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Descrição de dez espécies novas do gênero *Neoxyphinus* Birabén, 1953 da América Hispânica (Araneae, Oonopidae)

DANIELLA FRANZÓIA MOSS

Dissertação apresentada ao Programa de Pós-Graduação em Zoologia, Curso de Mestrado, do Museu Paraense Emílio Goeldi e Universidade Federal do Pará como requisito parcial para obtenção do grau de mestre em Zoologia.

Orientador: Dr. Gustavo R. Sanches Ruiz
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BELÉM - PARÁ
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SUMÁRIO

RESUMO

O gênero *Neoxyphinus* Birabén, 1953 consiste em espécies caracterizadas (dentre outros) por, nos machos, os enditos apresentam uma escavação retrolateral apical seguida por uma apófise retrolateral subapical e o palpo com o êmbolo compacto e em forma de S, com uma abertura ejaculatória ampla e circular. As fêmeas são caracterizadas pelo átrio epiginal grande e com as extremidades laterais angulares e a presença de, no máximo, dois espinhos no fêmur I. Atualmente o gênero apresenta dez espécies conhecidas para a América do Sul, sendo a maioria para o Brasil. Neste presente trabalho foram descritas dez novas espécies com ocorrência fora do território brasileiro: *N. amazonicus* sp. nov. da Colômbia e do Brasil, *N. yekuana* sp. nov., *N. trujillo* sp. nov., *N. caribensis* sp. nov. e *N. andersoni* sp. nov. da Venezuela, *N. macuna* sp. nov. e *N. pure* sp. nov. da Colômbia, *N. inca* sp. nov. do Peru, *N. coca* sp. nov. do Equador e *N. beni* da Bolívia. Para todas as espécies novas são apresentadas as descrições e as diagnoses e suas distribuições. Foram encontradas dois novos dimorfismos sexuais, em *N. macuna* sp. nov, com a superfície do pulmão ornamentado com projeções cuticulares e; em *N. yekuana* sp, nov., com a fêmea apresentando o clípeo extremamente alto em comparação com o macho. Foi encontrado também uma estrutura única na espécie *N. caribensis* sp. nov. que apresenta a superfície do esterno com uma crista transversal mediana em forma de arco simples e elevações nas laterais das coxas II e IV. Este trabalho esta inserido em um projeto maior, de cunho internacional, intitulado "Goblin Spider Planetary Biodiversity Inventory - The megadiverse, microdistributed spider family Oonopidae" - PBI-Oonopidae.

Palavras-chave: Oonopidae, *Neoxyphinus*, espécie nova, PBI, descrição e diagnose.

INTRODUÇÃO GERAL

Essa dissertação está inserida em um projeto maior, de cunho internacional, intitulado "Goblin Spider Planetary Biodiversity Inventory – The megadiverse, microdistributed spider family Oonopidae" (PBI – Oonopidae). O projeto conta com a participação de vinte instituições de pesquisas e com uma equipe de mais de 45 pesquisadores de vários países. Foi coordenado pelo American Museum of Natural History, financiado pela National Science Foundation (EUA) e contou com suporte de um banco de dados online (http://research.amnh.oonopidae/), onde estão reunidas as informações sobre as espécies de Oonopidae já descritas e as que estão em processo de descrição, além de trabalhos publicados e fotos. A escolha de Oonopidae para este PBI foi baseada na grande diversidade, abundância e distribuição da família e o baixo conhecimento a respeito da diversidade desta família. Desta forma, seu objetivo maior é promover revisões genéricas, descrições de espécies novas e estudar as relações filogenéticas dos integrantes desta família em escala global. Como resultados, de 2010 até 2014, mais de 80 trabalhos referentes ao projeto já foram publicados e, desde a implementação do projeto em 2006, o número de espécies conhecidas para a família subiu de 472 espécies em 68 gêneros (Harvey & Edward, 2007) para 1573 espécies em 107 gêneros (World Spider Catalog, 2015).

As aranhas Oonopidae Simon, 1890 são pequenas haplóginas (fêmeas sem dutos de fertilização) medindo de 0.8 a 3 mm de comprimento (Busschere et al., 2014). Estas aranhas são encontradas em todo o globo, exceto na região dos polos, porém atingem sua maior diversidade e abundância nas regiões tropicais. São, em sua maioria, aranhas noturnas, cursoriais e que vivem na serapilheira, apesar de serem encontradas

em diferentes ambientes, como florestas, desertos (Jocqué & Dippenaar-Schoeman, 2006) e em cavernas (Harvey & Edward, 2007).

Nos últimos anos houve um aumento no número de pesquisadores e trabalhos publicados sobre Oonopidae, porém, apesar de constituírem grupos naturais de gêneros e de um alto relacionamento filogenético entre os membros da família ter sido resolvido, os valores de suporte ainda são baixos (Álvarez-Padilla et al., 2012, Busschere et al., 2014). A primeira divisão informal foi feita por Simon (1893), que organizou a família em dois grupos: os Oonopidae "*molles*" que apresentam o abdômen pouco esclerotizado, sem escudos abdominais, e os Oonopidae "*loricatae*", aqueles que apresentam escudos abdominais. Petrunkevitch (1923) reorganizou a família em duas subfamílias, Oonopinae (="*molles*") e Gamasomorphinae (="*loricatae*") e Chamberlin & Ivie (1942) propuseram Orchestininae. A organização de subfamílias mais recente foi feita por Platnick et al. (2012), que estabeleceram uma nova subfamília, Sulsulinae, e sinonimizaram Gamasomorphinae com Oonopinae. Desta forma, atualmente a família contem três subfamílias: Orchestininae, Oonopinae e Sulsulinae (Platnick et al., 2012).

O reconhecimento de grupos monofilético em Oonopinae ainda é incipiente, tendo sido propostos apenas seis grandes grupos de gêneros: grupo *Scaphiella*, por Platnick & Dupérré (2009); grupo *Stenoonops*, por Platnick & Dupérré (2010); complexo *Dysderina*, por Platnick & Dupérré (2011a,b, 2012); grupo *Pelicinus*, por Platnick et al. (2012a, b) e Álvarez-Padilla et al. (2012); os chamados *Gamasomorphoids*, por Álvarez-Padilla et al. (2012) e; o grupo *Zyngoonops*, por Fannes (2012). Contudo, o monofiletismo de cada um destes grupos ainda não foi testado formalmente.

As primeiras observações sobre o monofiletismo da família foram feitas por Burger & Michalik (2010), que estudaram o sistema genital masculino e encontraram

um testículo não pareado, completamente fundido, sendo uma condição única para Oonopidae. Platnick et al. (2012) ao estudarem os órgãos tarsais, comprovam o monofiletismo da família, propondo que o dimorfismo desses receptores e a presença do sulco longitudinal, originando da extremidade proximal do órgão tarsal, são sinapomorfias potenciais para o grupo. Já Busschere et al. (2014) corroboraram a hipótese do monofiletismo da família usando rDNA, com um grande suporte em análises feitas a partir dos alinhamentos de 28S e 18S-28S. Já para os outros complexos de gêneros, apenas os complexos *Dysderina* e *Zyngoonoid* foram bem suportados pela informação molecular (Busschere et al. 2014). Segundo esses autores, o gênero *Neoxyphinus* aparece como grupo irmão dos demais gêneros do complexo *Dysderina*.

Neoxyphinus foi descrito por Birabén (1953) para agrupar duas espécies da América do Sul. Ambas são semelhantes às espécies incluídas em *Xyphinus* Simon, 1893, dos trópicos do Velho Mundo, por também apresentarem espinhos na carapaça. Segundo Birabén (1953), a diferença entre estes dois gêneros se daria pela disposição distinta desses espinhos. *Neoxyphinus* seria ainda diferenciado de outros gêneros pela presença de grandes espinhos ventrais na tíbia e metatarso I e II.

A primeira revisão moderna do gênero foi feita por Abrahim et al. (2012), dentro do contexto do PBI-Oonopidae, na qual foram redescritas 5 espécies e descritas 5 espécies novas. A espécie-tipo do gênero, descrita por Birabén (1953) é *Neoxyphinus ogloblini* Birabén, 1953. Brignoli (1983) suspeitou que a espécie-tipo, *N. ogloblini* fosse uma sinonímia de *Dysderina termitophila* (Bristowe, 1938). Posteriormente, ao revisarem o gênero, Abrahim et al. (2012) corroboraram a hipótese de Brignoli (1983), de que *N. ogloblini* seria um sinônimo júnior de *Dysderina termitophila,* formalizando a combinação *Neoxyphinus termitophilus* para esta espécie. Abrahim et al. (2012) sinonimizaram ainda o gênero *Hawkeswoodoonops,* descrito por Makhan & Ezzatpanah

(2011), e *Decuana*, descrito por Dumitrescu & Georgescu (1987) com *Neoxyphinus*. Com a revisão do gênero (Abrahim et al., 2012), este passou a ser diagnosticado por uma combinação de caracteres: presença de um conjunto de pequenos ou grandes tubérculos na superfície posterior da carapaça; enditos do macho com uma escavação retrolateral apical com uma projeção em formato de dente subapical e apófise curva; tanto o espiráculo traqueal posterior quanto o espiráculo anterior estão conectados por um sulco; palpo do macho fortemente inflado; êmbolo compacto, em formato de S (Birabén, 2953, Abrahim et aç., 2012).

O gênero *Neoxyphinus* é amplamente distribuído pela América do Sul, principalmente em regiões tropicais. No trabalho de Abrahim et al. (2012), das cinco espécies descritas pelos autores, apenas uma não tem ocorrência no Brasil, *N. gregoblin* Abrahim & Santos, 2012. Em observações do material tanto da fauna brasileira quanto de fora do país, muitas espécies de *Neoxyphinus* foram encontradas. Considerando a grande quantidade de exemplares a ser examinado, o baixo conhecimento da fauna fora do Brasil e o curto tempo para término da dissertação, a descrição dessas espécies foi dividida em duas partes. Na primeira (presente trabalho) são descritas espécies com ocorrência fora do Brasil e na segunda parte (em andamento) serão descritas novas espécies brasileiras.

No presente trabalho são descritas dez novas espécies de *Neoxyphinus* de ocorrência na América Hispânica (Colômbia, Venezuela, Peru, Equador, Brasil e Bolívia): *N. amazonicus* sp.nov, *N. andersoni* sp.nov, *N. beni* sp.nov, *N. caribensis* sp.nov., *N. coca* sp.nov., *N. inca* sp.nov, *N. macuna* sp.nov., *N. pure* sp.nov, *N. trujillo* sp.nov, *e N. yekuana* sp.nov.

Foram encontrados dimorfismos sexuais únicos, como em *Neoxyphinus yekuana*, na qual a fêmea apresenta um clípeo extremamente mais alto em relação ao

macho (fig. 218). Em *N. caribensis* o esterno apresenta uma crista em forma de arco simples na região mediana (fig. 59). Outra estrutura que merece destaque é a margem ornamentada com fileiras de projeções cuticulares do pulmão em *N. macuna* (fig. 144), reduzidas no macho (fig. 124) e ausente em outras espécies.

Os resultados desta dissertação é apresentado em formato de artigo científico, o qual será submetido à revista "American Museum Novitates".

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Description of ten new species of the Genus *Neoxyphinus* Birabén, 1953 from Hispanic America (Araneae, Oonopidae).

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ABSTRACT

Ten new species of the genus *Neoxyphinus* Birabén are described from Hispanic America: *N. amazonicus* sp. nov. from Colombia and Brazil; *N. macuna* sp. nov. and *N. pure* sp. nov. from Colombia*; N. yekuana* sp. nov., *N. trujillo* sp. nov., *N. andersoni* sp. nov. and *N. caribensis* sp. nov. from Venezuela*; N. inca* sp. nov. from Peru*; N. beni* sp. nov. from Bolivia and *N. coca* sp. nov. from Ecuador. The morphological diversity in the genus appears to be greater than previously expected. The male sternum of *N. caribensis* sp. nov. has a conspicuous, transversally raised, arched median ridge and lateral elevations on coxae II and IV. Unique sexual dimorphisms were observed in *N. yekuana* sp. nov., in which the clypeus is much higher in females than in males; and in *N. macuna* sp. nov., in which the female book lung margins are ornate with rows of cuticular projections.

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INTRODUCTION

This paper is a contribution to the Goblin Spider Planetary Biodiversity Inventory (PBI Oonopidae) and includes the description of new species of *Neoxyphinus* Birabén, 1953 from Hispanic America. Oonopidae is a family of small haplogyne spiders, ranging in size from 0.8 to 3mm (Busschere et al., 2014) and, according to the World Spider Catalog (2015) includes, to date, 1573 species in 107 genera. Burger and Michalik (2010), through observations of the male genital system, showed the first evidence of the monophyly of Oonopidae, the unpaired (completely fused) testis, a condition not present in any other spider family. Currently, three subfamilies are recognized: Oonopinae, Sulsulinae and Orchestininae (Platnick et al., 2012b). Platnick et al. (2012b), studying the morphology of the tarsal organs, hypothesized that the anterior/posterior serial dimorphism in raised receptor number and orientation, and the presence of a longitudinal ridge that originates at the proximal end of the tarsal organ are probable synapomorphies for Oonopidae. Busschere et al. (2014) tested the monophyly of Oonopidae using rDNA, producing a hypothesis of relationships for a large sample of oonopid genera. These authors found strong support for Oonopidae monophyly from 28S and 18S-28S DNA sequences.

The genus *Neoxyphinus* belongs to a highly diverse group of oonopines, the *Dysderina* complex. These groups of genera shares the inflated palpal bulb, usually completely fused to the cymbium (with no traces of a seam), and a sub-distally inserted embolus, often elaborate in shape (Platnick & Dupérré, 2011a). Busschere et al. (2014) corroborated the monophyly of the *Dysderina* complex, with *Neoxyphinus* arising as sister group of a clade including all remaining representatives of the complex.

Birabén (1953) described the genus *Neoxyphinus* for two South American species. The generic name refer to the Old World genus *Xyphinus* Simon, 1893 due to the spine-like tubercles (spines) on the carapace. *Neoxyphinus* also present those tubercles, however both genera differ on the distribution of them on the carapace (Birabén, 1953). However, the similarity between these two genera is most probably superficial and *Neoxyphinus* can be distinguished from its congeners by the presence of large spines on tibia and metatarsus I and II. However, the similarity between these two genera is most probably convergent, since they belong to different groups of genera (Abrahim et al., 2012; Busschere et al., 2014: fig. 4). The type species was proposed as *N. ogloblini* Birabén, 1953. Years later, Brignoli (1983) suggested that *Dysderina termitophila* Bristowe, 1938 could be a senior synonym of *N. ogloblini*, a hypothesis confirmed as a formal synonymy by Abrahim et al. (2012).

Contrary to Birabén (1953), Abrahim et al. (2012) found *Neoxyphinus* species without spikes-like tubercles. Furthermore, these authors characterized the genus using a unique combination of characters: the presence of low tubercles or large spikes on the posterior surface of carapace; male endites with an apical, retrolateral excavation bearing a subapical, toothlike, curved apophysis; both anterior and posterior pairs of spiracles connected by grooves; palpal bulb strongly inflated; embolus compact, S-shaped, with angular lateral corners. Abrahim et al. (2012) also suggested that the absence of a distal narrowing of the ejaculatory duct, resulting in a large opening with the same width as the duct, and the presence of a visible basal excavation and a distal retrolateral projection on embolus could be putative synapomorphies for the genus.

Abrahim et al. (2012), based on the embolar morphology and the assumption that the typical developed carapace spikes are homologous to small tubercles in other species, considered *Neoxyphinus* a senior synonym of two generic names:

Hawkeswoodoonops Makhan & Ezzatpanah (2011), described from Suriname, and the Venezuelan monotypic genus *Decuana* Dumitrescu & Georgescu, 1987.

The present study deals with species that occur primarily outside Brazil and a second paper (Feitosa et al., in prep.) will deal solely with those species whose known distribution ranges are restricted to the Brazilian territory. In the present paper, we describe ten new species from Hispanic America, namely Colombia, Venezuela, Peru, Ecuador, Bolivia and one species from Colombia and Brazil.

The morphological diversity in the genus appears to be greater than previously expected. At least three previously unknown morphological characters, two of them positively related to sexual dimorphism, are documented below. Females of *Neoxyphinus yekuana* sp.nov. have an extremely high clypeus, which is nearly 2.5 AME (anterior median eyes) diameter in height (fig. 218). In the *Dysderina* complex this feature is not found. For other genera on Oonopidae, these resembling, for instance, those of *Guaraguaoonops* Brescovit, Rheims and Bonaldo (Brescovit et al. 2012, fig. 2). However, unlike *Guaraguaoonops* species, the males of *N. yekuana* sp.nov. do not have such modified clypeus (fig. 199), similar to the unmodified clypeus in the *Dysderina* complex. Aside from the fact that males and females were collected in the same locality (within a few days apart) and details on the morphology of the carapace posterior surface suggest that these specimens belong to the same species. As far as we know, this kind of sexual dimorphism has not been observed in any other Oonopidae species.

Another sexual dimorphism was found in *N. macuna* sp.nov. Both males and females have book lungs covers ornate with rows of cuticular projections. This modification is more conspicuous in females (fig. 144) than in males (fig. 124). Modifications in the book lung area are known to occur in some species in *Pelicinus*

group (see Platnick et al., 2012a, Grismado et al., 2014), such as in *Grymeus* Harvey, 1987 (Australia), which has the matted setae arise directly from the book lung covers (Harvey, 1987, fig. 9). However, those book lung covers modification is not sexually dimorphic as in *N. macuna* sp.nov., in which these modifications are composed of tegumentary projections. The presence of cuticular projections surrounding the book lung covers are new for Oonopidae.

The *Dysderina* complex is notorious for having a wide range of modifications on the sternal surface, which proved to be of great importance in the recognition of the various lineages of the group (Platnick et al., 2013c). One of the species described below, *N. caribensis* sp.nov., presents a new of sternal morphology: three pairs of marginal elevations, the median one connected by a single transversally raised, arched ridge (fig. 59). This particular configuration is not found in other species of the *Dysderina* complex. However, some genera of the *Dysderina* complex show tegument modifications on the sternum that may prove to be important to the case in question. Species of the genera *Costarina* Platnick & Dupérré, 2011b (see also Platnick & Dupérré 2012), *Simonoonops* Harvey, 2002, (see also Platnick & Dupérré, 2011c), *Tridysderina* Platnick, Berniker & Bonaldo, 2013a, *Dysderina* Simon, 1891 and *Tinadysderina* Platnick, Berniker & Bonaldo, 2013b have transversal ridges at the level of the insertions of coxae II (anterior ridge), III (median ridge) and IV (posterior ridge). Most species of these genera have a full set of these ridges, sometimes connected by longitudinal ones, but species of *Tridysderina* are particularly interesting in having only one (anterior) or two (anterior and median) longitudinal ridges. Platnick et al. (2013a) suggested that the posterior ridge in *Tridysderina* (and in other genera in *Dysderina* complex) might be lost, being represented solely by lateral elevations. A case could therefore be made on the homology of the median ridge in *Tridysderina* and *N.*

caribensis sp.nov. Even the lateral elevations on coxae II and IV in *N. caribensis* sp.nov. could be interpreted as remnants of ridges. Thus, the loss of one or more ridges could be phylogenetically informative and the presence of at least one ridge in *Neoxyphinus* may be considered a symplesiomorphy, leading to the recognition of a large group of species in the genus supported by the synapomorphic absence of sternal ridges. On the other hand, the modifications could be interpreted as an autapomorphy for *N. caribensis* sp.nov., a hypothesis that would be congruent to the topology found by Busschere et al. (2014), where *Neoxyphinus* appears as the sister group of the remaining members of the *Dysderina* complex.

METHODS

Specimens were examined using a LEICA MZ16 stereomicroscope at Museu Paraense Emílio Goeldi, Belém (MPEG). Photographic images of body parts were produced using Leica M205A stereomicroscope with a DFC420 camera at MPEG. These images were assembled using the Leica applications suite software package (LAS). Some abdomens of females were digested with pancreatin, with comparable results. All measurements are in millimeters. Total body-length variation was determined from up to 10 specimens of both sexes whenever possible. For SEM images, specimen parts were dehydrated and air-dried beneath a warm light at room temperature. SEM images were taken with a Zeiss LEO 1450VP scanning electronic microscope at MPEG and Zeiss EVO LS15 at Companhia de Pesquisa de Recursos Minerais, Belém (CPRM). Maps were generated with free software Quantum GIS. Spination was described by dividing each leg segment into retrolateral, ventral,

prolateral and dorsal view, indicating the number of spines in the proximal, middle and distal one-third of each segment. Only legs surfaces bearing spines were reported. Descriptions were generated according the goblin spider PBI page database and summarized where possible. The sequence of the species in the text is in alphabetical order.

