



UNIVERSIDADE FEDERAL DO PARÁ
MUSEU PARAENSE EMÍLIO GOELDI
PROGRAMA DE PÓS-GRADUAÇÃO EM ZOOLOGIA
MESTRADO EM ZOOLOGIA - ÁREA EVOLUÇÃO E BIODIVERSIDADE

DEZ NOVAS ESPÉCIES DE *Amphidraus* SIMON, 1900
(ARANEAE: SALTICIDAE: EUOPHRYINI) E TRÊS NOVAS COMBINAÇÕES

ALEXANDRE SALGADO DE SOUZA

BELÉM-PA

2017

ALEXANDRE SALGADO DE SOUZA

**DEZ NOVAS ESPÉCIES DE *Amphidraus* SIMON, 1900
(ARANEAE: SALTICIDAE: EUOPHRYINI) E TRÊS NOVAS COMBINAÇÕES**

Dissertação apresentada ao Programa de Pós-graduação em Zoologia UFPA/MPEG, Área Evolução e Biodiversidade, como requisito parcial para obtenção do grau de mestre em Zoologia.

Orientador: Dr. Gustavo Rodrigo Sanches Ruiz

Área de concentração: Evolução

Linha de pesquisa: Sistemática e taxonomia

Belém-PA

2017

Dados Internacionais de Catalogação- na-Publicação (CIP)
Biblioteca do Instituto de Ciências Biológicas – UFPA

Souza, Alexandre Salgado de

Dez novas espécies de *Amphidraus* Simon, 1900 (Araneae: Salticidae: Euophryini) e três novas combinações / Alexandre Salgado de Souza ; Orientador, Gustavo Rodrigo Sanches Ruiz. - 2017.

63 f. : il.

Inclui bibliografias

Dissertação (Mestrado) - Universidade Federal do Pará, Instituto de Ciências Biológicas, Programa de Pós-graduação em Zoologia, Belém, 2017.

Museu Paraense Emílio Goeldi.

1. Aranhas saltadoras. 2. Zoologia - classificação. 3. Invertebrados – morfologia. I. Ruiz, Gustavo Rodrigo Sanches, orientador. II. Museu Paraense Emílio Goeldi. III. Título.

CDD – 22 ed. 595.44

AVISO

Esta Dissertação não é válida como publicação, como descrito no capítulo 3 do CÓDIGO INTERNACIONAL DE NOMENCLATURA ZOOLÓGICA. Mudanças taxonômicas e novos nomes propostos aqui não são válidos para propósito nomenclatural ou de prioridade.

WARNING

This Dissertation is not valid as publication, as described in the chapter 3 of the INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE. Taxonomic changes and new names here proposed are not valid for nomenclatural or priority purposes.

ALEXANDRE SALGADO DE SOUZA

**DEZ NOVAS ESPÉCIES DE *Amphidraus* SIMON, 1900
(ARANEAE: SALTICIDAE: EUOPHRYINI) E TRÊS NOVAS COMBINAÇÕES**

Dr Gustavo Rodrigo Sanches Ruiz (Orientador)

Universidade Federal do Pará

Dra Cristina Anne Rheims

Instituto Butantan - SP

Dra Daniele Polotow

UNICAMP - SP

Dr Ricardo Ott

Fundação Zoobotânica - RS

Dr Alexander Sánchez-Ruiz

Instituto Butantan - SP

Dr Alexandre B. Bonaldo

Museu Paraense Emílio Goeldi

“In every country, we should be teaching our children the scientific method and the reasons for a Bill of Rights. With it comes a certain decency, humility and community spirit. In the demon-haunted world that we inhabit by virtue of being human, this may be all that stands between us and the enveloping darkness”

Carl Sagan

AGRADECIMENTOS

Agradeço, primeiramente, ao Dr. Gustavo Ruiz pela excelente orientação durante a realização desse trabalho e pelos ensinamentos.

Ao programa de Pós-Graduação em Zoologia (MPEG/UFPA) pela formação recebida e ao Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPQ) pela bolsa concedida.

Aos curadores de todas as coleções que forneceram espécimes para serem examinados.

Ao Dr. Alexandre B. Bonaldo por disponibilizar os equipamentos do laboratório de Aracnologia (MPEG).

Ao Dr. Orlando Tobias Silveira por disponibilizar equipamentos do laboratório de Entomologia (MPEG) que foram fundamentais na etapa final da realização desse trabalho.

Ao aluno de doutorado da Universidade de Buenos Aires, Ivan Magalhães, por disponibilizar fotografias de materiais depositados no MACN.

A todos os colegas do laboratório de Aracnologia (MPEG) pelo acolhimento durante os dias de trabalho no museu, especialmente a Dra. Yulie Feitosa, Lilian Fernanda Serrão e Nithomas Matheus.

Ao Dr. Fernando Silva e a Dra. Regiane Saturnino pelos valiosos conselhos durante a banca de qualificação.

Aos colegas biólogos Abel Bustamante, Rafael Cabral Borges e Roxiris Azuaje pelas ótimas conversas sobre evolução e sistemática e pela troca de conhecimento.

Aos colegas da turma de mestrado pela agradável convivência durante as disciplinas.

Aos colegas do laboratório de Invertebrados (UFPA) pela agradável convivência durante esses dois anos de atividades.

A todos os divulgadores científicos que me despertaram através de suas obras uma curiosidade pelo mundo natural.

E por fim, a minha família (Felicita, Felipe e Gustavo), amigos e namorada (Tassia Abreu) pelo apoio e incentivo.

SUMÁRIO

1. RESUMO.....	8
1. ABSTRACT.....	8
2. INTRODUÇÃO.....	9
2.1. Ordem Araneae.....	9
2.2. Clados RTA e Dionycha.....	9
2.3. Família Salticidae e subfamília Salticinae.....	10
2.4. Tribo Euophryini.....	11
2.5. Clado <i>Amphidraus-Marma</i>	12
2.6. Histórico de <i>Amphidraus</i> Simon, 1900.....	13
3. OBJETIVOS.....	14
4. REFERÊNCIAS BIBLIOGRÁFICAS.....	14

Revision of *Amphidraus* Simon, 1900 (Araneae: Salticidae: Euophryini)

Abstract.....	18
Introduction.....	18
Material and Methods.....	20
Taxonomy.....	21
<i>Amphidraus</i> Simon, 1900.....	21
<i>Amphidraus mysticetus</i> sp. nov.	24
<i>Amphidraus caxiuanan</i> sp. nov.	28
<i>Amphidraus pulvinus</i> sp. nov.	30
<i>Amphidraus belzonte</i> sp. nov.	32
<i>Amphidraus nigrigenu</i> sp. nov.	35
<i>Amphidraus simplex</i> sp. nov.	37
<i>Amphidraus santanae</i> Galiano, 1967.....	40
<i>Amphidraus janauari</i> sp. nov.	43
<i>Amphidraus bifidus</i> sp. nov.	45
<i>Amphidraus draconicaudatus</i> sp. nov.	49

<i>Amphidraus loxodontillus</i> sp. nov.	55
<i>Titanattus</i> Peckham & Peckham, 1885.....	57
<i>Titanattus parvus</i> (Mello-Leitçao, 1945) new comb.	57
<i>Truncattus</i> Zhang & Maddison, 2012.....	57
<i>Truncattus manni</i> (Bryant, 1943) new comb.	58
<i>Truncattus mendicus</i> (Bryant, 1943) new comb.	58
Acknowledgments.....	62
References.....	62

1. RESUMO

Dez espécies novas de *Amphidraus* Simon, 1900 provenientes do Brasil são descritas: *A. belzonte* **sp. nov.** (♂), *A. bifidus* **sp. nov.** (♂♀), *A. caxiuanan* **sp. nov.** (♂), *A. draconicaudatus* **sp. nov.** (♂♀), *A. janauri* **sp. nov.** (♂), *A. loxodontillus* **sp. nov.** (♂), *A. mysticetus* **sp. nov.** (♂♀), *A. nigrigenu* **sp. nov.** (♂), *A. pulvinus* **sp. nov.** (♂) e *A. simplex* **sp. nov.** (♂♀). Uma nova diagnose é proposta para o gênero e três novas combinações são estabelecidas para três espécies atualmente mal alocadas em *Amphidraus*: *Nebridia parva* Mello-Leitão, 1945 = *Titanattus parvus* (Mello-Leitão, 1945) **new comb.**, *Nebridia manni* Bryant, 1943 = *Truncattus manni* (Bryant, 1943) **new comb.** e *Nebridia mendica* Bryant, 1943 = *Truncattus mendicus* (Bryant, 1943) **new comb.** Novos registros de *A. santanae* Galiano, 1967 são apresentados, permitindo um breve comentário sobre as variações morfológicas encontradas.

Palavras-chave: aranhas-saltadoras, sistemática, taxonomia, morfologia, *Titanattus*, *Truncattus*

ABSTRACT

Ten new species of *Amphidraus* Simon, 1900 from Brazil are described: *A. belzonte* **sp. nov.** (♂), *A. bifidus* **sp. nov.** (♂♀), *A. caxiuanan* **sp. nov.** (♂), *A. draconicaudatus* **sp. nov.** (♂♀), *A. janauri* **sp. nov.** (♂), *A. loxodontillus* **sp. nov.** (♂), *A. mysticetus* **sp. nov.** (♂♀), *A. nigrigenu* **sp. nov.** (♂), *A. pulvinus* **sp. nov.** (♂) and *A. simplex* **sp. nov.** (♂♀). A new diagnosis is proposed for the genus and three new combinations are established for species presently misplaced in *Amphidraus*: *Nebridia parva* Mello-Leitão, 1945 = *Titanattus parvus* (Mello-Leitão, 1945) **new comb.**, *Nebridia manni* Bryant, 1943 = *Truncattus manni* (Bryant, 1943) **new comb.** and *Nebridia mendica* Bryant, 1943 = *Truncattus mendicus* (Bryant, 1943) **new comb.** Several new records for *A. santanae* Galiano, 1967 are provided, enabling brief comments on the morphological variations founded.

Key words: jumping spiders, systematics, taxonomy, *Titanattus*, *Truncattus*

2. INTRODUÇÃO

2.1. Ordem Araneae

As aranhas possuem como características distintivas a presença de glândulas de veneno associadas às quelíceras, tarso do pedipalpo do macho modificado em órgão copulatório e apêndices abdominais modificados (fiandeiras) conectados a glândulas de seda do abdômen (Foelix 2011; Wheeler *et al.* 2016). Até o momento, foram descritas no mundo cerca de 46500 espécies, distribuídas em 4029 gêneros e 113 famílias (World Spider Catalog 2017).

Esta ordem é dividida em duas subordens: Mesothelae e Opisthothelae (Foelix 2011; Wheeler *et al.* 2016). Aranhas Mesothelae são conhecidas por possuírem evidente segmentação abdominal dorsal (tergitos livres) e fiandeiras localizadas na região mediana ventral do abdômen, sendo estas características consideradas plesiomórficas (Haupt 2003; Foelix 2011; Wheeler *et al.* 2016). Aranhas Opisthothelae não possuem tal segmentação evidente no abdômen e suas fiandeiras estão localizadas na região posterior, próximas ao tubérculo anal (Foelix 2011; Wheeler *et al.* 2016).

Opisthothelae contém duas infraordens (Mygalomorphae e Araneomorphae), que se diferenciam principalmente devido ao plano de movimentação de suas quelíceras (Foelix 2011; Wheeler *et al.* 2016). Mygalomorphae é o grupo que inclui as “tarântulas”, ou caranguejeiras, e possuem quelíceras paraxiais, com movimentação paralela ao eixo do corpo, uma plesiomorfia (Foelix 2011; Wheeler *et al.* 2016). Possuem outras características consideradas plesiomórficas, como por exemplo a presença de dois pares de pulmões e estrutura de teia mais simplificada (Foelix 2011; Wheeler *et al.* 2016). As Araneomorphae formam um grupo diverso, representando cerca de 90% de toda a diversidade de aranhas. Diferem-se das migalomorfas principalmente pelas quelíceras diaxiais, ou seja, com movimentação em um plano perpendicular ao eixo do corpo (Foelix 2011; Wheeler *et al.* 2016).

2.2. Clados RTA e Dionycha

Um representativo grupo (em relação ao número de táxons) dentro de Araneomorphae é o clado RTA, proposto por Coddington & Levi (1991). Possui como principal sinapomorfia a presença de uma apófise que se projeta em posição retrolateral

na tíbia do pedipalpo do macho. Esta estrutura, nomeada de “apófise tibial retrolateral”, em inglês, “retrolateral tibial apophysis” (RTA), possui importante função no ato da cópula, uma vez que, ao se fixar no epígino da fêmea, proporciona maior estabilidade para o pedipalpo do macho quando este se expande para a transferência de espermatozoides (Wheeler *et al.* 2016).

Internamente ao clado RTA encontra-se o clado Dionycha, contendo atualmente 17 famílias (Ramírez 2014; Wheeler *et al.* 2016). Seu nome foi introduzido na literatura por Petrunkevitch (1928). Estas aranhas são conhecidas pela presença, na maioria dos grupos, de duas garras na extremidade dos tarsos associadas a tufo de cerdas de função adesiva (Ramírez 2014; Wheeler *et al.* 2016). Dionycha sofreu mudanças em sua classificação ao longo do tempo (Petrunkevitch 1933; Lehtinen 1967), porém tais estudos não realizaram nenhuma análise filogenética, apenas agruparam táxons com base em determinadas características compartilhadas.

Finalmente, Ramírez (2014) propôs uma hipótese filogenética para Dionycha, baseada em caracteres morfológicos, na qual Salticidae Blackwall, 1841 aparece como grupo-irmão de Philodromidae Thorell, 1870. Posteriormente, uma nova hipótese foi apresentada para Araneae, com base em caracteres moleculares (Garrisson *et al.* 2016), na qual Salticidae Blackwall, 1841 aparece em um clado juntamente com Anyphaenidae Bertkau, 1878, Gnaphosidae Pocock, 1898, e Trachelidae Simon, 1897. No entanto, Philodromidae Thorell, 1870 não foi utilizada neste estudo. No mesmo ano, uma hipótese alternativa, também com base em dados moleculares foi proposta por Wheeler *et al.* (2016), na qual Salticidae Blackwall, 1841 aparece como grupo-irmão de um clado formado por Eutichuridae Lehtinen, 1967, e Philodromidae Thorell, 1870.

2.3. Família Salticidae e subfamília Salticinae

Com cerca de 6000 espécies em 620 gêneros, Salticidae (aranhas-saltadoras) é a mais diversa família de aranhas (World Spider Catalog 2017). Apresenta-se distribuída na maioria dos ecossistemas terrestres, exceto nos polos (Maddison 2015). A maioria das aranhas possui uma visão mais simples, com olhos pequenos e retina rudimentar, com exceção de Salticidae, cuja visão se destaca dentre as demais famílias (Jackson 1992). O arranjo ocular e o tamanho relativo dos olhos são de grande importância sistemática para classificação e identificação de diferentes famílias de aranhas (Foelix 2011). Nesse sentido, a presença de um par de olhos médios anteriores altamente especializados

ocupando a região frontal da carapaça representa a mais notável sinapomorfia dessa família (Foelix 2011; Maddison 2015). As aranhas-saltadoras são bastante dependentes da visão, de modo que muitas de suas características comportamentais estão intimamente relacionadas a determinado estímulo visual. Estes comportamentos incluem principalmente a captura de presas e a percepção de predadores, além do reconhecimento de parceiros sexuais e outros indivíduos da mesma espécie (Richman & Jackson 1992).

A subfamília Salticinae, redefinida recentemente por Maddison (2015) e conhecida anteriormente como o clado Salticoida (Maddison & Hedin 2003), inclui cerca de 90% das espécies conhecidas de Salticidae e está presente em todo o mundo, incluindo regiões temperadas e no ártico (Maddison 2015). Seu monofiletismo tem sido demonstrado tanto por caracteres morfológicos (Maddison 1996; Ramírez 2014), quanto por caracteres moleculares (Bodner & Maddison 2012; Maddison *et al.* 2014). Atualmente são conhecidas pelo menos 13 sinapomorfias morfológicas que sustentam Salticinae, dentro da qual encontra-se a tribo Euophryini, entre outras (Maddison 2015).

2.4. Tribo Euophryini

Euophryini corresponde atualmente a uma das maiores tribos de Salticidae, com cerca de 1000 espécies (Zhang & Maddison 2015). Prószyński (1976) incluiu 13 gêneros em Euophryinae (considerada uma subfamília naquela época), delimitando o grupo com base na presença de um êmbolo espiral na extremidade distal do tégulo do pedipalpo. Maddison & Hedin (2003) revisaram essa delimitação, especificando ainda mais a forma particular de êmbolo e tégulo: o plano espiral do êmbolo sendo ligeiramente paralelo ao eixo longitudinal do pedipalpo e o ducto espermático possuindo uma alça retrolateral projetada para o centro do tégulo. Com base nessa nova delimitação e na revisão dos palpos de outros gêneros, o número de táxons em Euophryinae aumentou de 13 para 34 gêneros. Em um estudo filogenético posterior usando dados moleculares (Zhang & Maddison 2013), espécies com diferentes morfologias de êmbolo e tégulo, foram incluídas no grupo, elevando o número para 85 gêneros. Embora a tribo esteja bem delimitada por dados morfológicos e moleculares, internamente sua classificação ainda é confusa. Há muitos casos de convergência na forma do corpo. Além disso, diferentes gêneros apresentam órgãos genitais semelhantes, dificultando a classificação e o reconhecimento destes (Zhang & Maddison 2015).

Segundo hipótese filogenética proposta por Zhang & Maddison (2015) baseada em caracteres moleculares, Euophryini se divide na base entre o clado *Anasaitis-Corythalia*, presente no Novo Mundo, e um clado maior contendo diversos outros gêneros, tanto do Velho, quanto do Novo Mundo. Neste segundo está um clado menor que inclui *Amphidraus* Simon, 1900 e *Marma* Simon, 1902 como grupo-irmão de *Tylogonus* Simon, 1902 e outros gêneros do Novo Mundo, como *Soesilarishius* Makhan, 2007, *Coryphasia* Simon, 1902, e *Ilargus* Simon, 1901 (Fig. 1).

Recentemente, Maddison (2015) revisou toda a classificação de Salticidae e a antiga subfamília Euophryinae foi estabelecida como uma tribo dentro de Salticinae.

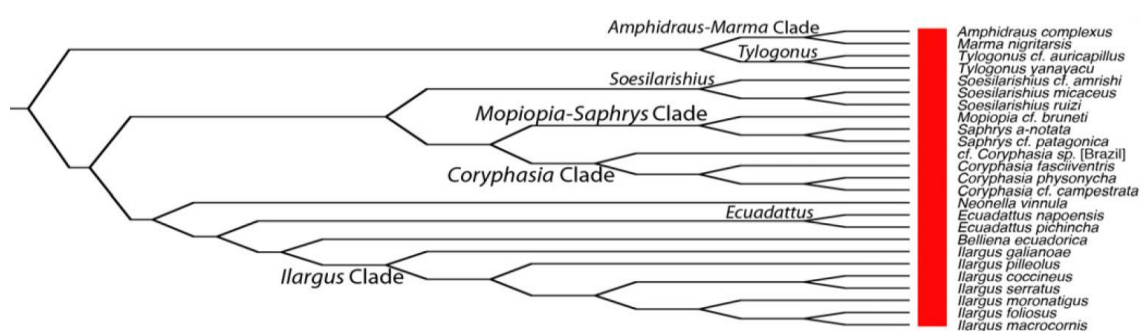


Figura 1: Reconstrução filogenética de um subclado de Euophryini que contém *Amphidraus* e gêneros proximamente relacionados. Modificado de Zhang & Maddison (2015; barra vermelha indica, no original, que todos os representantes são do Novo Mundo).

2.5. Clado *Amphidraus-Marma*

Espécies pertencentes ao clado *Amphidraus-Marma* são de pequeno a médio porte, com dois dentes promarginais e um dente fissidentado retromarginal com duas ou mais cúspides nas quelíceras e palpo do macho com projeções no disco embólico independentes do êmbolo (Zhang & Maddison 2015). *Amphidraus* Simon, 1900 se distingue de *Marma* Simon, 1902 por possuir um lóbulo na região proximal do tégulo, além de uma RTA grande e complexa, com diversas ramificações (Fig. 2) (Zhang & Maddison 2015). Maddison (2015) sugeriu uma possível relação de proximidade entre *Yacuitella* Galiano, 1999 e *Amphidraus* Simon, 1900, com base na forma do êmbolo e do corpo e nos dentes das quelíceras.

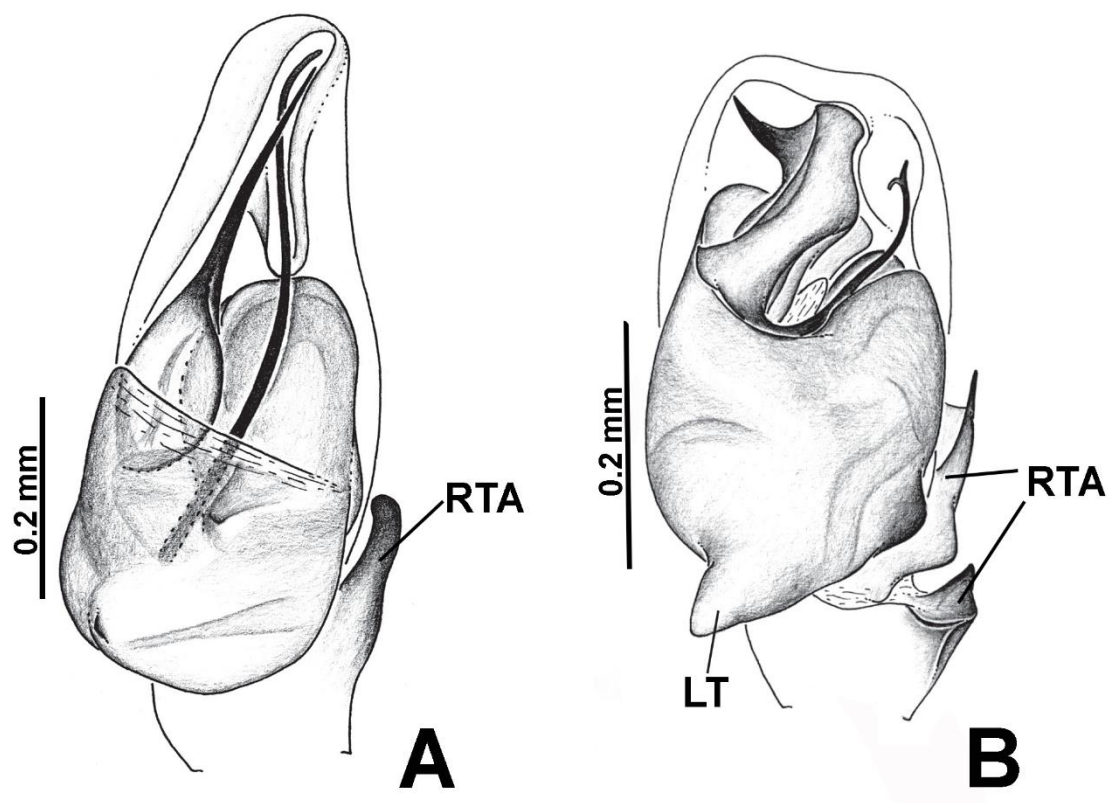


Figura 2: Palpo do macho em vista ventral. A *Marma nigratarsis* (Simon, 1900); B *Amphidraus complexus* Zhang & Maddison, 2012. Modificado de Zhang & Maddison (2015). RTA = retrolateral tibial apophysis; LT = lóbulo tegular.

2.6. Histórico de *Amphidraus* Simon, 1900

Amphidraus foi proposto por Simon (1900) para incluir *A. auriga* Simon, 1900, a espécie-tipo por designação original, e *A. nigratarsis* Simon, 1900, ambas descritas baseadas em machos da Bolívia. Galiano (1962) transferiu uma das espécies originalmente descritas em *Amphidraus*, *A. nigratarsis* Simon, 1900, para *Marma* Simon, 1902, e descreveu (Galiano 1967) duas espécies para o Brasil: *A. santanae* (macho e fêmea descritos) e *A. duckei* (somente macho na descrição original). A fêmea de *A. duckei* foi descrita em um trabalho posterior (Galiano 1976). Galiano (1963) ainda redescreveu as espécies descritas por Simon (1900, 1902) e descreveu (Galiano 1997) *A. argentinensis* da Argentina, baseada em ambos os sexos. Recentemente, Zhang & Maddison (2012) descreveram *A. complexus*, baseada no macho e na fêmea do Equador e, durante revisão dos gêneros de Euophryinae (Zhang & Maddison 2015), detectaram a proximidade da espécie-tipo de *Nebridia* (*N. semicana* Simon, 1902) com as espécies

incluídas em *Amphidraus*, transferindo esta espécie e, como consequência, sinonimizando *Nebridia* Simon, 1902 com *Amphidraus* Simon, 1900. Além da espécie-tipo, *Nebridia* incluía outras três espécies (de classificação atualmente incerta), que também passaram para *Amphidraus*: *N. manni* Bryant, 1943 (ambos os sexos conhecidos) e *N. mendicus* Bryant, 1943 (somente macho conhecido) de Hispaniola e *N. parva* Mello-Leitão, 1945 (somente fêmea conhecida) da Argentina.

