

Article

A new species of *Cerzodus* and new records of Asilinae and Ommatiinae (Diptera: Asilidae) from Tocantins, Brazil

Pietra S. Montanuci¹ , Rodrigo Vieira² , Tiago K. Krolow¹ 

1. Universidade Federal do Tocantins – UFT, Programa de Pós-Graduação em Biodiversidade, Ecologia e Conservação, Cx. Postal 136, 77500-000 Porto Nacional, TO, Brazil. (pyetrasally@gmail.com, tkkrolow@gmail.com)

2. Secretaria de Estado de Educação do Governo do Amazonas - SEDUC, Manaus, AM, Brazil/ Instituto Nacional de Pesquisas da Amazônia - INPA, Coordenação de Biodiversidade, 69067-375 Manaus, AM, Brazil. (rodrigo08vieira@gmail.com)

Received 19 May 2022

Accepted 22 March 2023

Published 15 May 2023

DOI 10.1590/1678-4766e2023008

ABSTRACT. This paper represents the first study on Asilidae for the state of Tocantins, Brazil. Here, we describe a new species of *Cerzodus* Bigot, 1857 and second record for the North Region of Brazil, as well as supply the first record of occurrence of five genera and 12 species of Asilinae and Ommatiinae in Tocantins. Additionally, we provide illustrations and comments for all new records of species and an updated list of Asilidae for the state.

KEYWORDS. Robber flies, *Lecania* group, taxonomy, checklist, Neotropical Region.

RESUMO. Nova espécie de *Cerzodus* e novos registros de Asilinae and Ommatiinae (Diptera: Asilidae) para o Estado do Tocantins, Brasil. Este artigo representa o primeiro estudo sobre Asilidae para o estado do Tocantins, Brasil. Nós descrevemos uma nova espécie de *Cerzodus* Bigot, 1857 e o segundo registro para a Região Norte do Brasil, bem como, fornecemos a primeira ocorrência de cinco gêneros e 12 espécies para o Tocantins. Adicionalmente, são apresentados comentários e ilustrações para todos os novos registros de espécies e uma lista atualizada de Asilidae para o estado.

PALAVRAS-CHAVE. Moscas-ladrão, grupo *Lecania*, taxonomia, lista de espécies, Região Neotropical.

The Asilidae are voracious predatory flies, popularly known as assassin flies, robber flies, among other names (FISHER, 2009). There are 14 subfamilies, 560 genera and 7,531 valid species in the world (DIKOW, 2009; PAPE *et al.*, 2011). The Neotropical region holds 11 subfamilies, 217 genera and 1,576 species (PAPAVERO, 2009). In Brazil, 101 genera and 466 valid species were recorded (LAMAS & CAMARGO, 2023), of which only three species are reported in the state of Tocantins, namely: *Cerzodus ayalai* Camargo, Vieira & Rafael, 2022 by CAMARGO *et al.* (2022), *Mallophora atra* Macquart, 1834 by ARTIGAS & ANGULO (1980) and *Ommatius exilis* Curran, 1928 by PAPAVERO (2009).

Cerzodus Bigot, 1857 is allocated in subfamily Asilinae. The genus was proposed as a monotypic for *Asilus nodicornis* Wiedemann, 1828. Then, a new species was described, *Cerzodus brachylobus* Vieira, Rafael & Limeira-de-Oliveira, 2013. The genus was recently reviewed by CAMARGO *et al.* (2022), who presented in detail the taxonomic history, redescription and photographs of the holotype, as well as the description of two new species, *Cerzodus ayalai* Camargo, Vieira & Rafael, 2022 and *Cerzodus platylobus* Camargo, Vieira & Rafael, 2022. At the moment, only four species are known and the genus has not been registered

outside Brazil. There are records of occurrence for the Northeast (Maranhão), North (Tocantins), Midwest (Goiás, Mato Grosso, Mato Grosso do Sul) and Southeast (São Paulo) Regions. Here, we describe a new species of *Cerzodus* for Brazil, present the second record of the genus for the North Region of Brazil, and provide the first occurrence records of five genera and 12 species for the State of Tocantins and an updated list of records.

MATERIAL AND METHODS

Origin of material and deposit. The specimens analyzed were obtained by examining the material deposited in the Coleção de Entomologia da Universidade Federal do Tocantins, Porto Nacional, Tocantins (CEUFT), and were collected in eight municipalities in the State of Tocantins, namely: Araguaína, Brejinho de Nazaré, Monte do Carmo, Novo Acordo, Palmas, Pium, Porto Nacional and Wanderlândia (Fig. 1). All specimens are deposited in CEUFT, with the exception of the holotype and one paratype of *Cerzodus inesperatus* sp. nov. deposited at Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas (INPA).

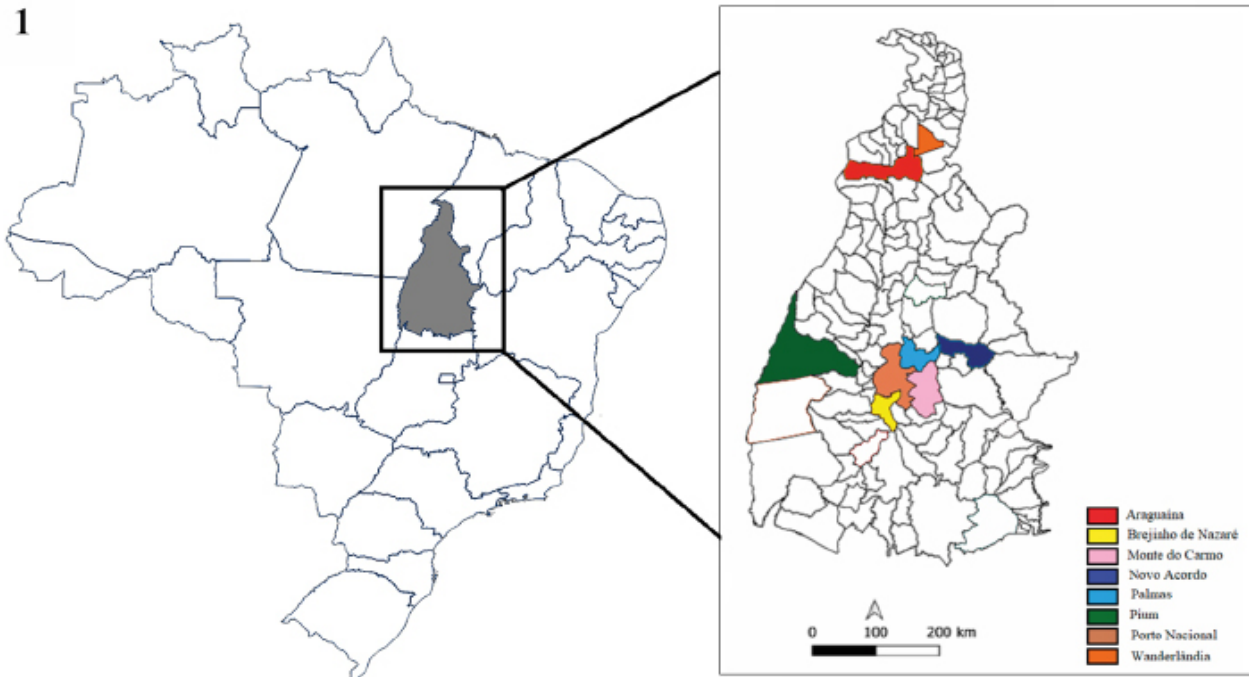


Fig. 1. Map of the state of Tocantins (Brazil) with an indication of the eight municipalities where the material was collected (highlighted in different colors).