MATERIAL EXAMINED

AMNH	American Museum of Natural History, New York, NY, United States of America
CAS	California Academy of Sciences, San Francisco, CA, United States of America
FMNH	Field Museum of Natural History, Chicago, IL, United States of America
ICN	Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, Colombia
MACN	Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires, Argentina
MPEG	Museu Paraense Emílio Goeldi, Belém, Brazil
MUSM	Museo de Historia Natural, Universidad Nacional de San Marcos, Lima, Peru
UA	Universidad Autónoma, Lima, Peru

TAXONOMY

Neoxyphinus Birabén, 1953

DIAGNOSIS and DESCRIPTION: See Abrahim et al., 2012.

DISTRIBUTION: Caribbean and South America, from Jamaica to northern Argentina.

Neoxyphinus amazonicus Moss and Feitosa, new species

Figures 01-29; map 01

TYPE: Male holotype from Acampamento do Mutum, Juruti, Pará, Brazil, (02°33'13.8"S, 56°13'22.1"W), 18-23 Feb. 2011, Rodrigues, Bastos & Lo Man-Hung (MPEG 019698, PBI_OON 44119). Female paratype from Estrada para Capiranga, Juruti, Pará, Brazil, (02°36'10.6"S, 56°12'25.8"W), 6 Sep. 2002, A.B. Bonaldo & D.D. Guimarães (MPEG 10666, PBI_OON 44397). Female paratype from Lago Taraíra, Bajo Rio Apaporis, Caparu Biological Station, Taraira, Vaupés, Colombia, (01°04'N, 69°29'W), 2 Apr. 2004, J. Pinzon (ICN, PBI_OON 40465).

ETYMOLOGY: The specific name is to be treated as a Latin adjective, referring to the distribution of this species on the Amazon Forest.

DIAGNOSIS: Males differ from those of species with smooth carapace with no spikes and abdomen with no denticles in having the particularly large ejaculatory opening (fig. 11). Females resemble those of *N. coca* sp. nov., *N. inca* sp. nov. and *N. hispidus* (Dumitrescu & Georgescu, 1987) by the absence of either carapace posterior spikes or denticles on the anterior dorsal scutum (fig. 29); they differ from those of *N. coca* sp. nov. and *N. inca* sp. nov. by the continuous groove connecting the spiracle openings (fig. 27) and from those of *N. hispidus* by the straight median element.

MALE (PBI_OON 44096, figs. 01-16, 18-19): Total length 2.12. **Cephalothorax:** Carapace orange-brown, broadly oval, *pars cephalica* strongly elevated, posterolateral surface without spikes, surface of elevated portion smooth, sides granulate, lateral margin with small denticles; posterior pars with one or two pairs of small tubercles (fig. 05); procurved set of setae on posterior surface with six small

tubercles (fig. 06). Clypeus margin slightly reborded, straight in frontal view, high. ALE separated from edge of carapace by more of their radius. Sternum as long as wide, orange-brown, radial furrow shallow, surface smooth, without pits, setae sparse, evenly scattered, originating from small pits. Endites and labium orange-brown. **Abdomen:** Book lung covers large, round. Pedicel tube medium. Dorsal scutum orange-brown, middle surface and sides smooth, anterior half without projecting denticles (fig. 09). Epigastric and postepigastric scutum orange-brown. **Legs:** Legs pale orange. Leg spination: tibiae: I v4-4-0; metatarsi: I v2-2-0. **Genitalia:** Epigastric region with sperm pore small and circular. Palp with proximal segments, cymbium and bulb yellow. Embolus oblong, with short apical projection (fig. 14), without prolateral prong or prolateral lamella (figs. 11-16).

FEMALE: (PBI_OON 44360, figs. 17, 20-29): Total length 2.28. **Cephalothorax:** Carapace pars cephalica slightly elevated in lateral view, with surface granulate (fig. 17); lateral margin without denticles; posterior part with five or more tubercles (fig.23); procurved set of setae on posterior surface with nine or more small tubercles (fig. 23). **Abdomen:** Posterior spiracles connected by a continuous groove. Dorsal abdominal scutum middle surface and lateral sides finely reticulate (fig. 28). **Legs:** Legs spination: femora: I v0-0-2; tibiae: I v2-2-1; II v4-2-2; metatarsi: I v4-1-0; II v2-0-2. **Genitalia:** Epigynal atrium wide; epigynal straight median element. (fig. 27).

OTHER MATERIAL EXAMINED: BRAZIL: **Pará:** *Juruti*, Beneficiamento, (02°30’27.4”S, 56°10’39.5”W), 17-21 Dec. 2012, A. S. Alves, E. L. S. Costa, & N. C. Bastos, MPEG 20759, (PBI_OON 44225), 1♂; 19-25 Aug. 2011, R. Saturnino, E. Cafofo & M. Bastos, MPEG 019596, (PBI_OON 44017), 1♂; 03-08 Aug. 2012, B. Rodrigues, M. Bastos & N. Abrahim, MPEG 19564, (PBI_OON 43985), 1♂; 07-12 May 2010, B. Rodrigues, M. Bastos & Lo-Man-Hung, MPEG 19632, (PBI_OON

44053) 1♂; 18-23 Feb. 2011, B. Rodrigues, M. Bastos & Lo-Man-Hung, MPEG 19720, (PBI_OON 44141) 1♂; MPEG 19722, (PBI_OON 44143) 1♂; Acampamento do Mutum, (01°36'44.7"S, 56°11'39.2"W), 03-10 Jun. 2007, D. F. Candiani & N. F. Lo Man-Hung, MPEG 19676, (PBI_OON 44097) 2♂; MPEG 19743, (PBI_OON 40773) 1♂; 08-15 Aug. 2006, D. F. Candiani & N. F. Lo Man-Hung, MPEG 10678 (PBI_OON 40310) 1♂; (01°36'45.2"S, 56°11'27.5"W), A. Bonaldo, MPEG 19635, (PBI_OON 44056) 1♂; (02°33'06.9"S, 56°13'29.0W), 18-23 Feb. 2011, B. Rodrigues, M. Bastos & N. F. Lo-Man-Hung, MPEG 19709, (PBI_OON 44130) 1♂; MPEG 19706, (PBI_OON 44127) 1♂; 19-25 Aug. 2011, R. Saturnino, E. Cafofo & M. Bastos, MPEG 19576, (PBI_OON 43997) 1♂; (02°33'13.8"S, 56°13'22.1"W), 18-23 Feb. 2011, B. Rodrigues, M. Bastos & N. F. Lo-Man-Hung, MPEG 19700, (PBI_OON 44121) 1♂; MPEG 19703, (PBI_OON 44124) 1♂; B. Rodrigues, MPEG 19693, (PBI_OON 44114) 1♂; (02°33'18.0"S, 56°13'22.4"W, 05-07 May 2010, B. Rodrigues, M. Bastos & N. F. Lo-Man-Hung, MPEG 19606, (PBI_OON 44027) 1♂; 23 Feb. 2011, B. Rodrigues, M. Bastos & N. F. Lo Man-Hung, MPEG 19610, (PBI_OON 44031) 1♂; 11 May 2010, MPEG 19708, (PBI_OON 44129) 1♂; Estrada base para Capiranga, (02°36'10.6"S, 56°12'25.8"W), 04-11 Sep. 2002, A. Bonaldo, MPEG 19638, (PBI_OON 44059) 1♂; MPEG 19639, (PBI_OON 44060) 1♂; Platô Capiranga, Linha 168E, (02°28'22.1"S, 56°12'29.4"W), 12-14 Aug. 2006, Candiani & Lo-Man-Hung, MPEG 10691, (PBI_OON 44401) 1♂; Platô do Rio Juruti, (02°33'07.2"S, 56°13'06.2"W), 12 Sep. 2002, A. Bonaldo, MPEG 19650, (PBI_OON 44071) 1♂; Vale do Igarapé Mutum, (01°36'44.7"S, 56°11'39.2"W), 08-15 Aug. 2006, Candiani & Lo-Man-Hung, MPEG 10696, (PBI_OON 44400) 1♂; MPEG 10687, (PBI_OON 44390) 1♀; MPEG 10694, (PBI_OON 44396) 1♂; *Melgaço*, Ferreira Penna Scientific Station, National Forest Caxiuanã, (01°44'15.5"S, 51°26'42.0"W), 28 May 2003, Barreiros, MPEG 10351,

(PBI_OON 44402) 1♂; 25 May 2003, Barreiros, MPEG 10354, (PBI_OON 44391) 1♂; 08 Aug. 2003, Barreiros, MPEG 10352, (PBI_OON 44398) 1♂; 17 Aug. 2003, Barreiros, MPEG 10347, (PBI_OON 44393) 1♂; MPEG 10350, (PBI_OON 44399) 1♂; 22 Oct. 2003, Barreiros, MPEG 10348, (PBI_OON 44395) 1♂; 25 Oct. 2003, Barreiros, MPEG 10344, (PBI_OON 44389) 1♀; (01°44'18.2"S, 51°27'48.01"W, 01 Sep. 2003, unknown collector, MPEG 14044, (PBI_OON 44394) 1♀; 21-31 Oct. 2003, unknown collector, MPEG 14058, (PBI_OON 44392) 1♀; *Portel*, Plot PPBIO, Igarapé Caquajó, Caxiuanã National Forest, (01°57'38.9"S, 51°36'45.3"W), 19-28 Jul. 2007, Ribeiro-Junior & Lo-Man-Hung, MPEG 17152, (PBI_OON 44512) 2♂; MPEG 17155, (PBI_OON 44405) 1♂; MPEG 17154, (PBI_OON 44516) 1♂; MPEG 17150, (PBI_OON 44407) 1♂; MPEG 17156, (PBI_OON 44510) 1♂; MPEG 17149, (PBI_OON 44408) 1♂; MPEG 17153, (PBI_OON 44511) 1♂; MPEG 17151, (PBI_OON 44515) 1♂; MPEG 17157, (PBI_OON 44406) 1♂; MPEG 17148, (PBI_OON 44514) 1♂. COLOMBIA: **Amazonas:** *Leticia:* Km 11 via Tarapacá, Est. II/2001, 18 Nov. 2001, Flores, ICN Ar- 1145, (PBI_OON 44312) 1♂; **Vaupes:** *Taraira:* Lago Taraíra, bajo Rio Apaporis, Caparu Biological Station, (01°04'N, 69°29'W), 02 Apr. 2004, unknown collector, ICN, (PBI_OON 44360) 1♀; ICN, (PBI_OON 44361) 3♂ 3♀.

DISTRIBUTION: Known from Amazon Region in Colombia and Brazil.

Neoxyphinus andersoni Moss and Feitosa, new species

Figures 30-38; map 01

TYPE: Male holotype from National Park Yacambu, Lara, Venezuela, 14.4 km SE from Sanare, 1500 m, (09°42'22"N 69°34'42"W), 17 May 1998, cloud forest litter, R. Anderson (AMNH, PBI_OON 44330).

ETYMOLOGY: The specific name is a patronym in honor of the collector of the holotype.

DIAGNOSIS: Males resemble those of *N. trujillo* sp. nov., *N. boibumba* Abrahim & Rheims, 2012, *N. hispidus* and *N. macuna* sp. nov. by the carapace surface without spikes and the anterior portion of the dorsal scutum with denticles; they differ from those of *N. macuna* sp. nov. by the dorsal scutum denticles being restricted to the anterior portion (fig. 33); from *N. hispidus* by the poorly developed embolar apical projection (fig. 36); from *N. boibumba* by the oblong embolus (fig. 36-38) and; from *N. trujillo* sp. nov. by the finely reticulated surfaces of carapace and abdomen (fig. 30).

MALE (holotype, figs. 30-38): Total length 2.69. **Carapace:** Carapace dark red-brown, broadly oval, *pars cephalica* slightly elevated, posterolateral surface without spikes, surface of elevated portion of and sides finely reticulate; lateral margin without denticles; posterior part with one pair of well-developed tubercles (fig. 31); procurved set of setae on posterior surface with four small tubercles (fig. 31). Clypeus margin slightly reborded, straight in front view, high, ALE separated from edge of carapace of carapace by more of their radius. Sternum as long as wide, dark red-brown; radial furrows shallow, surface smooth, without pits; setae sparse, evenly scattered, originating from small pits. Chelicerae, endites and labium dark red-brown. **Abdomen:** Book lung covers large. Pedicel tube medium. Dorsal scutum dark red-brown, middle surface reticulate, sides finely reticulate, anterior half with projecting denticles (fig. 33). Epigastric and postepigastric scutum dark red-brown. **Legs:** Legs orange-brown. Leg spination: tibiae: I v2-4-2; metatarsi: I v2-2-2. **Genitalia:** Epigastric region with sperm pore small and circular. Palp with proximal segments, cymbium and bulb pale orange. Embolus oblong, with a small apical projection (fig. 36, 37).

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: VENEZUELA: **Aragua:** National Park Henri Pittier, E. B. Rancho Grande, (10°20’42”N, 67°41’09”W), 12 May 1998, mountain forest litter, 1150 m , R. Anderson, AMNH, (PBI_OON 44331) 1♂.

DISTRIBUTION: Known from Northern Venezuela.

Neoxyphinus beni Moss and Feitosa, new species

Figures 39-55; map 02

TYPE: Male holotype and female paratype from 2 km NW from Tumichucua, Vaca Diez, Beni, Bolivia, (11°8.77’S, 66°9.91’W), F.I.T. Trap in forest, 01-09 Dec. 1993, P. Parrillo & W. Rojas (♂ FMNH, PBI_OON 10721), (♀ FMNH, PBI_OON 44362).

ETYMOLOGY: The specific name is a toponym referring to the Bolivian department in which the types were collected.

DIAGNOSIS: Males and females resemble *N. amazonicus* sp. nov., *N. inca* sp. nov. and *N. coca* sp. nov. by the smooth carapace surface and by the dorsal scutum without denticles. Males differ from those of *N. amazonicus* sp. nov. by the relatively small ejaculatory opening (figs. 45) and from those of *N. inca* sp. nov. and *N. coca* sp. nov. by the embolar apical projection tapered (figs. 44). Females differ from those of *N. amazonicus* sp. nov. by the posterior carapace with well-developed tubercles (fig. 49) and by the narrower epigynal atrium; from those of *N. inca* sp. nov. by the epigynal median element posteriorly positioned and from those of *N. hispidus* by the straight epigynal median element (fig. 55).

MALE (holotype, figs. 39-46): Total length 2.07. **Cephalothorax:** Carapace orange-brown, *pars cephalica* strongly elevated; posterolateral surface without spikes, surface and sides smooth (fig. 39); lateral margin with blunt denticles; posterior part

with one pair of well-developed tubercles (fig. 39), procurved set of setae on posterior surface with four small tubercles (fig. 39). Clypeus margin slightly reordered, straight in front view, high, ALE separated from edge of carapace by more their radius. Sternum as long as wide, orange-brown; radial furrows shallow, surface smooth, without pits; setae sparce, evenly scattered, originating from small pits. Chelicerae, endites and labium orange-brown. **Abdomen:** Book lung covers large and ovoid. Pedicel tube medium. Dorsal scutum orange-brown, middle surface and sides smooth, anterior half without projecting denticles (fig. 41). Epigastric and postepigastric scutum orange-brown. **Legs:** Legs orange-brown. Leg spination: tibiae: I v2-4-0; metatarsi: I v2-2-0. **Genitalia:** Epigastric region with sperm pore small and circular. Proximal segments, cymbium and bulb pale orange, cymbium completely fused with bulb. Embolus longer than wide, apical projection tapered (figs. 44-46).

FEMALE (paratype, figs. 47-55): Total length 2.18. **Cephalothorax:** Eyes all subequal (fig. 51). **Abdomen:** Dorsal scutum orange-brown, middle surface and sides smooth; groove connecting the posterior spiracles notch (fig. 54). **Legs:** Legs orange-brown. Leg spination: tibiae: I v6-2-0; II v4-2-0; metatarsi: I v4-2-0; II v2-2-0. **Genitalia:** Epigynal atrium narrow, epigynal median element posteriorly positioned (fig. 55).

OTHER MATERIAL EXAMINED: BOLIVIA: **Beni:** *Vaca Diez,* 2 km NW from Tumichucua, (11°8.77’S, 66°9.91’W), 01-09 Nov. 1993, berlese of forest leaf litter, P. Parrillo & W. Jojas, FMNH INS 043 137, (PBI_OON 10680) 1♂ 1♀.

DISTRIBUTION: Known from Beni department in Bolivia.

Neoxyphinus caribensis Moss and Feitosa, new species

Figures 56-64; map 02

TYPE: Male holotype from Las Melenis, Irapa, Mariño, Sucre, Venezuela, (10°41'N, 62°37'W), sifting leaf litter, 800 m, 10 May 1993, J. Lattke (CAS, PBI_OON 2622).

ETYMOLOGY: The specific name is a Latin adjective, referring to the geographic region in which the holotype was collected.

DIAGNOSIS: Easily distinguished from all other species in the genus by the modified male sternum, presenting three pairs of marginal elevations, the middle one connected by a single transversally raised arched ridge (fig. 59) and lack the leg spines.

MALE (holotype, figs. 56-64): Total length 2.28. **Cephalothorax:** Carapace dark red-brown, broadly oval, *pars cephalica* slightly elevated, posterolateral surface without spikes, surfaces and sides of smooth, lateral margin without denticles. Clypeus margin slightly reborded, straight in frontal view, high, ALE separated from edge of carapace by more their radius. Sternum wider than long, dark red-brown, without radial furrows and pits, surface smooth, with posterior hump and with a one pair of elevation near coxae II and near coxae IV, elevation in coxae III connected by a single transversally raised arched ridge (median ridge) (fig. 59); setae sparse, evenly scattered, originating from small pits. Chelicerae, endites and labium dark red-brown. **Abdomen:** Book lung covers large and ovoid. Pedicel tube medium. Dorsal scutum dark red-brown, middle surface smooth and sides finely reticulate, anterior half without projecting denticles (fig. 60). Epigastric and postepigastric scutum dark red-brown. **Legs:** Legs orange-brown. **Genitalia:** Epigastric region with sperm pore small and oval. Proximal segments, cymbium and bulb pale orange. Embolus with prolateral prong (fig. 64), apical projection short and thick (fig. 62-64).

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from type locality.

Neoxyphinus coca Moss and Feitosa, new species

Figures 65-87; map 02

TYPE: Male holotype and female paratype from Yasuni National Park, Orellana Province, Ecuador, (0°40'16"S, 76°24'18"W), 228 m, 01-05 Dec. 2009, B. Baerhr (♂ AMNH PBI_OON 44332), (♀ AMNH PBI_OON 44364).

ETYMOLOGY: The specific name is in apposition, referring to the early name of Francisco de Orellana city, La Coca, in Orellana Province.

DIAGNOSIS: Males and females resemble *N. inca* sp. nov., *N. amazonicus* sp. nov. and *N. beni* sp. nov. by the absence of either carapace posterior spikes or denticles on the anterior dorsal scutum and sternum surface without pits. Male differs from those of *N. amazonicus* sp. nov. by the presence of a prolateral embolar lamella (fig. 75) and one pair of tubercles on carapace posterior surface (fig. 69); differs from those of *N. inca* sp. nov. and *N. beni* sp. nov. by the short embolar apical projection (figs. 75-78). Females differ from those of *N. hispidus* and *N. inca* sp. nov. by the oblong epigynal median element. Differ from *N. amazonicus* sp. nov. and *N. beni* sp. nov. by the carapace with small posterior tubercles (fig. 73).

MALE (PBI_OON 30583, figs. 65-72, 74-78): Total length 2.16. **Cephalothorax:** Carapace orange-brown, broadly oval, *pars cephalica* slightly elevated, posterolateral surface without spikes, surface and sides smooth (fig. 67); lateral margin without denticles; posterior part with one pair of small tubercles (fig. 69); procurved set of setae on posterior surface with four small tubercles (fig. 67). Clypeus margin slightly reborded, straight in front view, high, ALE separated from edge of carapace by more their radius. Sternum as long as wide, orange-brown, radial furrows

shallow, surface smooth, without pits; setae sparse, evenly scattered, originating from small pits. Chelicerae, endites and labium orange-brown. **Abdomen:** Book lung covers large and round. Pedicel tube medium. Dorsal scutum orange-brown, surface and sides smooth, anterior half without projecting denticles (fig. 71). Epigastric and postepigastric scutum orange-brown. **Legs:** Legs pale orange. Leg spination: tibiae: I v4-4-0; metatarsi: I: v2-2-2. **Genitalia:** Epigastric region with sperm pore small and oval. Proximal segments, cymbium and bulb pale orange. Embolus rounded, with prolateral lamella (fig. 75), without prolateral prong, apical projection shorter (figs. 74-78).

FEMALE (PBI_OON 30583, figs. 73, 79-87): Total length 2.46. **Cephalothorax:** Carapace surface of elevated portion of pars cephalica finely reticulate and sides strongly reticulate; posterior part with three or more pair of tubercles (fig. 79); procurved set of setae on posterior surface with six or more small tubercles (fig. 79). **Abdomen:** Dorsal scutum middle surface and sides finely reticulate; groove connecting the posterior spiracles notch (fig. 87). **Legs:** Leg spination: femora: I, II v0-1-0; tibiae: I v6-4-0; II v4-4-2; metatarsi: I v4-2-0; II v2-2-0. **Genitalia:** Epigynum with conspicuous apodemes; epigynal median element oblong (fig. 87).

