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LIANDERSON FARIAS FRANCO

Contribuições taxonômicas para *Palpigera* Hebard (Orthoptera: Phalangopsidae) com descrição de novas espécies, novos registros e proposição de um novo gênero para Luzarina

Belém, 2025

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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.
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para seguir em frente e sempre buscar o melhor de mim

“Não diga que a vitória está perdida
Se é de batalhas que se vive a vida
Tente outra vez” -Raul S

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Nota: De acordo com o Código Internacional de Nomenclatura Zoológica, esta dissertação não constitui uma publicação formal. Portanto, quaisquer nomes novos aqui propostos ou atos que envolvam a nomenclatura não têm validade nomenclatural. Assim, esta dissertação não representa uma publicação oficial, e qualquer conteúdo de valor taxonômico nela contido é considerado inválido para fins nomenclaturais

Taxonomic contributions to *Palpigera* Hebard (Orthoptera: Phalangopsidae) with the description of new species, new records, and the proposal of a new genus to Luzarina

ABSTRACT

The subtribe Luzarina is the most representative in the neotropical region, currently with 128 valid species distributed across 49 genera. In this study, we contribute to the knowledge of the group by describing five new species of *Palpigera* and a new genus with a new species, *Parapalpigera amazonica* **gen. et sp. nov.** The five *Palpigera* species were identified from 74 specimens collected in different locations in Brazil, including Serra do Cachimbo (PA), Canaã dos Carajás (PA), São José do Rio Claro (MT), Cocalzinho de Goiás (GO), and the Parque Nacional das Sete Cidades (PI). Morphological and internal genitalia analysis revealed that these species differ from other members of the genus in features such as the shape of the palpi, the tenth tergite, metanotal glands, the arrangement of the tympana on the forelegs, vein cells in the tegmina, and the morphology of the phallic complex. These species represent the first records of *Palpigera* for the northern and northeastern regions of Brazil. Additionally, we describe *Parapalpigera amazonica* **gen. et sp. nov**., collected in the Amazon rainforest. This new genus, probably related to *Melanotes* and *Palpigera*, is distinguished by its reduced tegmina without a stridulatory apparatus, absence of tympanum, long and thin palpi, shape of the endophallus sclerite, bifid endophallus apodeme, and shape of the female copulatory papilla. These findings expand the taxonomic and biogeographic knowledge of the Luzarina subtribe in the neotropical region.

Keywords: Neotropical crickets; Biodiversity; Taxonomy; Genital morphology.

Contribuições taxonômicas para *Palpigera* Hebard (Orthoptera: Phalangopsidae) com descrição de novas espécies, novos registros e proposição de um novo gênero para Luzarina

RESUMO

A subtribo Luzarina é a mais representativa da região neotropical, contando atualmente com 128 espécies válidas distribuídas em 49 gêneros. Neste estudo, contribuímos para o conhecimento do grupo por meio da descrição de cinco novas espécies de *Palpigera* e preposição de um novo gênero monotípico, *Parapalpigera amazonica* **gen. et sp. Nov**. As cinco espécies de *Palpigera* foram identificadas a partir espécimes coletados em diferentes localidades do Brasil, incluindo Serra do Cachimbo (PA), Canaã dos Carajás (PA), São José do Rio Claro (MT), Cocalzinho de Goiás (GO) e o Parque Nacional das Sete Cidades (PI). A análise morfológica e da genitália interna revelaram que essas espécies diferem de outros membros do grupo em características como o formato dos palpos, do décimo tergito, das glândulas metanotais, na disposição dos tímpanos nas pernas anteriores, nas células das veias das tégminas e na morfologia do complexo fálico. Essas espécies representam os primeiros registros de *Palpigera* para as regiões Norte e Nordeste do Brasil. Além da descoberta de *Parapalpigera* **gen. nov**., para a Floresta Amazônica. Esse novo gênero, com parentescos a *Melanotes* e *Palpigera*, distingue-se por suas tégminas reduzidas sem aparato estridulatório, ausência de tímpano, palpos longos e delgados, formato do esclerito do endofalo, pelo apódema do endofalo bifurcado e pelo formato da papila copulatória feminina. Esses achados ampliam o conhecimento taxonômico e biogeográfico da subtribo Luzarina na região neotropical

Palavras-chave: Grilos neotropicais; Biodiversidade; Taxonomia; Morfologia genital.

INTRODUÇÃO GERAL

Ordem Orthoptera Olivier, 1789

A ordem Orthoptera compreende pouco mais de 30.000 espécies descritas e distribuídas por todos os continentes, exceto Antártica (Song et al. 2018). Estes insetos encontram-se espalhados pelo mundo todo, sendo ausentes apenas nas regiões polares (Sperber et al. 2020; Cigliano et al. 2025). O nome Orthoptera (derivado do grego "ortho" = reto e "ptera" = asa) se refere às asas anteriores, posicionadas seguindo o eixo longitudinal do corpo e modificadas em tégminas (Walker & Masaki 1989).

Estes insetos, são mais abundantes em regiões tropicais e subtropicais, além de serem encontrados em altitudes e latitudes elevadas, desempenhando papéis cruciais na fauna local (Song et al. 2018; Souza-Dias et al. 2024). Muitos ortópteros podem ser encontrados em habitats mais corriqueiros como ambientes secos, ambientes arbustivos e até os aquáticos (como a subfamília Leptysminae). Além desses habitats existem registros de ortópteros até mesmo em lugares mais inesperados como é o caso de espécies de gafanhotos encontrados em habitats desérticos (Deyrup 1996; Song et al. 2018).

Os ortópteros são conhecidos pela sua capacidade de locomoção através de saltos, o que levou a formulação do antigo termo Saltatoria para a Ordem. Esse tipo de locomoção é facilitado pelas das pernas posteriores desenvolvidas (Souza-Dias et al. 2024; Nickle & Walker, 2011). Além disso, possuem olhos compostos bem desenvolvidos, um grande pronoto em forma de escudo que se curva sob as laterais do tórax e aparelho bucal do tipo mastigador (Sperber *et al.* 2020). Entre os insetos que fazem parte deste grupo estão os populares grilos, gafanhotos, paquinhas, esperanças, taquarinhas e outros.

Esses insetos apresentam grande variedade de formas, desde indivíduos de grande porte até espécies minúsculas quase que imperceptível a olho nu. Esta grande variedade influencia também no comportamento alimentar dessas espécies, podendo se alimentas desde folhas até pequenos invertebrados (Souza-Dias et al. 2024). Os ortópteros são hemimetábolos e, como outros insetos com metamorfose incompleta, desenvolvem-se de ninfas a adultos por meio de uma série de estádios, que se tornam progressivamente mais semelhantes ao adulto (Key, 1970).

Insetos ortopteróides apresentam duas subordens monofiléticas atuais, sendo elas: Ensifera e Caelifera (Song *et al.* 2015). Caelifera é caracterizada por antenas mais curtas, com menos de 30 segmentos, ovipositor curto e tímpanos na base do abdômen, a qual compreende os gafanhotos. Por outro lado, Ensifera é caracterizada por antenas longas (geralmente mais longas que o corpo), com mais de 30 antenômeros, ovipositor normalmente em forma de sabre ou agulha, e órgãos auditivos, os tímpanos, nas tíbias dianteiras, sendo representados pelos grilos, paquinhas e esperanças (Sperber *et al*., 2012).

Em Orthoptera, o papel crucial do som na biologia e evolução de diversas linhagens a torna a mais sonora entre todas as ordens de insetos (Souza-Dias et al. 2024; Zefa, 2006). Na subordem Ensifera, a produção de som é caracterizada pela estridulação, sendo o atrito das tégminas uma das principais formas desse fenômeno. Isso é possível devido à presença de um aparelho estridulador composto por uma fileira de dentículos em uma das asas anteriores que são atritados por uma borda mais enrijecida da asa oposta (a palheta), resultando em vibrações em regiões especializadas das asas que, por sua vez, geram ondas sonoras (Alexander, 1968; Elliott & Koch, 1985). Por outro lado, em Caelifera, o aparelho estridulador dos gafanhotos é composto por dentículos na parte interna do fêmur, os quais são raspados contra a parte lateral das asas anteriores, ou ainda através do atrito entre a asa anterior e a posterior (Alexander, 1968).

Os ortópteros não apenas alimentam uma ampla gama de animais, mas também contribuem para a manutenção do ecossistema ao controlar a vegetação e reciclar matéria orgânica. Eles são peças-chave no equilíbrio ecológico, atuando tanto como presas quanto como agentes transformadores do ambiente (Cappellari et al. 2007; Amédégnato 1977). Ademais, muitas espécies são predadoras ou onívoras, contribuindo para o controle populacional de outros artrópodes e até pequenos vertebrados (Souza-Dias et al. 2024). Além do fato que, recentemente, algumas espécies da região Amazônica também colaboram para a dispersão de sementes na Amazônia (Santana et al. 2016).

Apesar da reconhecida importância ecológica dos Orthoptera, o conhecimento sobre a diversidade do grupo na Região Neotropical, considerada uma das áreas biogeográficas mais biodiversas do planeta, ainda é relativamente limitado. Até o ano de 2025, foram registradas 4.597 espécies na região, o que representa pouco mais de 15% da diversidade atualmente conhecida para a ordem em escala global (Cigliano et al. 2025). No contexto brasileiro, foram identificadas 2.258 espécies, distribuídas em 565 gêneros e 18 famílias, concentrando aproximadamente 49% da diversidade registrada na Região Neotropical (Cigliano et al. 2025). Entretanto, o número real de espécies deve ser muito maior, uma vez que há uma grande carência de estudos e de pesquisadores na região (Souza-Dias et al. 2024; Castro-Souza et al. 2024).

Família Phalangopsidae Blanchard, 1845

De acordo com o *Orthoptera Species File* (Cigliano et al. 2025), a família Phalangopsidae inclui 1.115 espécies válidas, distribuídas em 195 gêneros, sendo encontradas em todas as regiões biogeográficas, exceto na Holártica e Holantártica. No Brasil e na região Neotropical, Phalangopsidae se destaca por sua notável diversidade, sendo a família de Gryllidea com o maior número de espécies registradas no país, totalizando 132. Duas subfamílias são tradicionalmente reconhecidas nessa região: Paragryllinae e Phalangopsinae (Cigliano et al. 2025). Dentro dessa

família, a subfamília Phalangopsina**e** é a mais representativa da região Neotropical. No Brasil, atualmente 113 espécies são registradas, distribuídas em 34 gêneros (Cigliano et al. 2025).

Os falangopsídeos são insetos geralmente noturnos, facilmente encontrados na natureza, tipicamente habitando o interior de troncos podres a superfície inferior de rochas no sub-bosque de florestas tropicais, produzindo sinais acústicos, além de serem facilmente criados em ambiente de laboratório (Desutter-Grandcolas 1995a; Desutter-Grandcolas 1995b). Ademais, são conhecidos por apresentarem um corpo relativamente delgado, com pernas, antenas e cercos alongados. Eles também possuem cabeça pequena. Os escapos antenais são notavelmente desenvolvidos, mais largos que o fastígio. As tégminas muitas vezes estão ausentes ou reduzidas, o que os torna geralmente braquípteros, e a asa posterior está normalmente ausente (Desutter-Grandcolas, 1995a; Sperber *et al*., 2012).

A filogenia mais recente publicada para a superfamília Grylloidea (Chintauan-Marquier et al. 2016) trouxe uma nova perspectiva sobre a relação evolutiva de Phalangopsidae. Embora tenha identificado Phalangopsidae como uma das famílias monofiléticas, as relações internas revelaram-se notavelmente instáveis. No contexto da região Neotropical, das duas subfamílias tradicionalmente reconhecidas (Paragryllinae e Phalangopsinae), Paragryllinae foi recuperada como parafilética enquanto Phalangopsinae foi recuperada como polifilética.

Subtribo Luzarina Hebard, 1928

A subtribo Luzarina foi inicialmente descrita como o grupo Luzarae dentro da subfamília Phalangopsinae (Hebard 1928), baseada principalmente na morfologia externa e modos de vida, desconsiderando características da genitália interna e aparato estridulatório (Gorochov 2014). Posteriormente, foi elevada à categoria de tribo dentro da mesma subfamília (Chopard 1968) e, mais tarde, promovida ao status de subfamília dentro da família Phalangopsidae (Vickery 1977). No entanto, essa última reclassificação baseou-se em uma justificativa frágil, que defendia a elevação de todos os táxons supragenéricos da ordem Orthoptera devido à sua divisão em duas ordens (Gorochov 2024).

A organização desses táxons foi revisada por Gorochov (1995), que manteve Luzarini como uma tribo dentro de Phalangopsinae. Posteriormente, análises mais detalhadas da genitália masculina levaram o próprio autor a propor uma nova classificação para Phalangopsinae e seus grupos relacionados (Gorochov 2014). Nesta revisão, Phalangopsinae foi subdividida em cinco tribos e treze subtribos, com Luzarae sendo reclassificado dentro da tribo Phalangopsini como a subtribo Luzarina. Essa reorganização, especialmente a inclusão de Luzarina dentro de Phalangopsini, foi parcialmente apoiada pelo estudo de Chintauan-Marquier et al. (2016).

Apesar dessas revisões, o *Orthoptera Species File* continuou a tratar Luzarina como uma subfamília de Phalangopsidae. Somente após a reafirmação do status de subtribo por Gorochov (2024), o OSF corrigiu essa classificação em seu catálogo online. Atualmente, no cenário taxonômico a subtribo inclui 43 gêneros válidos em todo o mundo, incluindo *Palpigera* Hebard, 1928, abrangendo uma diversidade notável (Cigliano *et al*. 2025).

No entanto, é importante salientar que a verdadeira extensão da diversidade de espécies permanece em grande parte desconhecida, como indicado por Gorochov (2019). Essa falta de conhecimento ressalta a necessidade contínua de pesquisas para compreender a riqueza biológica e as relações dentro dessa complexa família.

***Palpigera* Hebard ,1928**

O gênero *Palpigera*, até o momento, possui quatro espécies descritas, registradas na região centro-oeste brasileira e na Bolívia (Figure 1). Suas características diagnósticas incluem uma expansão nos dois últimos artículos do palpo, sendo esses de cor branca (Hebard 1928). Adicionalmente, exibem uma venação das tégminas mais espessa e distinta e a extremidade da placa supranal dos machos amplamente truncada (Hebard, 1928). Algumas dessas características são compartilhadas também com o gênero *Melanotes*, que foi descrito por Dessuter em 1993, no qual ela destaca cacteres apomórficos entre esses dois gêneros, como por exemplo: palpos extremamente alargados; ângulo anterior do espelho deslocado para a borda do élitro, e não em posição central; extremidade dos braços epifálicos em forma de lobo, destacada dos escleritos associados (Desutter-Grandcolas 1993).

Hebard (1928) estabeleceu o gênero *Palpigera* para incluir três espécies, *Luzara boliviana* Bruner, 1916 e *Ectecous borellii* Giglio-Tos, 1897 que foram realocados para o então gênero novo, e *Palpigera fratercula* Hebard, 1928 que foi a espécie nova apresentada no mesmo trabalho. *Palpigera borellii* foi determinado como espécie tipo por Hebard. Gorochov (2014) descreveu *Palpigera aluzara*, descrevendo a primeira genitália interna para o gênero e a presença de glândulas metanotais abaixo da tégmina masculina. Todas as espécies foram descritas com base em machos e fêmeas, exceto *P. fratercula* que foi descrito com base apenas em macho.

A morfologia do órgão genital masculino (ou complexo fálico) e os escleritos fálicos têm sido importantes na taxonomia de grilos, sendo empregados em estudos desde a década de 1960 (Souza-Dias *et al.* 2014). No entanto, como mencionado anteriormente, somente a genitália de *P. aluzara* é conhecida (Gorochov 2014) . Por outro lado, Hebard (1928) baseou-se principalmente em descrições superficiais do palpo e da placa supra-anal para distinguir as espécies, o que resultou em informações limitadas e, consequentemente, dificultando o reconhecimento dessas espécies (Hebard 1928).

Dessa forma, este estudo tem como propósito executar um estudo taxonômico do gênero *Palpigera* Hebard, 1928, a fim de realizar descrições de espécies novas e atualizar/ampliar o registro da distribuição do gênero, com informações taxonômicas detalhadas, especialmente em relação à genitália e outras estruturas de machos e fêmeas. Além disso, descrevemos um novo gênero da subtribo Luzarina, aparentado a *Palpigera*, encontrado na Amazônia, contribuindo para o entendimento do grupo. Por fim, buscamos padronizar a terminologia utilizada para descrever as características genitais dos táxons descritos, seguindo Desutter (1987), modificado em Desutter-Grandcolas (2003).

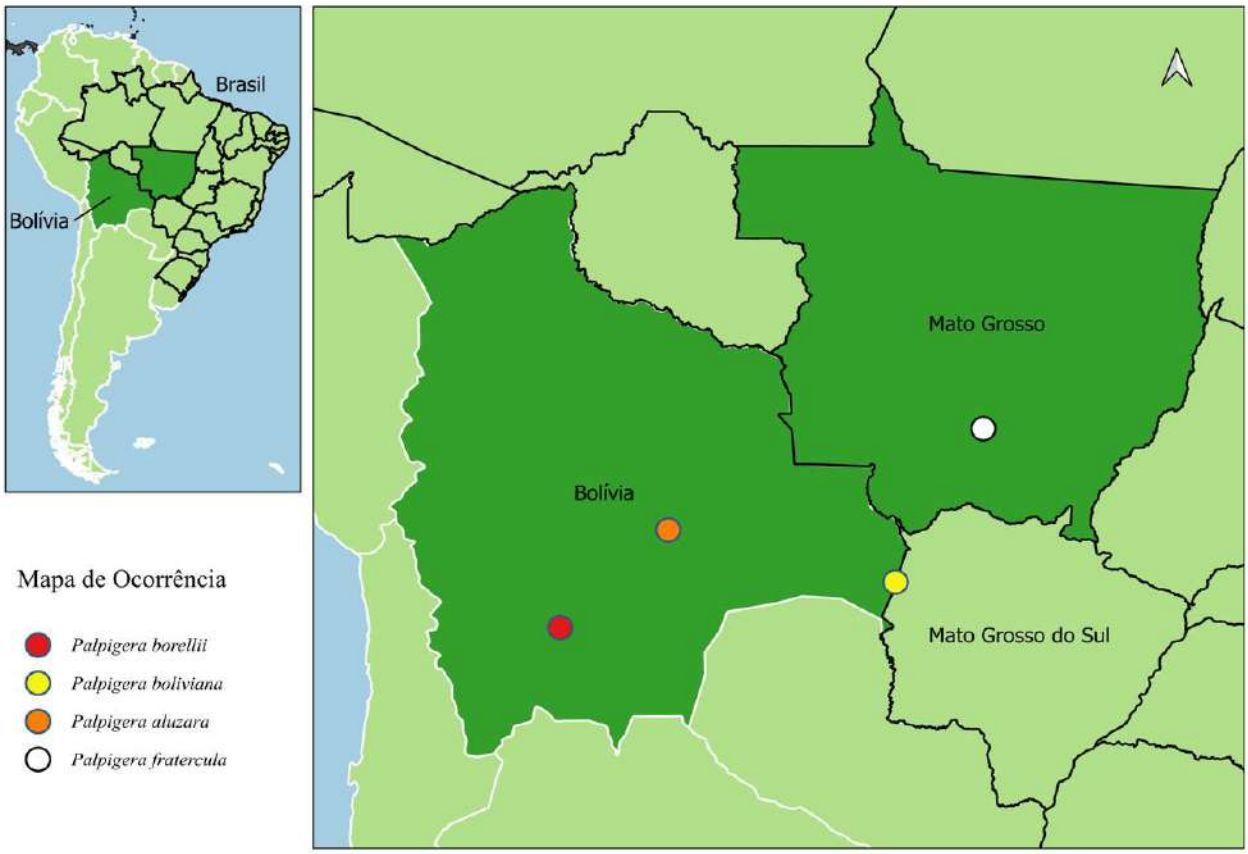

Figure 1 – Mapa de ocorrência das espécies de *Palpigera.*

Esta dissertação foi estruturada em dois capítulos, organizados na forma de artigos científicos, com o objetivo de contribuir para o conhecimento taxonômico do gênero *Palpigera* e da subtribo Luzarina (Orthoptera: Phalangopsidae) na região Neotropical. O primeiro capítulo, intitulado "Five new species of the genus *Palpigera* Hebard, 1928 (Orthoptera: Phalangopsidae) from Brazil", tem como propósito a descrição de cinco novas espécies pertencentes ao gênero *Palpigera*, além de ampliar significativamente os registros de ocorrência desse grupo no território brasileiro e, consequentemente, na América do Sul. Já o segundo capítulo, intitulado "A new genus of cricket of the subtribe Luzarina (Orthoptera: Phalangopsidae) from the Brazilian Amazon

Rainforest", tem como foco a descrição de um novo gênero de grilo coletado na Floresta Amazônica, morfologicamente próximo a *Palpigera* e *Melanotes*. Este estudo visa aprofundar a compreensão sobre a diversidade dentro da subtribo Luzarina, contribuindo para o reconhecimento de seus limites morfológicos.

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Capítulo 1

Five new species of the genus *Palpigera* Hebard, 1928 (Orthoptera: Phalangopsidae) from Brazil

O Capítulo I desta dissertação foi elaborado e formatado de acordo com as normas da revista científica *Zoological Studies*, cujas diretrizes estão anexadas (Anexo 1).

Five new species of the genus *Palpigera* Hebard, 1928 (Orthoptera: Phalangopsidae) from Brazil

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ABSTRACT

Five new species of *Palpigera* are described based on specimens collected in Serra do Cachimbo, Canaã dos Carajás (in Pará State), São José do Rio Claro (in Mato Grosso State); Cocalzinho de Goiás (in Goiás State), and Parque Nacional das Sete Cidades (in Piauí State). Morphological and internal genitalia analyses revealed five new species: *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, *Palpigera* sp. nov. 4, and *Palpigera* sp. nov. 5. These species differ from other members of the genus mainly in the shape of the palpus, tenth tergite, metanotal glands, the arrangement of the tympana on the fore legs, the vein cells in the tegmina, the presence or absence of a yellow line on the posterior region of the pronotum; and the morphology of the phallic complex. Additionally, we provide new insights into the internal genitalia and metanotal gland of the genus. These species represent the first records of *Palpigera* in the northern and northeastern regions of Brazil.

Keywords. Biodiversity, Luzarina, Neotropical crickets, Taxonomy

BACKGROUND

Palpigera Hebard, 1928 is a genus that currently includes four described species, recorded in central-western Brazil and Bolivia (Cigliano *et al*. 2025). Its main characteristics are the distinct expansion of the last two segments of the maxillary palpi, which are entirely white (Hebard, 1928), the thick and well-defined venation of the tegmina, and the broadly truncated male supra-anal plate (Hebard, 1928).

Hebard (1928) established the genus *Palpigera* to include three species: *Luzara boliviana* Bruner, 1916, and *Ectecous borellii* Giglio-Tos, 1897, which were moved to the newly created genus, along with *Palpigera fratercula* Hebard, 1928, described as a new species in the same study. Hebard designated *Palpigera borellii* as the type species. Later, Gorochov (2014) described *Palpigera aluzara*, providing the first description of the internal genitalia for the genus and reporting the presence of metanotal glands beneath the male tegmina. All species were described based on both males and females, except for *P. fratercula*, , which was described based only on the male.

The morphology of the male genital organ and its associated sclerites is pivotal in cricket taxonomy and has been widely used in taxonomic studies since the 1960s (Desutter-Grandcolas & Faberon, 2020; Martins et al., 2013; Mews & Sperber, 2008; Souza-Dias et al., 2014; Souza-Dias et al.,2015). However, as previously mentioned, the phallic complex of *P. aluzara* is currently the only one known (Gorochov, 2014).

Palpigera is a genus with only one official record in Brazil, specifically in the state of Mato Grosso, in the Central-West region. In this study, we describe five new species from three distinct regions of the country—North, Northeast, and Central-West—covering four states: Pará, Piauí, Goiás, and Mato Grosso. Thus, we expand both the geographic distribution and the knowledge of the genus.

MATERIALS AND METHODS

The male and female genitalia were removed with the aid of micropins and treated with a 10% aqueous potassium hydroxide (KOH) solution, heated for about 15 minutes to remove muscles and tissues, allowing better visualization of the structures. They were then washed in water, transferred to a vial with vinegar for 5 minutes (to neutralize the KOH reaction), washed again, and then placed in a vial with 80% alcohol, where they were stored along with the dissected specimen.

The nomenclature used for the male genitalia followed Desutter (1987; 1988), with modifications by Desutter-Grandcolas (2003): **Ps.P**, pseudepiphallic parameres; **Ect.F**, ectophallic fold; **Ect.A**, ectophallic apodemes; **Arc**, ectophallic arch; **B-Scl**, pseudepiphallic sclerite B; **Arm**, pseudepiphallic arms; **R**, rami; **En.a**, endophallic apodeme; **En.s**, endophallic sclerite. The

photographs were taken with a Leica DFC 450 camera attached to a Leica M205 A stereo microscope, stacked using Helicon Focus 8 and edited in Photoshop 2021.

The nomenclature used for the description of the stridulatory veins follows Josse et al. (2023): **ha**, harp; **mi**, mirror; **CuPa**, a subdivision of the Cu vein (cubitus); **PCuP**, a subdivision of the PCu vein (postcubitus); **C1**, **C2**, **C3**, posterolateral cells.

The measurements were taken with a caliper and are defined as follows: total length (**TL**) as the distance from the top of the head to the tenth tergite; pronotal length (**PL**) as the maximum distance between the anterior and posterior margins of the pronotal disc; pronotal width (**PW**) as the maximum distance between the lateral lobes of the pronotum; tegmina length (**Tg**) as the distance from the base to the apex of the tegmina; hind femur length (**HF**) as the distance from the base of the hind femur to the apex of the genicular lobes; hind tibia length (**HT**) as the distance from the base to the apex of the hind tibia; and ovipositor length (**Ov**) as the distance from the apex of the subgenital plate to the apex of the ovipositor.

The specimens analyzed are distributed in three Brazillian collections: entomological collection of the Museu Paraense Emílio Goeldi (MPEG), Pará; Seção de Entomologia da Coleção Zoológica, Departamento de Biologia e Zoologia, Universidade Federal de Mato Grosso, Cuiabá (CEMT); Coleção de Invertebrados Subterrâneos de Lavras (ISLA), Universidade Federal de Lavras, Minas Gerais . The map of biogeographic distribution was created using specimen label data and literature in Quantum GIS (QGis) software. When locations were not georeferenced, approximate coordinates were used.

RESULTS

Taxonomy

Order Orthoptera Olivier, 1789

Suborder Ensifera Chopard, 1921

Family Phalangopsidae Blanchard, 1845

Subfamily Phalangopsinae Blanchard, 1845

Tribe Phalangopsini Blanchard, 1845

Subtribe Luzarina Hebard, 1928

Genus *Palpigera* Hebard, 1928

***Palpigera* sp. nov. 1**

(Figs. 1, 2, 3, 4, 5, 6, 29)

Zoobank

Type material: *Holotype*. **Male**. Brazil, Pará, Novo Progresso; Serra do Cachimbo, Campo de Provas Brigadeiro Veloso, Ponto 2 ; 09°22'24"S, 55°01'10"W; 19.IX.2003; D.D. Guimarães leg.

Manual Noturna [the phallic complex was removed but kept in a microtube along with the specimen]. Repository: MPEG

Paratypes. **6 males** and **5 females**. Same data as the holotype. **3 males** and **2 females**. Same locality as the holotype but Ponto 1 ; 09°16'49" S, 54°56'32" W; 07–17.IX.2003; Pitfall. **13 males** and **11 females**. Same locality as the holotype but Ponto 4; 09°21'89"S, 55°02'01"W; 07–17.IX.2003; Pitfall. Repository: MPEG

Diagnosis. This species is similar to others in the genus, characterized by laminated expansion of last palpi segments, white coloration, and absence of transverse veins in the mirror. *Palpigera* sp. nov. 1 differs from other congeners in the tympanum present only on the inner face of the fore tibia (Figs. 2A, B), shared only with *P. aluzara*. In contrast, *P. boliviana* and *P. fratercula* have tympana on both faces of the fore tibia. Unlike *P. borellii*, *Palpigera* sp. nov. 1 has less expanded last two palpal articles (Fig. 3E) than *P. borellii*, but more expanded than *P. fratercula* and *P. boliviana*. The tenth tergite of *Palpigera* sp. nov. 1 has visible lateral lobes on the posterior margin (Fig. 3A), but it is only gently produced, much less prominent than in *P. boliviana*, *P. borellii*, and *P. aluzara*.

Palpigera sp. nov. 1 and *P. aluzara* have subtle differences in external morphology but distinct internal genitalia. *Palpigera aluzara* has **Ect.F** compressed, triangular; in *Palpigera* sp. nov. 1, it is wider and triangular (Fig. 4A); **Ect.A** in *P. aluzara* is thin and convergent; in *Palpigera* sp. nov. 1, it is smaller, wider, and divergent (Figs. 4A, C). **Ps.P** in *Palpigera* sp. nov. 1 has elongated lateral projections, curved inward, and with tapered tips; in *P. aluzara*, it has robust projections, less curved, and thicker on the base (Figs. 4A, D). In *P. aluzara*, **Ps.S**, **Ect.F**, and **Ps.P** are compressed, with almost no space between them; in *Palpigera* sp. nov. 1, there is a considerable separation between these sclerites. Additionally, there are differences in females in internal genitalia: copulatory papilla is irregular in *P. aluzara* and cone-shaped in *Palpigera* sp. nov. 1 (Fig. 6H).

Description: color varying from light to dark brown, legs darker than body (Figs. 1A, B). **Male head.** taller than wide, dark brown frontally, light brown dorsally, and with whitish areas around ocelli and antennal scapes (Fig. 1D). Labrum pale and clypeus similar to the head in color; labrum 1.5× larger than clypeus (Fig. 1D). Eyes oval, taller than wide, prominent in frontal and lateral views (Figs. 1B, D). Median and lateral ocelli visible, light brown. Antennal scape well-developed, as wide as the vertex (Fig. 1D). Antennae long, reaching the posterior femur apex (Figs. 1A, B). Pedicel like other antennomeres but slightly wider (Fig. 1D). Maxillary palpi elongated and robust, with the last two palpomeres white, twice as long as the head. First two palpomeres equal in length; third twice as long as the first two combined; fourth elongated and thickened (Fig. 3E); fifth

segment ventrally expanded, with slightly curved edges; three last palpomere equal in length (Fig. 3E).

Male thorax. Pronotum light brown on the disc but darker on the sides, with a light yellowish stripe on the posterior region (Figs. 1B, C). In dorsal view, longer than wide, anterior margin nearly straight with few setae, posterior margin concave (Fig. 1C). In lateral view, taller than wide, ventral margin convex, posteroventral and anteroventral angles obtuse (Fig. 1B). Metanotal gland dark brown, with two median lobe-shaped projections and a pair of rounded lateral tubercles (Fig. 1F). Prosternum reduced, quadrangular, with sharp cervical sclerites. Mesosternum rectangular, with slightly sinuous margins; anterior half dark brown, and posterior half ochre. Metasternum hexagonal, with posterior margin slightly emarginated; central portion with a triangular brown spot and lateral oblique lither portions (Fig. 3D).