Dado o histórico taxonômico apresentado, *Amphidraus* atualmente é composto por nove espécies (Tabela I).

Tab. I – Lista das espécies atualmente incluídas em *Amphidraus* Simon, 1900 (ordem alfabética) (World Spider Catalog 2017).

Espécie	Autor	Sexo Conhecido	Localidade-tipo
<i>A. argentinensis</i>	Galiano, 1997	♂♀	Argentina
<i>A. auriga</i>	Simon, 1900	♂	Bolívia
<i>A. complexus</i>	Zhang & Maddison, 2012	♂♀	Equador
<i>A. duckei</i>	Galiano, 1967	♂♀	Brasil
<i>A. manni</i>	(Bryant, 1943)	♂♀	Hispaniola
<i>A. mendicus</i>	(Bryant, 1943)	♂	Hispaniola
<i>A. parvus</i>	(Mello-Leitão, 1945)	♀	Argentina
<i>A. santanae</i>	Galiano, 1967	♂♀	Brasil
<i>A. semicanus</i>	(Simon, 1902)	♂	Venezuela

3. OBJETIVO

Este trabalho possui como objetivo descrever espécies novas para *Amphidraus* Simon, 1900 e verificar a situação taxonômica das espécies transferidas de *Nebridia*.

4. REFERÊNCIAS BIBLIOGRÁFICAS

BODNER, M. R. & MADDISON, W. P. 2012. The biogeography and age of salticid spider radiations (Araneae: Salticidae). **Molecular Phylogenetics and Evolution**, 65: 213–240.

- BRYANT, E. B. 1943. The salticid spiders of Hispaniola. **Bulletin of the Museum of Comparative Zoology at Harvard College**, 92: 445-529.
- CODDINGTON, J. A. & LEVI, H. W. 1991. Systematics and Evolution of Spiders (Araneae). **Annual Review of Ecology, Evolution and Systematics**, 22: 565-592.
- FOELIX, R. F. 2011. **Biology of Spiders**. Third Edition. Oxford University Press, 419 pp.
- GALIANO, M. E. 1962. Los géneros *Amphidraus* Simon y *Marma* Simon (Araneae, Salticidae). **Acta Zoologica Lilloana**, 18: 31-44.
- GALIANO, M. E. 1963. Las especies americanas de arañas de la familia Salticidae descritas por Eugène Simon: Redescripciones basadas en los ejemplares típicos. **Physis Buenos Aires (C)**, 23: 273-470.
- GALIANO, M. E. 1967. Dos nuevas especies del género *Amphidraus* Simon, 1900 (Araneae, Salticidae). **Physis Buenos Aires (C)**, 27: 95-100.
- GALIANO, M. E. 1976. Descripción del alotipo f de *Amphidraus duckei* Galiano, 1967 (Araneae, Salticidae). *Revista de la Sociedad Entomológica Argentina*, 35: 57-58.
- GALIANO, M. E. 1997. Descripción de *Amphidraus argentinensis*, nueva especie (Araneae, Salticidae). **Physis Buenos Aires (C)**, 53: 33-36.
- GARRISON, N. L., J. RODRIGUEZ, I. AGNARSSON, J. A. CODDINGTON, E. C. GRISWOLD, C. A. HAMILTON, M. HEDIN, K. M. KOCOT, J. M. LEDFORD & J. E. BOND. 2016. Spider phylogenomics: untangling the spider tree of life. **PeerJ**, 4: e1719.
- HAUPT, J. 2003. The Mesothelae – a monograph of an exceptional group of spiders (Araneae: Mesothelae). **Zoologica**, 154: 1–102.
- HUBER, B. A. 1995. Genital morphology and copulatory mechanics in *Anyphaena accentuata* (Anyphaenidae) and *Clubiona pallidula* (Clubionidae: Araneae). **Journal of Zoology**, 235: 689–702.
- JACKSON, R. R. 1992. Eight-legged tricksters: spiders that specialize in catching other spiders. **Bioscience**, 42: 590–598.
- LEHTINEN, P. T. 1967. Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Araneomorpha. **Annales Zoologici Fennici**, 4: 199–467.
- MADDISON, W. P. 1996. *Pelegrina* Franganillo and other jumping spiders formerly placed in the genus *Metaphidippus* (Araneae: Salticidae). **Bulletin of the Museum of Comparative Zoology**, 154: 215–368.

- MADDISON, W. P. & HEDIN, M. C. 2003. Jumping spider phylogeny (Araneae: Salticidae). **Invertebrate Systematics**, 17: 529–549.
- MADDISON, W. P., D. LI, M. BODNER, J. ZHANG, X. XU, Q. LIU & F. LIU. 2014. The deep phylogeny of jumping spiders (Araneae, Salticidae). **ZooKeys**, 440: 57-87.
- MADDISON, W. P. 2015. A phylogenetic classification of jumping spiders (Araneae: Salticidae). **Journal of Arachnology**, 43: 231-292.
- MELLO-LEITÃO, C. F. de 1945. Arañas de Misiones, Corrientes y Entre Ríos. **Revista del Museo de La Plata (N.S., Zool.)**, 4: 213-302.
- PETRUNKEVITCH, A. 1928. Systema araneorum. **Transactions of the Connecticut Academy of Arts and Sciences**, 29: 1–270.
- PETRUNKEVITCH, A. 1933. An inquiry into the natural classification of spiders, based on a study of their internal anatomy. **Transactions of the Connecticut Academy of Arts and Sciences**, 31: 303–389.
- PRÓSZYŃSKI, J. 1976. Studium systematyczno-zoogeograficzne nad rodziną Salticidae (Aranei) Regionów Palearktycznego i Nearktycznego. *Rozprawy Wyższa Szkoła Pedagogiczna Siedlcach*, 6: 1–260.
- RAMÍREZ, M. J. 2014. The Morphology and phylogeny of dionychan spiders (Araneae: Araneomorphae). **Bulletin of the American Museum of Natural History**, 390 (1): 1-374.
- RICHMAN, D. B; JACKSON, R. R. 1992. A review of the ethology of jumping spiders (Araneae, Salticidae). **Bulletin of the British Arachnological Society**, 9 (2): 33-37.
- SIMON, E. 1900. Descriptions d'espèces nouvelles de la famille des Attidae. **Annales de la Société Entomologique de France**, 69: 27-61.
- SIMON, E. 1902. Description d'arachnides nouveaux de la famille des Salticidae (Attidae) (suite). **Annales de la Société Entomologique de Belgique**, 46: 24-56, 363-406.
- WHEELER, W. C., J. A. CODDINGTON, L. M. CROWLEY, D. DIMITROV, P. A. GOLOBOFF, C. E. GRISWOLD, G. HORMIGA, L. PRENDINI, M. J. RAMÍREZ, P. SIERWALD, L. ALMEIDA-SILVA, F. ALVAREZ-PADILLA, M. A. ARNEDO, L. R. B. SILVA, S. P. BENJAMIN, J. E. BOND, C. J. GRISMADO, E. HASAN, M. HEDIN, M. A. IZQUIERDO, F. M. LABARQUE, J. LEDFORD, L. LOPARDO, W. P. MADDISON, J. A. MILLER, L. N. PIACENTINI, N. I. PLATNICK, D. POLOTOW, D. SILVA-DÁVILA, N. SCHARFF, T. SZÜTS, D. UBICK, C. J. VINK,

- H. M. WOOD & J. ZHANG. 2016. The spider tree of life: phylogeny of Araneae based on target-gene analyses from an extensive taxon sampling. **Cladistics**, 0: 1-43.
- WORLD SPIDER CATALOG. 2016. World Spider Catalog. Natural History Museum Bern, disponível em <http://wsc.nmbe.ch>, version 18.0.
- ZHANG, J. & MADDISON, W. P. 2012. New euophryine jumping spiders from Central and South America (Araneae: Salticidae: Euophryinae). **Zootaxa**, 3578: 1-35.
- ZHANG, J. & MADDISON, W. P. 2013. Molecular phylogeny, divergence times and biogeography of the subfamily Euophryinae (Araneae: Salticidae). **Molecular Phylogenetics and Evolution**, 68 (1): 81–92.
- ZHANG, J. & MADDISON, W. P. 2015. Genera of euophryine jumping spiders (Araneae: Salticidae), with a combined molecular-morphological phylogeny. **Zootaxa**, 3938 (1): 1-147.

Ten new species of *Amphidraus* Simon, 1900 (Araneae: Salticidae: Euophryini) and three new combinations

ALEXANDRE SALGADO * & GUSTAVO R.S. RUIZ

Instituto de Ciências Biológicas, Universidade Federal do Pará, Rua Augusto Corrêa, 01, CEP 66075-110, Belém, PA, Brazil.

Programa de Pós-Graduação em Zoologia, Universidade Federal do Pará / Museu Paraense Emílio Goeldi.

E-mail: alexandre.salgado.souza@gmail.com; gustavoruiz86@hotmail.com

* Corresponding author.

Abstract

Ten new species of *Amphidraus* Simon, 1900 from Brazil are described: *A. belzonte* **sp. nov.** (♂), *A. bifidus* **sp. nov.** (♂♀), *A. caxiuanan* **sp. nov.** (♂), *A. draconicaudatus* **sp. nov.** (♂♀), *A. janauri* **sp. nov.** (♂), *A. loxodontillus* **sp. nov.** (♂), *A. mysticetus* **sp. nov.** (♂♀), *A. nigrigenu* **sp. nov.** (♂), *A. pulvinus* **sp. nov.** (♂) and *A. simplex* **sp. nov.** (♂♀). A new diagnosis is proposed for the genus and three new combinations are established for species presently misplaced in *Amphidraus*: *Nebridia parva* Mello-Leitão, 1945 = *Titanattus parvus* (Mello-Leitão, 1945) **new comb.**, *Nebridia manni* Bryant, 1943 = *Truncattus manni* (Bryant, 1943) **new comb.** and *Nebridia mendica* Bryant, 1943 = *Truncattus mendicus* (Bryant, 1943) **new comb.** Several new records for *A. santanae* Galiano, 1967 are provided, enabling brief comments on the morphological variations founded.

Key words: jumping spiders, systematics, taxonomy, *Titanattus*, *Truncattus*

Introduction

Euophryini is currently the largest tribe of salticids, with approximately 1000 species commonly found in all tropical areas of the world (Zhang & Maddison 2015). Prószyński (1976) included 13 genera in Euophryinae, a subfamily at that time, and delimited the group based on the presence of a spiral embolus at the distal tip of the tegulum. Maddison

& Hedin (2003) revised that definition, recognizing two groups with different types of spiral emboli: one with the spiral plane slightly parallel to the longitudinal axis of the palp, which would characterize true euophryines, and another with the spiral plane perpendicular to the axis (mostly ballines), which were excluded from the euophryines. Moreover, Maddison & Hedin (2003) determined a retrolateral loop of the spermatic duct towards the center of the tegulum as another common character among true euophryines. Based on that new definition, the number of genera in Euophryinae increased from 13 to 34 (Maddison & Hedin 2003). In a later phylogenetic study, using molecular data, Zhang & Maddison (2013), identified species with different embolus and tegulum morphologies as belonging in the euophryines, increasing the number of genera to 85. More recently, Maddison (2015) revised the entire classification of the family, and established euophryines as a tribe within the subfamily Salticinae (Maddison 2015).

According to the phylogenetic hypothesis of Zhang & Maddison (2015), Euophryini split at the base, forming the Neotropical *Anasaitis-Corythalia* clade and a clade including the remaining 83 genera. In the latter, there is a smaller Neotropical clade that includes *Amphidraus* Simon, 1900 + *Marma* Simon, 1902 as sister group of *Tylogonus* Simon, 1902. This grouping is sister of a clade that gathers other genera, such as *Soesilarishius* Makhan, 2007, *Coryphasia* Simon, 1902, *Neonella* Gertsch, 1936 and *Ilargus* Simon, 1901 (see Zhang & Maddison 2015: fig. 1). Although morphology evolution is far from understood within the euophryines, the sister group relationship between *Amphidraus* and *Marma* seems to be supported by some characters: chelicerae with two promarginal teeth and one fissident retromarginal tooth with two or more cusps and male palps with embolic disc with projections that are independent from the embolus (Zhang & Maddison, 2015). Later, Maddison (2015) increased the euophryine genus list up to 116 members, including *Yacuitella* Galiano, 1999, which could be a possible close relative of *Amphidraus*, based on the form of the embolus, cheliceral teeth, and body (Maddison 2015: 248).

Amphidraus was proposed by Simon (1900) to include *A. auriga* Simon, 1900 (type species by original designation) and *A. nigratarsis* Simon, 1900, both described based on males from Bolivia. Galiano (1962) transferred *A. nigratarsis* to *Marma* Simon, 1902, and described later three species in *Amphidraus*: *A. santanae* Galiano, 1967 (both sexes) and *A. duckei* Galiano, 1967 (only male in the original description) from Brazil, and *A. argentinensis* Galiano, 1997 (both sexes) from Argentina. The female of *A. duckei* was described later (Galiano 1976). Recently, Zhang & Maddison (2012) described *A.*

complexus (both sexes) from Ecuador and, during a revision of the euophryine genera (Zhang & Maddison 2015), they transferred the type species of *Nebridia*, *N. semicana* Simon (1902) to *Amphidraus*. Besides the type species, *Nebridia* already included three other species of uncertain classification also transferred to *Amphidraus*: *N. manni* Bryant, 1943 (both sexes) and *N. mendica* Bryant, 1943 (only male), both from Hispaniola, and *N. parva* Mello-Leitão, 1945 (only female) from Argentina.

Herein we describe ten new species of *Amphidraus* from Brazil and review the classification of those three species transferred from *Nebridia*.

Material and methods

The material examined is deposited in the following institutions (acronyms and curators in parentheses): Instituto Butantan, São Paulo (IBSP, A.D. Brescovit), Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA, C. Magalhães), Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires (MACN, C.L. Scioscia e M.J. Ramírez), Museum of Comparative Zoology at Harvard University, Cambridge (MCZ, G. Giribet), Museo de La Plata, La Plata (MLP, L. Pereira) and Museu Paraense Emílio Goeldi, Belém (MPEG, A.B. Bonaldo). Coordinates taken from GoogleEarth® to complete label data are given in square brackets. Scanning electron micrographs were taken with a Zeiss Leo 1450 VP (Laboratório Institucional de Microscopia Eletrônica de Varredura of the Museu Paraense Emílio Goeldi). Color images were taken with digital cameras attached to stereomicroscopes. Extended focal range images were then composed. Drawings of the male palp and epigyne were made with a camera lucida attached to a stereomicroscope and treated in an illustration software to achieve the desired texture. The species are listed based on similarities of the male palp. Measurements are in millimeters. Legs are expressed in Roman numerals, except in the formula that indicates the relative length of legs, which is expressed in Arabic numbers. The length of the legs is given in the descriptions as: leg (Roman) total length [length of femur + (length of patella + tibia) + (length of metatarsus + tarsus)]. The following abbreviations are used: ALE, anterior lateral eyes; AME, anterior median eyes; CC, cymbial conductor; CD, copulatory duct; CO, copulatory opening; dPED, distal process on embolic disc; E, embolus; ED, embolic disc; FD, fertilization duct; ITA, Intermediate tibial apophysis; mPED, median process on embolic disc; PLE, posterior lateral eyes; PME, posterior median eyes; po, coupling pocket; pPED, proximal process on embolic disc; PS, primary spermatheca; RSDL,

retrolateral sperm duct loop; RTA, retrolateral tibial apophysis; RvTA: retroventral tibial apophysis; SD, sperm duct; SS, secondary spermatheca; TL, tegular lobe.

Taxonomy

Amphidraus Simon, 1900

Amphidraus Simon, 1900: 60 (type species: *Amphidraus auriga* Simon, 1900, original designation).

Nebridia Simon, 1902: 373 (type species: *Nebridia semicana* Simon, 1902); synonymized by Zhang & Maddison 2015: 22.

Relationships. Species of the *Amphidraus*-*Marma* clade are small to medium-sized jumping spiders with two promarginal teeth and one fissident retromarginal tooth with two or more cusps in the chelicerae (Figs 1E, 1F); the male palp in these two genera has an embolic disc with projections independent from the embolus (Figs 4C, 6C, 8C) (Zhang & Maddison 2015). The clade includes *Amphidraus* Simon, 1900, *Marma* Simon, 1902 and *Yacuitella* Galiano, 1999.

Revised diagnosis. *Amphidraus* can be distinguished from *Marma* and *Yacuitella* by the lobe on the proximal region of the tegulum (Figs 4C, 6C; absent in *Marma* and *Yacuitella*) and by the bifid tip of the embolus, forming a spiraled tube that varies in length (Fig. 3B; embolus simple in the other two genera). From *Marma*, *Amphidraus* also differs by the complex arrangements of tibial apophyses (RTA, RvTA and ITA; simple RTA in *Marma*), and by a membranous distal retroventral expansion of the cymbium in which part of the embolus rests (named “cymbial conductor”, Figs 3A, 3B, 4C; a narrow and not membranous structure in *Marma*, see Zhang & Maddison 2015, fig. 217).

Common features. Small-sized (2–3 mm) jumping spiders; thoracic area brown and cephalic area black, covered with sparse white and brown scales, mostly around the eyes (some species, such as *A. mysticetus* **sp. nov.** and *A. caxiuanan* **sp. nov.**, have a longitudinal stripe of white scales on the carapace; Figs 1A–D, 2A, 2C, 5A); legs yellow or brown; abdomen brown and variegated; female with unmodified palp. **Male palp:** some species with femur with a ventral distal depression, in which the proximal tegular lobe fits when palp is flexed (Fig. 10A); this is present in *A. belzonte* **sp. nov.**, *A. caxiuanan* **sp. nov.**, *A. loxodontilus* **sp. nov.** and *A. simplex* **sp. nov.** (Figs 6A, 10A, 14D, 26D); other species have a subproximal ventral projection, such as in *A. auriga* Simon,

1900, *A. duckei* Galiano, 1967, *A. nigrigenu* **sp. nov.** (Fig. 12D), *A. santanae* Galiano, 1967 (Fig. 15B) and *A. simplex* **sp. nov.** (Fig. 14D); patella short, with dorsal tuft of white scales (Fig. 3C); tibia as long as patella, with varied and complex arrangements of tibial apophyses, ranging from a single RTA, such as in *A. simplex* **sp. nov.** (Figs 14C, 14D) to a combination of RTA, ITA and RvTA, such as in *A. belzonte* **sp. nov.** (Figs. 10C, 10D) and *A. pulvinus* **sp. nov.** (Fig. 8D); cymbium oval (Figs 4B, 8B); tegulum usually without retrolateral sperm duct loop (present in most Euophryini); if present, slightly accentuated, such as in *A. complexus* Zhang & Maddison, 2012 and *A. pulvinus* **sp. nov.** (Fig. 8C); tegulum with rounded distal retrodorsal projection (Figs 8C, 10C, 14C) and with a small membranous region on the prolateral border (Figs 4A, 6A, 10A, 24A); embolus emerging from proximal portion of the embolic disc, projected towards the apex of the palp along the retrolateral side of the disc and with a well sclerotized, straight portion and a poorly sclerotized, subapical or apical filament curling around the straight portion and resting on the cymbial conductor (Figs 4C, 6C, 8C). **Epigyne:** epigynal plate with single (Fig. 14E) or a pair of close, semicircular copulatory openings (Figs 4E, 16I); coupling pocket narrow or large, dorsal, at the posterior border of the epigynal plate (figs 16I, 21E, 24F) or large and ventral, at the median portion of the epigynal plate (Figs 14E); some species, such as *A. mysticetus* **sp. nov.** (Fig. 4F) and *A. draconicaudatus* **sp. nov.**, have glands in the copulatory ducts near the copulatory openings (Fig. 24F); secondary spermatheca, when present, semicircular and located near the copulatory opening (Figs 14F, 21F); copulatory ducts short (as in *A. complexus* Zhang & Maddison, 2012) or long and convoluted (Figs 14F, 16J, 21F); primary spermatheca kidney-shaped (Figs 4F, 14F); fertilization duct laterally projected (Figs 4F, 21F).

Composition. Sixteen species: *Amphidraus argentinensis* Galiano, 1997, *A. auriga* Simon, 1900, *A. belzonte* **sp. nov.**, *A. bifidus* **sp. nov.**, *A. caxiuanan* **sp. nov.**, *A. complexus* Zhang & Maddison, 2012, *A. duckei* Galiano, 1967, *A. draconicaudatus* **sp. nov.**, *A. janauari* **sp. nov.**, *A. loxodontillus* **sp. nov.**, *A. mysticetus* **sp. nov.**, *A. nigrigenu* **sp. nov.**, *A. pulvinus* **sp. nov.**, *A. santanae* Galiano, 1967, *A. semicanus* (Simon, 1902) and *A. simplex* **sp. nov.**

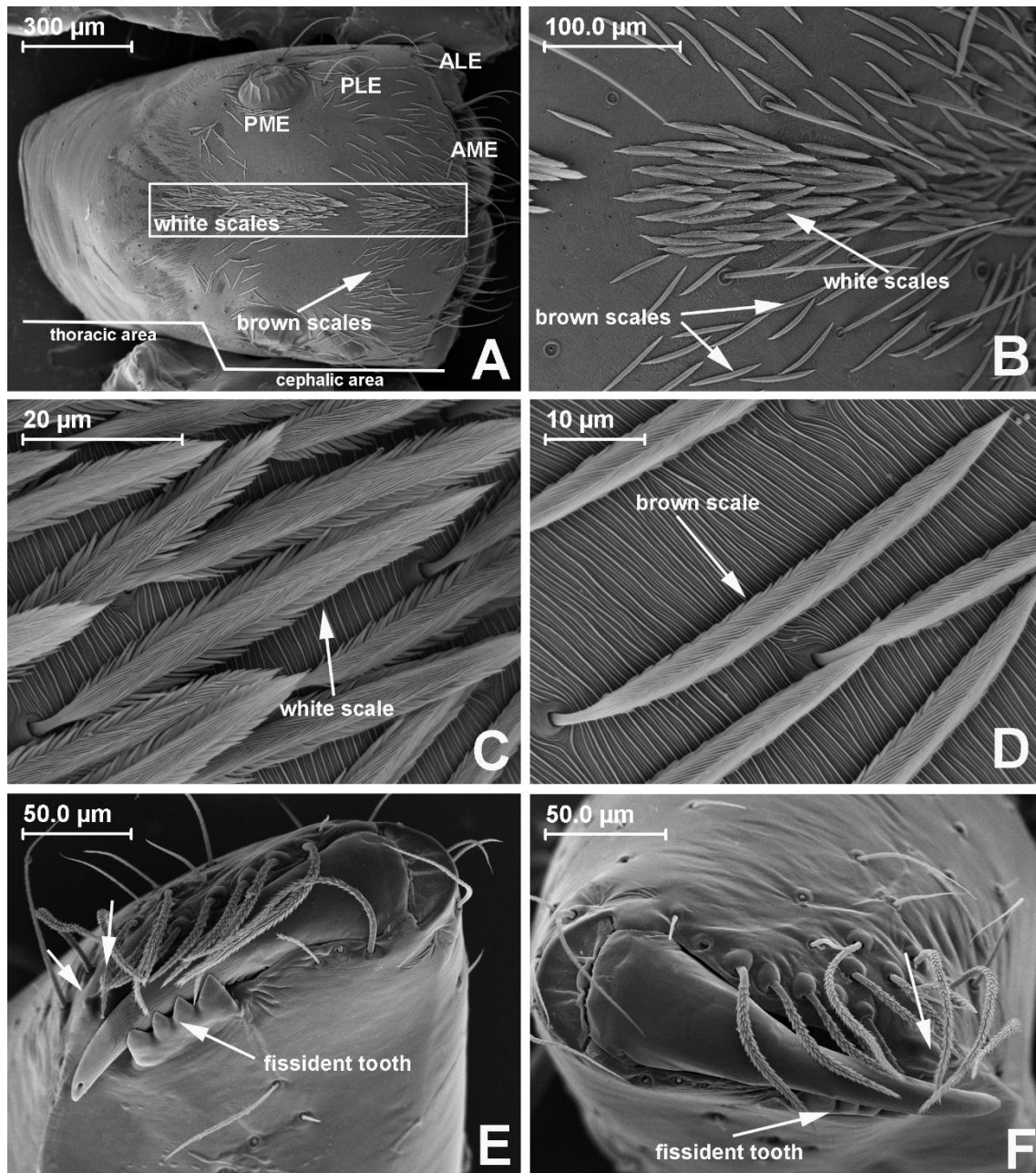


FIGURE 1. *Amphidraus mysticetus* sp. nov. A carapace; B cephalic area (different types of scales); C white scales; D brown scales; E left chelicera, retrodistal view (unnamed arrows show promarginal teeth); F right chelicera, distal view. ALE, anterior lateral eyes; AME, anterior median eyes; PLE, posterior lateral eyes; PME, posterior median eyes.