Identification. To identify the species, papers with original descriptions, keys and reviews were consulted (CARRERA, 1945, 1959; ARTIGAS & ANGULO, 1980; PAMPLONA & AIRES, 1999; SCARBROUGH, 2003, 2008; PAPAVERO *et al.*, 2009; VIEIRA *et al.*, 2010, 2012, 2013; CASTRO *et al.*, 2016), in addition to photos of type material from the Museum für Naturkunde, Berlin, Germany (MfN), and the Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZUSP). The dissection of the terminalia followed the protocol of VIEIRA & RAFAEL (2014). Terminology follows CUMMING & WOOD (2017).

Image acquisition and data presentation. Images were obtained using a LEICA MC120 HD digital camera coupled to a LEICA M165 C stereomicroscope. Photographs of the body (dorsal and lateral habitus) and head (frontal and lateral views) were taken for each species. Photos were edited with Adobe Photoshop CS6 software, version 22.0.0.35. The plates were elaborated using Adobe Illustrator 2021 software, version 25.2.1.236.

The information contained in the labels was written in full in the material examined. There was the use of commas to isolate different information. Data presented in square brackets is additional information that is not present on the labels. Slashes (/) were also used for data from the same specimen with separate labels. An asterisk indicates new distribution records.

Here, the Asilinae was divided into groups of genera as proposed by ARTIGAS & PAPAVERO (1997), namely: *Asilus* group; *Efferia* group; *Eicherax* group; *Glaphropyga* group;

Lecania group; *Mallophora* group and *Proctacanthus* group. These groups are commonly used to simplify species identification. Furthermore, The New World species of *Ommatius* (Ommatiinae) are divided into eight species groups [*ampliatius* and *holosericeus* (*holosericeus* complex), *costatus*, *hanebrinki*, *lucidatus*, *normus*, *pumilus* and *tibialis*] (SCARBROUGH, 1990, 1993, 2000, 2002, 2008; SCARBROUGH & PEREZ-GELABERT, 2006).

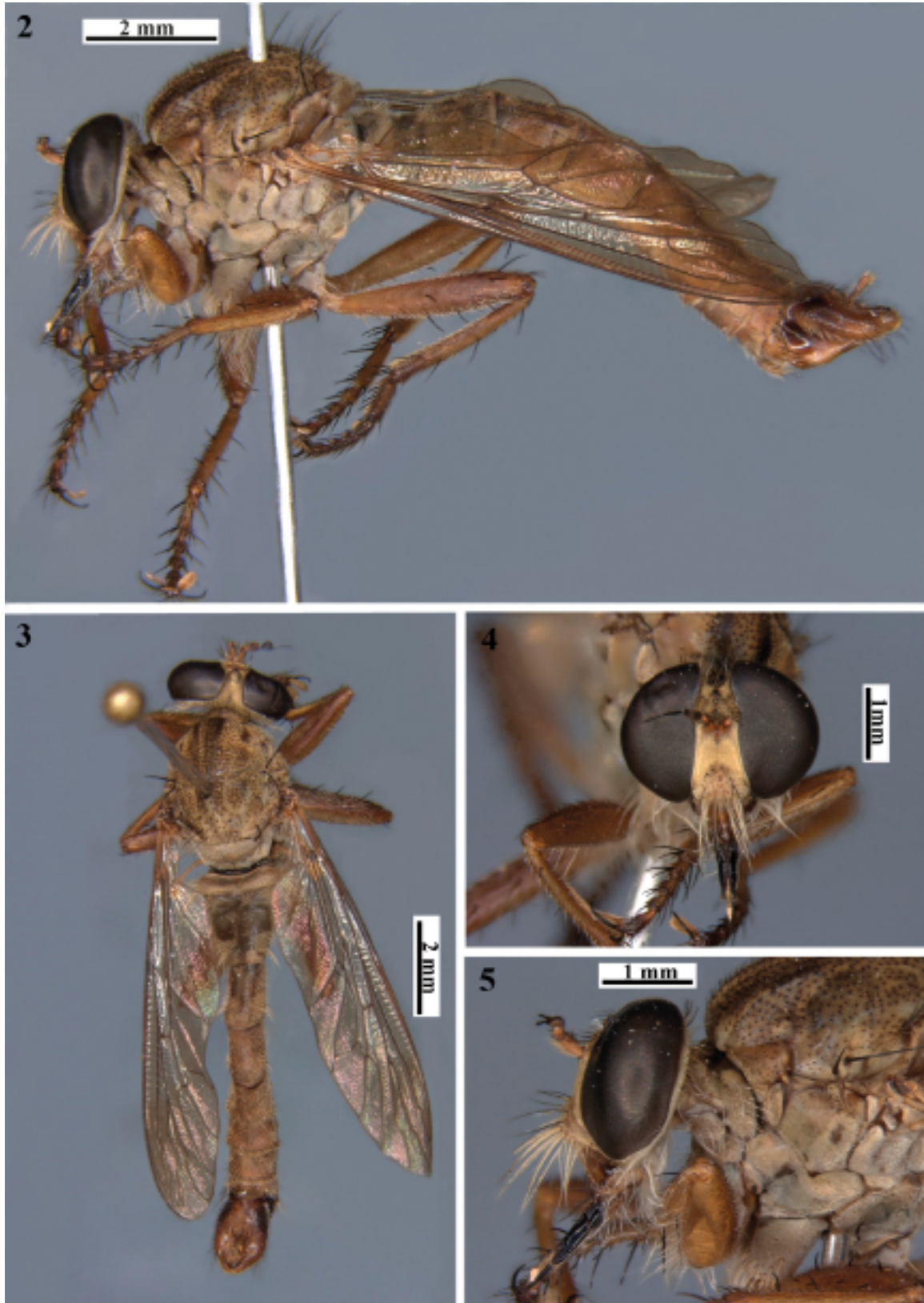
RESULTS AND DISCUSSION

Lecania group *Cerozodus inesperatus* sp. nov.