OTHER MATERIAL EXAMINED: ECUADOR: **Orellana Province:** Yasuni National Park, (0°40’16”S, 76°24’18W), 01-05 Dec. 2009, litter, 228 m, B. Baerhr, AMNH, (PBI_OON 44367) 1♂; AMNH, (PBI_OON 44365) 1♀; Yasuni Biological Station, (0.67111S, 76.4002W), 02 Dec. 2008, Canopy Tower, leaf litter, 200 m, unknown collector, AMNH, (PBI_OON 44366) 1♀; *Cantón,* Tiputini River, Yasuni Biological Station, (0.067428°S, 76.39764°W), 01-05 Dec. 2009, rain forest, 295 m, M. Ramirez, MACN, (PBI_OON 30601) 1♀; MACN, (PBI_OON 15090) 1♀ 1♂; berlese, MACN, (PBI_OON 30583) 1♀ 1♂; leaf litter, MACN, (PBI_OON 15104) 1♀ 1♂. **Napo Province:** *Cantón Tena,* Parroquia Puerto Napo, Jatun Sacha Biological Station,

(01°03’57.5”S, 77°37’00.2”W), 01-05 Dec. 2009, rain forest, leaf litter, 410 m, C. Grismado, & F. Labarque, MACN, (PBI_OON 30586586) 1 ♀; MACN, (PBI_OON 30592).

DISTRIBUTION: Known from Orellana and Napo Provinces, Ecuador.

Neoxyphinus inca Moss and Ruiz, new species

Figures 88-115; map 03

TYPE: Male holotype from Manu highway, km 165, Consuelo, Cusco, Peru, litter under crown of felled tree, 7 Oct. 1982, L. E. Watrous & G. Mazurek (FMNH INS 033 572, PBI_OON 10079). Female paratype from Tambopata, Madre de Dios, Peru, litter under crow of fallen tree, 28 Oct. 1982, L. E. Watrous & G. Mazurek (FMNH INS 033 543, PBI_OON 10050).

ETYMOLOGY: The specific name is a noun in apposition after the ancestral people who lived in the region where the specimens were collected.

DIAGNOSIS: Males and females resemble *N. amazonicus* sp. nov., *N. coca* sp. nov. and *N. beni* sp. nov. by the absence of either carapace developed posterior spikes and anterior denticles on dorsal scutum and by the smooth sternum surface. Males differ from those of *N. amazonicus* sp. nov. by the presence of a prolateral embolar lamella (fig. 104); from those of *N. coca* sp. nov. by the oblong embolus (figs. 103-105) and from those of *N. beni* sp. nov. by the truncated embolar ejaculatory opening. Females differ from those of *N. amazonicus* sp. nov. by the carapace with two pairs small posterior tubercles (fig. 110); differ from those of *N. coca* sp. nov. and *N. beni* sp. nov. by the epigynal median element placed anteriorly (fig. 115), and from those of *N. hispidus* by the circular epigynal median element.

MALE (PBI_OON 10680, figs. 88-97, 99-101, 103-105): Total length 2.30. **Cephalothorax:** Carapace dark red-brown, broadly oval, *pars cephalica* slightly elevated, posterolateral surface without spikes, surface and sides smooth; lateral margin with small denticles (fig. 88, 92); posterior part with one pair of well-developed tubercles (fig. 92); procurved set of setae on posterior surface with four small tubercles (fig. 92). Clypeus margin slightly reborded, straight in front view, high, ALE separated from edge of carapace by more their radius. Sternum as long as wide, dark red-brown, radial furrows shallow and smooth, without pits; setae sparse, evenly scattered, originating from small pits. Chelicerae, endites and labium dark red-brown. **Abdomen:** Book lung covers large and round. Pedicel tube medium. Dorsal scutum dark red-brown, middle surface and sides smooth, anterior half without projecting denticles (fig. 94). Epigastric and postepigastric scutum dark red-brown. **Legs:** Legs orange-brown. Leg spination: tibiae: I v4-4-0; metatarsi: I v2-2-0. **Genitalia:** Epigastric region with sperm pore small and circular. Proximal segments, bulb and cymbium pale orange. Embolus with prolateral lamella (fig. 104), without prolateral prong, apical projection truncated (fig. 95, 103).

FEMALE (PBI_OON 10680, figs. 98, 102, 106-115): Total length 2.56. **Cephalothorax:** Posterior carapace part with one or two pairs of tubercles (figs. 110). Clypeus high, ALE separated from edge of carapace by more their radius. **Abdomen:** groove connecting the posterior spiracles notch (fig. 114). **Legs:** Leg spination: I v6-2-2; II v4-4-0; metatarsi: I v4-2-0; II v4-0-2. **Genitalia: C**ircular epigynal median element (fig. 115).

OTHER MATERIAL EXAMINED: PERU: **Cusco:** road to Manu, km 165, 07 Oct. 1982, leaf litter, L.E. Watrous & G. Mazurek, FMNH INS 033 542, (PBI_OON 10049) 1♀; 01 Oct. 1982, rotten palm fruit L.E. Watrous & G. Mazurek, FMNH INS

033 588, (PBI_OON 10095) 1♂; 06 Oct. 1982, litter from prev. sifting, L.E Watrous & G. Mazurek, FMNH INS 033 590, (PBI_OON 10097) 1♀; 12 Oct. 1982, leaf litter, L.E. Watrous & G. Mazurek, FMNH FM(HD) 82-375, (PBI_OON 38408) 5♂; FMNH FM(HD) 82-360, (PBI_OON 38406) 1♂; FMNH FM(DH) 82-381, (PBI_OON 38407) 1♂; *Cusco,* Río Camisea Pagoreni, (11°42'22.5"S, 72°54'10.7"W), 09 Sep. 1998, 465 m, S. Córdova, MUSM ENT 050/436, (PBI_OON 40592) 1♂; 07-28 May 1998, pitfall trap, S. Córdova, MUSM ENT 050/434, (PBI_OON 40601) 2♂; MUSM-ENT 050/429, (PBI_OON 40587) 1♀ 1♂; MUSM-ENT 050/430, (PBI_OON 40590) 1♂; Río Camisea, San Martin, (11°47'09.8"S, 72°42'05.3"W), 09 Nov. 1997, pitfall trap, 474 m, S. Córdova, MUSM ENT 0500/467, (PBI_OON 40596) 1♀; MUSM ENT 0500/466, (PBI_OON 40588) 1♀; 07 Nov. 1997, MUSM ENT 0500-463, (PBI_OON 40595) 1♂; 08 Nov. 1997, MUSM-ENT 050/465, (PBI_OON 40597) 1♂. **Madre de Dios:** *Tambopata*, 25 Oct. 1982, litter along river, L.E. Watrous & G. Mazurek, FMNH INS 033 548, (PBI_OON 10055) 1♂; 25 Oct. 1982, rotten palm flowers, L.E. Watrous & G. Mazurek, FMNH INS 033 592, (PBI_OON 10099) 1♂; 28 Oct. 1982, bamboo litter, L.E. Watrous & G. Mazurek, FMNH FM(HD) 82-402, (PBI_OON 10607) 1♀; FMNH FM(HD) 82-402, (PBI_OON 10625) 1♂; Quebrada Las Piedras, (245502E, 8579622N), 10 Mar. 2008, forest mountain bamboo, M. Vasquez, UA 162/2008, (PBI_OON 15057) 1♀; Rio Cupodnoe, (281545E, 8579622N), Aug. 2008, bamboo forest high hill, M. Vasquez, UA 208/2008, (PBI_OON 15053) 1♂; Cuenca del Rio Los Amigos/CICRA, 16 Feb. 2006, M. Deza, UA 080, (PBI_OON 14818) 2♀. **Loreto:** Pithecia, (0511S, 7242W), T. Erwin & D. Silva, MUSM, (PBI_OON 40604) 1♀ 1♂.

DISTRIBUTION: Known from Madre de Dios and Cusco Department in Peru.

Neoxyphinus macuna Moss and Ruiz, new species

Figures 116-144; map 03

TYPE: Male holotype from La Pedrera Querada el Ayo, La Pedrera, Amazonas, Colombia, (01°35'N, 69°31'W), May 2002, J. Pinzon, ICN, (PBI_OON 44329). Female paratype from, Lago Taraíra bajo Rio Apaporis, Caparu Biological Station, Taraíra, Vaupes, Colombia, (01°04'N, 69°29'W), 02 Apr. 2004, J. Pinzon, ICN, (PBI_OON 44363).

ETYMOLOGY: The specific name is in apposition, referring to the indigenous tribe Macuna, which inhabited the type locality.

DIAGNOSIS: Males resemble those of *N. hispidus*, *N. boibumba*, *N. andersoni* sp. nov. and *N. trujillo* sp. nov. by the carapace posterior surface without spikes and by the anterior portion of the dorsal scutum with denticles; differs from those of *N. trujillo* sp. nov., *N. hispidus* and *N. andersoni* sp. nov. by the smooth dorsal scutum surface, with denticle field reaching the anterior half of the dorsal scutum; and from those of *N. boibumba* by the elongated embolus (fig. 125). Females are easily recognized by the presence of abdominal dorsal denticles and by the book lung margins with rows of cuticular projections (fig. 144).

MALE (holotype, figs. 116-133): Total length 2.57. **Cephalothorax:** Carapace orange-brown, broadly oval, *pars cephalica* slightly elevated, posterolateral surface without spikes, surface and sides smooth; lateral margin without denticles (fig. 119); posterior part with one pair of well-developed tubercles (fig. 119); procurved set of setae on posterior surface with four small tubercles (fig. 119). Clypeus margin slightly reborded, straight in front view, high, ALE separated from edge of carapace by more their radius. Sternum as long as wide, orange-brown, radial furrows shallow; surface smooth, without pits; setae sparse, evenly scattered, originating from small tubercles (fig. 120). Chelicerae, endites and labium orange-brown. **Abdomen:** Book lung covers

large and ovoid. Pedicel tube long. Dorsal scutum orange-brown, middle surface and side smooth, anterior half with projecting denticles. Epigastric and postepigastric scutum orange-brown. **Legs:** Legs pale orange. Leg spination: tibiae: I v4-4-2; metatarsi I v2-2-0. **Genitalia:** Epigastric region with sperm pore small and oval. Proximal segments, bulb and cymbium pale orange. Embolus oblong, without prolateral lamella, with prolateral prong (fig. 128), apical process shorter (figs. 125, 128-131).

FEMALE (paratype, figs. 134-144): Total length 2.84. **Cephalothorax:** Carapace surface of elevated portion of pars cephalica and sides smooth. Clypeus high, ALE separated from edge of carapace by more their radius. **Abdomen:** Book lung ornate with rows of cuticular projections (fig. 144). Dorsal scutum middle surface and side smooth, anterior half with projecting denticles (fig. 143); with groove connecting the posterior spiracles notch (fig. 142). **Legs:** Leg spination: femora: II v0-2-0; tibiae: I v4-4-2; II v6-2-0; metatarsi: I v2-4-0; II v4-2-0. **Genitalia:** Epigynum narrow.

OTHER MATERIAL EXAMINED: COLOMBIA: **Vaupes:** *Taraíra,* Lago Taraíra, bajo Río Apaporis, Caparu Biological Station, (01°04'N, 69°29'W), 02 Apr. 2004, J. Pinzon, ICN, (PBI_OON 40464) 1♀ 3♂; ICN, (PBI_OON 44359) 1♀.

DISTRIUTION: Know from Vaupés and Amazonas Department in Colombia.

Neoxyphinus pure Moss and Bonaldo, new species

Figures 145-173; map 04

TYPE: Male holotype and female paratype from Quebrada el Ayo, La Pedrera, Amazonas, Colombia, (01°35'N, 68°31'W), May 2002, J. Pinzon, (♂ ICN, PBI_OON 44340), (♀ ICN, PBI_OON 44341).

ETYMOLOGY: The specific name is a toponym referring to Puré River, which runs through the type locality.

DIAGNOSIS: Males and females resemble those of *N. termitophilus*, *N. petrogoblin* Abrahim & Ott, 2012 and *N. gregoblin* Abrahim & Santos, 2012 by the presence of four spikes on carapace posterior surface (figs. 145, 146). Both males and females differ from those of *N. termitophilus* and *N. petrogoblin* by the presence of pits on sternal surface (fig. 149, 160) and from those of *N. gregoblin* by the lateral margin of carapace with small denticles (fig. 145, 166).

MALE (PBI_OON 44328, figs. 145-154, 155, 159-162): Total length 1.55. **Cephalothorax:** Carapace orange-brown, broadly oval, *pars cephalica* slightly elevated, posterolateral surface with two pairs of spikes, surface and sides smooth; lateral margin with small denticles. Clypeus margin slightly reborded, straight in front view, high, ALE separated from edge of carapace by more their radius. Sternum longer than wide, orange-brown, radial furrows deep and with rows of small pits, surface smooth covered with small round pits (fig. 149); setae sparse, evenly scattered, originating from small pits. Chelicerae, endites and labium orange-brown. **Abdomen:** Book lung covers large and ovoid. Pedicel tube long. Dorsal scutum orange-brown, middle surface and sides smooth, anterior half with projecting denticles (fig. 148). Epigastric and postepigastric scutum orange-brown. **Legs:** Legs pale orange. Leg spination: tibiae: I v4-4-0; metatarsi: I v4-4-0. **Genitalia:** Epigastric region with sperm pore small and oval; proximal segments, bulb and cymbium yellow; embolus rounded, without prolateral prong or lamella, apical process shorter (fig. 152, 162).

FEMALE (PBI_OON 44342, figs. 156-158, 163-173): Total length 1.80. **Cephalothorax:** Carapace dark red-brown. **Abdomen:** Pedicel tube medium. Dorsal scutum dark red-brown, anterior half without projecting denticles (fig. 163, 171); groove connecting posterior tracheal spiracles presenting of a pair of sub-terminal

notches (fig. 170). **Legs:** Leg spination: tibiae: I v6-2-0; II v4-2-2; metatarsi: I v4-2-0; II v2-2-0. **Genitalia:** Epigynal atrium elliptical (fig. 170)..

OTHER MATERIAL EXAMINED: COLOMBIA: **Amazonas:** *La Pedrera*, Quebrada el Ayo, (01°35'N, 69°31'W), May 2002, J. Pinzon, ICN AR 4100, (PBI_OON 44328) 1♂; ICN, (PBI_OON 44342) 1♀; ICN, (PBI_OON 40466) 3♀ 2♂.

DISTRIUTION: Known from La Pedrera municipality, Amazonas, Colombia.

Neoxyphinus trujillo Moss and Bonaldo, new species

Figures 174-184; map 04

TYPE: Male holotype and female paratype from 27.7 km N from Bocono, Trujillo, Venezuela, dry litter, 6700 ft, 31 Mar. 1992, L. Herman (♂ AMNH, PBI_OON 140), (♀ AMNH, PBI_OON 44358).

ETYMOLOGY: The specific name is a toponym taken from the type locality.

DIAGNOSIS: Males resemble *N. hispidus* and *N. andersoni* sp. nov. by the reticulated surfaces of the carapace and dorsal scutum, carapace without posterior spikes and dorsal scutum with denticles; differs from those of *N. hispidus* by the presence of an embolar prolateral prong (fig. 183) and from those of *N. andersoni* sp. nov. by the strongly reticulated carapace and abdomen surfaces (figs. 177, 181). Females resemble those of *N. furtivus* (Chickering, 1986) and *N. keyserlingi* (Simon, 1907) by the carapace devoid of spikes and by the surfaces of carapace and abdomen strongly reticulated; differs from those of *N. keyserlingi* by the absence of sternal pits and from those of *N. furtivus* by the groove connecting the posterior spiracles presenting a pair of sub-terminal reinforced notches (fig. 192) and by the carapace posterior surface with one pair of tubercles (fig. 189).

MALE (holotype, figs. 174-184): Total length 2.85. **Cephalothorax:** Carapace orange-brown, broadly oval, *pars cephalica* slightly elevated, posterolateral surface without spikes, surface of elevated portion and sides strongly reticulate (fig. 177); lateral margin with small denticles; posterior pars with one pair of small tubercles (fig. 177); procurved set of setae on posterior surface with eight small tubercles (fig. 177). Clypeus margin slightly reborded, straight in front view; high, ALE separated from edge of carapace by more their radius. Sternum as long as wide, orange-brown, radial furrows shallow and smooth, without pits; setae sparse, evenly scattered, originating from small pits. Chelicerae, endites and labium pale orange. **Abdomen:** Book lung covers large and round. Pedicel tube medium. Dorsal scutum orange-brown, middle surface and sides reticulate, anterior half with projecting denticles (fig. 181). Epigastric and postepigastric scutum orange-brown. **Legs:** Legs pale orange. Leg spination: tibiae: I v2-4-0; metatarsi: I v2-2-0. **Genitalia:** Epigastric region with sperm pore small and circular. Proximal segments, bulb and cymbium pale orange; embolus with apical projection stout (182-184), with prolateral prong (fig. 183).

FEMALE (paratype, figs. 185-194): Total length 3.21. **Cephalothorax:** posterior part with one pair of small tubercles. Clypeus high, ALE separated from edge of carapace by more their radius. **Abdomen:** Dorsal scutum anterior half without projecting denticles (fig. 193); with groove connecting the posterior spiracles notch (fig. 194). **Legs:** Leg spination: femora: I v0-0-2; tibiae: I v6-4-0; II v4-4-0; metatarsi: I v2-2-2; II v2-2-0. **Genitalia:** Epigynal atrium large (fig. 192).

OTHER MATERIAL EXAMINED: None.

DISTRIUTION: Known only from Trujillo, Venezuela.

Neoxyphinus yekuana Moss and Bonaldo, new species

Figures 195-223; map 04

TYPE: Male holotype and female paratype from 1.5 km E from Caño Tigre, Puerto Ayacucho, Amazonas, Venezuela, primary forest, 12 Jul. 1996, I. Netuzhilin (♂ MACN, PBI_OON 44325), 07 Jan. 1996 (♀ MACN, PBI_OON 44326).

ETYMOLOGY: The specific name is a noun in apposition, honoring an indigenous tribe who inhabits the tropical forests in Bolivar and Amazonas states in Venezuela.

DIAGNOSIS: Males resemble those of *N. barreirosi* Abrahim & Bonaldo, 2012 and *N. furtivus* by the absence of spikes on carapace posterior surface or denticles on dorsal scutum and by the presence of pits on sternum surface; differs from those of *N. barreirosi* by the rounded embolus (fig. 211) and from those of *N. furtivus* by absence of an embolar prolatero-apical lamella (fig. 211). Females are easily distinguished by clypeus two time the diameter of ALE (fig. 218).

MALE (holotype, figs. 195-212): Total length 1.99. **Cephalothorax***:* Carapace orange-brown, ovoid, *pars cephalica* slightly elevated, posterolateral surface without spikes, elevated portion finely reticulate, sides strongly reticulate (fig. 197-200); lateral margin with small denticles; posterior pars with three pairs of small tubercles (fig. 200); procurved set of setae on posterior surface with ten small tubercles (fig. 200). Clypeus margin strongly reborded, curved downwards in front view (fig. 199), high, ALE separated from edge of carapace by more their radius. Sternum as long as wide, orange-brown, radial furrows conspicuous, with rows of small pits, surface smooth, covered with small round pits (fig. 198); setae sparse, evenly scattered, originating from small pits. Chelicerae, endites and labium orange-brown. **Abdomen:** Book lung large, round. Pedicel tube medium. Dorsal scutum orange-brown, middle surface and sides reticulate, anterior half without projecting denticles (fig. 202). Epigastric and postepigastric

scutum orange-brown. **Legs:** Legs pale orange, spination: tibiae: I v4-4-2; metatarsi: I v2-2-2. **Genitalia:** Sperm pore small. Proximal segments, cymbium and bulb pale orange; embolus rounded, without prolateral lamella or prolateral prong (fig. 204, 211), well-developed apical projection (figs. 203, 205, 211).

FEMALE (paratype, figs. 213-223): Total length 1.78. **Cephalothorax:** Carapace broadly oval; posterior pars with two pairs of small tubercles (fig. 217); procurved set of setae on posterior surface with eight small tubercles (fig. 216, 217). Clypeus very high, curved downwards in front view (fig. 218). **Abdomen:** Dorsal scutum middle surfaces and sides finely reticulate (fig. 220); groove connecting the posterior spiracles continuous (fig. 222). **Legs:** Leg spination: tibiae: I v4-4-2; II v4-2-2; metatarsi: I v2-2-0; II v2-2-0. **Genitalia:** Epigynal atrium wide (fig. 222).

