The authors point out that these two biological phenomena (bearing troglomorphisms and being a troglobite) may be independent. Therefore, the occurrence of troglomorphisms does not imply necessarily that a species is a troglobite.

Zacharda (1979), studying mites, distinguished two different types of specializations to life in subterranean environments in arthropods: edaphomorphisms, observed in organisms living in soil environment; and troglomorphisms, related to life in subsurface habitats, such as caves. According to the author, depigmentation, desclerotization and reduction or loss of the eyes are characteristic of both, while longer appendages are typical of troglomorphic species, as a specialization for the food scarcity characteristic of hypogean but not of soil habitats.

The variety of ocular patterns observed in *Paracymbiomma* **gen. nov.** species, for example, is a kind of variation in congeneric species well documented in spiders, especially in genera that include species with troglomorphic and edaphomorphic characteristics (Platnick 1994; Platnick & Shadab 1976; Platnick & Shadab 1979; Huber 2000). It is expected, since similar selective regimes under similar environmental conditions can result in similar morphological patterns (Culver *et al.* 1995).

Two Brazilian species of Prodidomidae are considered exclusively cavernicolous (i.e. found exclusively in caves), *Lygromma ybyguara* Rheims & Brescovit and *Brasilomma enigmatica* Brescovit, Ferreira & Rheims, based on the presence of one or more troglomorphisms (Rheims & Brescovit 2004; Brescovit *et al.* 2012). In the present paper we increase the number to five, with the description of *Paracymbiomma carajas* **sp. nov.**, *P. bocaina* **sp. nov.** and *P. caecus* **sp. nov.,** all collected in ferruginous caves in Carajás National Forest in the state of Pará (Figs 76–79). In addition to the three subterranean species, *Paracymbiomma* **gen. nov.** also includes three epigean species, *Paracymbiomma angelim* **sp. nov.**, *P. doisirmaos* **sp. nov.** and *P. pauferrense* **sp. nov.**, all collected in leaf litter and showing some degree of depigmentation and eye reduction (Table 1).

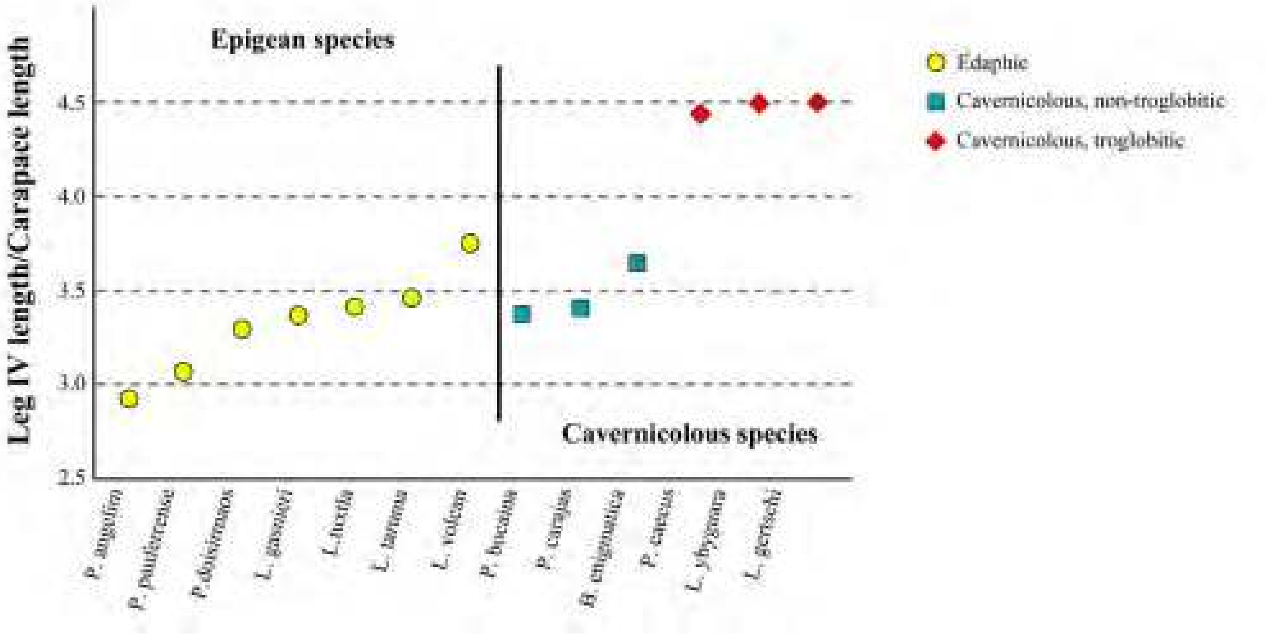
Appendage elongation in subterranean spiders

Appendage elongation is also a trait generally considered a troglomorphism and well documented in troglobitic salamanders and several aquatic and terrestrial invertebrates (Kury 2008; Santos *et al.* 2013; Miranda *et al.* 2016), including spiders (Jager 2005; Bayer & Jager 2009; Ruzicka *et al.* 2013). Miller (2005) compared morphological traits of epigean and subterranean species of *Anthrobia* Tellkampf, 1844 (Linyphiidae) and found that, in addition to lacking eyes, these species have much longer legs, both absolutely and proportionally. In contrast, Arnedo *et al.* (2008) observed that appendage elongation does not always occur in troglobitic *Dysdera* Latreille, 1804 (Dysderidae).