Note. The species described by Simon [*A. auriga* Simon, 1900 and *A. semicanus* (Simon, 1902)] were already redescribed by Galiano (1962, 1963). These and the species described by her (*A. duckei* Galiano, 1967, *A. santanae* Galiano, 1967 and *A. argentinensis* Galiano, 1997) have good-quality diagnostic illustrations and descriptions

and do not need redescriptions. The same can be said about *A. complexus* Zhang & Maddison, 2012.

***Amphidraus mysticetus* sp. nov.**

Figs 1–4, 32

Types. Holotype: ♂ from Centro de Treinamento em Manejo Floresta Roberto Bauch, Instituto Floresta Tropical [3°27'S, 48°35'W], Paragominas, Pará, Brazil, 2015, G.R.S. Ruiz leg. (MPEG 32684). Paratypes: 1♂ from Mocambo [1°26'13.3"S 48°25'14.9"W], Belém, Pará, Brazil, 10.VII.2003, J.A.P. Barreiros & D.R. Santos leg. (IBSP) and 1♀ from Tailândia, 02°36'04.2", 48°44'53.1", Pará, Brazil, 18.VI.2016, G.R.S. Ruiz leg. (MPEG 32692).

Etymology. The species epithet, to be treated as a Latin noun, refers to the conformation of the RTA and RvTA bearing thick setae, resembling an open mouthed whale with the baleen plates hanging from the upper maxilla (RvTA).

Diagnosis. The embolic disc (with dPED of rounded tip, prolaterally projected and short mPED ventrally projected; Fig. 4C) and pattern of scales on the carapace of *A. mysticetus* sp. nov. (Figs 1A, 2A, 2C) are similar to those of *A. caxiuanan* sp. nov. (Fig. 5A, 6C). However, *A. mysticetus* sp. nov. differs from this species in having the RvTA with triangular tip (Fig. 4D), the RTA with the tip prolaterally curved over the cymbium (Fig. 4B), and by the presence of enlarged, distal retrolateral setae on the tibia (Figs 3C, 3D, 4D), while *A. caxiuanan* sp. nov. have rounded RTA (Fig. 6D), erect RvTA (Fig. 6B) and no enlarged setae.

Description. Male holotype (MPEG 32684). Total length: 2.17. Carapace with a longitudinal stripe of white scales on cephalic region and tufts of brown scales laterally (Figs 1A, 2A, 2C), 1.22 long, 0.84 wide and 0.55 high. Ocular quadrangle 0.67 long. Anterior eye row 0.87 wide, posterior 0.76 wide. Legs 4312. Length of leg: I 1.81 (0.57 + 0.67 + 0.57); II 1.73 (0.55 + 0.61 + 0.57); III 2.09 (0.65 + 0.68 + 0.76); IV 2.28 (0.65 + 0.76 + 0.87). Color in alcohol: thoracic area brown and cephalic area black; abdomen brown and variegated; legs light brown (Figs 2A, 2B).

Female paratype (MPEG 32692). Total length: 2.51. Carapace with scale pattern as in male (Figs 2C, 2D), 1.48 long, 0.87 wide and 0.57 high. Ocular quadrangle 0.57 long. Anterior eye row 0.91 wide, posterior 0.80 wide. Legs: 4312; Length of leg I 1.98 (0.65 + 0.76 + 0.57); II 1.85 (0.61 + 0.67 + 0.57); III 2.2 (0.68 + 0.72 + 0.8); IV 2.47

($0.68 + 0.84 + 0.95$). Epigyne (Figs 4D, 4E) with glands in the copulatory ducts near the copulatory openings. Color in alcohol as in male (Figs 2C, 2D).

Distribution. Known only from the type locality (Brazil, Pará).

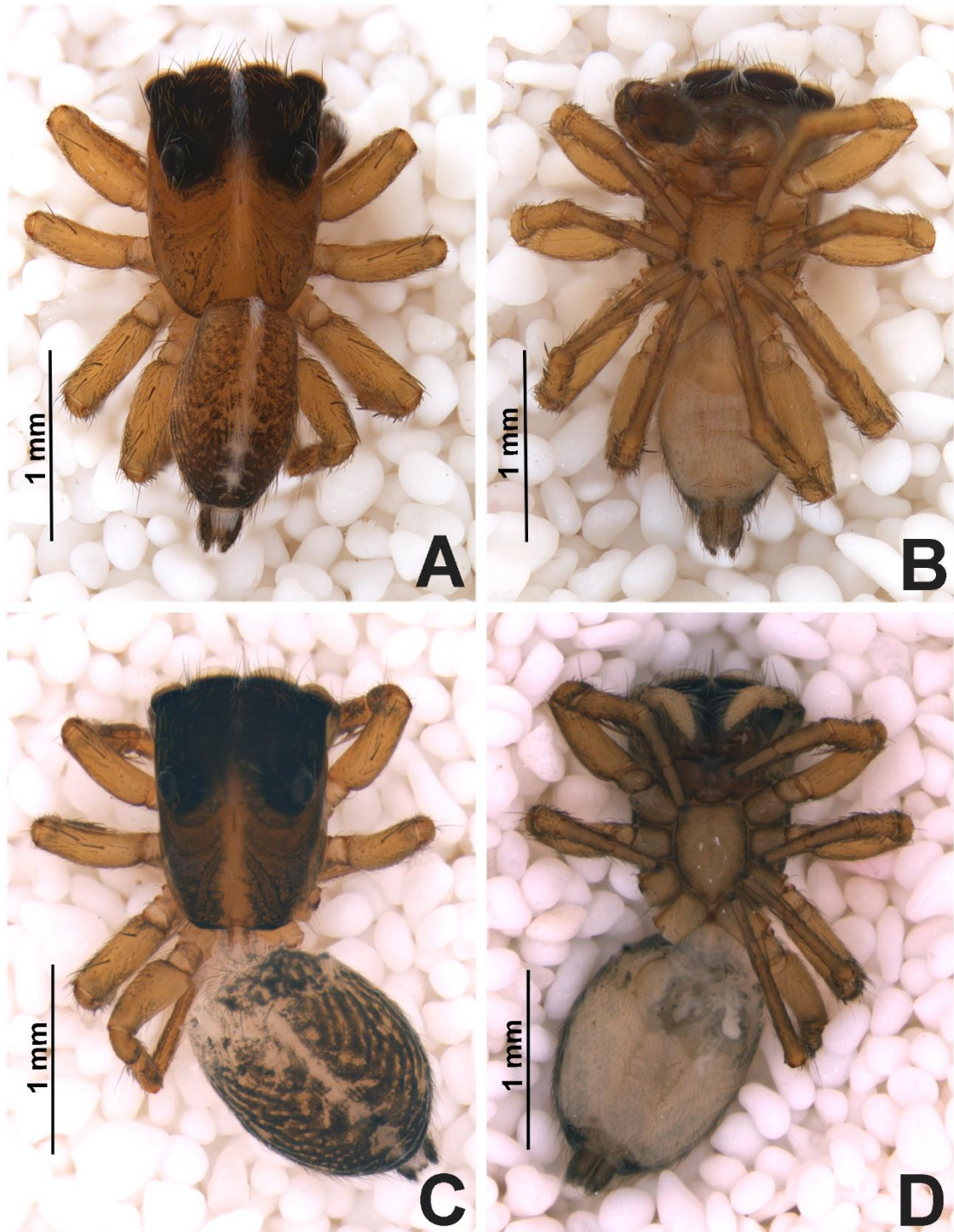


FIGURE 2. *Amphidraus mysticetus* **sp. nov.** A male holotype, dorsal view; B same, ventral view; C female paratype, dorsal view; D same, ventral view.

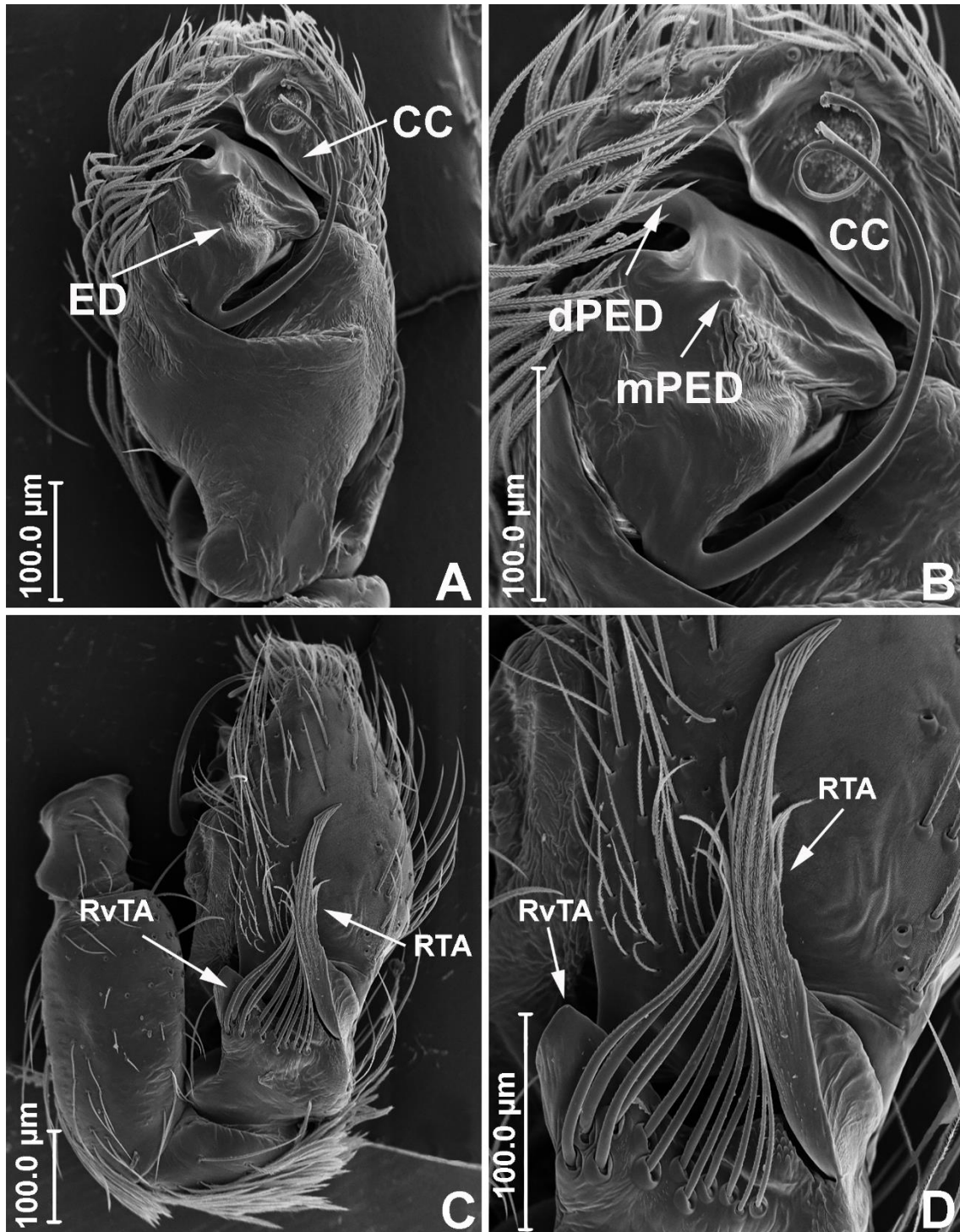


FIGURE 3. *Amphidraus mysticetus* sp. nov. A male palp, ventral view; B same, embolic disc, ventral view; C same, retrolateral view; D same, RTA and RvTA, retrolateral view. CC, cymbial conductor; ED, embolic disc; mPED, median process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; RvTA: retroventral tibial apophysis.

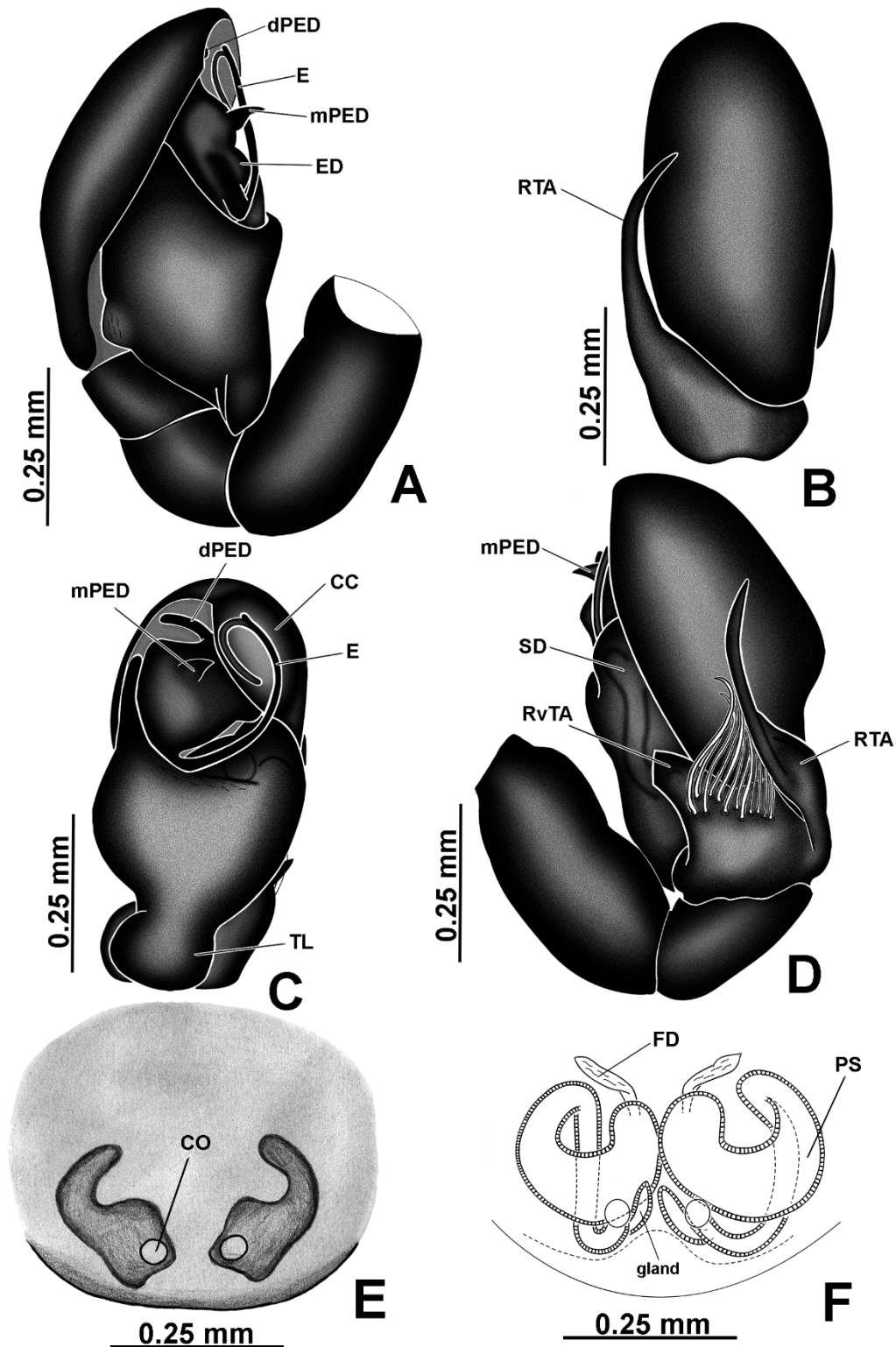


FIGURE 4. *Amphidraus mysticetus* sp. nov. A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view; E epygine, ventral view; F same, cleared, ventral view. CC, cymbial conductor; ED, embolic disc; E, embolus; mPED, median process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct; CO, copulatory opening; PS, primary spermatheca. FD, fertilization duct.

***Amphidraus caxiuanan* sp. nov.**

Figs 5–6, 29

Types. Holotype: ♂ from Estação Científica Ferreira Penna [1°42'24"S, 51°27'34.3"W], FLONA, Caxiuanã, Melgaço, Pará, Brazil, 14.IV.2006, J.A.P. Barreiros leg. (MPEG 29052).

Etymology. Noun in apposition taken from type locality. The final –n is added in order to mimic phonetics of the name of the locality.

Diagnosis. The embolic disc (with dPED of rounded tip, prolaterally projected and short mPED ventrally projected; Fig. 6C) and pattern of scales on the carapace of *A. caxiuanan* sp. nov. (Figs 5A) are similar to those of *A. mysticetus* sp. nov. (Figs 1A, 2A, 2C, 4C). However, *A. caxiuanan* sp. nov. can be distinguished from this species in having RvTA with rounded tip (Fig. 6D), a straight RTA (Fig. 6B), while *A. mysticetus* sp. nov. has triangular RvTA tip (Fig. 4D) and the RTA with the tip prolaterally curved over the cymbium (Fig. 4B). In addition, it also differs from *A. mysticetus* sp. nov. by the curved, proximal, dorso-prolateral projection in cymbium (Fig. 6B) and a retrolateral depression on cymbium where the RTA fits (Fig. 6D).

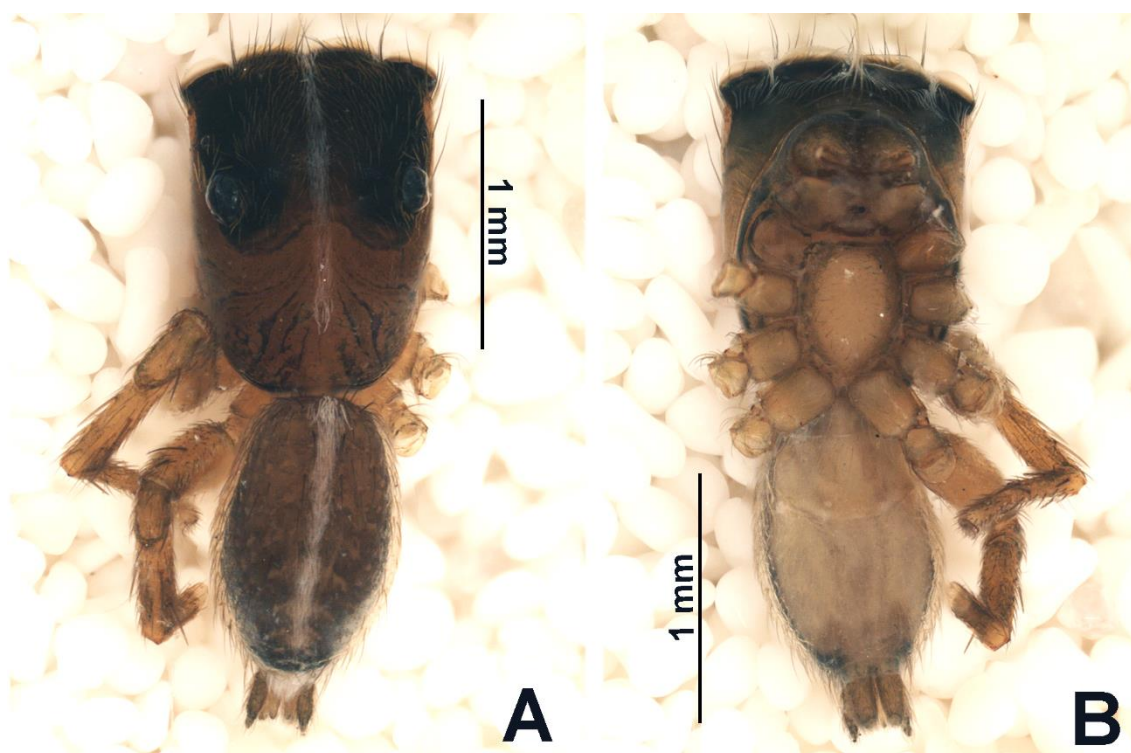


FIGURE 5. *Amphidraus caxiuanan* sp. nov. A male holotype, dorsal view; B same, ventral view.

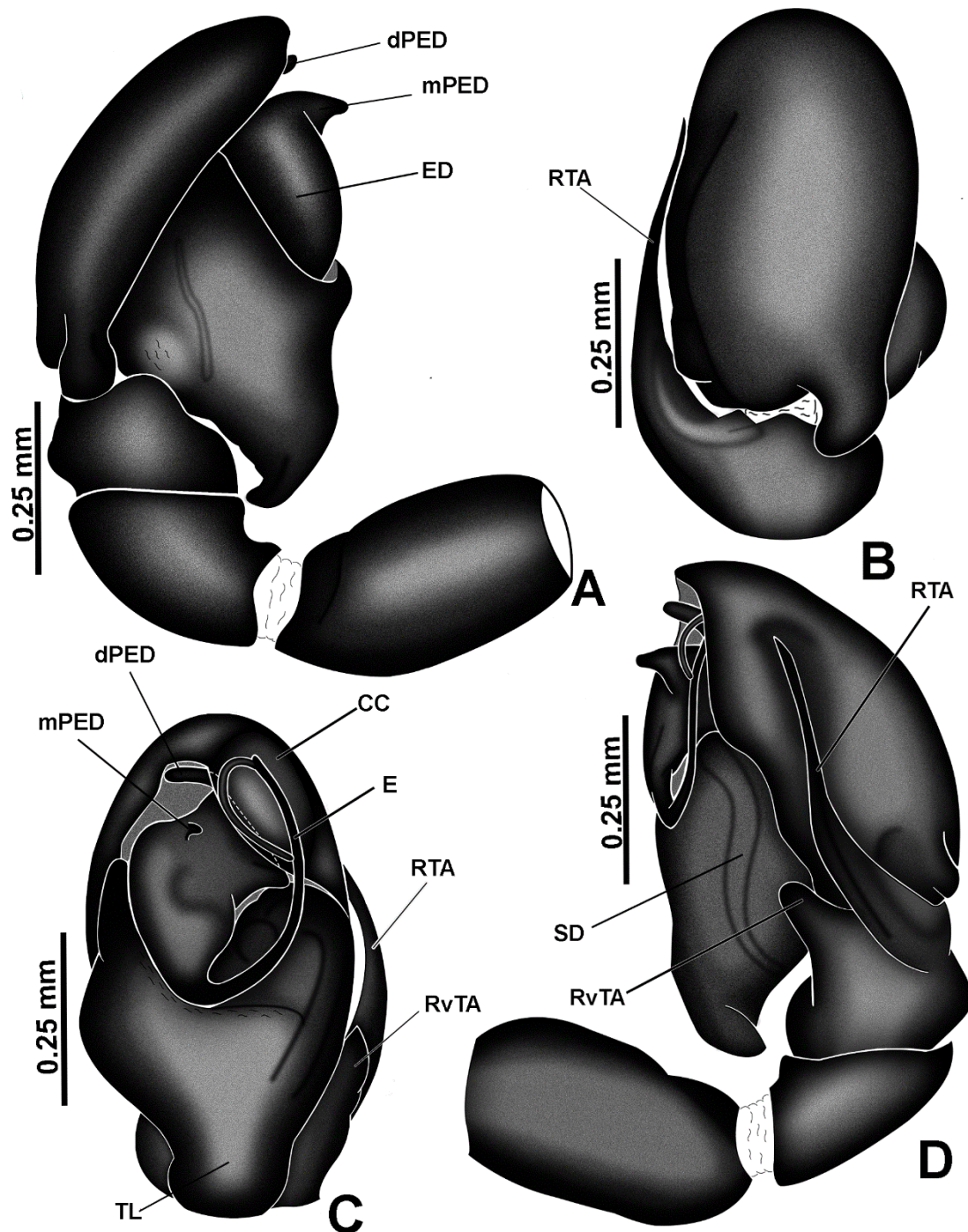


FIGURE 6. *Amphidraus caxiuanan* sp. nov. A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view. CC, cymbial conductor; ED, embolic disc; E, embolus; mPED, median process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct.

Description. Male holotype (MPEG 29052). Total length: 2.43. Carapace with a longitudinal stripe of white scales on carapace and tufts of brown scales laterally (Fig. 5A), 1.33 long, 0.93 wide and 0.65 high. Ocular quadrangle 0.65 long. Anterior eye row 0.99 wide, posterior 0.84 wide. Legs: unknown (I–II lost). Length of leg III 2.44 (0.8 + 0.8 + 0.84); IV unknown (0.74 + 0.87 + broken). Palp (Figs 6A–D): femur with a slightly distal depression, where the proximal tegular lobe fits when the palp is flexed (Fig. 6A). Color in alcohol: thoracic area dark brown and cephalic area black; abdomen brown and variegated; legs brown (Fig. 5).