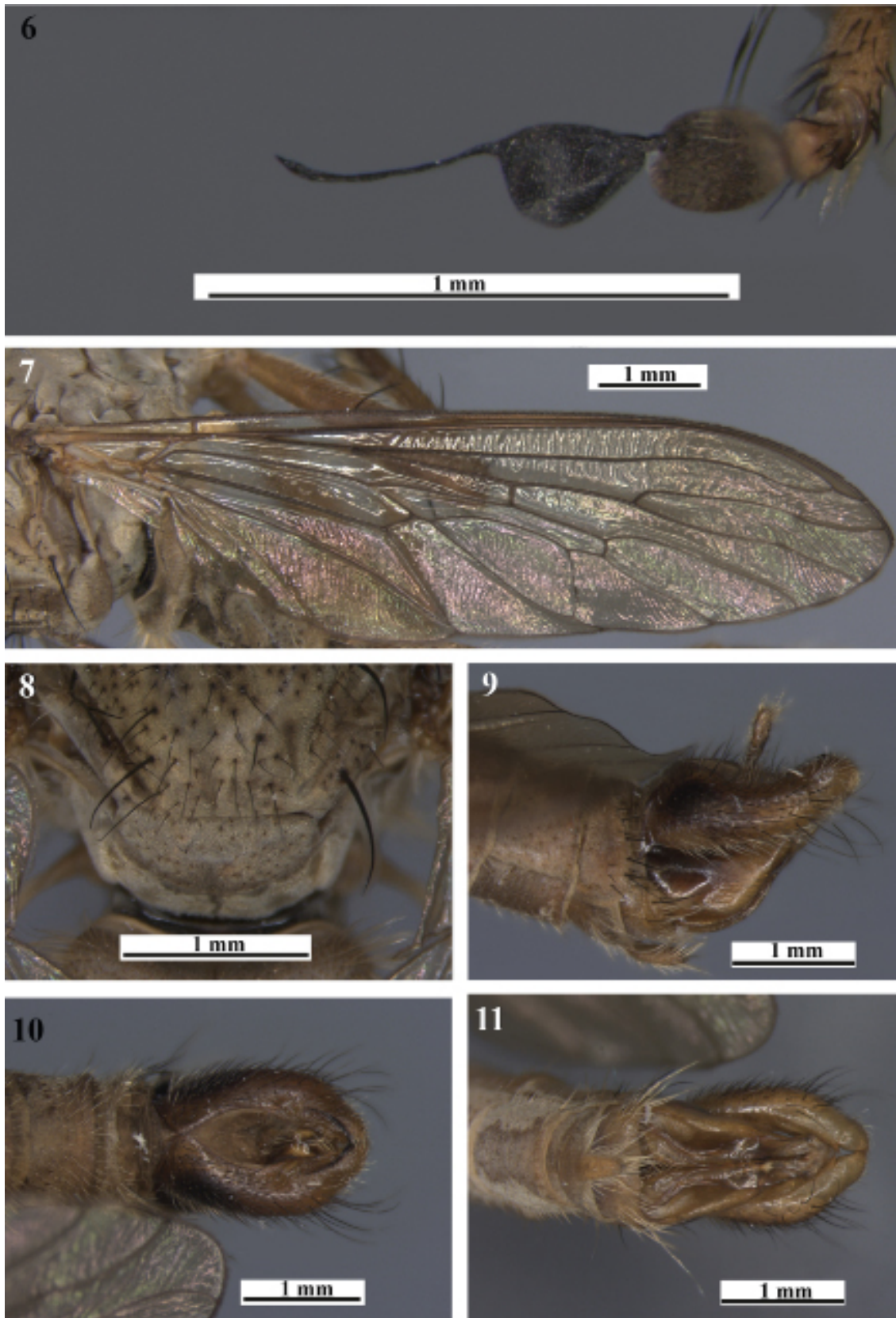
(Figs 2–23)

urn:lsid:zoobank.org:pub:2759FA81-34CA-4C69-ABDA-DA55D4920D47

Diagnosis. Postpedicel rounded (Fig. 6); stylus about three times the postpedicel length (Fig. 6); sternite 8 with tongue-shaped projection on the posterior margin (Figs 9, 11, 12, 14, 17); hypandrium with straight margin, without projection (Figs 9, 11, 12, 14, 15); epandrium with an apical small pointed projection internally (Figs 10, 11, 13, 14, 18, 19); epandrium curving inward apically, forming a subtriangular apical cavity in ventral view (Figs 11, 14, 19); cercus cone-shaped (Figs 13, 18–20); gonocoxite with apical margin rounded (Figs 9, 11, 12, 14); gonostylus narrow and slender (Figs 11, 12, 14).



Figs 2–5. *Cerozodus inesperatus* sp. nov., male holotype, habitus: 2, lateral view; 3, dorsal view; head: 4, frontal view; 5, lateral view.



Figs 6–11. *Cerozodus inesperatus* sp. nov., male holotype: 6, antenna, lateral view; 7, wing, dorsal view; 8, scutellum, dorsal view; terminalia: 9, lateral view; 10, dorsal view; 11, ventral view.

Holotype ♂. Body length: 13 mm; wing: 9 mm. Head (Figs 4, 5). Light brown; scape and pedicel light brown (Fig. 6), with yellow ventral and black dorsal setae; postpedicel dark brown and rounded; stylus black and about three times the postpedicel length (Fig 6); basal projection of the stylus gray tomentose in the middle; two black ocellar setae; three black orbital setae; frons and face black, golden tomentose; mystax with white and black macrosetae; palpus with black setae; proboscis black with yellow setae at apex; labial setae yellowish; occiput black, whitish tomentose; three black postocular macrosetae.

Thorax (Figs 2, 3, 8). Light brown; antepronotum and postpronotum dark brown, golden tomentose; scutum brown, golden tomentose; median stripe light brown; paramedian stripe brown; pleura dark brown, golden tomentose; two black notopleural macrosetae; one black supraalar macroseta; one black postalar macroseta; three pairs of thick, black postsutural dorsocentral macrosetae; scutellum gray, without marginal scutellar macrosetae (Fig. 8); discal scutellar setae whitish; katatergal macrosetae whitish; setae on posterior meron+metanepisternum whitish.

