PROGRAMA DE PÓS-GRADUAÇÃO EM ZOOLOGIA
UNIVERSIDADE FEDERAL DO PARÁ

ADINEY FERREIRA FERREIRA

Urhai gen. nov., um novo gênero para Edessinae (Hemiptera: Heteroptera: Pentatomidae)

Belém,
2025

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Dissertação de Mestrado apresentado ao Programa de Pós-Graduação em Zoologia da Universidade Federal do Pará (UFPA), como requisito para obtenção do título de Mestre em Zoologia.
Área de concentração: Evolução.
Linha de Pesquisa: Sistemática e Taxonomia.
Isenção de responsabilidade: Todo o nome científico novo proposto nesse documento não tem efeito nomenclatural segundo o Código Internacional de Nomenclatura Zoológica e, portanto, não está disponível.
Orientador: Prof. Dr. José Antônio Marin Fernandes

Belém,

2025

AGRADECIMENTOS

Primeiramente, gostaria de agradecer a Deus por me permitir chegar aqui. Aos meus pais, João Pantoja, Laura Pantoja, Amir Pantoja e Luzinete Ferreira, meus irmãos (Adnelson Ferreira, Lucinéia Ferreira e Lucinelma Ferreira) e a minha tia Auxiliadora Pantoja, por todo apoio e incentivo nessa jornada, vocês foram muito importantes, muito obrigado por nunca me deixarem desistir a cada obstáculo que surgiu nessa caminhada.

Aos amigos (as) de Laboratório (Benedito Nunes, Bia Moura, Bruna Façanha, Bruno Gouvea, Cristian Mendoza, Everton Evaristo, Gustavo Tavares, Lian Franco, Luiza Fagundes, Valéria Juliete e Welington Nobre) pelo apoio, risadas, conselhos e companheirismo ao longo desse período.

Agradeço à Universidade Federal do Pará (UFPA) pelo apoio institucional, programa de Pós-graduação em Zoologia (PPGZOOL), a Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) pela concessão da bolsa e ao Laboratório de Zoologia de Invertebrados (LA–INV) pela infraestrutura.

Agradeço ao meu orientador, Dr. José Antônio Marin Fernandes pela confiança, orientação, por todos os ensinamentos e conhecimentos repassados e ao Me. Eduardo Cunha pela ajuda e colaboração neste trabalho.

Agradeço a todos que contribuíram direto ou indiretamente para a conclusão deste mestrado!

FICHA CATALOGRÁFICA

Dados Internacionais de Catalogação na Publicação (CIP) de acordo com ISBD
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F383u Ferreira Ferreira, Adiney.
Urhai gen. nov., um novo gênero para Edessinae (Hemiptera: Heteroptera: Pentatomidae) / Adiney Ferreira Ferreira. — 2025.
67 f. : il. color.

Orientador(a): Prof. Dr. José Antônio Marin Fernandes Fernandes
Dissertação (Mestrado) - Universidade Federal do Pará, Instituto de Ciências Biológicas, Programa de Pós-Graduação em Zoologia, Belém, 2025.

1. Edessa; Espécies novas; Nomenclatura; Taxonomia. I. Título.

CDD 595.754

FOLHA DE APROVAÇÃO

ADINEY FERREIRA FERREIRA

***Urhai* gen. nov., um novo gênero para Edessinae (Hemiptera: Heteroptera: Pentatomidae)**

Dissertação apresentada ao Programa de Pós-Graduação em Zoologia, do convênio da Universidade Federal do Pará e Museu Paraense Emílio Goeldi, como requisito parcial para obtenção do título de Mestre em Zoologia, sendo a COMISSÃO JULGADORA composta pelos seguintes membros:

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PÓS-DOC. GUSTAVO COSTA TAVARES
Universidade Federal do Pará

PÓS-DOC. ABEL ANTONIO BUSTAMANTE FERRADA
Museu Paraense Emílio Goeldi

Aprovado em: 31 de março de 2025.
Local de defesa: Belém, Pará, Brasil.

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Urhai **gen. nov.**, a new genus to Edessinae (Hemiptera: Heteroptera: Pentatomidae)

ABSTRACT

Edessinae is the second most diverse subfamily of Pentatomidae, with approximately 500 described species distributed in 17 genera. This taxon is considered monophyletic, supported by molecular evidence and morphological characteristics. Among the genera, *Edessa* stands out for harboring more than 300 species, but it faces taxonomic challenges, including problems of nomenclature and classification, and is often considered a "species repository". This work aims to describe a new genus with three species previously allocated to *Edessa* and five new species. For the study, 94 specimens from national and foreign institutions were analyzed. *Urhai* **gen. nov.** is easily recognized by the morphology of the body, mainly presenting the head with median punctuations forming two vertical stripes on the clypeus, antennal articles I–III with small dark circular spots, pronotum with developed humeral angle; flattened and punctuated dorsoventrally; distal margin laminar; posterior angle spiniform, posterior margin of the pronotum covering the anterior part of the scutellum, metasternal process flattened; anterior arms of the bifurcation reaching or nearly reaching the limit of the propleura; distal margin generally straight. Diagnoses, species identification key and distribution maps were presented. This study is of great importance in understanding the diversity of Edessinae.

Keywords: *Edessa*; New species; Nomenclature; Taxonomy.

Urhai **gen. nov.**, um novo gênero para Edessinae (Hemiptera: Heteroptera: Pentatomidae)

RESUMO

Edessinae é a segunda mais diversa subfamília de Pentatomidae, com aproximadamente 500 espécies descritas distribuídas em 17 gêneros. Este táxon é considerado monofilético, sustentado por evidências moleculares e características morfológicas. Entre os gêneros, *Edessa* destaca-se por abrigar mais de 300 espécies, porém enfrenta desafios taxonômicos, incluindo problemas de nomenclatura e de classificação, sendo frequentemente considerado um "depósito de espécies". Este trabalho tem como objetivo a descrição de um novo gênero com três espécies anteriormente alocadas em *Edessa* e cinco espécies novas. Para o estudo foram analisados 94 exemplares provenientes de instituições nacionais e estrangeiras. *Urhai* **gen. nov.** é facilmente reconhecido pela morfologia do corpo por apresentar pincipalmente a cabeça com pontuações medianas formando duas listras verticais no clípeo, artículos antenais I–III com pequenas manchas circulares escuras, pronoto com ângulo umeral desenvolvido; achatado e pontuado dorsoventralmente; margem distal laminar; ângulo posterior espiniforme, margem posterior do pronoto cobrindo a parte anterior do escutelo, processo metasternal achatado; braços anteriores da bifurcação atingindo ou quase o limite da propleura; margem distal geralmente reta. Diagnoses, chave de identificação das espécies e mapas de distribuição foram apresentados. Esse estudo representa grande importância na compreensão da diversidade de Edessinae.

Palavras-chave: *Edessa*; Espécies novas; Nomenclatura; Taxonomia.

INTRODUÇÃO GERAL

Hemiptera é uma ordem de insetos cujo nome é de origem grega composto por "*hemi*" que significa metade e "*pteron*" igual a asa. O nome faz referência às asas anteriores que são semicoriáceas. Sendo considerado o táxon mais diverso entre os insetos hemimetábolos (Grazia *et al*., 2024). Os hemípteros são facilmente identificados por apresentarem a peça bucal em forma de um rostro, constituído pelo lábio articulado onde se alojam as demais peças bucais sugadoras; antena com três a dez artículos; tarsos com um a três artículos; presença de freno (que une a margem posterior do hemiélitro ao mesoscutelo). Além disso, a maioria das espécies apresentam a coloração variada, sendo frequentes casos de mimetismo e aposematismo (Grazia *et al*., 2024). Os insetos pertencentes a esta ordem são encontrados em ambientes terrestres, aquáticos ou semiaquáticos (Grazia *et al*., 2024). A diversidade da ordem é distribuída em quatro subordens: Auchenorrhyncha, Coleorrhyncha, Sternorrhyncha e Heteroptera.

Dentre as subordens de hemíptera, Heteroptera é a mais diversa, com aproximadamente 45.000 espécies descritas. Este táxon faz parte da radiação mais bem sucedida de insetos não holometábolos (Weirauch & Schuh, 2011, Grazia *et al*., 2024). Heteroptera constitui-se um grupo monofilético, com base em evidências morfológicas e moleculares (Wheeler *et al*., 1993; Weirauch & Schuh, 2011; Johnson *et al*., 2018). Um caráter diagnóstico amplamente utilizado é o hemiélitro que é derivado dentro de Heteroptera Weirauch & Schuh (2011). Esta subordem é dividida em 92 famílias que se distribuem por quase todos os continentes com exceção da Antártida (Grazia *et al*., 2024) e estima-se que cerca de 51 destas famílias ocorrem no Brasil (Grazia & Fernandes, 2012).

Pentatomidae destaca-se como a terceira família mais numerosa dentro de Heteroptera, contendo 940 gêneros, 4.950 espécies descritas e muitos táxons novos aguardando ainda descrição, com estimativas de que o número total de espécies possa alcançar a 6.000 (Rider *et al*., 2018). Os representantes da família são conhecidos vulgarmente como fede-fede, percevejo-fedorento, percevejo-verde e entre outros nomes populares. A família divide-se em dez subfamílias: Aphylinae, Asopinae, Cyrtocorinae, Discocephalinae, Edessinae, Pentatominae, Podopinae, Phyllocephalinae, Serbaninae e Stirotarsinae (Rider *et al*., 2018).

Pentatomidae é um táxon monofilético bem suportado com base em características morfológicas e sequências de DNA em estudos de relações filogenéticas de famílias de Pentatomoidea (Gapud, 1991; Henry, 1997; Li *et al*., 2005, 2012; Xie *et al*., 2005; Grazia *et al*., 2008; Yao *et al*., 2012; Rider *et al*., 2018). Sendo apoiado morfologicamente pela perda da válvula

VIII, válvula IX reduzida e fundida aos valvíferos IX, gonângulos ausentes e o ducto do receptáculo invaginado, formado por três paredes (Grazia *et al*., 2008).

A subfamília Edessinae é a segunda com o maior número de espécies de Pentatomidae, contendo cerca de 500 espécies (dados pessoais), distribuídos exclusivamente na região neotropical (Grazia & Fernandes, 2012), com exceção de *Ascra bifida* Say, 1832 registrada no Sul dos Estados Unidos (Santos *et al.*, 2015). A subfamília está distribuída nos 17 gêneros seguintes: *Edessa* Fabricius, 1803; *Brachystethus* Laporte, 1832; *Ascra* Say, 1837; *Peromatus* Amyot & Serville, 1843; *Pygoda* Amyot & Serville, 1843; *Hypoxys* Amyot & Serville, 1843; *Olbia* Stål, 1862; *Pantochlora* Stål, 1870; *Mediocampus* Thomas, 1994; *Doesburgedessa* Fernandes, 2010; *Paraedessa* Silva & Fernandes, 2013; *Grammedessa* Correia & Fernandes, 2016; *Plagaedessa* Almeida & Fernandes, 2018; *Anisoedessa* Nunes & Fernandes, 2019; *Graziaedessa* Eger, 2021; *Calcatedessa* Silva & Fernandes, 2021 e *Odara* Campos & Fernandes, 2022.

A monofilia de Edessinae foi demostrada no trabalho de Barcellos & Grazia (2003). Baseado em caracteres morfológicos, os autores apontaram as seguintes sinapomorfias: um rostro curto, que ultrapassa ligeiramente as mesocoxas; metasterno elevado e projetado anteriormente sobre o mesoesterno e não é contínuo com a carena presente no mesosterno. Recentemente, Roca-Cusachs *et al* (2021), desta vez com dados moleculares, demostraram a monofila da subfamília com altos valores de suporte.

Os membros desta subfamília têm o corpo de médio a grande, ovalados, geralmente de cor verde com marcas escuras ou brilhantes, búculas curtas, arqueadas e quase em forma de aba e os ângulos umerais são frequentemente bem proeminentes, espinhosos ou truncados. Uma importante característica é o processo metasternal proeminentemente, elevado e túmido, projetado para frente ou além do mesosterno. No gênero *Edessa* (e gêneros relacionados), esta estrutura bifurca-se anteriormente (Rider *et al.*, 2018). Algumas espécies apresentam importância econômica por serem pragas de cultivares como, por exemplo, *Edessa meditabunda* Fabricius, 1794 que ataca soja e tabaco e *Edessa rufomarginata* De Geer, 1773, se alimenta de Leguminosae, mas é frequentemente encontrada em Solanaceae, causando danos a plantações de tomate (Grazia *et al.*, 2015).

Edessinae possui um histórico taxonômico muito problemático e confuso. Em 1843, Amyot & Serville incluíram os gêneros relacionados a *Edessa* e também alguns gêneros atualmente incluídos em Tessaratomidae e Dinidoridae em "Édessides". Dallas (1851) tratou o grupo como Edessidae. Posteriormente, Walker (1868), adicionou mais gêneros na família e manteve os táxons citados por Dallas (1851). A composição de Edessidae foi modificada com a proposta de classificação de Stål (1872) que considerou *Aceratodes* Amyot & Serville, 1843, e um subgênero de

Pentatoma descrito por Say (1832), *Ascra*, sinônimos de *Edessa*. Porém, continuou usando os nomes sinonimizados a *Edessa* para identificar grupos de espécies na sua chave.

Subsequentemente, no catálogo de Lethierry & Severin (1893), os gêneros de Amyot & Serville (1843) - *Dorypleura, Hypoxys, Pygoda e Aceratodes* e *Ascra*, foram considerados como sinônimos de *Edessa*. Posteriormente, Kirkaldy (1909), no seu catálogo, propôs a tribo Edessini, adicionando os seguintes gêneros: *Edessa, Peromatus* e *Olbia*, contrariando os trabalhos anteriores (Dallas, 1851; Walker, 1868; Stål, 1872; Distant, 1890) e considerou como subgêneros de *Edessa* os táxons *Ascra, Aceratodes, Dorypleura, Hypoxys* e *Pygoda*, mas não alocou as espécies conhecidas nos subgêneros. Por fim, Edessinae que era tratada como uma tribo de Pentatominae, foi elevada à subfamília por Rolston e McDonald (1979), que ainda transferiram *Pantochlora* de Tessaratomidae para Edessinae. Nos últimos anos, a subfamília e principalmente *Edessa* estão sendo estudados na perspectiva de organização e revisão da classificação do táxon.

Identificação do problema.

Os limites de Edessinae e *Edessa* são muito próximos, pois falta caracteres diagnósticos e uma diagnose clara para *Edessa*. Por isso, todas as espécies novas que não se encaixam nos gêneros de Edessinae são imediatamente designados como pertencentes a *Edessa*, tornando o táxon um "depósito de espécies" (Fernandes 2010; Fernandes & Van Doesburg 2000b; Santos *et al*., 2015). Devido ao fato de Edessinae possuir uma taxonomia confusa e uma grande diversidade de espécies descritas e novas a serem descritas. Fernandes & van Doesburg (2000a) propuseram revisar *Edessa* em grupos de espécies. No cladograma de Nunes *et al* (2019), percebe-se a monofilia dos táxons, com exceção de *Edessa*, um grupo polifilético, visto que suas espécies aparecem em três ramos distintos da árvore, apresentando ancestrais distintos. A partir da proposta de Fernandes & Van Doesburg foram descritos diversos gêneros e espécies novas.

Dentre os novos gêneros Silva & Fernandes (2021) descreveram um novo gênero de Edessinae (*Calcatedessa*), grupo irmão de *Grammedessa* Correia & Fernandes (2016), baseado em análise cladística. O clado *Calcatedessa-Grammedessa* e ambos os gêneros foram recuperados como monofiléticos. Assim como também, mostra o polifiletismo das espécies de *Edessa* e dos gêneros de Edessinae, em especial *Edessa laticornis* Stål, 1872, uma das espécies alvo deste trabalho.

Stål (1872) reuniu 22 espécies descritas de *Edessa* e considerou o grupo nominal do gênero, caracterizado por possuir o ângulo umeral desenvolvido em graus variados, cilíndrico em direção ao ápice, truncado apicalmente, inchado e ligeiramente curvado para trás. Uma das espécies incluídas neste grupo é *Edessa laticornis* Stål, 1872 que atualmente não pertence a qualquer grupo de espécies

descritos para o gênero. Neste estudo, *E. laticornis* é grupo irmão de um clado representado pelos gêneros *Calcatedessa* Silva & Fernandes, 2021 e *Grammedessa* Correa & Fernandes, 2016 (Figura 1).

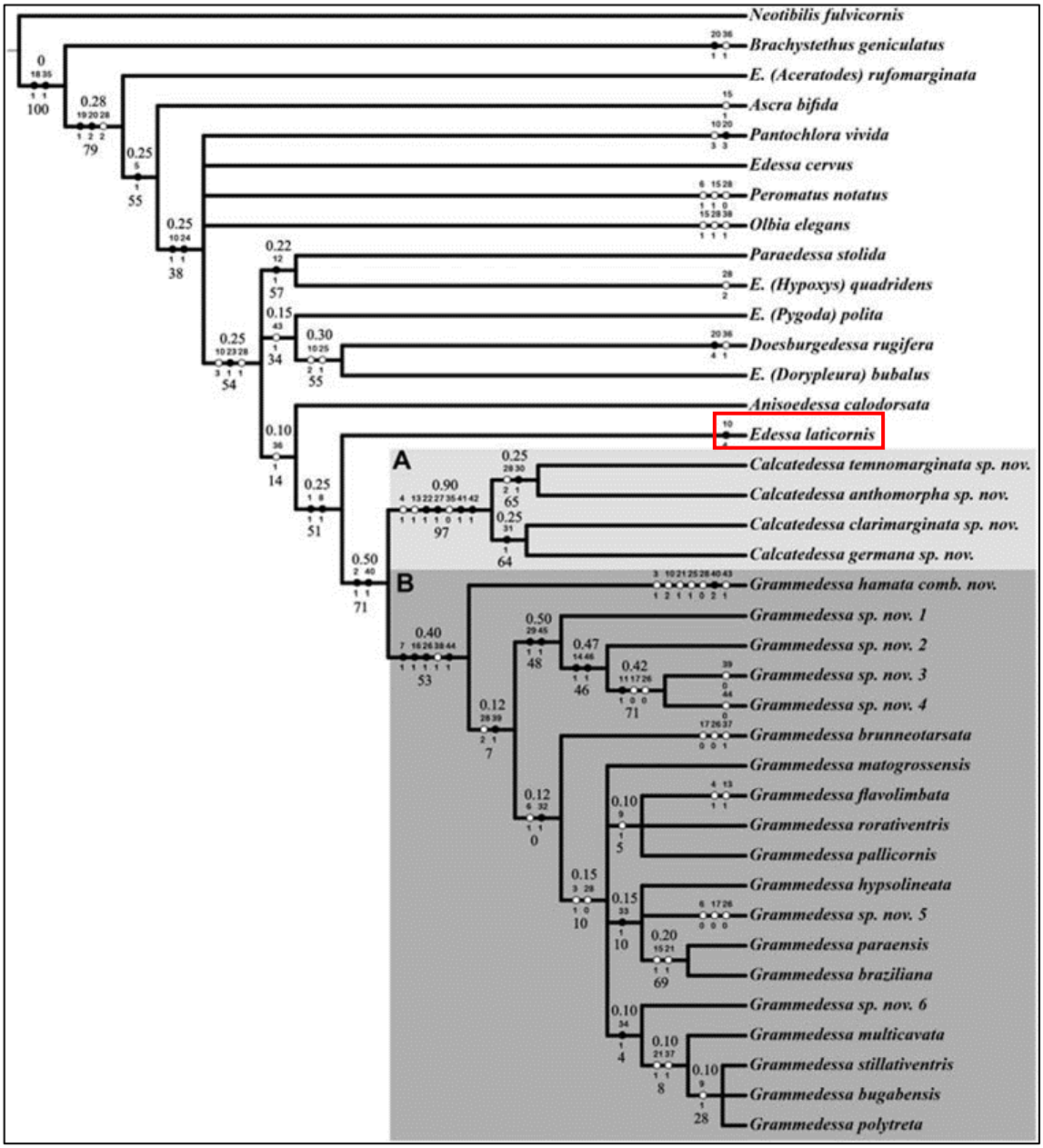

Figura 1- Filogenia de *Grammedessa* e táxons externos selecionados com base no método de Máxima Parcimônia, árvore de consenso. A: Clado *Calcatedessa*, B: Clado *Grammedessa*. Retângulo vermelho evidenciando a espécie *Edessa laticornis* Stål, 1872. Retirado: Silva & Fernandes (2021).