Male tegmina. Tegmina covering more than half of abdomen (Fig. 1A). **CuPa** well-defined, separating dorsal and lateral fields; posterior margin convex, nearly straight (Fig. 1E). Stridulatory apparatus complete, with reduced venation, **ha** well-defined, **mi** reduced, wider than long, with no transverse veins (Fig. 1E). **C1** and **C3** elongated; **C2** reduce compared to the other cells, with parallel veins converging medially. Lateral field narrow, with seven longitudinal veins (Fig. 1E).

Male legs. light brown with yellowish spots (Fig. 2A-F). Tympanum oval, present only on the inner side of fore tibiae (Figs. 2A, B). All legs covered with small setae (Fig. 2A-F). Fore and mid tibiae equal in length as respective femora (Figs. 2A-D). Hind legs elongated, femora robust, 1.5× longer than the body (Figs. 2E, F). Fore tibia with two apical spurs (Figs. 2A, B); mid tibia with four apical spurs (Figs. 2C, D); hind tibia with four mid-distal dorsal subapical spurs, several small spines between them and on the mid-proximal portion of the tibia, and three apical spurs per margin (Figs. 2E, F). Outer apical spurs of hind tibia: dorsal and ventral almost equal in size and mid one smaller (Fig. 2F). Inner apical spurs of hind tibia: dorsal spines very long, medial slightly smaller, and ventral almost half the length of the first (Fig. 2E). Hind basitarsus almost twice longer than other tarsomeres combined, dorsally with several spines, and two apical spurs, being the inner longer than the outer one (Figs. 2E, F).

Male abdomen. elongated, representing more than half of the total body length, light brown dorsally and dark brown laterally (Figs. 1A, B). Supra-anal plate trapezoidal, with mid-proximal lateral margins concave, followed by more deep mid-distal lateral margins, and a posterior margin truncated, with mid-distal portion very gently convex, flanked by two small lobes on the corners (Fig. 3A). Subgenital plate longer than wide. In ventral view, with a broad base and sinuous lateral margins, formed by a mid-lateral lobe flanked by two slightly concave oblique margins; distal margin widely concave, emarginated (Fig. 3C). In lateral view, with ventral margin convex; dorsal margin sinuous (Fig. 3B).

Male Genitalia: Pseudepiphallus: Ps.S elevated, forecurved in lateral view, slightly translucent surface in axial view, and with a widely but shallow concave dorsal margin in dorsal view (Figs. 4A, B, D). **Arc** short in relation to the **Ect.A**, almost covered by **Ps.S** (Fig. 4A). **R** elongated, slender, and, in lateral view, arched (Figs. 4A, B, D). **B-Scl** narrow, well-sclerotized; in lateral view, upcurved, with hyaline apical distal **Arms** (blue arrow) (Fig. 4B). **Ps.P** heavily sclerotized. In axial view, **Ps.P** formed by two main lobes portions: a large lateral projection with concave and oblique dorsal and ventral margins and a distal projection formed by an elevated horn-like structure (Fig. 4D). In dorsal and ventral views, **Ps.P** with elongated and incurved lateral projections, with tapered tips; small comma-shaped posterior projection (red arrow) (Figs. 4A, C). In lateral view, **Ps.P** with the proximal portion forming large lobes and the distal portion as an elevated and conspicuous horn-like structure (Fig. 4B). **Ectophallus: Ect.F,** in dorsal view, distal region with two concavities, narrower than the proximal region. (Fig. 4A); in lateral view, distal portion emerges after **Ps.S** and before **Ps.P**, almost as high as the **Ps.P** (Fig. 4B); in axial view, distal apex arched (Fig. 4D). **Ect.A** short in relation to the **R**, widened, reaching half of **R,** distally whitish, roundly expanded, and divergent (Figs. 4A, C). **Endophallus: En.s** elongated, surpassing the **R**, with a seed-like tip and a large apodeme. (Figs. 4A, B, C).

Female. Similar to males in size and coloration (Figs. 5A, B), differing in the ambisexual characters: no metanotal glands (Fig. 5C). Tegmina slightly smaller than males, with simple longitudinal veins (Figs. 5E, F). Thoracic sternites similar to males (Fig. 5D). Supra-anal plate setose, broadly convex posteriorly, with lateral margins similar to males but smaller and deeper (Fig. 6C). Subgenital plate sub-trapezoidal, with emarginated apex (Figs. 6B, C). Ovipositor straight, 2/3 the length of the hind femur, and with an acuminate and arrow-shaped apex (Figs. 6D, E). Copulatory papilla elongated, well-sclerotized, cone shape; distal base broad, lateral margins converge to the proximal region with a small membranous opening (Figs. 6F, G, H). In dorsal view, with a central hyaline line, like a slit, and deep V-shaped proximal and distal margins (Fig. 6F); in lateral view, with a broad base and rounded (Fig. 6G); in ventral view, with a V-shaped hyaline distal margin and a truncated proximal margin (Fig. (6H).

Measurements (mm).

Twenty-Three males. **TL:** 16.0–20.0; **PL:** 2.0–3.0; **PW:** 3.0–4.5 **Tg:** 9.0–10.0; **HF:** 11.0–15.0; **HT:** 10.0–13.0

Eighteen females. **TL:** 16.0–20.0; **PL:** 3.0–3.5; **PW:** 3.5–4.5; **Tg:** 3.5–5.0; **HF:** 12.0–15.5; **HT:** 10.0–13.0; **Ov:** 8.0–11.

***Palpigera* sp. nov. 2**

(Figs. 7, 8, 9, 10, 11, 12, 29)

Zoobank

Type material: *Holotype*. **Male**. Brazil, Mato Grosso, São José do Rio Claro, 13°47'49.7"S / 56°42'11.8"W, alt. 327 m.; 21.X.2018, Chagas Jr, A.; Santos, LM & Borges, DM [the phallic complex was removed but kept in a microvial with the specimen]. Repository: CEMT

Paratypes. **1 male**. Brazil, Mato Grosso, Chapada dos Guimarães, Condominio Ecoville, 15°11'44,61"S / 55°55'51,91"W - alt 303m; 22-24.II.2019, Chacará 74, Turma Zoologia II. **1 female**. Same locality as the holotype but 13°47'47.1"S / 56°42'13.9"W, alt. 323; 23.X.2018, Chagas, Jr, A. Santos, LM & Borges, DM; Coleta noturna. **1 female**. Same locality as the holotype but 13°47'48.7"S / 56°42'12.7"W, alt. 330 m.; 21.X.2018, Chagas, Jr, A. Santos, LM & Borges, DM. Repository: CEMT

Diagnosis. *Palpigera* sp. nov. 2 differs from other congeners in the tympanum present only on the inner face of the fore tibia (Figs. 8A, B), shared only with *Palpigera* sp. nov. 1 and *P. aluzara*. In contrast, *P. boliviana* and *P. fratercula* have tympana on both sides of the hind tibia. *Palpigera* sp. nov. 2 has the last two palpal articles less expanded than in *P. borellii*, but more expanded than in *P. fratercula* and *P. boliviana* (Fig. 9E). The tenth tergite of *Palpigera* sp. nov. 2 has no lateral lobes, the posterior margin is completely truncated, differing from *P. boliviana*, *P. borellii*, *P. aluzara*, and *Palpigera* sp. nov. 1 (Fig. 9C).

The new species, *Palpigera* sp. nov. 2, resembles *Palpigera* sp. nov. 1 and *P. aluzara* in genital shape (Figs. 10A-D). However, unlike *P. aluzara*, *Palpigera* sp. nov. 1 and *Palpigera* sp. nov. 2 do not have **Ps.S**, **Ect.F**, and **Ps.P** compressed and positioned with minimal spacing between them (Figs. 10C; 4B). Compared to *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2 has the **Ect.A** less expanded and oriented in divergent directions, also differing from *P. aluzara* (Figs. 10A; 4A). In lateral view, the apex of **Ect.F** in *Palpigera* sp. nov. 2 is directed proximally, whereas in *Palpigera* sp. nov. 1, it points upward (Figs. 10C; 4B). **Ps.P** in *Palpigera* sp. nov. 2 is similar to *P. aluzara*, with more robust and less curved projections and a thicker base, contrasting with *Palpigera* sp. nov. 1, which has more elongated and widely curved lateral projections (Figs. 10A, C; 4A, B). In axial view, the **Ps.P** in *Palpigera* sp. nov. 2 has more compressed and twisted lateral and median projections, while these sclerites are more spaced in *Palpigera* sp. nov. 1. The base of **Ps.P** is nearly straight in *Palpigera* sp. nov. 2, whereas in *Palpigera* sp. nov. 1, it has a beveled contour (Figs. 10D; 4D). The main difference between females lies in the internal genitalia. Like *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2 has a conical copulatory papilla, differing from *P. aluzara*, which

presents more rounded lateral margins (Figs. 12F-H; 6F-H). However, *Palpigera* sp. nov. 2 lacks the medial hyaline line present in *Palpigera* sp. nov. 1 in dorsal view (Figs. 12F; 6F).

Description. Dark brown coloration, with small yellowish spots on the ventral part of the posterior femur (Figs. 7A, B). **Male head** hypognathous, taller than wide, dark brown (Fig. 7D). Labrum and clypeus ligther than the rest of head, with labrum larger than clypeus (Fig. 7D). In frontal and lateral view, eyes oval, taller than wide, and prominent (Figs. 7B, D). Lateral and median ocelli clearly visible, similar in color to labrum and clypeus (Fig. 7D). Antennal scape well-developed, almost the same size as the vertex. Long antennae. Pedicel similar to other antennomeres but slightly longer (Fig. 7D). Maxillary palpi robust, with the last two palpomeres white, twice as long as the head. First two palpomeres nearly the same size; second slightly longer than the first; third twice as long as the first two combined (Fig. 9E); fourth wider than the first three but shorter than fifth and third; fifth elongated ande tapered, curved distally (Fig. 9E).

Male thorax. Pronotum dark brown throughout, with a light-yellow stripe on the posterior region (Fig. 7C). In dorsal view, longer than wide, with anterior and posterior margins nearly straight (Fig. 7C). In lateral view, height and width equal, with ventral margin slightly convex and posteroventral and anteroventral angles obtuse (Fig. 7B). Metanotal gland dark, with two median lobe-shaped projections and a pair of rounded lateral tubercles (Fig. 7F). Prosternum reduced, quadrangular, with sharp cervical sclerites. Mesosternum rectangular, with posterior margin slightly sinuous. Metasternum hexagonal, with anterior margin straight and posterior margin emarginated (Fig. 9D).

Male tegmina. Tegmina covering more than half of abdomen (Fig. 7A). **CuPa** vein well-defined, separating dorsal and lateral fields; posterior margin convex, nearly straight (Fig. 7E). Stridulatory apparatus complete, with reduced venation; **ha** with visible veins, reduced **mi**, longer than wide, with not crossed by any vein. **C1** and **C3** elongated, **C2** reduced, with parallel veins converging medially. Lateral field narrow, with six longitudinal veins (Fig. 7E).

Male legs dark brown, similar to the body (Figs. 8A-F). Tympanum oval, present only on the inner side of fore tibiae (Figs. 8A, B). All legs covered with small setae (Fig. 8A-F). Fore and mid tibiae equal in length as fore and mid femora, respectively (Figs. 8A-D). Hind legs elongated and robust, 2× as long as the body (Figs. 8E, F). Fore tibiae with two apical spurs (Figs. 8A, B); mid tibiae with four apical spurs (Figs. 8C, D); hind tibiae, on each dorsal margin, with four mid-distal spurs, several small spines between them and mid-proximally, and three apical spurs (Figs. 8E, F). Outer apical spur of the hind tibia: dorsal and ventral almost same-lengthened, medial twice as long. Inner apical spurs of the hind tibia: dorsal and medial equal in length, ventral one smaller. Hind basitarsus almost twice longer than other tarsomeres combined, dorsally with several spines and two apical spurs, being the inner longer than the outer one (Figs. 8E, F).

Male abdomen elongated, with more than half of the total body length and color dark brown (Fig.

8A). Supra-anal plate trapezoidal, with irregular and curved lateral margins in the medial region, straight extremities, and truncated posterior margin (Fig. 9C). Subgenital plate longer than wide. In ventral view, with a broad base, almost straight lateral margins; distal margin widely bilobed, emarginated (Fig. 9A). In lateral view, with ventral margin slightly convex, dorsal margin sinuous (Fig. 9B).

Male Genitalia: **Pseudepiphallus: Ps.S** shortened; proximal portion elevated, with sclerotized surface in axial view (Figs. 10C, D). **Arc** short, almost covered by **Ps.S** (Fig. 10A). **B-Scl** narrow, well-sclerotized; in lateral view, upcurved, with hyaline apical distal **Arms** (blue arrow) (Figs. 10B, C). **Ps.P** heavily sclerotized. In axial view, **Ps.P** formed by two main lobes portions: a large lateral projection with highly twisted dorsal and ventral concave margins and a distal projection formed by an elevated horn-like structure (Fig. 10D). In dorsal and ventral views, **Ps.P** has projections resembling the shape of a boot (Figs. 10A, C). In lateral view, **Ps.P** with the proximal portion forming large lobes and the distal portion as an elevated and conspicuous horn-like structure, surpassing the height of the lobes (Fig. 10B). **Ectophallus: Ect.F,** in dorsal view, distal region with two concavities, narrower than the proximal region; in lateral view, distal portion emerges after **Ps.S** and before **Ps.P** (Fig. 10A); in axial view, distal apex curved (Fig. 10D). **Ect.A** short in relation to the **R**, widened, reaching half of **R**, distally whitish, expanded in a rod-like shape, and divergent. (Figs. 10A, B). **Endophallus En.s** elongated, surpassing the **R**, with a seed-like tip and a large apodeme (Figs. 10A, B, C).

Female similar to males in size and coloration (Figs. 11A, B), differing in the ambisexual characteristics: no metanotal glands (Fig. 11C). Tegmina smaller than males, with simple longitudinal veins (Figs. 11E, F). Thoracic sternites similar to males (Fig. 11D). Supra-anal plate setose, broadly convex posteriorly, with lateral margins similar to males but smaller and deeper (Fig. 12C). Subgenital plate sub-trapezoidal, with emarginated apex (Fig. 12A). Ovipositor straight, half the size of the hind femur, with uniform pointed apex (Figs. 12D, E). Copulatory papilla elongated, well-sclerotized, with a rounded triangular shape, broad distal base, and lateral margins converging to the proximal region with a small membranous opening (Figs. 12F, G, H). In dorsal view, with deep V-shaped proximal and distal margins (Fig. 12F); in lateral view, with a broad and rounded base (Fig. 12G); in ventral view, with a truncated proximal margin (Fig. 12H).

Measurements (mm).

Two males. **TL:** 22.0; **PL:** 3.0–4.0; **PW:** 4.5–5.0 **Tg:** 10.0; **HF:** 16.0–17.0; **HT:** 14.5–16.0

Two females. **TL:** 21.0–23.0; **PL:** 3.5–4.0; **PW:** 4.0–5.5; **Tg:** 5.0–6.0; **HF:** 16.5–17.5; **HT:** 14.5–15.0; **Ov:** 11.0–12.0

***Palpigera* sp. nov. 3**

(Figs. 13, 14, 15, 16, 17, 18, 29)

Zoobank

Type material . *Holotype*. Male**.** Brazil, Pará, Canaã dos Carajás 6°20'57.9"S 50°25'07.1"O, 17.IX.2018 [the phallic complex was removed but kept in a microtube along with the specimen]. Repository: ISLA

Paratypes. **1 female**. Same locality as the holotype but 6°21'03.3"S 50°23'29.7"O, 06.XI.2018. **1 female**. Same locality as the holotype but 6°21'01.0"S 50°23'49.3"O, 14.XI.2018. **1 female**. Same locality as the holotype but 6°20'36.7"S 50°24'14.6"O, 24.XI.2018. Repository: ISLA

Diagnosis. *Palpigera* sp. nov. 3 possesses a tympanum only on the inner face (Figs. 14A, B), similar to *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, and *P. aluzara*, whereas *P. boliviana* and *P. fratercula* have tympana on both faces of the hind tibia. This species differs by lacking the last two palpal articles as expanded as in *P. borellii*, although they are more expanded than in *P. fratercula* and *P. boliviana*, and by having the fifth article longer than in *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 1, and *P. aluzara* (Fig. 15E). Additionally, the tenth tergite features lateral lobes (Fig. 15A), which are absent in *Palpigera* sp. nov. 2 and *P. fratercula* but are less specialized compared to those in *P. boliviana* and *P. borellii*.

Palpigera sp. nov. 3 has a thinner **Ect.A** compared to *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, and *P. aluzara* (Fig. 16A). Among these four species, it possesses the longest and thinnest **R** (Figs. 16A, C). Like *Palpigera* sp. nov. 1 and *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3 lacks compressed **Ps.S**, **Ect.F**, and **Ps.P**, unlike *P. aluzara* (Fig. 16B). In dorsal view, the **Ps.P** of *Palpigera* sp. nov. 3 exhibits broadly everted and straight lateral posterior projections (Figs. 16A, C), whereas in *Palpigera* sp. nov. 2 and *P. aluzara*, these projections are directed backward, and in *Palpigera* sp. nov. 1, they are slightly curved. In axial view, the **Ps.P** of *Palpigera* sp. nov. 3 features a broadly beveled posterior base, obtuse medial projections, and no distal tapering (Fig. 16D); in contrast, *Palpigera* sp. nov. 1 and *Palpigera* sp. nov. 2 have tapered medial projections, with the posterior base slightly beveled or absent, respectively. Females of *Palpigera* sp. nov. 3 differ in their internal genitalia, although they share a conical shape with *Palpigera* sp. nov. 1 and *Palpigera* sp. nov. 2. Distinct from *P. aluzara*, *Palpigera* sp. nov. 3 is characterized by a bifurcated distal region and a large dorsal concavity (Figs. 18F, G, H).

Description. Coloration Dark brown, with yellowish details on the posterior femur and abdomen (Figs. 13A, B). **Male head**. Taller than wide, dark brown to almost black (Fig. 13D). Labrum whitish, clypeus similar to rest of head, 2× smaller than labrum (Fig. 13D). Eyes oval, taller than wide, prominent in frontal and lateral views (Figs. 13B, D). Lateral and median ocelli whitish and

visible (Fig. 13D). Antennal scape well-developed, as wide as the vertex (Fig. 13D). Antennae long, reaching the posterior femur apex (Figs. 13A, B). Pedicel similar to other antennomeres but slightly longer and wider (Fig. 13D). Maxillary palpi slender, with last two palpomeres white, twice as long as the head (Fig. 15E). First two palpomeres nearly sam-lengthened, second slightly longer; third 2× longer than first two combined; fourth long, slender, similar to third, with brown setae; fifth elongated and curved with distal region directed dorsally (Fig. 15E).

Male thorax. Pronotum dark brown, with light yellow stripe on the posterior region (Fig. 13C). In dorsal view, longer than wide, with anterior and posterior margins nearly straight (Fig. 13C). In lateral view, as tall as wide, with slightly convex ventral margin, posteroventral and anteroventral angles obtuse (Fig. 13B). Metanotal gland dark brown, with two median lobe-shaped openings and a pair of rounded lateral tubercles (Fig. 13F). Prosternum reduced, quadrangular, with sharp cervical sclerites. Mesosternum rectangular, with slightly sinuous margins; anterior half dark brown, and posterior half ochre. Metasternum hexagonal, with posterior margin slightly emarginated (Fig. 15D).

Male tegmina. Tegmina covering more than half of abdomen (Fig. 13A). **CuPa** well-defined, separating dorsal and lateral fields; posterior margin broadly convex (Fig. 13E). Stridulatory apparatus complete, with reduced venation, **ha** with six visible veins, **mi** reduced, longer than wide, with no transverse veins. **C1** and **C3** elongated; **C2** reduced, parallel **PCuP** veins converging medially. Lateral field very narrow, with about six longitudinal veins (Fig. 13E).

Male legs dark brown with yellowish spots (Figs. 14A-F). Tympanum oval, present only on the inner side of fore tibiae (Figs. 14A, B). All legs covered with small setae (Fig. 14A-F). Fore and mid tibiae same-lengthened as the corresponding femora (Figs. 14A-D). Hind legs long and robust, 2× body length (Figs. 14E, F). Fore tibia with two apical spurs (Figs. 14A, B); mid tibia with four apical spurs (Figs. 14C, D); hind tibia with four mid-distal dorsal spurs, several small spines between them and on the mid-proximal portion, and three apical spurs per margin (Figs. 14E, F). Outer spurs of the hind tibia: dorsal and ventral spurs same length, and medial spurs twice as long as the other two. Hind tibia inners spurs: dorsal and medial spurs of the same length, ventral spurs smaller. Hind basitarsus almost twice longer than other tarsomeres combined, dorsally with several spines and two apical spurs, being the inner longer than the outer one (Figs. 14E, F).

Male abdomen elongated, corresponding to more than half of the total body length, and dorsally light brown (Figs. 13A, B). Supra-anal plate trapezoidal, with mid-proximal lateral margins concave, followed by more deep mid-distal lateral margins and a posterior margin truncated, with mid-distal portion very gently convex, flanked by two big lobes on the corners (Fig. 15A). Subgenital plate longer than wide. In ventral view, with a broad base, lateral margins convex

proximally and straight mid-distally, and sinuous posterior margin (Fig. 15C). In lateral view, with ventral margin convex and dorsal margin almost straight (Fig. 15B).

Male Genitalia. **Pseudepiphallus: Ps.S** elevated, forecurved in lateral view, with slightly sclerotized surface in axial view and a broadly but shallow concave dorsal margin in dorsal view (Figs. 16A, B, D). **Arc** short and thin (Fig. 16A). **R** elongated, slender, and, in lateral view, straight (Figs. 16A, B, D). **B-Scl** narrow, well-sclerotized; in lateral view, upcurved, with hyaline apical distal **Arms** (blue arrow) (Fig. 16B). **Ps.P** heavily sclerotized. In axial view, the Ps.P formed by two main portions: a large lateral projection with concave and oblique dorsal and ventral margins, posteriorly beveled, and a twisted distal projection formed by an elevated, widened structure (Fig. 16D). In dorsal and ventral views, **Ps.P** with broadly everted and straight lateral-posterior projections (Figs. 16A, C). In lateral view, **Ps.P** with a proximal portion forming large lobes that fit into the distal portion, which features an elevated and conspicuous structure extending beyond these lobes, resembling a horn (Fig. 16B). **Ectophallus: Ect.F**, in dorsal view, almost trapeizodal, with a slightly broader proximal portion and margin with a small medial projection. (Fig. 16A); in lateral view, the distal portion emerges after **Ps.S** and before **Ps.P**, as high as the **Ps.P** (Fig. 16B); in axial view, distal apex arched (Fig. 4D). **Ect.A** short in relation to the **R**, thin, straight, reaching half of **R**, distally whitish, and divergent (Figs. 16A, C). **Endophallus: En.s** extending beyond the **R**, with a rod-like shape and a large apodeme (Figs. 16A, B, C).

Female Similar to males in size and coloration (Figs. 17A, B). Tegmina smaller than males, with simple longitudinal veins (Figs. 17E, F). Thoracic sternites similar to males (Fig. 17D). Supra-anal plate setose, progressively convex from median to posterior region, with lateral margins medially excavated (Fig. 18C). Subgenital plate sub-trapezoidal, with emarginated apex (Fig. 18A). Ovipositor straight, measuring half the length of the hind femur, with a pointed, arrow-shaped apex (Figs. 18D, E). Copulatory papilla well sclerotized, cone-shaped, base concave, lateral edges converging, with a bifid distal opening (Figs. 18F, H). In lateral view, mid-proximal portion broadly oval and well-sclerotized; distal portion more acuminated, with dorsal surface completely membranous (Fig. 18G).

Measurements (mm).

One male. **TL:** 18.0; **PL:** 3.0; **PW:** 5.0 **Tg:** 8.5; **HF:** 13.5; **HT:** 13.0

Three females. **TL:** 18.0–22.5; **PL:** 3.0–4.5; **PW:** 4.5–5.0; **Tg:** 4.5–5.5; **HF:** 13.0–18.5; **HT:** 13.0–17.5; **Ov:** 11.0–14.5

***Palpigera* sp. nov. 4**

(Figs.19, 20, 21, 22, 23, 24, 29)

Zoobank

Type material: *Holotype*. Male. Brazil, Piauí, Piracuruca, Parque Nacional das 7 cidades 4°3'42.7"S, 41°43'23.401"W, 6.XII.2006, L. S. Carvalho, D. F. Candiani & N. F. Lo Man Hung. Pitfall [the phallic complex was removed but kept in a microtube along with the specimen]. Repository: MPEG

Paratypes. **8 males** and **12 females**. Same data as the holotype. **2 females.** Same locality as the holotype but 4°5'51.601"S, 41°41'42.202"W, 26.I.2007, L. S. Carvalho, M. T. L. Avelino & M. P. Albuquerque. Pitfall. **1 female** Same locality as the holotype but 4°6'29.3"S, 41°40'47.464"W, 24.I.2007 L. S.

Diagnosis. *Palpigera* sp. nov. 4 has a tympanum on both faces of the internal tibia, similar to *P. boliviana* and *P. fratercula*, but of equal size on both sides (Figs. 20A, B). The last two palpal articles are elongated and slender, longer than any other palpomere, a unique characteristic within the genus (Fig. 21E). The tenth tergite lacks lateral lobes, distinguishing it from *Palpigera* sp. nov. 3, *P. boliviana*, *P. borellii*, and *P. aluzara*; its posterior region is convex, unlike *Palpigera* sp. nov. 2 and *P. fratercula* (Fig. 21A). Unlike other species, it does not have a yellow stripe on the pronotum (Fig. 19C). The **C2** cell of the tegmen is unbranched and elongated, differing from the other species (Fig. 19E). The metanotal gland features two median openings surrounded by setae (Fig. 20F), whereas other species possess lobes and lateral tubercles without setae.

Palpigera sp. nov. 4 has **Ect.A** narrow, elongated, and convergent, resembling *P. aluzara*, but differing from *Palpigera* sp. nov. 1 (wider) and *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3 (divergent) (Figs. 22A, B). **En.s** is positioned close to the pseudepiphallus, contrasting with *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, and *P. aluzara* (where it is much more distant and internalized) (Figs. 22A, B, C). **Ect.F** is dorsally robust and rectangular, with a small central notch, whereas it is triangular in *P. aluzara* and rectangular with a large central opening in *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, and *Palpigera* sp. nov. 3 (Fig. 22A). Similar to *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, and *Palpigera* sp. nov. 3, *Palpigera* sp. nov. 4 lacks compressed **Ps.S**, **Ect.F**, and **Ps.P**, a condition present in *P. aluzara*, where there is minimal space between them (Fig. 22C). Unlike *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, and *P. aluzara*, *Palpigera* sp. nov. 4 has no membranous **Arm** at the **B-Scl** apex; instead, it possesses a bifid sclerotized **Arm** (Figs. 22B, C, D). In females, the copulatory papilla is less sclerotized and more membranous compared to other species (Figs. 20F, G, H).

Description. Color varying from light to dark brown, with legs darker than the body (Figs. 19A, B). **Male head**. Taller than wide, dark brown with light spots around ocelli and antennal scapes (Figs. 19B, D). Labrum and clypeus light brown, labrum 1.5× larger than clypeus. Eyes oval, taller than

wide, prominent in frontal and lateral views (Fig. 19D). Median and lateral ocelli visible, light brown (Fig. 19D). Antennal scape well-developed, with half the vertex width (Fig. 19D). Antennae long, extend beyond the body (Figs. 19A, B). Pedicel similar to other antennomeres but slightly wider (Figs. 19A, B, D). Maxillary palpi slender and elongated, with last two palpomeres white, 1.5× thicker than antennomeres, 2× longer than head (Fig. 21E). First and two palpomeres equal in length; third twice as long as the first two combined; fourth thinner but slightly smaller than fifth; fifth arched, distal end slightly rounded, lighter (Fig. 21E).

Male thorax. Pronotum light brown on the disc but darker on the sides (Figs. 19B, C). In dorsal view, longer than wide, with anterior margin nearly straight bearing few setae, posterior margin concave (Fig. 19C). In lateral view, longer than high, with ventral margin slightly emarginated and posteroventral and anteroventral angles obtuse (Fig. 19B). Metanotal gland present, with two median projections covered in numerous setae (Fig. 19F). Prosternum reduced, "H"-shaped, slightly rounded, symmetrical edges. Mesosternum rectangular, with posterior margin slightly emarginated. Metasternum hexagonal, posterior margin emarginated (Fig. 21D).

Male tegmina. Tegmina reaching the fourth tergite, covering half of the abdomen (Figs. 19A, E). **CuPa** well-defined, separating dorsal and lateral fields; posterior margin rounded, convex (Fig. 19E). Stridulatory apparatus complete but with reduced venation, **ha** with six visible veins, reduced **mi**, longer than wide, not crossed by any vein. **C1, C2, C3** elongated, unbranched. Lateral field narrow, with four or five parallel longitudinal veins (Fig. 19E).

Male legs light brown with yellowish spots (Figs. 20A–F). Tympana oval, present on both sides of fore tibiae (Figs. 20A, B). All legs covered with small setae. Fore and mid tibiae equal in length as corresponding femora (Figs. 20A–D). Hind legs elongated, robust, twice as long as the body (Figs. 20E, F). Fore tibia with two apical spurs (Figs. 20A, B); mid tibia with four apical spurs (Figs. 20C, D); hind tibia with four mid-distal dorsal spurs, several small spines between them and on the mid-proximal portion of the tibia, and three apical spurs per margin (Figs. 20E, F). Inner apical spurs of the hind tibia: medial spur larger than dorsal and ventral spur, which are equal in size. Outer apical spurs of the hind tibia: dorsal spur longer than the others, followed by medial and ventral spurs. Hind basitarsus almost twice longer than other tarsomeres combined, dorsally with several spines and two apical spurs, being the inner longer than the outer one (Figs. 20E, F).

Male abdomen elongated, corresponding to more than half of total body length, dark brown from first to fourth tergite, light brown from fourth to tenth (Fig. 19A). Supra-anal plate trapezoidal, with lateral margins slightly curved, concave at extremities, and posterior margin slightly convex (Fig. 21A). Subgenital plate longer than wide. In lateral view, ventral margin slightly convex, and dorsal margins sinuous (Fig. 21B). In ventral view, with a base broad and lateral and posterior margin almost straight (Fig. 21C).