In order to test whether cavernicolous *Paracymbiomma* **gen. nov.** are troglobites, we compared, among others characteristics, the proportion of leg IV length/carapace length in males of *Paracymbiomma* **gen. nov.** and other subterranean species of Prodidomidae (Table 1). As observed by Miller (2005) for *Anthrobia*, the increase in appendage length was evident in the three cavernicolous eyeless species (Fig. 84), including *P. caecus* **sp. nov.** (leg IV ~ 4.42–4.49 times carapace length). The other two cavernicolous species of *Paracymbioma* **gen. nov.**, *P. carajas* **sp. nov.** and *P. bocaina* **sp. nov.,** as well as *B. enigmatica,* showed no evident increase in leg length when compared to the epigean species (leg IV ~ 2.95–3.75 times carapace length).

TABLE 1. Summary of occurrence and trgolomorphic characteristic, such as eyes number and proportions of legs length/carapace length of the thirteen species of Prodidomidae.

SPECIES	HABITAT	CAVE LITHOLOGY	EYES	Leg IV / Carapace (mm)
L. gasnieri	Epigean	-	6 (absence AME)	3.380
L. taruma	Epigean	-	6 (absence AME)	3.475
L. volcan	Epigean	-	6 (absence AME)	3.757
L. tuxtla	Epigean	-	6 (absence AME)	3.417
P. angelim	Epigean	-	6 (absence AME)	2.950
P. doisirmaos	Epigean	-	6 (absence AME)	3.309
P. pauferrense	Epigean	-	8 (reduction AME)	3.067
P. carajas	Cavernicolous	Ferruginous	8 (reduction AME and PME)	3.397
P. bocaina	Cavernicolous	Ferruginous	6 (absence AME and reduction PME)	3.370
P. caecus	Cavernicolous	Ferruginous	Absent	4.425
B. enigmatica	Cavernicolous	Ferruginous, quartizite and limestone	Absent	3.628
L. ybyguara	Cavernicolous	Limestone	Absent	4.479
L. gertschi	Cavernicolous	Limestone	Absent	4.489



FIGURES 84. Relationship between leg IV length/carapace length of thirteen species of Prodidomidae.

Troglobitic status of the studied species

Due to insufficient epigean samplings, allowing the direct verification of the troglobitic status (defined by the absence in epigean habitats, Trajano & Carvalho 2017) the comparative method was used to infer this condition in the studied species.

Our data indicate that the extreme reduction of eyes, depigmentation or weak pigmentation, and appendage elongation observed in the subterranean *P. caecus* **sp. nov.,** *L. ybiguara* and *L. gertschi*, are troglomorphic traits, i.e., autapomorphies related to the subterranean way of life, and indicate that these three species are indeed troglobites.

On the other hand, the characteristics observed in *P. carajas* **sp. nov.**, *P. bocaina* **sp. nov.** and *B. enigmatica* are not enough to define if they are consequences of adaptation to edaphic environment or if they are only in different levels of troglomorphism. The three species do not show a significant increase in appendage length proportional to body size when compared to epigean species. They show different degrees of eye reduction, but this is also observed in epigean prodidomds, such as *P. pauferrense* **sp. nov**.

In addition, *P. carajas* **sp. nov.**, *P. bocaina* **sp. nov.** and *B. enigmatica* were found in more than one cave, separated from each other by long distances. *P. carajas* **sp. nov.** was collected in 15 different caves with distances of up to 80 km between them, and *P. bocaina* **sp. nov.** was collected in two caves separated by approximately 40 km. *Brasilomma enigmatica* shows an even more complex distribution, being found in different lithologies and in caves separated by approximately 180 km, reducing the probability of subterranean migration (Brescovit *et al.* 2012). Trajano & Carvalho (2017) suggested that the most parsimonious explanation for this type of distribution is dispersal through deep soil. According to the recent list of Brazilian obligatory subterranean fauna (Gallão & Bichuette 2018), the blind species *B. enigmatica* is not considered a troglobitic species, as suggested by our comparative study between related species of Prodidomidae, since it shows intermediate leg lengths when compared to the other epigean species and the three troglobites blind species.

Thus, taking into account the presence and degree of troglomorphisms, as well as the species distribution patterns we consider that, of the six cavernicolous species included in this study, only *P. caecus* **sp. nov.,** *L. ybiguara* and *L. gertschi* are true troglobites. The remaining species should be treated as subterranean, even though the troglobitic condition cannot be excluded.

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