OTHER MATERAL EXAMINED: VENEZUELA: **Amazonas:** *Puerto Ayacucho,* 1.5km E Caño Tigre, 07 Jan. 1996, primary forest I. Netuzhilin, MACN, (PBI_OON 44327), 1♂; MACN, (PBI_OON 44311), 1♂.

DISTRIBUTION: Known from Puerto Ayacucho, in Amazonas, Venezuela.

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CAPTIONS (FIGURES AND MAPS)

Figs. 01-10. *Neoxyphinus amazonicus*, male. **01**. Dorsal view. **02.** Lateral view. **03.** Cephalothorax, dorsal view. **04.** Same, anterior view. **05.** Same, lateral view. **06.** Same, posterior view. **07.** Same, ventral view. **08.** Abdomen, ventral view. **09.** Same, dorsal view. **10.** Same, lateral view.

Figs. 11-19. *Neoxyphinus amazonicus.* **11.** Left palp, prolateral view. **12.** Same, ventral view. **13.** Same, retrolateral view. **14.** Right palp, ventral view. **15.** Left palp, ventral view. **16.** Right palp, ventral view. **17.** Female, cephalothorax, dorsal view. **18.** Male, endites. **19.** Male, cephalothorax, ventral view.

Figs. 20-29. *Neoxyphinus amazonicus*, female. **20.** Dorsal view. **21.** Lateral view. **22.** Cephalothorax, lateral view. **23.** Same, posterior view. **24.** Same, anterior view. **25.** Same, ventral view. **26.** Abdomen, ventral view. **27.** Epigynum, ventral view. **28.** Abdomen, lateral view. **29.** Same, dorsal view.

Figs. 30-38. *Neoxyphinus andersoni*, male. **30.** Dorsal view. **31.** Cephalothorax, dorsal view. **32.** Same, ventral view. **33.** Abdomen, dorsal view. **34.** Same, ventral view. **35.** Lateral view. **36.** Left palp, retrolateral view. **37.** Same, ventral view. **38.** Same, prolateral view.

Figs. 39-46. *Neoxyphinus beni*, male. **39.** Cephalothorax, dorsal view. **40.** Same, ventral view. **41.** Abdomen, lateral view. **42.** Same, dorsal view. **43.** Same, ventral view. **44.** Left palp, ventral view. **45.** Same, prolateral view. **46.** Same, prolateral view.

Figs. 47-55. *Neoxyphinus beni*, female. **47.** Dorsal view. **48.** Lateral view. **49.** Cephalothorax, dorsal view. **50.** Same, ventral view. **51.** Same, anterior view. **52.** Abdomen, lateral view. **53.** Same, dorsal view. **54.** Same, ventral view. **55.** Epigynum, ventral view.

Figs. 56-64. *Neoxyphinus caribensis*, male. **56.** Dorsal view. **57.** Lateral view. **58.** Ventral view. **59.** Cephalothorax, ventral view. **60.** Abdomen, dorsal view. **61.** Cephalothorax, anterior view. **62.** Left palp, prolateral view. **63.** Same, retrolateral view. **64.** Same, ventral view.

Figs. 65-72. *Neoxyphinus coca*, male. **65.** Dorsal view. **66.** Lateral view. **67.** Cephalothorax, dorsal view. **68.** Same, anterior view. **69.** Same, posterior view. **70.** Abdomen, anterior view. **71.** Same, dorsal view. **72.** Same, ventral view.

Figs. 73-78. *Neoxyphinus coca*. **73.** Female, cephalothorax, dorsal view. Male. **74.** Endite. **75.** Left palp, ventral view. **76.** Same, ventral view.**77.** Same, prolateral view. **78.** Same, retrolateral view.

Figs. 79-87. *Neoxyphinus coca*, female. **79.** Dorsal view. **80.** Lateral view. **81.** Ventral view. **82.** Cephalothorax, ventral view. **83.** Same, anterior view. **84.** Abdomen, lateral view. **85.** Same, dorsal view. **86.** Same, ventral view. **87.** Epigynum, ventral view.

Figs. 88-97. *Neoxyphinus inca*, male. **88.** Dorsal view. **89.** Ventral view. **90.** Lateral view. **91.** Cephalothorax, anterior view. **92.** Same, posterior view. **93.** Abdomen, ventral view. **94.** Same, dorsal view. **95.** Left palp, ventral view. **96.** Same, retrolateral view. **97.** Same, prolateral view.

Figs. 98-105. *Neoxyphinus inca*. **98.** Female, cephalothorax, posterior view. **99.** Male, cephalothorax, posterior view. **100.** Endites. **101.** Abdomen, posterior view. **102.** Female, abdomen, ventral view. **103.** Male, left palp, embolus, ventral view. **104.** Right palp, embolus, ventral view. **105.** Left palp, ventral view.

Figs. 106-115. *Neoxyphinus inca*, female. **106.** Dorsal view. **107.** Ventral view. **108.** Lateral view. **109.** Cephalothorax, ventral view. **110.** Same, posterior view. **111.** Same, lateral view. **112.** Same, anterior view. **113.** Abdomen, dorsal view. **114.** Same, ventral view. **115.** Epigynum, ventral view.

Figs. 116-127. *Neoxyphinus macuna*, male. **116.** Dorsal view. **117.** Lateral view. **118.** Cephalothorax, anterior view. **119.** Same, dorsal view. **120.** Same, ventral view. **121.** Abdomen, anterior view. **122.** Same, dorsal view. **123.** Same, ventral view. **124.** Same, lateral view. **125.** Left palp, ventral view. **126.** Same, embolus, prolateral view. **127.** Same, retrolateral view.

Figs. 128-133. *Neoxyphinus macuna*, male. **128.** Left palp, embolus, prolateral view. **129.** Right palp, embolus, prolateral view. **130.** Left palp, prolateral view. **131.** Right palp, prolateral view. **132.** Endites. **133.** Abdomen, dorsal view.

Figs. 134-144. *Neoxyphinus macuna*, female. **134.** Dorsal view. **135.** Ventral view. **136.** Lateral view. **137.** Cephalothorax, anterior view. **138.** Endites. **139.** Cephalothorax, lateral view. **140.** Same, dorsal view. **141.** Same, ventral view. **142.** Abdomen, ventral view. **143.** Same, dorsal view. **144.** Same, lateral view.

Figs. 145-154. *Neoxyphinus pure*, male. **145.** Dorsal view. **146.** Ventral view. **147.** Lateral view. **148.** Abdomen, dorsal view. **149.** Cephalothorax, ventral view. **150.** Same, anterior view. **151.** Left palp, prolateral view. **152.** Same, ventral view. **153.** Same, retrolateral view. **154.** Same, embolus, prolateral view.

Figs. 155-162. *Neoxyphinus pure*. **155.** Male, abdomen, dorsal view. **156.** Female, cephalothorax, dorsal view. **157.** Abdomen, ventral view. **158.** Epigynum, ventral view. **159.** Male, endites. **160.** Cephalothorax, ventral view. **161.** Right palp, ventral view. **162.** Same, embolus, ventral view.

Figs. 163-173. *Neoxyphinus pure*, female. **163.** Dorsal view. **164.** Ventral view. **165.** Lateral view. **166.** Cephalothorax, dorsal view. **167.** Same, anterior view. **168.** Same, ventral view. **169.** Abdomen, ventral view. **170.** Epigynum, ventral view. **171.** Abdomen, lateral view. **172.** Cephalothorax, lateral view. **173.** Same, posterior view.

Figs. 174-184. *Neoxyphinus trujillo*, male. **174.** Ventral view. **175.** Dorsal view. **176.** Lateral view. **177.** Cephalothorax, dorsal view. **178.** Same, ventral view. **179.** Abdomen, lateral view. **180.** Same, ventral view. **181.** Same, dorsal view. **182.** Left palp, retrolateral view. **183.** Same, ventral view. **184.** Same, prolateral view.

Figs. 185-194. *Neoxyphinus trujillo*, female. **185.** Dorsal view. **186.** Ventral view. **187.** Lateral view. **188.** Cephalothorax, ventral view. **189.** Same, dorsal view. **190.** Same, anterior view. **191.** Same, lateral view. **192.** Epigynum, ventral view. **193.** Abdomen, lateral view. **194.** Same, ventral view.

Figs. 195-205. *Neoxyphinus yekuana*, male. **195.** Dorsal view. **196.** Ventral view. **197.** Lateral view. **198.** Cephalothorax, ventral view. **199.** Same, anterior view. **200.** Same, dorsal view. **201.** Abdomen, lateral view. **202.** Same, dorsal view. **203.** Left palp, embolus, prolateral view. **204.** Same, ventral view. **205.** Same, retrolateral view.

Figs. 206-212. *Neoxyphinus yekuana*, male. **206.** Abdomen, dorsal view. **207.** Right palp, ventral view. **208.** Left palp, ventral view. **209.** Endites. **210.** Left leg I. **211.** Left palp, embolus, ventral view. **212.** Cephalothorax, ventral view.

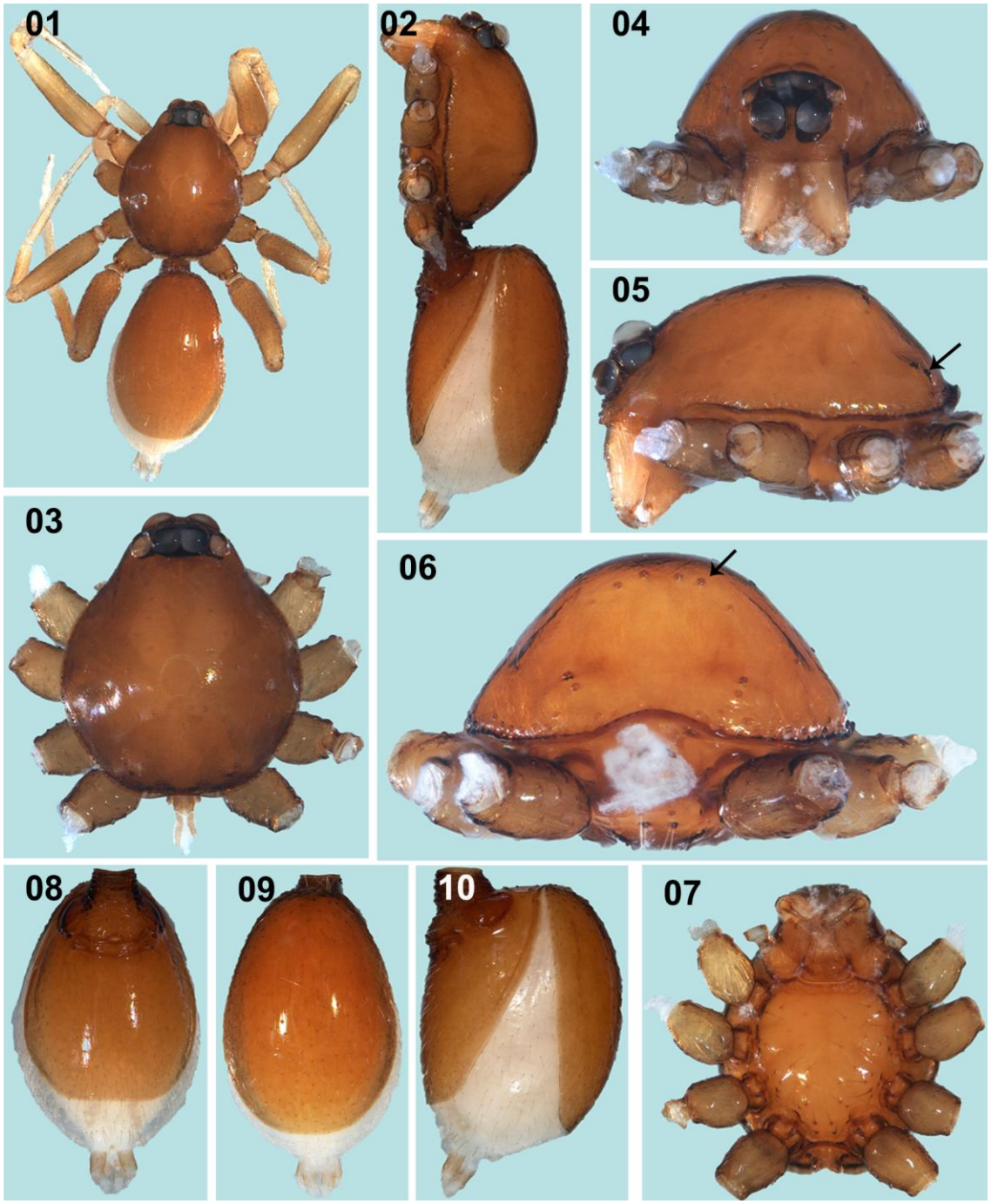
Figs. 213-223. *Neoxyphinus yekuana*, female. **213.** Dorsal view. **214.** Ventral view. **215.** Lateral view. **216.** Cephalothorax, lateral view. **217.** Same, dorsal view. **218.** Same, anterior view. **219.** Abdomen, dorsal view. **220.** Same, lateral view. **221.** Same, ventral view. **222.** Epigynum, ventral view. **223.** Cephalothorax, ventral view.

Map 1. Records of *Neoxyphinus amazonicus* (triangles) and *N. andersoni* (circles).

Map 2. Records of *Neoxyphinus beni* (triangles), *Neoxyphinus caribensis* (squares) and *Neoxyphinus coca* (circles).

Map 3. *Neoxyphinus inca* (circles) and *Neoxyphinus macuna* (triangles).