Wings (Figs 2, 3, 7). Translucent, slightly brown; dark brown veins; without costal dilatation; bifurcation of veins R_4 and R_5 placed beyond apex of discal cell; transverse vein r-m situated beyond middle of disc cell; microtrichia on posterior wing margin arranged in a single plane; halteres light yellow.

Legs (Figs 2, 3). Yellowish; femur reddish dorsally; fore tibiae yellow; mid and hind tibiae yellow with a reddish apex; fore tarsi yellow; mid and hind tarsi reddish-yellow; pulvilli yellowish; empodia reddish-yellow; claws shiny black. Chaetotaxy: hind trochanter with three white macrosetae ventrally, two long macrosetae posteroventrally and one short macroseta medioventrally; fore and hind coxae with a row of long white macrosetae posterodorsally; hind coxa with two macrosetae dorsomedially and three macrosetae ventroapically; mid and hind femora covered by white setae alternating with black; fore and mid femora with 7-9 whitish macrosetae ventrally; hind femur with four black macrosetae lateroventrally, one black macroseta dorsomedially, two black macrosetae anterodorsally and two black macrosetae dorsoapically; femora with white and black setae laterally; femora with whitish setae dorsally; tibiae with black macrosetae; fore and mid tibiae with short, scattered white setae; hind tibiae with a row of short white setae; tarsomeres with black setae and macrosetae; first and second tarsomeres with a row of golden setae.

Abdomen (Figs 2, 3). Tergite 1 with anterior half dark brown and posterior half light brown, gray tomentose; tergite 1 with a row of whitish marginal setae and macrosetae laterally and with whitish setae dorsally on the posterior margin; tergites 2-3 dark brown, gray tomentose; tergites 2 and 4 with whitish macrosetae laterally and black setae dorsally; tergites 4-8 reddish-brown with whitish marginal

setae; sternites reddish-brown with short, sparse, whitish macrosetae; tergite 8 dorsally with black macrosetae apically; sternite 8 with whitish-yellow setae; sternite 8 with tongue-shaped projection on the posterior margin (Figs 9, 11–14).

Terminalia (Figs 9–20). Light brown, except epandrium and gonocoxite dark brown dorsobasally; hypandrium with eight or nine black macrosetae apically and laterally; hypandrium with straight posterior margin, without projection (Figs 9, 11, 12, 14, 15); epandrium with black and yellow setae dorsally, and black macrosetae ventrally at apex; epandrium with a dorsal curvature in lateral view (Figs 9, 12, 20); epandrium with an apical small pointed projection internally (Figs 10, 11, 13, 14, 18, 19); epandrium curving inward apically, forming a subtriangular apical cavity in ventral view (Figs 11, 14, 19); cercus cone-shaped (Figs 13, 18); gonocoxite with apical margin rounded (Figs 9, 11, 12, 14); gonostylus narrow and slender (Figs 11, 12, 14); ejaculatory apodeme long and wide apically (Figs 12, 13).

Holotype condition. Left antenna missing, without the postpedicel and the stylus. Few mystacal macrosetae broken. Part of the abdomen and terminalia in microtube with glycerin. Microtube pinned under the specimen.

♀. Similar to ♂, except by: body length: 14 mm; antenna with second article of stylus without broad basal projection (Fig. 21); wing length: 10 mm; Color of legs lighter; tibiae with a darker apex; darker tarsi; abdomen reddish-brown; tergite 2 gray with a dark spot on the posterior half; terminalia shiny black (Figs 22, 23); tergite 8 with a yellow lateral spot at the base; sternite 8 with a yellow lateral spot at the base and a rounded one in the middle; cercus dark brown with yellow setae.

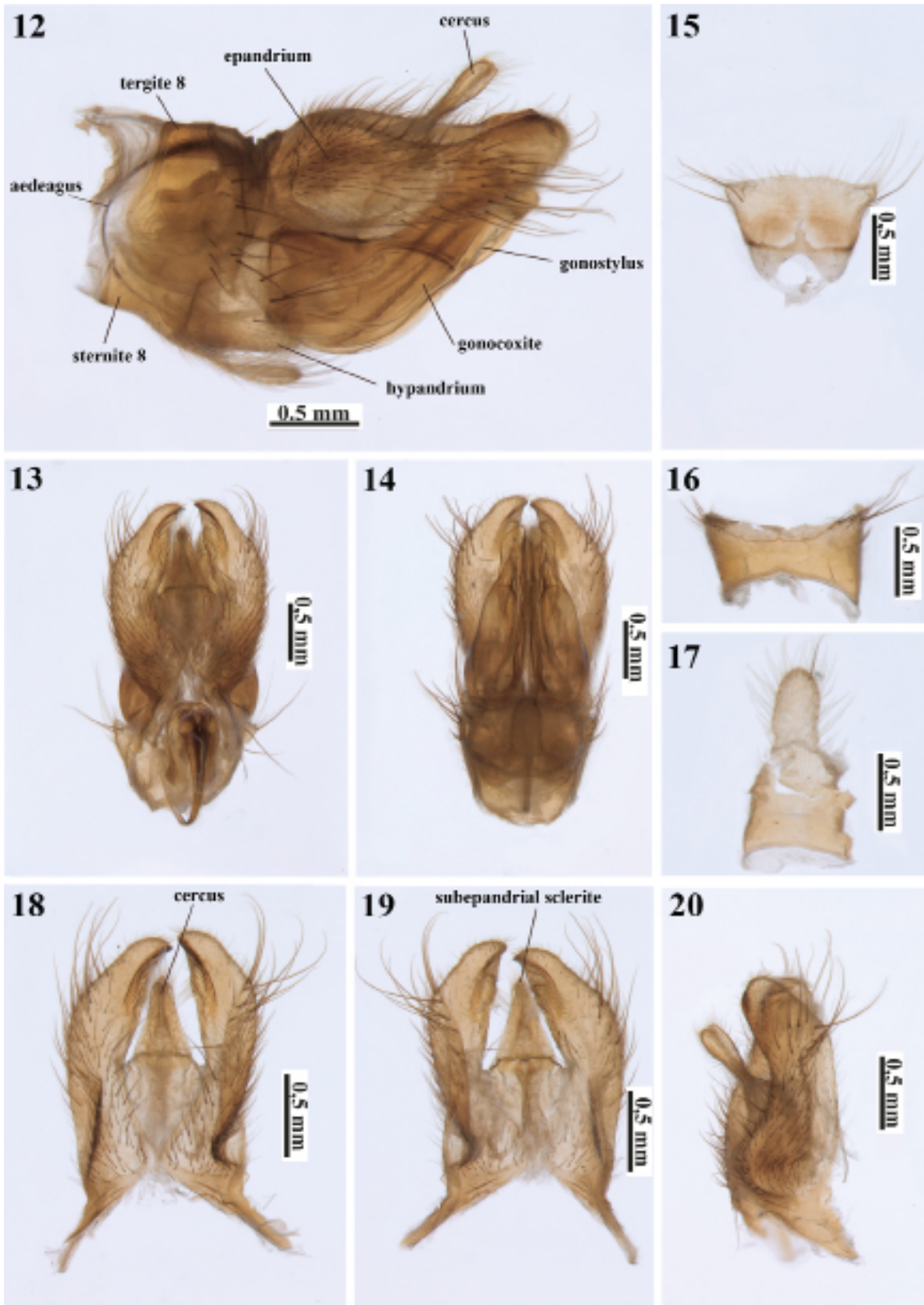
Variations. Male paratype with two yellow occipital macrosetae; body length 12.5 mm and wing length 8 mm.