Com base neste cladograma e analises morfológicas, identificamos caracteres morfológicos do grupo de espécies semelhantes a *Edessa*, principalmente da genitália externa, que não se encaixam nos gêneros já existentes, possibilitando propor um novo gênero para esta subfamília. Tais características foram observadas nas espécies *Edessa leucogramma* Perty, 1833 e *Edessa tribuaria* Distant, 1890, incluindo as mesmas no gênero novo.

Objetivos

Objetivo geral

Realizar um estudo taxonômico da subfamília Edessinae com a descrição de um gênero novo e cinco espécies novas.

Objetivos específicos:

- Descrever novos táxons.
- Realizar arranjos nomenclaturais e taxonômicos.
- Elaborar uma diagnose para o novo gênero.
- Elaborar uma diagnose para as espécies.
- Fornecer uma chave de identificação para suas espécies.

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Capítulo I

Urhai gen. nov., a new genus to Edessinae (Hemiptera: Heteroptera: Pentatomidae)

O capítulo I desta Dissertação foi elaborado e formatado conforme as normas de publicação científica da revista *Anais da Academia Brasileira de Ciências* (AABC), as quais se encontram em anexo (Anexo I).

Urhai **gen. nov.**, a new genus to Edessinae (Hemiptera: Heteroptera: Pentatomidae)

Adiney Ferreira Ferreira[1*], Eduardo Victor de Paiva Cunha[1] and José Antônio Marin Fernandes[1]

[1]Programa de Pós-Graduação em Zoologia, Augusto Correa, Universidade Federal do Pará, Instituto de Ciências Biológicas, Av. 66075–110, Belém, Pará, Brazil.

Adiney Ferreira Ferreira, ORCID: http://orcid.org/0000-0002-7621-8909.

Eduardo Victor de Paiva Cunha, ORCID: https://orcid.org/0000-0002-2386-6734.

José Antônio Marin Fernandes, ORCID: http://orcid.org/0000-0001-7450-5296.

Palavras–chave

Edessa; New species; Nomenclature; Taxonomy.

Running title

A new genus to Edessinae

Seção dos AABC à qual o artigo pertence: Ciências Biológicas.

Adiney Ferreira Ferreira, Universidade Federal do Pará, Instituto de Ciências Biológicas, Av. 66075–110, Belém, Pará, Brazil, +5591985948588, adineyferreira0@gmail.com

Abstract

Edessinae is the second most diverse subfamily of Pentatomidae, with approximately 500 described species distributed in 17 genera. This taxon is considered monophyletic, supported by molecular evidence and morphological characteristics. Among the genera, *Edessa* stands out for harboring more than 300 species, but it faces taxonomic challenges, including problems of nomenclature and classification, and is often considered a "species repository". This work aims to describe a new genus with three species previously allocated to *Edessa* and five new species. For the study, 94 specimens from national and foreign institutions were analyzed. *Urhai* **gen. nov.** is easily recognized by the morphology of the body, mainly presenting the head with median punctuations forming two vertical stripes on the clypeus, antennal articles I–III with small dark circular spots, pronotum with developed humeral angle; flattened and punctuated dorsoventrally; distal margin laminar; posterior angle spiniform, posterior margin of the pronotum covering the anterior part of the scutellum, metasternal process flattened; anterior arms of the bifurcation reaching or nearly reaching the limit of the propleura; distal margin generally straight. Diagnoses, species identification key and distribution maps were presented. This study is of great importance in understanding the diversity of Edessinae.

Key words: *Edessa*; New species; Nomenclature; Taxonomy.

Introduction

Edessinae constitutes a monophyletic taxon, supported by molecular data (Roca-Cusachs et al. 2021) and morphological synapomorphies: metasternal process higher than the mesosternal carina; abdominal sternites II and III laterally fused; phallus with a reduced vesica; and beak-like projection on the thickening of the vaginal intima (Barcellos & Grazia, 2003; Nunes et al. 2019).

Edessinae is the second most diverse subfamily of Pentatomidae, with around 500 described species (personal data) grouped into 17 genera. Among these, *Edessa* Fabricius, 1803 is the richest in described species (more than 300 species). Distant (1890) highlighted that the genus was numerous and morphologically diverse. *Edessa* has a complex taxonomic history and nomenclatural issues; it is considered a "species repository" (Santos et al. 2015; Nunes et al. 2020).

Since the early 21st century, Fernandes & van Doesburg (2000a) have proposed a long-term revision of *Edessa* into small species groups based on morphological characteristics. Consequently, new genera have been described, and previous subgenera of *Edessa* have been revalidated. Given its morphological diversity and the number of species described, there is still potential to identify new taxa (Fernandes & van Doesburg 2000b; Nascimento et al. 2017). In recent cladistic analyses, *Edessa* was recovered as a polyphyletic genus (Nunes et al. 2019; Silva & Fernandes, 2021). Moreover, the largest subgenus of *Edessa* (*Edessa*) has been revised and diagnosed (Mendonça et al. 2023), contributing to the internal organization of the taxon.

Previously, Stål (1872) grouped 22 described species of *Edessa* in the nominal group of the genus, characterized by a humeral angle developed into varied degrees, cylindrical towards the apex, truncated apically, swollen, and slightly curved backward. One species in this group is *Edessa laticornis* Stål, 1872, which currently does not belong to any group within the *Edessa* groups or subgenus. However, was included in a cladistic analysis by Silva & Fernandes (2021). In their study, *Edessa* was recovered as polyphyletic, and *E. laticornis* was identified as the sister group to a clade

represented by the genera *Calcatedessa* Silva & Fernandes, 2021 and *Grammedessa* Correa & Fernandes, 2016 (see Silva & Fernandes, 2021-Fig. 1 and Fig. 2).

Based on the results of Silva & Fernandes (2021) and detailed morphological analyses of body and genitalia, we identified shared morphological characteristics among the species *Edessa laticornis* Stål, 1872, *Edessa leucogramma* (Perty, 1833), *Edessa tribuaria* Distant, 1890, and five new species. These characteristics include dark spots on the antenna, head, and legs, the development of humeral angles, the metasternal process, and male and female genitalia, supporting the proposal of a new genus within the subfamily.

Therefore, this study aims to describe a new genus for Edessinae, redescribe three known species (*E. laticornis, E. leucogramma,* and *E. tribuaria*), make nomenclatural arrangements, describe five new species, and propose an identification key for the species of the new genus.

Material and methods

We examined 94 specimens from the following collections: BM – British Museum, London, United Kingdom; BMNH – The Natural History Museum, London, United Kingdom; CEIOC – Coleção Entomológica do Instituto Oswaldo Cruz, Rio de Janeiro, Brazil; CMNH – Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, United States; DM – Deutsches Museum, Munich, Germany; DOE – Dodge Engelmann Collection, University of Nebraska State Museum, Lincoln, United States; FIOCRUZ – Fundação Oswaldo Cruz, Rio de Janeiro, Brazil; INBIO – National Institute of Biodiversity, Santo Domingo de Heredia, Costa Rica; JEE – Joseph E. Eger Collection, Tampa, United States; KU – The University of Kansas, Kansas, United States; MFN – Museum Für Naturkunde, Berlin, Germany; MHNLS – La Salle Museum of Natural History, Caracas, Venezuela; MNHN – Museum National D'Histoire Naturelle, Paris, France; MUSM – Museo de Historia Natural, Lima, Peru; MZUSP – Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil; NHRM – National Museum of Natural History, Stockholm, Sweden; RL – Lupoli Roland Collection, Paris,

France; TAMU – Texas A&M University, College Station, United States; UCVEN – Central University of Venezuela, Caracas, Venezuela; UEMA – Universidade Estadual do Maranhão, Maranhão, Brazil; UFES – Universidade Federal do Espirito Santo, Espirito Santo, Brazil; UFMT – Universidade Federal do Mato Grosso, Mato Grosso, Brazil; UFPA – Universidade Federal do Pará, Pará, Brazil; UFRGS – Universidade Federal do Rio Grande do Sul, Rio Grande do Sul, Brazil; UNAM – Universidad Nacional Autonoma do México, Mexico City, Mexico; UNICAMP – Universidade Estadual de Campinas, Campinas, São Paulo, Brazil; USNM – National Museum of Natural History, Smithsonian Institution, Washington DC, United States.

The terminology used in the descriptions is as follows: Dupuis (1970) for male genitalia, Zhou & Rédei (2020) for female genital plates, and Fernandes (2010) for body morphology. Cleaning specimens and removing male genitalia (pygophore) followed Mendonça et al. (2021).

Specimen measurements were taken using a reticle attached to the eyepiece of a Zeiss Discovery V8 stereomicroscope. Images were captured with a Leica DFC 450 camera attached to a Leica M205A stereomicroscope and stacked using Helicon Focus 8. The distribution map of the specimens was made using the QGIS Development Team software (2024).

Labels were organized as follows: number of specimens, sex (♂ male and ♀ female), country, district, province, or department (if applicable), state, city, additional label data, and the collection in parentheses "()". Additionally, information enclosed in brackets "[]" indicates inferred data not included on the label.

Results and discussion

Identification key to the species of *Urhai* **gen. nov.**

1. Head: dorsal surface with two vertical stripes; antennae: antennomeres I–III with dark circular spots; corium: median venation in the shape of a "Y" (Fig. 9a, 10a, c, e, 11a, c. 13a) 2

1'. Head: dorsal surface without stripes; antennae: without spots; corium: median venation diffuse (Fig. 12a) ..... *Urhai tribuaria* **comb. nov.**

2. Pronotum: humeral angle straight or slightly curved posteriorly. (Figs. 11a–b, 11c–d, 13a–b.) 3

2'. Pronotum: humeral angle curved anteriorly (Figs. 9a–b, 10a–b, 10c–d, Fig. 10e–f) 5

3. Pronotum: humeral angle longer than wide (Fig. 11) 4

3'. Pronotum: humeral angle as long as wide (Fig. 13) ..... *Urhai leucogrammum* **comb. nov.**

4. Prontoum: distal margin of the humeral angles as wide as their base; apex of the humeral angles with slightly developed posterior lobes (Fig. 11a–b) ……..……...…… *Urhai krikatis* **sp. nov.**

4'. Pronotum: distal margin of the humeral angles narrower than the base; apex of the humeral angles with developed posterior lobes (Fig. 11c–d) ……..... *Urhai trilobularis* **sp. nov.**

5. Pronotum: apex of the humeral angles with the anterior lobe less developed than the posterior lobe or both anterior and posterior lobes slightly developed (Figs. 9a–b, 10a–b, 10c–d) 6

5'. Pronotum: apex of the humeral angles with anterior lobes more developed than the posterior ones (Fig. 10e–f) ..... *Urhai rotundus* **sp. nov.**

6. Pygophore: superior process of the genital cup vestigial; posterior face of the proctiger pentagonal (Fig. 1c) ..... *Urhai laticornis* **comb. nov.**

6'. Pygophore: superior process of the genital cup absent; posterior face of the proctiger triangular (Figs. 2c–d, 3c–d) 7

7. Pygophore: ventral rim with median excavation "U" shaped (Fig. 2b) ..... *Urhai aruaque* **sp. nov.**

7'. Pygophore: ventral rim with median excavation "V" shaped (Fig. 3b); female genitalia: valvifers VIII with posterior margin inclined (Fig. 3e); valvifers IX with posterior margin arched (Fig. 3e) ..... *Urhai warao* **sp. nov.**

Urhai **gen. nov**.

Etymology. *Urhai* is the ancient name of the city of Edessa, which is present-day Şanlıurfa in Turkey. Edessa was a cultural and religious center in antiquity, serving as a hub of early Christianity and a meeting point for various cultures and religions. In Greek, it was referred to as "Orra" (Ορρα) or "Orroa" (Ορροα). (Urhai = Urfa, Edessa). Gender: neutral.

Type species: *Edessa laticornis* Stål, 1872

Description. Medium to large-sized body (12.5–22.4 mm). Dorsal surface grayish green to olive (some specimens exhibit a yellowish coloration, possibly due to pigment loss); densely punctured; punctuation large, deep set in brown or black spots (Figs. 9a; 10a, c, e; 11a, c; 12a, 13a). Head usually punctured, except *Uhai tribuaria* **comb. nov.**, which unpunctured; median punctuation forming two vertical stripes on the tylus base (Figs. 9a, 10a, c, e; 11a, c; 13a). Antenomeres I–III with small circular dark spots (Figs. 9a, 10a, c, e; 11a, c; 13a), except for the *U. tributaria* **comb. nov.**, which lacks spots. Pronotum with humeral angle well-developed to highly developed, flattened and punctuated dorsoventrally; distal margin of the humeral angle laminar and with two lobes, anterior angle rounded, and posterior angle spiniform or acuminate (Figs. 9a, 10a, c, e; 11a, c; 12a, 13a); posterior margin of pronotum covering the anterior part of the scutellum (Figs. 9a, 10a, c, e; 11a, c; 12a, 13a). Ventral surface yellowish white to greenish yellow (Figs. 9b, 10b, d, f; 11b, d; 12b, 13b), (some specimens exhibit a yellow coloration due to pigment loss). Metasternal process flattened ventrally; anterior bifurcation arms long, reaching (Figs. 9b, 10b, d; 11d) or nearly reaching the limit of the propleura (Figs. 10f, 11b, 12b, 13b); apical margin generally straight (Figs. 9b, 10b, d, f; 11b, d; 13b) (except in *U. tribuaria* **comb. nov.**, which is rounded (Fig. 12b). *Male genitalia*. Dorsal rim of the pygophore with a brown to black stripe; posterolateral angles developed (Figs. 1a, 2a, 3a, 5a, 6a, 7a, 8a). Paramere

generally spatulate (Figs. 1c–d, 2c–d, 3c–d) or sub-spatulate (Figs. 5c–d, 6c–d, 8c–d) (except for *U. tribuaria* **comb. nov.** which has the paramere in "Y" shaped) (Fig. 7c–d). Ventral rim of the pygophore with a swollen expansion, featuring a dark ventrolateral band associated with a tuft of setae (Figs. 1c–d, 2c–d, 3c–d, 5c–d, 6c–d, 7c–d, 8c–d). *Female genitalia*. Genital plates punctured; punctuation large, deep set in dark spots or concolor (Figs. 1e, 2e, 3e, 4a, 5e, 7e, 8e). Valvifer VIII subrectangular or rounded (Figs. 1e, 2e, 3e, 4a, 5e, 7e, 8e). Valvifer IX with a mediobasal keel (Figs. 1e, 2e, 3e, 4a, 5e, 7e, 8e).

Head. Dorsal surface yellowish green and punctured, with punctuation large and deep, set in brown or black spots. Mandibular plates convex, punctured, with punctuation large, deep, and set in a brown or black spot. Ventral surface greenish-yellow (Figs. 9b, 10b, d, f; 11b, d; 12b, 13b). Bucculae truncated, punctured, enclosing ¾ or the entire first segment of the rostrum. Antennae yellow to yellowish-green (Figs. 9b, 10b, d, f; 11b, d; 12b, 13b).

Thorax. Pronotum yellowish green to green. Humeral angle curved dorsally, anteriorly or straight; apex as wide or narrower than the base; distal part with a reddish-brown or blackish spot (Figs. 9a, 10a, c, e; 11a, c; 12a, 13a); ventral surface punctate along its entire length (Figs. 9b, 10b, d, f; 11b, d; 12b, 13b). Scars callous, punctured; area delimited by sulcus. Scutellum densely punctured; punctuations deep, set in brown to black spots; anterior half with large punctuations; posterior and lateral halves with small punctuations; apex acuminate (Figs. 9a, 10a, c, e; 11a, c; 12a, 13a). Corium brown, variegated with yellow veins Y-shaped (Figs. 9a, 10a, c, e; 11a, c; 13a), except *U. tribuaria* **comb. nov.** which has veins joined and diffuse (Fig. 12a); wing with membrane brown translucent (Figs. 9a, 10a, c, e; 11a, c; 12a, 13a). Ventral surface greenish-yellow or brown (Figs. 9b, 10b, d, f; 11b, d; 12b, 13b). Propleura, mesopleura, and metapleura punctured; punctuation small and shallow, set in brown or black spots, sparse or uniformly distributed. Evaporatorium area rugose, opaque in the ostiolar region; lateral region with brown or black spot; peritreme ruga-like. (Figs. 9b, 10b, d, f; 11b, d; 12b, 13b). Legs yellow with small circular brown or black spots (Figs. 9b, 10b, d, f; 11b, d; 13b),

except for *U. tribuaria* **comb. nov.** (Fig. 12b), which lacks spots; posterior margin of the femur with three black projections, one being more prominent than the others.