Map 4. Records of *Neoxyphinus pure* (circles), *Neoxyphinus trujillo* (triangles) and *Neoxyphinus yekuana* (squares).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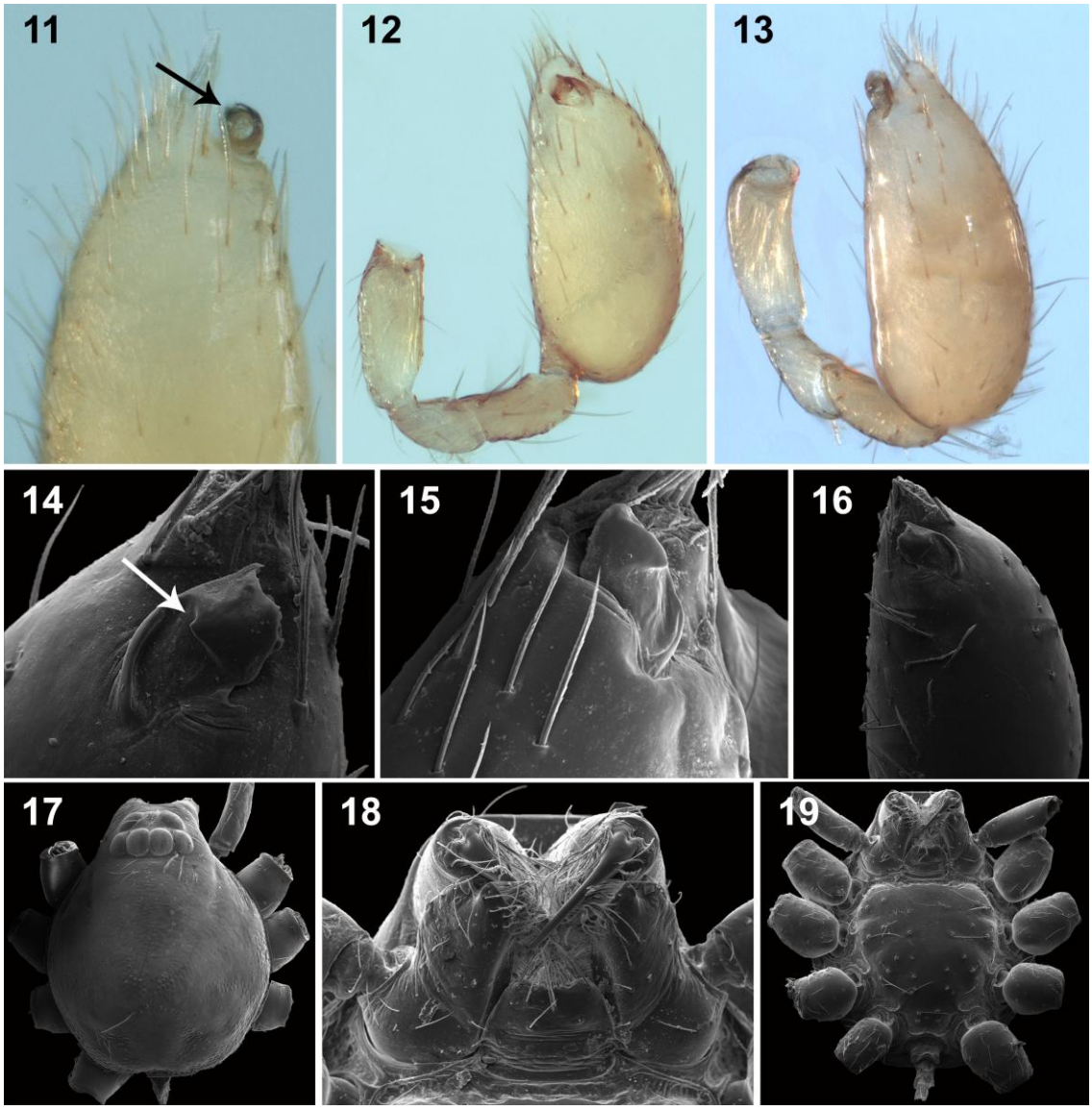
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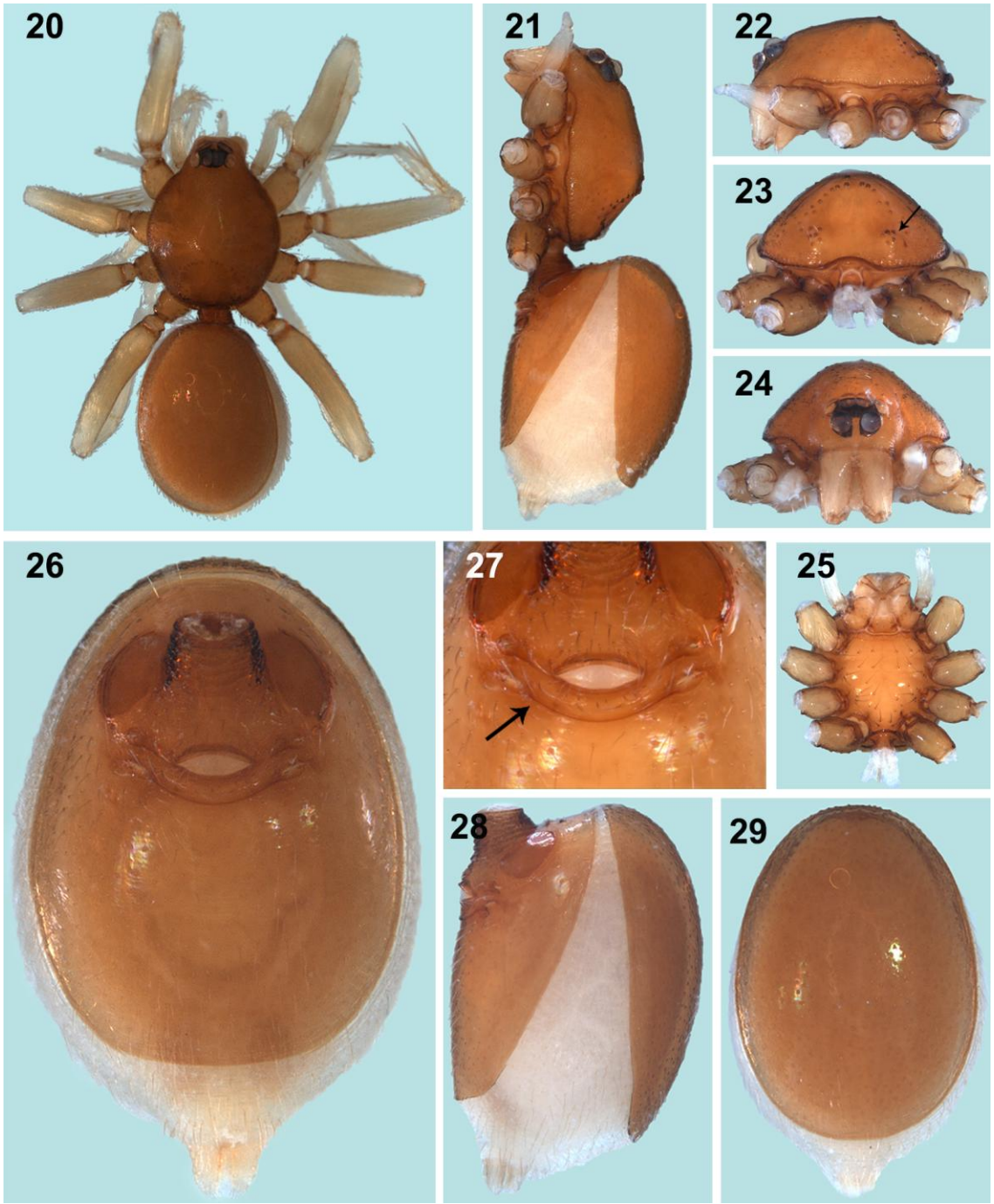
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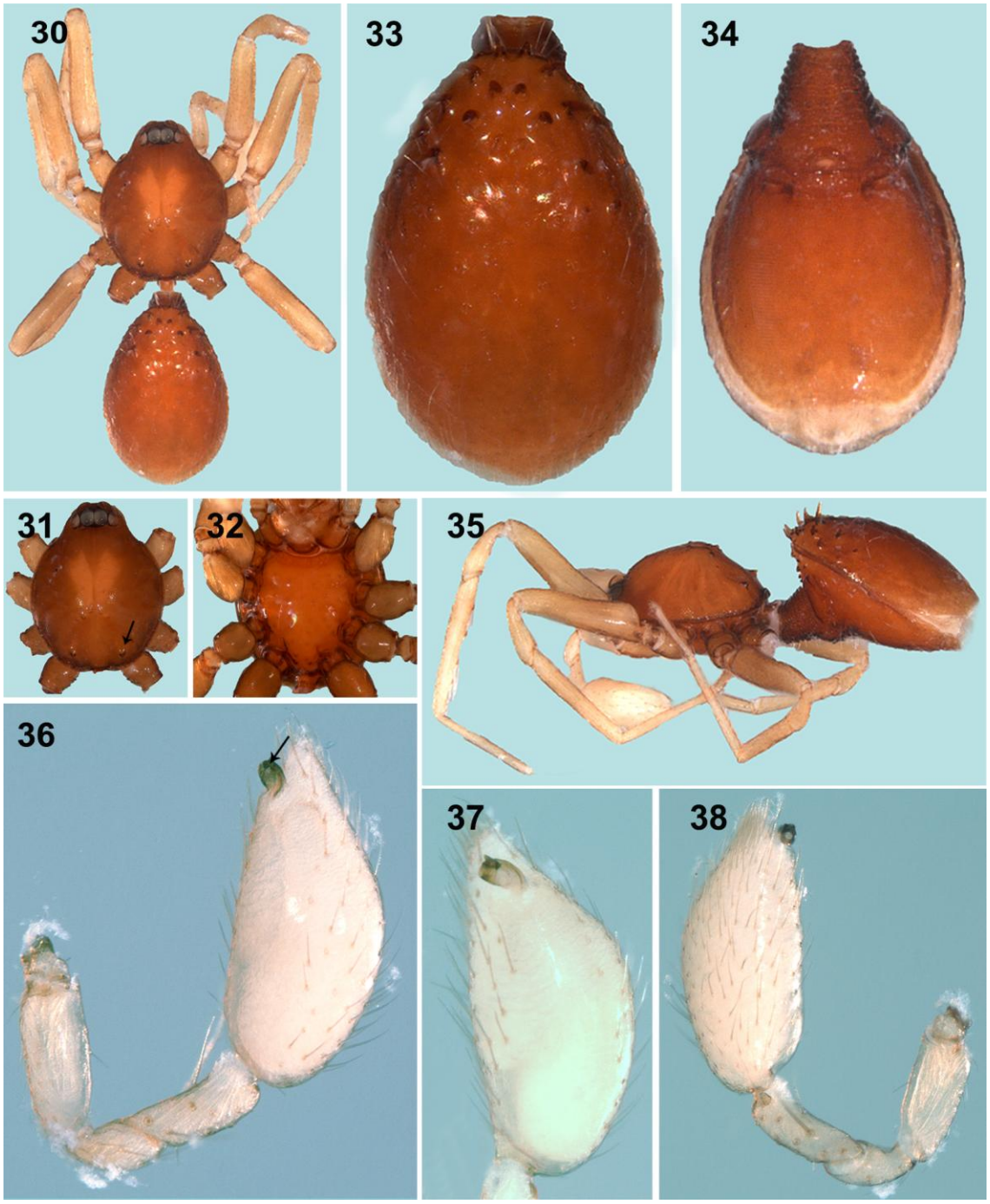
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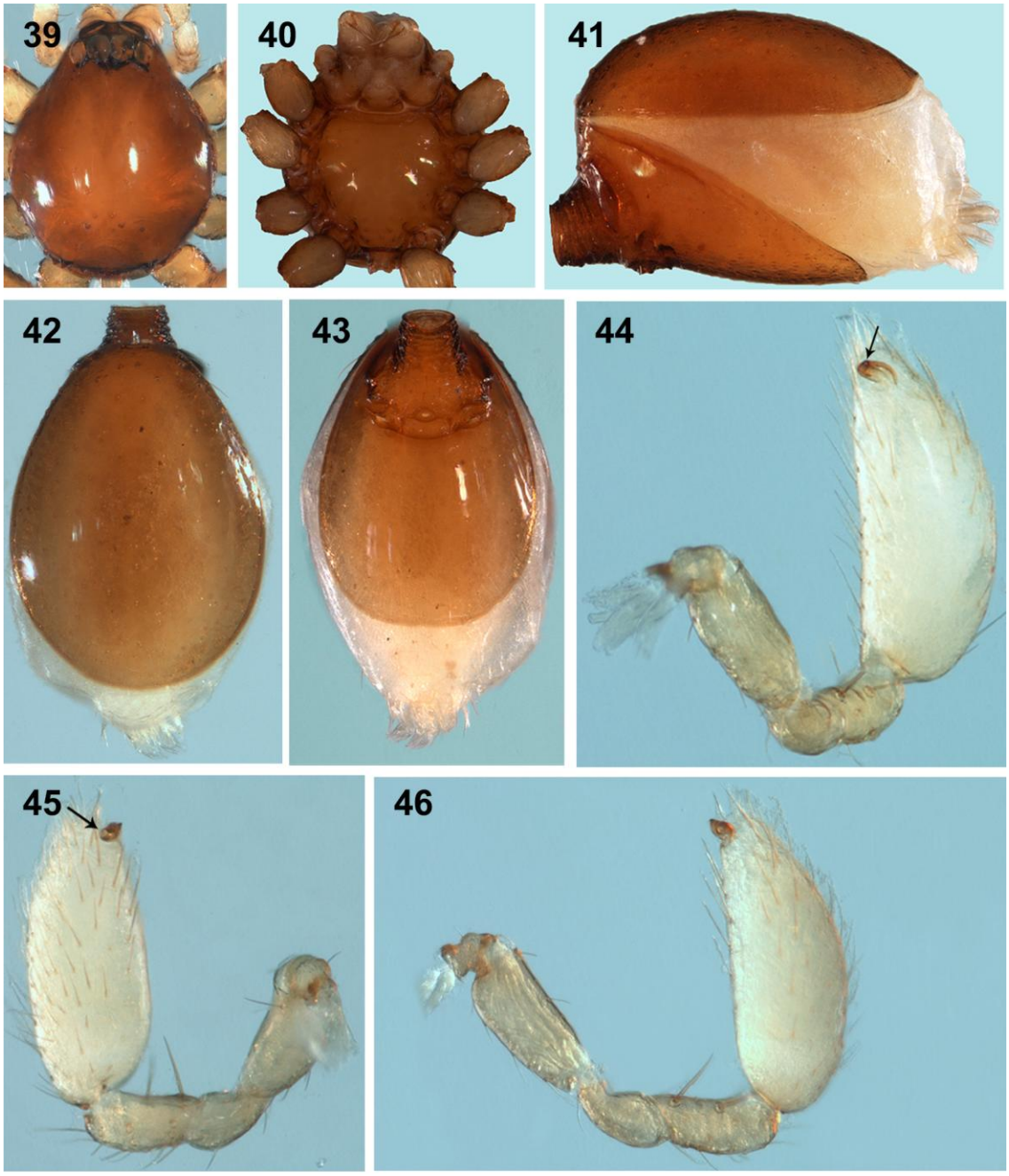
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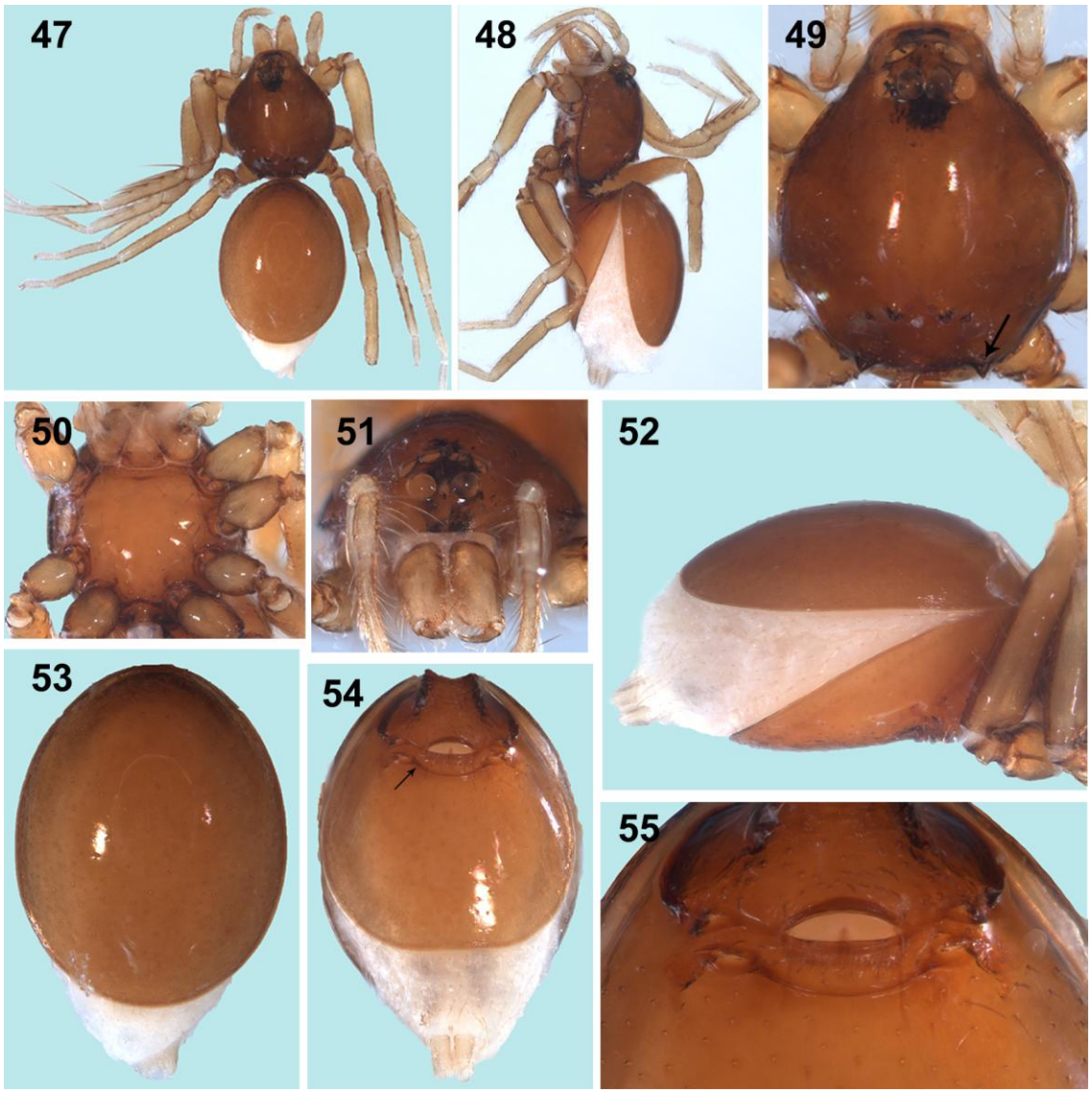
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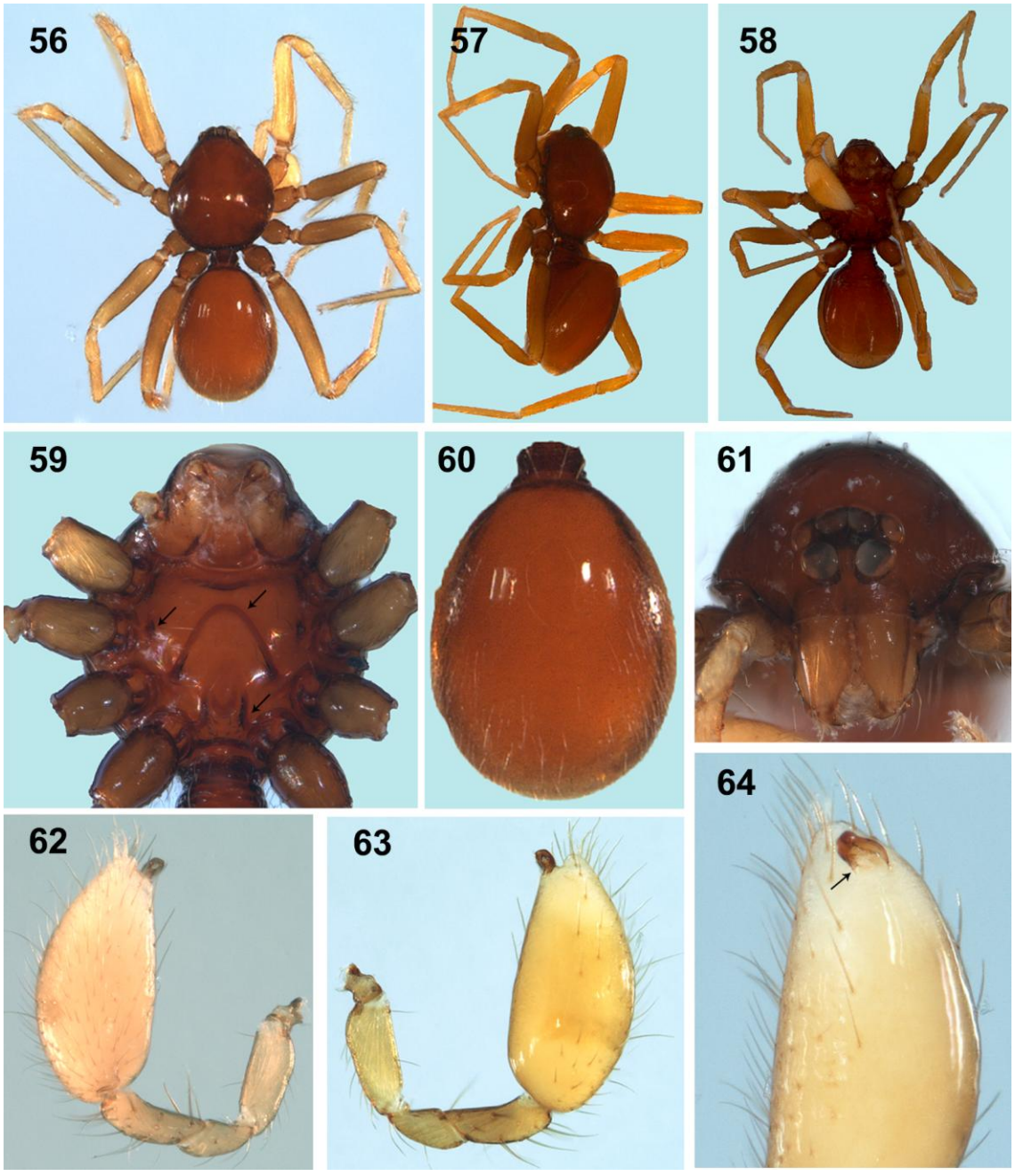
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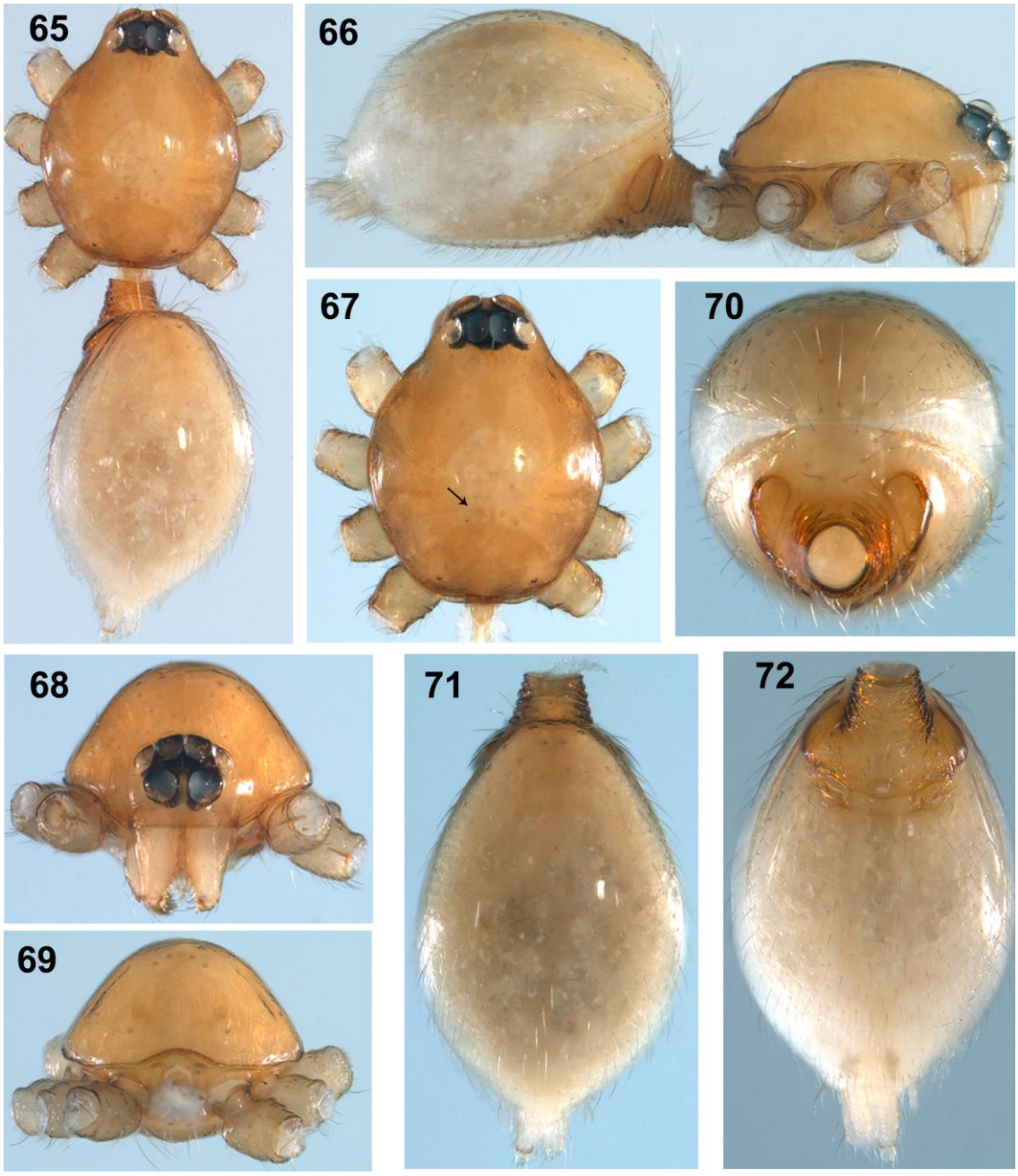
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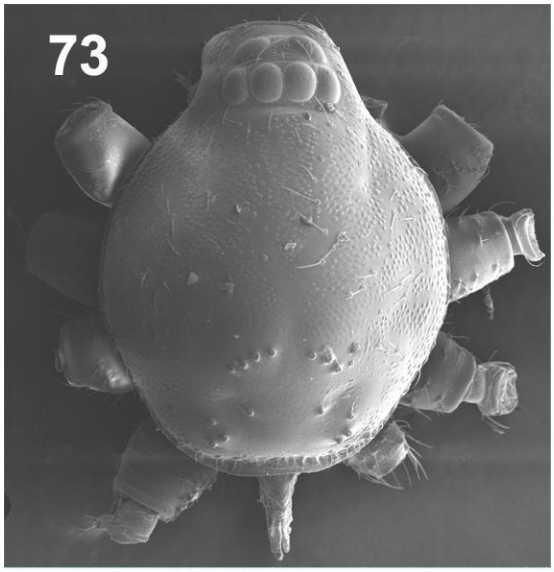
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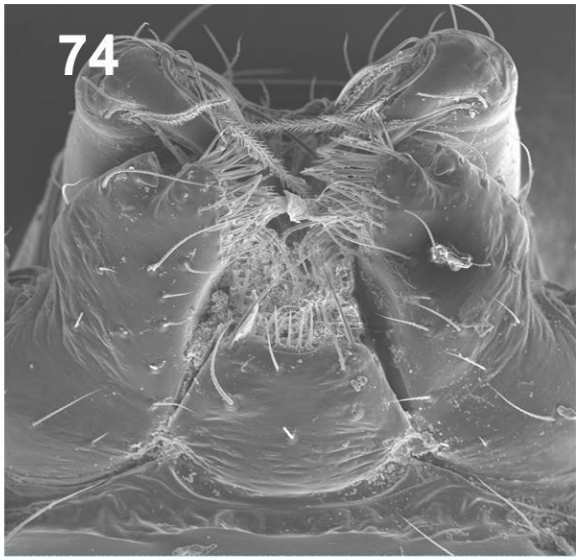
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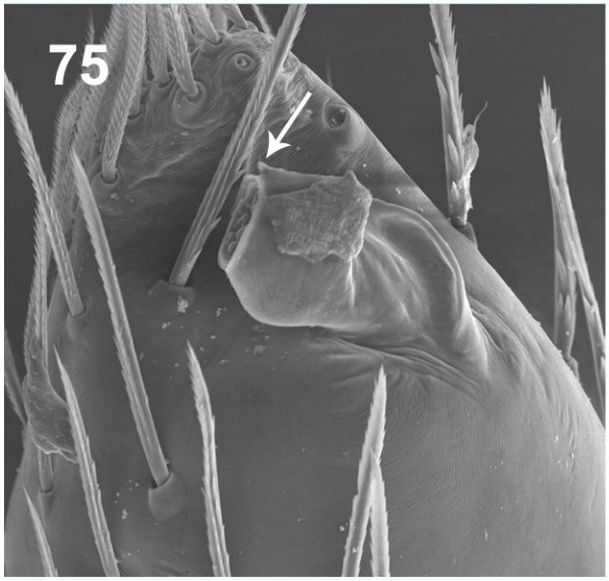
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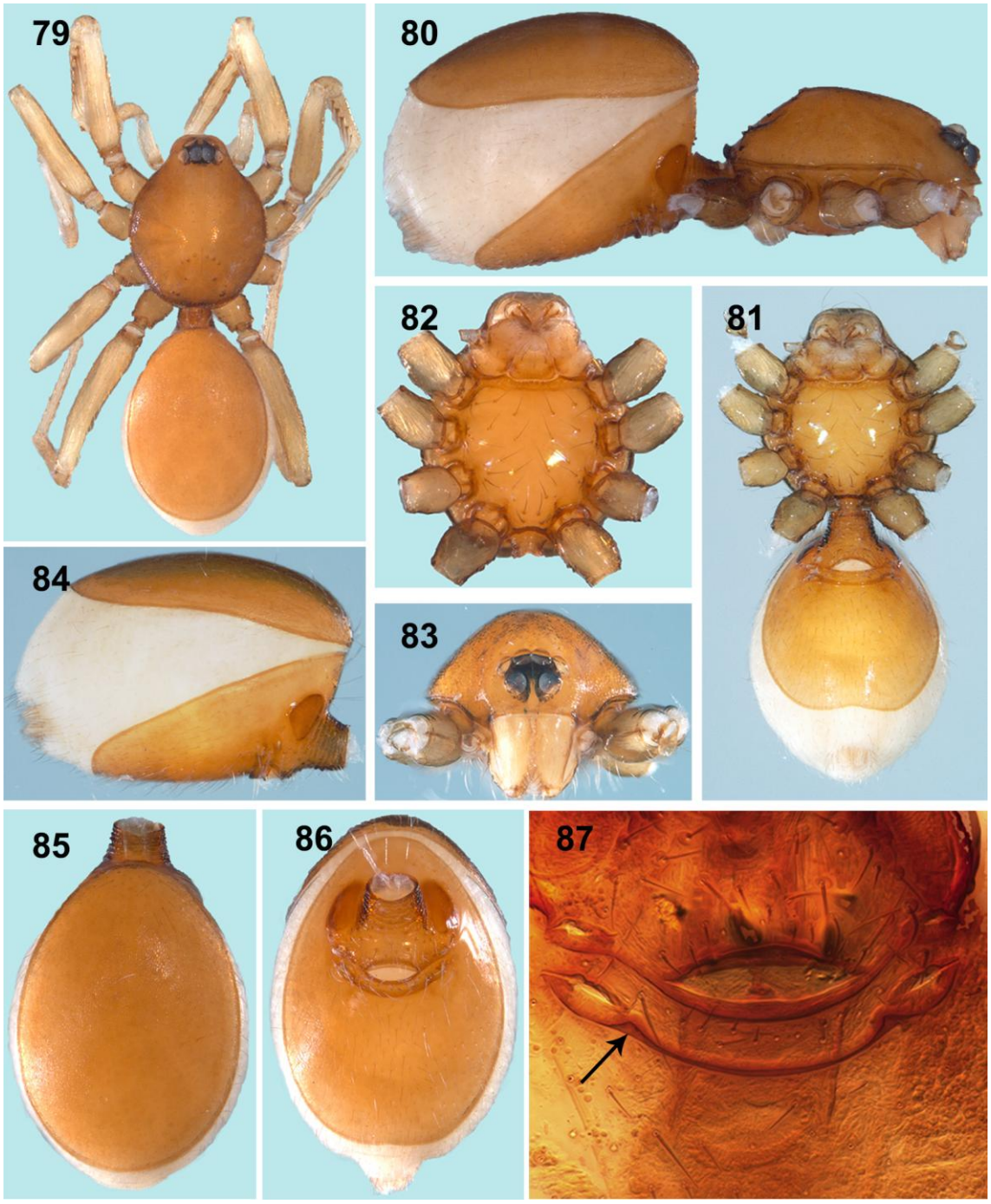
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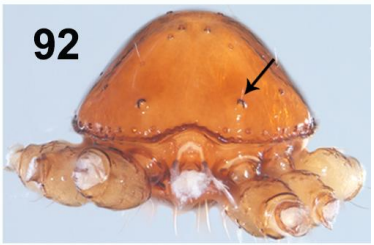
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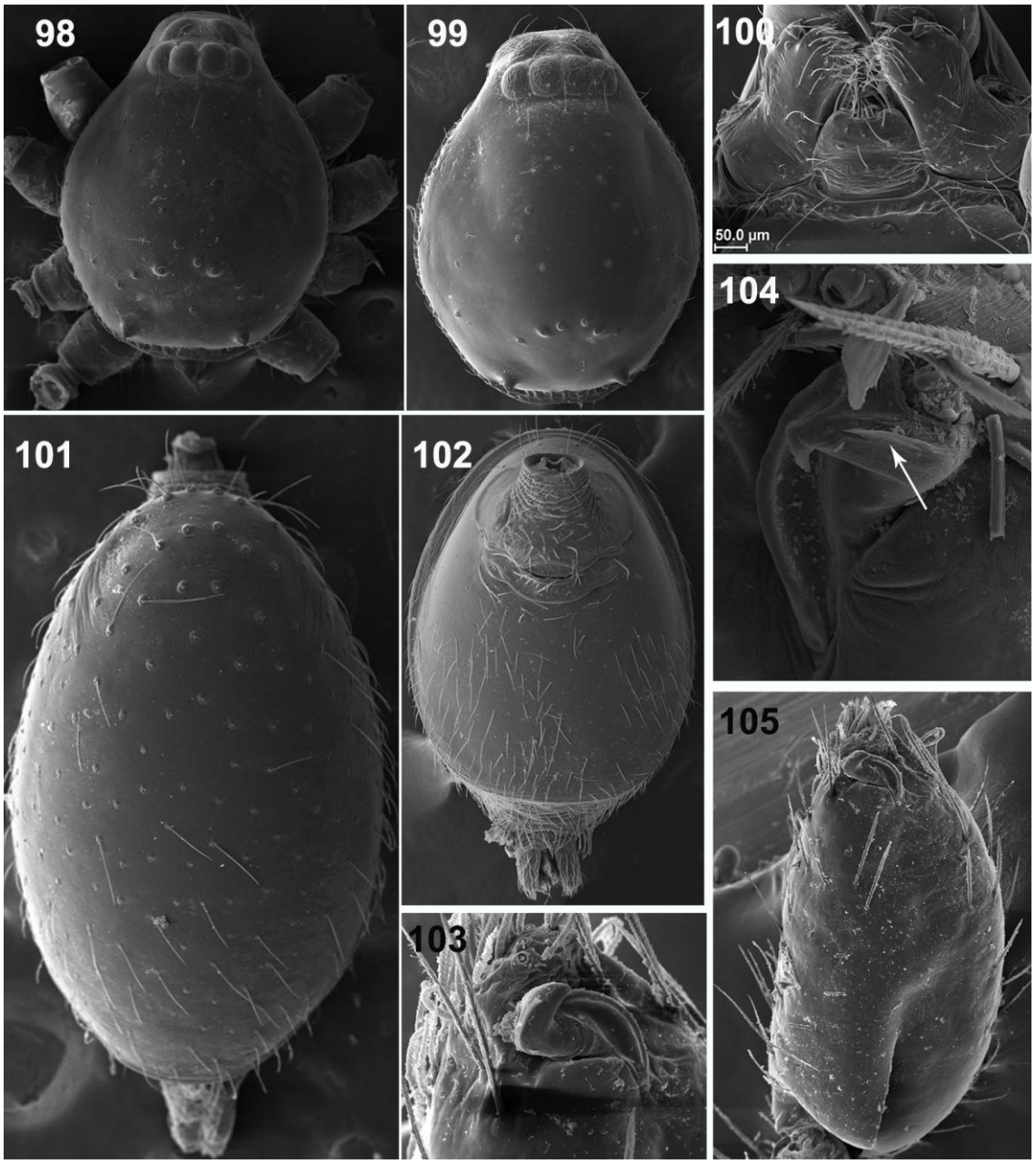
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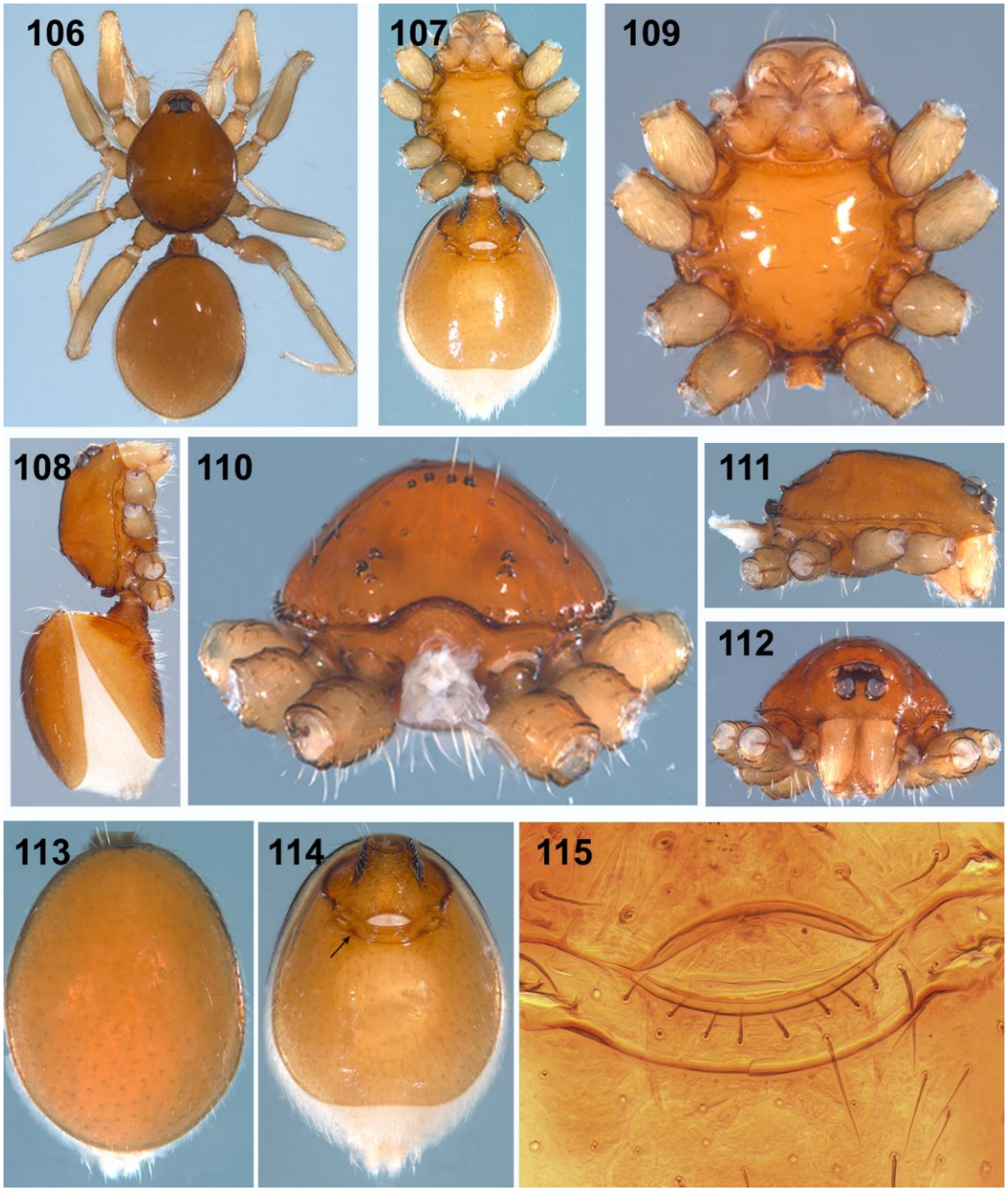
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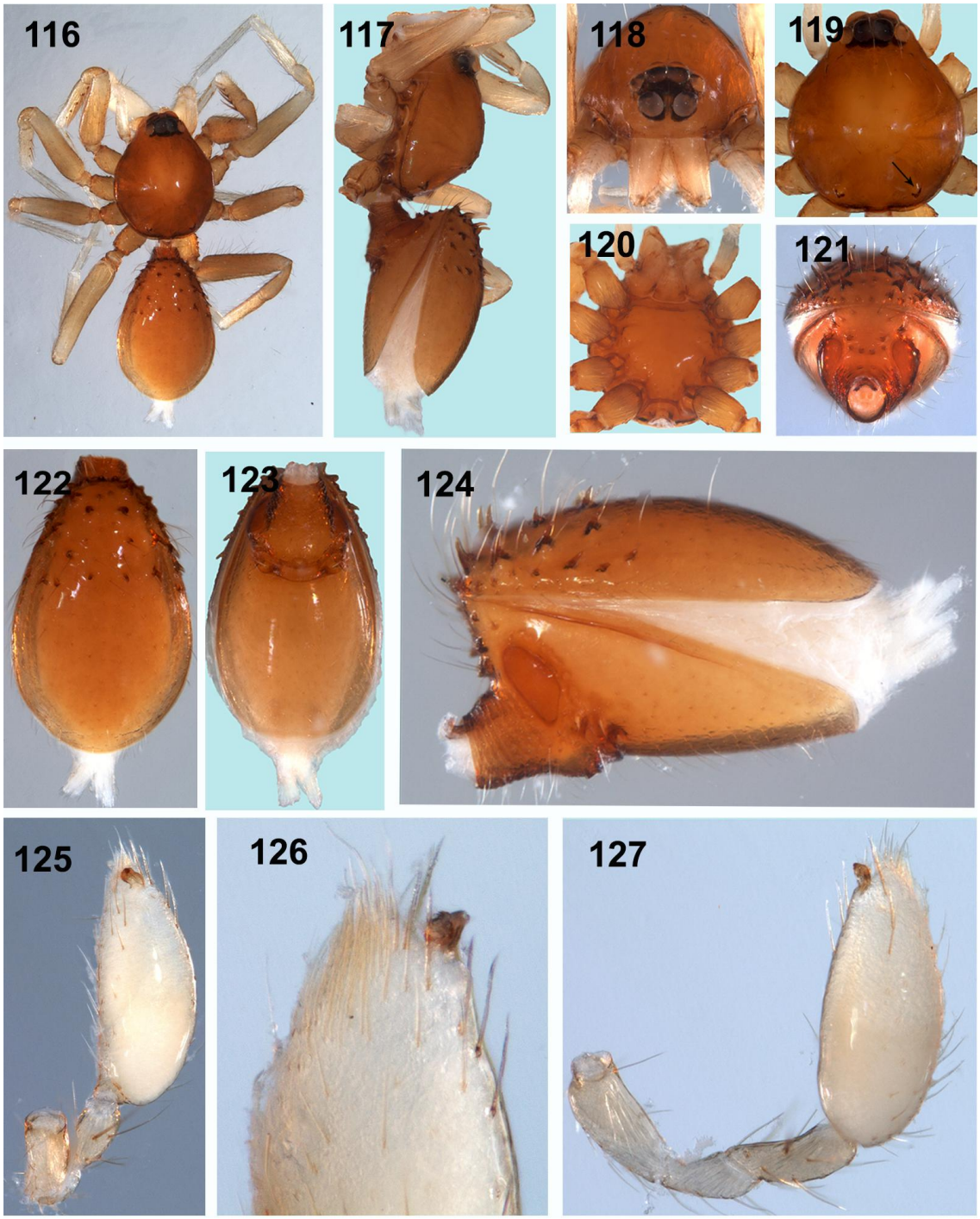