Female. Unknown.

Distribution. Known only from the type locality (Brazil, Pará).

***Amphidraus pulvinus* sp. nov.**

Figs 7–8, 29

Types. Holotype: ♂ from Juruti, 02°30'27.4"S, 56°10'39.5"W, Pará, Brazil, 18–23.II.2011, B.V.B. Rodrigues leg. (MPEG 32687).

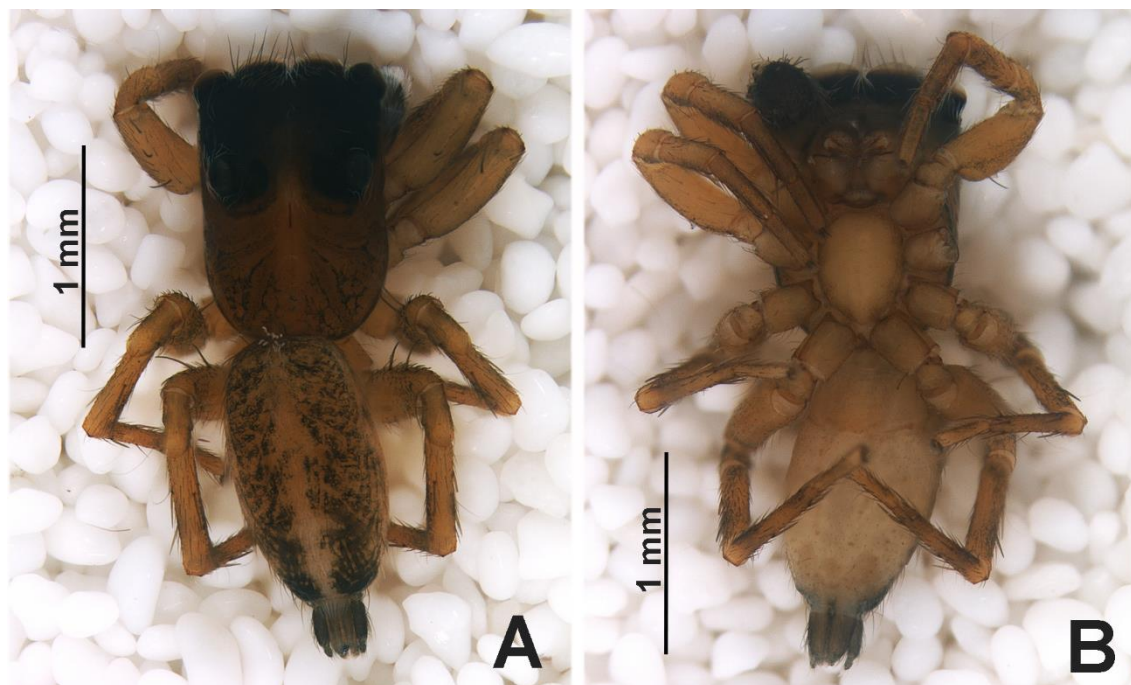


FIGURE 7. *Amphidraus pulvinus* sp. nov. A male holotype, dorsal view; B same, ventral view.

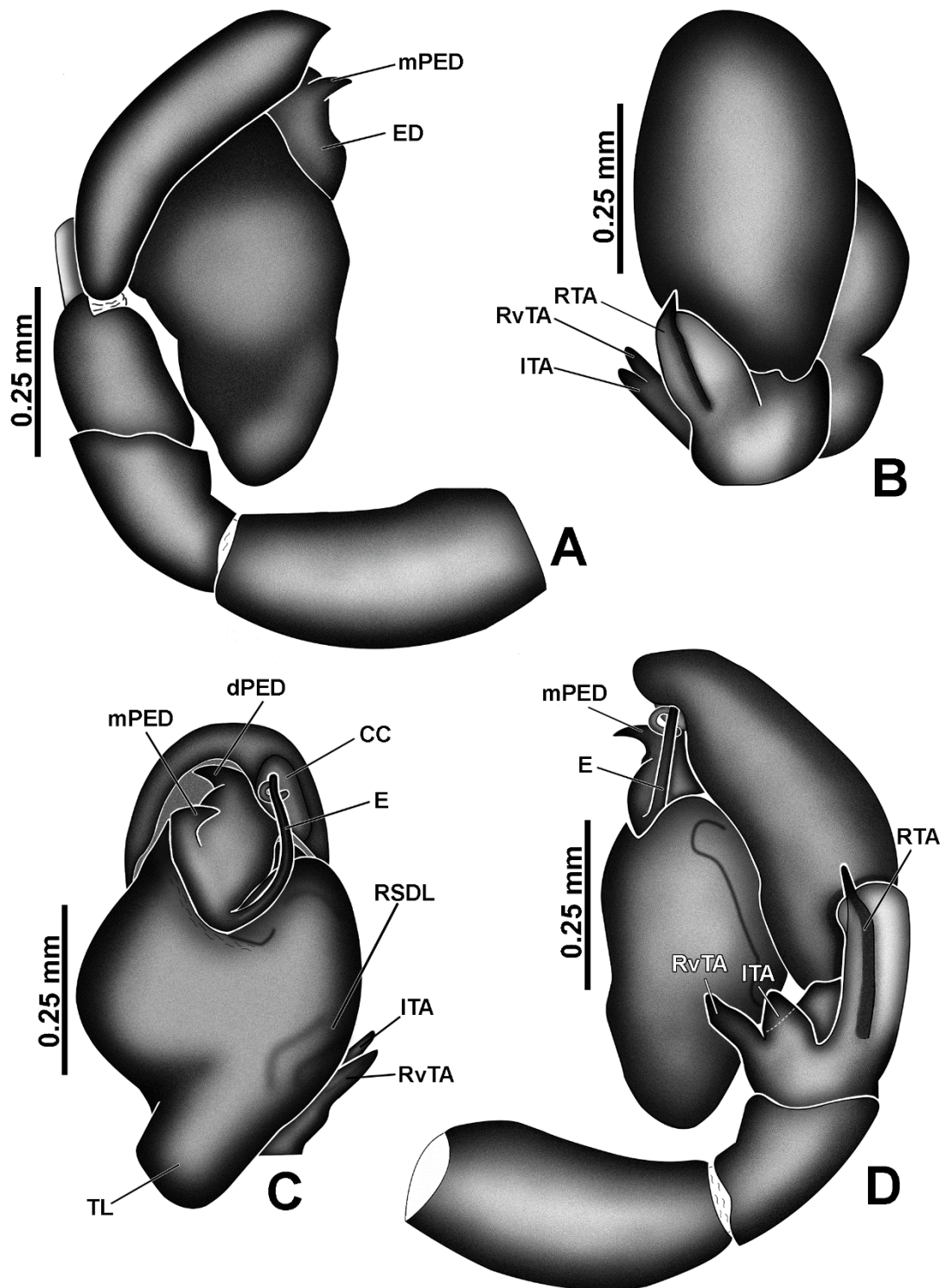


FIGURE 8. *Amphidraus pulvinus* sp. nov. A male holotype, dorsal view; B same, ventral view. same, ventral view; D same, retrolateral view. CC, cymbial conductor; ED, embolic disc; E, embolus; mPED, median process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; ITA, intermediate tibial apophysis; RvTA, retroventral tibial apophysis; TL, tegular lobe; RSDL, retrolateral sperm duct loop.

Etymology. A Latin noun meaning pillow, in reference to the modified RTA.

Diagnosis. The embolic disc and embolus of *A. pulvinus* **sp. nov.** are similar to those of *A. argentinensis* Galiano, 1997: the short dPED points prolaterally and the mPED points retrolaterally. However, the mPED of *A. pulvinus* **sp. nov.** arises from prolateral border of the embolic disc (Fig. 8C), while in *A. argentinensis* it arises from the middle of the distal portion of the disc (see Galiano 1997: fig. 10). In addition, *A. pulvinus* **sp. nov.** has RvTA and ITA short and narrow, and a RTA linked to a pillow-like membrane (Figs 8B, 8D), whereas in *A. argentinensis* the RvTA is trapezoidal with three apical teeth and both the ITA and the pillow-like membrane are absent (see Galiano 1997: figs 8, 11). *Amphidraus complexus* Zhang & Maddison, 2012 has also the pillow-like membrane, however, it differs from *A. pulvinus* **sp. nov.**, in having one less projection in the embolic disc and different shapes of tibial apophyses (see Zhang & Maddison, 2015: figs 211, 212).

Description. Male holotype (MPEG 32687). Total length: 2.55. Carapace 1.25 long, 0.84 wide and 0.65 high. Ocular quadrangle 0.67 long. Anterior eye row 0.87 wide, posterior 0.72 wide. Legs: 4321 or 4312. Length of leg I 1.9 (0.57 + 0.68 + 0.65); II 1.9 (0.57 + 0.68 + 0.65); III 2.47 (0.72 + 0.84 + 0.91); IV 2.62 (0.76 + 0.87 + 0.99); Palp (Figs 8A–D): cymbium with a proximal, retrolateral depression where the pillow-like membrane of tibia fits (Fig. 8D); tegulum with slight RSDL and tegular lobe prolaterally curved (Fig. 8C). Color in alcohol: thoracic area brown and cephalic area black; abdomen brown and variegated; legs light brown (Fig. 7).

Female. Unknown

Distribution. Known only from the type locality (Brazil, Pará).

***Amphidraus belzonte* sp. nov.**

Figs 9–10, 28

Types. Holotype: ♂ from Estação Ecológica da Universidade Federal de Minas Gerais, 19°52'S, 43°58'W, Belo Horizonte, Minas Gerais, Brazil, VII.1999–II.2001, E.S.S. Álvares *et al.* leg. (IBSP 32545). Paratype: 1♂, same data as holotype (MPEG 32763).

Etymology. Noun referring to the type locality (Belo Horizonte), in the way the name of the city is pronounced by some local people.

Diagnosis. *A. belzonte* **sp. nov.** differs from all *Amphidraus* species by the bifid tegular lobe (when seen laterally, Fig. 10A), the ITA emerging from proximal portion of

the tibia (Figs 10B, 10C, 10D), the flattening of the embolus in its initial portion and its emerging point in the median portion from the embolic disc (Fig. 10C) and the conspicuous distal cavity on the femur, in which the proximal tegular lobe fits when the palp is flexed (Fig. 10A). In other *Amphidraus* species, the ITA emerges from distal region of tibia, the emerging point of the embolus is proximal, retrolateral, and the distal cavity of femur is poorly conspicuous.

Description. Male holotype (IBSP 32545). Total length: 2.89. Carapace 1.48 long, 0.95 wide, 0.68 high. Ocular quadrangle 0.72 long. Anterior eye row 1.03 wide, posterior 0.91 wide. Legs: 4312; Length of leg I 2.51 (0.76 + 0.95 + 0.8); II 2.36 (0.76 + 0.84 + 0.76); III 2.97 (0.95 + 0.99 + 1.03); IV 3.28 (1.0 + 1.1 + 1.18). Palp (Figs 10A–D): RvTA short and rounded, RTA retrolaterally projected, with tip curved towards ventral side and ITA retrolaterally projected (Figs 10B–D); cymbium with proximal, retrolateral cavity, in which the RTA fits (Fig. 10D); embolic disc well developed with two acute processes, one of them longer, emerging from the distal region of the disc, projected to the prolateral side, and the other, shorter, emerging at the middle of distal part of the disc and projected to the retrolateral side (Fig. 10C). Color in alcohol: thoracic area brown and cephalic area black; abdomen brown and variegated; legs light brown (Fig. 9).

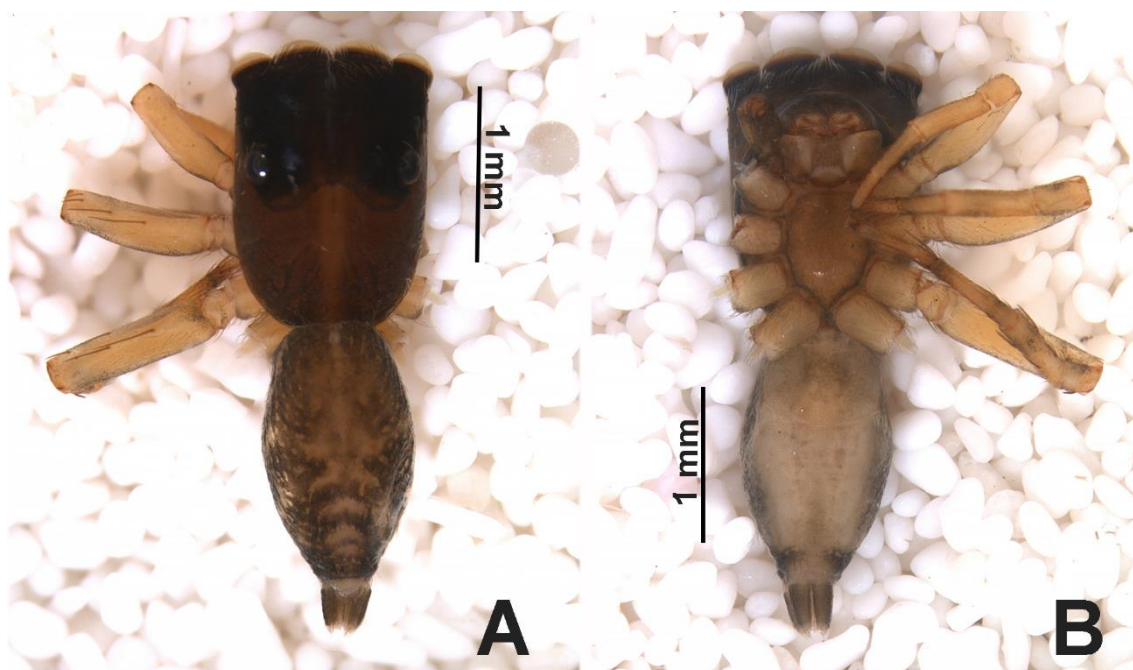


FIGURE 9. *Amphidraus belzonte* sp. nov., A male holotype, dorsal view; B same, ventral view.

Female. Unknown.

Distribution. Known only from the type locality (Brazil, Minas Gerais).

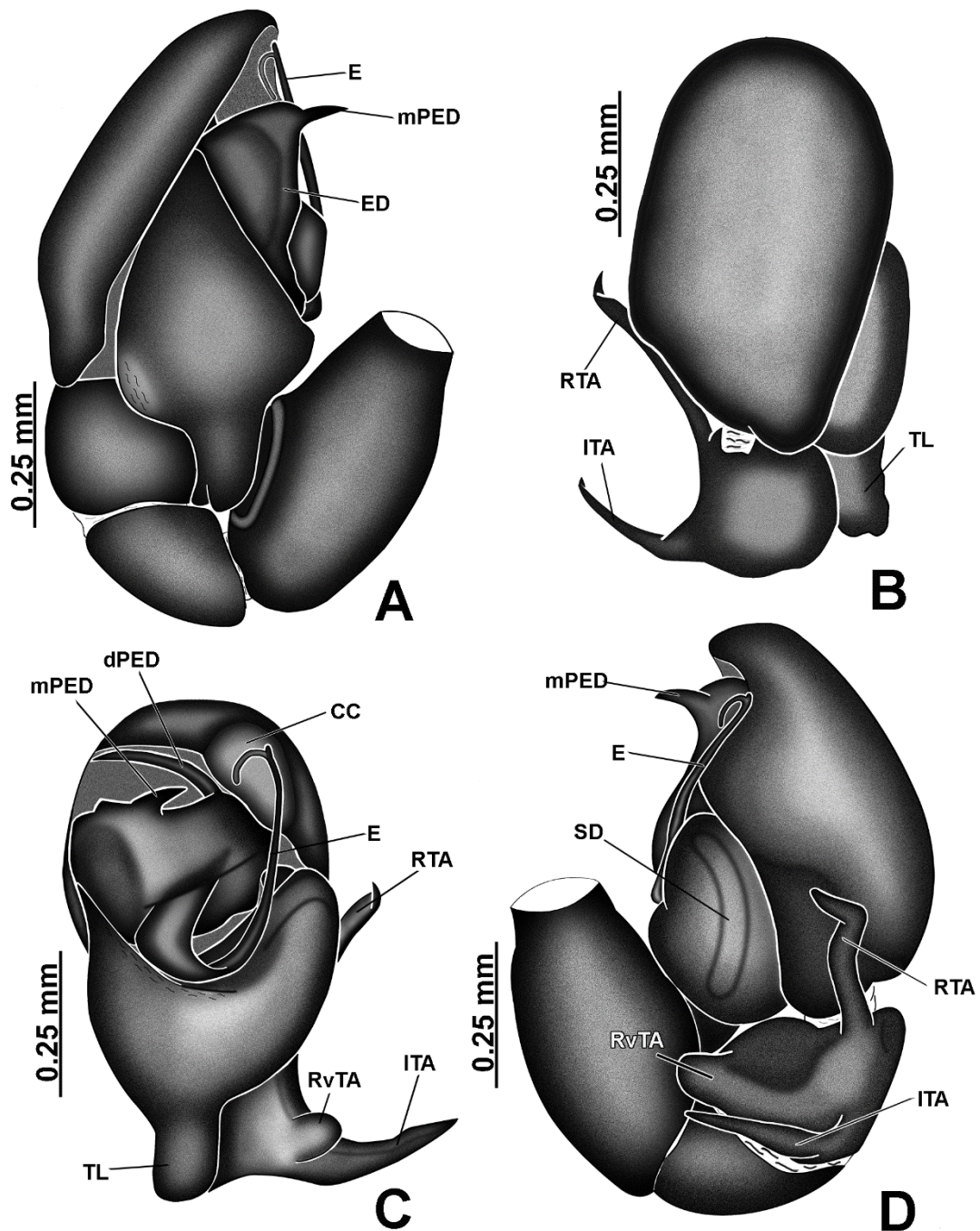


FIGURE 10. *Amphidraus belzonte* sp. nov. A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view. CC, cymbial conductor; ED, embolic disc; E, embolus; mPED, medium process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; ITA, intermediate tibial apophysis; RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct.

***Amphidraus nigrigenu* sp. nov.**

Figs 11–12, 31

Types. Holotype: ♂ from Juruti, 02°30'27.4"S, 56°10'39.5"W, Pará, Brazil, 17–21.XII.2012, A.S. Alves *et al.* leg. (MPEG 32688).

Etymology. A composed Latin noun (nigri + genu), meaning “black-knee”, in reference to the dark markings on middle portion of legs.

Diagnosis. The embolic disc and embolus of *Amphidraus nigrigenu* sp. nov. are similar to those of *A. duckei* Galiano, 1967, *A. santanae* Galiano, 1967, and *A. simplex* sp. nov.: there are two dPED and the mPED projects retrolaterally; also, the embolus is thicker and sickle-shaped (Fig. 12C). However, *A. nigrigenu* sp. nov. can be distinguished by the short and rounded RTA with two teeth on the border (Fig. 12D), being triangular in *A. duckei*, quadrangular with one tooth in *A. santanae* (see Galiano 1967: fig. 4) and narrow in *A. simplex* sp. nov. (Fig 14D). In addition, their legs differ from all *Amphidraus* species by the presence of black spots on distal femora, patellae, mid tibiae and proximal metatarsi (Fig. 11).



FIGURE 11. *Amphidraus nigrigenu* sp. nov. A male holotype, dorsal view; B same, ventral view.

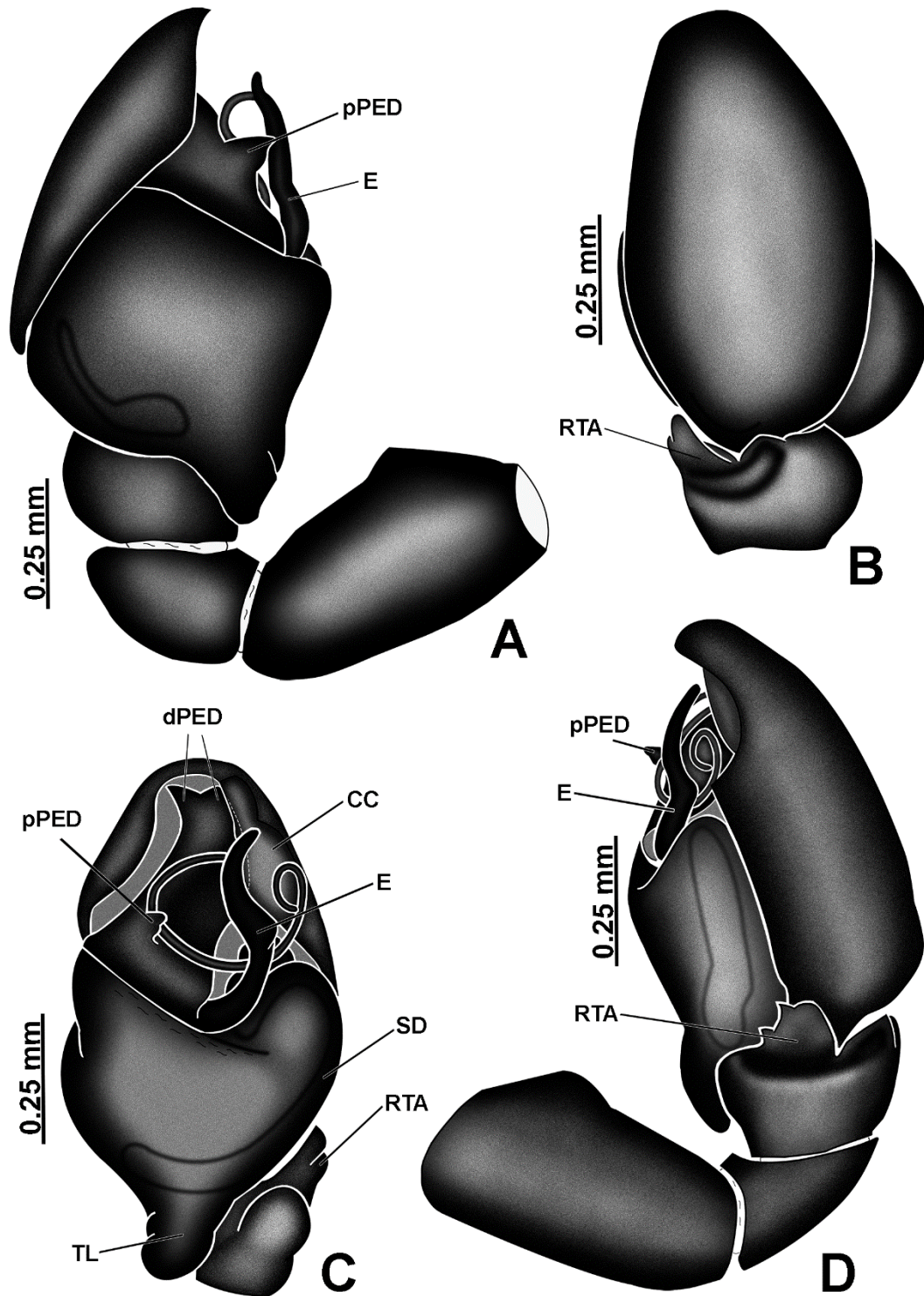


FIGURE 12. *Amphidraus nigrigenus* sp. nov. A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view. CC, cymbial conductor; ED, embolic disc; E, embolus; pPED, proximal process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; TL, tegular lobe; SD, sperm duct.

Description. Male holotype (MPEG 32688). Total length: 2.93. Carapace 1.44 long, 1.03 wide and 0.80 high. Ocular quadrangle 0.57 long. Anterior eye row 1.10 wide, posterior 0.91 wide. Legs: 3412. Length of leg I 2.2 (0.72 + 0.76 + 0.72); II 2.16 (0.72 + 0.76 + 0.68); III 2.96 (0.95 + 0.95 + 1.06); IV 2.92 (0.87 + 0.95 + 1.1); Palp (Figs 12A–D): femur with subproximal ventral projection (Figs 12A, 12D); tibia with a retrodorsal triangular apophysis and depression below the RTA (Figs 12B, 12D). Color in alcohol: thoracic area brown and cephalic area black; abdomen dorsally almost black; legs with dark spots (Figs 11A, 11B).

Female. Unknown.

Distribution. Known only from the type locality (Brazil, Pará).

***Amphidraus simplex* sp. nov.**

Figs 13–14, 30

Types. Holotype: ♂ from Juruti, 02°30'27.4"S, 56°10'39.5"W, Pará, Brazil, 08–13.V.2010, B.V.B. Rodrigues *et al.* leg. (MPEG 32685). Paratypes: 1 ♂ (IBSP) and 1 ♀ (MPEG 32686), both from Juruti, Pará, Brazil, 16–17.XII.2012, A.S. Alves *et al.* leg.