Male Genitalia: Shortened in relation to the others species. **Pseudepiphallus: Ps.S** elevated, partially curved forward in lateral view, with a slightly translucent surface in axial view and a widely concave dorsal margin in dorsal view (Figs. 22A, B, D). **Arc** short in relation to the **Ect.A**, almost entirely covered by **Ps.S** (Fig. 22A). **R** elongated and slender (Figs. 22A, B, D). **B-Scl** narrow, well-sclerotized; in lateral view, upcurved, with bifid sclerotized apical **Arms** (blue arrow) (Fig. 22B). **Ps.P** heavily sclerotized. In axial view, **Ps.P** consists of a large lateral projection with twisted dorsal and ventral margins, featuring three lateral spine-like projections (Fig. 22D). In dorsal and ventral views, **Ps.P** positioned laterally, with the distal projection curved, forming a pronounced arc (Figs. 22A, C). In lateral view, **Ps.P** with the proximal portion forming large lobes (Fig. 22B). **Ectophallus: Ect.F**, In dorsal view, narrow, elongated, with the distal part wider than the proximal region, a small medial notch in the proximal portion, and a straight distal margin. (Fig. 22A); in lateral view, the distal portion emerges mush after **Ps.S** and just before **Ps.P**, higher than **Ps.P** (Fig. 22B); in axial view, distal apex arched with a significant membranous area (Fig. 22D). **Ect.A** long, almost the same length as **R**, distally whitish, rounded, and convergent (Figs. 22A, C). **Endophallus: En.s** close to the pseudepiphallus, elongated, with a curved shape (Figs. 22A, B, C).

Female. Similar to males in size and coloration (Figs. 23A, B). Tegmina smaller than males, with simple longitudinal veins (Figs. 23E, F). Thoracic sternites like males (Fig. 23D). Supra-anal plate setose, broadly convex posteriorly, lateral margins straight ending in a small lobe, contiguous with the broadly convex distal margin (Fig. 24C). Subgenital plate sub-trapezoidal, with apex emarginated (Figs. 24B, C). Ovipositor straight, similar in length to the posterior femur, with pointed and arrow-shaped apex (Figs. 24D, E). Copulatory papilla short, weakly sclerotized, cylindrical in shape, with a broad distal margin and rounded lateral margins converging to the convex and widely open proximal margin (Figs. 24F, G, H). In dorsal view, the distal region highly membranous (Fig. 24F); in lateral view, dorsoventrally flattened (Fig. 24G); in ventral view, with a V-shaped hyaline distal margin and a truncated proximal margin (Fig. 24H).

Measurements (mm).

Nine males. **TL:** 16.0–17.5; **PL:** 2.0–3.0; **PW:** 3.0–4.0 **Tg:** 6.0–7.5; **HF:** 10.0–13.0; **HT:** 9.0–11.0

Fourteen females. **TL:** 16.0–18.5; **PL:** 2.5–3.0; **PW:** 3.5–4.5; **Tg:** 3.0–5.0; **HF:** 12.0–14.0; **HT:** 10.0–12.0; **Ov:** 12.0–14.0

***Palpigera* sp. nov. 5**

(Figs. 25, 26, 27, 28, 29)

Zoobank

Material examined. *Holotype*. Male. Brazil, Goiás, Cocalzinho de Goiás 15°41'24.5"S 48°24'23.9"O, 12.X.2007. Pitfall [the phallic complex was removed but kept in a microtube along

with the specimen]. Repository: ISLA

Diagnosis. *Palpigera* sp. nov. 5 shares several characteristics with other species in the genus, including the presence of tympana on both faces of the fore tibia (Figs. 26A, B), a trait also observed in *Palpigera* sp. nov. 4, *P. boliviana*, and *P. fratercula*. However, it differs from *P. boliviana* and *P. fratercula* by having tympana of equal size on both faces. The last two palpomeres in *Palpigera* sp. nov. 5 are elongated but not as expanded as in *P. boliviana*, *P. borellii*, *P. aluzara*, and *Palpigera* sp. nov. 2, and less slender than in *Palpigera* sp. nov. 3 and *Palpigera* sp. nov. 4 (Fig. 27E). The tenth tergite of *Palpigera* sp. nov. 5 lacks lateral lobes, distinguishing it from *Palpigera* sp. nov. 3, *P. boliviana*, *P. borellii*, and *P. aluzara*. Additionally, its posterior region is broadly convex, in contrast to *Palpigera* sp. nov. 2 and *P. fratercula* (Fig. 27E). Unlike most species in the group, *Palpigera* sp. nov. 5, like *Palpigera* sp. nov. 4, does not have a yellow stripe on the posterior margin of the pronotum (Fig. 25C). The metanotal gland in *Palpigera* sp. nov. 5 has two median projections surrounded by numerous setae, resembling *Palpigera* sp. nov. 4 (Fig. 26F); however, in other species, these projections are lobe-shaped, and the gland features a pair of rounded lateral tubercles without setae.

Palpigera sp. nov. 5 has **Ect.A** thicker, elongated, and divergent, similar to *Palpigera* sp. nov. 2, but differs from *Palpigera* sp. nov. 1 (wider) and *P. aluzara* and *Palpigera* sp. nov. 4 (convergent) (Fig. 28A). The **En.s** in *Palpigera* sp. nov. 5 is positioned nearer to the pseudepiphallus, resembling *Palpigera* sp. nov. 4, whereas in *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, and *P. aluzara*, it is more distant (Figs. 28A, B, C). The **Ect.F** in *Palpigera* sp. nov. 5 is robust and rectangular in dorsal view, with a small central notch, similar to *Palpigera* sp. nov. 4, but differs in proportions—being almost as wide as long in *Palpigera* sp. nov. 5, whereas in *Palpigera* sp. nov. 4, it is longer than wide (Fig. 28A). In contrast, *P. aluzara* has a triangular **Ect.F**, while in *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, and *Palpigera* sp. nov. 3, it is rectangular with a large central opening (Figs. 28A, C). Like *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, and *Palpigera* sp. nov. 4, *Palpigera* sp. nov. 5 lacks compressed **Ps.S, Ect.F,** and **Ps.P**, resulting in minimal space between them, unlike *P. aluzara* (Fig. 28C). In axial view, *Palpigera* sp. nov. 5 has fewer projections on **Ps.P** than *Palpigera* sp. nov. 4 and is also less twisted (Fig. 28D). In dorsal view, the **Ps.P** in *Palpigera* sp. nov. 5 is oriented medially, exposing sclerotized **Arms**, whereas in *Palpigera* sp. nov. 4, it is positioned laterally, fully covering the sclerotized **Arms** (blue arrow) (Fig. 28A).

Description. Color dark brown (Figs. 25A, B). **Male head.** higher than wide, same brown color as the rest of the body (Figs. 25B, D). Labrum and clypeus lighter than the head, labrum 1.5x wider than the clypeus (Fig. 25D). In dorsal view, ecdysial line clearly visible (Figs. 25C, D). Eyes oval, taller than wide, and prominent in frontal and lateral views (Figs. 25B, D). Lateral ocelli clearly

visible, light brown, with swollen surface around medial ocellus (Fig. 25D). Antennal scape well-developed, half as wide as the vertex (Fig. 25D). Pedicel similar to other antennomeres, but slightly wider (Fig. 25D). Maxillary palpi slender, elongated, with last two palpomeres 2x longer than the head (Fig. 27E). First and second palpomeres same length; third 2x longer than first two combined and with cylindrical shape; fourth longer than the previous ones, slightly curved, cylindrical, tapering distally; fifth enlarged, elliptical, longer and wider than previous palpomeres, distal end gently rounded (Fig. 27E).

Male thorax. Pronotum dark brown, similar to head (Fig. 25C). In dorsal view, longer than wide, with anterior margin almost straight bearing setae and posterior margin concave (Fig. 25C). In lateral view, longer than high, with ventral margin straight and obtuse posteroventral and anteroventral angles (Fig. 25B). Metanotal gland present with two medial projections, surrounded by many setae (Fig. 25F). Prosternum reduced, almost imperceptible. Mesosternum rectangular with posterior margin emarginated and color ochre. Metasternum hexagonal with posterior margin emarginated (Fig. 27D).

Male tegmina. Large tegmina, reaching up to the sixth tergite, covering almost the entire abdomen (Fig. 25A). **CuPa** vein well-defined, delimiting dorsal and lateral fields; posterior edge convex and rounded (Fig. 25E). Stridulatory apparatus complete but with reduced venation, **ha** with seven apparent veins, reduced **mi**, longer than wide, not crossed by any veins. **C1** and **C3** elongated, **C2** reduced with parallel veins, **PCuP** converging medially. Lateral field narrow, with 4 or 5 parallel longitudinal veins (Fig. 25E).

Male legs dark brown with yellowish spots (Figs. 26A–F). Tympana oval, present on both sides of fore tibiae (Figs. 26A, B). All legs covered with small setae. Fore and mid tibiae equal in length to the corresponding femora (Figs. 26A–D). Hind legs elongated, robust, and twice as long as the body (Figs. 26E, F). Fore tibia with two apical spurs (Figs. 26A, B); mid tibia with four apical spurs (Figs. 26C, D); hind tibia with four mid-distal dorsal spurs, several small spines between them and on the mid-proximal portion of the tibia, and three apical spurs per margin (Figs. 26E, F). Outer apical spurs of the hind femur: medial spur longer than the other spur, followed by the ventral and dorsal spurs. Inner apical spurs of the hind tibia: dorsal spur longer than the other spurs, followed by medial and ventral spurs. Hind basitarsus almost 2x longer than other tarsomeres combined, dorsally with several spines and two apical spurs, being the inner longer than the outer one (Figs. 26E, F)

Male abdomen, in dorsal view, elongated, corresponding to more than half of the total body length, uniformly dark brown in color, like the rest of the body (Fig. 25A). Supra-anal plate trapezoidal, lateral margins with proximal portion slightly concave, ending in acute corners, followed by a concave and deeper distal portion, and a slightly convex posterior margin (Fig. 27A). Subgenital

plate longer than wide; in ventral view, with distal margin slightly emarginated and broad base (Fig. 27C); in lateral view, ventral gently convex with slightly sinuous dorsal margin (Fig. 27B).

Male genitalia. Shortened in relation to the other species. **Pseudepiphallus: Ps.S** elevated, partially forecurved in lateral view, with a slightly translucent surface in axial view and a sinuous margin in dorsal view (Figs. 28A, B, D). **Arc** short, completely covered by **Ps.S** (Fig. 28A). **R** elongated and well-sclerotized (Figs. 28A, B, D). **B-Scl** narrow, well-sclerotized; in lateral view, upcurved, with bifid, sclerotized apical **Arms** (blue arrow) (Fig. 28B). **Ps.P** heavily sclerotized. In axial view, **Ps.P** consists of a large lateral projection with twisted dorsal and ventral margins, bearing three oblique and convex lateral projections (Fig. 28D). In dorsal view, **Ps.P** reduced in size, exposing the sclerotized **Arms** (Figs. 28A, C). In lateral view, **Ps.P** with the proximal portion forming large lobes with small projections at the apex (Fig. 28B). **Ectophallus: Ect.F**, in dorsal view, widened and shortened, trapezoidal in shape, with a small medial notch in the proximal portion and a straight distal margin (Fig. 28A); in lateral view, the distal portion emerges after **Ps.S** and before **Ps.P**, almost the same size as **Ps.P** (Fig. 28B); in axial view, distal apex arched with a significant membranous region (Fig. 28D). **Ect.A** long, almost the same length as **R**, distally whitish, rounded, and divergent (Figs. 28A, C). **Endophallus: En.s** close to the pseudepiphallus, elongated, curved in shape (Figs. 28A, B, C).

Measurements (mm).

One male. **TL:** 16.0; **PL:** 3.5 **PW:** 4.0 **Tg:** 8.0 **HF:** 13.0 **HT:** 11.0

DISCUSSION

The genus *Palpigera* has a restricted known distribution in South America, with confirmed records in Bolivia and Central-Western Brazil (Cigliano *et al*. 2025; Gorochov 2014; Hebard 1928). In this study, we expand the known distribution of the genus with new records from northern and northeastern Brazil (Fig. 29). Until now, only *P. fratercula* had been recorded in Brazil, in the state of Mato Grosso (Fig. 29). However, after analyzing new samples, we identified new species in three additional states, as well as another unknown species in Mato Grosso. In the Central-West region, in the state of Goiás, we identified another species, *Palpigera* sp. nov. 5. In Northern Brazil, we recorded *Palpigera* sp. nov. 1 and *Palpigera* sp. nov. 3, in the Amazon Rainforest, specifically in the state of Pará, representing the first records of the genus for the Amazon biome. Finally, in the Northeast, *Palpigera* sp. nov. 4 was found in the state of Piauí, near the "Dry Diagonal," a transition zone between the Cerrado, Caatinga, Chaco, and Seasonally Dry Tropical Forests (Fig. 29) (Vanzolini 1963; Prado and Gibbs 1993).

One of the main differences among *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, *Palpigera* sp. nov. 4, and *Palpigera* sp. nov. 5 lies in the genitalia, especially in the axial view (Figs. 4D; 10D; 16D; 22D; 28D). The differences occur mainly in the shape of the sclerites and their projections. Although *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, and *Palpigera* sp. nov. 3 have large **Ps.P** with a similar shape in the dorsal view, they differ significantly in the axial view, particularly in the shape of the lateral margin of the **Ps.P** and the median projections (Figs. 4D; 10D; 16D). On the other hand, *Palpigera* sp. nov. 4 and *Palpigera* sp. nov. 5, despite having a smaller **Ps.P**, exhibit notable differences in the axial view, mainly in the number of median projections, with *Palpigera* sp. nov. 4 being more twisted than *Palpigera* sp. nov. 5 (Figs. 22D; 28D).

Palpigera sp. nov. 4 and *Palpigera* sp. nov. 5 share significant similarities, distinguishing themselves from the other species of the genus, particularly in aspects of the genitalia, palpi, and metanotal gland. The palpi of *Palpigera* sp. nov. 4, *Palpigera* sp. nov. 5, and *P. fratercula* is considerably slenderer and narrower compared to that of other *Palpigera* species (Figs. 21E; 27E). Additionally, in *Palpigera* sp. nov. 4 and *Palpigera* sp. nov. 5, the metanotal gland has only two medial projections surrounded by numerous setae. In contrast, in *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, and *P. aluzara*, this structure features two medial lobe-shaped openings along with a pair of rounded lateral tubercles, but without setae (Figs. 19F; 25F). The metanotal gland plays a crucial role in mating behavior, providing nuptial gifts that nourish and engage females during copulation (Prado 2006; Campos et al. 2021).

Despite this importance, there are no descriptions of the presence of this structure in *P. borellii, P. fratercula*, and *P. boliviana.* However, the metanotal gland is probably present in these species too. The similarities between *Palpigera* sp. nov. 4 and *Palpigera* sp. nov. 5 are also evident in their internal genitalia. Shared characteristics include the **En.s** positioned close to the pseudepiphallus, reduced **Ps.P**, rectangular **Ect.F**, and the sclerotized **Arms** at the apex of the *B-Scl*. These traits are exclusive to these two species, suggesting a possible new taxonomic status, potentially a subgenus. However, this hypothesis cannot be confirmed for now once access to the genitalia of the type species, *P. borellii,* is unavailable

CONCLUSION

In this study, we describe five new species of *Palpigera* based on morphological and internal genitalia analyses. *Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, *Palpigera* sp. nov. 4, and *Palpigera* sp. nov. 5 differ from other species of the genus in the shape of the palpi, the tenth tergite, the metanotal gland, the arrangement of the tympana on the foreleg, the vein cells in

the tegmina, the presence or absence of a yellow line on the posterior region of the pronotum, and the morphology of the male genitalia, especially Ps.P and the position of the En.s. Additionally, we expand the distribution of the genus with records in the northern and northeastern regions of Brazil and, for the first time, records in the Amazon rainforest, highlighting the importance of studies in this extremely diverse yet underexplored area. Additionally, we provide new information on the internal genitalia and metanotal gland of the genus. These species represent the first records of *Palpigera* for the Northern and Northeastern regions of Brazil.

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LIST OF ABBREVIATIONS

Ps.P: pseudepiphallic parameres;

Ect.F: ectophallus fold;

Ect.A: ectophallus apodeme;

Arc: ectophallus arch;

B-Scl: pseudepiphallic arm's sclerite B;

R: rami; En.a, endophallus apodeme;

En.s: endophallus sclerite.

ha: harp;

mi: mirror;

CuPa: a subdivision of the Cu vein (cubitus);

PCuP: a subdivision of the PCu vein (postcubitus);

C1, **C2**, **C3**: posterolateral cells.

TL: total length

PL: pronotal length

PW: pronotal width

Tg: tegmina length

HF: hind femur length

HT: hind tibia length

OV: ovipositor length

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Availability of data and materials: All data are available in the paper.

Consent for publication: Not applicable.

Ethics approval consent to participate: Not applicable.

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FIGURE LIST (obs: apesar das normas da revista solicitarem que as imagens sejam enviadas separadas, optamos por colocá-las no final do trabalho para facilitar a visualização)

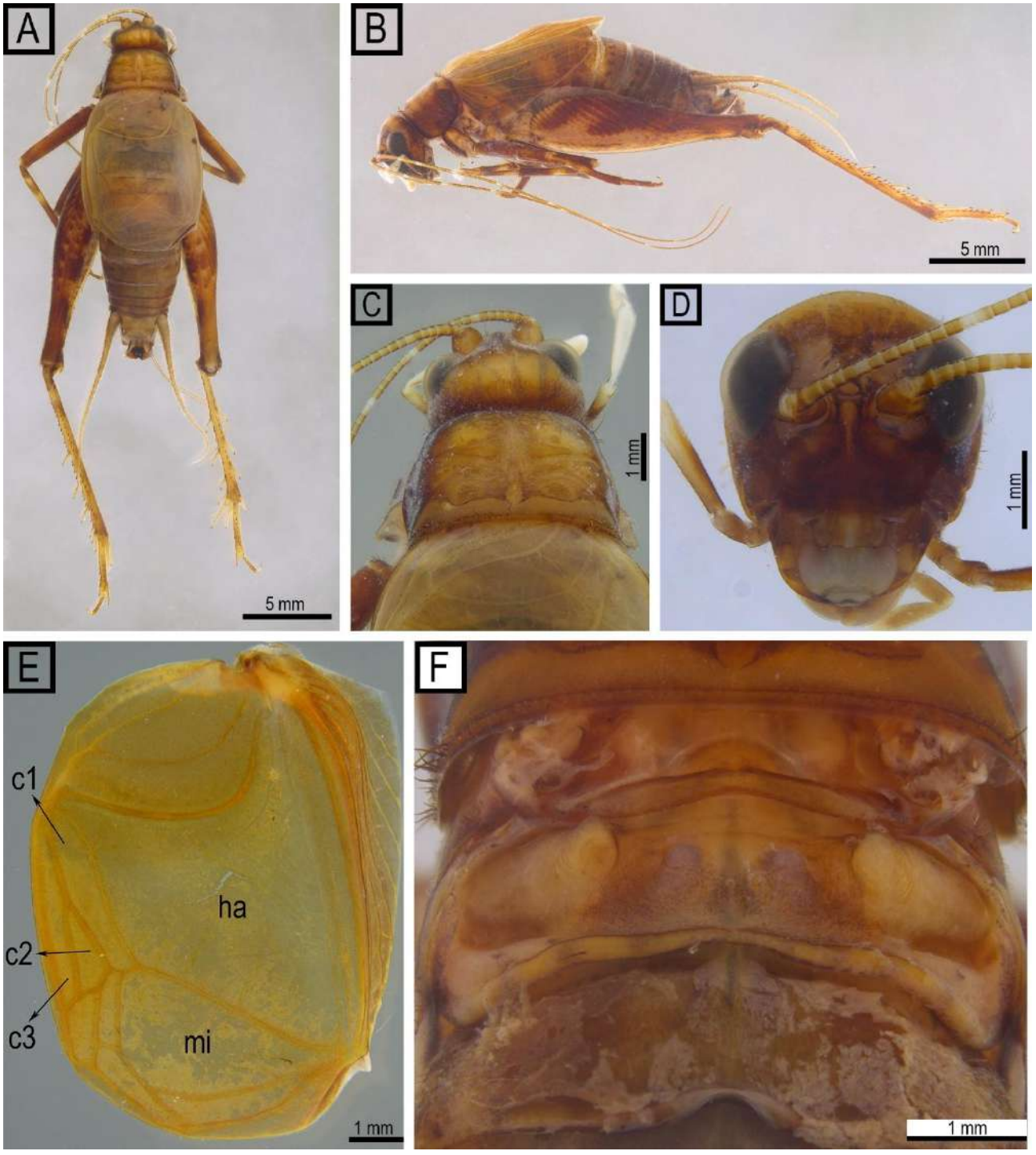

Figure 1 – *Palpigera* sp. nov. 1. male. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Frons. (E) Right tegmen in dorsal view. (F) Metanotal gland.

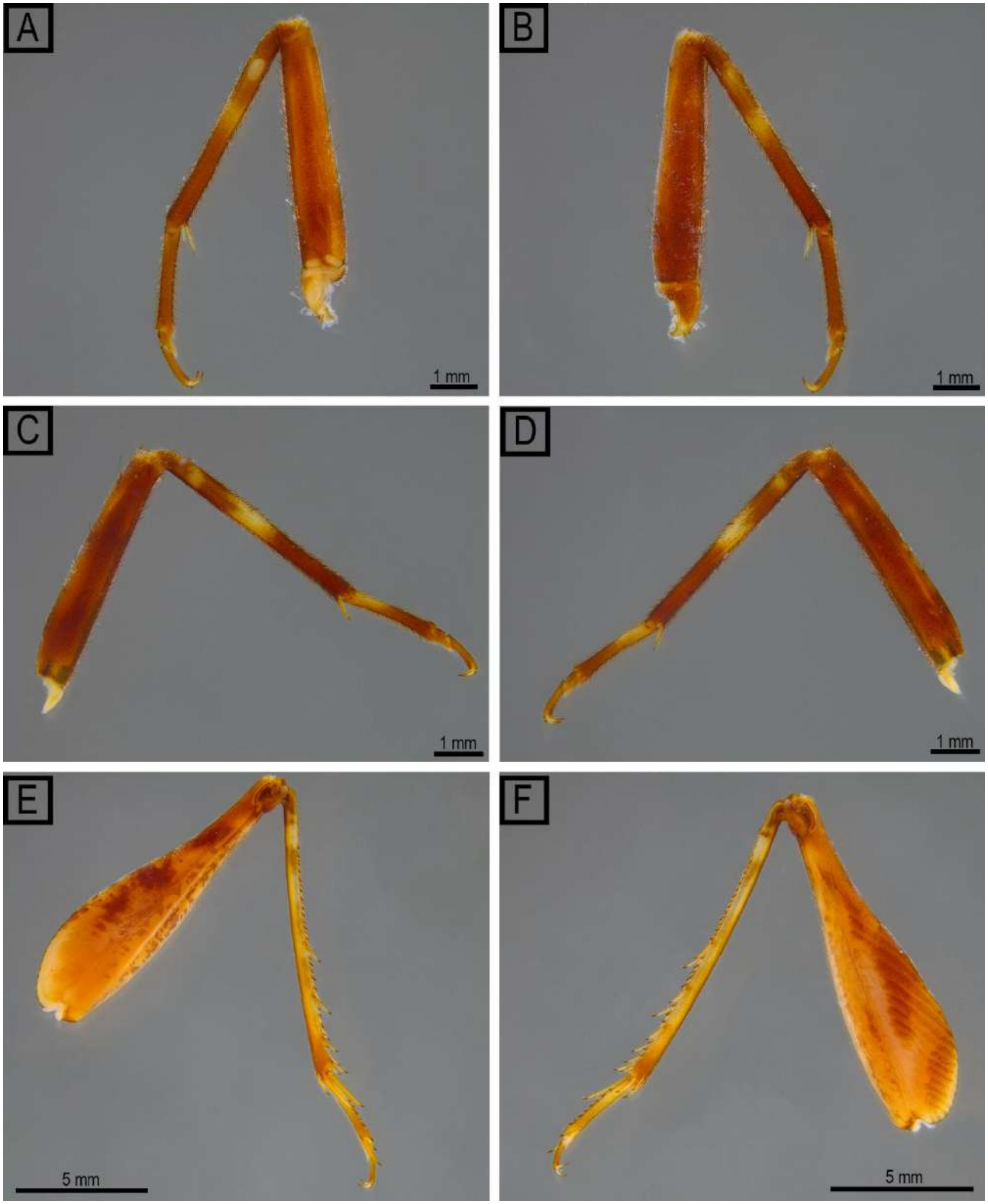

Figure 2 – *Palpigera* sp. nov. 1. male. Inner (A, C, E) and outer (B, D, F) views of fore (A–B). Mid (C–D), and hind legs (E–F), respectively.

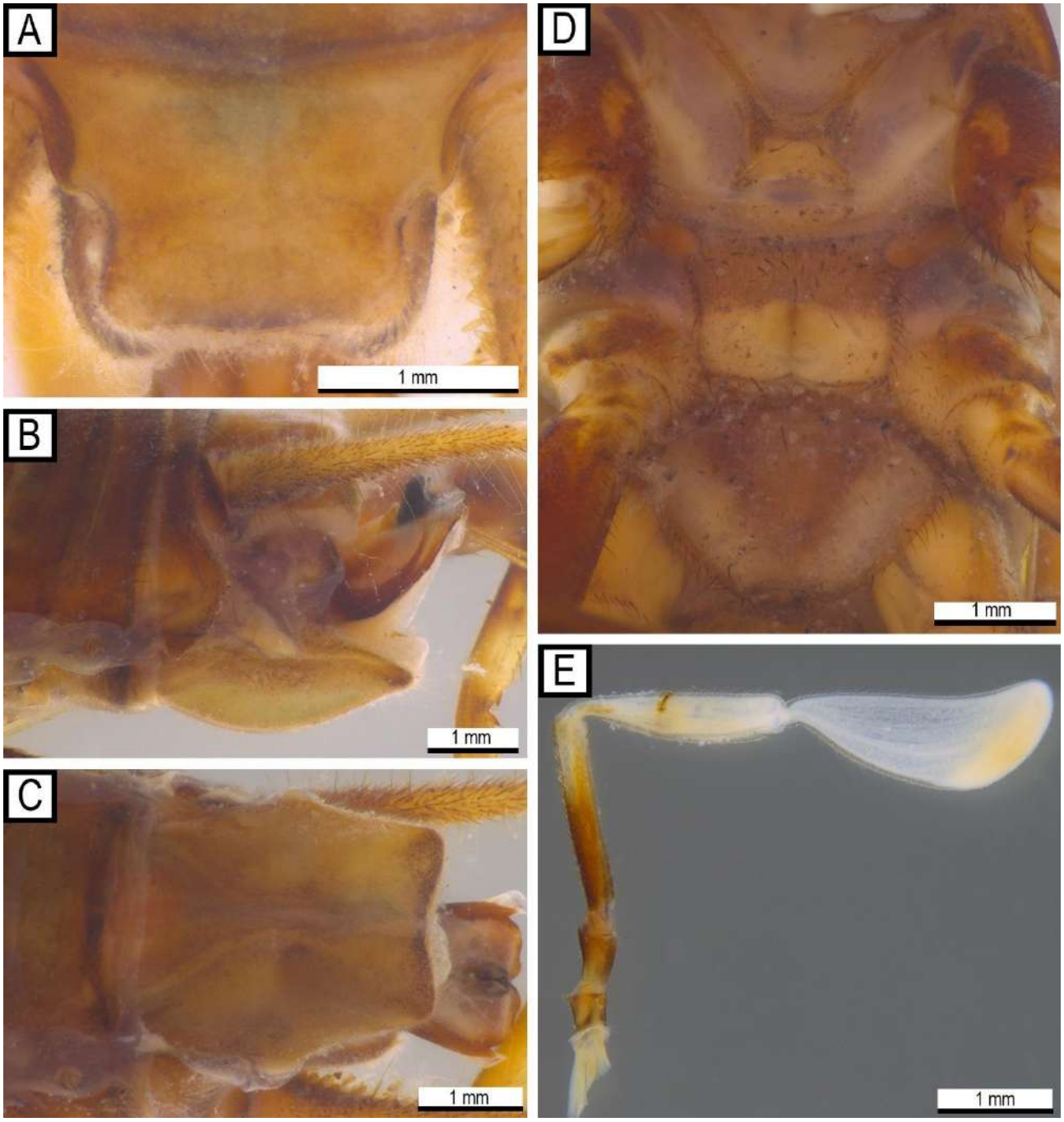

Figure 3 – *Palpigera* sp. nov. 1. male. Terminalia in (A) dorsal, (B) lateral, (C) ventral views. (D) Sternum. (E) Right palp.

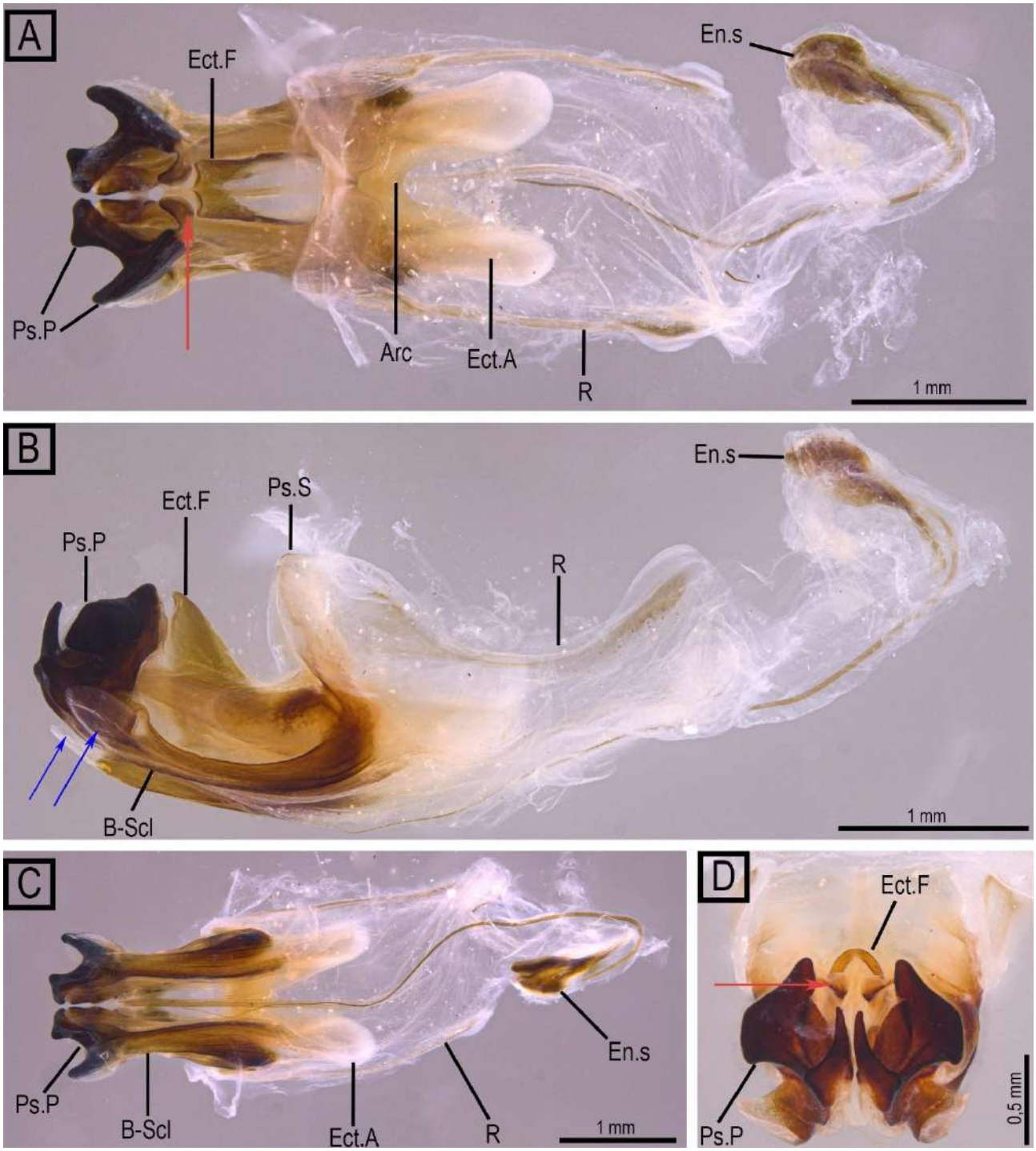

Figure 4 – *Palpigera* sp. nov. 1. male. Phallic complex in (A) dorsal, (B) lateral, (C) ventral, (D) axial views. Apical distal **Arms** (blue arrow); Lateral projections of the **Ps.P** (red arrow)

Figure 5 – *Palpigera* sp. nov. 1. Female. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Sternum. Right tegmen in (E) dorsal and (F) ventral views.