Abdomen. Dorsal surface with brown stripes in the anterior region of each segment. Connexivum green or yellowish-green; anterior and posterior regions of each segment callous; posterolateral angles slightly projected, acuminated, brown or black (Figs. 9a, 10a, c, e; 11a, c; 12a, 13a). Segment VII projected below the apices level of the laterotergites VIII. Ventral surface yellowish white to greenish-yellow, with narrow brown bands in the intersegmental regions and pseudosutures; lateral region punctured, with punctures dark and deep; punctuations and spots forming cells in each segment (Figs. 9b, 10b, d, f; 11b, d; 12b, 13b). Spiracles elliptical. Trichobothria arranged in a line, one parallel to the spiracle and the other displaced laterally.

Male genitalia. Pygophore subrectangular (Figs. 1a, 2a, 3a, 5a, 6a, 7a, 8a). Dorsal rim rugose; setulose laterally; excavated, excavation concave (Figs. 1a, 2a, 3a, 5a, 6a, 7a, 8a). Superior process of the genital cup present (Figs. 5c–d, 6c–d, 7c–d, 8c–d) or absent (Figs. 2c–d, 3c–d), brown to black. Paramere oblique in posterior view, at or below the level of the dorsal rim; distal region with two or three lobes. (Figs. 1c–d, 2c–d, 3c–d, 5c–d, 6c–d, 7c–d, 8c–d). Proctiger subcylindrical; excavated laterally, excavated area setulose (Figs. 1c–d, 2c–d, 3c–d, 5c–d, 6c–d, 7c–d, 8c–d). Ventral rim with a rounded expansion below the level of the apex of the posterolateral angles; median excavation U-shaped (Figs. 1b, 2b, 7b, 8b) or V-shaped (Figs. 3b, 5b, 6b).

Female genitalia. Valvifer VIII convex, with or without small circular brown to black spots; posterior margin arched or straight; outer angle rounded; inner angle acuminate; sutural borders contiguous, with an oval excavation distally (Figs. 1e, 2e, 3e, 4a, 5e, 7e, 8e). Valvulae IX exposed or not exposed (Figs. 1e, 2e, 3e, 4a, 5e, 7e, 8e). Valvifer IX trapezoidal with a posterior margin straight or rounded (Figs. 1e, 2e, 3e, 4a, 5e, 7e, 8e). Laterotergite VIII triangular with a spiniform apex, longer than wide, convex medially, laterally excavated; surface with small circular spots; apices surpassing the level of the angles of the VII abdominal segment; lateral margin with a black or brown spot (Figs. 1e, 2e, 3e,

4a, 5e, 7e, 8e). Laterotergite IX triangular; lateral margin straight or sinuated; base excavated; apex acute; surpassing the mediotergites VIII (Figs. 1e, 2e, 3e, 4a, 5e, 7e, 8e).

Distribution (Figs. 14–15): Mexico, Nicaragua, Costa Rica, Panama, Venezuela, Colombia, French Guiana, Suriname, Brazil, Peru and Paraguay.

Remarks. *Urhai* **gen. nov.** can be easily differentiated from other genera of Edessinae by external characteristics on the body. The species of *Urhai* **gen. nov.** have two longitudinal stripes on the head, a feature also observed in the genera *Grammedessa* Correia & Fernandes, 2016, and *Calcatedessa* Silva & Fernandes, 2021. However, *Grammedessa* has six to eight stripes on the head, and *Calcatedessa* has eight. The species of *Urhai* **gen. nov.** have well-developed humeral angles and a distal laminar margin with anterior angle rounded and posterior angle spiniform or acuminate, a characteristic exclusive to species of this genus. In *Urhai* **gen. nov.**, the posterior margin of the pronotum is expanded and covers the anterior margin of the scutellum, a feature also observed in *Olbia* Stål, 1862 and *Pantochlora* Stål, 1870. However, in *Olbia* and *Pantochlora*, the posterior expansion is associated with lateral teeth. The antennal segments I–III and the legs have small, dark, circular spots. Furthermore, the ventral rim of the pygophore in *Urhai* **gen. nov.** has dark ventrolateral stripes associated with a tuft of setae, a morphological feature exclusive to the genus.

Urhai laticornis (Stål, 1872) **comb. nov.**

(Figs. 1a–e, 9a–c, 14)

Edessa laticornis Stål, 1872. Svensk. Vet. Handl. 10. Nº. 4. p. 50 (original description); Distant 1880 op. cit. 87, Pl. 8. f. 9 (catalog); Silva et al. 2018: 420 (checklist).

Type Material: Lectotype designated here. Male. Mexico, Deycalle (NHRM). Examined.

Paralectotype. Female. Mexico, Vera Cruz. (NHRM). Examined.

Material examined (n=7). ♀ MEXICO: Guerrero, Acapulco 28–04–1999. J. Bueno. Colección del instituto de Biologia. México, D.F. Donated by Brailovsky Dec. 2000. *Edessa laticornis* Stål, 1872 Fernandes, JAM 1999. José.7. (UNAM). ♂ Acapulco, Carr. Panoramica Pto Marquez 20–IX–1997

180m J. Bueno S. Santiago. Donated by Brailovsky Dec. 2000. *Edessa laticornis* Stål, 1872 Fernandes, JAM 1999. José.7. (MSNM). ♀ NICARAGUA: Carazao [Carazo], [Rivas] Tola, bioreserva chococenter 11 31 N 86 08 W 10/13–IV–92 Lopez R. & Martinez A. Encontrado sobre ramas y hojas de *Lonchocarpus miniflorus*, *Edessa laticornis* Stål, 1872 Fernandes J.A.M. 1999. José. (UFPA). ♀ COSTA RICA: Prov. Puntarenas [Província Punta Arenas], Puerto Jiménez, P.N. Corcovado. Send. Rio Madrigal. 5m. 20 Mar–3–abr.2003. A. Azofeifa. Libre S L 267200 517500 #73589. *Edessa laticornis* Det. T. James Lewis 04. INB0003710269 INBIOCRI Costa Rica. *Edessa laticornis* Stål, 1872 Fernandes, JAM det. (INBIO). ♂ Guan. [Guanacaste], Bagaces, 13 mi. S.E. Liberia, 400' 12–VII–1974 C.W. & L. O'Brien & Marshall. *Edessa laticornis* Stål, 1872 Fernandes J.A.M. 1999. RO. (INBIO). ♂ [Guanacaste], Est. Lomas Barbudal, 30m. A.C.T.U. Chavarria. Jul 1991, L–N–275150, 385650. Edessa laticornis Det. T. James Lewis 04. Costa Rica INBIO CRI000 601248. *Edessa laticornis* Stål, 1872 Fernandes, JAM det. (INBIO). ♂ PANAMA: C.Z. [Panama Canal Zone], Banro col ls. 24–II–5 Cd. D.S. Wilson. *Edessa laticornis* Stål, 1872 Fernandes J.A.M. 1999. Off lights at night. E–18. (DOE).

Measurements (mm). Total length: 20.2–22.4; head length: 1.5–2.3; head width: 3.5–3.8; interocular distance: 1.6–2.0; antennal segment lengths: I: 1.0–1.2; II: 1.5–2.1; III: 2.1–3.6; IV: 3.5–4.7; V: 4.0; pronotum length: 4.3–4.8; pronotum width: 18.5–22.0; scutellum length: 8.3–10.2; scutellum width: 6.0–7.4; abdomen width: 9.7–11.5.

Description. Antennomeres I–III with small circular brown spots (Fig. 9a). Humeral angle well-developed, anteriorly slightly bent; distal margin with a reddish-brown to blackish spot; anterior and posterior angles poor-developed, with the posterior angle spiniform; apex narrower than base humeral angles (Fig. 9a). Corium with veins Y-shaped (Fig. 9a). Evaporatorium area with a mediocentral region concolor, black spot in the lateral region; peritreme reaching half the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 9b). Metasternal process enclosing ¼ of the rostral segment III (Fig. 9b); apical margin of the anterior bifurcation arms straight, near or reaching

the propleura limit (Fig. 9b). Legs with small, circular brown spots (Fig. 9b). *Male genitalia*. Dorsal rim of the pygophore with a central discontinuous dark stripe (Fig. 1a). Posterolateral angles well developed, curved; small dark circular spots on the inner face (Fig. 1a–d). Superior process of the genital cup vestigial, fused to the pygophore diaphragm. Paramere spatulate with distal margin black; posterior face striated; head of the paramere with two lobes; anterior lobe triangular and large; posterior lobe rounded, wavy, and large (Fig. 1c–d). Pygophore wall with a brown spot extending to the floor (Fig. 1c–d). Proctiger slightly compressed laterally; posterior face ogival (Fig. 1c–d). Ventral rim medially U-shaped; ventral margin expansion slightly developed and below the level of the posterolateral angles (Fig. 1b). *Female genitalia.* Valvifer VIII with posterior margin arched; distal part punctured; punctuations inserted light brown spot; inner angle of the medial edge dentiform, reaching the middle of valvifers IX (Fig. 1e). Valvulae IX exposed (Fig. 1e). Valvifer IX with posterior margin straight; small dark circular spots (Fig. 1e). Laterotergite VIII setulose, with small, dense punctuation inserted with a brown spot (Fig. 1e). Laterotergite IX inner surface with punctuations inserted with brown spots and quite setulose (Fig. 1e).

Distribution (Fig. 14). Mexico: Guerrero, Nicaragua: Carazo, Costa Rica: Punta Arenas, Guanacaste and Panama: Panama Canal Zone.

Remarks. *Urhai laticornis* **comb. nov.** and *U. warao* **sp. nov.** have the humeral angles projected anteriorly and posterior angle spiniform on the distal margin of the humeral angle. However, in *U. laticornis* **comb. nov.**, the spiniform posterior angle is as long as the anterior angle, whereas, in *U. warao* **sp. nov.**, the spiniform posterior angle is longer than the anterior angle on the distal margin of the humeral angle. *U. laticornis* **comb. nov.**, *U. aruaque* **sp. nov.**, and *U. warao* **sp. nov.** have paramere spatulate with anterior and posterior lobes well-developed. However, *U. laticornis* **comb. nov.** has the posterior face of the proctiger pentagonal, while the proctiger of *U. aruaque* **sp. nov.** and *U. warao* **sp. nov.** is triangular.

Urhai aruaque **sp. nov.**

(Figs. 2a–e, 10a–b, 14)

Etymology. The name refers to the indigenous people "Aruaque" or "Aaruaques," who inhabited South America and the Caribbean and were the first native peoples to meet Europeans upon their arrival in the Americas. This word is neither Greek nor Latin, nor is it derived from these languages. The word should be treated as a random combination of letters.

Material examined (n=7). **Type Material:** Holotype male. FRENCH GUIANA: Roura, Entomotech Lodge. 30 km SE on Kaw Rd. XI–2004–II–2005, F. Goubert. N04º 33.570' W052º 12.433' 300m MV Light. *Edessa* sp. nr laticornis? det. J.E. Eger, 2006. J.E. Eger Collection. *Edessa laticornis* Stål, 1872 Fernandes, JAM det. (JEE).

Paratypes. ♀ FRENCH GUIANA: Borue IV avic. 1983 G. Tavakilian coll. *Edessa laticornis* Stål, 1872 Fernandes, JAM det. (RL). ♂ Saint Georges de l'Oyapock, Pied Saut, [Piedsaut] Oyapok [Oyapock] River, S.M. Klages, C.M. Acc. 6173. Insect collection Carnegie Museum of Natural History Pittsburg, Pa. March. 1918. *Edessa laticornis* Stål Det. J.C. Lutz. (CMNH). ♂ Régina, Nouragues, Saut Pararé 4°02'N–52°41'W, Ngulagus PL 17.VII.2009. 07/2018. (RL). ♀ Savane–Roche encaissée à 130m, Inselberg, Hte–Koursibo [Savane Roche, Inselberg, de la Haute-Koursibo], Bar 125 W 2.III.2013. (RL). ♂♀ PERU: JU [Junín], Puerto Ocopa, 04–09.IX.2011 74º 18’29”/11º9’51” 654m. I. Medina Y L. Figueroa. Peru 2024. (MUSM). Sem abdômen, BRASIL: Pará, Belém, janeiro.2014 UFPA, col. Harada L. *E. laticornis*. (UFPA).

Measurements (mm). Total length: 19.2–21.8; head length: 1.8–2.2; head width: 3.4–3.7; interocular distance: 1.6–1.8; length of antennal articles: I: 1.0–1.3; II: 2.1–2.3; III: 1.7–2.2; IV: 4.0–4.8; V: 4.1; pronotum length: 4.2–5.0; pronotum width: 18.1–20.4; scutellum length: 8.4–9.0; scutellum width: 6.2–6.7; abdomen width: 9.2–10.3.

Description. Antennomeres I–III with small circular brown spots (Fig. 10a). Humeral angle well-developed, anteriorly slightly bent; distal margin with a black spot; anterior and posterior angles slightly developed, posterior angle spiniform; apex narrower than basal humeral angle (Fig. 10a).

Corium with Y-shaped veins (Fig. 10a). Evaporatorium area with mediocentral region concolor, lateral region with a brown spot; peritreme reaching ¼ of the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 10b). Metasternal process enclosing ¼ of the rostral segment III (Fig. 10b); apical margin of the bifurcation anterior arms straight, near or reaching the limit of the propleura (Fig. 10b). Legs with small and circular brown spots (Fig. 10b). *Male genitalia*. Dorsal rim of the pygophore with a continuous dark stripe (Fig. 2a). Posterolateral angles well-developed, straight, and inner part with a continuous dark spot (Fig. 2a–d). Superior process of the genital cup absent. Paramere spatulate, brown; posterior face striated; paramere head with two lobes; anterior and posterior lobes subtriangular, anterior lobe larger than the posterior lobe (Fig. 2c–d). Proctiger strongly compressed laterally; posterior face triangular (Fig. 2c–d). Ventral rim medially U-shaped; ventral margin expansion poorly-developed and below the level of the posterolateral angles (Fig. 2b). *Female genitalia*. Valvifer VIII with posterior margin slightly arched; inner angle dentiform (Fig. 2e). Valvula IX exposed. Valvifer IX with posterior margin straight; surface with median dark spot (Fig. 2e). Laterotergite VIII setulose, with concolorous, small, and sparse punctuations (Fig. 2e). Laterotergite IX with the inner surface bearing punctuations inserted in brown spots and strongly setulose (Fig. 2e).

Distribution (Fig. 14). French Guiana: Roura, Régina, Brazil: Pará and Peru: Junín.

Remarks. *Urhai aruaque* **sp. nov.** resembles *U. laticornis* **comb. nov.** in the humeral angles and male genitalia, with the pygophore parameres spatulate and with two lobes. In the female genitalia, both species share posteriorly arched valvifers VIII and valvifers VIII with posterior margin straight. However, *U. aruaque* **sp. nov.** can be distinguished from *U. laticornis* **comb. nov.** by its male genitalia. The dorsal rim of the pygophore in *U. aruaque* **sp. nov.** has a continuous dark stripe, but in *U. laticornis* **comb. nov.**, the stripe on the dorsal rim is discontinuous. The posterolateral angles in *U. aruaque* **sp. nov**. are straight, while in *U. laticornis* **comb. nov.** are curved. The superior process of the genital cup is absent in *U. aruaque* **sp. nov.**, but in *U. laticornis* **comb. nov.** it is vestigial.

Additionally, *U. aruaque* **sp. nov.** has a posterior face of the proctiger triangular, whereas the posterior face of the proctiger in *U. laticornis* **comb. nov.** is pentagonal.

Urhai warao **sp. nov.**

(Figs. 3a–e, 10c–d, 14)

Etymology. The name honors Warao ethnic group, the second-largest indigenous group in Venezuela. The name "Warao" means "people of the water" in their native language or "canoe people," reflecting their deep connection with rivers and flooded areas. This word is neither Greek nor Latin, nor is it derived from these languages. It should be treated as a random combination of letters.

Material examined (n= 6). **Type Material:** Holotype male. VENEZUELA: Aragua, Maracay, Inst. Zool. Agricola–Fac. Agronomia Univ. Central, col. A. Leal. B Caracas. DP. 10–10–35. (UCVEN).

Paratypes. ♀ VENEZUELA: Aragua, Maracay, Inst. Zool. Agricola–Fac. Agronomia Univ. Central, AR Venezuela 45m 12–XII–53, Gallardo. Col. (UCVEN). ♀ Aragua, Inst. Zool. Agricola–Fac. Agronomia Univ. Central, Caracas 21–IX–42 I.E. García, Edessa sp. J.W. Evans det. 1948, Com. Inst. Ent. Coll. Nº. 11014. (UCVEN). ♀ Aragua, Inst. Zool. Agricola–Fac. Agronomia Univ. Central, Col. B. Schelotto Caracas (UCVEN). ♀ Aragua, Inst. Zool. Agricola–Fac. Agronomia Univ. Central, Venezuela–AR El Limon 450 m 3–IV–1952, R. Requena Cols. (UCVEN). ♀ Aragua, Inst. Zool. Agricola–Fac. Agronomia Univ. Central, El Limon. AR Venezuela 450 m 29.VIII.57, M. Selmz col., Eu apamate. (UCVEN).

Measurements (mm). Total length: 20.2–22.4; head length: 1.5–2.3; head width: 3.5–3.8; interocular distance: 1.6–2.0; length of antennal articles: I: 1.0–1.2; II: 1.5–2.1; III: 2.1–3.6; IV: 3.5–4.7; V: 4.2; pronotum length: 4.3–4.8; pronotum width: 18.5–22.0; scutellum length: 8.3–10.2; scutellum width: 6.0–7.4; abdomen width: 9.7–11.5.

Diagnosis. Antennomeres I–III with small circular brown spots (Fig. 10c). Humeral angle well-developed, anteriorly slightly bent; distal margin with a reddish-brown spot; posterior angle more developed than the anterior lobe; posterior angle spiniform; apex narrower than the base of the humeral

angles (Fig. 10c). Corium with Y-shaped veins (Fig. 10c). Evaporatorium area with a concolorous mediocentral region, lateral region with a brown spot; peritreme reaching half the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 10d). Metasternal process enclosing ¼ of the rostral segment III (Fig. 10d); apical margin of the anterior arms of the bifurcation straight, near or reaching the limit of the propleura (Fig. 10d). Legs with small and circular brown spots (Fig. 10d). *Male genitalia*. Dorsal rim of the pygophore with a continuous dark stripe (Fig. 3a). Posterolateral angle well-developed and straight; inner face with a black spot extending to the apex (Fig. 3a–d). Superior process of the genital cup absent. Paramere spatulate, brown; paramere head with two lobes; anterior lobe subtriangular, striated, elongated; posterior lobe rounded, smaller than the anterior; paramere shaft expanded posteriorly, undulated (Fig. 3c–d). Proctiger strongly compressed laterally; posterior face subtriangular (Fig. 3c–d). Ventral rim medially V-shaped (Fig. 3b). *Female genitalia*. Valvifer VIII with posterior margin inclined; surface with punctuation concolorous; inner angle acuminate, reaching the basal third of valvifers IX (Fig. 3e). Valvulae IX not exposed. Valvifer IX with posterior margin rounded; surface with small dark circular spots (Fig. 3e). Laterotergite VIII setulose, punctuation concolorous (Fig. 3e). Laterotergite IX with inner surface punctured, punctuation inserted in brown spots; setulose (Fig. 3e).