Etymology. *inesperatus* from Latin, refers to something unexpected.

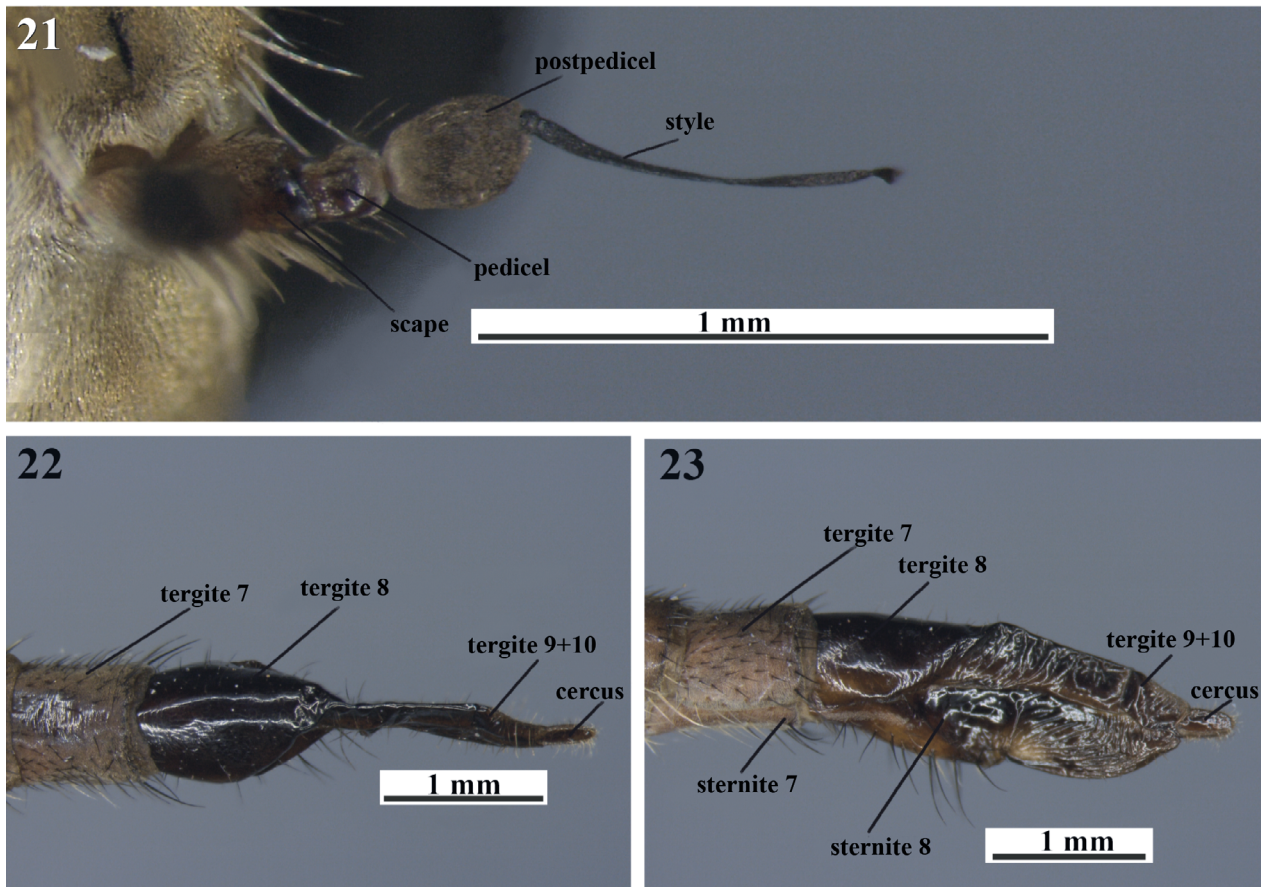
Distribution. State of Tocantins, Brazil.

Biology/phenology. The specimens were collected in the district of Taquaruçu, a tourist region of Palmas, capital of Tocantins. It is a mountainous region, with valleys, plains and cliffs with elevations ranging from 34 to 960 m (SEPLAN, 2003). This area has a rich vegetation, with typical *cerrado*, gallery forest and riparian forest. The climate is semi-humid tropical, with seasonally well-defined rainfall periods, with a hot and dry winter (May to September) and a rainy season (October to April) (MARCUSO & GOULARTE, 2013). The specimens were found in riparian forests of an Environmental Protection Area called Serra do Lajeado, being captured with a Malaise trap both in the dry and rainy seasons. The data obtained here corroborate the information presented by CAMARGO *et al.* (2022), in relation to the distribution patterns of the other species of the genus.

Type material. Holotype ♂, BRASIL, TO[CANTINS], Palmas, Taquaruçu, Faz[enda] Encantada, 10°14'41.79"S; 48°7'22.79"W, 15-22.IV.2012, Malaise, Krolow, T. K. &



Figs 12–20. *Cerozodus inesperatus* sp. nov., male holotype, terminalia: 12, lateral view; 13, dorsal view; 14, ventral view; 15, hypandrium, ventral view; 16, tergite 8, dorsal view; 17, sternite 8, ventral view; epandrium: 18, dorsal view; 19, ventral view; 20, lateral view.



Figs 21–23. *Cerzodus inesperatus* sp. nov., female paratype: 21, antenna, lateral view; terminalia: 22, dorsal view; 23, lateral view.

Lima, I. L. H. (INPA) / Holotype *Cerzodus inesperatus* det. Montanuci, P. S.B., 2021. Paratypes. Same data as holotype except: 26.X-02.XI.2012 (♂ CEUFT / 004816); 03-10.VIII.2012 (♀ INPA); 07-14.IX.2012 (♀ CEUFT / 004819).