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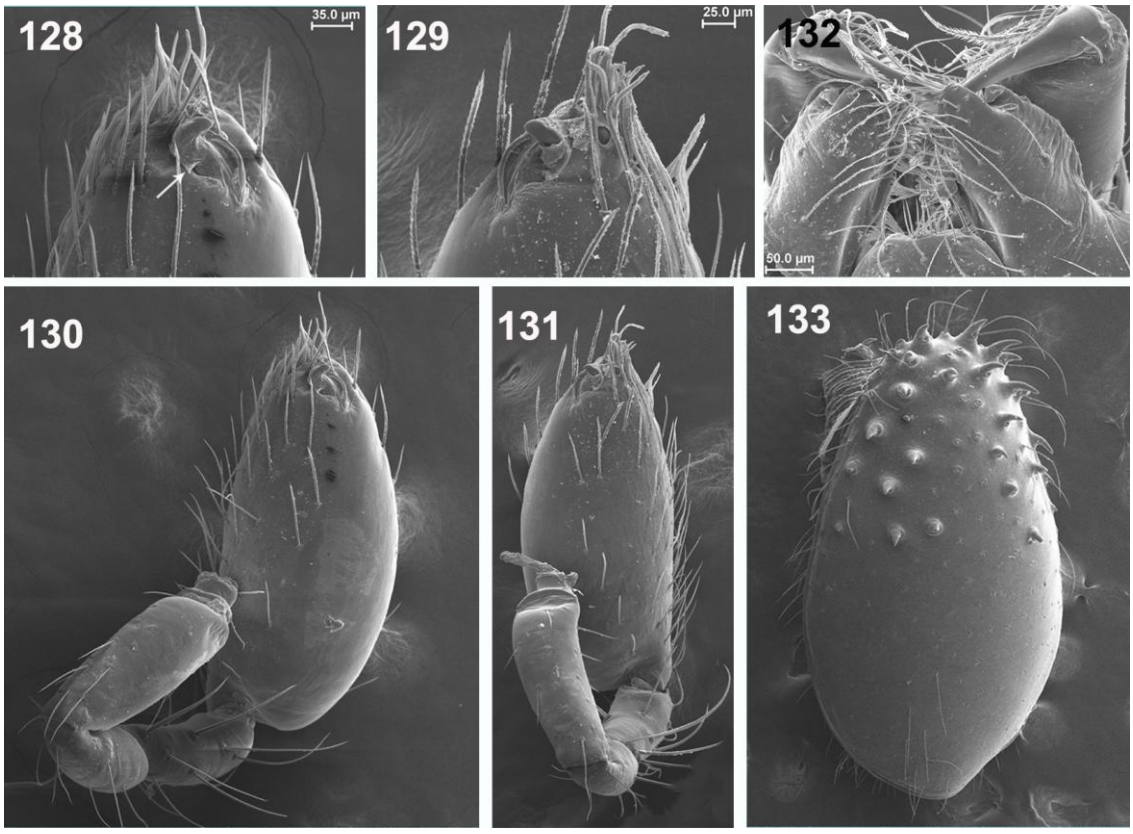
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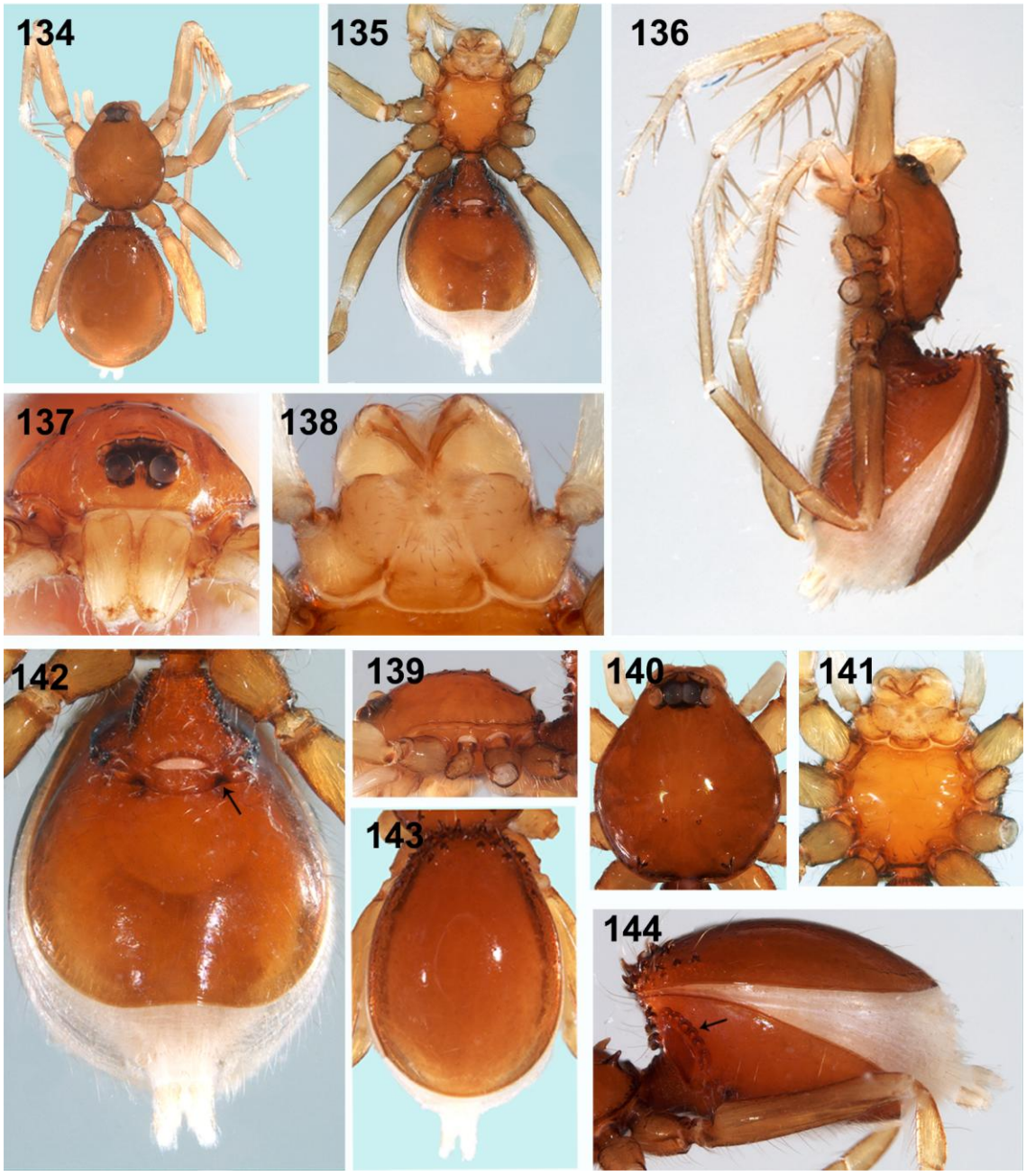
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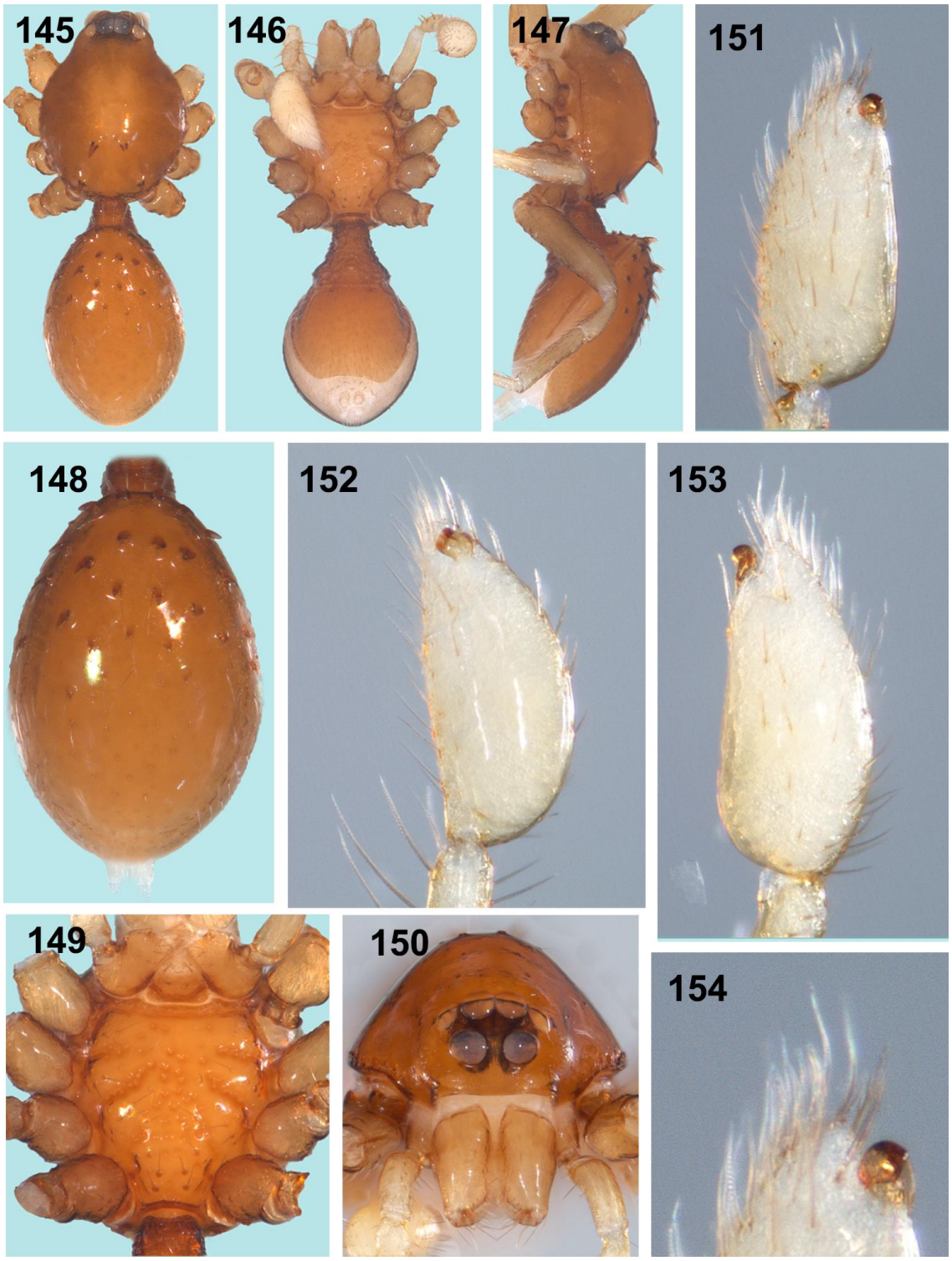
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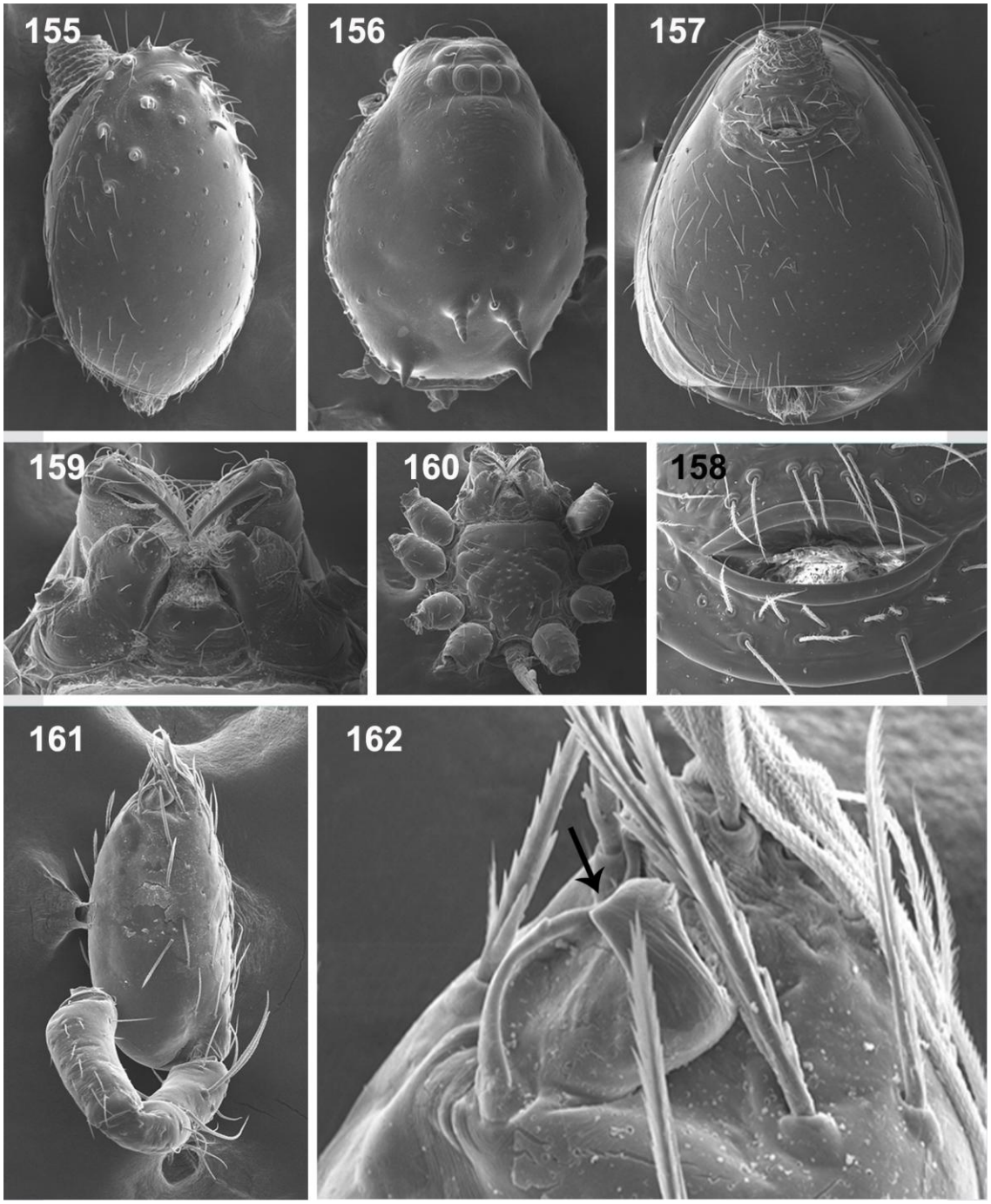
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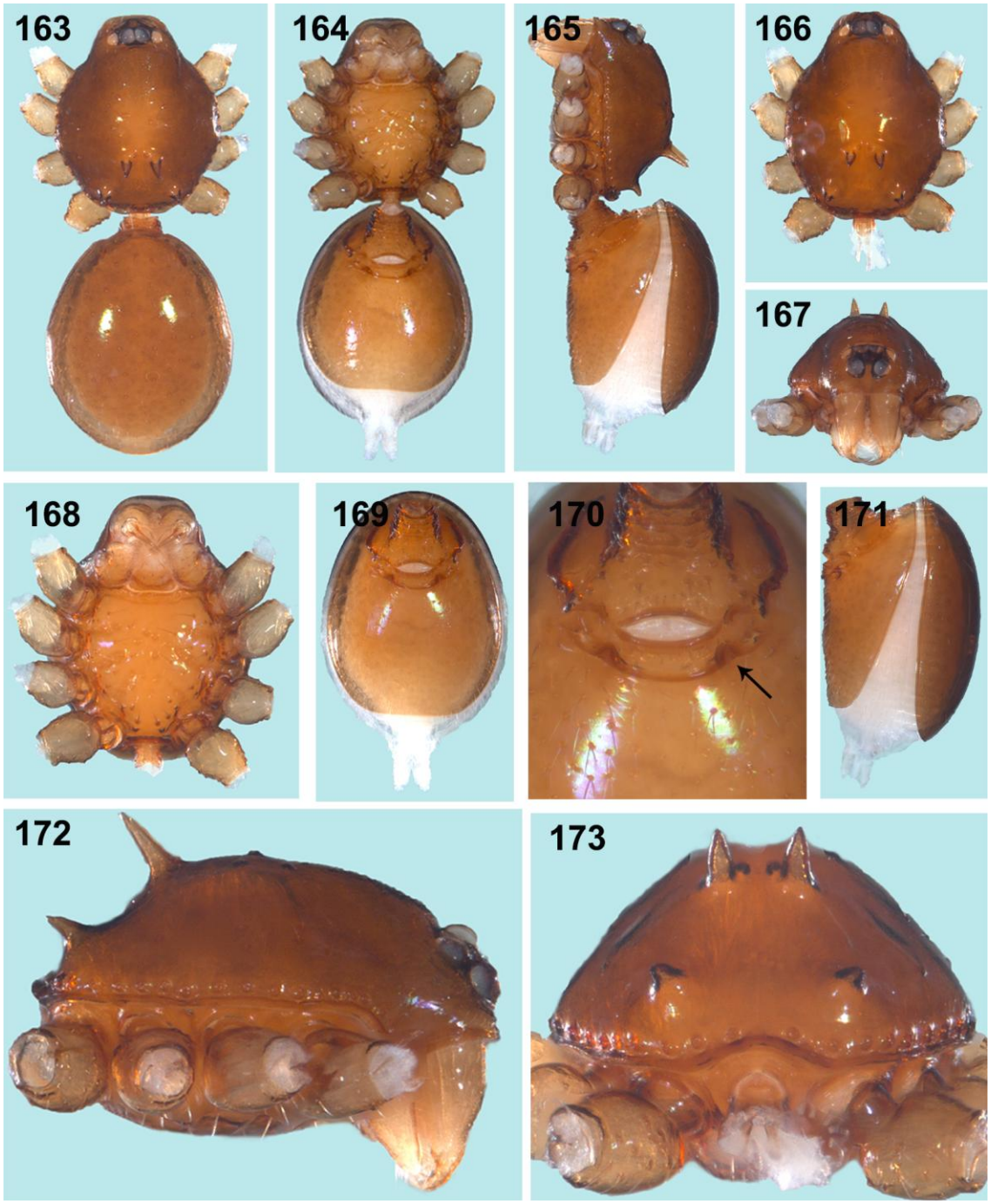
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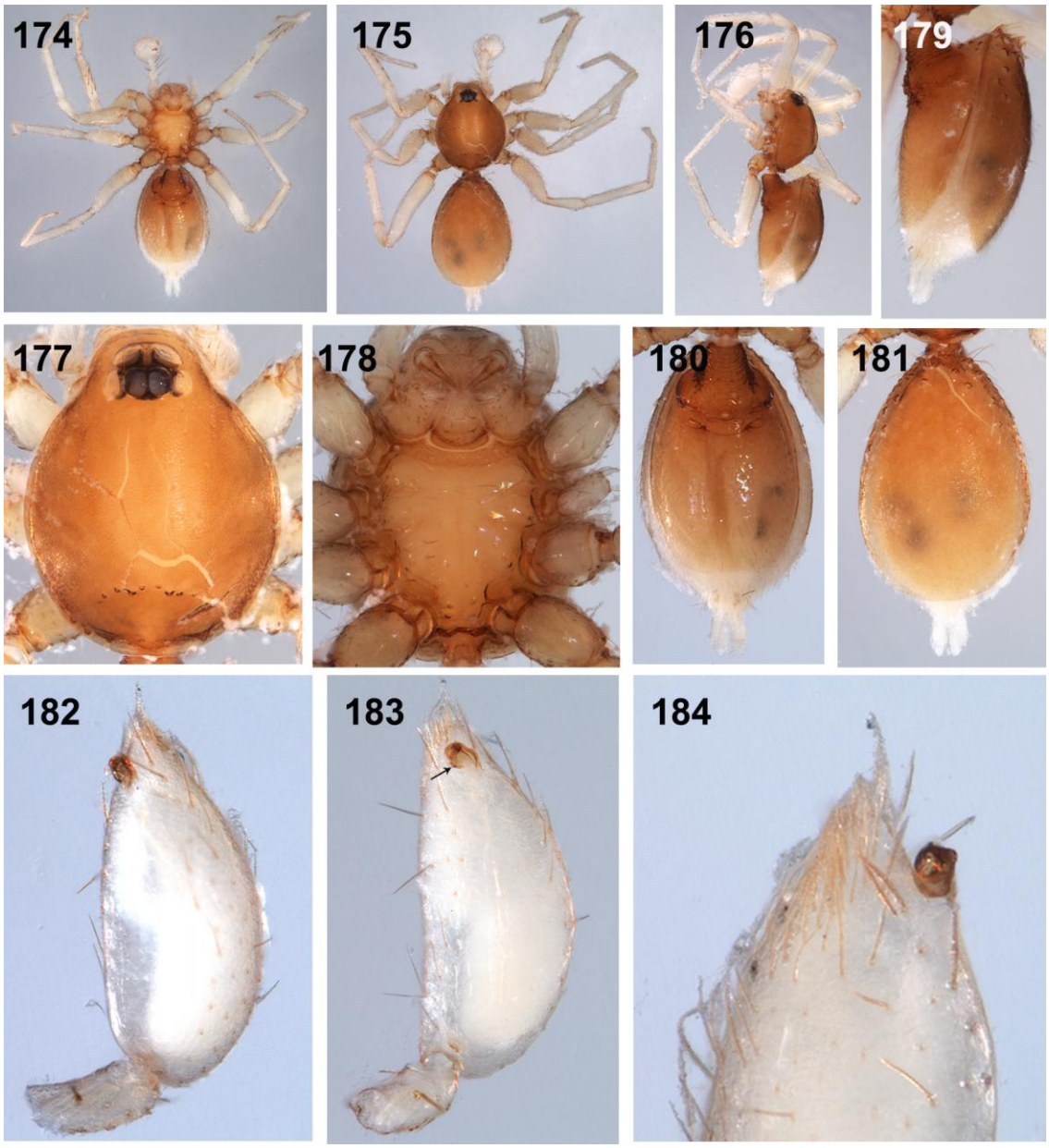
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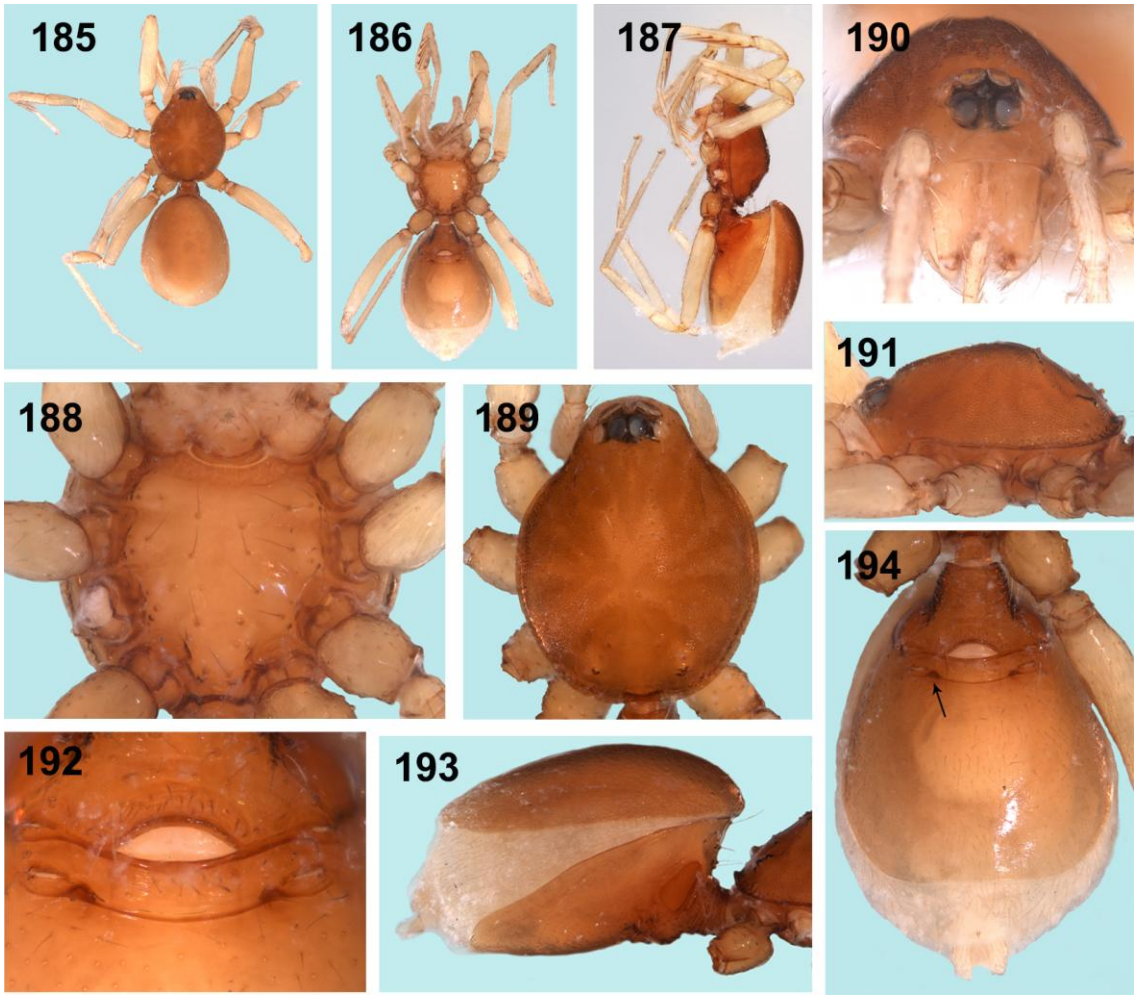
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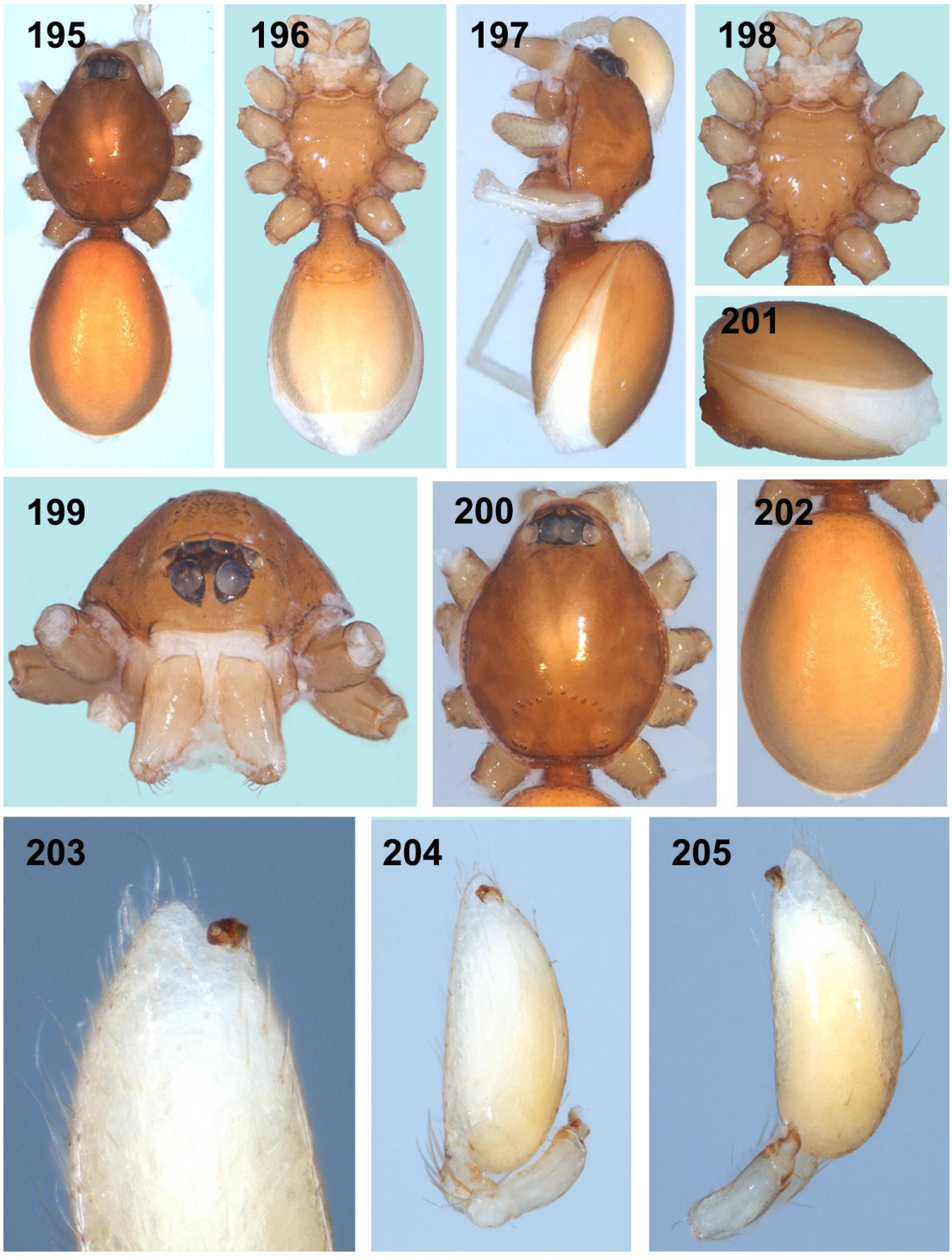
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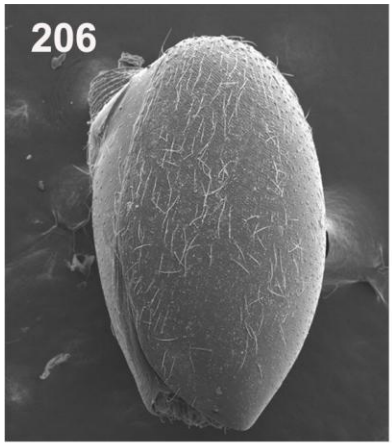
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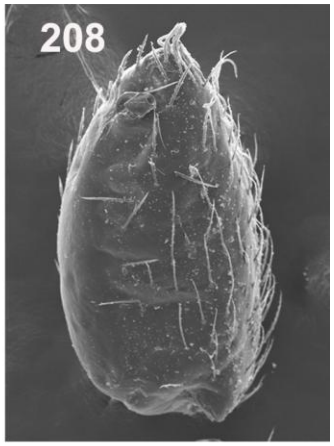
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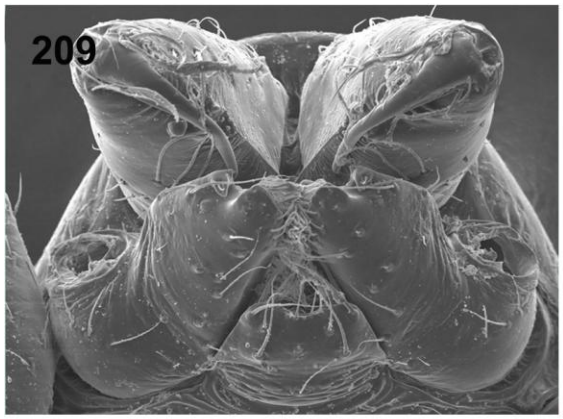
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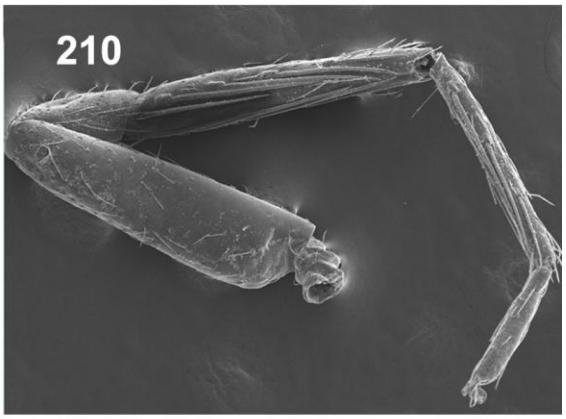
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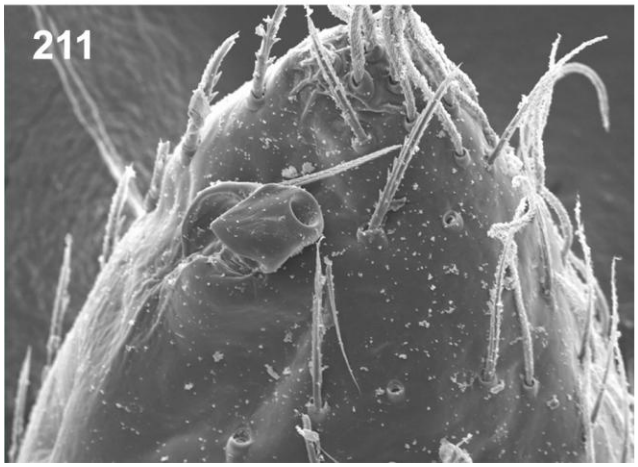
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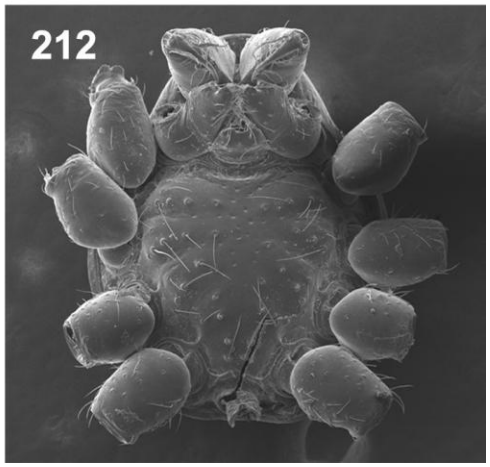
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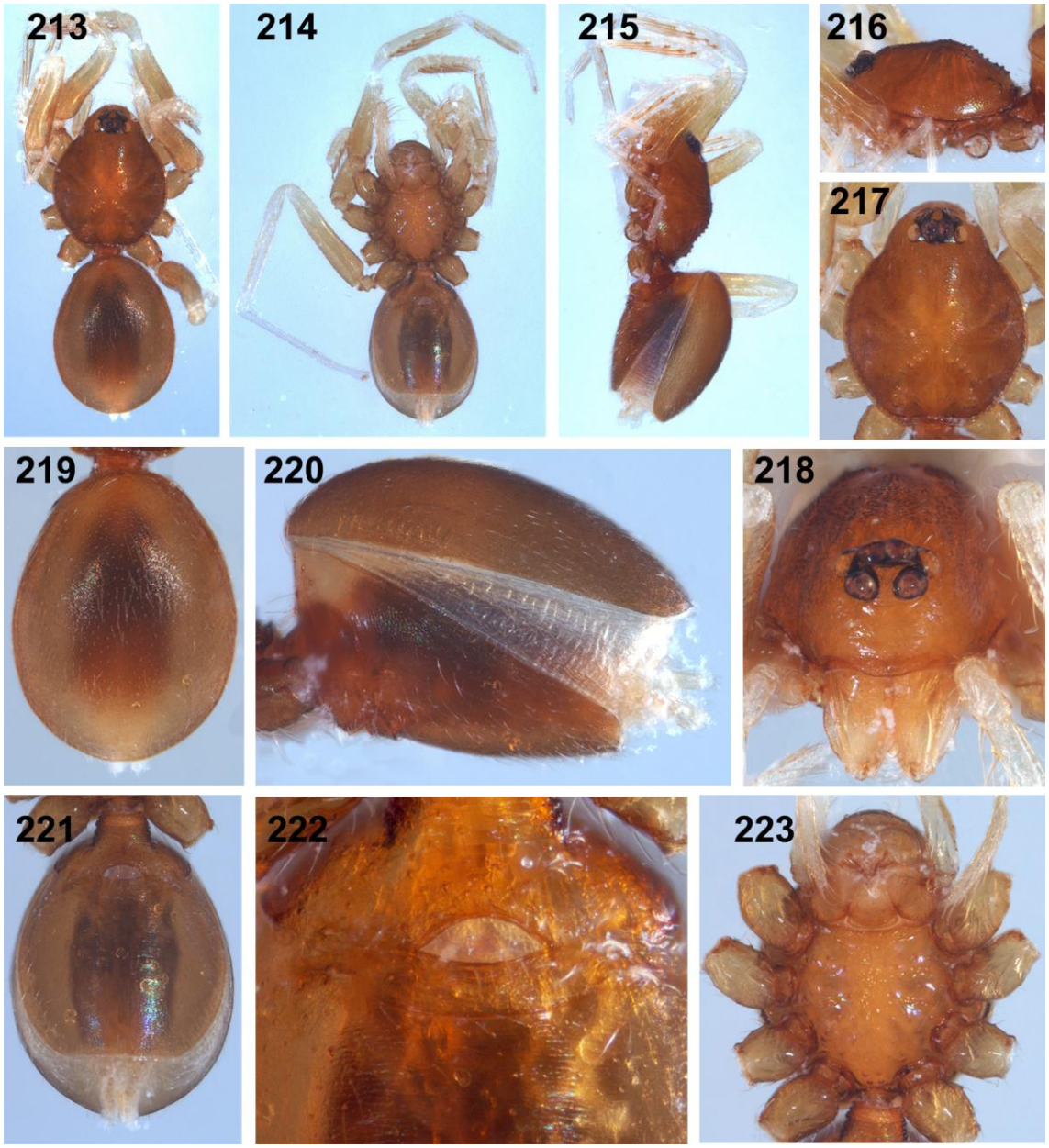
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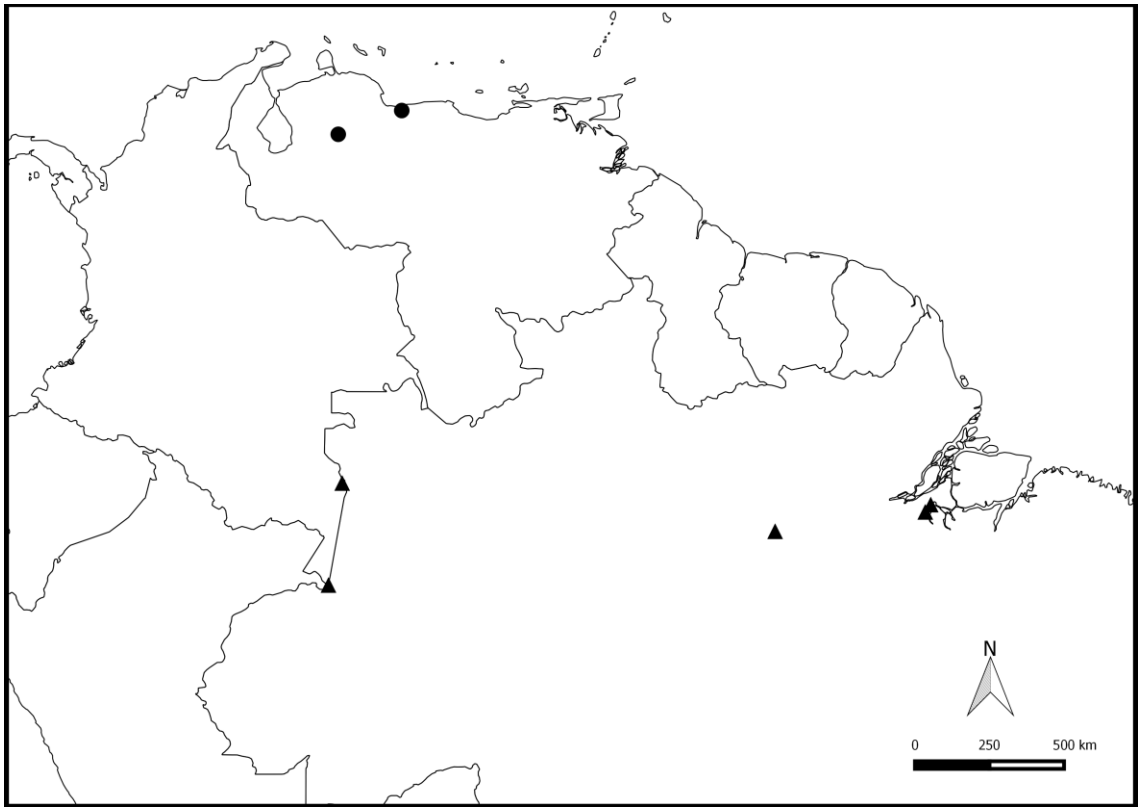