Distribution (Fig. 14). Venezuela: Aragua.

Remarks. The *U. warao* **sp. nov.** can be easily distinguished from other species in the genus by having the longest humeral angle. In the male genitalia, the ventral rim is medially V-shaped. In females, the posterior margin of the valvifer VIII is linear, and the valvifers IX has the posterior margin rounded.

Urhai rotundus **sp. nov.**

(Figs. 4a, 10e–f, 14)

Etymology. The name "*rotundus*" refers to the shape of the anterior margin of the humeral angle, which is greatly expanded and rounded. The word comes from Latin, meaning "round, circular, or spherical".

Material examined (n=2). **Type Material:** Holotype female. BRAZIL: Probably Brazil [no specific locality], circa 1830 B.M. 1974–88. Brit. Museum, 15/10/99 (BM).

Paratype. ♀ 211. Brazil, Nin, 245. (MFN).

Measurements (mm). Total length: 20.6–21.3; head length: 1.6–1.8; head width: 3.4–3.6; interocular distance: 1.8–1.9; length of antennal articles: I: 1.0; II: 2.0–2.1; III: 1.8–2.1; IV: lost; V: lost; pronotum length: 5.0; pronotum width: 22.4–22.7; scutellum length: 8.7; scutellum width: 6.4–6.6; abdomen width: 9.5.

Diagnosis. Antennomeres I–III with small circular brown spots (Fig. 10e). Humeral angle well-developed, anteriorly slightly bent; anterior angle well-developed compared to posterior angle; posterior angle spiniform and black; apex as wide as the base of the humeral angles (Fig. 10e). Corium with Y-shaped veins (Fig. 10e). Evaporatorium area with mediocentral region concolor, lateral region with brown spot; peritreme reaching 1/3 of the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 10f). Metasternal process enclosing ¼ of the rostral segment III; apical margin not reaching the limit of the propleura (Fig. 10f). *Male genitalia*. Unknown. *Female genitalia*. Valvifer VIII with posterior margin straight; median area with brown spot; inner angle acuminate, reaching the base of valvifers IX (Fig. 4a). Valvulae IX not exposed. Valvifer IX with posterior margin straight (Fig. 4a). Laterotergite VIII with large dark punctuation distributed vertically (Fig. 4a). Laterotergite IX surface with dense punctuations inserted in brown spots (Fig. 4a).

Distribution (Fig. 14). Brazil.

Remarks. *Urhai rotundus* **sp. nov.** can be easily distinguished from other species of the genus by having a well-developed anterior angle of the humeral angle. The female genitalia, specifically valvifers VIII of *U. rotundus* **sp. nov.** (Straight and parallel) are similar to *Urhai warao* **sp. nov.** (Straight and perpendicular) because both species have posterior margin straight. However, *U. rotundus* **sp. nov.** has posterior margin of valvifers IX straight, whereas in *U. warao* **sp. nov.** the posterior margin is rounded.

Urhai krikatis **sp. nov.**

(Figs. 5a–e, 11a–b, 14)

Etymology. The name honors an Indigenous group that inhabits the state of Maranhão, Brazil, specifically in the "Krikatis" indigenous territory, which is the type locality of the species. The name is neither a Greek nor Latin word nor derives from these languages. It should be treated as a random combination of letters.

Material examined (n=5). **Type Material:** Holotipe male. BRAZIL: Maranhão, Caxias, Res. Eco. Inhamum A. Luminosa. 26–28.III.2009. E.A.S. Barbosa & M.B. Aguiar–Neto cols. II–2010 Maranhão Francisco (UEMA).

Paratypes. BRAZIL: ♂ Maranhão, Caxias, Campus UEMA [Universidade Estadual do Maranhão]. Morro do Alecrim. Coleta incidental 04.VI.2009 L.A. LUZ. col. II–2010 Maranhão Francisco. (UEMA). ♀ Maranhão, Caxias campus/UEMA Morro do Alecrim. Coleta incidental 07.V.2010, J.A. Silva, col. (UEMA). ♀ Goiás, Minaçu, Serra da Mesa, 19–30.XI.1996 L. Moura col. 1999. (UFRGS). ♂ Rondônia, Costa Marques, Forte Príncipe da Beira, 19.XI–3.XII. 1967 G.R. Kloss col. MZSP 29/09/98. (MZUSP).

Measurements (mm). Total length: 16.3–19.0; head length: 1.6–1.7; head width: 3.1–3.4; interocular distance: 1.5–1.8; length of antennal articles: I: 1.0–1.1; II: 1.5–2.2; III: 1.8–2.1; IV: 3.6–4.2; V: lost; pronotum length: 3.7–4.5; pronotum width: 16.5–20.0; scutellum length: 7.0–8.0; scutellum width: 5.4–6.0; abdomen width: 8.0–9.4.

Description. Antennomeres I–III with small circular brown spots (Fig. 11a). Humeral angle well-developed, straight; distal margin with black spot; anterior and posterior angles slightly developed, posterior angle spiniform, associated with a rounded lobe posteriorly; apex as wide as the base of the humeral angle (Fig. 11a). Corium with Y-shaped veins (Fig. 11a). Evaporatorium area with mediocentral region concolor, lateral region with brown spot; peritreme reaching 1/3 of the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 11b). Metasternal

process enclosing ¼ of the rostral segment III (Fig. 11b); apical margin of the bifurcation of the anterior arms straight, close to or reaching the limit of the propleura (Fig. 11b). Legs with small, circular, brown spots (Fig. 11b). *Male genitalia*. Dorsal rim of the pygophore with dark discontinuous stripe centrally and medially with a small rounded projection (Fig. 5a). Posterolateral angles poorly-developed and straight, internally with a continuous brown spot and apex punctured (Fig. 5a–d). Superior process of the genital cup concave and C-shaped (Fig. 5c–d). Parameres subspatular with distal margin brown to black; posterior face slightly striated; paramere head with three rounded lobes; anterior lobe single and longer than the posterior lobes; (Fig. 5c–d) posterior lobes with sinuose margins. Proctiger with lateral keel; posterior face subrectangular (Fig. 5c–d). Ventral margin medially V-shaped (Fig. 5b); ventral margin expansions subtly acuminated, below the level of the posterolateral angles (Fig. 5b–d). *Female genitalia.* Valvifer VIII with posterior margin sinuous, medialy with punctuation inserted in dark spots, and inner angles rounded (Fig. 5e). Valvulae IX slightly exposed. Valvifer IX with posterior margin subrounded (Fig. 5e). Laterotergite VIII with small punctuation inserted into brown spot, punctuations distributed posteriorly (Fig. 5e). Laterotergite IX with punctuations inserted in brown spots (Fig. 5e).

Distribution (Fig. 14). Brazil: Maranhão, Goiás, Rondônia.

Remarks. *Urhai krikatis* **sp. nov.** has a pygophore similar to *Urhai trilobularis* **sp. nov.**; both species share posterolateral angles slightly developed, superior process of the genital cup C-shaped, parameres with three lobes, and a ventral margin with a median V-shaped excavation. However, *U. krikatis* **sp. nov.** has a humeral angle apex subequal to its base (whereas in *U. trilobularis* **sp. nov.** the apex of the humeral angle is narrower than its base). Additionally, the spiniform projection of the humeral angles in *U. krikatis* **sp. nov.**, is short and associated with a black lobe (while in *U. trilobularis* **sp. nov.** the spiniform projection is not associated with a lobe and is more prominent).

Urhai trilobularis **sp. nov.**

(Figs. 6a–d, 11c–d, 14)

Etymology. The name refers to three lobes of the paramere, latim adjective (*trilobularis* = trilobular).

Material examined (n=1). **Type material.** Holotype male. PANAMA: Canal Zone [Panama Canal Zone], BCL VIII.15.79 S. Gross. Scott W. Gross Collection 1990. Washington 08/2014. (USNM).

Measurements (mm). Total length: 21.0; head length: 1.9; head width: 3.8; interocular distance: 1.9; length of antennal articles: I: 1.2; II: 2.1; III: 2.3; IV: 4.6; V: Lost; pronotum length: 5.3; pronotum width: 22.8; scutellum length: 9.0; scutellum width: 7.0; abdomen width: 10.5.

Description. Antennomeres I–III with small circular brown spots (Fig. 11c). Humeral angle well-developed, straight; distal margin with reddish-brown spot; posterior angle more developed than the anterior angle, posterior angle spiniform and prominent; apex narrower than the base of the humeral angles (Fig. 11c). Corium with Y-shaped veins (Fig. 11c). Evaporatorium with whitish mediocentral region, lateral region with brown spot; peritreme reaching half the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 11d). Metasternal process enclosing ¼ of the rostral segment III (Fig. 11d); apical margin of the anterior bifurcation arms straight, reaching the limit of the propleura (Fig. 11d). Legs with small and circular brown spots (Fig. 11d). *Male genitalia*. Dorsal rim of the pygophore with a continuous dark stripe, median region with a small rounded projection (Fig. 6a). Posterolateral angles of pygophore poorly-developed, straight, and inner surface with continuous brown spots and punctuated apex (Fig. 6a–d). Superior process of the genital cup small, concave, C-shaped (Fig. 6c–d). Paramere subspatular, with the distal margin brown to black; posterior face slightly striated; paramere head with three rounded lobes; anterior lobe longer than the posterior lobes; posterior lobes with wavy margin (Fig. 6c–d). Proctiger slightly compressed laterally, posterior face elliptical (Fig. 6c–d). Ventral rim of the pygophore medially V-shaped; expansion of the ventral rim poorly-developed and rounded (Fig. 6b–d). Female genitalia. Unknown.

Distribution (Fig. 14). Panama: Panama Canal Zone.

Remarks. See remarks of *Urhai krikatis* **sp. nov.**

Urhai tribuaria (Distant, 1890) **comb. nov.**

(Figs. 7a–e, 12a–d, 14)

Edessa tribuaria Distant, 1890. op. cit. 344, Pl. 32. f. 6.

Type Material: Lectotype designated here. Male. Mexico, Yucatan, Temax, Gaumer. (BMNH). Examined.

Paralectotypes. 1 male, 9 females. Same data of Lectotype. (BMNH).

Material examined (n=6). ♀ MEXICO: Hidalgo, Atlapexco Yahualica [Tlalchiyahualica]. km. 9 Carr. 1230 MSNM N 20 58 12 W 98 24 00 6–08–1999 E. Barrera. Colección del Instituto de Biologia, UNAM [Universidade Nacional Autónoma de México]. México, D.F. *Edessa tribuaria* Distant, 1890 Fernandes, J.A.M. 2002. (UNAM). ♀ km.9 Carr. 1230 MSNM N 20 58 12 W 98 24 00 6–08–1999 E. Barrera. Colección del Instituto de Biologia, UNAM. México, D.F. *Edessa tribuaria* Distant, 1890 Fernandes, J.A.M. 2002. (UNAM). ♂ San Luis Potosi, Ciudad Valles, Micos 20–II–7. *Edessa tribuaria* Distant, 1890 Comp. w. Type Fernandes, JAM 1999. (UNAM). ♂ Veracruz, San Andres Tuxtla, H–Bralovsky 22–VII–72. Univ. Kans. Mex. Expedition. *Edessa tribuaria* Distant, 1890 Fernandes, J.A.M. 1999. (UNAM). ♀ Yucatán, Tixmehuac, G. F. Gaumer. *Edessa tribuaria* Distant, 1890 Comp. w. Type Fernandes, JAM 1999. (KU). ♂ 15 mt S Pujal SLP. Mexico VI–21–52. *Edessa tribuaria* Distant, 1890 Fernandes, J. A. M. 1999. (KU).

Measurements (mm). Total length: 15.5–17.1; head length: 1.4–1.6; head width: 2.9–3.2; interocular distance: 1.5–1.7; antennal segment lengths: I: 0.9–1.0; II: 1.5; III: 1.7–2.0; IV: 3.2; V: Lost; pronotum length: 3.2–3.7; pronotum width: 12.9–14.8; scutellum length: 7.3–8.5; scutellum width: 5.2–6.5; abdomen width: 8.5–9.7.

Description. Antennae without dark spots (Fig. 12a). Humeral angle developed, anteriorly slightly bent; distal margin with brown spots; anterior and posterior angles poorly-developed, posterior angle acuminated; with apex twice as narrow as the base of the humeral angle (Fig. 12a). Corium with veins diffuse (Fig. 12a). Evaporatorium area with a mediocentral region concolor, lateral region with brown spots; peritreme reaching 3/4 of the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 12b). Mesosternum with two moderately brown spots (Fig. 12b). Metasternal

process housing 1/4 of the rostral segment III (Fig. 12b); apical margin of the anterior bifurcation arms rounded, not reaching the limit of the propleura (Fig. 12b). Legs without dark spots (12b). *Male genitalia.* Dorsal rim of the pygophore with a continuous light brown stripe (Fig. 7a). Posterolateral angles of the pygophore little developed and swollen, and the inner surface with an extensive brown spot reaching the apex (Fig. 7a–d). Superior process of the genital cup laminar, subtriangular and posteriorly bifurcated (Fig. 7c–d). Paramere Y-shaped, distal margin black; posterior surface; paramere head with two lobes; anterior lobe cylindrical, with a rounded apical margin, narrow, parallel to the proctiger, posterior lobe projected the posterolateral angle, slightly curved dorsally (Fig. 7c–d). Proctiger deeply excavated laterally; posterior surface triangular (Fig. 7c–d). Ventral rim of the pygophore medially U-shaped; expansions rounded and above the posterolateral angles (Fig. 7b). *Female genitalia.* Valvifer VIII with posterior margin oblique; lateral margin flattened; outer angle acuminate; internal angle rounded below the level of valvifers IX (Fig. 7e). Valvulae IX not exposed. Valvifer IX with posterior margin rounded (Fig. 7e). Laterotergite VIII with small concolor punctuations (Fig. 7e). Laterotergite IX with basal margins brown spot (Fig. 7e).

Distribution (Fig. 14). Mexico: Hidalgo, San Luis Potosi, Vera Cruz, Yucatán.

Remarks. *Urhai tribuaria* **comb. nov.** and *Urhai leucogrammum* **comb. nov.** are the only species with a less developed humeral angle compared to the other species of the genus. *Urhai tribuaria* **comb. nov.** has a corium with diffuse venation, whereas *U. leucogrammum* **comb. nov.** follows the typical Y-shaped venation pattern observed in other species of the genus. Additionally, *U. tribuaria* **comb. nov.** is the only species that lacks circular brown spots on the antennae, head and legs — found in other species.

Urhai leucogrammum (Perty, 1833) **comb. nov.**

(Figs. 8a–e, 13a–f, 15)

Pentatoma leucogrammum Perty, 1833 Del. An. 167, P1.33. £.9.

Edessa maculata Dallas, 1851 List. 322, **N. sym.**

Edessa leucogramma (Stål, 1872) op. cit. 54; Distant 1881 op. cit. 89.

Edessa ochracea Bergroth, 1891. **N. sym.**

Type Material: Lectotype designed here. Female. *Pentatoma leucogrammum*, Brasilia aequatorialis. (DM). Examined.

Lectotype designed here. Male. *Edessa maculata* Brazil, (BMNH). Examined.

Lectotype designed here. Male. *Edessa ochracea* Brazil, Minas Gerais (Collection Fallou) (MNHN). Examined.

Material examined (n=64). ♂ COSTA RICA: Guan. [Guanacaste], Pr. La Cruz, Cerro El Hacha, 300m, 12 km SE. May 1988. M. Espinoza 320000. 364000. Costa Rica INBIO CRI000 046723. *Edessa leucogramma* (Perty, 1833) Fernandes, JAM det. *Edessa* sp 25. (INBIO). ♂ Barra Honda de Nicoya, 3 km NO de Nacaome, 100m. P.N. 5 a 27 Jul. 1992 M. Reyes L–N 239000, 386000. Costa Rica INBIO CRI000 896201. *Edessa leucogramma* (Perty, 1833) Fernandes, JAM det. *Edessa* sp. det. J. E. Eger, 2000. *Edessa* sp 25. (INBIO). ♀ Liberia, NP. Oct 1988, 30km N. Finca Jenny, GNP Biod. Survey 316200, 364400. *Edessa leucogramma* (Perty, 1833) Fernandes, JAM det. Costa Rica INBIO CRI000 006660. *Edessa* sp 25. (INBIO). ♀ PANAMA: Prov. Colón [província de Colón], Sabanitas, 2 km S 15–19.VII.1999 9º19'19"N 79º47'54"W el. 120 m. J. Schaffner. Taken on *Artocarpus altilis* (Park) Fosb. det. M. Akers '99. TAMU–Ento X0685930. TAMU out. 2011. (TAMU). ♀ Sabanitas, 2 km S 15–19.VII.1999 9º19'19"N 79º47'54"W el. 120 m. J. Schaffner. Taken on *Artocarpus altilis* (Park) Fosb. det. M. Akers '99. TAMU-ENTO X0686005. TAMU out. 2011. (TAMU). ♂ Quebrada Lopez, 3 km. S. Sabanitas 27–VIII–98 A.R. Gillogly. TAMU–Ento X0680668. TAMU out. 2011. *Edessa leucogramma* (Perty, 1833) Fernandes, JAM det. (TAMU). ♂ Quebrada Lopez, 3 km. S. Sabanitas 27–VIII–98 A.R. Gillogly. TAMU–Ento X0683489. TAMU out. 2011. (TAMU). ♂ Quebrada Lopez, 3 km. S. Sabanitas 27–VIII–98 A.R. Gillogly. TAMU–Ento X0684466. TAMU out. 2011. *Edessa leucogramma* (Perty, 1833) Fernandes, JAM det. (TAMU). ♀ Quebrada Lopez, 3 km. S. Sabanitas 27–VIII–98 A.R. Gillogly. TAMU–Ento X0685943. TAMU out. 2011. (TAMU). ♀ Quebrada Lopez,