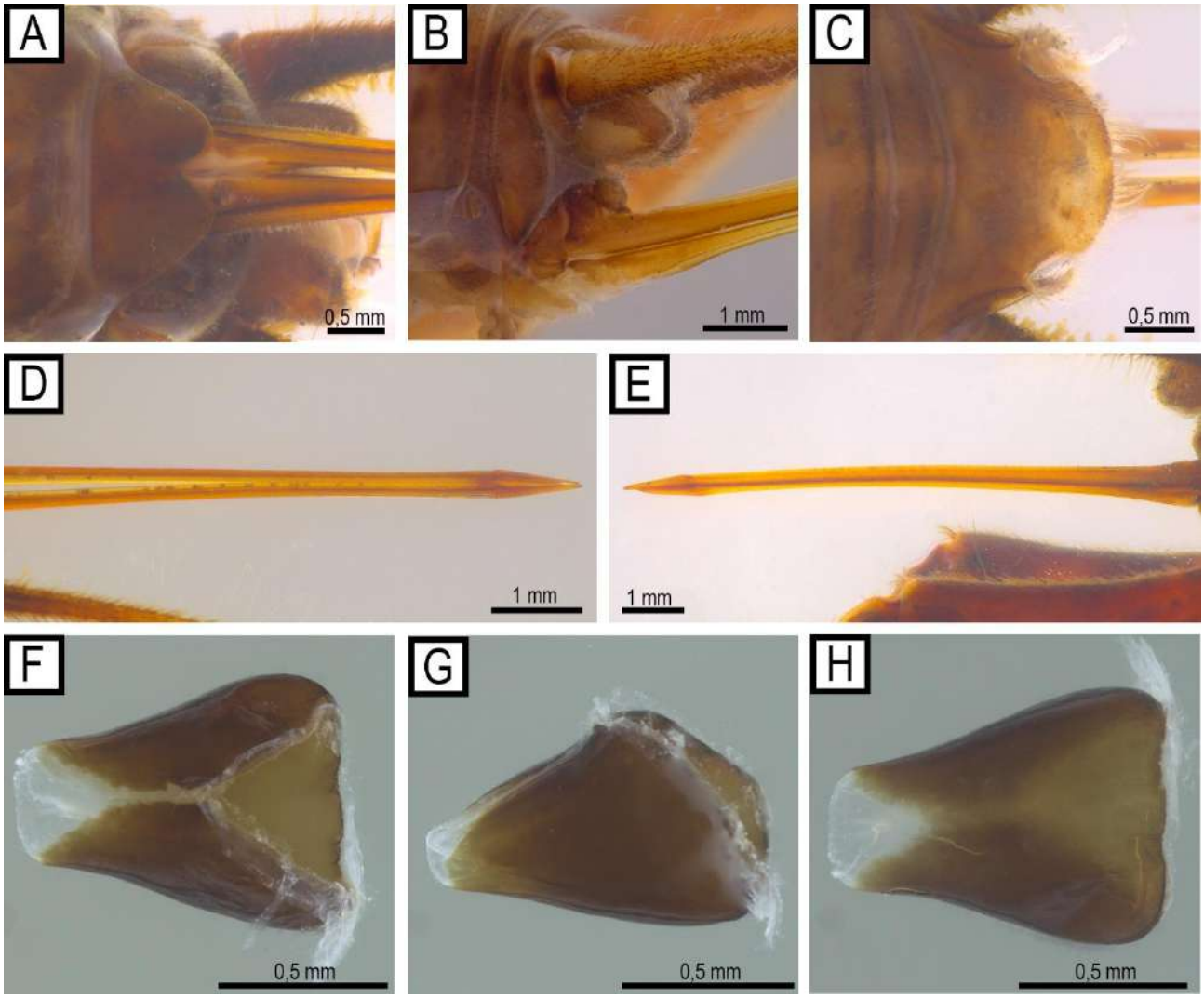

Figure 6 – *Palpigera* sp. nov. 1. Female. Terminalia in (A) ventral, (B) lateral, (C) dorsal views. Ovipositor in (D) dorsal and (E) lateral views; copulatory papilla in (F) dorsal, (G) lateral, and (H) ventral views.

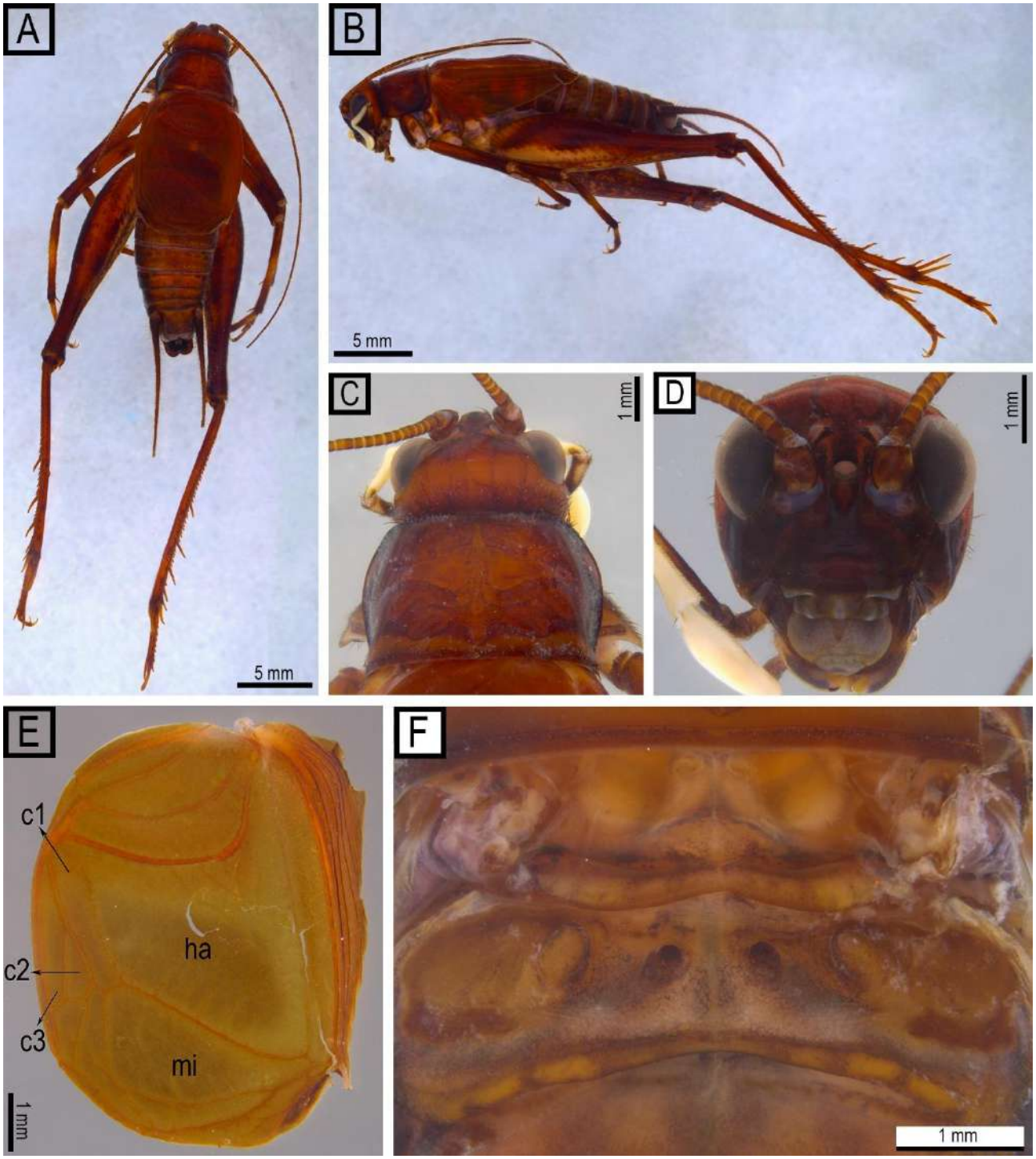

Figure 7 – *Palpigera* sp. nov. 2. male. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Frons. (E) Right tegmen in dorsal view. (F) Metanotal gland.

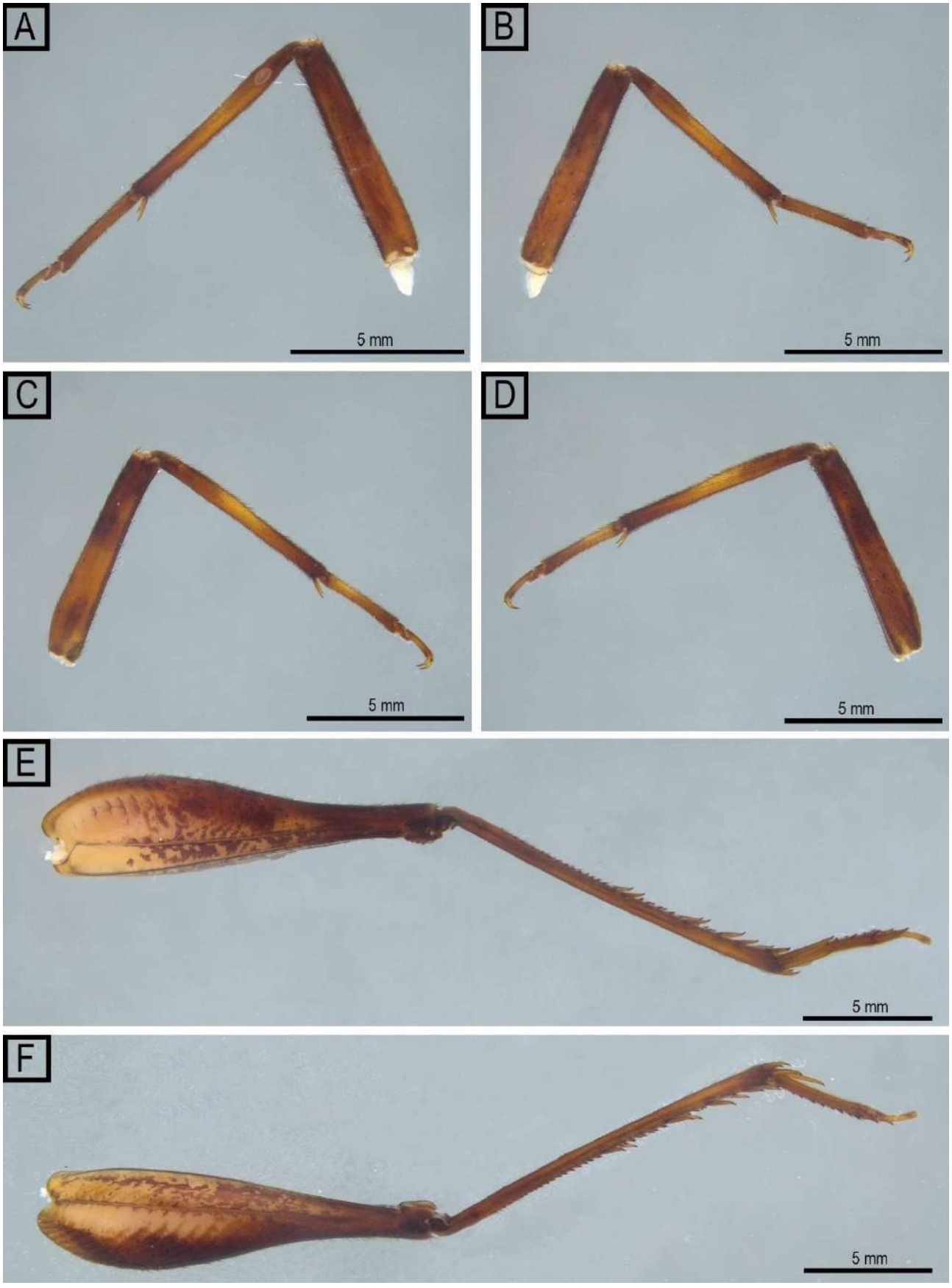

Figure 8 – *Palpigera* sp. nov. 2. male. Inner (A, C, E) and outer (B, D, F) views of fore (A–B). Mid (C–D), and hind legs (E–F), respectively.

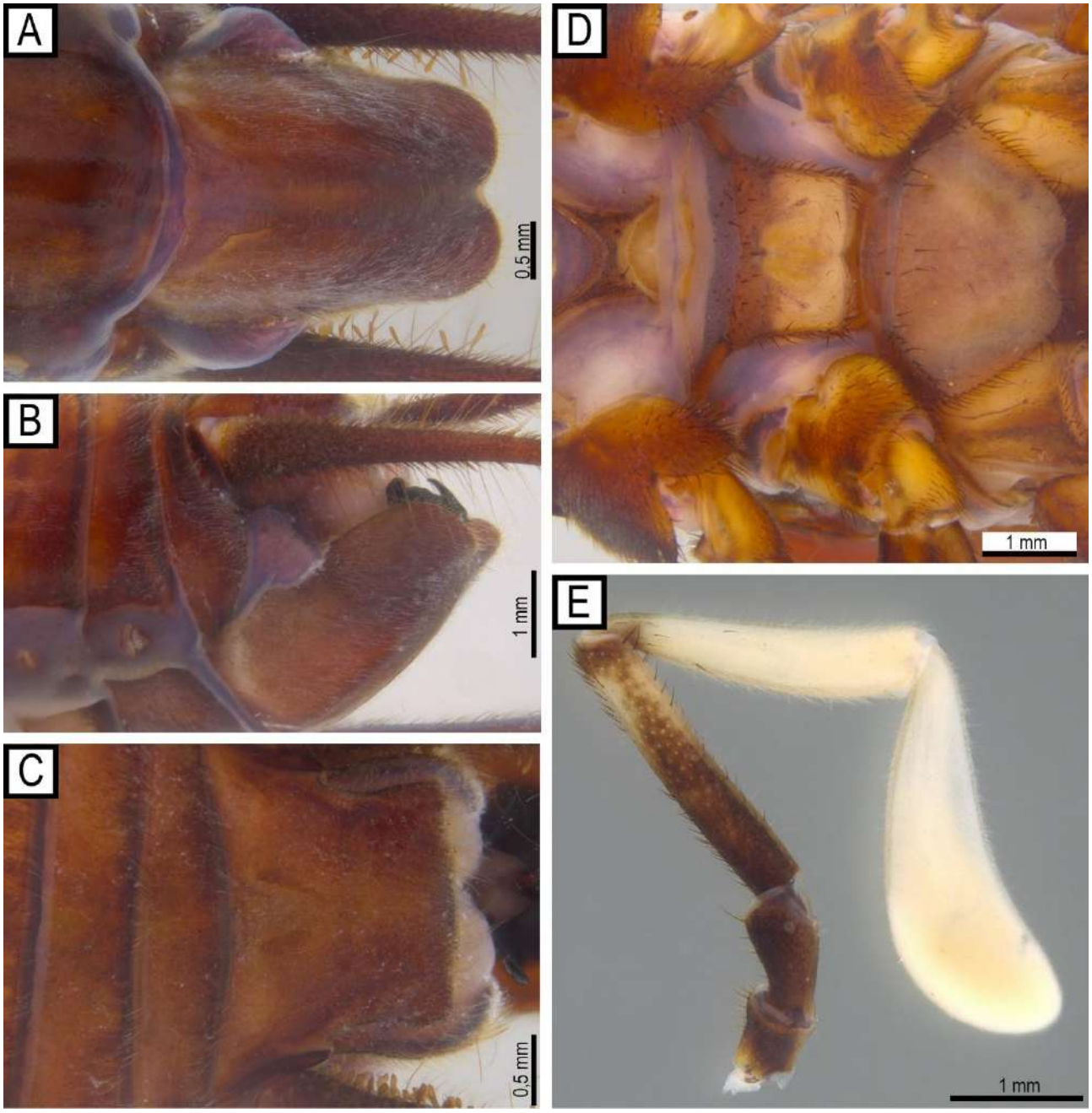

Figure 9 – *Palpigera* sp. nov. 2. male. Terminalia in (A) dorsal, (B) lateral, (C) ventral views. (D) Sternum. (E) Right palp

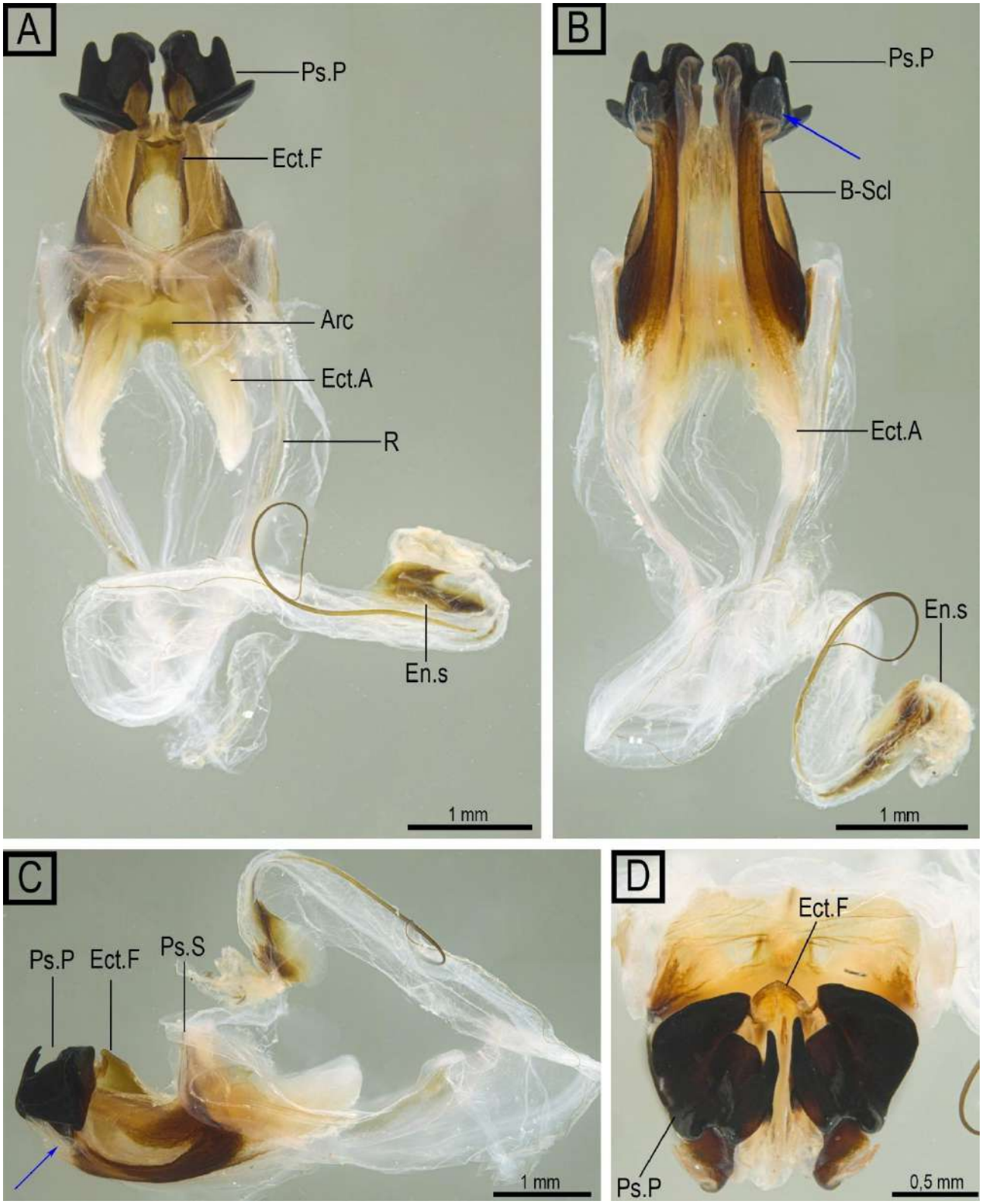

Figure 10 – *Palpigera* sp. nov. 2**.** male. Phallic complex in (A) dorsal, (B) ventral, (C) lateral, (D) axial views. Apical distal **Arms** (blue arrow)

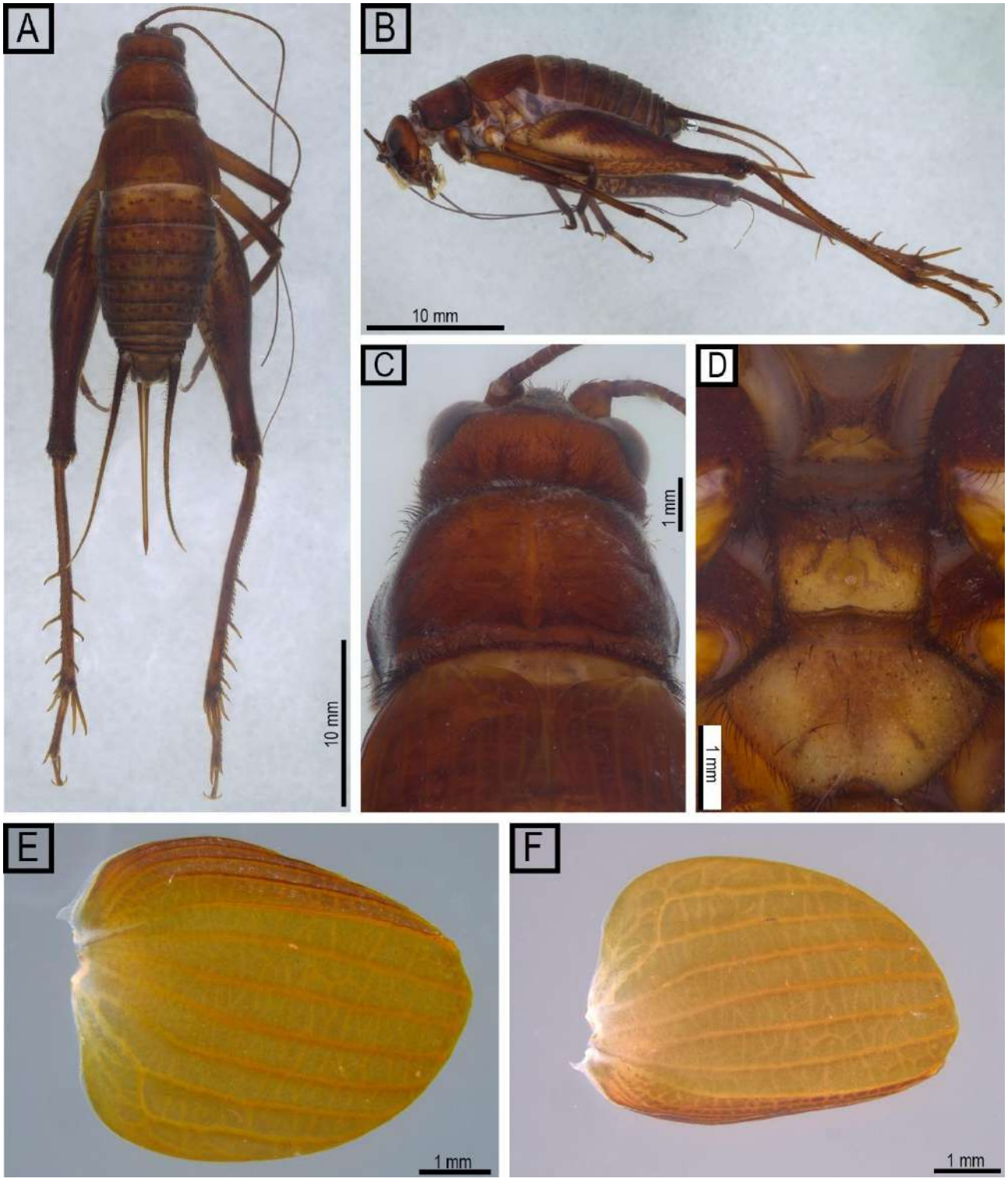

Figure 11 – *Palpigera* sp. nov. 2**.** Female. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Sternum. Right tegmen in (E) dorsal and (F) ventral views.

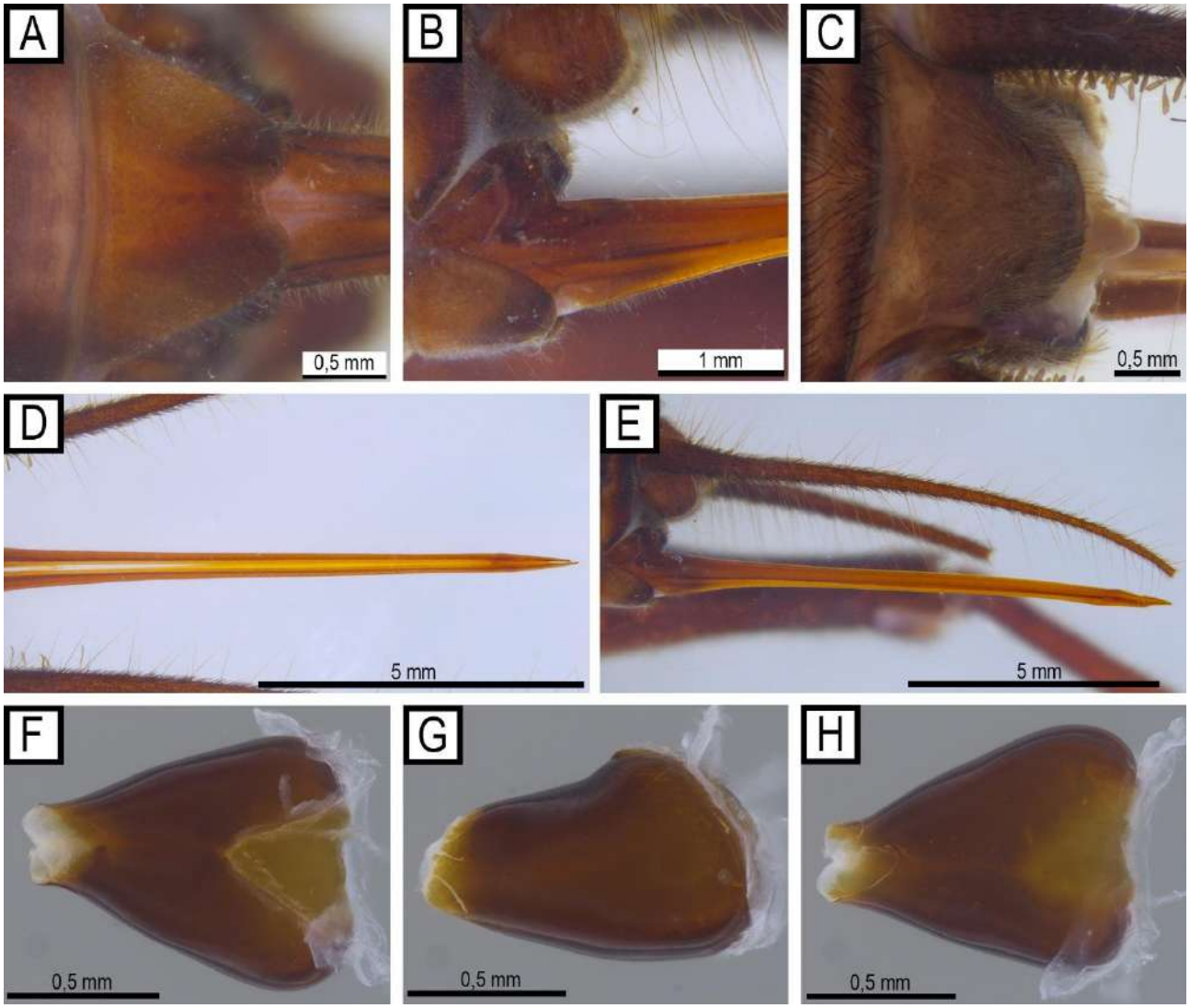

Figure 12 – *Palpigera* sp. nov. 2**.** Female. Terminalia in (A) ventral, (B) lateral, (C) dorsal views. Ovipositor in (D) dorsal and (E) lateral views; copulatory papilla in (F) dorsal, (G) lateral, and (H) ventral views

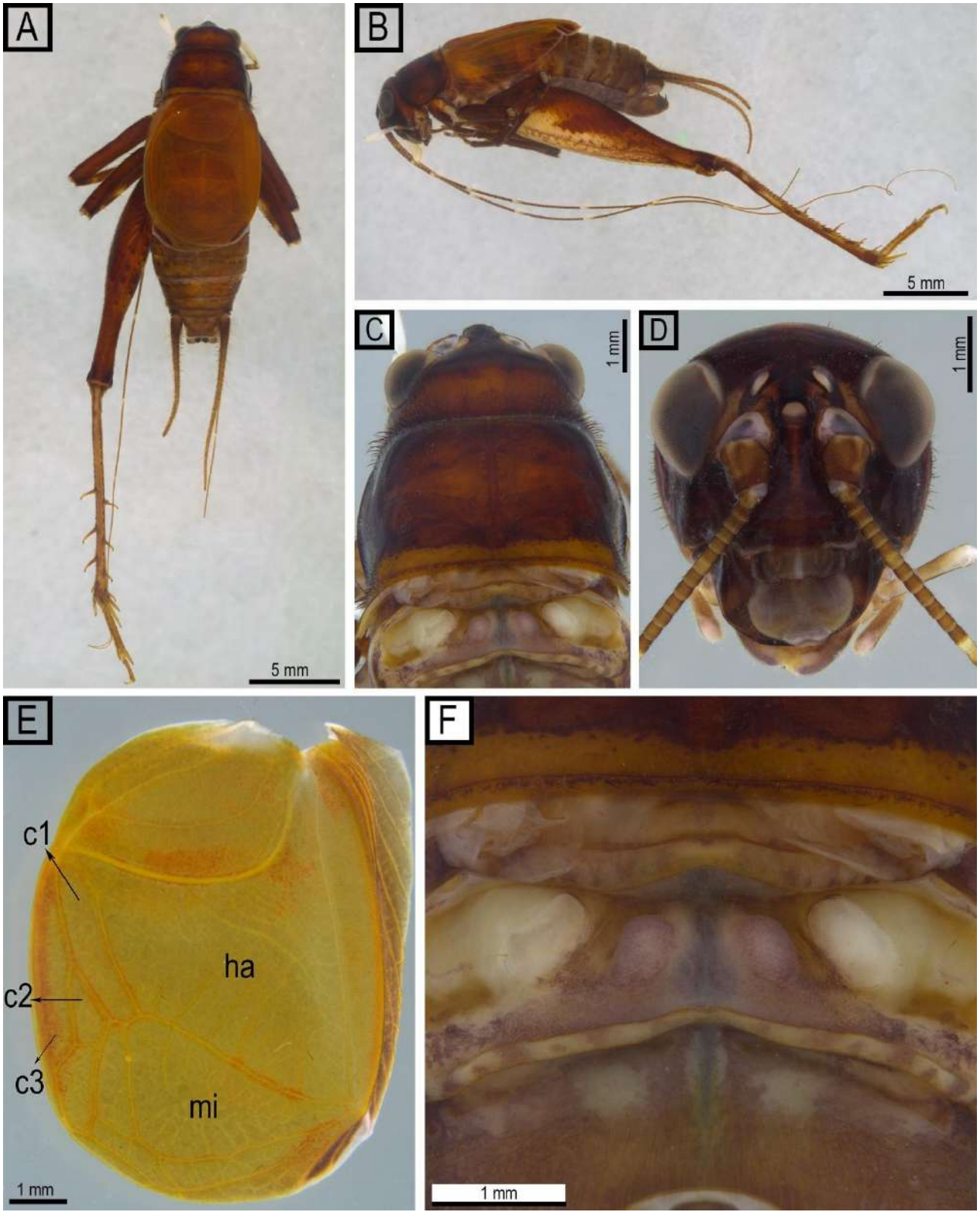

Figure 13 – *Palpigera* sp. nov. 3**.** male. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Frons. (E) Right tegmen in dorsal view. (F) Metanotal gland.