Etymology. Latin adjective, referring to the simple RTA.

Diagnosis. The embolic disc and embolus of *A. simplex* sp. nov. are similar to those of *A. duckei* Galiano, 1967, *A. santanae* Galiano, 1967, and *Amphidraus nigrigenu* sp. nov.: there are two dPED and the mPED projects retrolaterally; also, the embolus is thicker and sickle-shaped. However, *A. simplex* sp. nov. can be distinguished from these species by the narrow RTA (Figs 14C, 14D), triangular in *A. duckei*, quadrangular with one tooth in *A. santanae* (see Galiano 1967: fig. 4) and rounded with two teeth in *A. nigrigenu* sp. nov. (Fig. 12D). It also differs from all *Amphidraus* species by the presence of stout scales emerging from the proximal portion of tibia (Figs 14B, 14D). The female of *A. simplex* sp. nov., *A. duckei* Galiano, 1967, *A. santanae* Galiano, 1967 (Fig. 16I), *A. draconicaudatus* sp. nov. (Fig. 24F) and *A. bifidus* sp. nov. (Fig. 21F) have semicircular secondary spermatheca near copulatory opening. However, *A. simplex* sp. nov. differs from all *Amphidraus* species in having a single copulatory opening (atrium), whereas the other species have two copulatory openings. In addition, its coupling pocket is located ventrally in the middle portion of epigynal plate (Figs 14E, 14F), whereas *A. duckei* and *A. santanae* have dorsal pockets on the posterior border of the epigynal plate (Figs 15D, 16D, 17I).

Description. Male holotype (MPEG 32685). Total length: 2.39. Carapace 1.37 long, 0.95 wide and 0.95 high. Ocular quadrangle 0.57 long. Anterior eye row 1.06 wide, posterior 0.87 wide. Legs: 3412. Length of leg I 2 (0.61 + 0.72 + 0.67); II 1.86 (0.57 + 0.68 + 0.61); III 2.66 (0.87 + 0.84 + 0.95); IV 2.63 (0.8 + 0.84 + 0.99). Palp (Figs 14A–D): femur with subproximal ventral projection and a slight distal cavity, in which the tegular lobe fits when the palp is flexed (Fig. 14D); cymbium with proximal, retrolateral depression, in which the RTA fits (Fig. 14D); tegulum with tegular lobe curved towards prolateral side (Fig. 14C). Color in alcohol: thoracic area brown and cephalic area black, abdomen brown and variegated, legs light brown (Figs 13A, 13B).

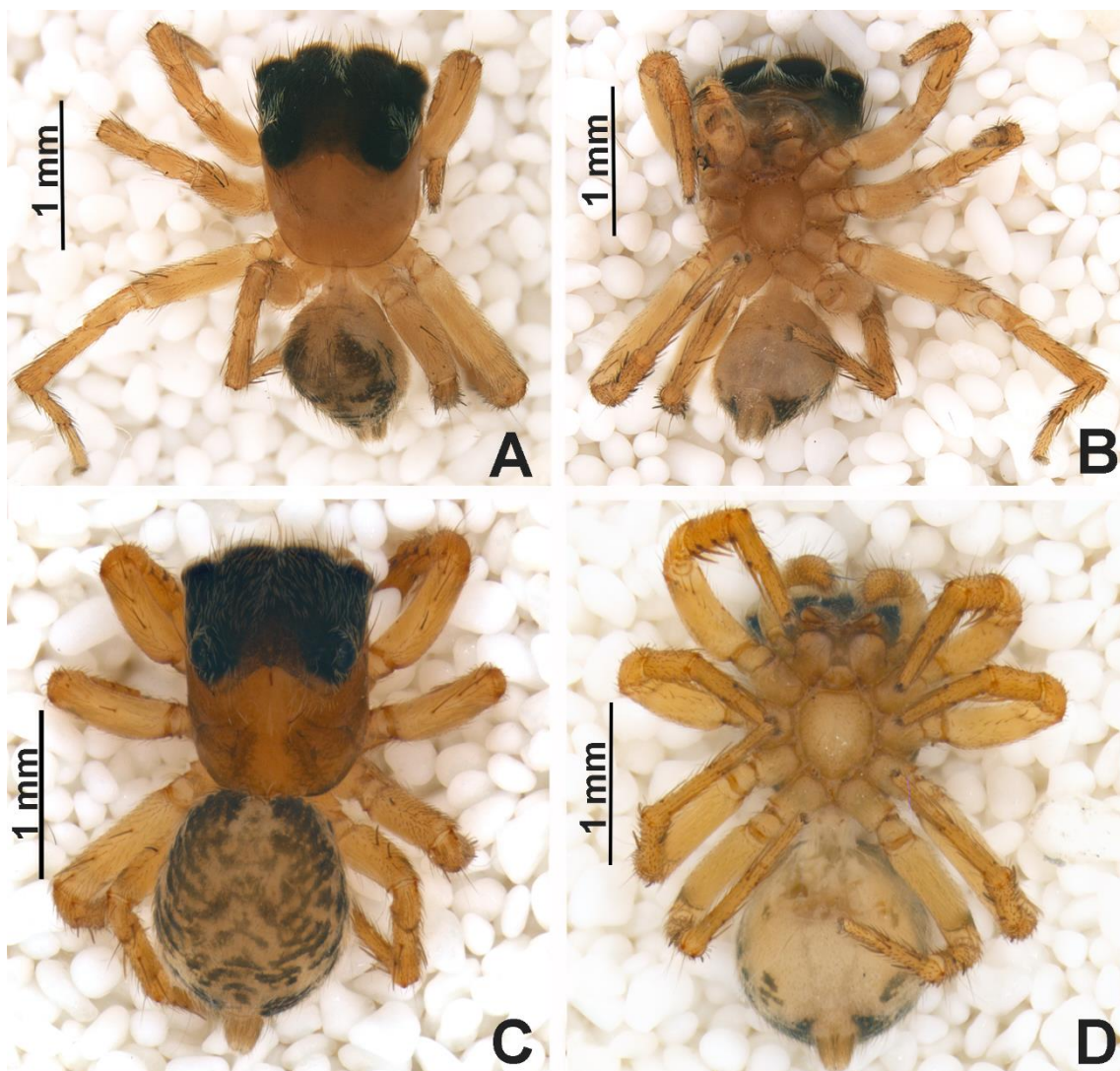


FIGURE 13. *Amphidraus simplex* sp. nov, A male holotype, dorsal view; B same, ventral view; C female paratype, dorsal view; D same, ventral view

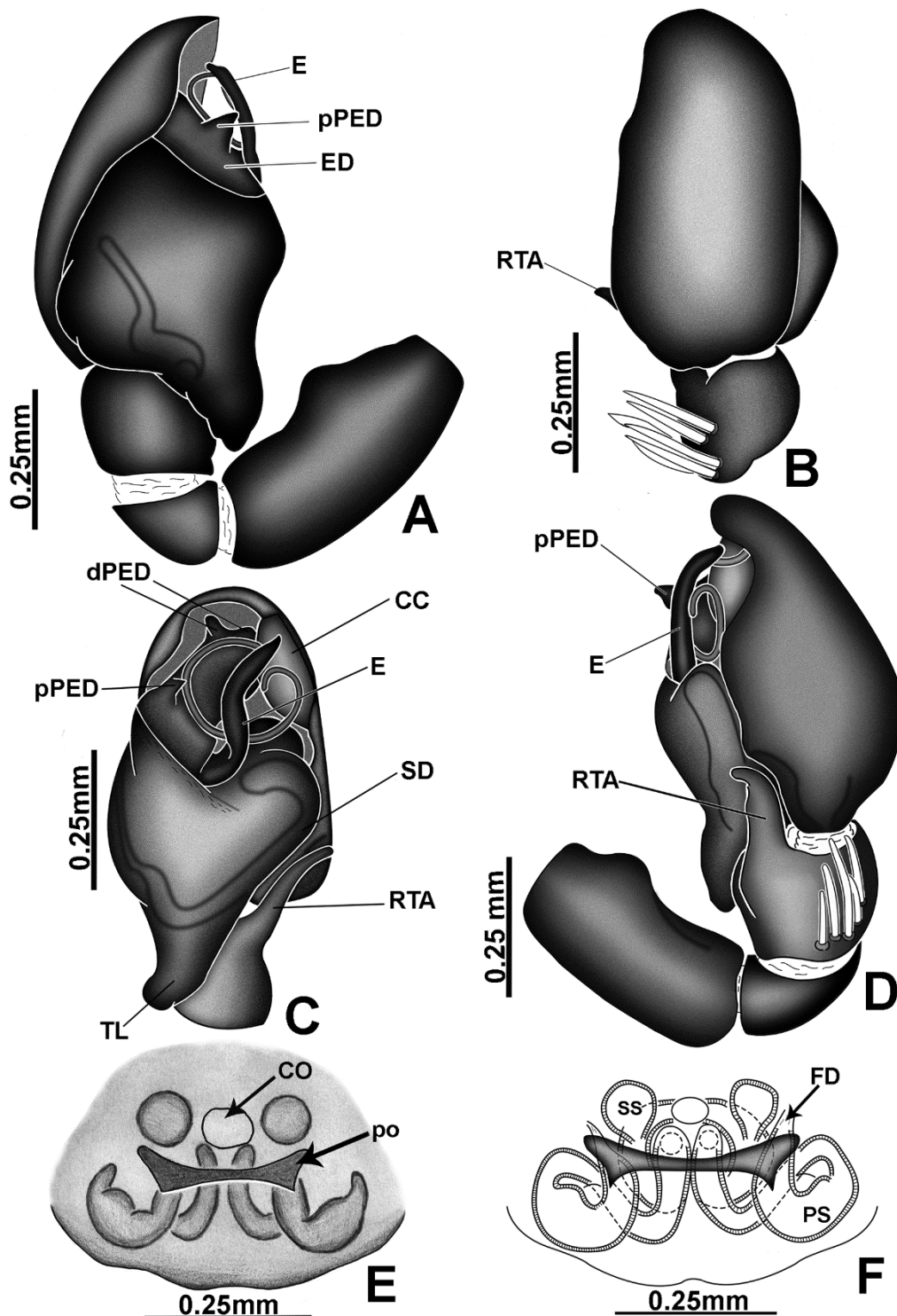


FIGURE 14. *Amphidraus simplex* sp. nov. A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view; E epigyne, ventral view; F Same, cleared, ventral view. CC, cymbial conductor; ED, embolic disc; E, embolus; pPED, proximal process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct; CO, copulatory opening; PS, primary spermatheca; SS, secondary spermatheca; FD, fertilization duct; po, coupling pocket.

Female paratype (MPEG 32686). Total length: 2.66. Carapace 1.41 long, 1.01 wide and 0.76 high. Ocular quadrangle 0.72 long. Anterior eye row 1.06 wide, posterior 0.91 wide. Legs: 4312. Length of leg I 2.19 (0.68 + 0.84 + 0.67); II 2.02 (0.65 + 0.72 + 0.65); III 2.77 (0.91 + 0.95 + 0.91); IV 2.89 (0.91 + 0.93 + 1.05). Color in alcohol: as in male (Figs 13C, 13D).

Distribution. Known only from the type locality (Brazil, Pará).

***Amphidraus santanae* Galiano, 1967**

Figs 15–16, 30

Amphidraus santanae Galiano, 1967b: 98, figs 4–9 (Holotype ♂ from Santana, Amapá, Brazil deposited in MACN 5990, allotype ♀, same locality as holotype, deposited in MACN 5991).

Additional material examined. BRAZIL: **Pará:** Tailândia (between 02°34'37.3"S, 48°44'52.1"W and 02°36'04.2"S, 48°48'51.7"W): 2♂, 2♀, 17–18.VI.2016, G.R.S. Ruiz *et al.* leg. (MPEG 32795–32798); Vitória do Xingu, 03°13'47.64"S, 52°00'29.23"W: 2♂, 4♀, 03.VIII.2016, G.R.S. Ruiz leg. (MPEG 32789–32794); São Felix do Xingu, Parque Nacional da Serra do Pardo, 05°52'40.1"S, 52°47'43.4"W: 1♂, 3♀, 26–27.IV.2012, G.R.S. Ruiz *et al.* leg. (MPEG 32785–32788); Canaã do Carajás, Floresta Nacional de Carajás (Serra do Tarzan, between 06°19'37.7"S, 50°07'03.3"W and 06°22'17.7"S, 50°10'34.4"W): 4♂, 3♀, 02–08.IV.2015, M.B. Aguiar-Neto *et al.* leg. (MPEG 32799–32805).

Diagnosis. The embolic disc and embolus of *Amphidraus santanae* Galiano, 1967 (Figs 15A, 16A) are similar to those of *A. duckei* Galiano, 1967, *A. nigrigenu* **sp. nov.** (Fig. 12C), and *A. simplex* **sp. nov.** (Fig. 14C): there are two dPED and the mPED projects retrolaterally; also, the embolus is thicker and sickle-shaped (Figs 15A, 16A). However, *A. santanae* can be distinguished by the quadrangular RTA with one tooth on the border (Figs 15B, 16D), being triangular in *A. duckei*, rounded with two teeth in *A. nigrigenu* **sp. nov.** (Fig. 12D) and narrow in *A. simplex* **sp. nov.** (Fig 14D).

Description. See Galiano (1967).

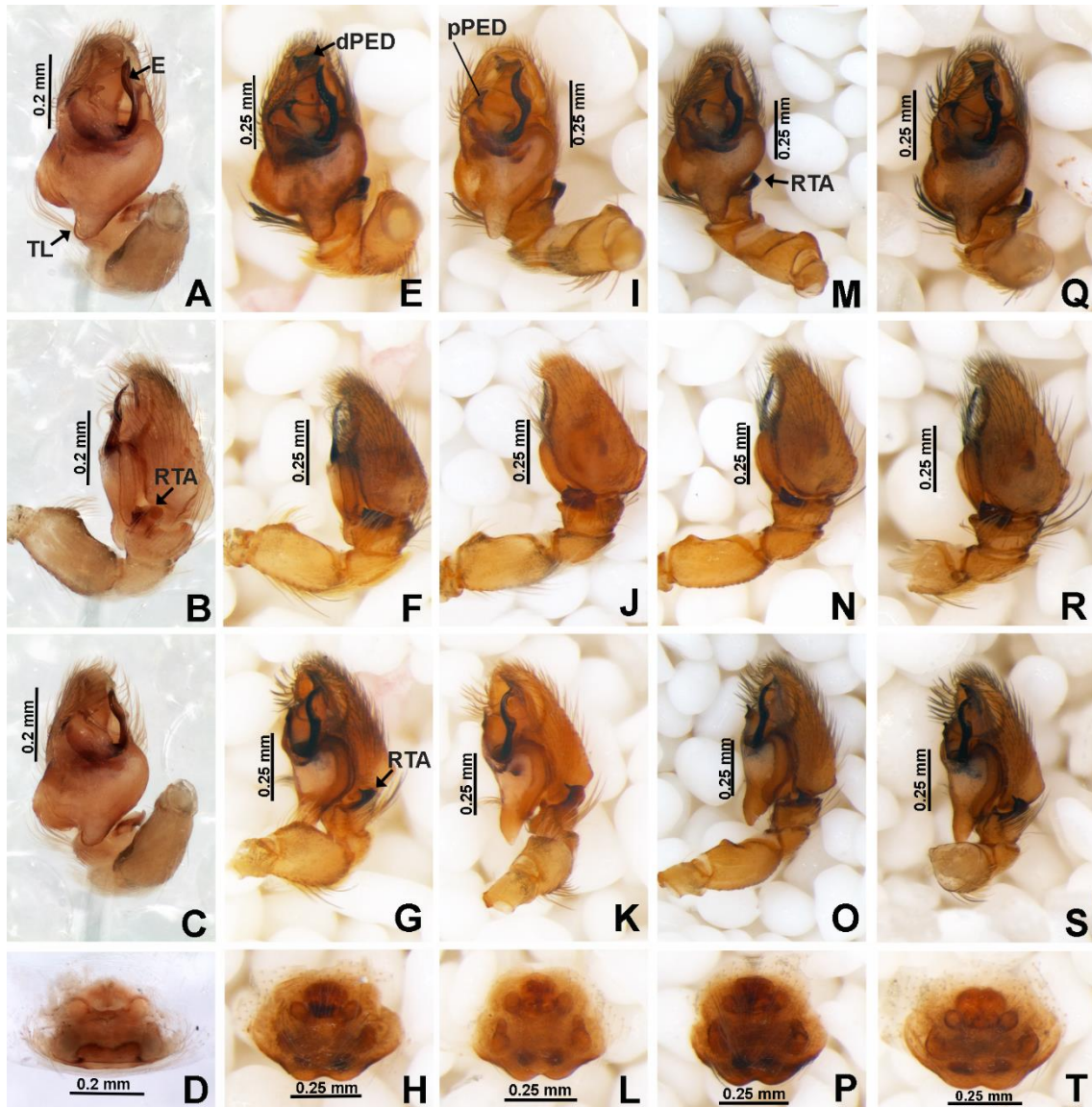


FIGURE 15. Genital variations of *Amphidraus santanae*. A–C male palp (holotype); D epigyne, ventral view (allotype); E–G variation from Vitória do Xingú, male palp; H same, epigyne; I–K variation from São Felix do Xingú, male palp; L same, epigyne; M–O variation from Canaã do Carajás, male palp; P same, epigyne; Q–S variation from Tailândia, male palp; T same, epigyne; E, embolus; pPED, proximal process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; TL, tegular lobe; po, coupling pocket.

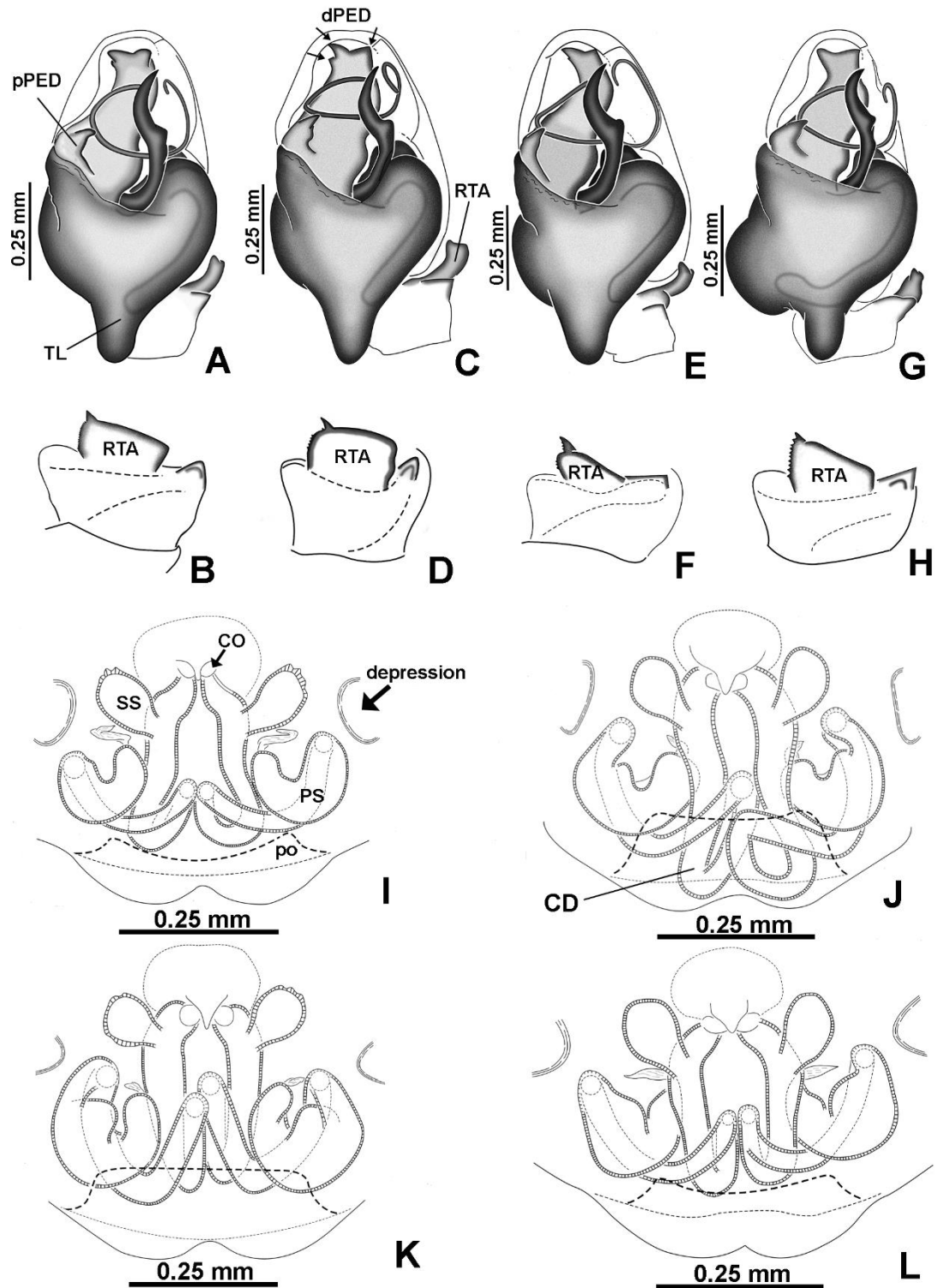


FIGURE 16. Genital variations of *Amphidraus santanae* (except the types). A, C, E, G, male palp, ventral view. B, D, F, H, tibia, retrolateral view; I–L epigyne, cleared, ventral view. pPED, proximal process on embolic disc; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; CO, copulatory opening; CD, copulatory duct; PS, primary spermatheca; SS, secondary spermatheca; po, coupling pocket.

Variation. Palp (Figs 15A–C, 15E–G, 15I–K, 15M–O, 15Q–S, 16A–H): RTA is generally short with one tooth on superior border and with serrated ventral border (Figs 16B, 16D, 16F, 16H). Its shape varies from rectangular (Figs 15B, 16D), or trapezoidal (Figs 16B, 16H) to rounded (Fig. 16F); tegular lobe can be parallel to the longitudinal axis of the palp (Figs 16A, 16C, 16E, 16G) or prolaterally curved (Fig. 15A); embolic disc with two (Figs 15A, 16G) or three (Figs 16A, 16C) distal processes; embolus generally sickle-shaped (Figs 15A, 16A, 16C, 16E, 16G). Its retrolateral border can have a small and rounded projection (Fig. 15A) or be approximately straight (Figs 16A, 16C, 16E, 16G). Epigyne (Figs 15D, 15H, 15L, 15P, 15T, 16I–L): epigynal plate can have the posterior border without modifications (Fig. 15D) or be expanded and bilobed (Figs 15H, 15L, 15P, 15T); copulatory duct medium-sized (Figs 16I, 16K, 16L) or very long (Fig. 16J); coupling pocket with different degrees of depth (Figs 16I, 16J, 16K, 16L).

Distribution. States of Amapá and Pará (Brazil).

***Amphidraus janauari* sp. nov.**

Figs 17–18, 32

Type. Holotype: ♂ from Lago Janauari, 03°20'S, 60°17'W, Manaus, Amazonas, Brazil, 16.XI.1989, J. Adis *et al.* leg. (INPA 5245).

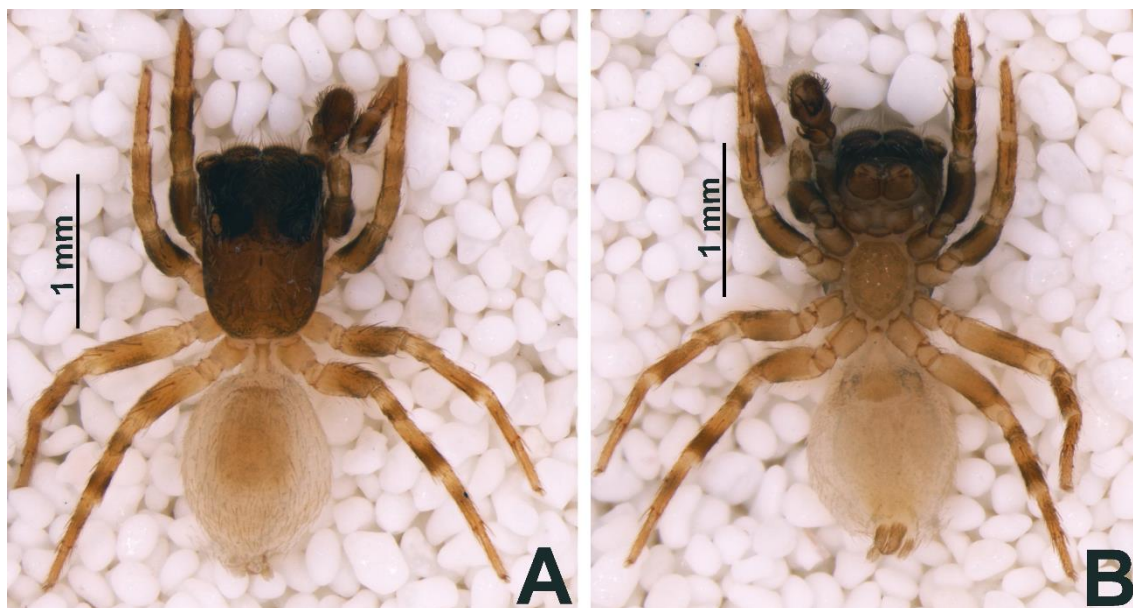


FIGURE 17. *Amphidraus janauari* sp. nov, A male holotype, dorsal view; B same, ventral view.