3 km. S. Sabanitas 27–VIII–98 A.R. Gillogly. TAMU–Ento X0686257. TAMU out. 2011. *Edessa leucogramma* (Perty, 1833) Fernandes, JAM det. (TAMU). ♀ Sabanitas, 2 km S 15-19.VII.1999 9º19'19"N 79º47'54"W el. 120 m. J. Schaffner. Taken on *Artocarpus altilis* (Park) Fosb. det. M. Akers '99. TAMU–ENTO X0683305. TAMU out. 2011. (TAMU). ♂ Sabanitas, 2 km S 15-19.VII.1999 9º19'19"N 79º47'54"W el. 120m. J. Schaffner. Taken on *Artocarpus altilis* (Park) Fosb. det. M. Akers '99. TAMU–Ento X0685137. TAMU out. 2011. (TAMU). ♂ COLOMBIA: Tolima, Coyaima, 450 M, S, A. XI–44. *Edessa* nr. Zebu Breddin Det. J. C. Lutz. R.A. Stirton collector. Washington 08/2014. (USNM). ♂ VENEZUELA: DF [Distrito Capital], Caracas, 920M 12–VIII–63. Inst. Zool. Agricola–Fac. Agronomia Univ. Central. *Edessa leucogramma* (Perty, 1833) Fernandes J.A.M. 1999. José. *E. leucogramma*. E. Osuna col. En apamate. (UCVEN). ♂ Caracas, 920 M 12–VIII–63. Inst. Zool. Agricola–Fac. Agronomia Univ. Central. E. Osuna col. En apamate. (UCVEN). ♀ Caracas, D.F. 18–VIII–63 J.L. Garcia. Museo Hist. Nat. La Salle Caracas–Venezuela. *Edessa leucogramma* Perty det. J. Fernandes. (MHNLS). ♂ SURINAME: **[**Pará], Berlin [Berlijn], II.1964 P. Kuglen. *Edessa ochracca* bergrota 1891 Fernandes det. Comp. W. Type. *Edessa maculata* Dallas 1851 Comp. W. Type Fernandes, JAM 1999. (UFPA). 2♀ BRAZIL: Pará, Belém, 2005 Fernandes, J. (UFPA). ♀ Belém, UFPA ICU Christian col. 18–IX–19. (UFPA). ♀ Belém, UFPA–04.10.18 Nilton Monteiro. (UFPA). 2♂ Pará, Belém, JAM Col; III–24. (UFPA). ♀ Belém, ILC–UFPA. L.A.P Santos Col. 5–VIII–2024. (UFPA). ♀ Mato Grosso, Chapada dos Guimarães. manual 28–XII–2012 C. A.S. Batista. (UFMT). ♀ Cuiabá, Boa Esperança Manual 05.III.2011 J. Alfredo. (UFMT). ♀ Cuiabá JD. Burity, manual. 12.XII.2011 J. Esteves. (UFPA). ♂ Cuiabá JD. Burity, manual. 15.XII. 2011 J. Esteves. (UFPA). ♀ Cuiabá–30–IV–1992 Gessy M. Inácio. (UFMT). ♀ Mato Grosso, Região Tijucal coleta manual 22/10/2009 coletor Pinheiro, D.D. Ordem, Hemiptera, família Pentatomidae. (UFMT). ♂ Mato Grosso, Pousada Caiman, Miranda 22–XII–1991 Souza, M.V.D. *E. ochracia* bergraten Fernandes det. C/ with Type. *E. leucogramma*. *Edessa leucogramma* (Perty, 1833) Fernandes J.A.M. 1999. José. (UFPA). ♂ Cuiabá, Faz. Sta. Maria [Fazenda Santa Maria], 24/X/91 Luiz C. Chieveate. Pentatomidae.

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Measurements (mm). Total length: 12.5–21.0; head length: 0.9–2.0; head width: 2.8–3.5; interocular distance: 0.7–1.8; antennal segment lengths: I: 0.8–1.1; II: 1.2–1.6; III: 1.1–2.9; IV: 3.0–4.0; V: 2.3–4.1; pronotum length: 3.2–4.5; pronotum width: 10.3–16.7; scutellum length: 6.2–9.7; scutellum width: 5.4–6.8; abdomen width: 8.1–11.0.

Description. Antennomeres I–III with small, circular brown spots (Fig. 13a). Humeral angle poorly-developed, straight or slightly curved posteriorly; distal part with a black spot extending ventrally; anterior and posterior angles slightly developed, posterior angle acuminate; apex narrower than the

base of the humeral angles (Fig. 13a). Corium with veins Y-shaped (Fig. 13a). Evaporatorium area brown; peritreme reaching half the distance between the ostiole of the odoriferous gland and the lateral margin of the body (Fig. 13b). Metasternal process housing ¼ of the rostral segment III; apical margin rounded to straight; apex reaching or not reaching the limit of the propleura (Fig. 13b). Legs with small, circular brown spots (Fig. 13b). *Male genitalia.* Dorsal rim of the pygophore with a continuous or discontinuous dark stripe (Fig. 8a). Posterolateral angles well-developed curved laterally, and inner surface with spots extending to the apices (Fig. 8a–d). Superior process of the genital cup reniform (Fig. 8c–d). Paramere subspatular; posterior surface wrinkled; paramere head with three lobes: anterior lobe subrectangular, large, parallel to the proctiger; median lobe poorly-developed, rounded, directed dorsally; posterior lobe subrectangular, well-developed, directed to posterolateral angle (Fig. 8c–d). Proctiger slightly furrowed laterally; posterior surface ogival (Fig. 8c–d). Ventral rim medially U-shaped (Fig. 8b). *Female genitalia.* Valvifer VIII with posterior margin slightly sinuous; punctuated medially, punctuation inserted brown spot; inner angle dentiform, reaching 1/3 of valvifers IX (Fig. 8e). Valvulae IX not visible. Valvifer IX with posterior margin straight, with small dark circular spots (Fig. 8e). Laterotergite VIII punctured, punctuation inserted brown spot; apex curved laterally (Fig. 8e). Laterotergite IX punctured, punctuation distally, inserted into brown spots (Fig. 8e).

Distribution (Fig. 15). Costa Rica: Guanacaste, Panama: Colón, Venezuela: Distrito Capital, Colombia: Tolima, Suriname: Pará, Brazil: Pará, Mato Grosso, São Paulo, Espírito Santo, Rio de Janeiro, Rio Grande do Sul, Peru: Junín and Paraguay: Cordillera.

Remarks. This species has a broad geographical distribution, as shown on the map (Fig. 15), with some variations among specimens, such as body size, the degree of development of the humeral angle, male genitalia, and paramere coloration, which may range from brown to black. Furthermore, the apex of the anterior lobe may be narrow or broad, and the posterior lobe, which is projected anteriorly, may also vary in width and be slightly curved toward the posterolateral angle. *Urhai leucogrammum* **comb. nov.** differs from other species of the genus by the male genitalia, which has a reniform superior

process of the genital cup and a subspatular paramere with three lobes, where the anterior and posterior lobes are well-developed, while the median lobe is less developed. Additionally, in the female genitalia, the apex of laterotergites VIII is laterally curved, a characteristic exclusive to *U. leucogrammum* **comb. nov.**

Acknowledgments

We would like to thank the curators of the mentioned museums, the owners of the cited private collections, the Programa de Pós-graduação em Zoologia (PPGZOOL-UFPA), the Laboratório de Invertebrados (LA–INV) for its infrastructure, and Dr. Angélico Asenjo for his help with material from the Natural History Museum of Lima, Peru. I would also like to thank Bruno Gouvea and Bruna Façanha for their assistance with map preparation. This work was partially funded by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) (JAMF CNPq 310436/2021–4).

Author contributions

All authors contributed equally to this research.

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Illustrations and legends

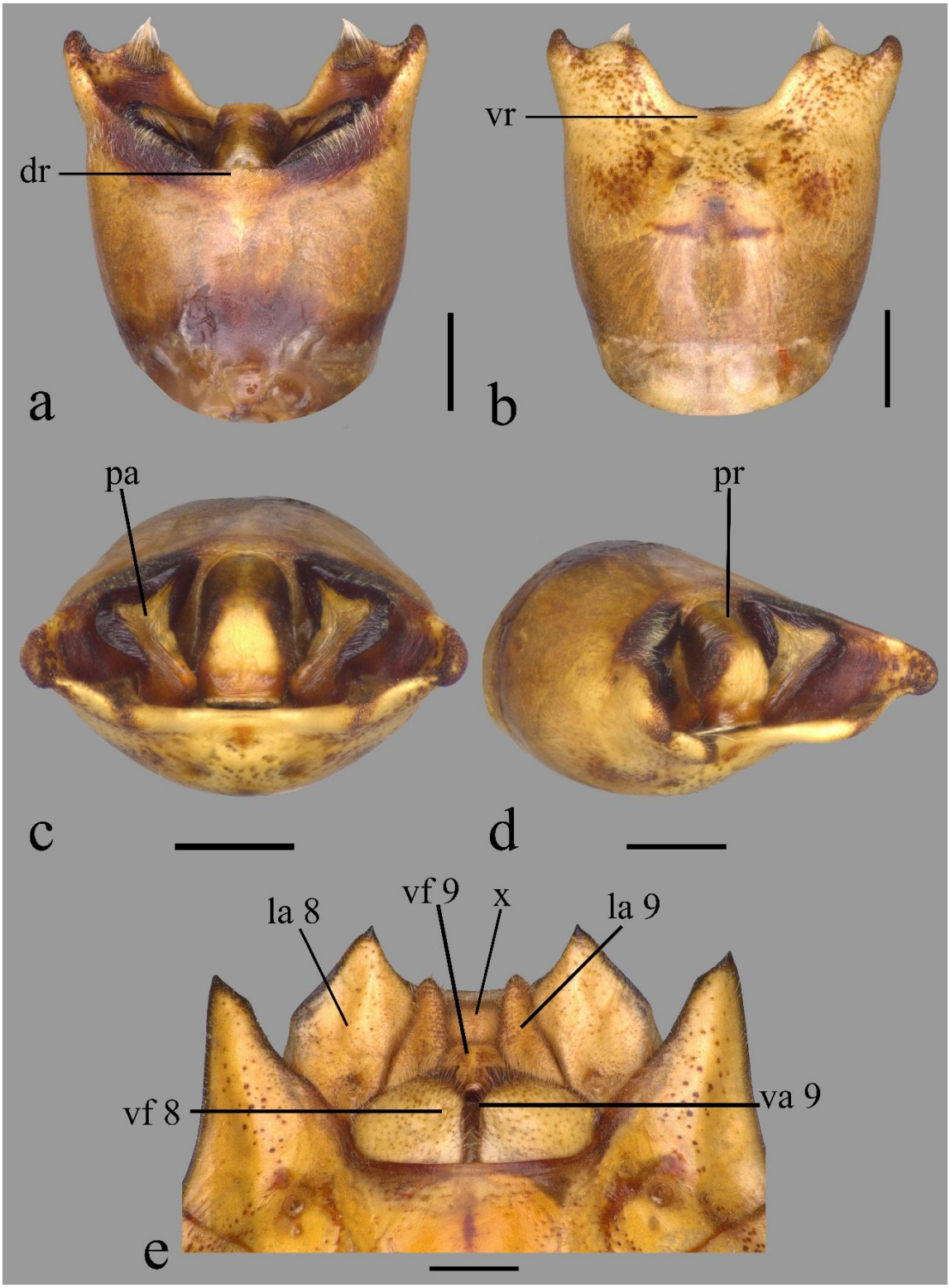

Figure 1. *Urhai laticornis* (Stål, 1872) **comb. nov.** Male (pygophore): a–Dorsal view, b–Ventral view, c–Posterior view, d–Posterolateral view, e–Genital plates. Scale bar = 1 mm. Acronyms: Dr = Dorsal rim, Vr = Ventral rim, Pa = Paramere, Pr = Proctiger, Vf 8 = Valvifer VIII, Vf 9 = Valvifer IX, La 8 = Laterotergite VIII, La 9 = Laterotergite IX, Va 9 = Valvulae 9, X = Tenth tergite.

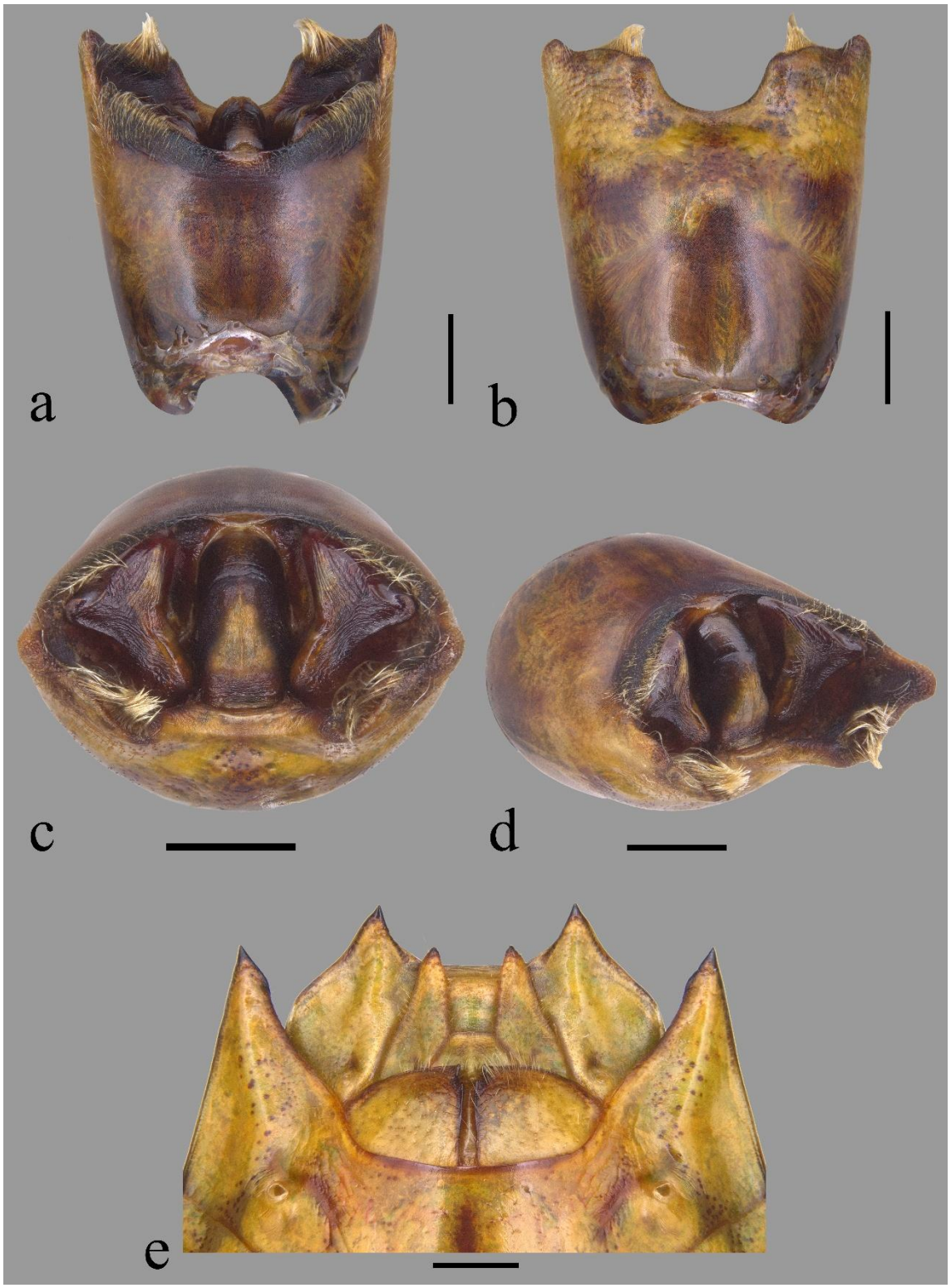

Figure 2. *Urhai aruaque* **sp. nov.** Male (pygophore): a–Dorsal view, b–Ventral view, c–Posterior view, d–Posterolateral view. Female: e–Genital plates. Scale bar = 1 mm.

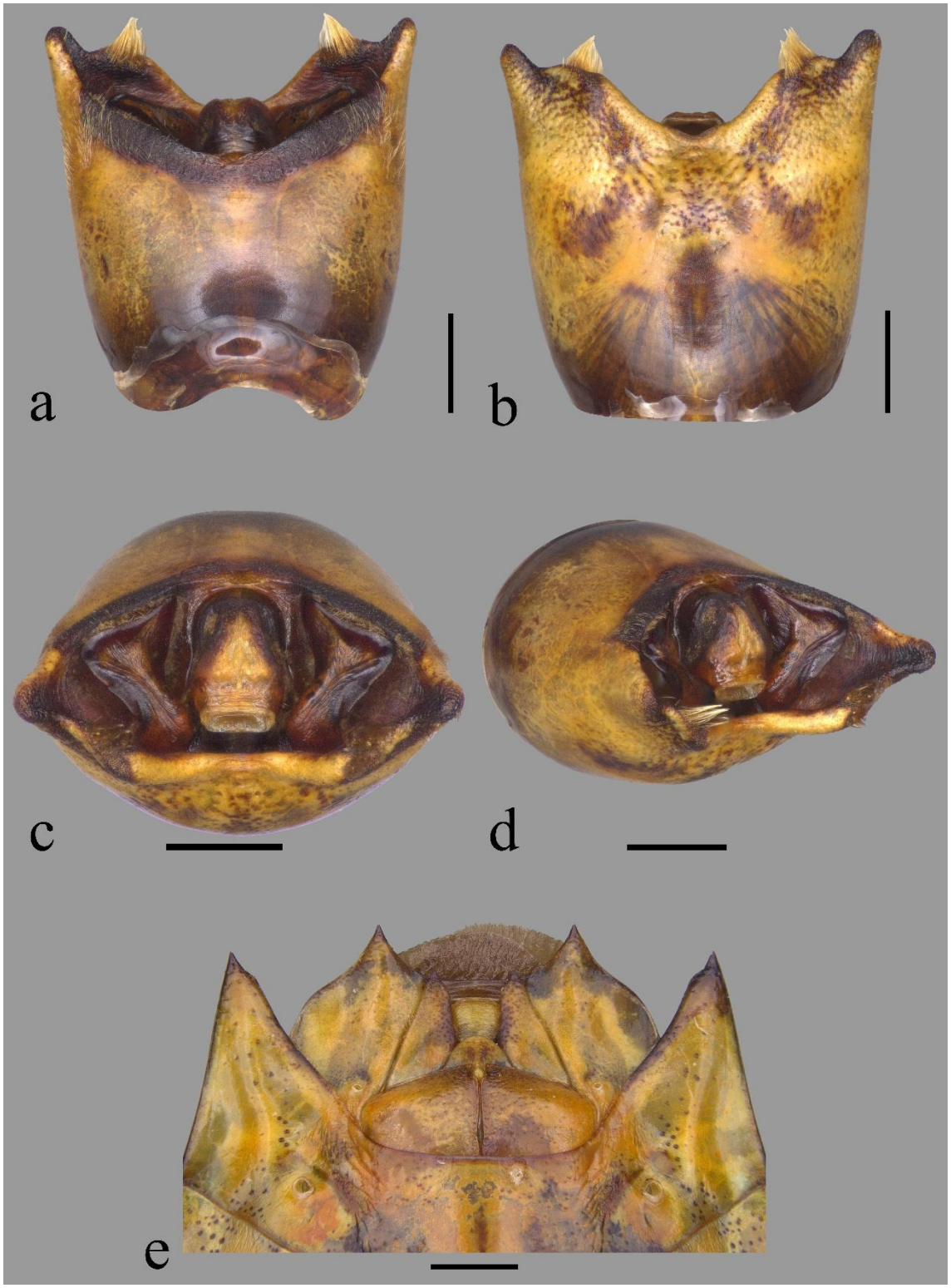

Figure 3. *Urhai warao* **sp. nov.** Male (pygophore): a–Dorsal view, b–Ventral view, c–Posterior view, d–Posterolateral view. Female: e–Genital plates. Scale bar = 1 mm.