Figure 14 – *Palpigera* sp. nov. 3**.** male. Inner (A, C, E) and outer (B, D, F) views of fore (A–B). Mid (C–D), and hind legs (E–F), respectively.

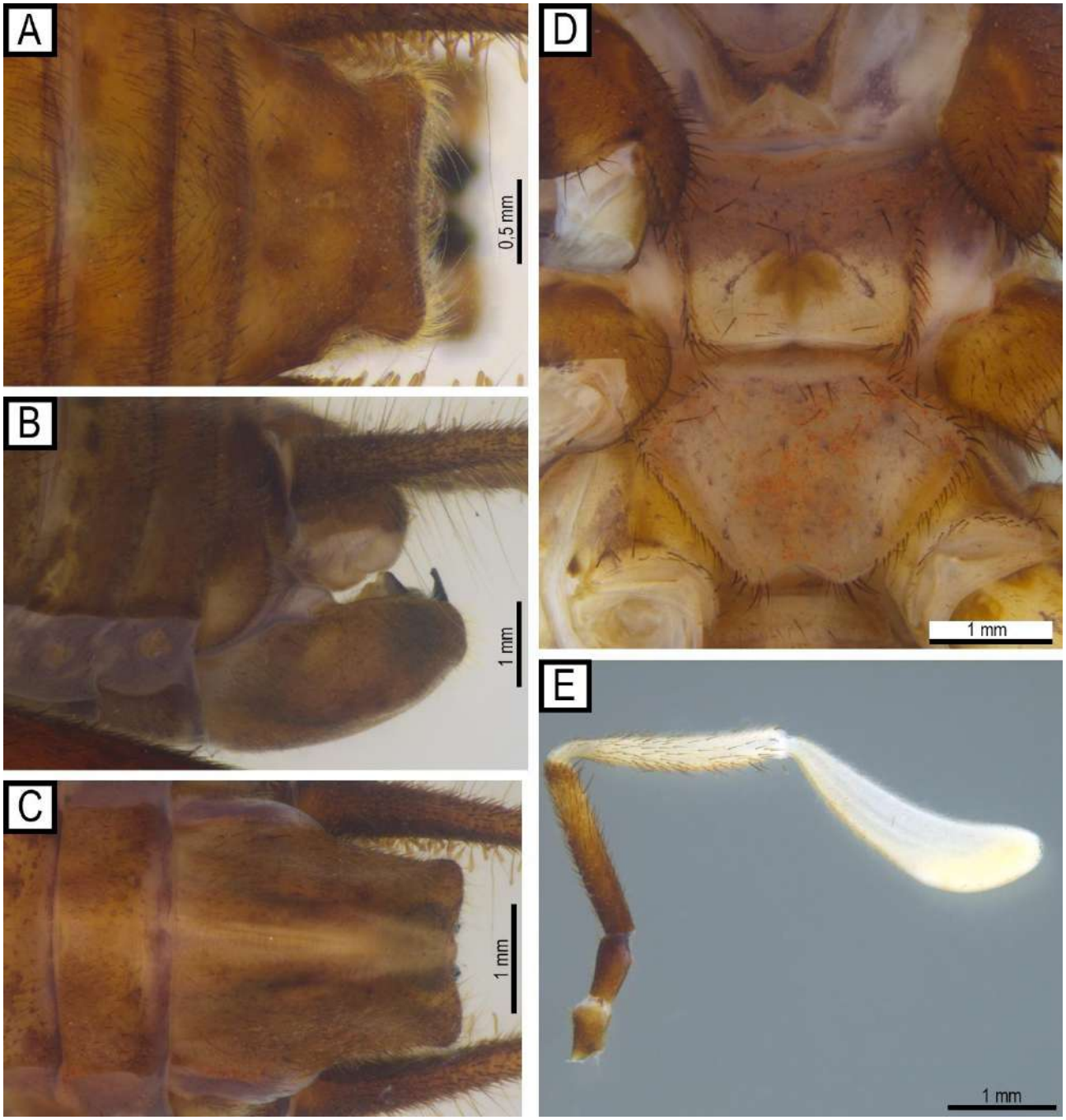

Figure 15 – *Palpigera* sp. nov. 3**.** male. Terminalia in (A) dorsal, (B) lateral, (C) ventral views. (D) Sternum. (E) Right palp.

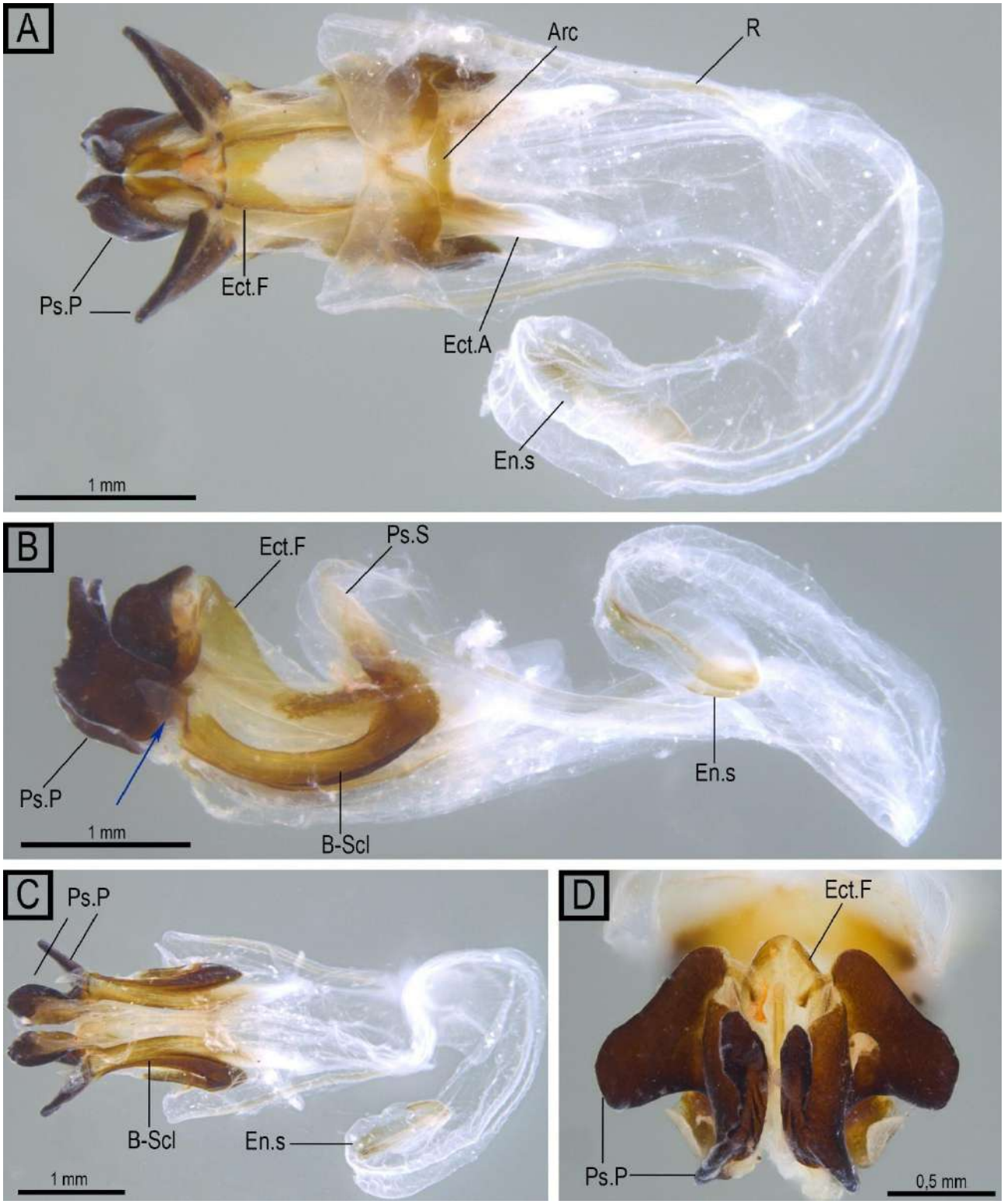

Figure 16 – *Palpigera* sp. nov. 3**.** male. Phallic complex in (A) dorsal, (B) lateral, (C) ventral, (D) axial views. Apical distal **Arms** (blue arrow)

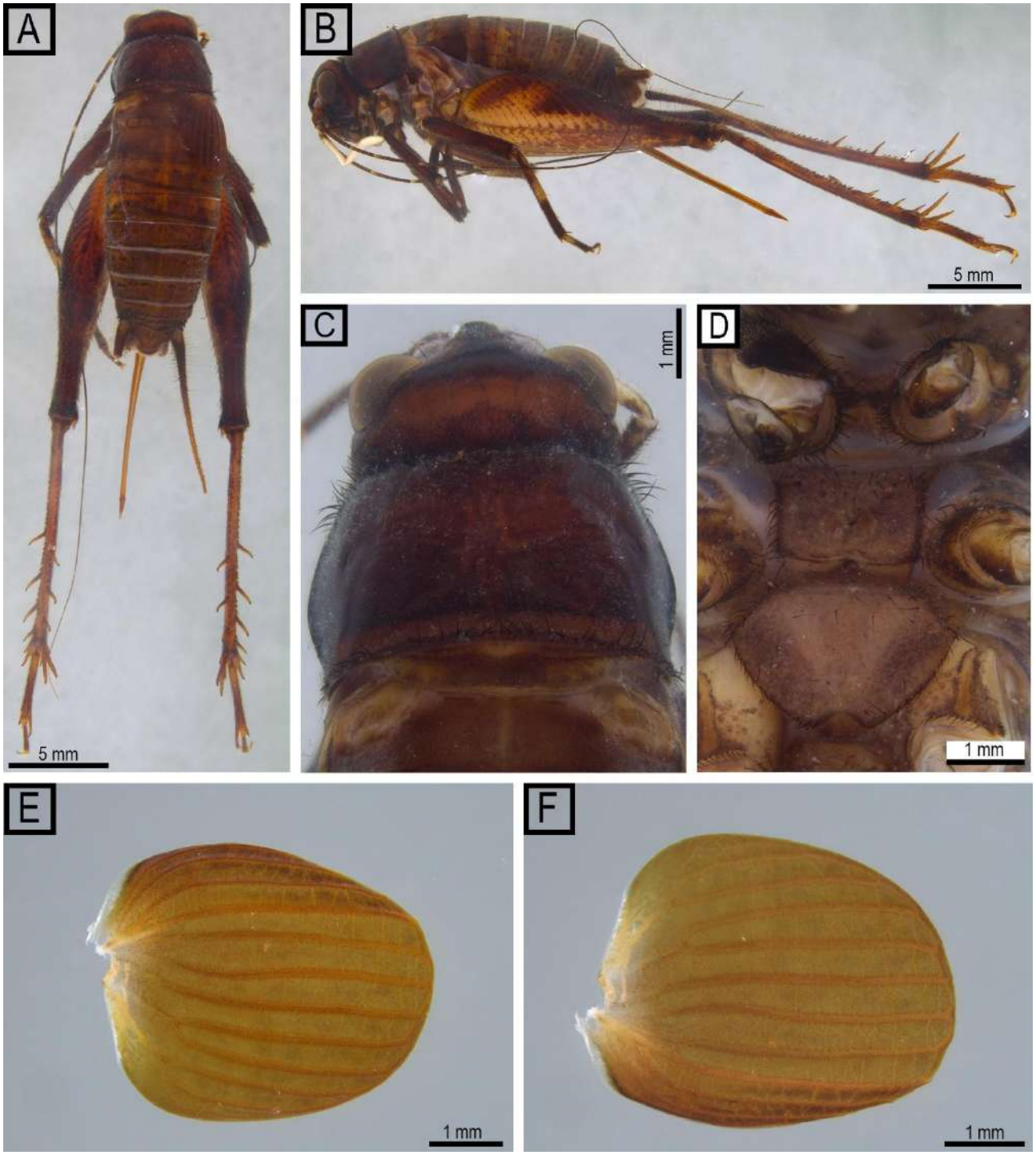

Figure 17 – *Palpigera* sp. nov. 3**.** Female. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Sternum. Right tegmen in (E) dorsal and (F) ventral views.

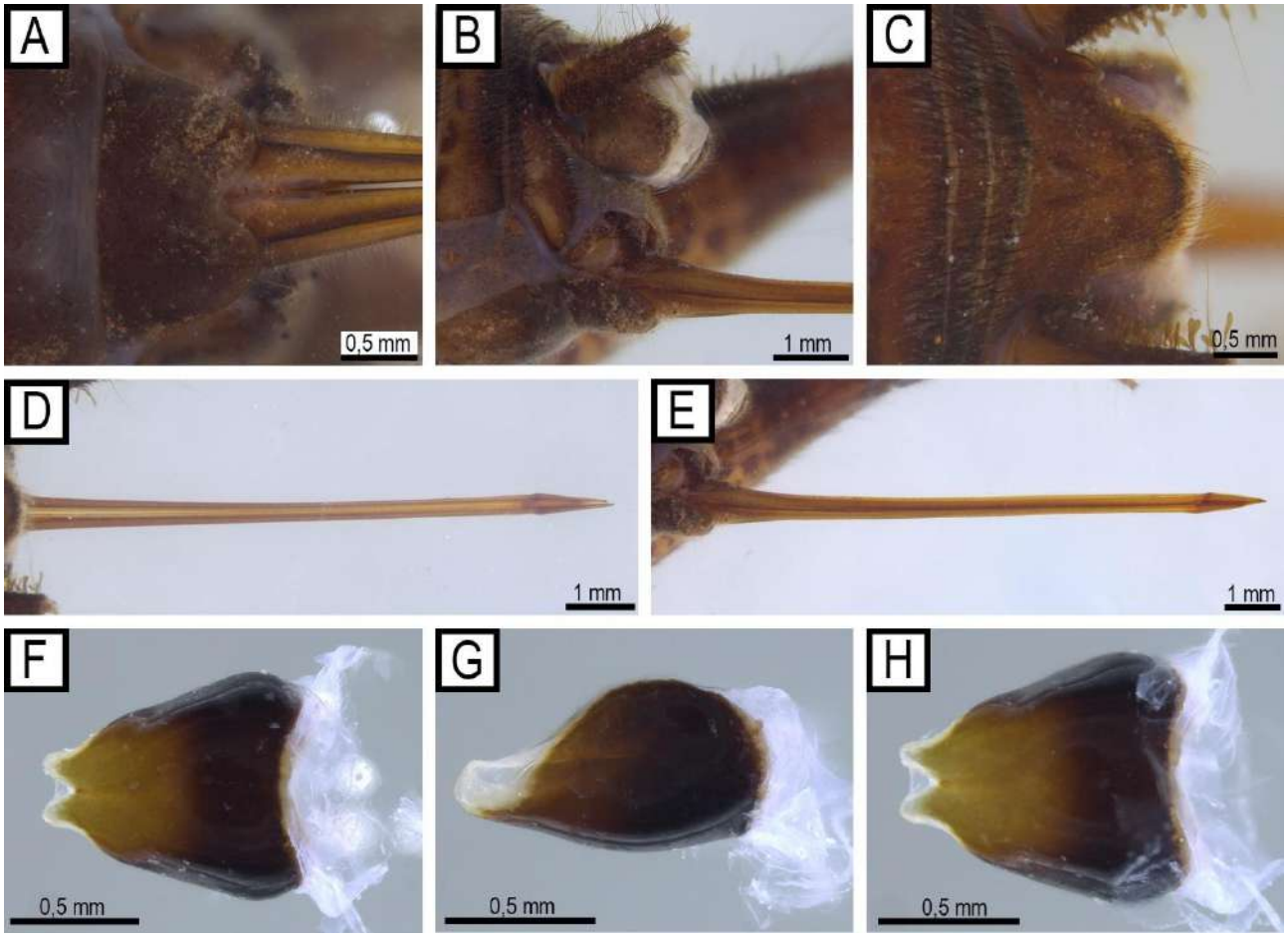

Figure 18 – *Palpigera* sp. nov. 3**.** Female. Terminalia in (A) ventral, (B) lateral, (C) dorsal views. Ovipositor in (D) dorsal and (E) lateral views; copulatory papilla in (F) dorsal, (G) lateral, and (H) ventral views

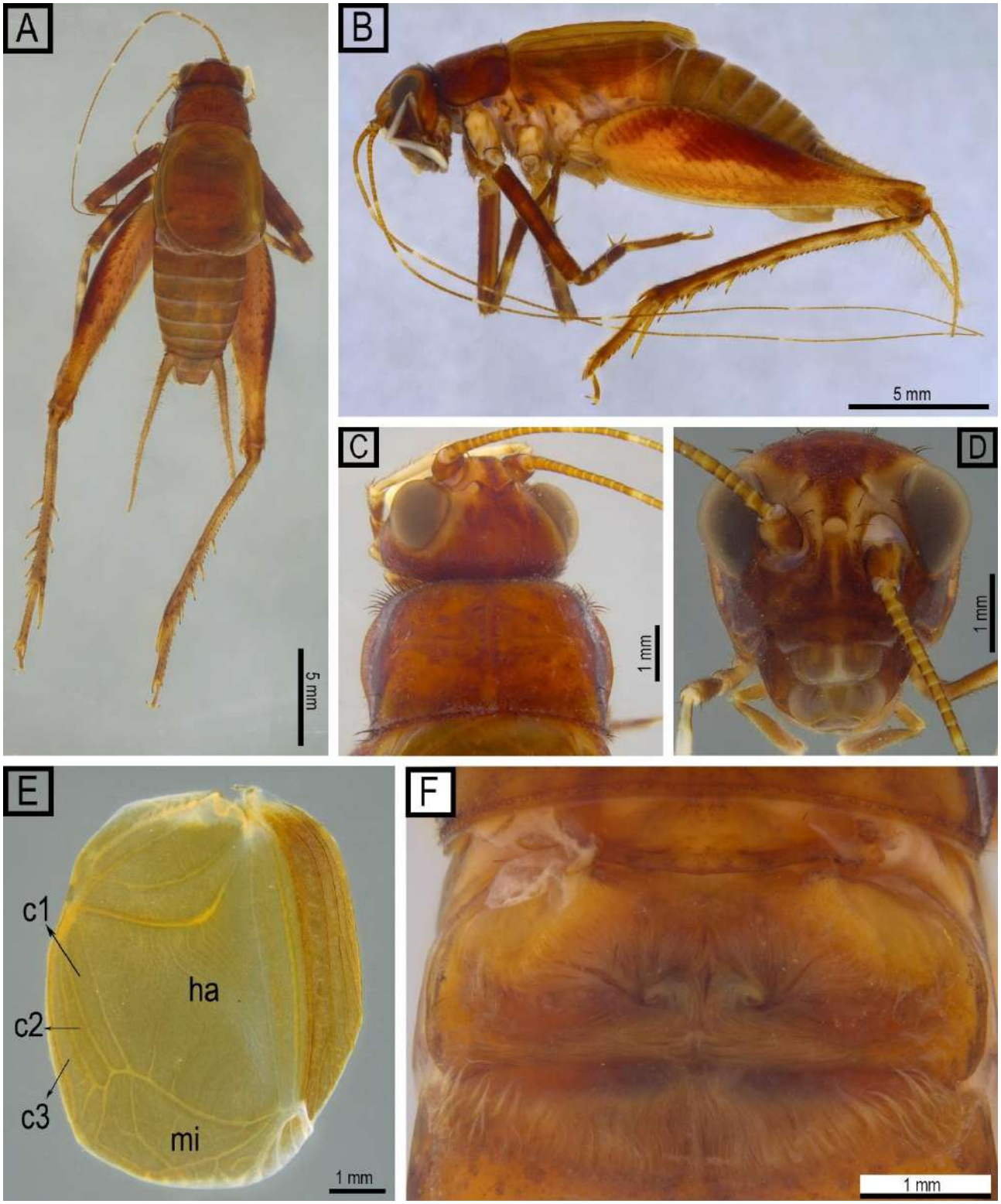

Figure 19 – *Palpigera* sp. nov. 4**.** male. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Frons. (E) Right tegmen in dorsal view. (F) Metanotal gland.

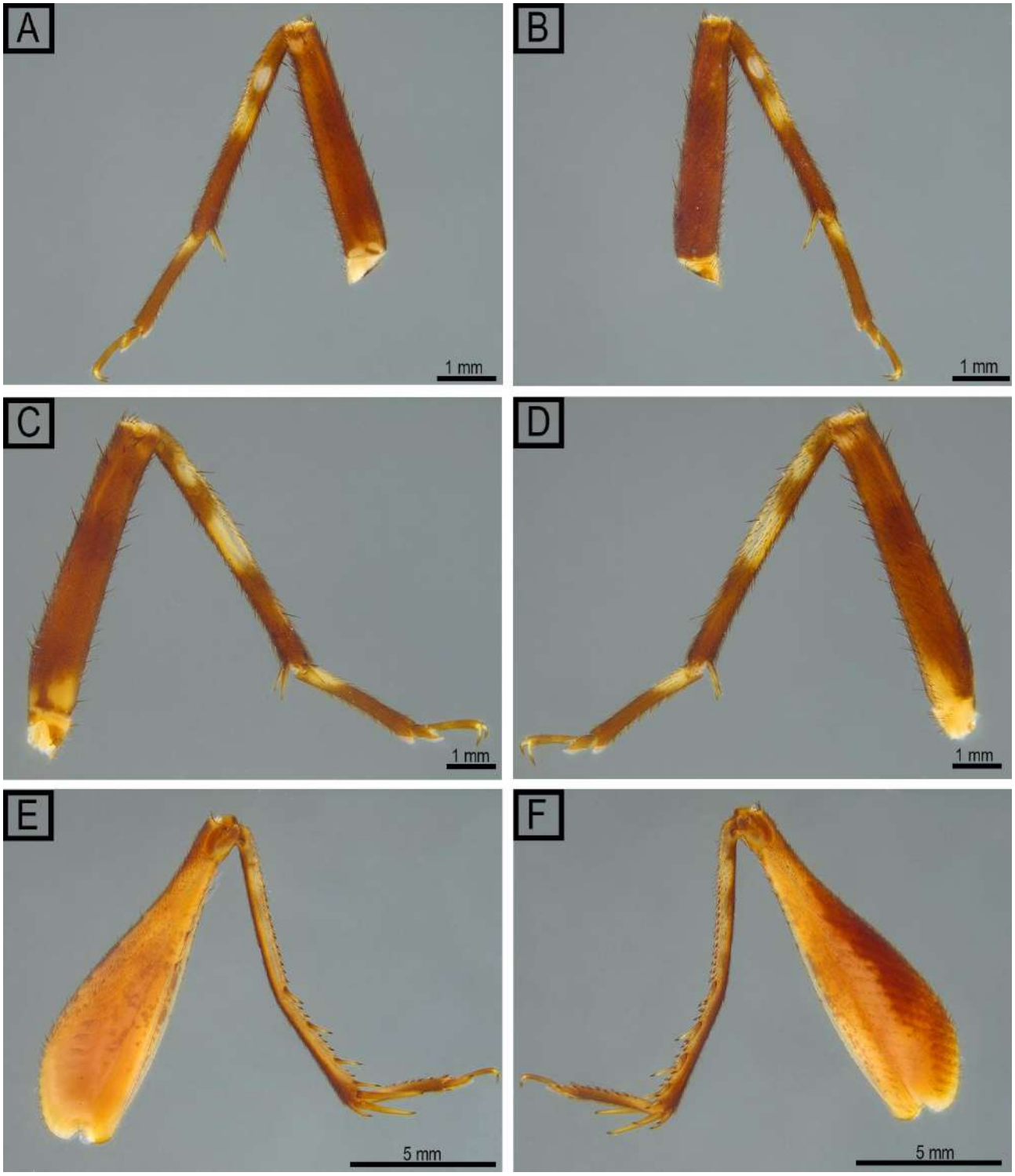

Figure 20 – *Palpigera* sp. nov. 4**.** male. Inner (A, C, E) and outer (B, D, F) views of fore (A–B). Mid (C–D), and hind legs (E–F), respectively.

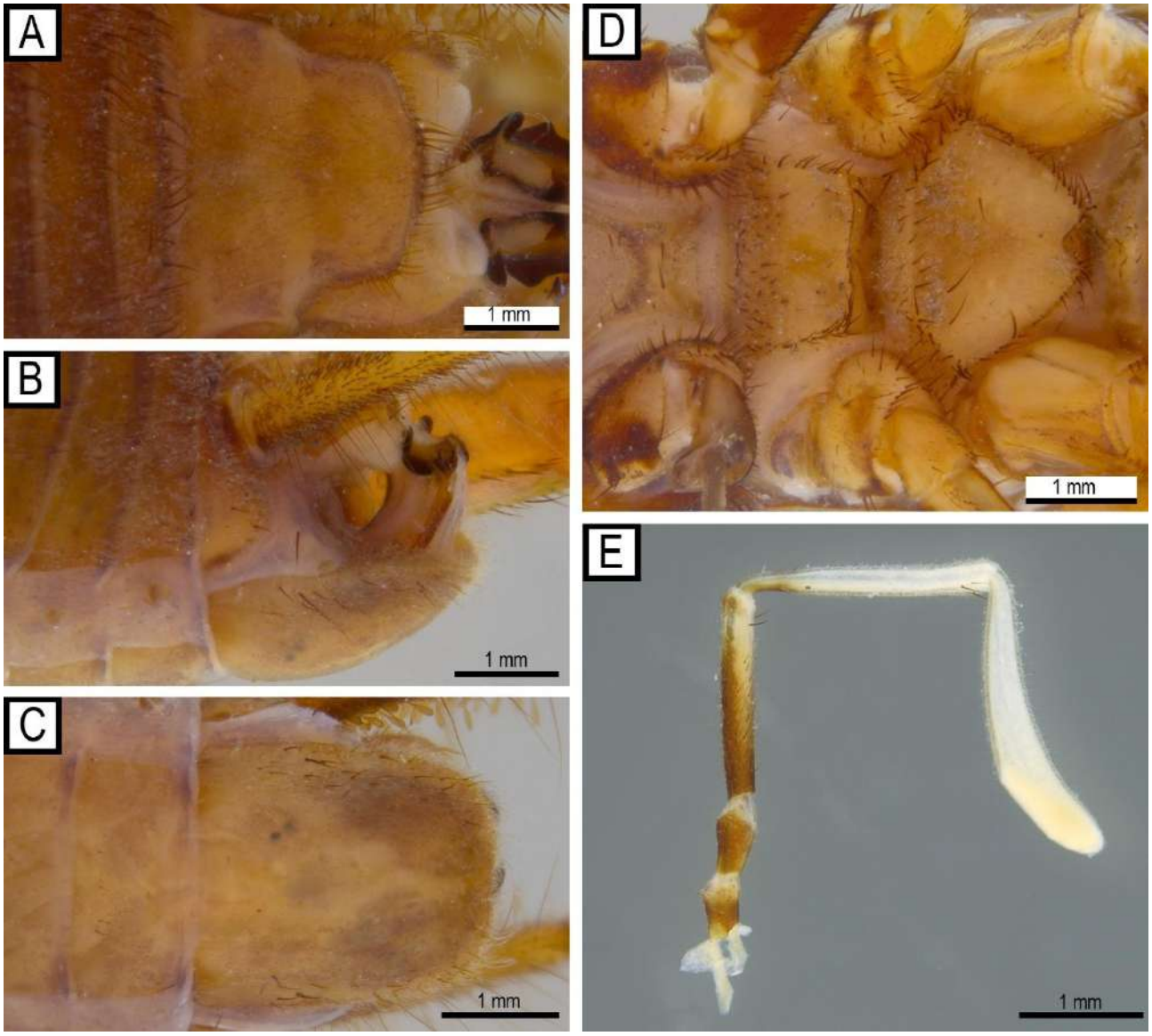

Figure 21 – *Palpigera* sp. nov. 4**.** male. Terminalia in (A) dorsal, (B) lateral, (C) ventral views. (D) Sternum. (E) Right palp.