Discussion. *Cerzodus* was recently reviewed by CAMARGO *et al.* (2022) and currently has four valid species. *Cerzodus inesperatus* sp. nov. runs to step 2 of the key by CAMARGO *et al.* (2022), from this point it can be easily distinguished from the other species by presenting the hypandrium with a straight margin, without projection (Fig. 15), and its conspicuous tongue-shaped projection in this species is found on the sternite 8 (Figs 12, 17) and not on the hypandrium as in other species of the genus.

New Asilidae records for Tocantins
Asilinae
***Asilus* group**
***Anarmostus iopterus* (Wiedemann, 1828)**

(Figs 24–27)

Material examined. BRASIL [BRAZIL], **Tocantins:** Pium, Centro de Pesquisas Canguçu, 09°58'42.47"S - 50°02'16.54"W, lençol iluminado [light sheet], 13-18.V.2016, Krolow, T. K. & Valadares, A. C. (♀ CEUFT).

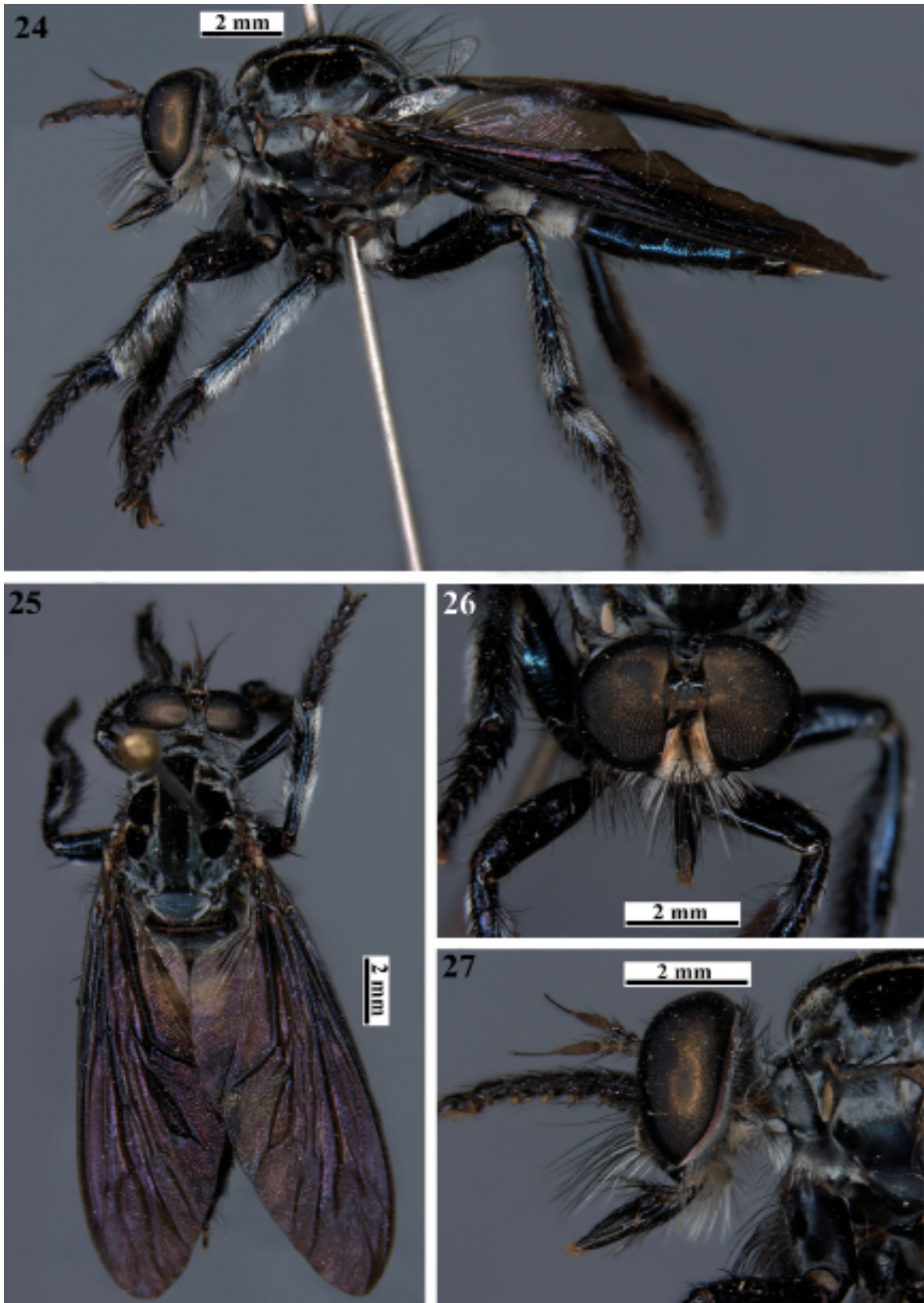
Distribution. Belize, Honduras, Costa Rica, Venezuela, Guyana, Peru, Brazil (Amazonas, Pará, Tocantins*, Bahia), Bolivia (VIEIRA *et al.*, 2006; VIEIRA, 2012; PAPAVERO, 2009).

Comments. In Brazil, the same is registered only in the North and Northeast Regions (VIEIRA *et al.*, 2006; PAPAVERO 2009; VIEIRA, 2012). This is the first record in an ecotonal area between Cerrado and Amazon biomes in Brazil. *Anarmostus iopterus* is characterized by having metallic blue coloration (Figs 24–26); black mystax interspersed with white setae (Figs 26, 27); black legs, tibiae with black and white macrosetae, hind legs with the first tarsomeres covered by white tomentum and white macrosetae (Figs 24, 25).