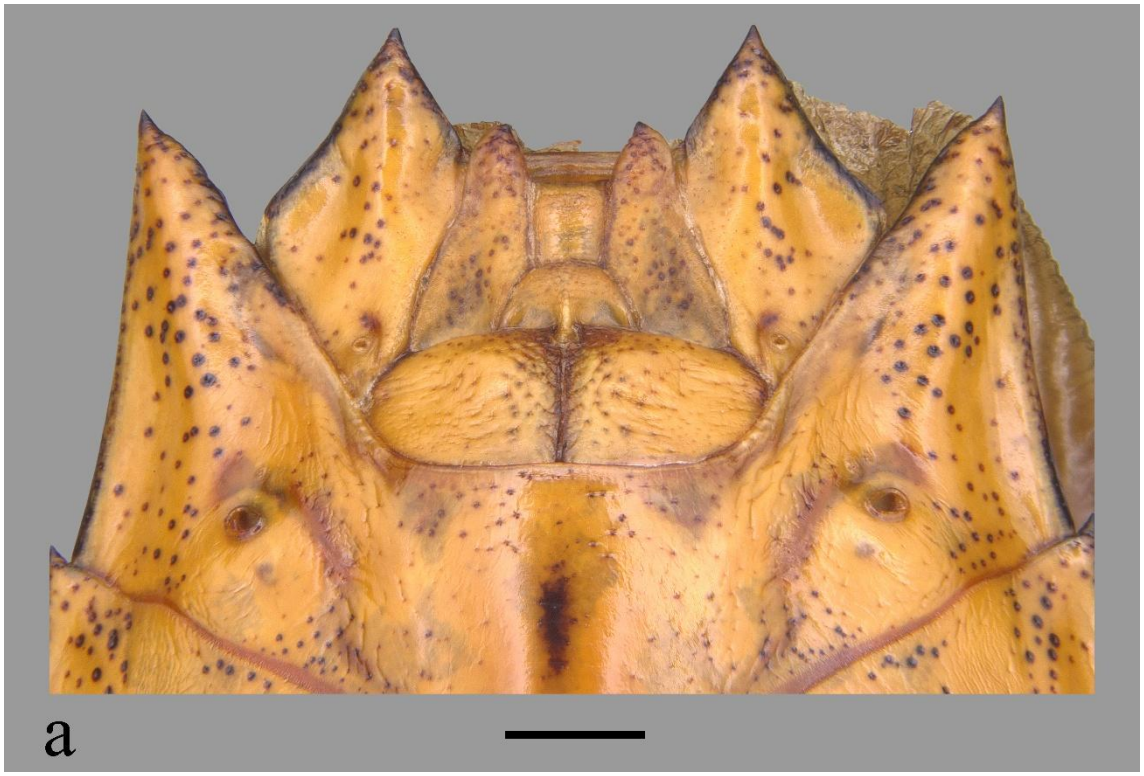

Figure 4. *Urhai rotundus* **sp. nov.** Female: e–Genital plates. Scale bar = 1 mm.

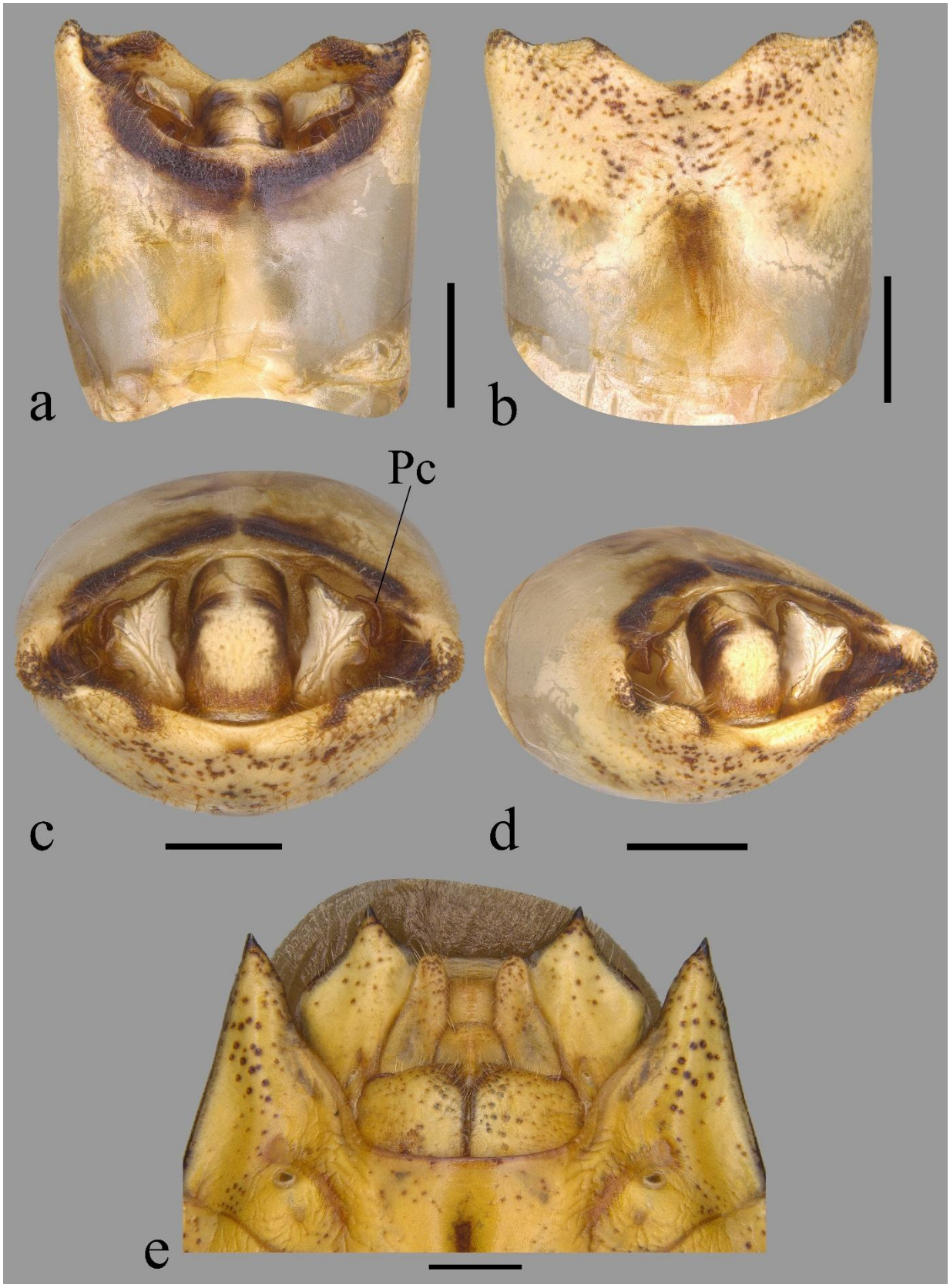

Figure 5. *Urhai krikatis* **sp. nov.** Male (pygophore): a–Dorsal view, b–Ventral view, c–Posterior view, d–Posterolateral view. Female: e–Genital plates. Scale bar = 1 mm.

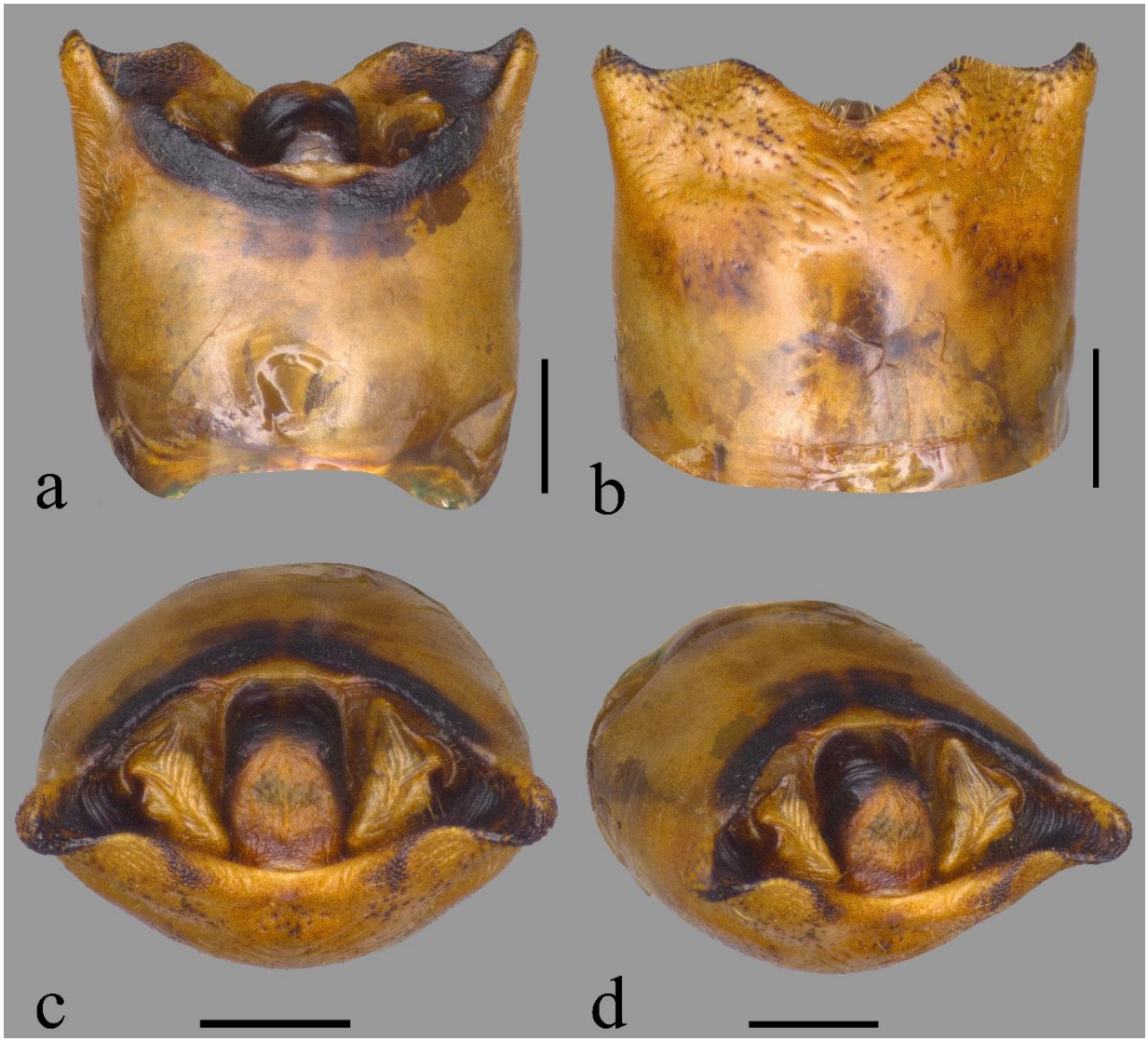

Figure 6. *Urhai trilobularis* **sp. nov.** Male (pygophore): a–Dorsal view, b–Ventral view, c–Posterior view, d–Posterolateral view. Scale bar = 1 mm.

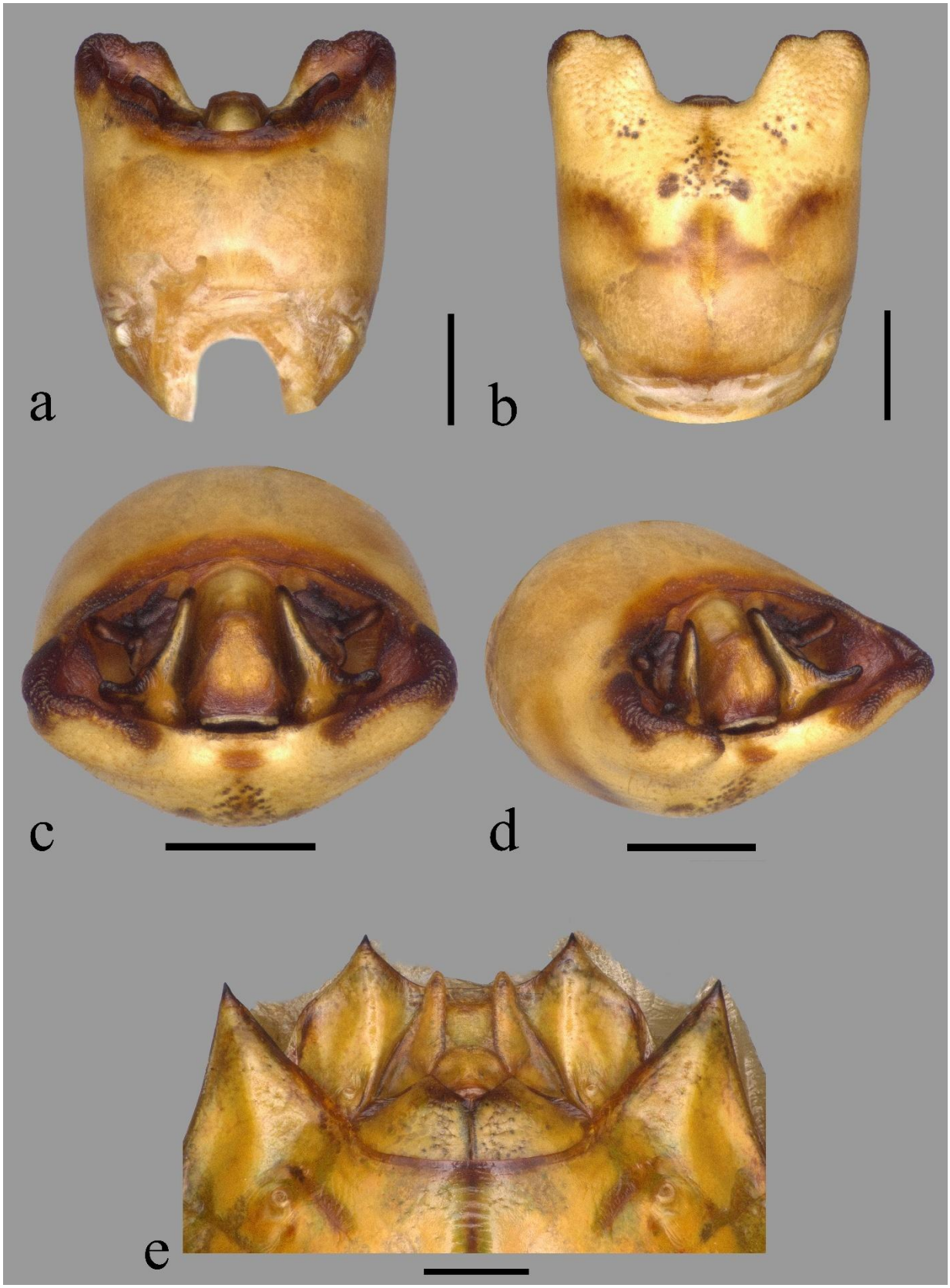

Figure 7. *Urhai tribuaria* (Distant, 1890) **comb. nov.** Male (pygophore): a–Dorsal view, b–Ventral view, c–Posterior view, d–Posterolateral view. Female: e–Genital plates. Scale bar = 1 mm.

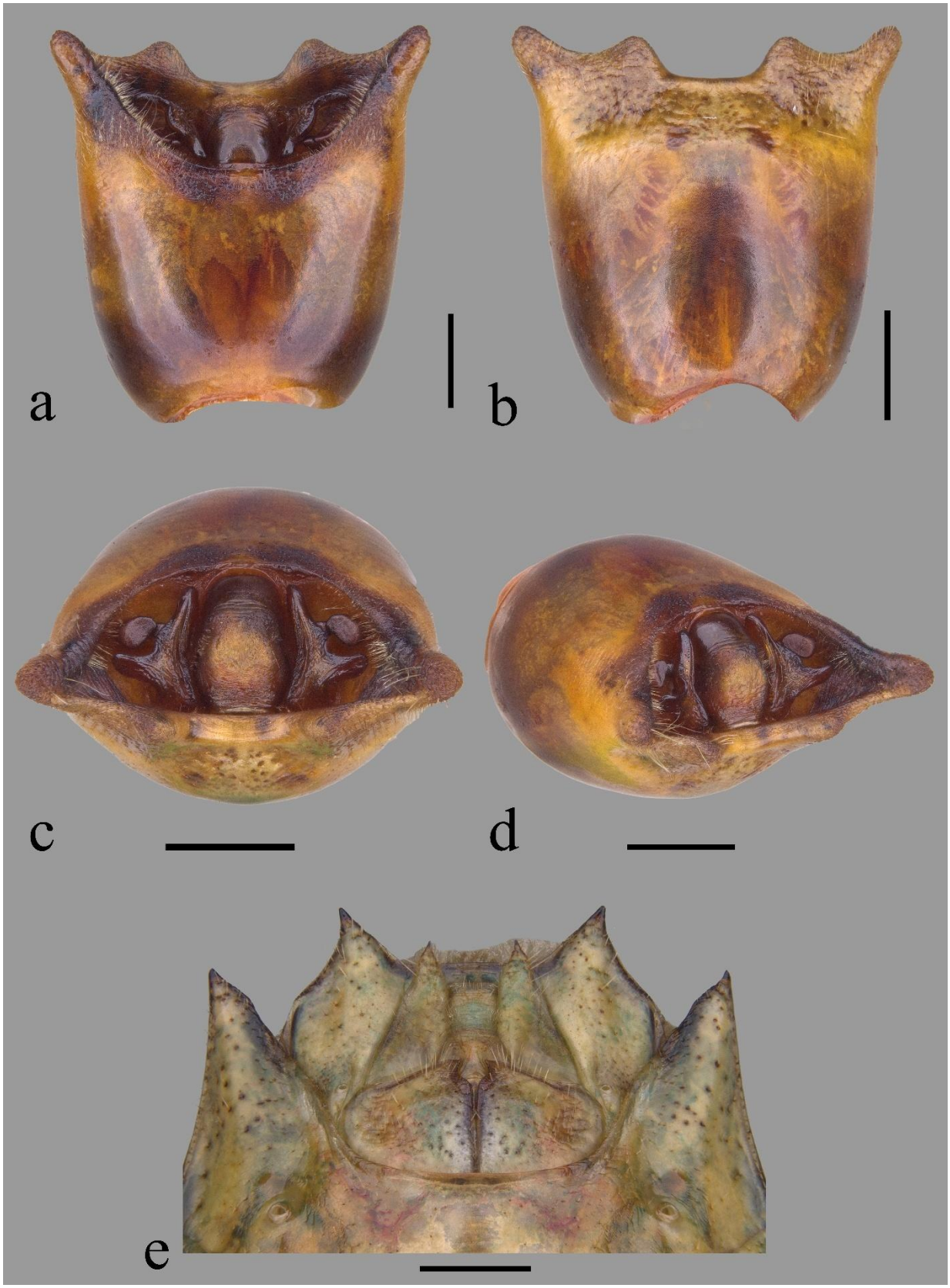

Figure 8. *Urhai leucogrammum* (Perty, 1833) **comb. nov.** Male (pygophore): a–Dorsal view, b–Ventral view, c–Posterior view, d–Posterolateral view. Female: e–Genital plates. Scale bar = 1 mm.