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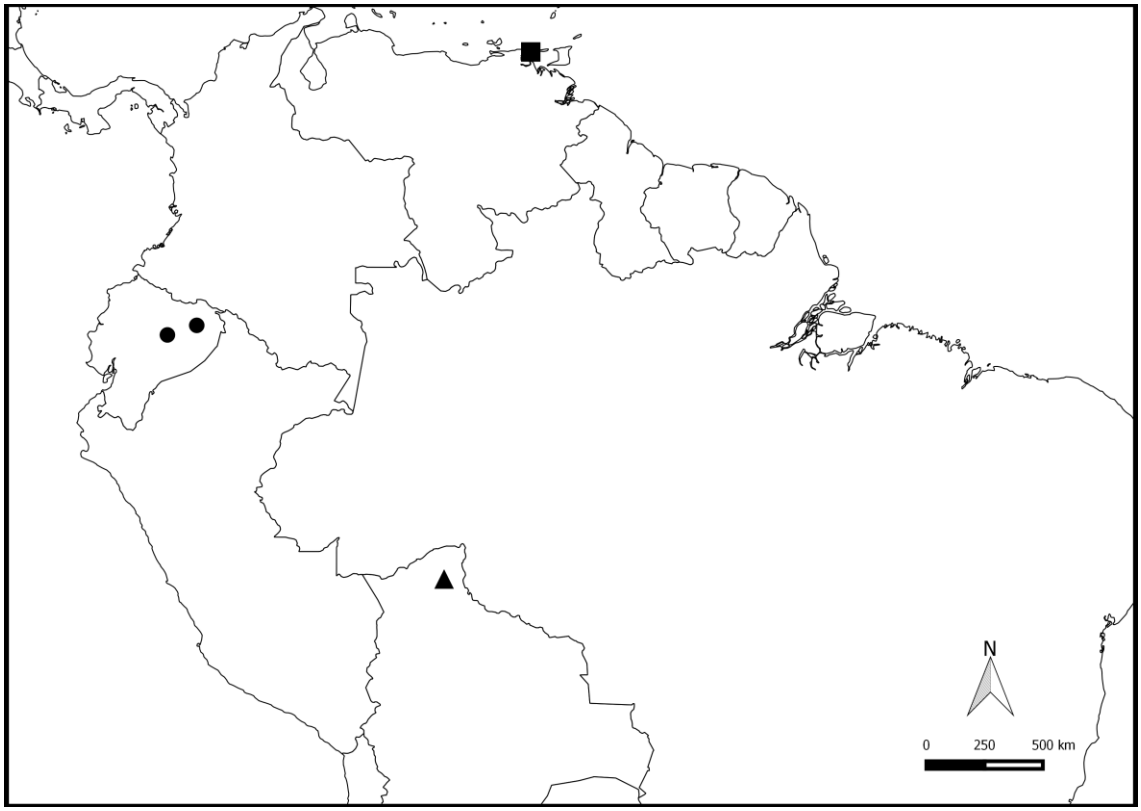