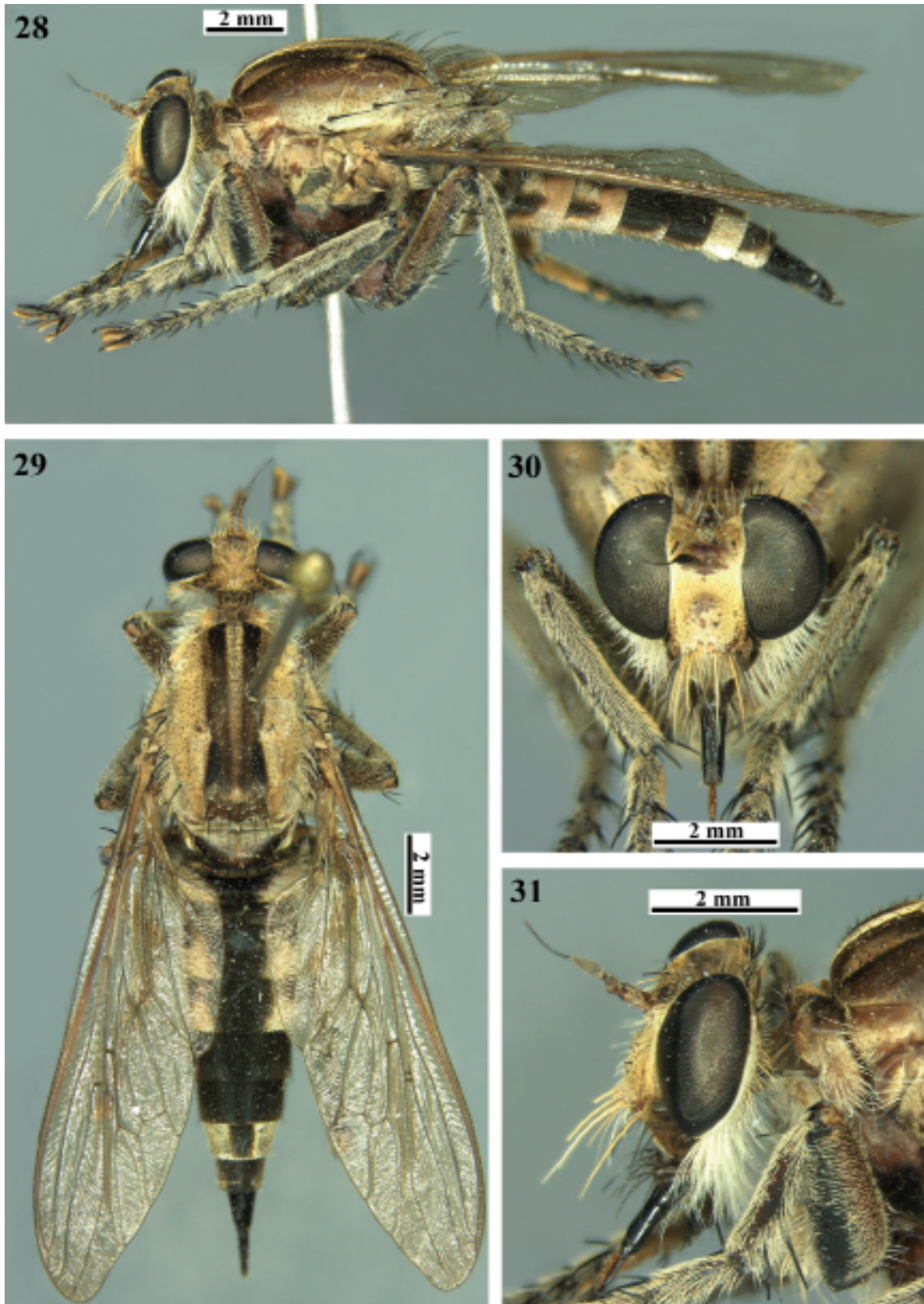
***Efferia* group**
***Triorla striola* (Fabricius, 1805)**

(Figs 28–31)

Material examined. BRASIL [BRAZIL], **Tocantins:** Porto Nacional, *Campus* UFT [Universidade Federal do Tocantins], 10°41'18.649"S - 48°22'58.252"W, coleta manual [manual collection], 21.XI.2018, Silva, B. M. (♀ CEUFT).



Figs 24–27. *Anarmostus iopterus* (Wiedemann, 1828), female, habitus: 24, lateral view; 25, dorsal view; head: 26, frontal view; 27, lateral view.



Figs 28–31. *Triorla striola* (Fabricius, 1805), female, habitus: 28, lateral view; 29, dorsal view; head: 30, frontal view; 31, lateral view.

Distribution. Panama, Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil (Pará, Tocantins*, Mato Grosso, Goiás, Rio Grande do Norte, Minas Gerais, Espírito Santo, Rio de Janeiro, Paraná), Paraguay (CASTRO *et al.*, 2016).

Comments. *Trioria striola* is characterized by having the yellow mystax interspersed with white and black setae (Figs 30, 31); thorax and head brown, golden tomentose (Figs 28, 29); gray scutellum with a dark spot on the margin; femora dorsally reddish brown, black tibiae, black tarsomeres; black abdomen, tergites 1-3 with white lateral bands that cover more than half of the posterior part, tergites 4 and 5 entirely black, tergite 6 with a dorsomedial black spot, tergite 7 black with white lateral bands that cover the ventral and dorsoposterior parts; terminalia conical, shiny black, tergite and sternite 8 as long as the 6 and 7 combined, without macrosetae, tergite 9 shorter in length.

***Eicherax* group**

***Eraxasilus pruinosus* Carrera, 1959**

(Figs 32–35)

Material examined. BRASIL [BRAZIL], **Tocantins:** Araguaína, Bairro Setor Brasil, 7°10'28.6"S – 48°12'00.4"W, coleta manual [manual collection], 07.X.2016, Rippel, M. L. S. (♂ CEUFT).

Distribution. Brazil (Pará, Tocantins*, Mato Grosso, Goiás, São Paulo) (CARRERA, 1959; VIEIRA, 2012).

Comments. Currently, *E. pruinosus* is only recorded in Brazil. *Eraxasilus pruinosus* is characterized by having yellow mystax interspersed with black setae (Figs 34, 35); gray thorax, yellow tomentose, gray scutellum (Fig. 33); black femora (Fig. 32), yellow tibiae, black tarsi posteriorly (Fig. 33), terminalia reddish (Fig. 32) (ARTIGAS & ANGULO, 1980).

Eraxasilus pruinosus is very close to *E. acuminatus* Carrera, 1959, but they can be distinguished by the shape of the hypandrium. In *E. pruinosus* the hypandrium is not acuminate, but curved and smooth, while in *E. acuminatus* the hypandrium has a small acuminate projection covered with small setae (CARRERA, 1959).

***Glaphyropyga* group**

***Glaphyropyga pollinifera* Carrera, 1945**

(Figs 36–39)

Material examined. BRASIL [BRAZIL], **Tocantins:** Palmas, Distrito de Taquaruçu, Fazenda Encantada, 10°14'45.21"S – 48°07'24.07"W, malaise [malaise trap], 09-16.XI.2012, Krolow, T. K. & Lima, H. I. L. (♂ CEUFT); idem, 19-26.X.2012, Krolow, T. K. & Lima, H. I. L. (2♂ CEUFT); idem, 16-23.XI.2012, Krolow, T. K. & Lima, H. I. L. (♂ CEUFT); idem, 30.XI-07.XII.2012, Krolow, T. K. and Lima, H. I. L. (4♂ CEUFT); idem, 02-09.XI.2012, Krolow, T. K. and Lima, H. I. L. (2♂ CEUFT); idem, 05.X-28.XI.2012,

Krolow, T. K. and Lima, H. I. L. (♂ CEUFT); idem, 23-30.XI.2012, Krolow, T. K. & Lima, H. I. L. (♀ CEUFT).