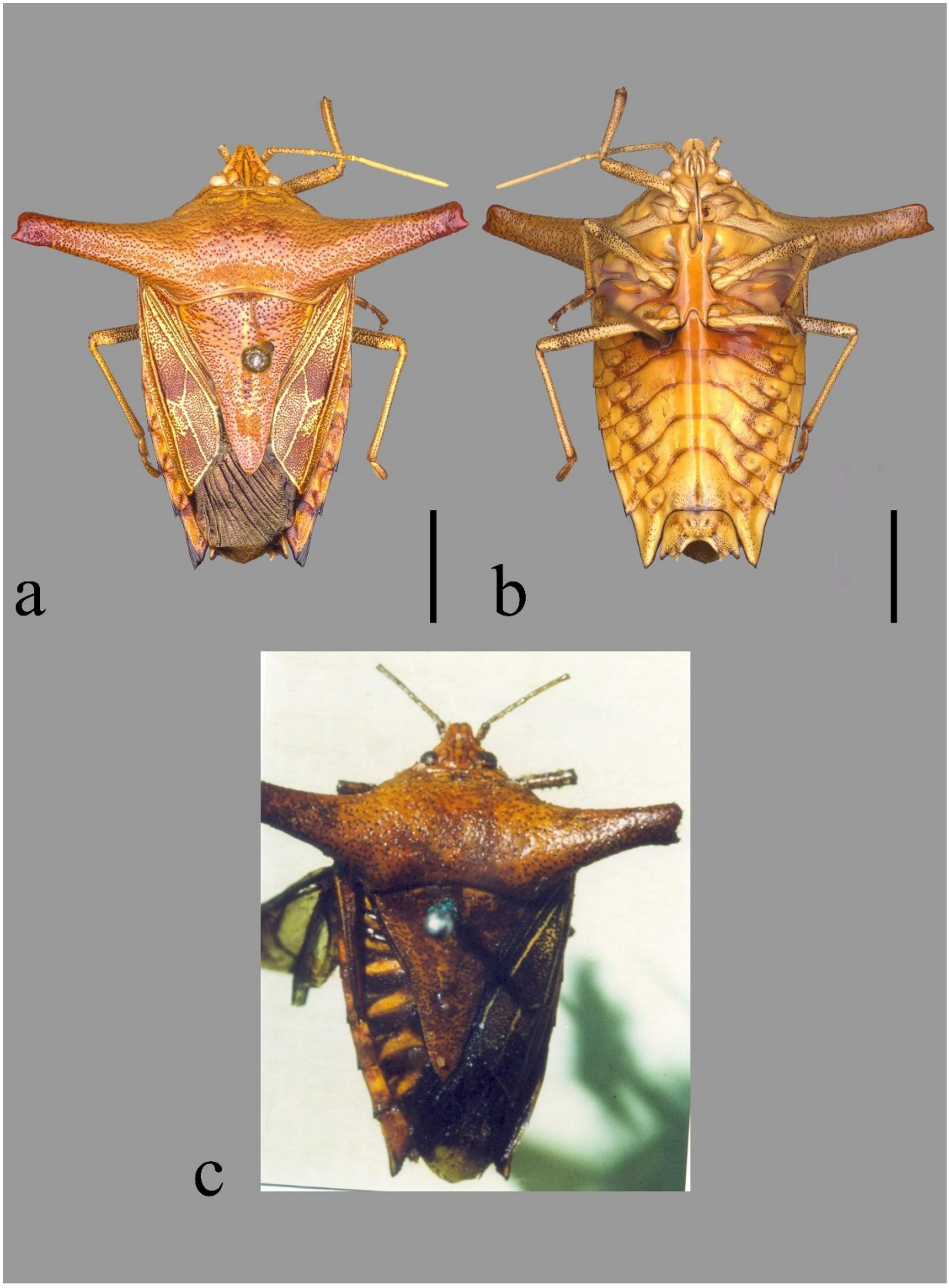

Figure 9. *Urhai laticornis* (Stål, 1872) **comb. nov.** a–Dorsal view, b–Ventral view. Scale bar = 5 mm. c–Dorsal view of the Lectotype of *Edessa laticornis* **comb. nov.** Photo: Piet van Doesburg.

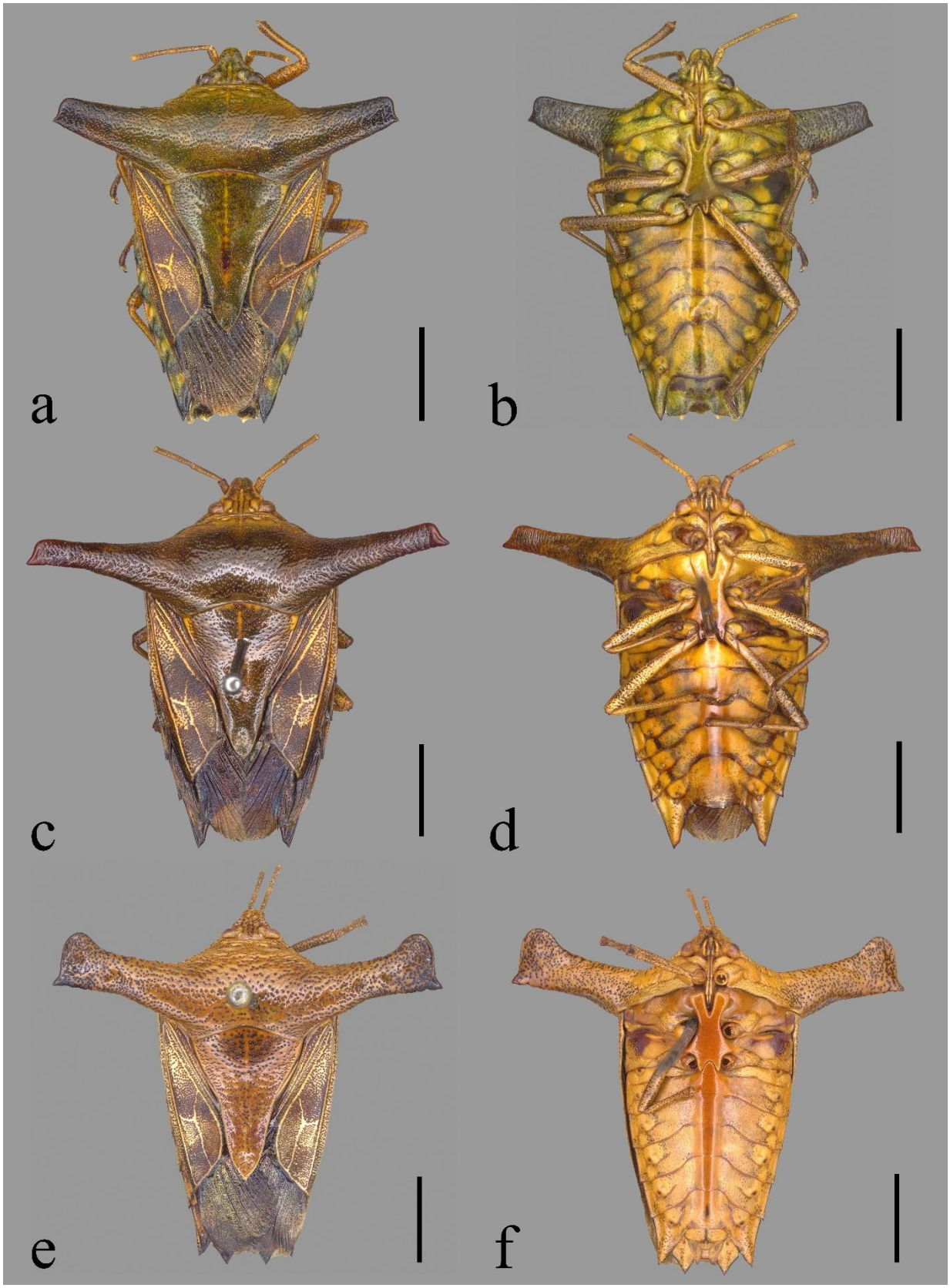

Figure 10. *Urhai aruaque* **sp. nov.** a–Dorsal view and b–Ventral view. *Urhai warao* **sp. nov.** c–Dorsal view and d–Ventral view. *Urhai rotundus* **sp. nov.** e–Dorsal view and f–Ventral view. Scale bar = 5 mm.

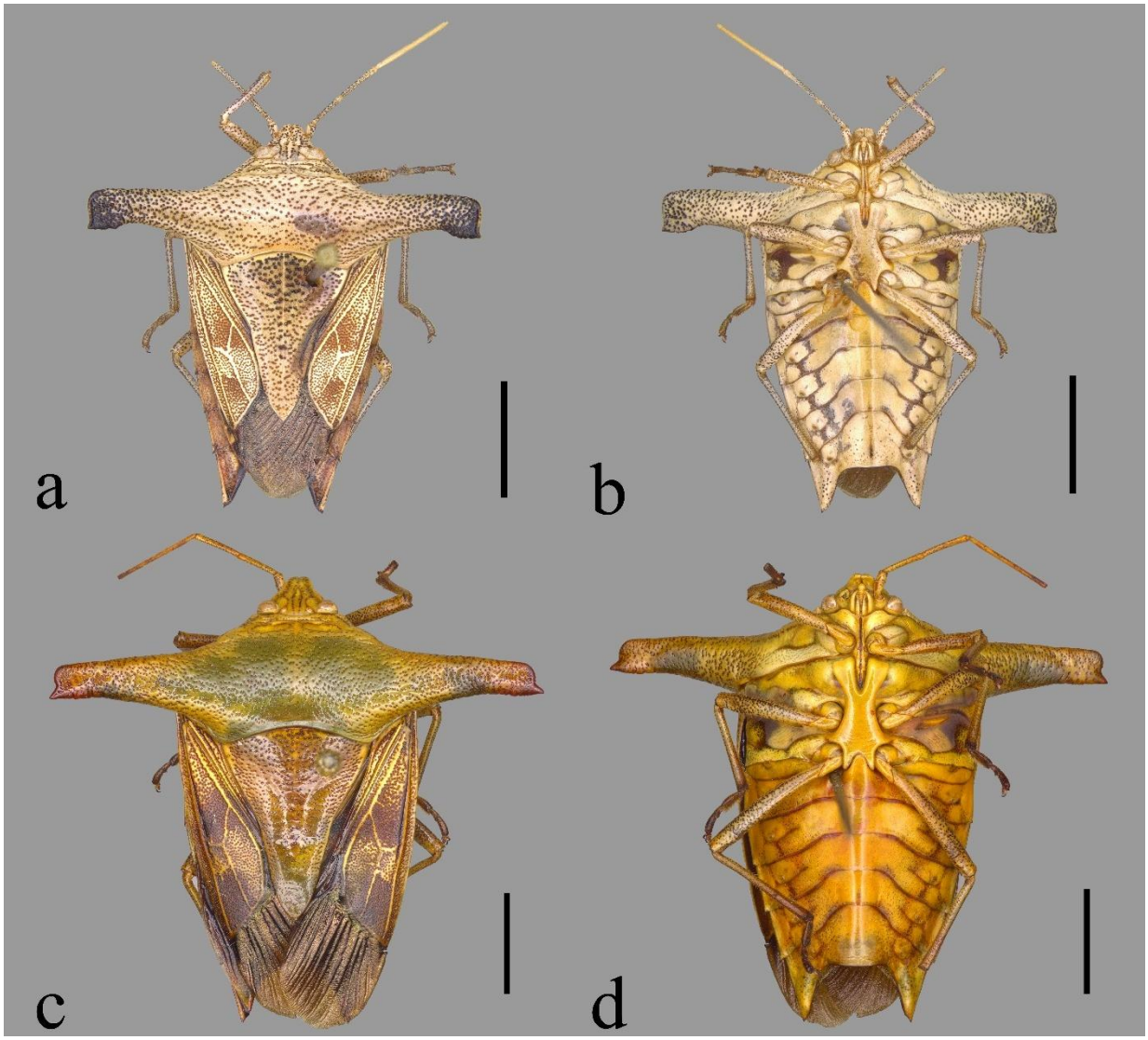

Figure 11. *Urhai krikatis* **sp. nov.** a–Dorsal view and b–Ventral view. *Urhai trilobularis* **sp. nov.** c–Dorsal view and d–Ventral view. Scale bar = 5 mm.

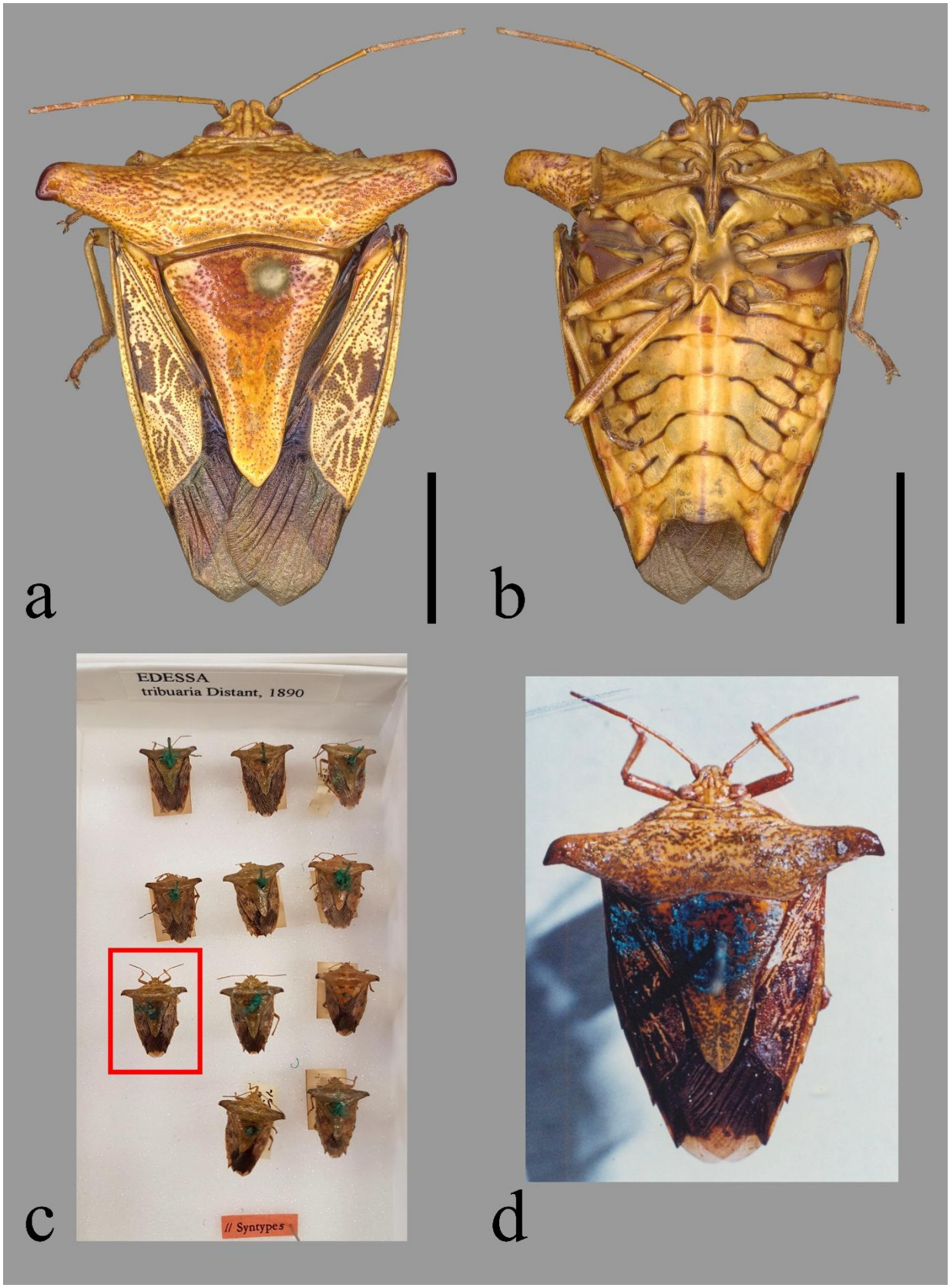

Figure 12. *Urhai tribuaria* (Distant, 1890) **comb. nov.** a–Dorsal view, b–Ventral view. Scale bar = 5 mm. c–Syntype box. Photo: José A.M.F. d–Detail of the Lectotype in the red rectangle. Photo: Piet van Doesburg.