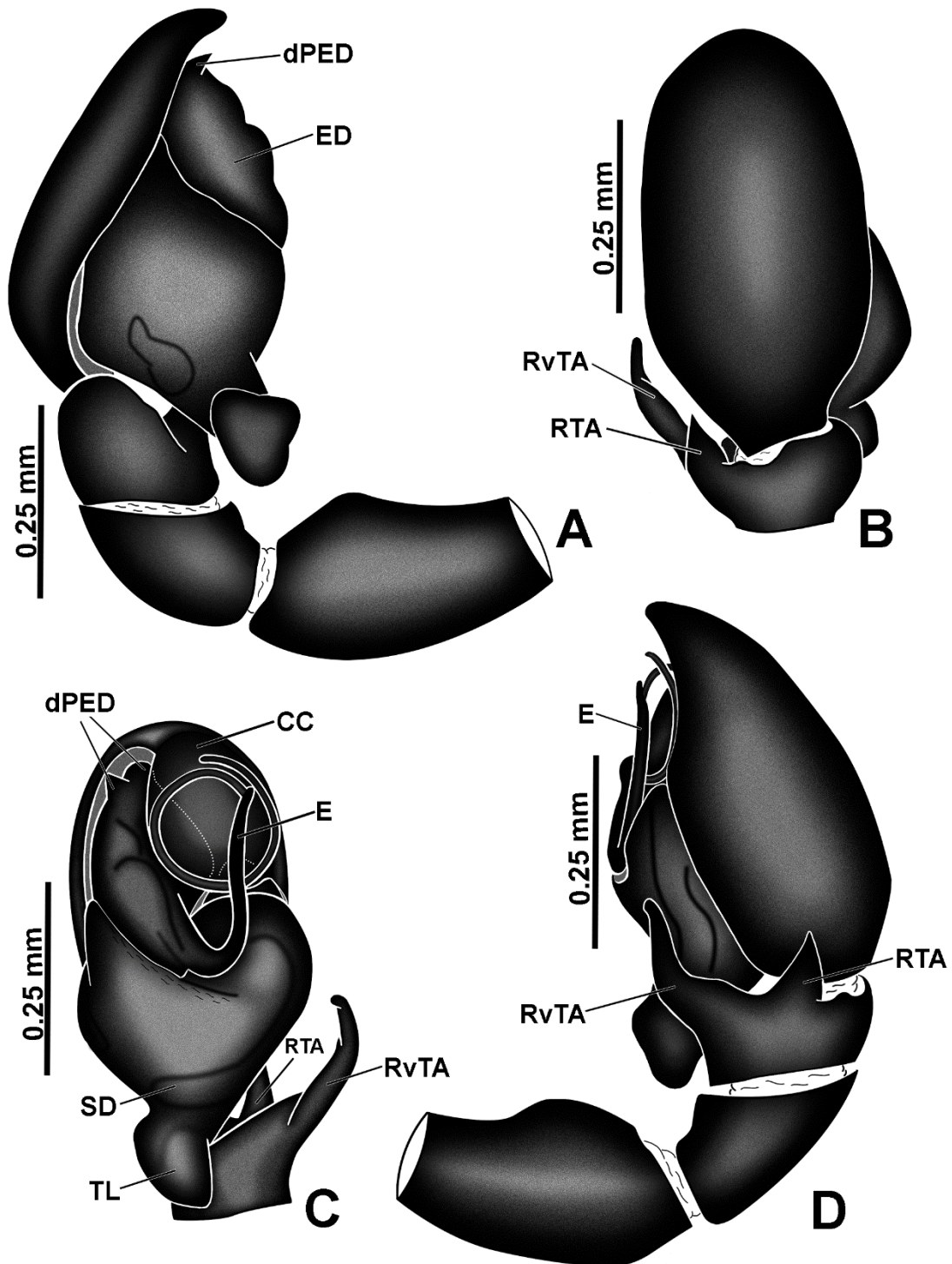


FIGURE 18. *Amphidraus janauari* sp. nov., A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view. CC, cymbial conductor; ED, embolic disc; E, embolus; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct.

Etymology. Noun in apposition taken from type locality.

Diagnosis. The male palp of *Amphidraus janauari* **sp. nov.** is similar to that of *Amphidraus bifidus* **sp. nov.**, with only two short dPED (no mPED; Fig. 18C). However, the bifid projection on basal portion of embolus is absent in *A. janauari* **sp. nov.** (Figs 18C, 21C) and its RTA shorter than RvTA (Figs 18D, 21D).

Description. Male holotype (INPA 5245). Total length: 2.51. Carapace 1.20 long, 0.82 wide and 0.44 high. Ocular quadrangle 0.55 long. Anterior eye row 0.86 wide, posterior 0.65 wide. Legs: 3421; Length of leg I 1.51 (0.49 + 0.53 + 0.49); II 1.55 (0.49 + 0.57 + 0.49); III 1.79 (0.53 + 0.65 + 0.61); IV 1.75 (0.53 + 0.61 + 0.61). Palp (Figs 18A–D): tibia with RvTA elongate and ventrally projected (Figs 18C, 18D), RTA short and acute (Figs 18B, 18D) and with reduced distal retrodorsal tublercle (Fig. 18D); cymbium with large cymbial conductor (Fig. 18C). Color in alcohol: thoracic area brown and cephalic area black; abdomen light brown; legs light brown (Fig. 17).

Female. Unknown.

Distribution. Known only from the type locality (Brazil, Amazonas).

Amphidraus bifidus **sp. nov.**

Figs 19–21, 31

Types: Holotype: ♂ from Reserva Ducke, [3°00'13.0"S, 59°55'07.5"W], Manaus, Amazonas, Brazil, 20.I.1992, H. Hofer & T. Gasnier leg. (INPA 2840). Paratypes: 1♂, same data as holotype (MPEG 32756) and 1♀ from Reserva Ducke, Manaus, Amazonas, Brazil, 3°00'13.0"S, 59°55'07.5"W, 23.IX.1991, H. Hofer & T. Gasnier leg. (INPA 2841).

Additional material examined. BRAZIL: *Amazonas*: Manaus, Reserva Ducke, 3°00'13.0"S, 59°55'07.5"W: 6♂, 1♀, 1991–1997, H. Hofer & T. Gasnier leg. (INPA 2834–2839, 2842).

Etymology. Latin adjective referring to the base of the embolus.

Diagnosis. The male palp of *A. bifidus* **sp. nov.** is very similar to that of *A. janauari* **sp. nov.**, with only two short dPED (no mPED; Fig. 21C). However, *A. bifidus* **sp. nov.** can be distinguished by the bifid projection on basal portion of the embolus (Fig. 21C), which is absent in *A. janauari* **sp. nov.** (Fig. 18C), and in having the RTA as long as the RvTA (Figs 18D, 21D).

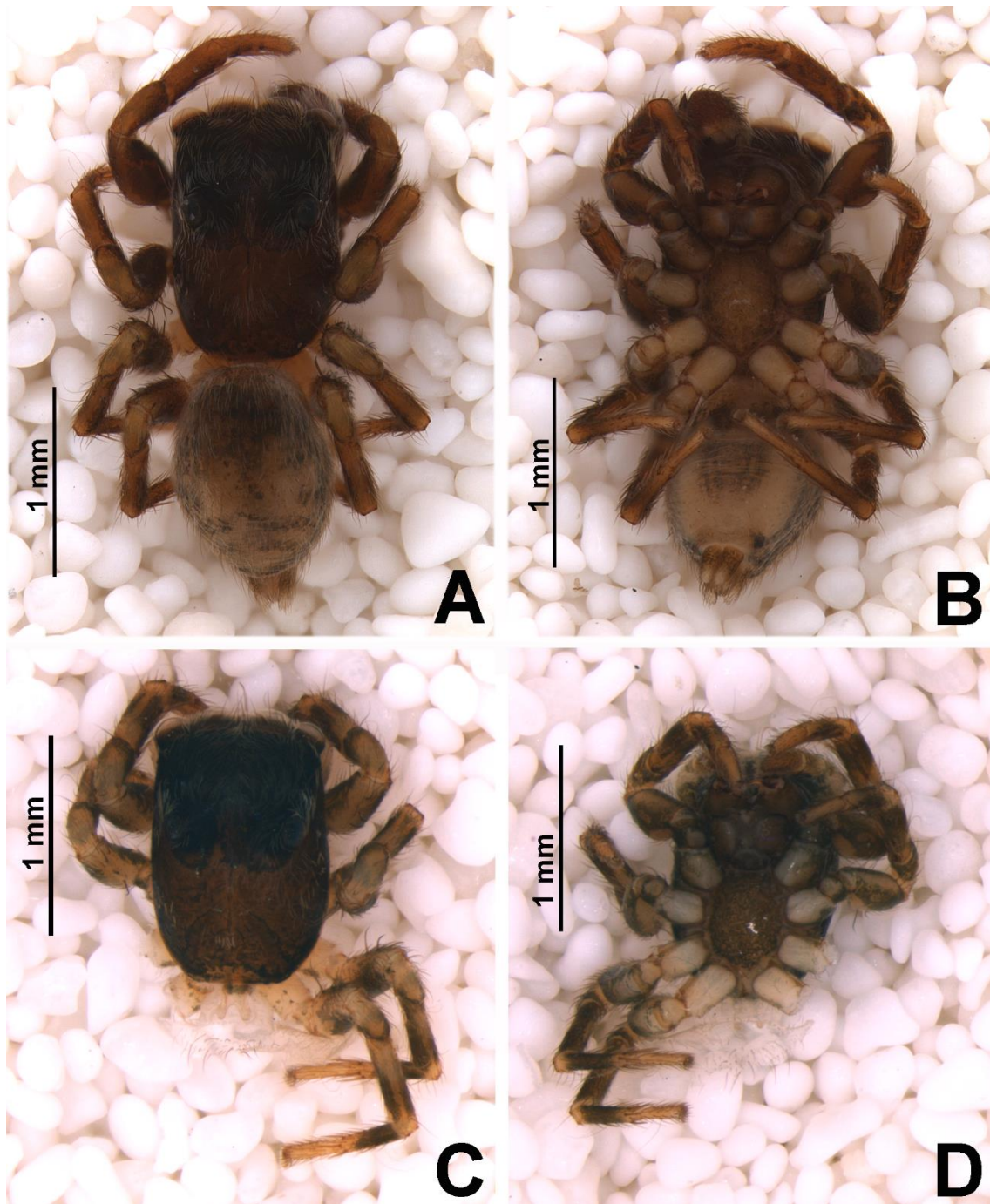


FIGURE 19. *Amphidraus bifidus* **sp. nov.**, A male holotype, dorsal view; B same, ventral view; C female paratype, dorsal view; D same, ventral view.

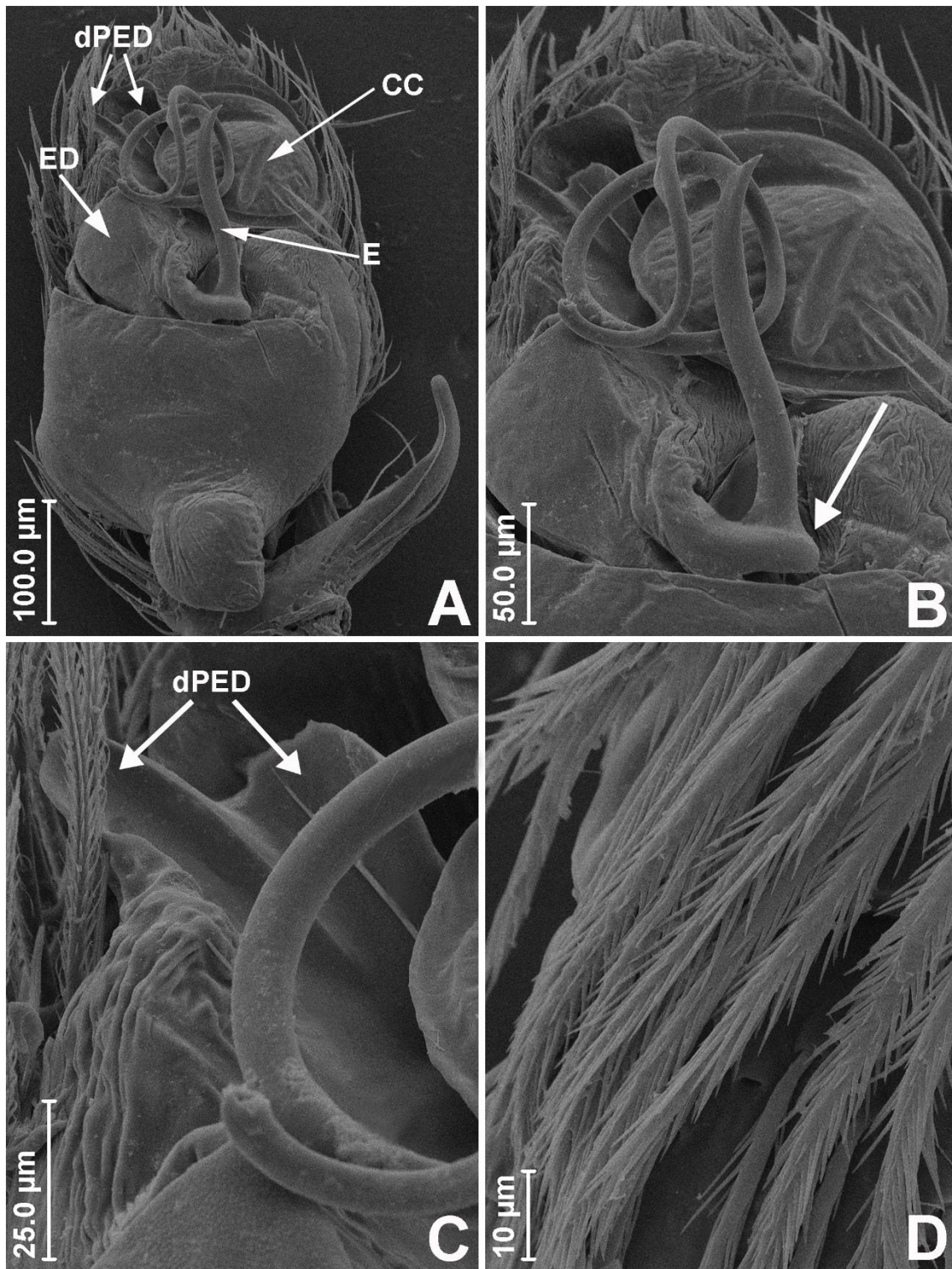


FIGURE 20. *Amphidraus bifidus* sp. nov. A male palp, ventral view; B same, embolic disc + cymbial conductor, ventral view (arrow shows basal projection on the embolus); C distal process on embolic disc, ventral view; D setae from the cymbium; CC, cymbial conductor; ED, embolic disc; E, embolus; dPED, distal process on embolic disc.

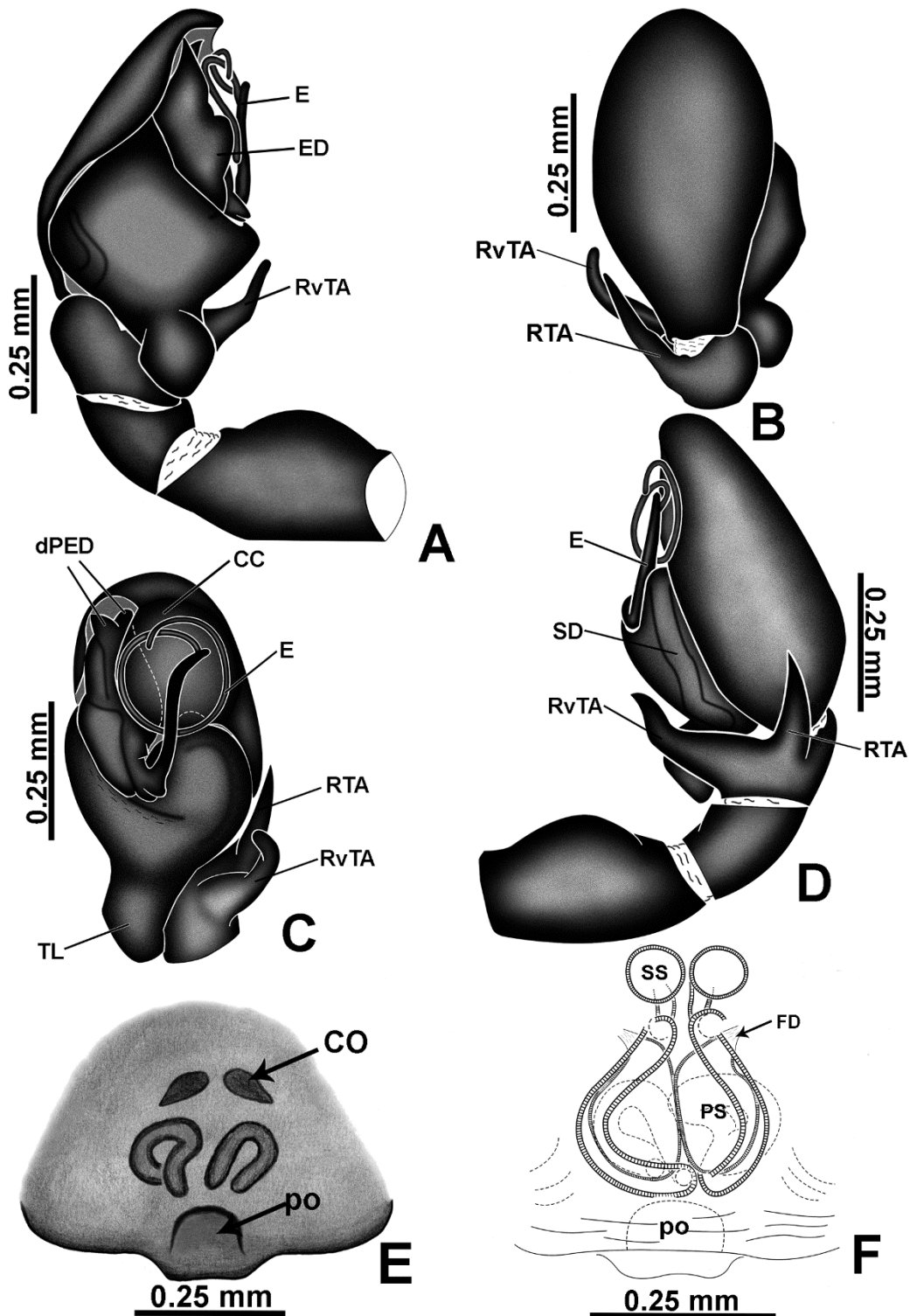


FIGURE 21. *Amphidraus bifidus* sp. nov. A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view; E epygine, ventral view; F Same, cleared, dorsal view. CC, cymbial conductor; ED, embolic disc; E, embolus; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis; RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct; CO, copulatory opening; PS, primary spermatheca. SS, secondary spermatheca; FD, fertilization duct.

Description. Male holotype (INPA 2840). Total length: 2.39. Carapace 1.12 long, 0.72 wide and 0.46 high. Ocular quadrangle 0.59 long. Anterior eye row 0.76 wide, posterior 0.65 wide. Legs: 4312. Length of leg I 1.71 (0.57 + 0.61 + 0.53); II 1.67 (0.61 + 0.53 + 0.53); III 2.12 (0.65 + 0.8 + 0.67); IV 2.13 (0.65 + 0.76 + 0.72); Palp (Figs 20A–D, 21A–D): tibia with RvTA elongate and ventrally projected (Figs 21C, 21D), RTA medium-sized and acute (Figs 21C, 21D) and with reduced distal retrodorsal tubercle (Fig. 21B); cymbium with large cymbial conductor (Figs 20A, 20B, 20C, 21C). Color in alcohol: thoracic area dark brown and cephalic area black; abdomen brown and variegated; legs brown (Figs 19A, 19B).

Female paratype (INPA 2841). Total length: unknown (abdomen lost). Carapace 1.21 long, 0.78 wide and 0.45 high. Ocular quadrangle 0.55 long. Anterior eye row 0.76 wide, posterior 0.64 wide. Legs: 4312; Length of leg I 1.62 (0.52 + 0.62 + 0.48); II 1.55 (0.5 + 0.55 + 0.5); III 1.99 (0.57 + 0.71 + 0.71); IV 2.04 (0.57 + 0.76 + 0.71). Epigyne (Figs 21E–F): epigynal plate with depressions on the lateral regions; secondary spermatheca circular near of copulatory openings; coupling pocket narrow in the proximal portion of epigynal plate. Color in alcohol: as in male (Figs 19C, 19D).

Distribution. Known only from the type locality (Brazil, Amazonas).

***Amphidraus draconicaudatus* sp. nov.**

Figs 22–24, 31

Types: Holotype: ♂ from Centro de Pesquisa Canguçu, 9°58'38.7"S, 50°02'05.0"W, Pium, Tocantins, Brazil, 11–26.V.2016, L.F.B. Serrão *et al.* leg. (MPEG 32689). Paratypes: 1♂ (IBSP) and 2♀ (IBSP, MPEG 32690), same data as holotype.

Additional material examined. BRAZIL: **Tocantins:** Pium (Centro de Pesquisa Canguçu, 9°58'38.7"S, 50°02'05.0"W): 6♂, 1♀, 11–26.V.2016, L.F.B. Serrão *et al.* leg. (MPEG 32757–32763).

Etymology. The epithet is a compound adjective in Latin (draco + cauda) and refers to the shape of the projection of the embolic disc.

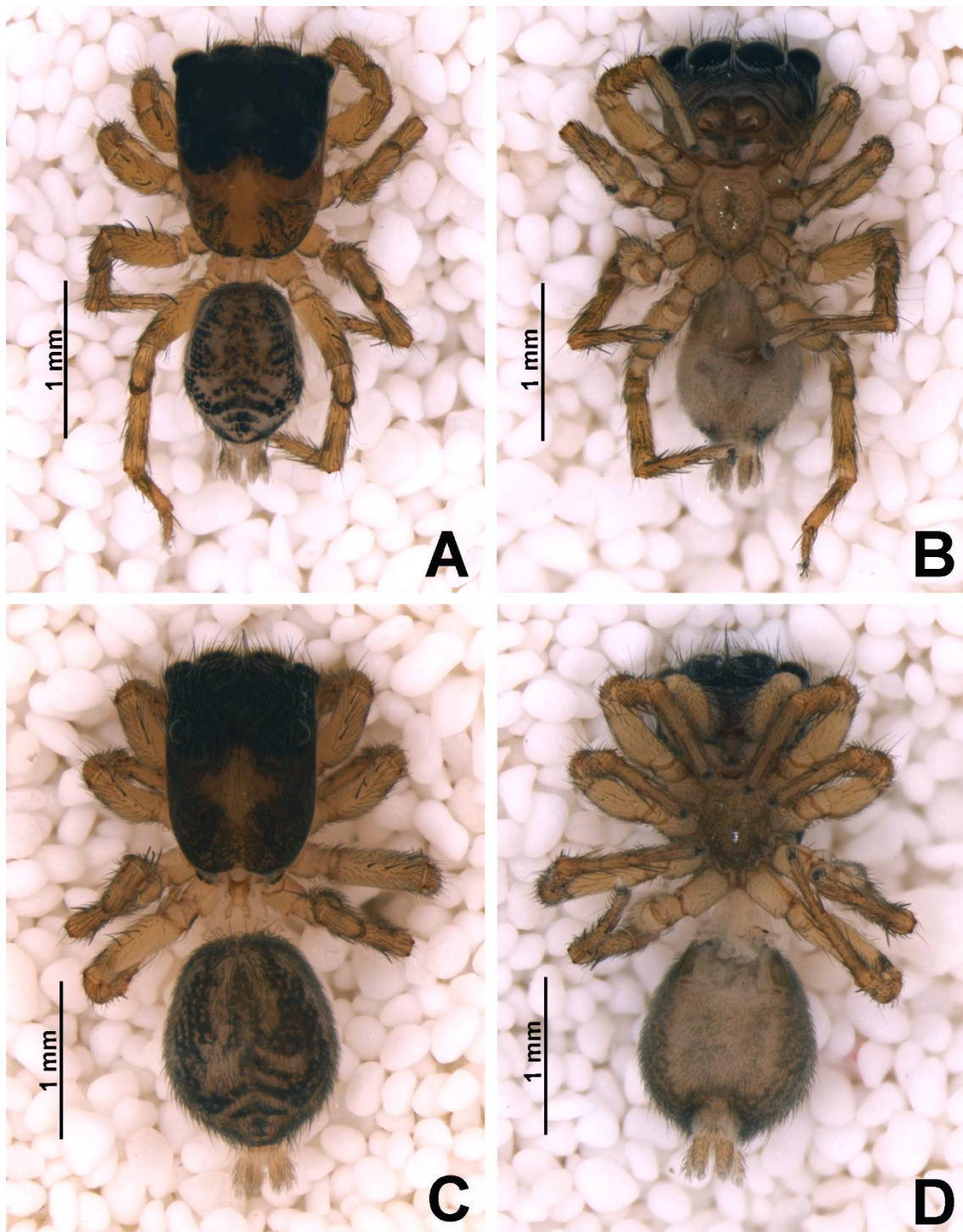


FIGURE 22. *Amphidraus draconicaudatus* sp. nov. A male holotype, dorsal view; B same, ventral view; C female paratype, dorsal view; D same, ventral view.