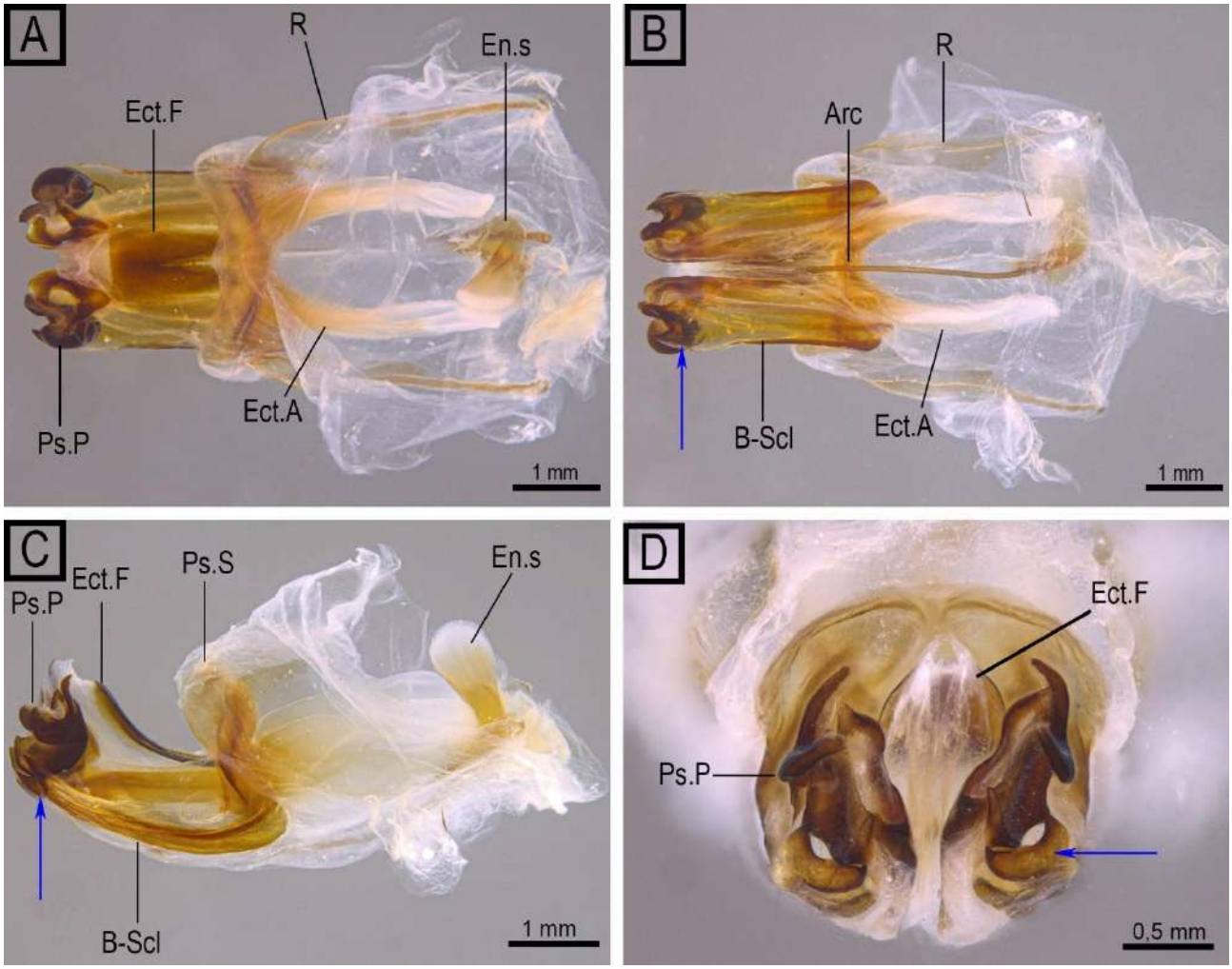

Figure 22 – *Palpigera* sp. nov. 4**.** male. Phallic complex in (A) dorsal, (B) ventral, (C) lateral, (D) axial views. Apical distal **Arms** (blue arrow)

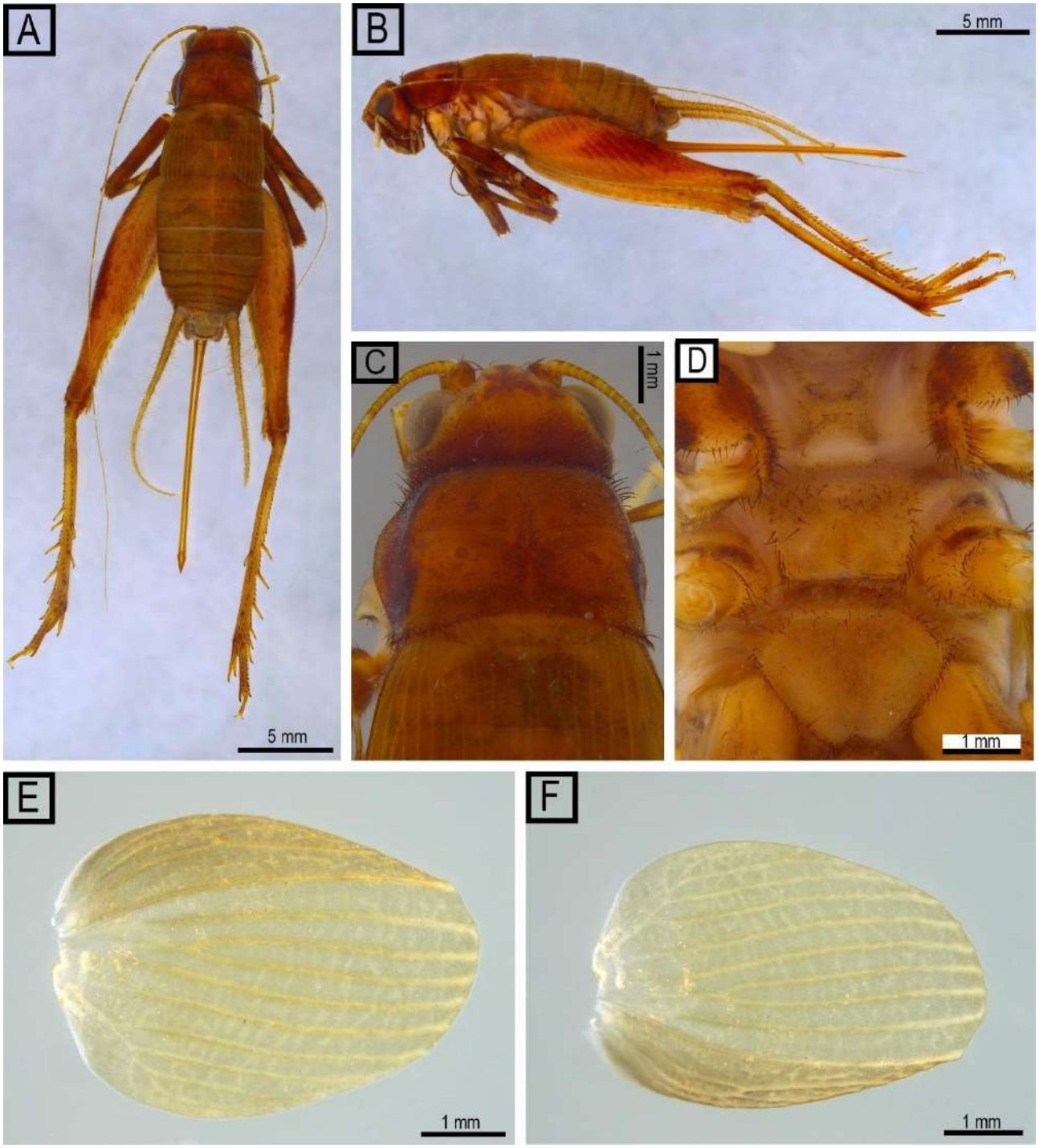

Figure 23 – *Palpigera* sp. nov. 4**.** Female. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Sternum. Right tegmen in (E) dorsal and (F) ventral views

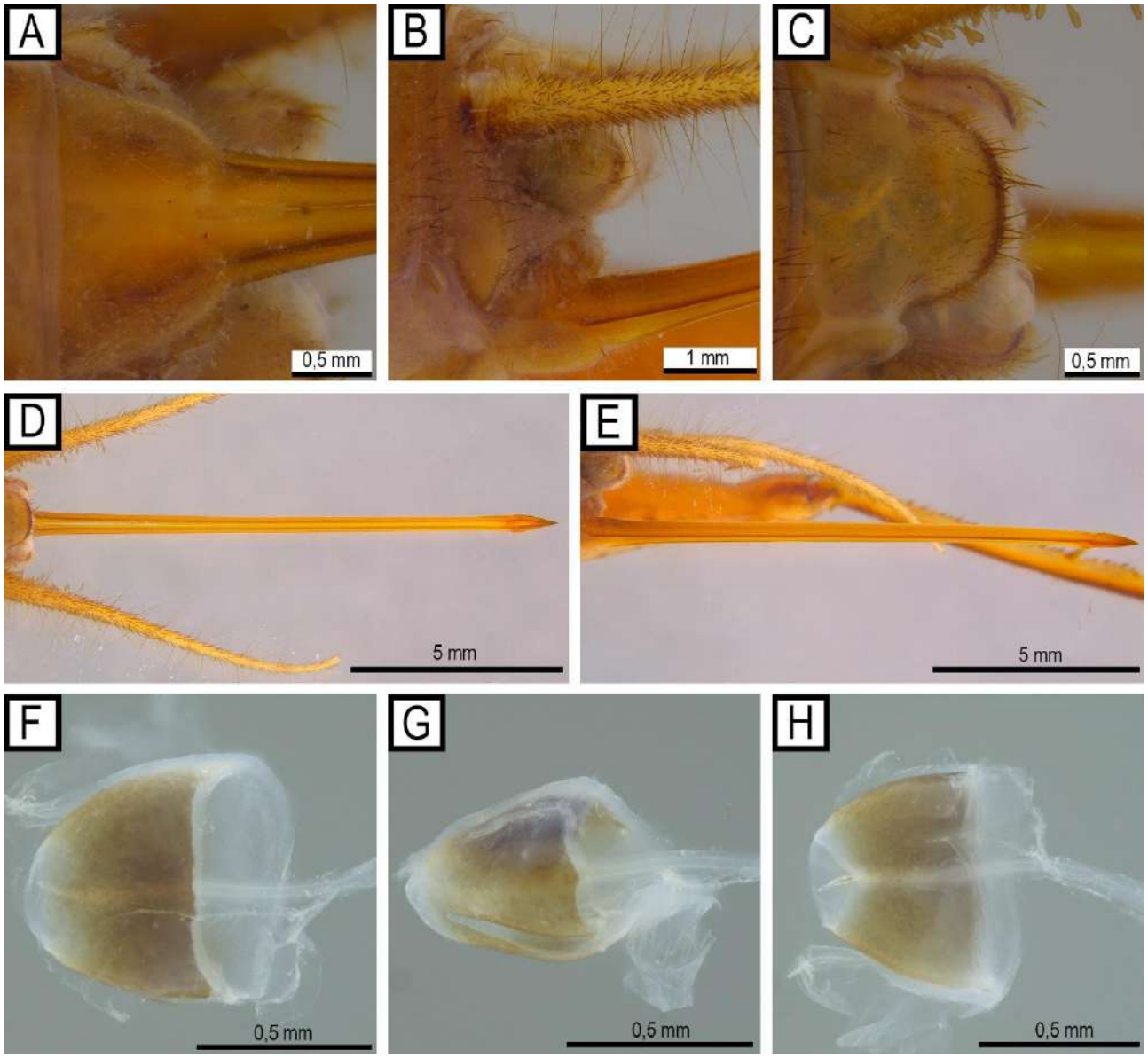

Figure 24 – *Palpigera* sp. nov. 4**.** Female. Terminalia in (A) ventral, (B) lateral, (C) dorsal views. Ovipositor in (D) dorsal and (E) lateral views; copulatory papilla in (F) dorsal, (G) lateral, and (H) ventral views

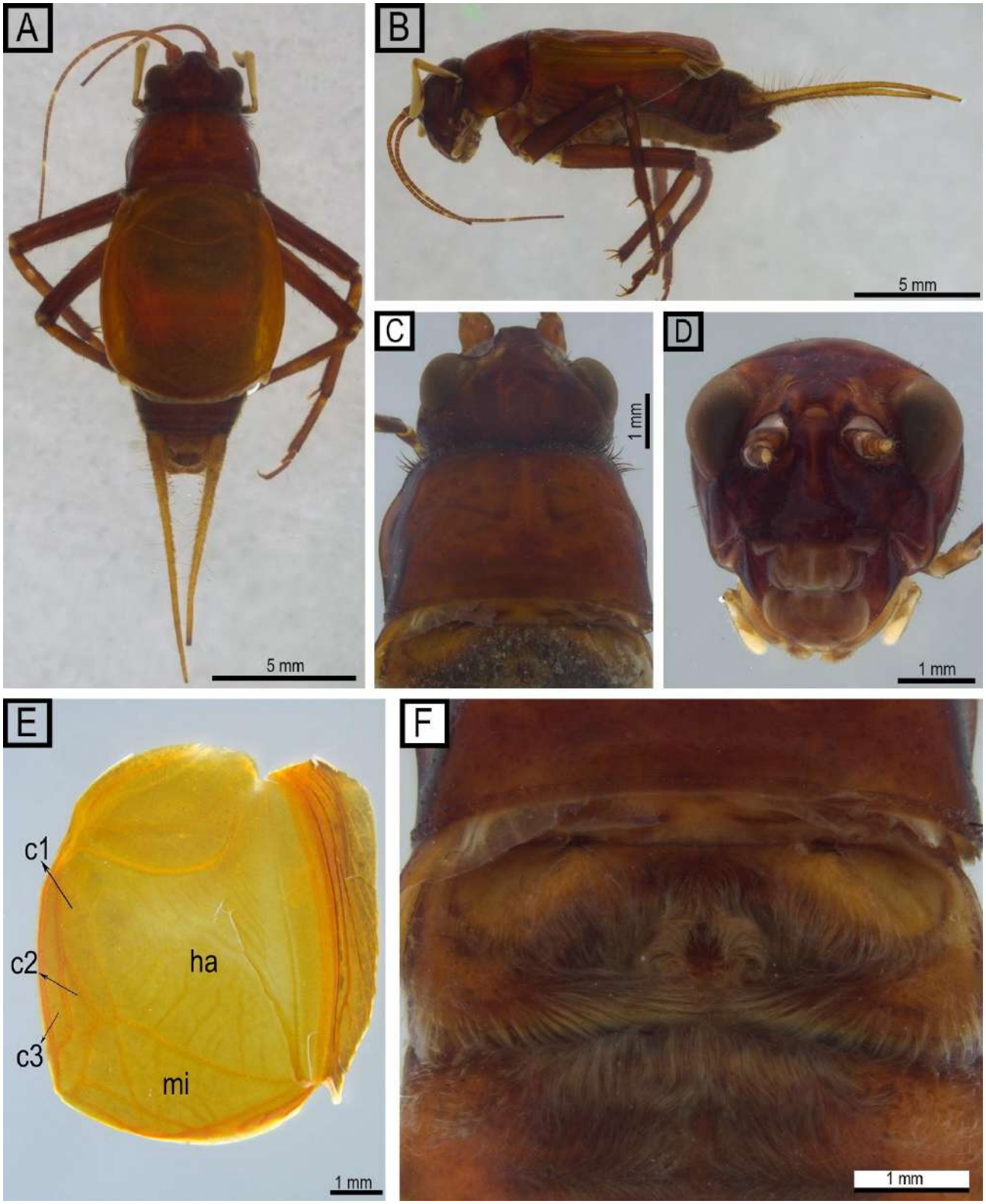

Figure 25 – *Palpigera* sp. nov. 5**.** male. *Habitus* (A) dorsal and (B) lateral views. (C) Dorsal view of head and thorax. (D) Frons. (E) Right tegmen in dorsal view. (F) Metanotal

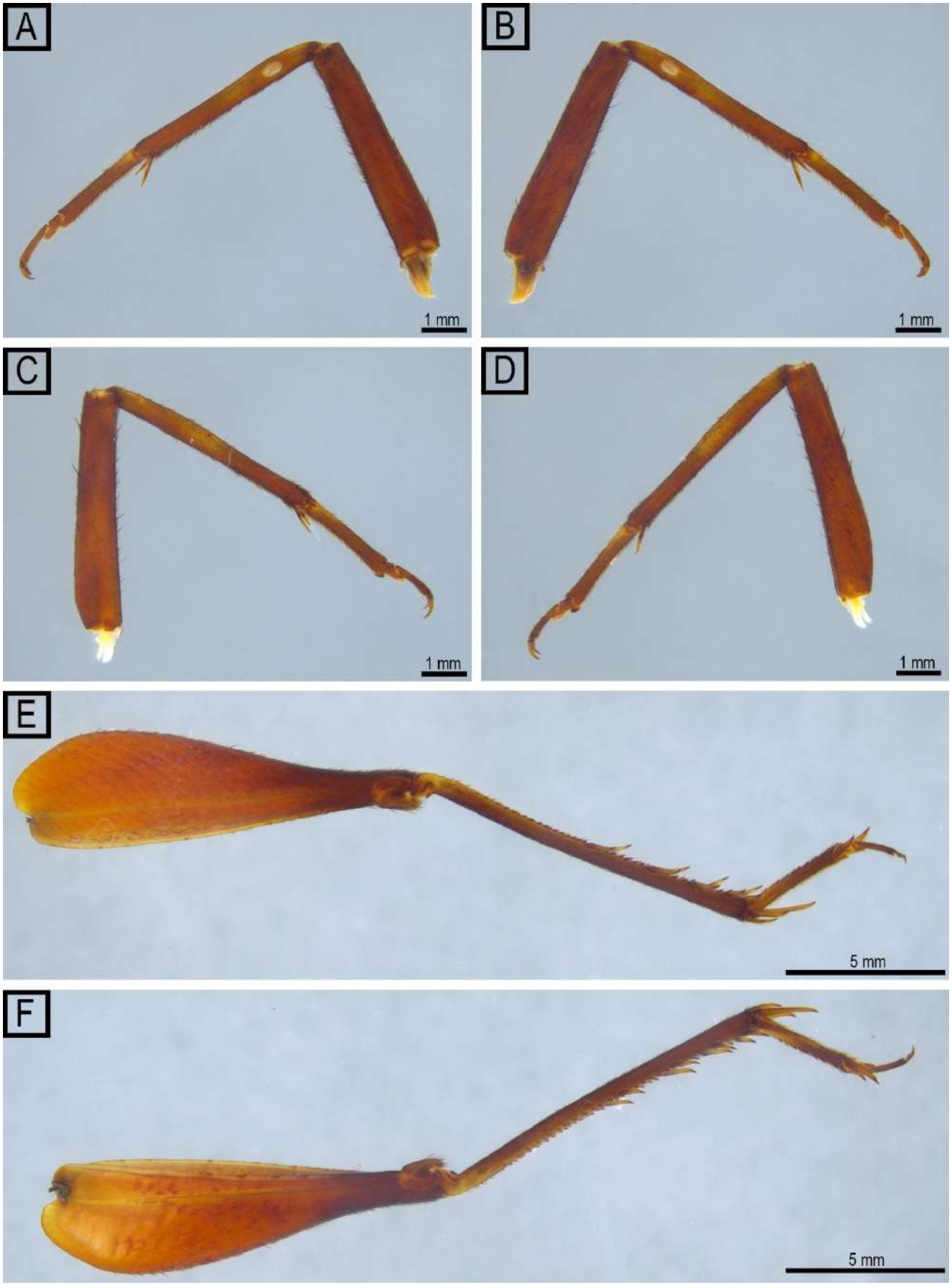

Figure 26 – *Palpigera* sp. nov. 5**.** male. Inner (A, C, E) and outer (B, D, F) views of fore (A–B). Mid (C–D), and hind legs (E–F), respectively.

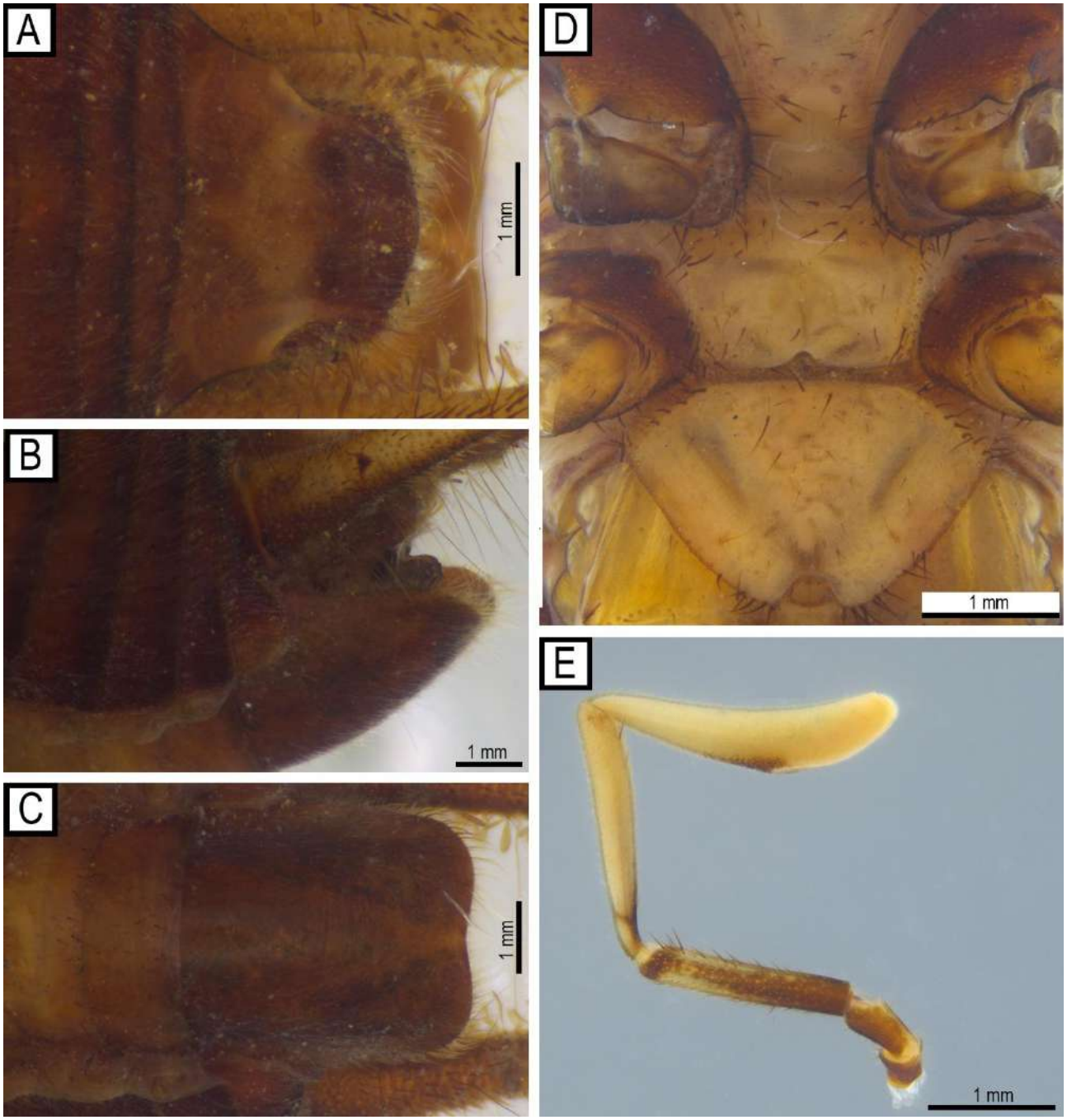

Figure 21 – *Palpigera* sp. nov. 5**.** male. Terminalia in (A) dorsal, (B) lateral, (C) ventral views. (D) Sternum. (E) Right palp.

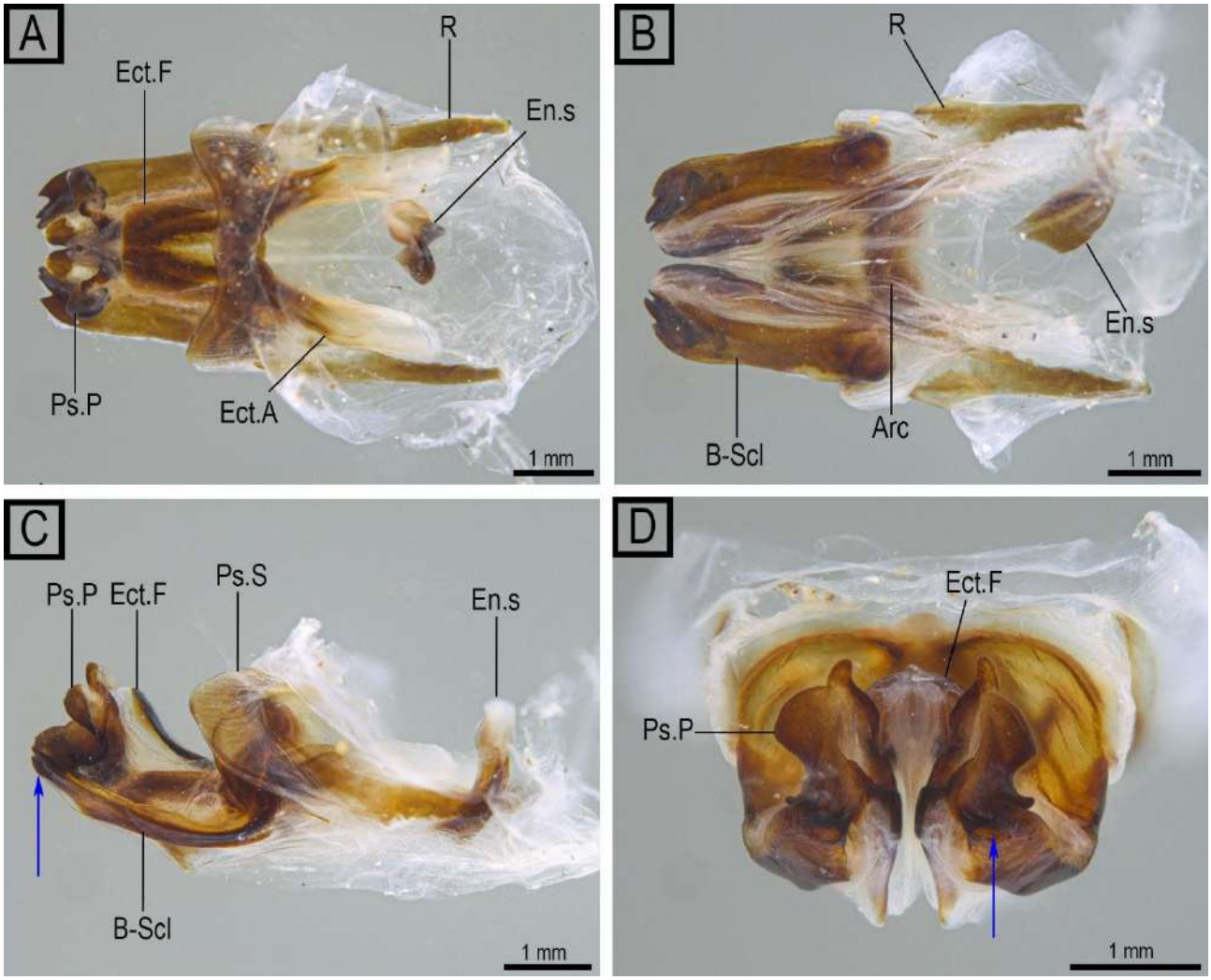

Figure 28 – *Palpigera* sp. nov. 5**.** male. Phallic complex in (A) dorsal, (B) ventral, (C) lateral, (D) axial views. Apical distal **Arms** (blue arrow)

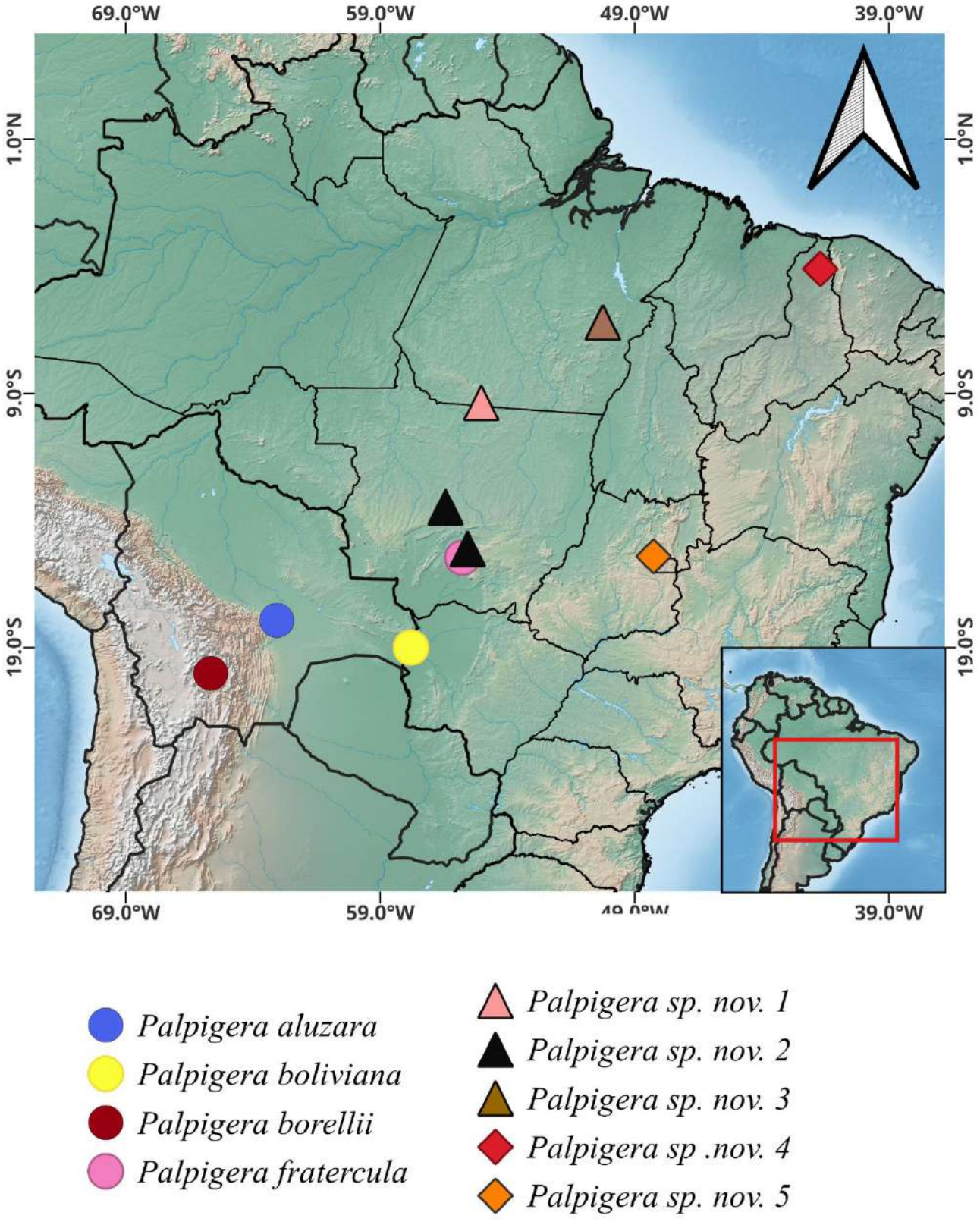

Figure 29 - Distribution map of *Palpigera* species.

Capítulo 2

A new genus of cricket of the subtribe Luzarina (Orthoptera: Phalangopsidae) from the Brazilian Amazon Rainforest

O capítulo 2 desta Dissertação foi elaborado e formatado de acordo com as normas da revista científica *Anais da Academia Brasileira de Ciências,* cujas diretrizes estão anexadas (Anexo 2).

A new genus of long-legged cricket Luzarina (Orthoptera: Phalangopsidae) from the Brazilian Amazon Rainforest

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Keywords. Ensifera, Grylloidea, Neotropical crickets, Phalangopsinae, Phalangopsini, Taxonomy

Running title: A new genus of Luzarina

Section: Animal Science

2. Abstract

In the neotropical region, the subtribe **Luzarina** is the most representative within Phalangopsini, currently with 128 valid species distributed in 49 genera (Cigliano et al. 2025). In this contribution, a new genus and species, ***Parapalpigera amazonica* gen. et sp. nov.,** is described based on specimens collected in Northern Brazil, in the Amazon rainforest. The genus is closely related to ***Melanotes*** Desutter-Grandcolas, 1993 and ***Palpigera* Hebard, 1928**, but it can be distinguished by the following combination of characteristics: reduced tegmina without stridulatory apparatus; absent tympanum; very elongated and thin palpus; shape of the endophallus sclerite; bifid endophallus apodeme; and shape of the female copulatory papilla.