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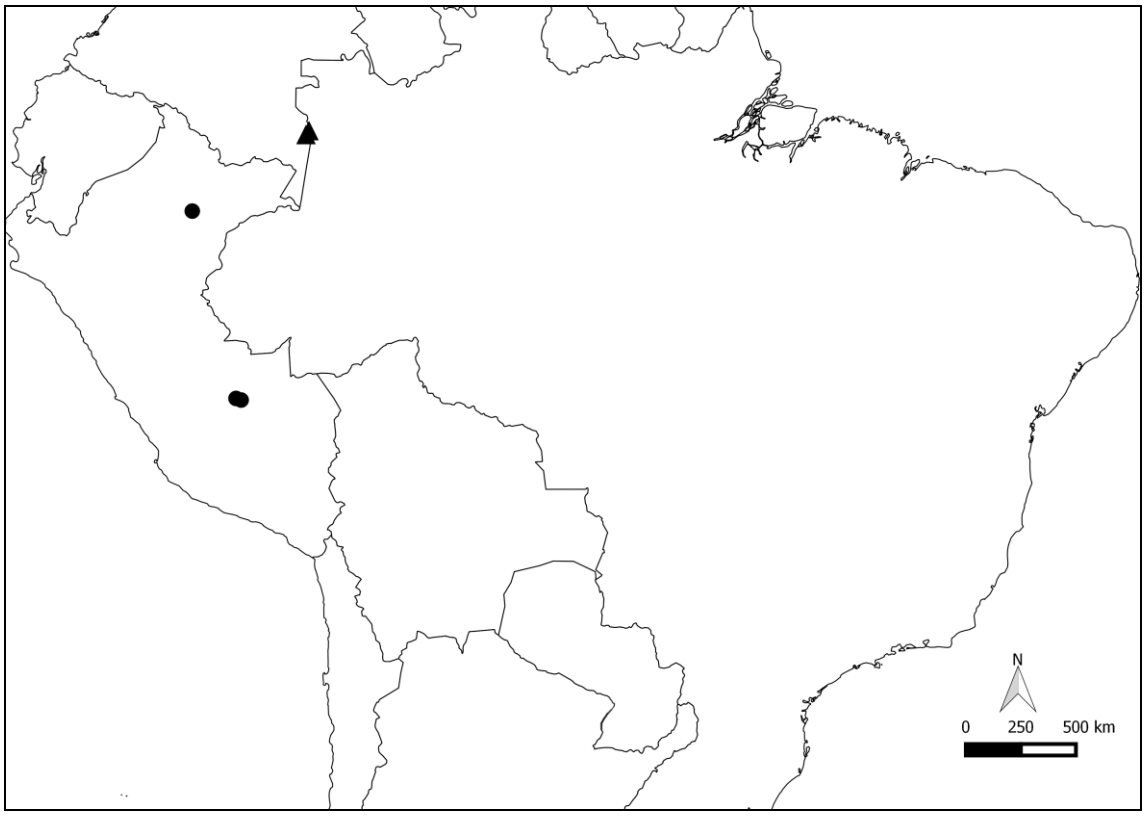

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