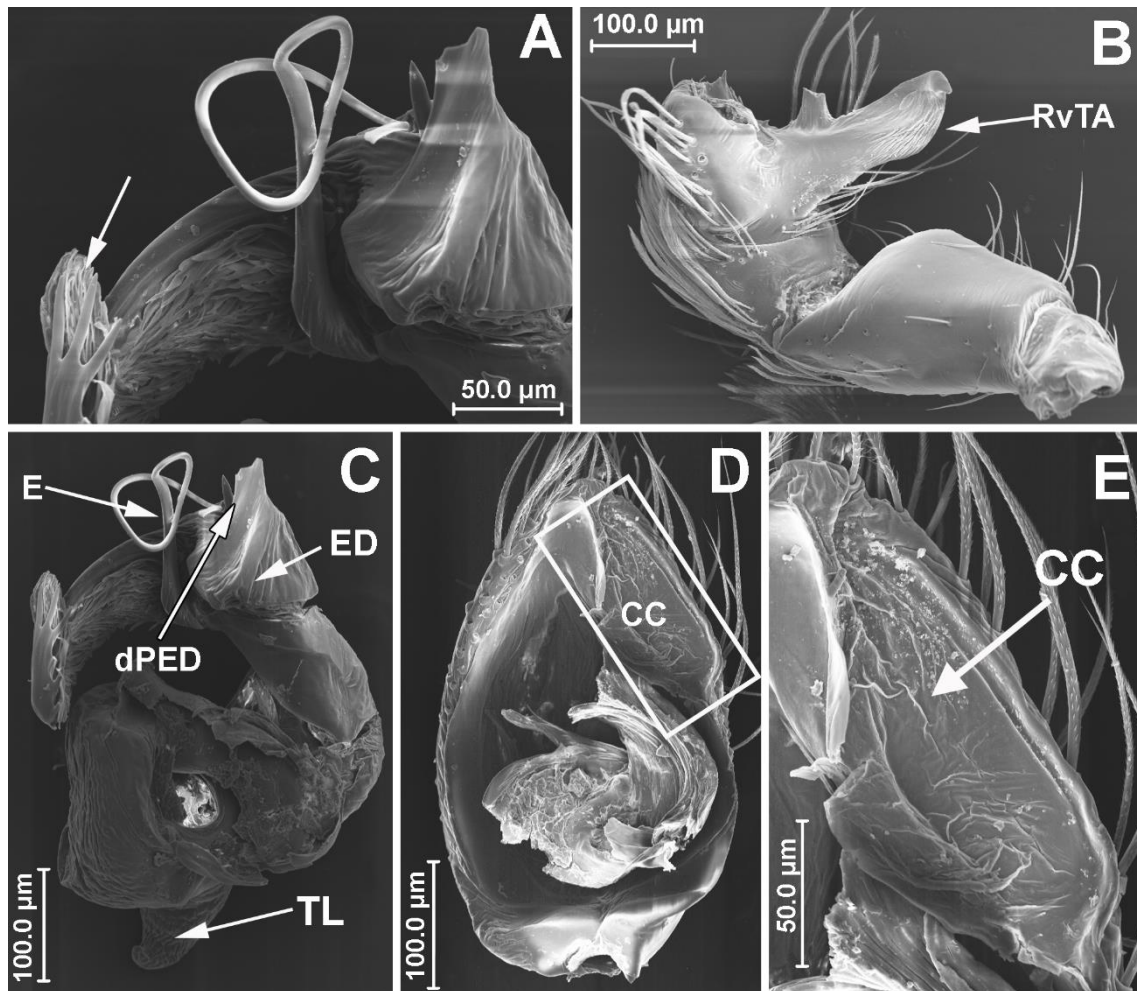


FIGURE 23. *Amphidraus draconicaudatus* **sp. nov.** A embolic disc, retrolateral view (white arrow shows branchy projection of the embolic disc); B femur + patella + tibia, proventral view; C tegulo + embolic disc + embolus, retrolateral view; D cymbium, ventral view; E cymbial conductor, ventral view. CC, cymbial conductor; ED, embolic disc; E, embolus; dPED, distal process on embolic disc; RvTA, retroventral tibial apophysis; TL, tegular lobe.

Diagnosis. *A. draconicaudatus* **sp. nov.** differs from all *Amphidraus* species in having the RvTA with a tooth with two cusps (Figs 24B, 24C, 24D), the tegular lobe with rounded retrolateral projection (Fig. 24C), the embolic disc with two distal projections, one of them being rectangular and, the other, triangular, retrolaterally projected (Figs 23C, 24C), and by the presence of an elongate and stout projection, with eleven terminal branches linked with tufts of scales, that emerges from the retrolateral border of the embolic disc and extends towards the tegulum border (Figs 23A, 23C, 24C, 24D).

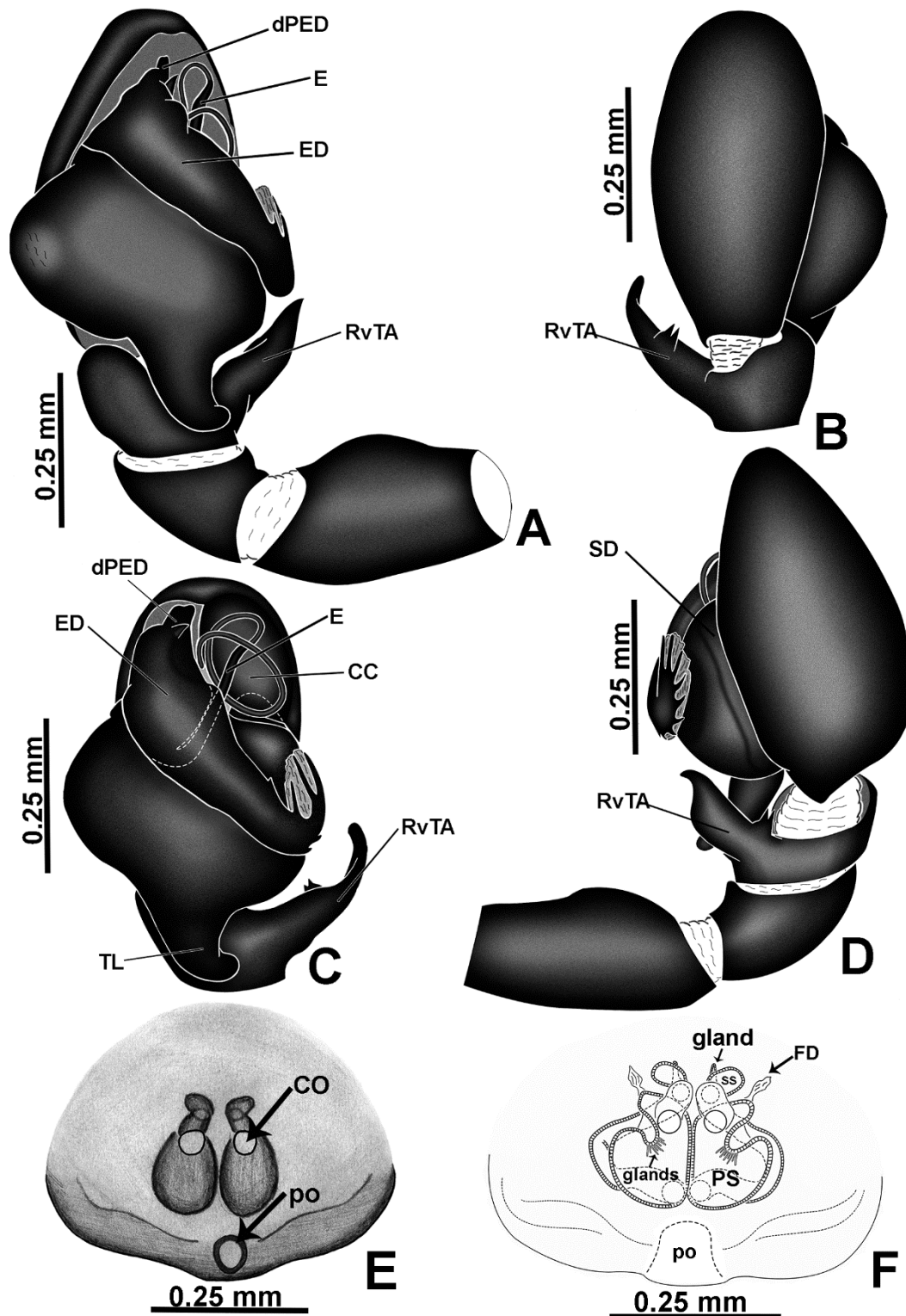


FIGURE 24. *Amphidraus draconicaudatus* **sp. nov.**, A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view; E epygine, ventral view; F Same, cleared, ventral view. CC, cymbial conductor; ED, embolic disc; E, embolus; dPED, distal process on embolic disc; RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct; CO, copulatory opening; PS, primary spermatheca; SS, secondary spermatheca; FD, fertilization duct; po, coupling pocket.

Description. Male holotype (MPEG 32689). Total length: 2.47. Carapace 1.29 long, 0.91 wide and 0.63 high. Ocular quadrangle 0.65 long. Anterior eye row 0.99 wide, posterior 0.87 wide. Legs: 3412. Length of leg I 1.89 (0.61 + 0.63 + 0.65); II 1.83 (0.59 + 0.63 + 0.61); III 2.36 (0.84 + 0.87 + 0.65); IV 2.32 (0.72 + 0.76 + 0.84). Palp (Figs 23A–E, 24A–D); cymbium with large cymbial conductor (Fig. 24C). Color in alcohol: thoracic area brown and cephalic area black; abdomen brown and variegated; legs brown (Figs 22A, 22B).

Female paratype (MPEG 32690). Total length 2.92. Carapace 1.4 long, 0.96 wide and 0.88 high. Ocular quadrangle 0.6 long. Anterior eye row 1.0 wide, posterior 0.88 wide. Legs: 3412; Length of leg I 2.06 (0.6 + 0.78 + 0.68); II 2.02 (0.66 + 0.72 + 0.64); III 2.56 (0.8 + 0.84 + 0.92); IV 2.48 (0.76 + 0.76 + 0.96). Epigyne (Fig 24): coupling pocket narrow, dorsally placed on the posterior border of epigynal plate; secondary spermatheca semicircular; gland near secondary spermatheca; primary spermatheca with evident glands (Figs 24E, 24F). Color in alcohol: thoracic area dark brown with a light brown rhombus in the middle portion and cephalic area black; abdomen brown and variegated, legs light brown (Figs 22C, 22D).

Distribution. Known only from the type locality (Brazil, Tocantins).

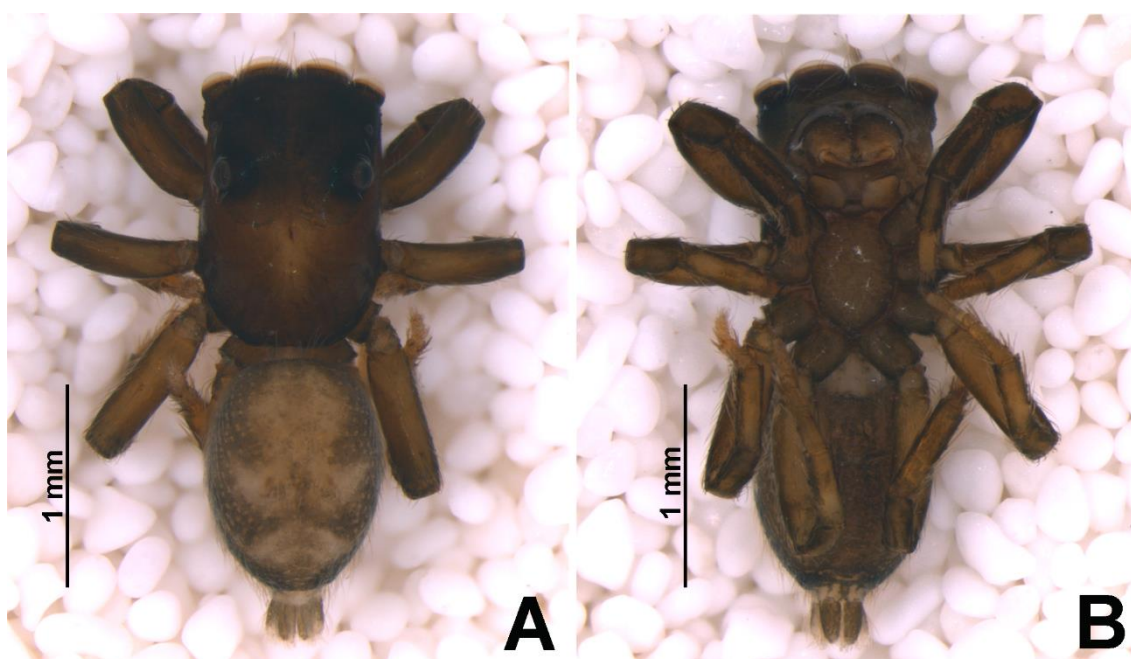


FIGURE 25. *Amphidraus loxodontillus* sp. nov, A male holotype, dorsal view; B same, ventral view.

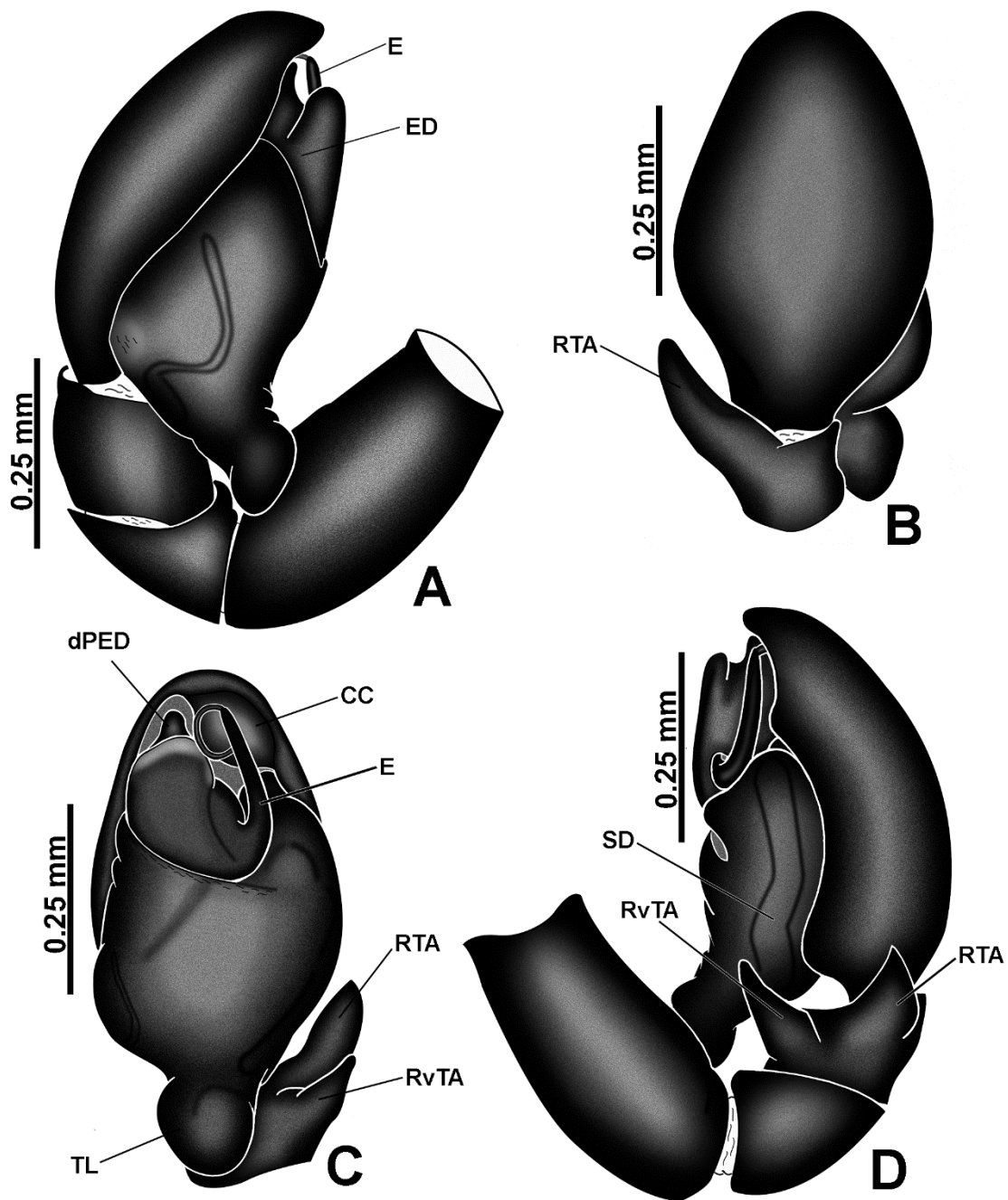


FIGURE 26. *Amphidraus loxodontillus* sp. nov. A male palp, prolateral view; B same, dorsal view; C same, ventral view; D same, retrolateral view; CC, cymbial conductor; ED, embolic disc; E, embolus; dPED, distal process on embolic disc; RTA, retrolateral tibial apophysis RvTA, retroventral tibial apophysis; TL, tegular lobe; SD, sperm duct.

***Amphidraus loxodontillus* sp. nov.**

Figs 25–26, 29

Type. ♂ Holotype from Igapó Tarumã-Mirim, [3°00'49.0"S, 60°10'33.5"W], Manaus, Amazonas, Brazil, 8.X.1987, unknown leg. (deposited in INPA).

Etymology. Epithet to be treated as a compound Latin noun (loxodonta, the African elephant + the alternative suffix -illus to create the diminutive), in allusion of the shape of the embolic disc and embolus, which, seen upside down, create the image of a young elephant with large ear (the disc) and long trunk (the embolus).

Diagnosis. The embolic disc and embolus of *A. loxodontillus* sp. nov. are similar to those *A. semicanus* (Simon, 1902), with a rounded dPED (Fig. 26C). However, *A. loxodontillus* sp. nov. differs from this species in having a small-sized embolus apical filament (Fig. 26C), while in *A. semicanus* it is very long and spiral (see Galiano 1963, page 260: figs 15–16). In addition, the RTA is narrow in *A. loxodontillus* sp. nov. and stout in *A. semicanus*, and the RvTA is present only in *A. loxodontillus* (Fig. 26D; see Galiano 1963, page 260: fig. 15).

Description. Male (deposited in INPA). Total length: 2.51. Carapace 1.29 long, 0.84 wide and 0.53 high. Ocular quadrangle 0.65 long. Anterior eye row 0.87 wide, posterior 0.76 wide. Legs: 4312. Length of leg I 1.9 (0.61 + 0.72 + 0.57); II 1.86 (0.65 + 0.68 + 0.53); III 2.11 (0.7 + 0.65 + 0.76); IV 2.47 (0.76 + 0.8 + 0.91). Palp (Figs 26A–D): femur with slight distal ventral depression (Fig. 26D). Color in alcohol: thoracic area dark brown and cephalic area black; abdomen brown and variegated; legs brown (Fig. 25).

Female. Unknown

Distribution. Known only from the type locality (Brazil, Amazonas)

Misplaced species. The type species of *Nebridia* (*Nebridia semicana* Simon, 1902) was transferred to *Amphidraus* by Zhang & Maddison (2015). Consequently, *Nebridia* Simon, 1902 and *Amphidraus* Simon, 1900 were synonymized. In addition to the type species, *Amphidraus* currently includes three other species transferred from *Nebridia*, namely *A. manni* (Bryant, 1943), *A. mendicus* (Bryant, 1943) and *A. parvus* (Mello-Leitão, 1945), whose morphology did not correspond to that of true *Amphidraus* and are discussed here.

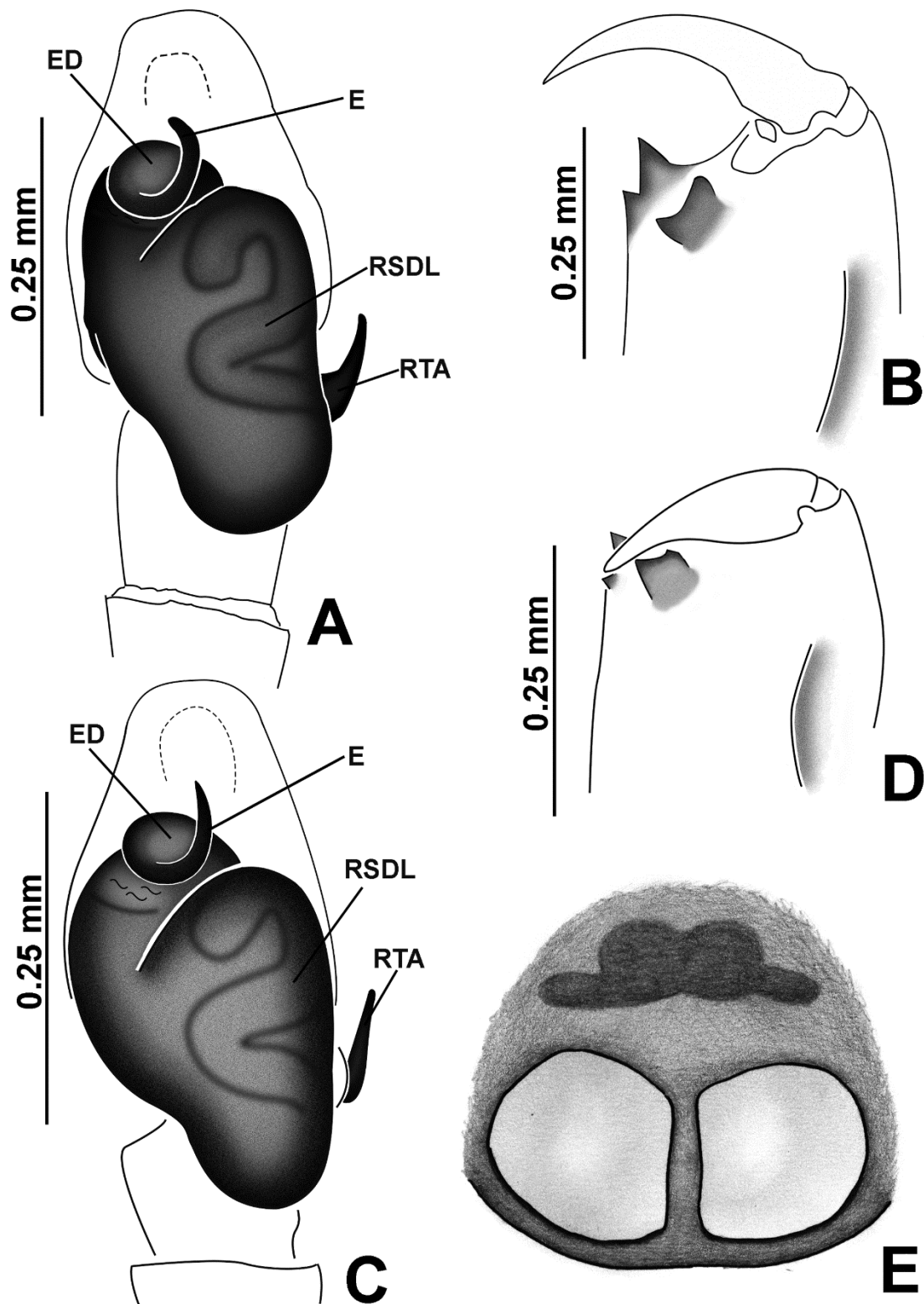


FIGURE 27. New Diagnostic illustrations based on types material. A *Truncattus manni* (Bryant, 1943) **new comb.**, male palp, ventral view; B same, chelicera, back view; C *Truncattus mendicus* (Bryant, 1943) **new comb.**; D same, chelicera, back view; E *Titanattus parvus* (Mello-Leitão, 1945) **new comb.**, Epigyne, ventral view. E, embolus; ED, embolic disc; RSDL, retrolateral sperm duct loop; RTA, retrolateral tibial apophysis.