3. Introduction

The Amazon is an exceptional biome, housing the largest tropical forest in the world and a mosaic of unique ecosystems, making it the most species-rich biome on the planet (Hoorn et al. 2010). Most of this forest is located in Brazil, covering nearly 60% of the national territory and spanning eight states (Brazil 2015, 2016, Guayasamin et al. 2024). With its continental expanse and diversity of terrestrial and aquatic habitats, it is estimated that Brazil harbors 20% of global biodiversity (Brazil 2015, 2016, Guayasamin et al. 2024). However, the biological richness of the Brazilian Amazon, particularly in relation to insects, remains underexplored (Peres 2005).

According to the Orthoptera Species File (Cigliano et al. 2025), Phalangopsidae includes 1,115 valid species distributed across 195 genera, found in all biogeographical regions except the Holarctic. In Brazil and the Neotropical region, Phalangopsidae crickets stands out for its remarkable diversity, being the family of Gryllidea with the highest number of recorded species in the country, totaling 132. Two subfamilies are traditionally recognized in this region: Paragryllinae and Phalangopsinae (Cigliano et al. 2025). Within this family, Phalangopsinae is the most representative in the Neotropical region. In Brazil, 113 species are currently recorded, distributed across 34 genera (Cigliano et al. 2025).

The Luzarae group was originally established by Hebard (1928), based on external morphology and different modes of life of its representatives, without considering the stridulatory apparatus or male genitalia. Later, the group's status was elevated to the tribe (Chopard 1968) and subfamily (Desutter 1990) levels. In 2014, Gorochov reestablished Luzarina as a subtribe, using external morphological characteristics and internal genitalia; however, it was only in 2024, after the publication of Gorochov's last work (2024), that the Orthoptera Species File updated its classification to subtribe within the tribe Phalangopsini. Currently, Luzarina includes 23 genera and 71 described species (Cigliano et al. 2025; Gorochv 2024).

Desutter (1990) recovered three groups of genera within the neotropical cricket of the "Luzarinae" (treated as a subfamily of Phalangopsidae), and classified them as groups A, B, and C. Group B corresponds (at least partially) to Luzarae as defined by Hebard (1928), including *Palpigera* and *Melanotes*, which are genera closely related to the new genus described here. These two genera share the following apomorphies: extremely enlarged palps; the anterior angle of the mirror shifted toward the edge of the tegmina rather than centrally positioned; and the epiphallic arms' ends shaped like lobes, separated from the associated sclerites (Desutter-Grandcolas 1992).

In this article, we describe *Parapalpigera* **gen. nov.**, a new genus included in the subtribe Luzarina, which is related to *Melanotes* and *Palpigera*, genera included in the group B sensu Desutter-Grandcolas. This genus includes a new species, *Parapalpigera amazonica* ***sp. nov.***

4. Materials and methods

Three specimens were analyzed. They were collected with pitfall traps in the FLONA Caxiuanã (1°43'35"S, 51°26'36"W, 45 m), in the municipality of Melgaço, Pará, Brazil. The male and female genitalia were removed with the aid of micropins and treated with a 10% aqueous potassium hydroxide (KOH) solution, heated for about 15 min to remove muscles and tissues, allowing better visualization of the structures. They were then washed in water, transferred to a vial with vinegar for 5 min (to stop the KOH reaction), washed again, and then placed in a microvial with 80% alcohol, where they were stored along with the dissected specimen.

The nomenclature used for the male genitalia followed Desutter (1987, 1988), with modifications by Desutter-Grandcolas (2003): Ps.P, pseudepiphallic parameres; Ps.S, pseudepiphallic sclerite; Ect.F, ectophallic fold; Ect.A, ectophallic apodeme; Arc, ectophallic arch; Arm, pseudepiphallic arms; R, rami; En.a, endophallic apodeme; En.s, endophallic sclerite. The photographs were taken with a Leica DFC 450 camera attached to a Leica M205 A stereo microscope, stacked using Helicon Focus 8, and edited in Photoshop 2021.

The measurements were taken with a caliper and are defined as follows: Body length (BL), distance from the top of the head to the tenth tergite; pronotal length (PL), maximum distance between the anterior and posterior margins of the pronotal disc; pronotal width (PW), maximum distance between the lateral lobes of the pronotum; tegmina length (Tg), distance from the base to the apex of the tegmina; hind femur length (HF), distance from the base of the hind femur to the apex of the genicular lobes; hind tibia length (HT), distance from the base to the apex of the hind tibia; and ovipositor length (Ov), distance from the apex of the subgenital plate to the apex of the ovipositor.

All specimens analyzed will be deposited in the entomological collection of the Museu Paraense Emílio Goeldi (MPEG) in Belém, Pará, Brazil. The map was created using specimen label data and literature in Quantum GIS (QGis) software. When locations were not georeferenced, approximate coordinates were used.

5. Results

Family Phalangopsidae Blanchard, 1845

Subfamily Phalangopsinae Blanchard, 1845

Tribe Phalangopsini Blanchard, 1845

Subtribe Luzarina Hebard, 1928

Parapalpigera Franco, Fernandes & Tavares gen. nov.

Zoobank link.

Etymology. The prefix "para-" in the word *Parapalpigera* comes from the Greek "παρά" (para), which means "next to," "close to," or "similar to," in relation to the genus *Palpigera*. The gender of the name is feminine.

Type-species: *Parapalpigera amazonica* **Franco, Fernandes & Tavares n. sp**., described below.

Diagnosis: Male with a robust body and long and slender legs (Fig.1a). Micropterous, with tegmina reaching the posterior margin of the metanotum or slightly surpassing it (Fig. 1a). Stridulatory apparatus absent (Figs.1e-f). Tympana absent on the fore tibiae (Figs. 2a-b). **En.s** well-developed and sclerotized (Fig. 4a). **En.a** bifid (Figs. 4a-c). **Ect.A** well-developed and rough (Fig. 4f-g). Female with a body shape similar to the male, with short tegmina reaching the posterior region of the mesonotum (Figs. 5a; c), also with long and white maxillary palps (Fig. 5b). Ovipositor upcurved, almost as long as the cerci (Figs. 6c-d).

Parapalpigera **gen. nov.** differs from *Palpigera* and *Melanotes* primarily in external morphology and genital morphology. In the new genus, the tympanum is absent, whereas in *Melanotes* and *Palpigera*, the tympanum is present. In *Parapalpigera* **gen. nov.**, the maxillary palps are white, like in *Melanotes* and *Palpigera*, and have a shape similar to that of *Palpigera fratercula* Hebard, 1928, with the last two palpomeres being long and slender. In contrast, *Melanotes* and other species of *Palpigera* have the last two palpomeres broader and shorter. In the new genus, the wings are undeveloped (micropterous), and the stridulatory apparatus is absent, differing from the other two genera, where the tegmina are well-developed and the stridulatory apparatus is present.

FIGURE 1

Melanotes spp. and *Palpigera aluzara* Gorochov, 2014 (the only species of *Palpigera* with known genitalia) do not have the **En.s** as developed as in *Parapalpigera* **gen. nov.** Additionally, in the new genus, ***En.a*** comprises a medial bifid projection; in *Melanotes*, it is bifid and reduced to two lateral lamellae at ***En.a*** base; in *P. aluzara*, consists of one projection. **Ect.F** extends beyond the pseudepiphallic arms in all three genera; however, in *Parapalpigera* **gen. nov.**, it is elongated anteriorly, surpassing the **En.s**, while in *Melanotes* and *P. aluzara*, it is way more shortened, not surpassing even the **Ps.S**.

Regarding females, the new genus has very short tegmina, scale-like, reaching the anterior margin of the mesonotum, while in *Melanotes* and *Palpigera*, the tegmina are much longer, reaching the first or the second abdominal tergite. Additionally, the ovipositor in *Parapalpigera* **gen. nov.** is slightly upcurved, while it is straight in the other two in the genera.

Parapalpigera amazonica **sp. nov. Franco, Fernandes & Tavares sp. nov.**

Zoobank link.

Figs 1–7

Type material. *Holotype.* **Male**. Brazil, Pará, Melgaço, FLONA Caxiuanã—ECFPn, ESECAFLOR, 1°43'35"S, 51°26'36"W. 45 m. I.2012. D.A. Cunha *leg*. Pitfall [The phallic complex was removed and kept in a microvial with the specimen. All legs (except the left hind femur) and the right maxillary palpus were removed and kept in the same specimen vial]. Repository: MPEG

*Paratypes***.** 2 female. Same data as the holotype. Repository: MPEG

Etymology. The specific epithet refers to the Amazon rainforest domain, the habitat of this species.

Diagnosis. Same as for the genus.

Description:

Male head. Higher than wide, and dark brown (Figs. 1a-d). Lateral and median ocelli clearly visible and light brown; lateral ocelli near the dorsal margin of the eye, taller than wide; median ocellus between the antennal orbits, close to the dorsal margin (Fig. 1d). In dorsal view, the area around the median ocellus noticeably swollen, reaching halfway along the scape (Fig. 1c). In frontal and lateral views, eyes oval, taller than wide, and prominent (Figs. 1b-d). Antennae extending beyond the hind tibia, with large scapes, about half the width of the vertex (Figs. 1a-d). Pedicel similar to the other antennomeres, slightly wider and longer (Figs. 1c-d). Labrum half dark brown and half white; clypeus whitish (Fig. 1d). Labrum as wide as the proximal half of clypeus (Fig. 1d). Maxillary palps robust, with the last two palpomeres white (Fig. 3a), elongated and thick, twice as long as the head and twice as thick as the antennomeres (Figs. 1b, d). First two palpomeres equal in length; third twice as long as the first two combined; fourth thinner than the others, as long as the fifth; fifth upcurved, with the apical margin arched (Fig. 3a).

Male thorax. Pronotum dark brown, wider than longe, similar in color to the head, with a median and longitudinal light stripe, dorsal disc anterior margin straight, and posterior margin concave (Fig. 1c). Lateral lobes as high as long, with a convex ventral margin and obtuse anteroventral and posteroventral angles (Fig. 1b). Prosternum reduced, quadrate, with a small convex arc near the posterior margin (Fig. 3b). Mesosternum subquadrate, with a straight anterior margin and a notched posterior margin (Fig. 3b). Metasternum subhexagonal and wide, almost twice as wide as the mesosternum and with a notched posterior margin (Fig. 3b). Metanotal gland covered by the tegmina, with a lateral opening on each side, covered with dense setae. Opening with a darker tone. (Fig. 1g).

FIGURE 2

Male tegmina. Dark brown, short, reaching the posterior margin of the metanotum (Fig. 1a-b), stridulatory apparatus absent, and with lateral and dorsal field slightly reticulated (Figs. 1e-f).

Male legs I, II, and III light brown or ochre, covered with small setae, most prominent on the fore tibiae; tympana absent (Figs. 2a-f). Fore and mid legs with nearly the same length (Figs. 2a-d). Hind legs twice as long as the body, with well-developed femora (Figs. 2e-f). Tibiae I with two apical spurs (Figs. 2a-b); tibiae II with four, those on the inner margin reduced, and those on the outer margin elongated (Figs. 2c-d); tibiae III serrulated, armed with four inner and four outer subapical spurs, and three apical spurs on each margin (Figs. 2e-f), with inner dorsal apical spur being the largest of the inner margin, followed by the medium and ventral spurs (Figs. 2e-f), and the outer mid apical spur being the largest of the outer margin, followed by the dorsal and ventral ones, respectively (Figs. 2e-f). Basitarsi at least four times longer than the other tarsomeres combined (Figs. 2e-f).

Male abdomen, in dorsal view, elongated, comprising more than half of the total body length, dark brown, with the tenth tergite lighter in color (Figs. 1a-b). Supra-anal plate trapezoidal, with a medium-distal concavity on the lateral margins (Fig. 3e). Posterior margin slightly concave (Fig. 3e). Subgenital plate longer than wide. In lateral view, dorsal margin slight concave in the middle-distal portion (Fig. 3c). In ventral view, broad basally with straight lateral margins and a slightly concave posterior margin (Fig. 3d).

FIGURE 3

Male Genitalia: Phallic complex elongated, elliptical in dorsal and ventral views (Figs. 4a-d). **Ps.S** shortened; proximal portion elevated and straight in lateral view (Fig. 4c), with a rough posterior surface (Fig. 4d). **Arc** short, covered by the **Ps.S**. **Ps.P1** divided into two pairs, the first two elongated and rod-shaped, while the other two shorter, less than half the length of the first pair (Figs. 4b, f). **Ps.P2** as two elongated and upwardly prominent lobes in lateral view (Fig. 4c) and acuminated in axial view (Fig. 4d). **Ect.F** very long and wide, with a distal portion divided into two lobes emerging after the **Ps.S** and before the **Ps.P1** (Fig. 4a), a bifid medial portion with the ventral branch almost reaching the proximal pair of **Ps.P1** (Figs. 4b-e), and a long proximal portion reaching the **En.s** (Figs. 4a-b). **En.s** well sclerotized, "E"-shaped (Fig. 4a), and with a bifid **En.a**, darker in color than the **En.s** (Fig. 4a). **R** long, narrow, and arched (Figs. 4a-c). **Ect.A** large, reaching halfway along the **Ect.F** and divergent (Fig. 4a). **Arm** well sclerotized; in lateral view, upcurved and tapered at the tip (Figs. 4a-d).

FIGURE 4

Female: Similar to the male in coloration and size, differing in tegmina length and the absence of the metanotal gland (Figs. 5a-b). Tegmina short, scale-like, reaching the anterior margin of the metanotum, with some poorly-marked longitudinal veins (Figs. 5c, e-f). Sternum similar to males (Fig 5d). Supra-anal plate setose, widely convex in the mid-distal region and posteriorly projected and flanked by two small medio-proximal lobes (Fig. 6a). Subgenital plate short, subtrapezoidal, with the posterior margin emarginated, forming two lobes (Fig. 6b). Ovipositor slightly upcurved, equal in length to the cerci, with an acute and tapered apex (Figs. 6c-d).

FIGURE 5

Female Genitalia: Copulatory papilla robust and conical in shape in both dorsal and ventral views (Figs. 6e-f). In dorsal view, distal end with a large opening (Fig. 6e) and anterior margin with a pronounced border flanked by lateral concavities. In lateral view, proximal margin widely open, with a sinuose margin (Fig. 6f). In ventral view, proximal margin slightly emarginated and distal end truncated (Fig. 6g).

FIGURE 6

Measurements (mm).

Holotype male. **BL:** 18.0; **PL:** 3.0; **PW:** 4.0 **Tg:** 2.0; **HF:** 13.0; **HT:** 13.0

Two females. **BL:** 16.5–19.0; **PL:** 2.0–3.5; **PW:** 3.0–4.0; **Tg:** 1.0; **HF:** 14.0–15.0; **HT:** 12.0–14.0; **Ov:** 8.0–

9.0

6. Discussion

In addition to the differences between the new genus and *Melanotes* and *Palpigera* (the two most closely related genera) cited above, *Parapalpigera* **gen. nov.** exhibits distinctive features that set it apart from other apparently similar genera within the subtribe, like *Koilenoma* Desutter-Grandcolas, 1993, *Luzarida* Hebard, 1928, *Luzaridella* Desutter-Grandcolas, 1992, *Lecticusta* Cadena-Castañeda & García García, 2012, *Dyscophogryllus* Rehn, 1901, and *Dentoluzara* Cadena-Castañeda & Quintana-Arias, 2024. The **En.s** is developed in a large E-shaped structure. In contrast, in *Koilenoma,* it is elongated. In *Luzaridella and Dentoluzara,* it is shortened, and in *Luzarida*, it is *absent*. In *Lecticusta*, it is also enlarged and somehow E-shaped, but it has an elongated posterior projection, which is absent in the new genus. However, in *Parapalpigera* **gen. nov.**, the two apical palpomeres are white, elongated, and slender. Although also white in *Palpigera* Hebard, 1928, and *Melanotes* Desutter-Grandcolas, 1993, in other genera abovementioned, they are brown. The tympanum is absent, a feature found in *Koilenoma and Lecticusta*, whereas it is developed in the other genera. The tegmina are reduced and lack a stridulatory apparatus, unlike *Koilenoma*, where they are also reduced, but in *Palpigera, Melanotes*, *Luzarida, Luzaridella*, *Lecticusta, Dentoluzara*, and *Dyscophogryllus*, they are fully developed. Furthermore, the endophallic apodeme is bifid, more like *Dentoluzara, Lecticusta*, and *Melanotes,* whereas in *Luzaridella* and *Koilenoma*, it is reduced and single, and in the other genera, it is absent. These features reinforce the decision to describe *Parapalpigera* as a new genus.

Parapalpigera **gen. nov.** differs from *Palpigera* and *Melanotes* by having apical palpomeres that are white, elongated, and slender, while in *Palpigera* and *Melanotes*, they are wider and shorter, except in *P. fratercula*. The tympanum is absent in the new genus and present in *Palpigera* and *Melanotes*. The tegmina are reduced and lack a stridulatory apparatus, whereas both genera have fully developed tegmina (*Melanotes* has tegmina bordered by two yellow-ochre lateral bands, while in *Palpigera* it is concolor). The endophallic sclerite is "E"-shaped, contrasting with the oval and elongated shape of *Palpigera* and the triangular shape of *Melanotes*. Endophallic apodeme bifid

in *Parapalpigera* **gen. nov**. and *Melanotes*: in *Parapalpigera* **gen. nov**., the bifurcation is medially positioned; in *Melanotes*, the bifurcation comprises two lateral lamellae at **En.a** base, and in *Palpigera*, it is a single projection. These differences clearly demonstrate that *Parapalpigera* **gen. nov**. is a distinct genus. Additionally, *Parapalpigera* **gen. nov.** is recorded in the Amazon rainforest (Fig. 7), while *Palpigera* occurs in the Cerrado formation and *Melanotes* in the Atlantic Forest.

FIGURE 7

7. Acknowledgments.

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8. Author contribution

All authors contributed equally to all stages of this article.

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10. Figure List

Figure 1 – *Parapalpigera amazonica* **gen. et sp. nov.** Holotype male. *Habitus* (a) dorsal and (b) lateral views. (c) Dorsal view of head and thorax. (d) Frons. Right tegmen in (e) dorsal and (f) ventral views. (g) Metanotal gland.

Figure 2 – *Parapalpigera amazonica* **gen. et sp. nov.** Holotype male. Inner (a, c, e) and outer (b, d, f) views of fore (a–b). Mid (c–d), and hind legs (e–f), respectively.

Figure 3 – *Parapalpigera amazonica* **gen. et sp. nov.** Holotype male. (a) Right palp. (b) Sternum. Terminalia in (c) lateral, (d) ventral views, (e) dorsal views.

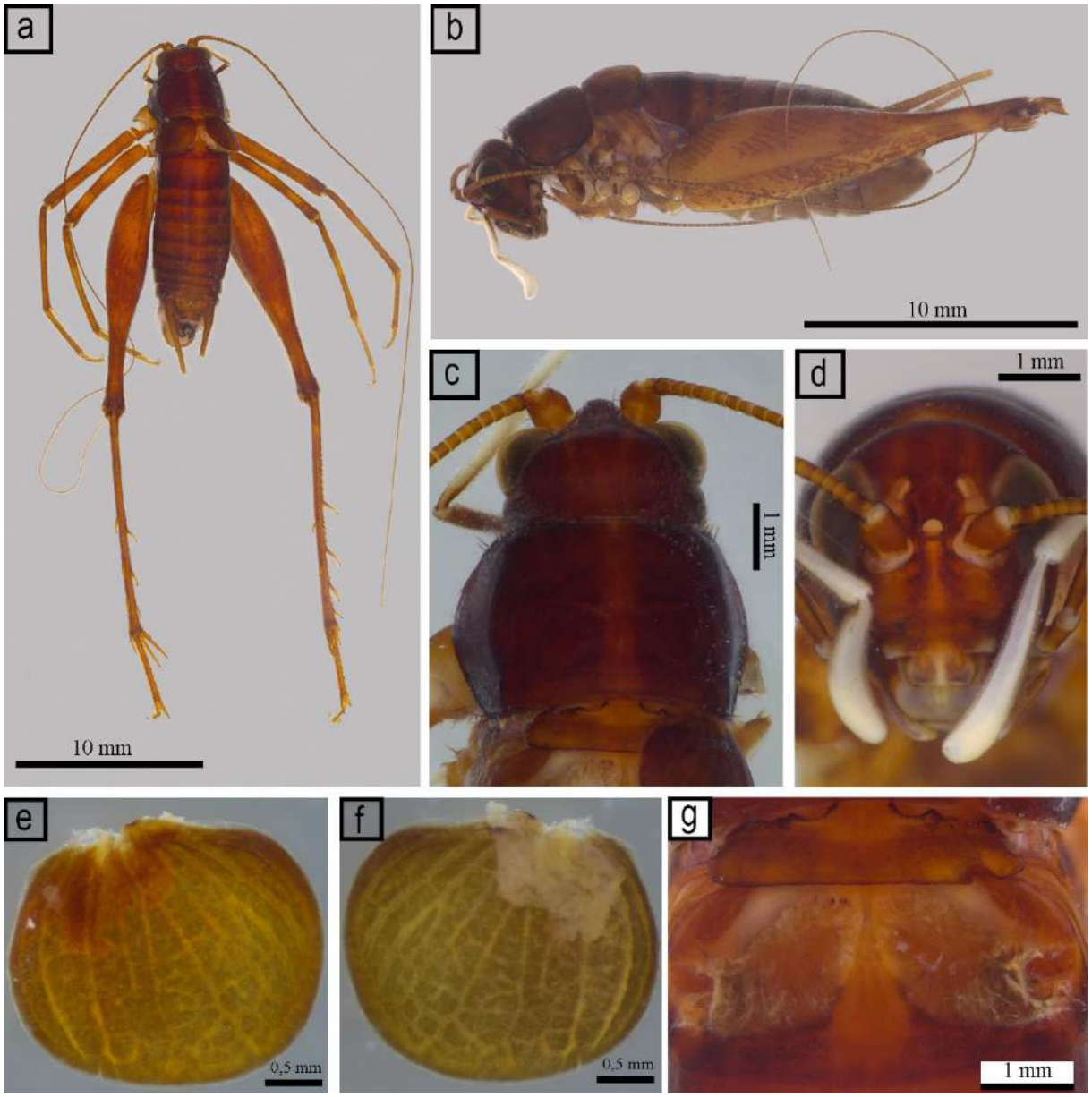
Figure 4 – *Parapalpigera amazonica* **gen. et sp. nov.** Holotype male. Phallic complex in (a) dorsal, (b) ventral, (c) lateral, (d) axial views. (e) Closer view of the distal sclerites of **Ect.F**. (f) Closer view of **Ps.P1**

Figure 5 – *Parapalpigera amazonica* **gen. et sp. nov.** Paratype female. *Habitus* (a) dorsal and (b) lateral views. (c) Dorsal view of head and thorax. (d) Sternum. Right tegmen in (e) dorsal and (f) ventral views.

Figure 6 – *Parapalpigera amazonica* **gen. et sp. nov.** Paratype female. (a) Tenth tergite. (b) Subgenital plate. Ovipositor in (c) lateral and (d) dorsal views; copulatory papilla in (e) dorsal, (f) lateral, and (g) ventral views.

Figure 7 - Collection site of *Parapalpigera amazonica* **gen. et sp. Nov**

10. Figure List (obs: apesar das normas da revista solicitarem que as imagens sejam enviadas separadas, optamos por colocá-las no final do trabalho para facilitar a visualização)



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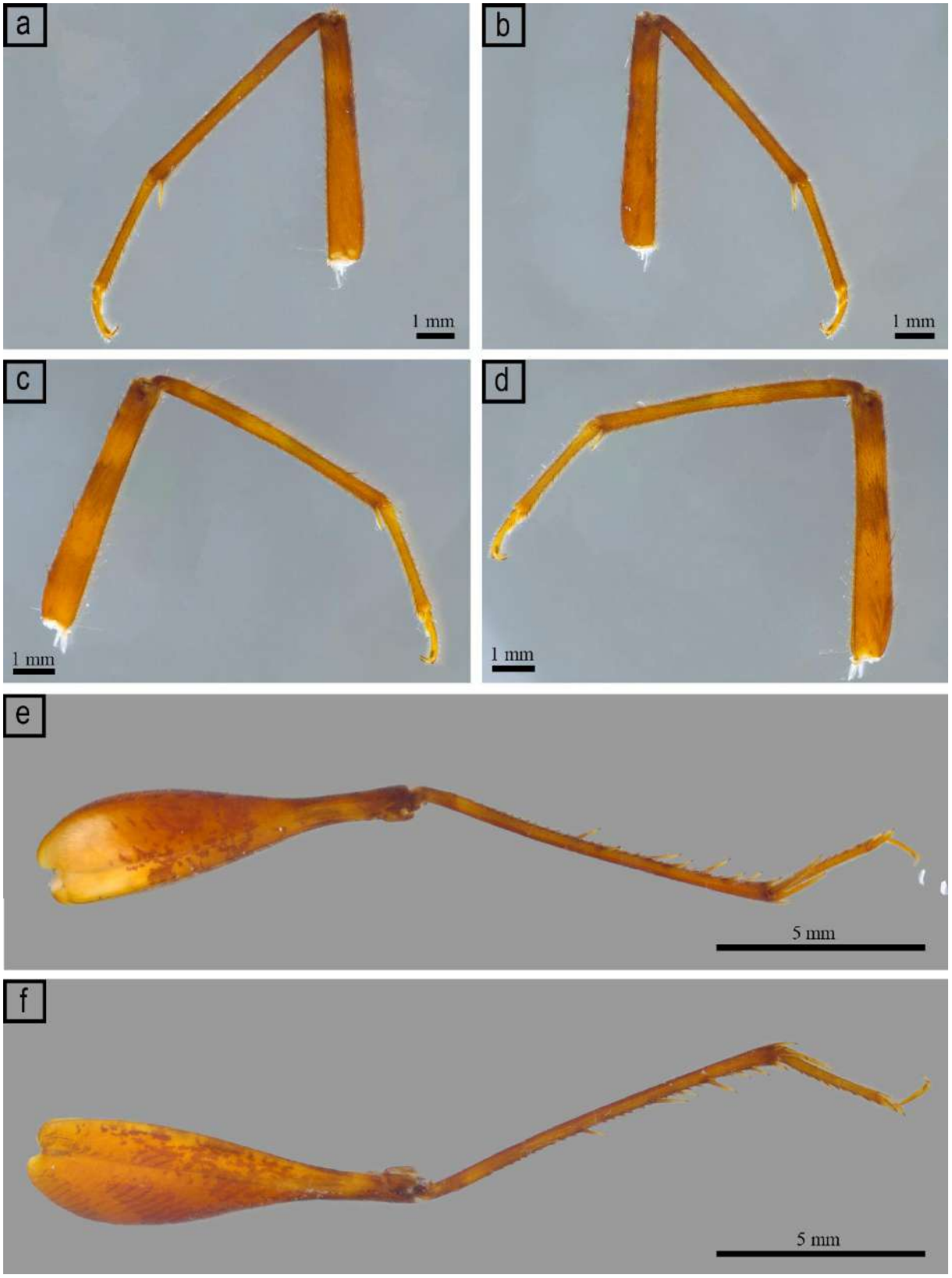