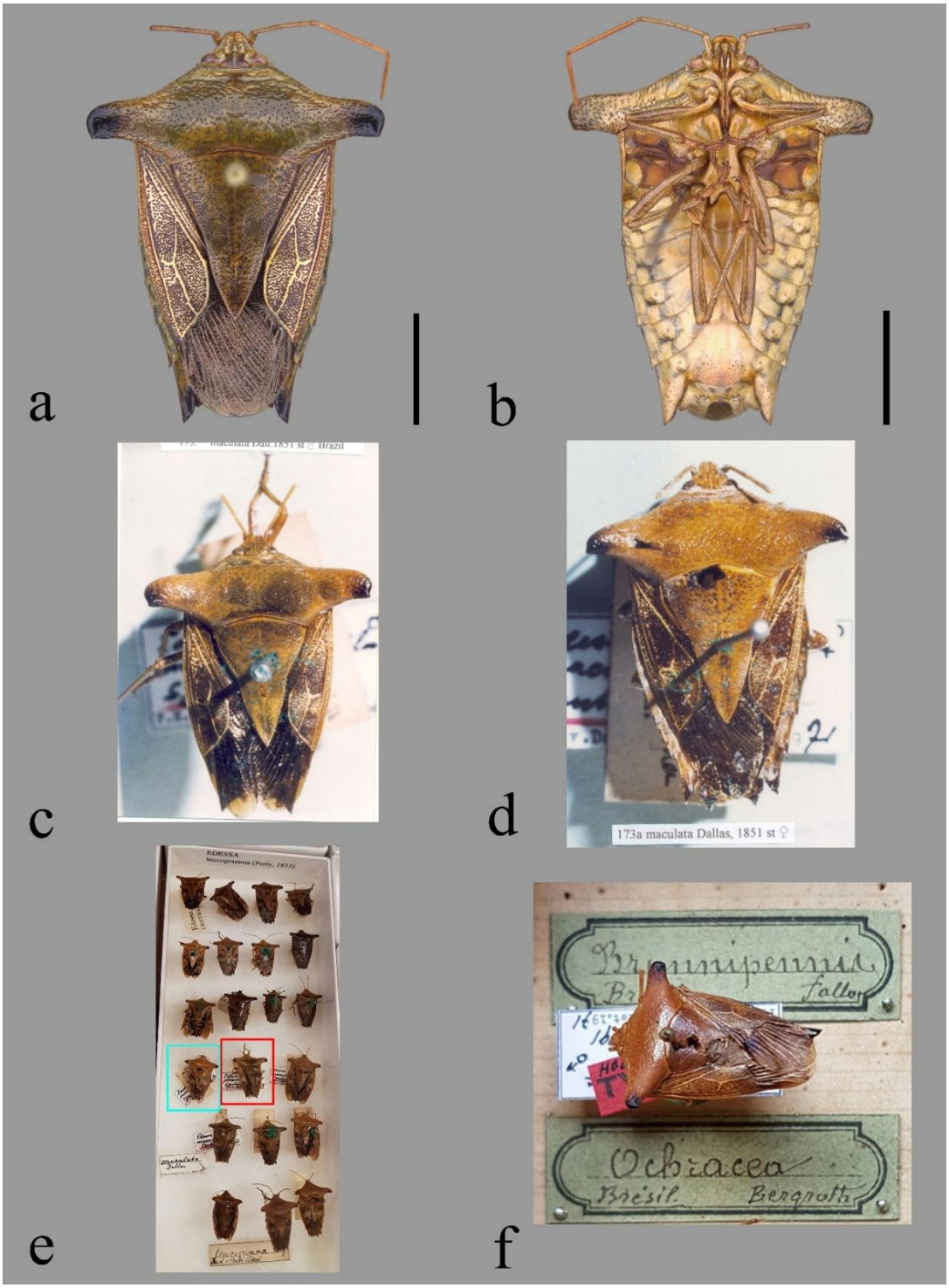

Figure 13. *Urhai leucogrammum* (Perty, 1833) **comb. nov.** a–Dorsal view, b–Ventral view. Scale bar = 5 mm. c–Dorsal view of the lectotype male of *E. maculata* Dallas, 1851, red rectangle indicates de Lectotype. Photo: José A.M.F. d–Dorsal view of the lectotype female of *Edessa maculata* Dallas, 1851, blue rectangle enlarged. Photo: José A.M.F. e–Syntype box of *Edessa maculata*, Photo: José A.M.F. f–Dorsal view of the Lectotype of *Edessa ochracea* Bergroth, 1891. Photo: José A.M.F.

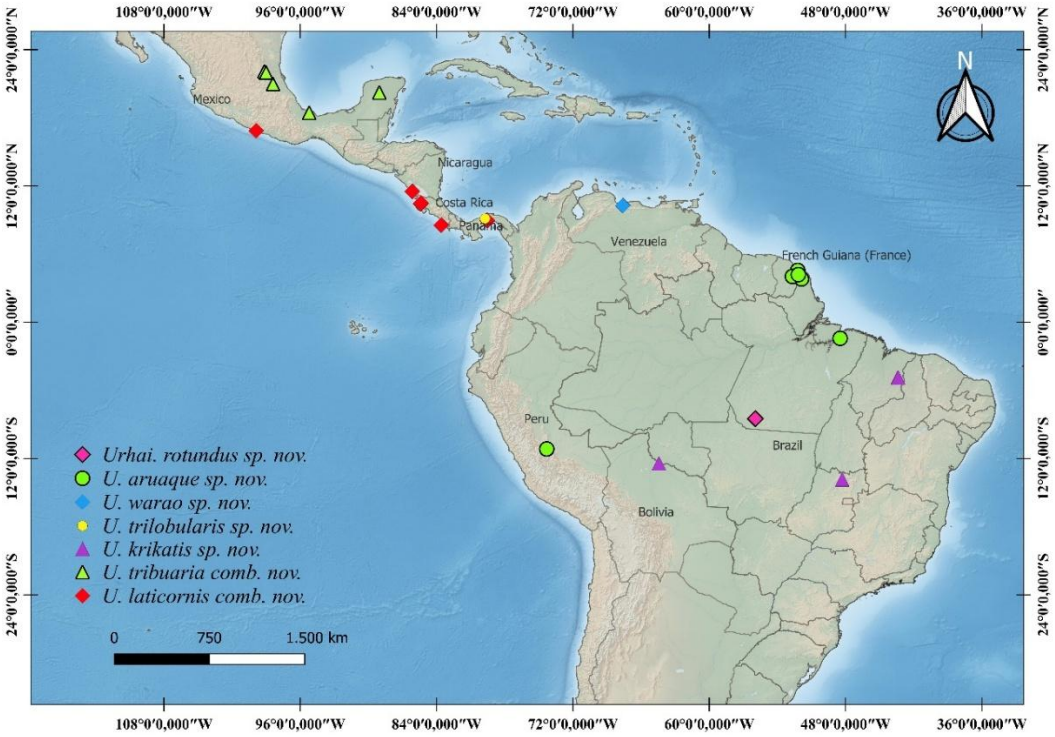

Figure 14. Distribution map of the species of the genus.

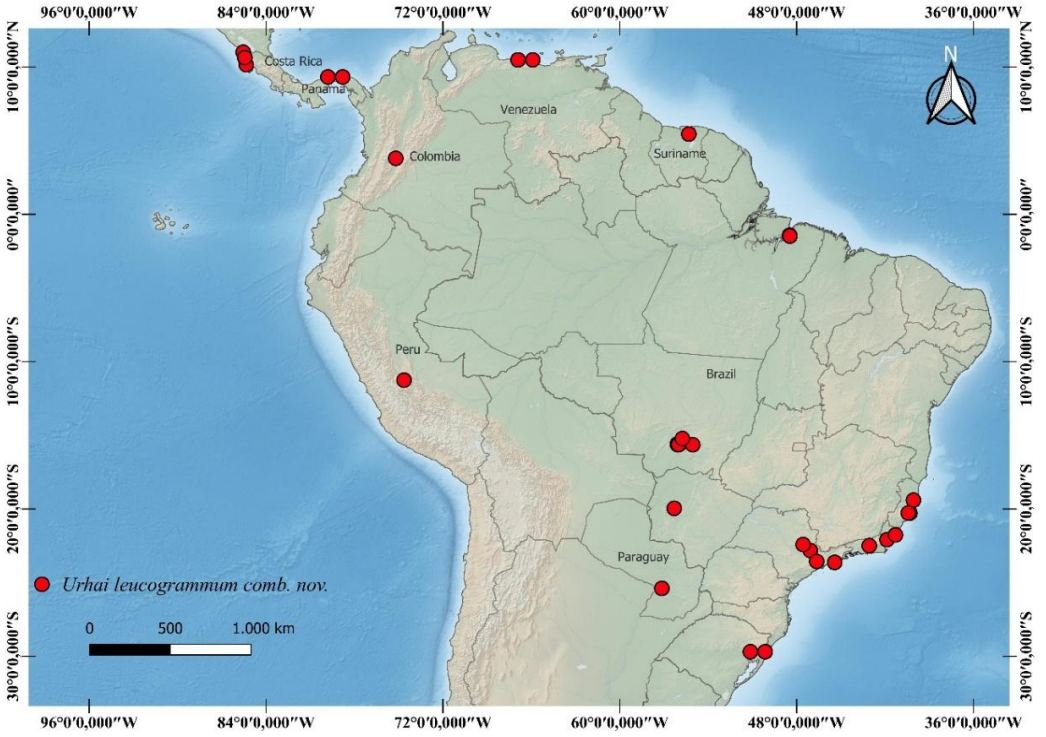

Figure 15. Distribution map of *Urhai leucogrammum* **comb. nov.**

CONCLUSÕES GERAIS

O presente trabalho apresentou a descrição de um novo gênero para Edessinae, redescrevendo três espécies conhecidas (*Urhai laticornis* (Stål, 1872) **comb. nov.**, *Urhai leucogrammum* (Perty, 1833) **comb. nov.**, *Urhai tribuaria* (Distant, 1890) **comb. nov.**) sendo realizado arranjos nomenclaturais, descrição de cinco espécies novas para a Ciência, Lectótipos foram designados e a distribuição geográfica conhecida foi ampliada. Uma chave dicotômica de identificação para as espécies do novo gênero foi apresentada.

Urhai **gen. nov.** pode ser facilmente reconhecido pela morfologia do corpo por apresentar principalmente a cabeça com pontuações formando duas listras verticais no clípeo, artículos antenais I–III com pequenas manchas circulares escuras; pronoto com ângulo umeral desenvolvido a bastante desenvolvido, achatado e pontuado dorsoventralmente, margem distal laminar, ângulo posterior espiniforme, margem posterior do pronoto cobrindo a parte anterior do escutelo; processo metasternal achatado ventralmente, braços anteriores da bifurcação longos, atingindo ou quase o limite da propleura e com a margem distal geralmente reta. No pigóforo, o bordo dorsal apresenta uma faixa marrom a preta, ângulos posterolaterais desenvolvidos; parâmeros geralmente em formato de espátula, subespatular ou em “Y” e a expansão do bordo ventral do pigóforo entumecida com faixa escura ventrolateral associada a um tufo de cerdas.

A descrição do novo gênero contribui com a organização e classificação da subfamília Edessinae e de *Edessa*.

ANEXO

Anexo I – Normas da revista *Anais da Academia Brasileira de Ciências* (AABC), na qual será submetido para publicação o capítulo I dessa Dissertação.

Instructions to authors

Types of Papers

Reviews

Reviews are published by **invitation only** and still have to undergo our peer review process. However, a proposal for a Review may be submitted via e-mail to our editorial staff (aabc@abc.org.br). The e-mail should state the topics and authors of the proposed review, as well as the abstract, academy section and the justification why the topic is of particular interest to the field.

The AABC allows authors to deposit preprints of their submission in community preprint servers such as ArXiv.org and bioRxiv.org. However, the authors must updated their entries expressly acknowledging that the article has been accepted/published by AABC.

Letters to the Editor

Letters to the Editor will be subjected to editing and revision and should not contain material that has been submitted or published elsewhere. Letters in reference to an article published by the AABC should not exceed 250 words (excluding references), and must be received within four weeks after online publication of the article. Letters not related to an article published by the AABC should not exceed 500 words (excluding references). A letter can have no more than ten references and one figure or table.

Articles

Whenever possible the articles should be subdivided into the following parts: **1.** Front Page; **2.** Abstract (written on a separate page, 200 words or less, no abbreviations); **3.** Introduction; **4.** Materials and Methods; **5.** Results; **6.** Discussion; **7.** Acknowledgments, if applicable; **8.** Author Contributions (when the paper has more than one author); **9.** References. **10.** Figure legends, if applicable. Articles from some areas such as Mathematical Sciences should follow their usual format. In some cases, it may be advisable to omit part (4) and to merge parts (5) and (6). Whenever applicable, the Materials and Methods section should indicate the Ethics Committee that evaluated the procedures for human studies or the norms followed for the maintenance and experimental treatments of animals.

Short communications

Short communications aim to report a **concise, but important contribution on research**, which has progressed to the stage when it is considered that results should be publicized to other workers in the field. A short communication should also have an Abstract (100 words or less), a short introduction (up to 200 words) and should not exceed 1,500 words. Tables and Figures may be included but the text length should be proportionally reduced. This

section of the AABC should contain extremely relevant contributions and competition is very high.

After the first screening, the articles will be evaluated by at least two reviewers, them being from educational and/or national and international research institutions, with proven scientific production. After due corrections and possible suggestions, the paper may be accepted or rejected, considering the reviews received.

We use the integrated Crossref Similarity Check program to detect plagiarism. There are no APC and submission charges in the AABC.

Preparation of manuscripts

All parts of the manuscript should be double-spaced throughout. After acceptance, no changes will be made in the manuscript so that proofs require only corrections of typographical errors. The authors should send their manuscript in electronic version only.

Length of manuscript

While papers may be of any length required for the concise presentation and discussion of the data, succinct and carefully prepared papers are favored both in terms of impact as well as in readability. They must not, however, exceed 50 pages, including all items (figures, tables, references, etc…), unless previously agreed with the Editor-in-Chief.

Title page

The title page of the manuscript should present the following items: **1.** Title of the article (the title should be up to 150 characters including spaces, and informative to a broad scientific community); do not include abbreviations in the title. **2.** Full name(s) of all author(s); use superscript numbers right after each author name to indicate the affiliation; **3**. Professional address and ORCid of all authors, including Department and Institution name, street name and number, ZIP/Postal code, City, State and country; **4.** Key words (four to six in alphabetical order separated by commas); **5.** Running title (a short version of the title, up to 50 characters including spaces); **6.** Academy Section to which the content of the work belongs; **7.** Name, address, phone number, e-mail of the correspondent author, including to whom all correspondence and proofs should be sent to (please indicate the corresponding author with an * after the name).

Should any of these requirements not be met, we may unsubmit your paper and ask for corrections.

Abstract

The abstract must contain no more than 200 words and present the main findings of the article, including a brief introduction, the objectives of the work and a conclusion based on the presented findings. If the authors are submitting an invited/authorized review, the abstract must introduce the main theme of the review and explicit the contribution of the revision to the field. References should not be included in the abstract.

Manuscript text

All text should be written in double-space using 12-point Times New Roman or equivalent typeface. Please organize, whenever possible, the text into the following parts: **1.** Title Page; **2.** Abstract (written on a separate page, 200 words or less, no abbreviations); **3.** Introduction; **4.** Materials and Methods; **5.** Results; **6.** Discussion; **7.** Acknowledgments, if applicable; **8.** Author contributions, when there is more than one author, explaining briefly how each author has contributed for the paper **9.** References. **10.** Figure and table legends, if applicable.

Articles from some areas such as Mathematical Sciences should follow their usual format. In some cases it may be advisable to omit part (4) and to merge parts (5) and (6). Whenever applicable, the Materials and Methods section should indicate the Ethics Committee that evaluated the procedures for human studies or the norms followed for the maintenance and experimental treatments of animals.

All procedures must be described in detail. Use American English style to write the text. Chemical names should be provided according to IUPAC, and strains of organisms should be specified. Provide names of reagents and/or equipment suppliers. Use units and symbols according to Bureau International des Poids et Mesures (SI) symbols whenever possible.

Acknowledgments

These should be included at the end of the text. Personal acknowledgments should precede those of institutions or agencies. Footnotes should be avoided; when necessary they must be numbered. Acknowledgments to grants and scholarships, and of indebtedness to colleagues as well as mention to the origin of an article (e.g. thesis) should be added to the Acknowledgments section. Include the full name of the funding agency, country, and funded project number (if applicable).

Abbreviations

These should be defined at their first occurrence in the text, except for official, standard abbreviations. Units and their symbols should conform to those approved by the Bureau International des Poids et Mesures (SI).

Figure Legends

This information must be provided at the end of the manuscript, after the abbreviations. All figures must contain a descriptive legend. The legend must contain an introductory sentence that describes the main findings. All panels (if applicable) must be identified in the figure legend by lower case letters (1a, 2a, 2b, 3c, 3d, etc.). When presenting error bars, please inform if a number that follows the ± sign is a standard error of mean (SEM) or a standard deviation of mean (SD). Or include in the legend if the presented result is representative of N individual experiments.

Tables

Each table should have a brief title above it. Table footnotes should be placed below the table. Tables have to be cited in the paper in Roman numerals (Table I, Table II, Tables IV and V, etc.). Tables must be submitted as separate files in editable format, preferably as *.doc or *docx file.

Figures

Only high-quality figures will be accepted (minimum of 300 dpi). All illustrations will be considered figures including drawings, graphs, maps, photographs, etc. Their tentative placement in the text should be indicated and all figures must be cited with their respective number along the text. Figures should be sent according to the following specifications: **1.** Drawings and illustrations should be in format .PS/.EPS or .CDR (PostScript or Corel Draw) and never be inserted in text; **2.** Images or figures in grayscale should be in format .TIF and never be inserted in text; **3.** Each figure should be saved and sent in a separate file; **4.** Figures should, in principle, be submitted at the size they are to appear in the journal, i.e., 8 cm (one column) or 16.2 cm (two columns) wide, with maximal height for each figure and respective legend smaller than or equal to 22 cm.

The legends to the figures should be sent double-spaced on a separate page. Each linear dimension of the smallest characters and symbols should not be less than 2 mm after reduction. Colored figures are accepted just as much as b/w ones, but up to 5 black and white figures are free of charge, while every colored figure will be charged, due communication will be made in the production phase (after the evaluation process), should the author want them colored as well in the printed version. For the purpose of counting black and white figures, tables occupying two thirds of the page or having more than 12 columns or 24 rows will be considered b/w figures; 5. Manuscripts on Mathematics, Physics or Chemistry may be typesetted in TEX, AMS-TEX or LaTEX; 6. Manuscripts without mathematical formulae may be sent in .RTF or doc/docx for Windows.

References

Authors are responsible for the accuracy of the References. Published articles and those in press may be included. Personal communications (Smith, personal communication) must be authorized in writing by those involved. References to thesis, meeting abstracts (not published in indexed journals) and manuscripts in preparation or submitted, but not yet accepted, should be cited in the text as (Smith et al., unpublished data) and should NOT be included in the list of references.

The references should be cited in the text as, for example, ‘Smith 2004’, ‘Smith & Wesson 2005’ or, for three or more authors, ‘Smith et al. 2006’. Two or more papers by the same author(s) in the same year should be distinguished by letters, e.g. ‘Smith 2004a’, ‘Smith 2004b’ etc. Letters should also distinguish papers by three or more authors with identical first author and year of publication. References should be listed according to the alphabetical order of the first author, always in the order SURNAME XY in which X and Y are initials. If there are more than ten authors, use et al. after the first author.

References must contain the title of the article. Names of the journals should be abbreviated without dots or commas. For the correct abbreviations, refer to lists of the major databases in which the journal is indexed or consult the World List of Scientific Periodicals. The abbreviation to be used for the Anais da Academia Brasileira de Ciências is **An Acad Bras Cienc**. The following examples are to be considered as guidelines for the References.

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