***Titanattus* Peckham & Peckham, 1885**

Titanattus Peckham & Peckham, 1885: 62 (type species: *Titanattus saevus* Peckham & Peckham, 1885, original designation and monotypy).

Diagnosis. The group is still poorly understood. Ruiz & Maddison (2015) mentions *Titanattus* as having the posterior eye row on elevations of the carapace and modified tips of front legs and slight ant-mimic behavior.

***Titanattus parvus* (Mello-Leitão, 1945) new comb.**

Fig. 27E

Nebridia parva Mello-Leitão, 1945: 289 (female holotype from Pindapoy, Misiones, Argentina, Birabén leg., MLP 16810, examined).

Amphidraus parvus: Zhang & Maddison, 2015: 22 (transferred from *Nebridia* to *Amphidraus* after genus synonymy); World Spider Catalog 2017.

Description. See Mello-Leitão (1945).

Distribution. Known only from the type locality (Argentina, Misiones)

Note. The genus *Titanattus* belongs in the clade Amycoidea and is nested within a smaller clade including scopocirines, sarindines and thiodinies (See Ruiz & Maddison 2015, clade 2). The new combination is based on the similarity with other species of *Titanattus*, including the epigyne, with the species referred to as “*Titanattus* sp. D” in Ruiz & Maddison (2015), which is in description by Bustamante & Ruiz (**in prep.**). New diagnostic illustration of the holotype of *T. parvus* (Mello-Leitão) is herein provided (Fig. 27E).

***Truncattus* Zhang & Maddison, 2012**

Figs 27A–D

Truncattus Zhang & Maddison, 2012: 47 (type species: *Truncattus flavus* Zhang & Maddison, 2012, original designation).

Diagnosis. *Truncattus* is similar to *Antillattus* Bryant, 1943 and *Emathis* Simon, 1899. It differs from *Antillattus* by the non-modified male chelicerae and endites and from

Emathis by the bicuspid retromarginal tooth on the chelicera (three or more cusps in *Emathis*). This genus is also similar to *Caribattus* Bryant, 1950 in color pattern, but can be distinguished by the bicuspid retromarginal tooth (*Caribattus* has one unident retromarginal tooth), and the presence of a proximal tegular lobe on the male palp (absent in *Caribattus*) (Zhang & Maddison 2012: 47).

***Truncattus manni* (Bryant, 1943) new comb.**

Figs 27A–B

Nebridia manni Bryant, 1943: 492 (male holotype from Hispaniola, MCZ 21981, examined; female paratype, MCZ 27893, same data as holotype, not examined).

Amphidraus manni: Zhang & Maddison, 2015: 22 (transferred from *Nebridia* to *Amphidraus* after genus synonymy); World Spider Catalog 2017.

Description. See Bryant (1943).

***Truncattus mendicus* (Bryant, 1943) new comb.**

Figs 27C–D

Nebridia mendica Bryant, 1943: 494 (male holotype from Hispaniola, MCZ 22030, examined).

Amphidraus mendicus: Zhang & Maddison, 2015: 22 (transferred from *Nebridia* to *Amphidraus* after genus synonymy); World Spider Catalog 2017.

Description. See Bryant (1943).

Note. *A. manni* and *A. mendicus* are clearly members of the euophryines by the spiraled embolus and the well developed RSDL, but differ from *Amphidraus*, which does not have a well developed RSDL, by a simple RTA and an embolic disc poorly developed, with no processes (Figs 27A, 27C). These species share great similarity with the species of the *Antillattus*-clade, composed of *Antillattus* Bryant, 1943, *Petemathis* Prószyński & Deeleman-Reinhold, 2012, and *Truncattus* Zhang & Maddison, 2012, and restricted to the Caribbean Islands (See Zhang & Maddison, 2015). The species of this clade usually have two promarginal teeth (See Zhang & Maddison 2015: figs 58, 65, 66, 73, 75, 88, 94) and a coiled embolus of no more than half a circle (see Zhang & Maddison, 2015: figs

50, 57, 64, 72, 80, 87, 93). Among the genera of this clade, *A. manni* and *A. mendicus* share more morphological similarities with *Truncattus* in having the chelicera with one bicuspid retromarginal tooth and with a retrolateral depression on the chelicerae (Figs 27B, 27D; see Zhang & Maddison 2012: figs 250, 260; see Zhang & Maddison 2015: Fig. 94) and the male palp with large proximal tegular lobe (Figs 27A, 27C; see Zhang & Maddison 2012: figs 240, 249, 259). Based on these evidences, these two species are herein transferred to *Truncattus*.

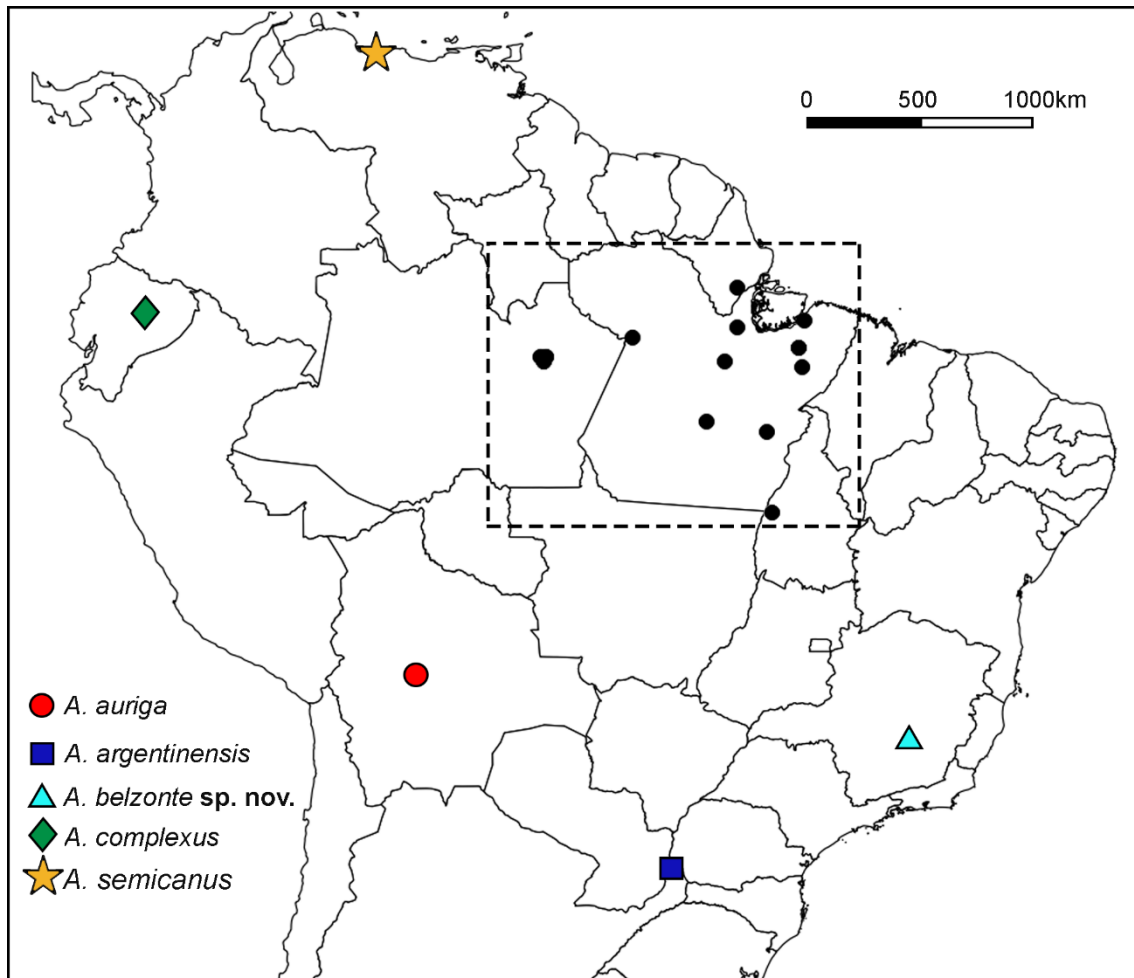


FIGURE 28. Map of northern South America showing records of all currently known *Amphidraus* species. Region delimited by dashed line is explained in the maps below.

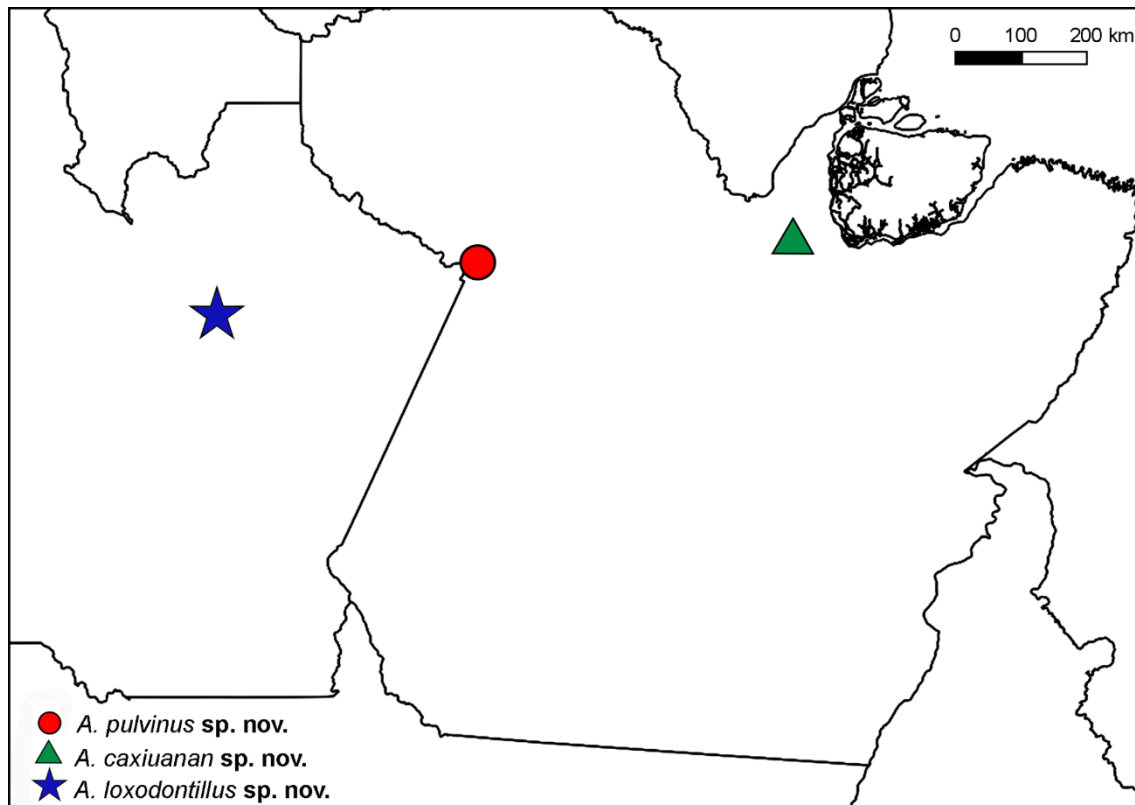


FIGURE 29. Map of collection sites of *A. pulvinus* sp. nov., *A. caxiuanan* sp. nov. and *A. loxodontillus* sp. nov. For context of this map within South America, see Fig. 28.

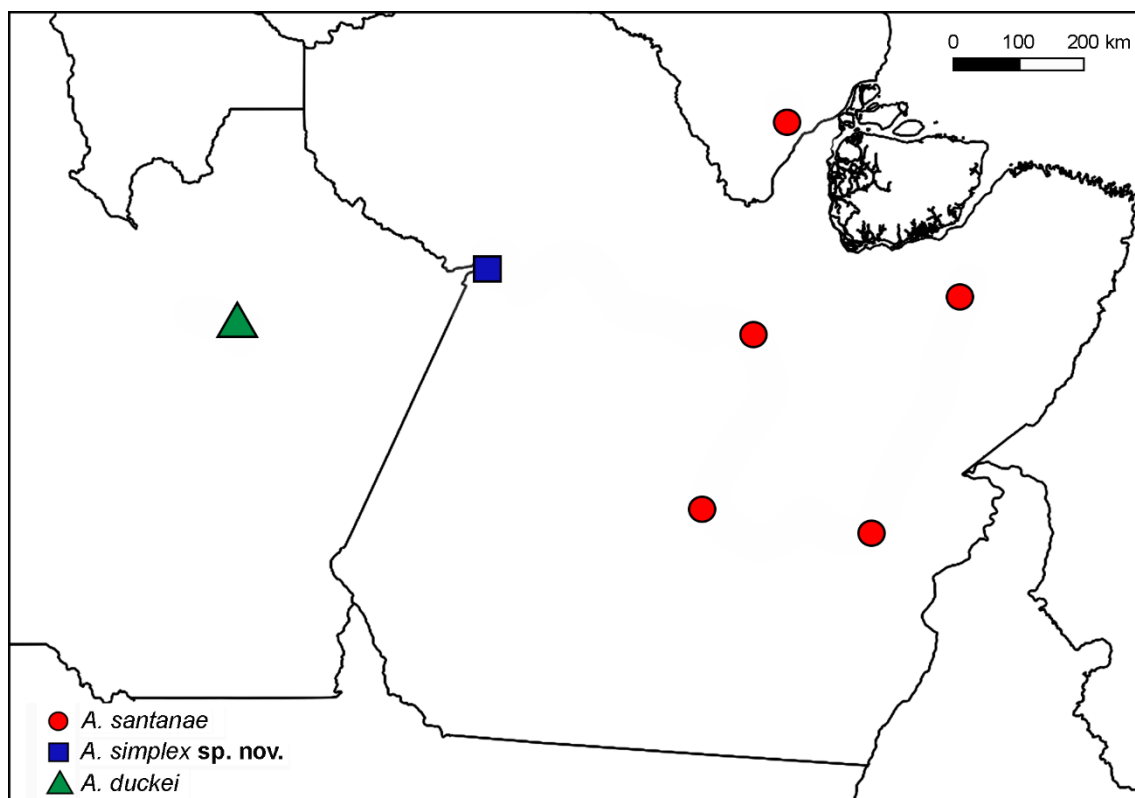


FIGURE 30. Map of collection sites of *A. santanae*, *A. simplex* sp. nov. and *A. duckei*. For context of this map within South America, see Fig. 28.

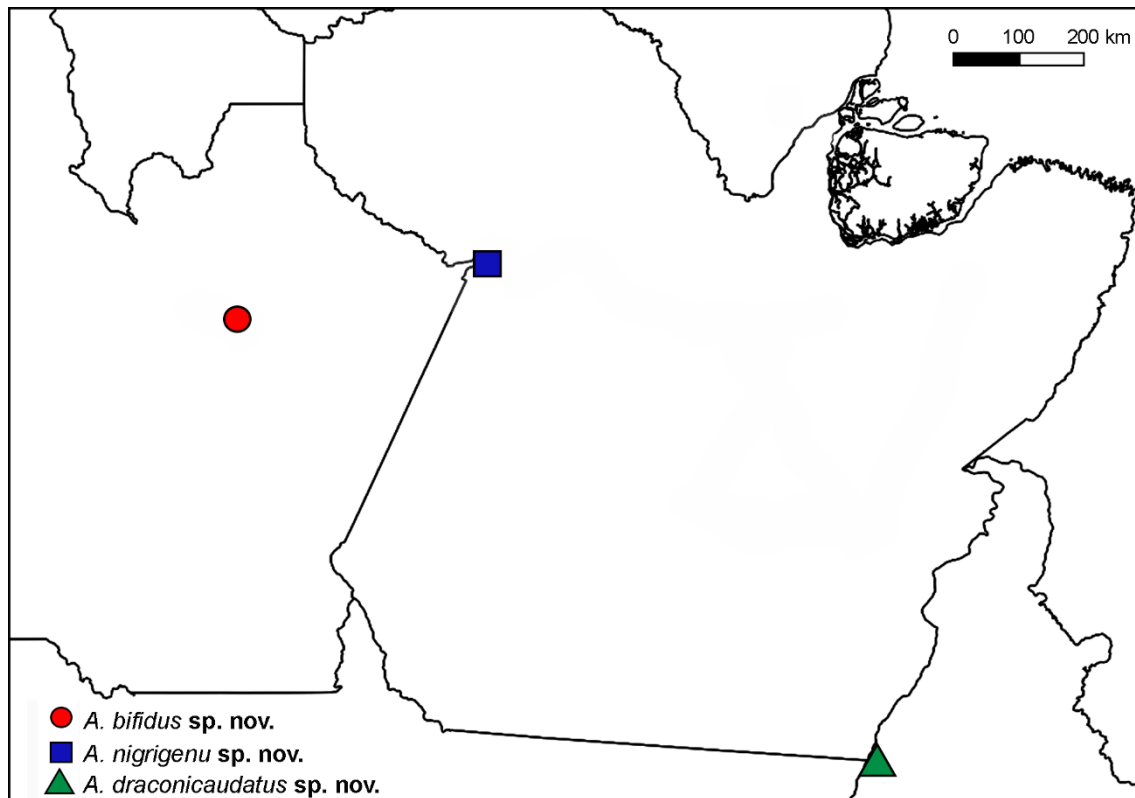


FIGURE 31. Map of collection sites of *A. bifidus* sp. nov., *A. nigrigenu* sp. nov. and *A. draconicaudatus* sp. nov. For context of this map within South America, see Fig. 28.

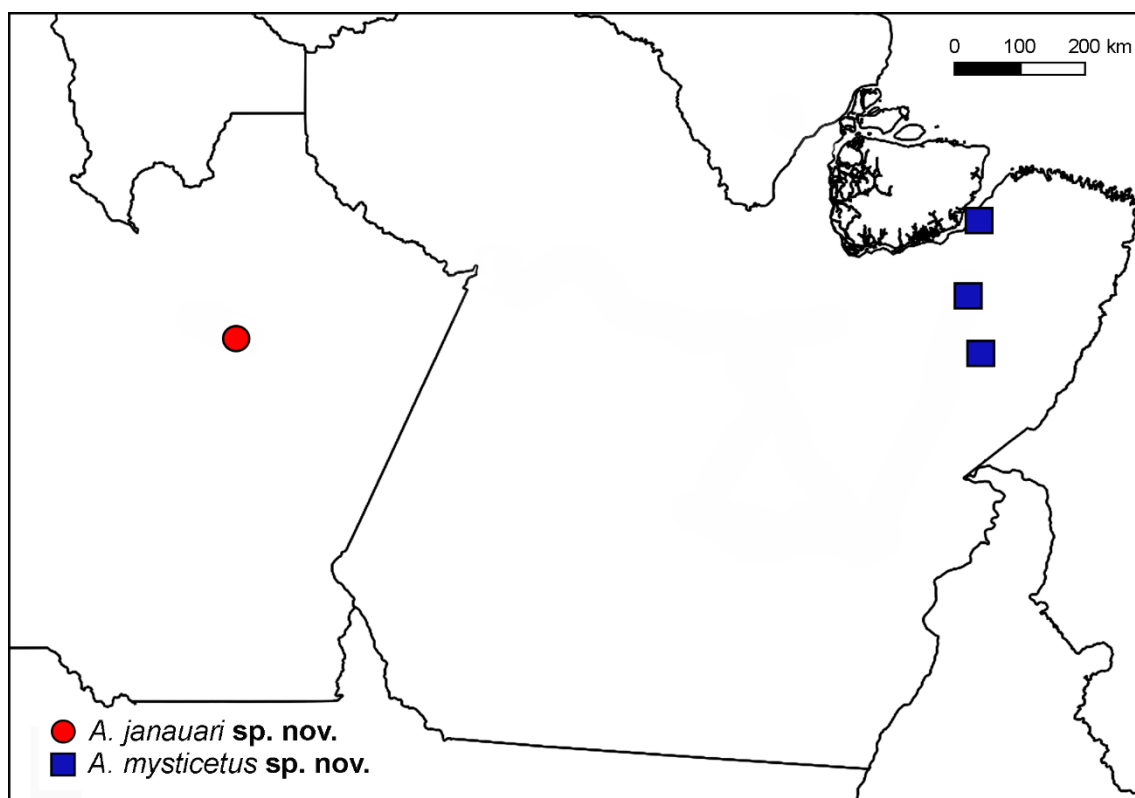


FIGURE 32. Map of collection sites of *A. janauari* sp. nov., *A. mysticetus* sp. nov. For context of this map within South America, see Fig. 28.

Acknowledgments

We thank the Programa de Pós-Graduação em Zoologia, convênio Universidade Federal do Pará/Museu Paraense Emílio Goeldi, the Laboratório de Aracnologia do Museu Paraense Emílio Goeldi and the Laboratório de Invertebrados da Universidade Federal do Pará, for making this study possible; the curators for the loan of specimens; to Conselho Nacional do Desenvolvimento Científico e Tecnológico (CNPQ); to Ivan Magalhães (from Universidad de Buenos Aires) for sending the photos of the types of *A. santanae* and Cristina A. Rheims for comments on the draft.

References

- Bryant, E. B. (1943) The salticid spiders of Hispaniola. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 92, 445–529.
- Galiano, M. E. (1962) Los géneros *Amphidraus* Simon y *Marma* Simon (Araneae, Salticidae). *Acta Zoologica Lilloana*, 18, 31–44.
- Galiano, M. E. (1963) Las especies americanas de arañas de la familia Salticidae descritas por Eugène Simon: Redescripciones basadas en los ejemplares típicos. *Physis Buenos Aires (C)*, 23, 273–470.
- Galiano, M. E. (1967) Dos nuevas especies del género *Amphidraus* Simon, 1900 (Araneae, Salticidae). *Physis Buenos Aires (C)*, 27, 95–100.
- Galiano, M. E. (1976) Descripción del alotipo f de *Amphidraus duckei* Galiano, 1967 (Araneae, Salticidae). *Revista de la Sociedad Entomológica Argentina*, 35, 57–58.
- Galiano, M. E. (1997) Descripción de *Amphidraus argentinensis*, nueva especie (Araneae, Salticidae). *Physis Buenos Aires (C)*, 53, 33–36.
- Maddison, W. P. & Hedin, M. C. (2003) Jumping spider phylogeny (Araneae: Salticidae). *Invertebrate Systematics*, 17, 529–549.
- Maddison, W. P. (2015) A phylogenetic classification of jumping spiders (Araneae: Salticidae). *Journal of Arachnology*, 43, 231–292.
- Mello-leitão, C. F. de (1945) Arañas de Misiones, Corrientes y Entre Ríos. *Revista del Museo de La Plata (N.S., Zool.)*, 4, 213–302.
- Prószyński, J. (1976) Studium systematyczno-zoogeograficzne nad rodziną Salticidae (Aranei) Regionów Palearktycznego i Nearktycznego. *Rozprawy Wyższej Szkoły Pedagogicznej*, 6, 1–260.
- Ruiz, G. R. S. & Maddison, W. P. (2015) The new Andean jumping spider genus *Uruguayu* and its placement within a revised classification of the Amycoidea (Araneae: Salticidae). *Zootaxa*, 4040 (3), 251–279.
- Simon, E. (1900) Etudes arachnologiques. 30e Mémoire. XLVII. Descriptions d'espèces nouvelles de la famille des Attidae. *Annales de la Société Entomologique de France*, 69, 27–61.
- Simon, E. (1902) Description d'arachnides nouveaux de la famille des Salticidae (Attidae) (suite). *Annales de la Société Entomologique de Belgique*, 46, 24–56, 363–406.
- World Spider Catalog (2017) World Spider Catalog. Natural History Museum Bern, online at <http://wsc.nmbe.ch>, version 18.0, accessed on March 10th, 2017.

- Zhang, J. X. & Maddison, W. P. (2012a) New euophryine jumping spiders from the Dominican Republic and Puerto Rico (Araneae: Salticidae: Euophryinae). *Zootaxa*, 3476, 1–54.
- Zhang, J. X. & Maddison, W. P. (2012b) New euophryine jumping spiders from Central and South America (Araneae: Salticidae: Euophryinae). *Zootaxa*, 3578, 1–35.
- Zhang, J. X. & Maddison, W. P. (2013) Molecular phylogeny, divergence times and biogeography of the subfamily Euophryinae (Araneae: Salticidae). *Molecular Phylogenetics and Evolution*, 68 (1), 81–92.
- Zhang, J. X & Maddison, W. P. (2015) Genera of euophryine jumping spiders (Araneae: Salticidae), with a combined molecular-morphological phylogeny. *Zootaxa*, 3938 (1), 1–147.