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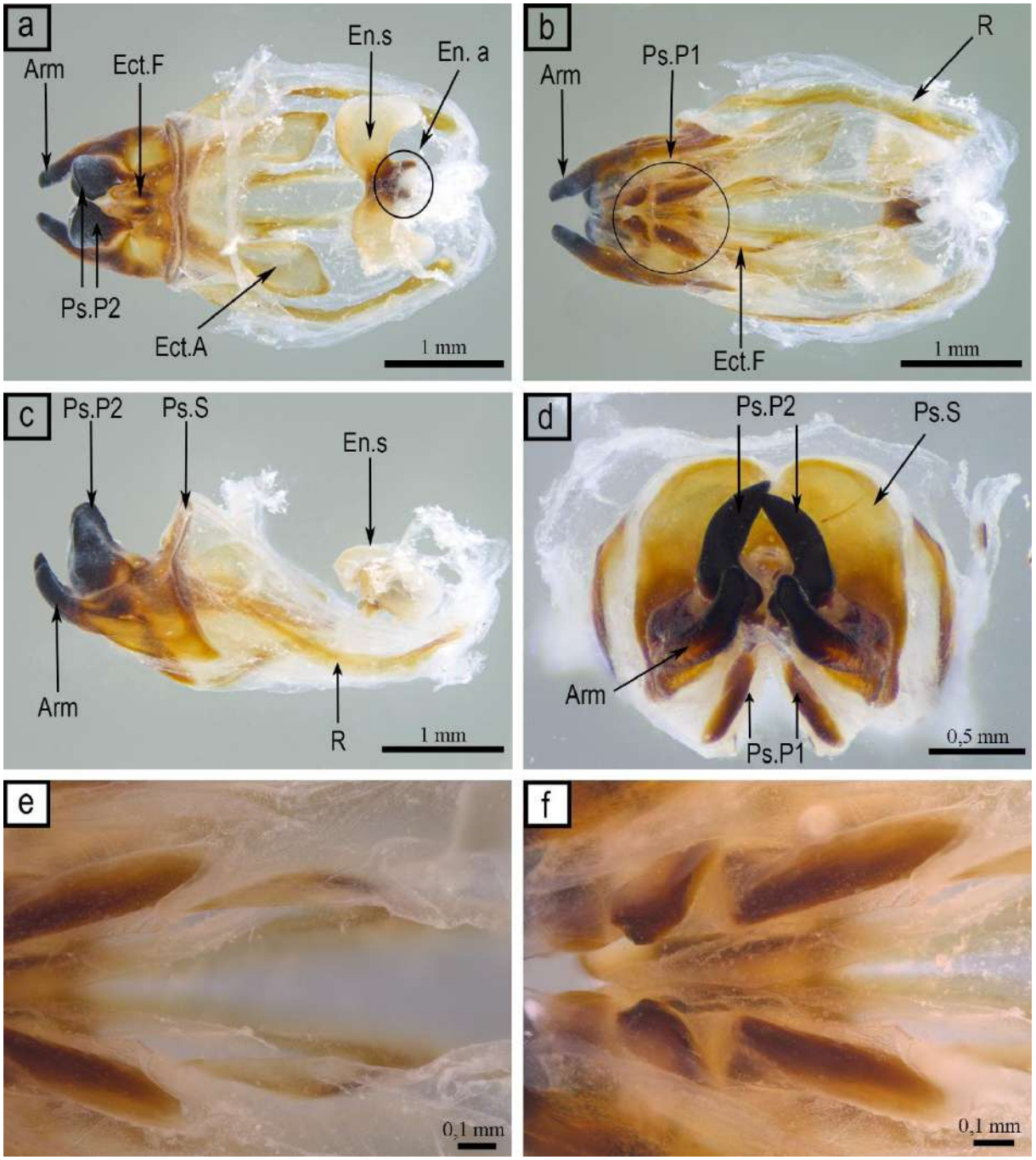
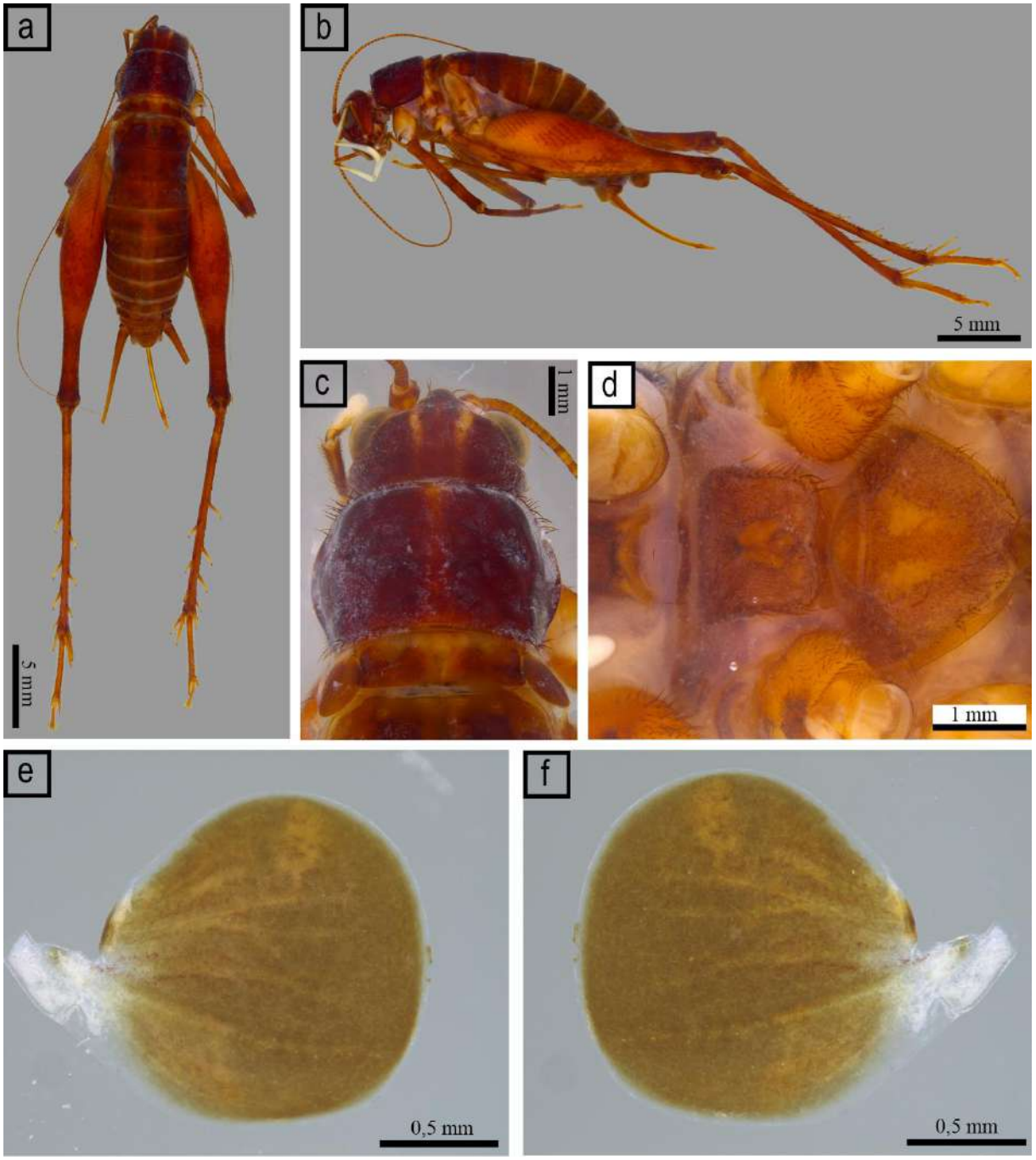


Figure 4 – *Parapalpigera amazonica* **gen. et sp. nov.** male. Phallic complex in (a) dorsal, (b) ventral, (c) lateral, (d) axial views. (e) Closer view of the distal sclerites of **Ect.F**. (f) Closer view of **Ps.P1**



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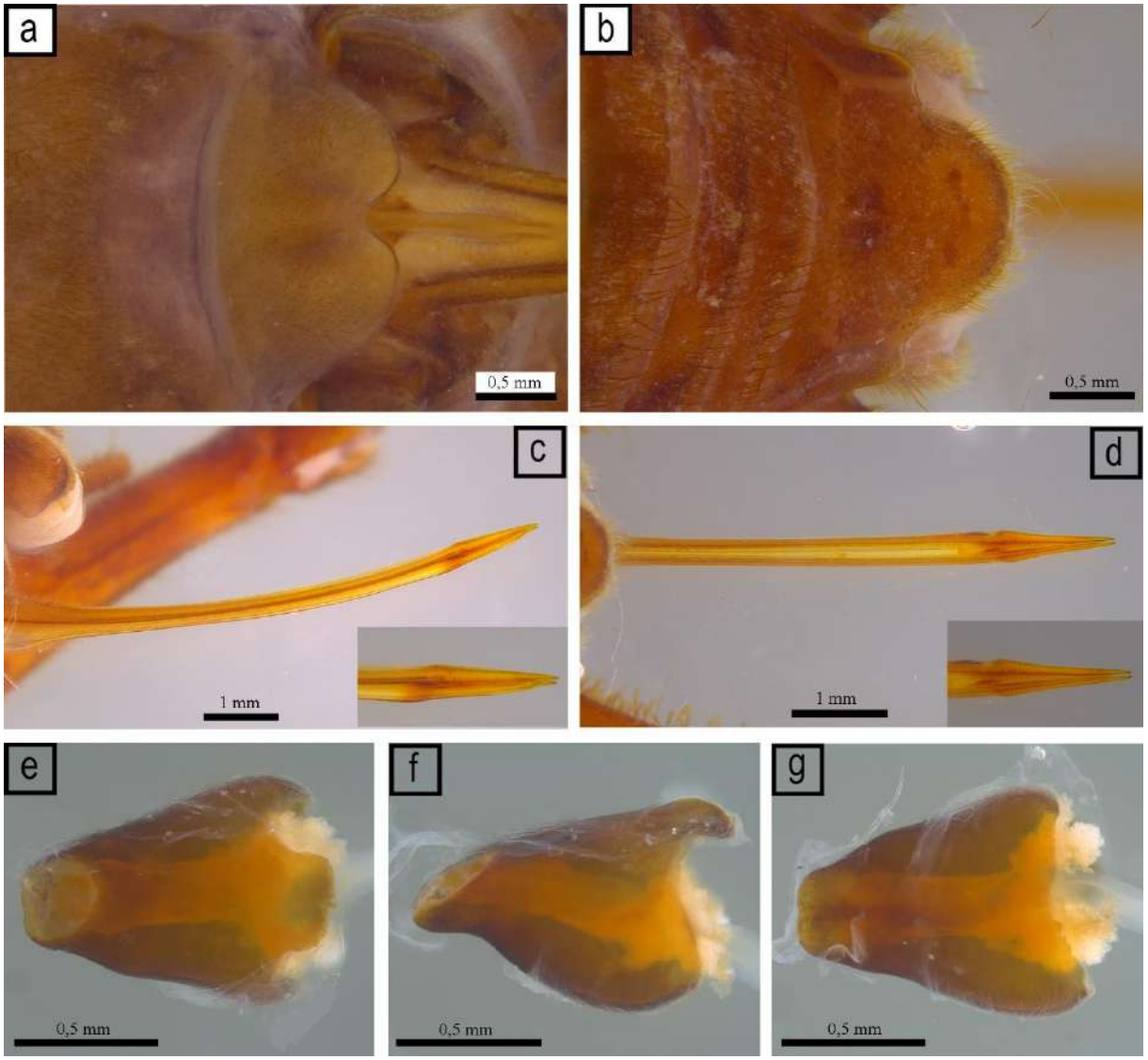

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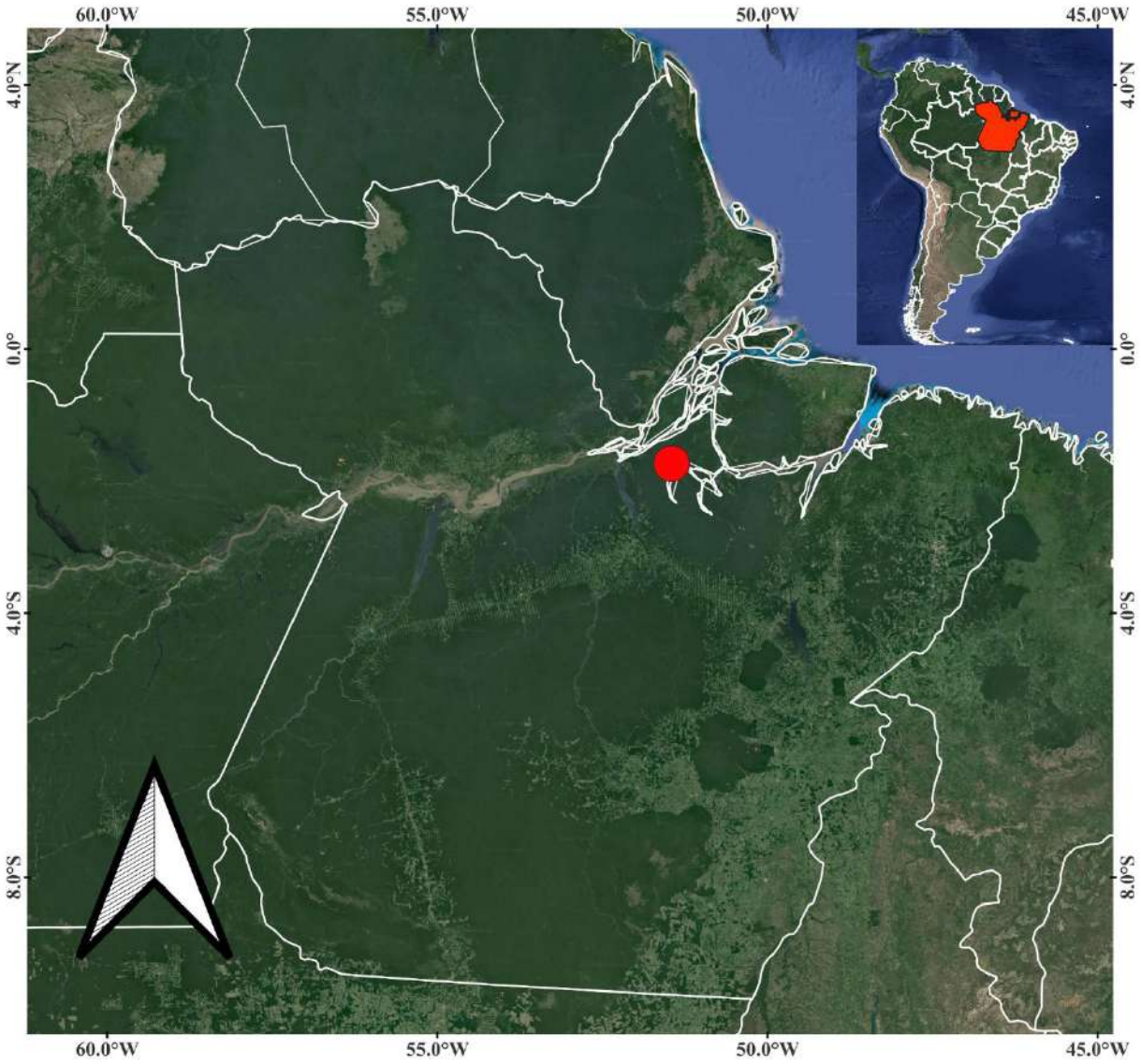

Figure 7 - Distribution map of *Parapalpigera amazonica* **gen. et sp. nov.**

CONCLUSÕES GERAIS

Neste estudo, ampliamos o conhecimento sobre a subtribo Luzarina dentro de Phalangopsini por meio da descrição de novos táxons com base em análises morfológicas, incluindo da genitália interna. Descrevemos cinco novas espécies de *Palpigera: Palpigera* sp. nov. 1, *Palpigera* sp. nov. 2, *Palpigera* sp. nov. 3, *Palpigera* sp. nov. 4 e *Palpigera* sp. nov. 5 , que se diferenciam por características-chave, como o formato dos palpos, décimo tergito, glândula metanotal, disposição dos tímpanos nas pernas anteriores, células das veias nas tegminas e morfologia da genitália masculina. Essas espécies representam os primeiros registros de *Palpigera* para as regiões Norte e Nordeste do Brasil.

Além disso, apresentamos *Parapalpigera amazonica* gen. et sp. nov., um novo gênero e espécie da Floresta Amazônica, provavelmente relacionado a *Melanotes* e *Palpigera*, mas distinguível por suas tegminas reduzidas sem aparelho estridulatório, ausência de tímpano, palpo longo e delgado, esclerito amplo com apódema bifurcado, além do formato distinto da papila copulatória feminina

Esses achados ampliam o conhecimento sobre a diversidade e a distribuição de Luzarina na região Neotropical, destacando a importância de estudos taxonômicos contínuos para a compreensão da biodiversidade em ecossistemas tropicais. A descrição de novos táxons, como *Parapalpigera amazonica* e as cinco novas espécies de *Palpigera,* reforça a necessidade de mais pesquisas em áreas pouco exploradas, como a Amazônia brasileira, onde a diversidade de grilos ainda é subestimada.

ANEXOS

Anexo 1 - Normas da revista *Zoological Studies*, para a qual será submetido o Capítulo I dessa Dissertação

Zoological Studies publishes original research papers in five major fields, including **Animal Behavior**, **Comparative Physiology**, **Evolution**, **Ecology**, and **Systematics and Biogeography**. Manuscripts are welcome from around the world, but must be written in English. When the manuscript concerns the use of animals or specimens in research, a statement to the effect that the author(s) has adhered to the legal requirements of the country in which the work was carried out or to any institutional guidelines must be included. Authors are encouraged to provide the names and e-mail addresses of 4 possible Reviewers, and 3 Associate editors from our Editorial Board. The Editorial Board has final authority concerning acceptance or rejection of any manuscript. As a condition of publication, the authors, copyright automatically belongs to *Zoological Studies*. If the author(s) does not have clear title to the copyright of any part of the manuscript, it is the sole responsibility of the author(s) to obtain written permission from the copyright holder and present it to the editor of *Zoological Studie*s.

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Key words: Five key words representing the main content of the article

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Acknowledgments

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Preparing Tables

Tables should not duplicate material found in the text or in accompanying illustrations. Tables must be numbered consecutively in the order of mention in the text, and be described in brief but

complete legends. All tables must be typed single-spaced in the correct column without vertical lines. All symbols (a, b, c, etc.) and abbreviations used must be briefly and clearly explained in the table footnotes. Asterisks should be used to indicate levels of significance: a single asterisk (*) for $p \leq 0.05$, double asterisks (**) for $p \leq 0.01$, and triple asterisks (***) for $p \leq 0.001$).

Preparing figures

Figures should be provided as separate files, not embedded in the text file. Each figure should include a single illustration and should fit on a single page in portrait format. If a figure consists of separate parts, it is important that a single composite illustration file be submitted which contains all parts of the figure. There is no charge for the use of color figures.

Figure Legends:

Each figure should be accompanied by a title and explanatory figure legend. All associated descriptive legends should be typed (double-spaced) on a separate sheet; sufficient detail should be given in each legend to understand the figure independent of the text.

Figures should be in the following format:

- Figures must be in finished form and ready for reproduction.
- Number the figures using Arabic numerals according to the order of mention in the text.
- Appropriate lettering and labeling should be used with letters and numbers which will be at least 1.5 mm high in the final reproduction.
- The Font of the lettering should be Arial. All figures should be one or two column widths (either 8 or 17 cm) in size. The maximum page height is 23 cm. Include scale bars where appropriate. Color and grayscale photograph should be saved in EPS or TIFF format. The files can open in Adobe Illustrator will be better.
- Color photographs should be at a resolution of 300 pixels/inch. Grayscale photographs should be saved in 8 bits/channel. Photographs should be saved in CMYK which is suitable for printing. Do not save the format in indexed color.
- Line drawings should be prepared in TIFF format at a resolution of 1200 pixels/inch. Figures are edited using EXCEL, so please provide the original files.
- Authors should prepare any TIFF- or EPS-formatted figures at the intended final size which is suitable for editing, and also prepare figures with no labels or words after the manuscript is accepted.
- If all parts of a figure can be clearly seen in the printed version, then this is a good indication that the figure will be acceptable.
- The maximum size for all originals should not exceed the size of a printed page. High-quality original artwork or glossy prints should be submitted for reproduction mounted on appropriate mounting cards.

Authors may indicate their size preferences of each figure (i.e., two-column width, “do not reduce,” etc.). All lines must be dark and sharply drawn. Reproductions may be used for review copies of a manuscript.

Anexo 2 - Normas da revista *Anais da Academia Brasileira de Ciências*, para a qual foi submetido o Capítulo II dessa Dissertação

O periódico Anais da Academia Brasileira de Ciências considera para publicação as submissões feitas exclusivamente pelo sistema online de gerenciamento de artigos. Uma vez que seu artigo esteja de acordo com as instruções abaixo, favor acessar o sistema no link https://mc04.manuscriptcentral.com/aabc-scielo.

Por favor, leia estas instruções com atenção e as siga rigorosamente. Desta forma você irá garantir que a avaliação e a publicação de seu artigo sejam o mais eficiente e veloz quanto possível. Os editores reservam-se ao direito de devolver artigos que não estejam de acordo com estas instruções. Apesar de dispormos de uma página de instruções em português, lembramos que só consideramos para submissão, avaliação e publicação os artigos redigidos de forma **clara e concisa na língua inglesa.**

Objetivo e política editorial

Todos os manuscritos submetidos devem conter pesquisa original que não tenha sido publicada ou esteja sob consideração em outro periódico. O critério primário para aceitação é qualidade científica. Artigos devem evitar o uso excessivo de abreviações ou jargões, além de ser tão inteligíveis quanto possível para o público em geral. Deve ser dada atenção particular às seções Abstract, Introduction e Discussion, as quais devem detalhar a novidade e significância dos dados relatados. Não cumprir com qualquer um dos pontos acima pode causar atraso na publicação ou até mesmo a recusa do artigo.

Textos podem ser publicados em forma de revisão, artigo completo ou como comunicação curta (*short communications*). Os volumes regulares dos AABC são publicados em março, junho, setembro e dezembro.

Tipos de artigos

Revisões

Revisões são publicadas apenas por **meio de convite**, tendo ainda que passer pelo processo de revisão por pares. Contudo, uma proposta de revisão pode ser enviada por e-mail para a Assessoria de publicações (aabc@abc.org.br). O e-mail deve conter os tópicos e autores da revisão proposta, bem como o abstract, área dos AABC na qual o artigo se encaixa e a justificativa pela qual este tópico seria de particular interesse à área.

Os AABC permitem que os autores depositem preprints de seus artigos em servidores de preprint tais como, mas não limitados a, ArXiv.org e bioRxiv.org. Contudo, autores devem atualizar os registros informando que o artigo foi aceito/publicado pelos AABC.

Cartas ao editor

Cartas ao editor (*Letters to the Editor*) estarão sujeitas à edição e revisão, não podendo conter material que tenha sido submetido ou publicado em outro periódico. Cartas que venham a se referir a um artigo publicado nos AABC não podem exceder 250 palavras (não contando com referências) e devem ser recebidas em até 4 semanas após a publicação online do artigo. Cartas não relacionadas a um artigo publicados pelos AABC não podem exceder 500 palavras (não contando com referências). Uma carta não pode ter mais de dez referências, além de uma figura ou tabela.

Articles

Sempre que possível, artigos devem estar subdivididos nas seguintes partes: **1.** Página de rosto; **2.** Abstract (em página separada, 200 palavras ou menos, sem abreviações); **3.** Introduction; **4.** Materials and Methods; **5.** Results; **6.** Discussion; **7.** Acknowledgments, se aplicável; **8.** Author contributions (se o artigo tiver mais de um autor); **9.** References; **10.** Legendas de figuras e tabelas, se aplicável. Artigos de algumas áreas, como por exemplo Ciências Matemáticas, devem seguir seu format padrão. Em alguns casos, pode ser aconselhável omitir a seção (4) e juntar as partes (5) e (6). Quando aplicável, a seção Materials and Methods deve indicar o Comitê de Ética que avaliou os procedimentos para estudos em seres humanos ou as normas seguidas para tratamentos experimentais em animais.

Shortcommunications

Short communications procuram relatar uma **importante e concisa contribuição para pesquisa**, a qual progrediu para o estágio em que os resultados devem ser tornados públicos para outros pesquisadores do mesmo campo. Uma short communication também deve possuir Abstract (100 palavras ou menos, neste caso), uma pequena introdução (até 200 palavras) e não pode exceder 1500 palavras. Tabelas e Figuras podem ser incluídas no texto, mas este deve ser proporcionalmente reduzido. Este tipo de publicação nos AABC deve conter contribuições extremamente relevantes, sendo um tipo de artigo com alta competição.

Após recebimento e primeira triagem editorial, artigos serão avaliados por pelo menos dois revisores, sendo eles de instituições educacionais e/ou de pesquisa tanto nacionais quanto internacionais, desde que comprovada sua produção científica. Após possíveis correções e sugestões, o artigo pode ser aceito ou recusado, considerando os pareceres recebidos.

Nós utilizamos o programa integrado Crossref Similarity Check para detectar possíveis plágios.

Os AABC não possuem taxas de submissão, avaliação e publicação de artigos.

Preparação de manuscritos

Todas as seções do manuscrito devem possuir espaçamento duplo. Após o aceite, nenhuma mudança será feita no artigo, de modo que as provas de prelo precisem apenas de correções em erros tipográficos. Lembramos que o envio de artigos é feito exclusivamente pelos autores através do nosso sistema de gerenciamento de artigos.

Tamanho do artigo

Os artigos podem ser de qualquer tamanho necessário para a apresentação e discussão concisa dos dados, mas mantendo-se conciso e cuidadosamente preparado tanto em termos de impacto quanto de legibilidade. No entanto, artigos não devem exceder 50 páginas, incluindo todos os itens (figuras, tabelas, referências, etc.),a menos que possua autorização prévia do Editor-Chefe.

Página de rosto

A página de rosto do artigo deve apresentar os seguintes itens: **1.** Título do artigo com até 150 caracteres, sem abreviações e com a tentativa de manter o interesse amplo da comunidade científica; **2.** Nomes completos de todos os autores. Utilize números sobrescritos para indicar a filiação de cada autor. **3.** Endereços profissionais e ORCID de todos os autores, incluindo instituição, departamento, rua, número, CEP, cidade, estado e país; **4.** Key words (de 4 a 6 em ordem alfabética e separadas por vírgulas); **5.** Running title (versão resumida – e não abreviada - do título com até 50 caracteres, incluindo espaços); **6.** Seção dos AABC à qual o artigo pertence; **7.** Nome, endereço, telefone e e-mail do autor para correspondência, a quem serão enviadas as mensagens mais relevantes do processo de avaliação. Este autor ou autora deve ser indicado com um asterisco após seu nome.

Não cumprir com qualquer dos requisitos acima fará com que o artigo seja devolvido (*unsubmitted*) para correções.

Abstract

O abstract deve conter até 200 palavras e apresentar as principais descobertas do artigo, incluindo uma breve introdução, os objetivos do trabalho e uma conclusão baseada nas presentes descobertas. Caso os autores estejam submetendo uma revisão convidada/autorizada, o abstract deve abordar o principal tema da revisão e explicitar a contribuição de tal revisão à área. O abstract não deve possuir títulos nem citações/referências

Texto do manuscrito

Todo o texto deve ser escrito com espaçamento duplo utilizando a fonte Times New Roman tamanho 12 ou equivalente, desde que mantida a legibilidade. Por favor, organize seu texto nas seguintes partes sempre que possível: **1.** Página de rosto; **2.** Abstract (em página separada, 200 palavras ou menos, sem abreviações); **3.** Introduction; **4.** Materials and Methods; **5.** Results; **6.** Discussion; **7.** Acknowledgments, se aplicável; **8.** Author contributions (se o artigo tiver mais de um autor); **9.** References; **10.** Legendas de figuras e tabelas, se aplicável.

Artigos de algumas áreas, como por exemplo Ciências Matemáticas, devem seguir seu formato padrão. Em alguns casos, pode ser aconselhável omitir a seção (4) e juntar as partes (5) e (6). Quando aplicável, a seção Materials and Methods deve indicar o Comitê de Ética que avaliou os procedimentos para estudos em seres humanos ou as normas seguidas para tratamentos experimentais em animais.

Todos os procedimentos devem ser detalhadamente descritos. Utilize inglês norte-americano para escrever o texto. Nomenclaturas da área de Química devem ser fornecidos de acordo com a União Internacional de Química Pura e Aplicada (IUPAC). Cepas de organismos também devem estar identificadas. Informe nomes de fornecedores de reagentes e/ou equipamentos. Utilize unidades e símbolos de acordo com o Bureau International des Poids et Mesures (SI) sempre que possível.

Acknowledgments

Devem ser incluídos ao fim do texto, antes das referências. Agradecimentos pessoais devem preceder nomes de instituições e agências. De forma ideal, notas de rodapé devem ser evitadas, mas, quando necessário, devem estar numeradas. Agradecimentos a financiamentos, subsídios, bolsas de estudo e dívidas com outros colegas, bem como menções à origem do artigo (como uma tese, por exemplo), devem estar nesta seção. Favor incluir o nome completo da agência de fomento, país e número do projeto (se aplicável).

Abreviações
Devem ser definidas em sua primeira ocorrência no texto, exceto por abreviações padrão e oficiais. Unidades e seus símbolos devem estar em conformidade com as aprovadas pelo Bureau International des Poids et Mesures (SI).

Legendas de figuras

Esta informação deve ser fornecida ao fim do manuscrito, após as referências. Todas as figuras devem conter legenda. A legenda deve possuir uma sentença introdutória que descreve as principais descobertas. Todas as divisões na figura devem ser identificadas com letras minúsculas, quando aplicável (1a, 2a, 2b, 3c, 3d, etc.). Quando for o caso da utilização de barras de erro, favor informar se um número que vem após o símbolo ± é um Standard Error Of Mean (SEM) ou standard deviation of mean (SD). Deve ser informado na legenda se o resultado apresentado representa N experimentos individuais.

Tabelas

Cada tabela deve possuir um pequeno título acima da mesma. Notas abaixo da tabelas também pode ser utilizadas. Tabelas devem ser citadas no artigo em algarismos romanos (Table I, Table II, Tables IV and V, etc.). Tabelas devem ser submetidas separadamente em arquivos editáveis, preferencialmente .doc ou .docx.

Figuras

Só serão aceitas figuras de alta qualidade (mínimo de 300 dpi). Todas as ilustrações serão consideradas figuras, incluindo desenhos, gráficos, mapas, fotografias, esquemas, etc. Seu posicionamento tentativo deve ser indicado, assim como todas as figuras devem ser citadas com seu respectivo número ao longo do texto. Figuras devem ser enviadas de acordo com as seguintes especificações: **1.** Desenhos e ilustrações devem estar em formato .PS/.EPS ou .CDR (PostScript ou Corel Draw) e nunca inseridas no texto; **2.** Imagens ou figuras em escala de cinza devem estar em formato .TIF e nunca inseridas no texto; **3.** Cada figura deve ser enviada em arquivo separado; **4.** Figuras devem, a princípio, ser submetidas no tamanho em que espera-se que estejam publicadas no periódico, ou seja, largura de 8cm (uma coluna) ou 16,2cm (duas colunas), com a altura máxima de cada figura e respectiva legenda sendo menor ou igual a 22cm.

As legendas das figuras devem ser enviadas com espaçamento duplo em página separada. Cada dimensão linear dos menores caracteres e símbolos não pode ser menor que 2mm após redução. Figuras coloridas são aceitas tanto como figuras em preto e branco. No entanto, 5 figuras em p/b

são sem custo aos autores, enquanto cada figura colorida na versão impressa será cobrada dos autores, com a comunicação sendo feita durante a fase de produção (após o processo de avaliação). De modo a padronizar a contagem e cobrança de figuras preto e branco, tabelas que ocupem dois terços da página ou que tenham mais que 12 colunas ou 24 colunas serão consideradas figuras p/b. Manuscritos de Matemática, Física ou Química podem ser redigidos em TEX, AMS-TEX ou LaTeX, desde que o arquivo .BIB seja enviado junto. Manuscritos sem fórmulas podem ser enviados em .RTF ou doc/docx para Windows.

Referências

Os autores são responsáveis pela exatidão das referências, bem como suas respectivas citações. Artigos publicados ou ainda 'In press' podem ser incluídos. Comunicações pessoais (Smith, personal communication) devem ser autorizadas por escritos pelos envolvidos. Referências a teses, abstracts de encontros (não publicados em jornais indexados) e manuscritos em preparação ou apenas submetidos, mas não ainda aceitos, devem ser citados no texto no formato (Smith et al., unpublished data) e NÃO devem ser incluídos na lista de referências.

Referências devem ser citadas no texto no formato a seguir sem a aspa simples, 'Smith 2004', 'Smith & Wesson 2005' ou, quando há 3 ou mais autores, 'Smith et al. 2006'. Quando houver dois ou mais artigos cujo nome do primeiro autor e ano de publicação são idênticos, as referências devem ser diferenciadas por letras minúsculas, como em 'Smith 2004a', 'Smith 2004b', etc.

As referências devem ser listadas alfabeticamente de acordo com o nome do primeiro autor, sempre na ordem SOBRENOME XY, sendo X e Y as iniciais. Se há mais de 10 autores na referência, usar SOBRENOME XY ET AL., sem listar os demais autores. Referências devem conter também o título do artigo. Os nomes dos periódicos devem estar abreviados sem itálico, pontos ou vírgulas. Para as abreviações corretas, verifique listas das maiores bases de dados nas quais o periódico está indexado, ou consulte a World List of Scientific Periodicals. A abreviação a ser usada em referências dos Anais da Academia Brasileira de Ciências é **An Acad Bras Cienc**. Os seguintes exemplos devem servir de guias para sua lista de referências em nossa revista:

REFERENCES

ALBE-FESSARD D, CONDES-LARA M, SANDERSON P & LEVANTE A. 1984a. Tentative explanation of the special role played by the areas of paleospinothalamic projection in patients with deafferentation pain syndromes. Adv Pain Res Ther 6: 167-182.

ALBE-FESSARD D, SANDERSON P, CONDES-LARA M, DELAND-SHEER E, GIUFFRIDA R & CESARO P. 1984b. Utilisation de la depression envahissante de Leão pour l'étude de relations entre structures centrales. An Acad Bras Cienc 56: 371-383.

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