Distribution. Peru, Brazil (Acre, Pará, Tocantins*, Bahia, Espírito Santo, São Paulo, Rio de Janeiro), Bolivia (CARRERA, 1945; VIEIRA, 2012).

Comments. Specimens of *G. pollinifera* show great variations, such as eye color and body size. This species is very close to *Glaphyropyga himantocera* (Wiedemann, 1828), from which it is distinguished by the patterns of tomentum on the scutum and pleura, the absence of setae on the scutellum and the dark brown spot on the wings. This species is characterized by having a yellow scape and pedicel, a scape longer than pedicel (Figs 38, 39), a short stylus with a small sensorial element at the apex; pleura with a dark vertical spot on the anterior part and yellow wings with a dark spot on the subcostal cell (Figs 36, 37), which does not extend to R₄ (CARRERA, 1945).

***Mallophora* group**

***Mallophora calida* (Fabricius, 1787)**

(Figs 40–43)

Material examined. BRASIL [BRAZIL], **Tocantins:** Palmas, Distrito de Taquaruçu, Fazenda Encantada, 10°14'45.21"S – 48°07'24.07"W, lençol iluminado [light sheet], 27.VIII.2017, Krolow, T. K. & team (♂ CEUFT); Porto Nacional, Fazenda Dois Irmãos, Córrego São João, [10°42'41.1"S – 48°22'23.0"W], malaise [malaise trap], 17-21.VI.2020, Krolow, T. K. & team (2♂ CEUFT); Palmas, Parque Estadual do Lajeado, 10°06'05.00"S – 48°14'46.00"W, malaise [malaise trap], 04.X.2019, Oliveira, J.W. & team (♂ CEUFT);

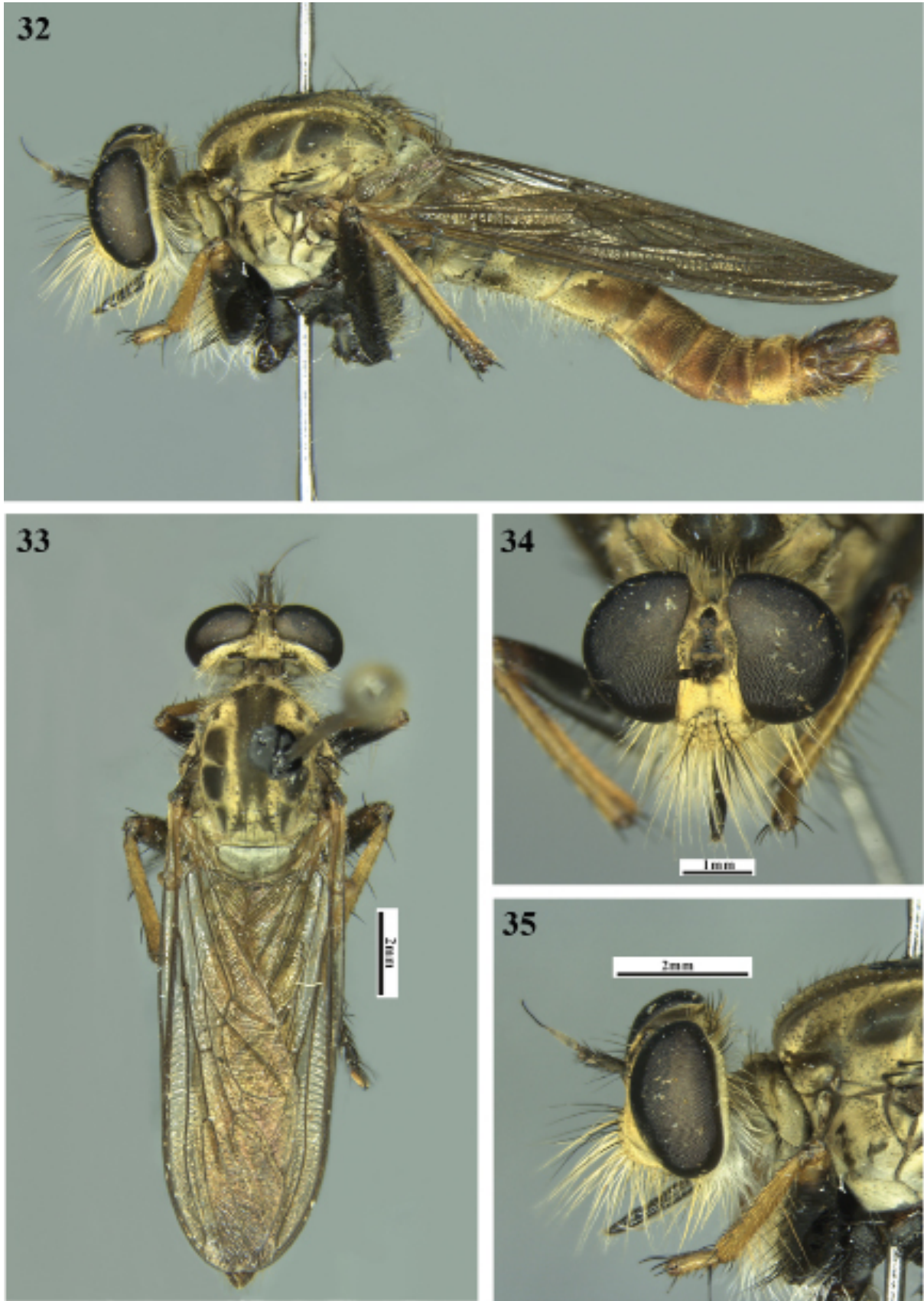
Distribution. Mexico, Venezuela, Colombia, Guyana, French Guiana, Brazil (Amazonas, Pará, Ceará, Rio Grande do Norte, Tocantins*, Paraíba, Bahia, Mato Grosso, Goiás, Minas Gerais, Mato Grosso do Sul, Rio de Janeiro, São Paulo to Rio Grande do Sul), Paraguay, Argentina, Bolivia, Uruguay (ARTIGAS & ANGULO, 1980; KOHLER *et al.*, 2013).

Comments. *Mallophora calida* is relatively small when compared to the others, but the females tend to be larger than males (ARTIGAS & ANGULO, 1980). In addition, it presents a great variation in the size and tonality of the macrosetae, and can often present an extension at the apex of the hind tibiae. This species has a yellow mystax (Figs 42, 43), brown thorax, yellow legs with yellow setae (Fig. 40), shiny black hind tarsomeres with black setae interspersed with white ones, shiny black abdomen, tergites with orange setae (Figs 40, 41) (ARTIGAS & ANGULO, 1980).

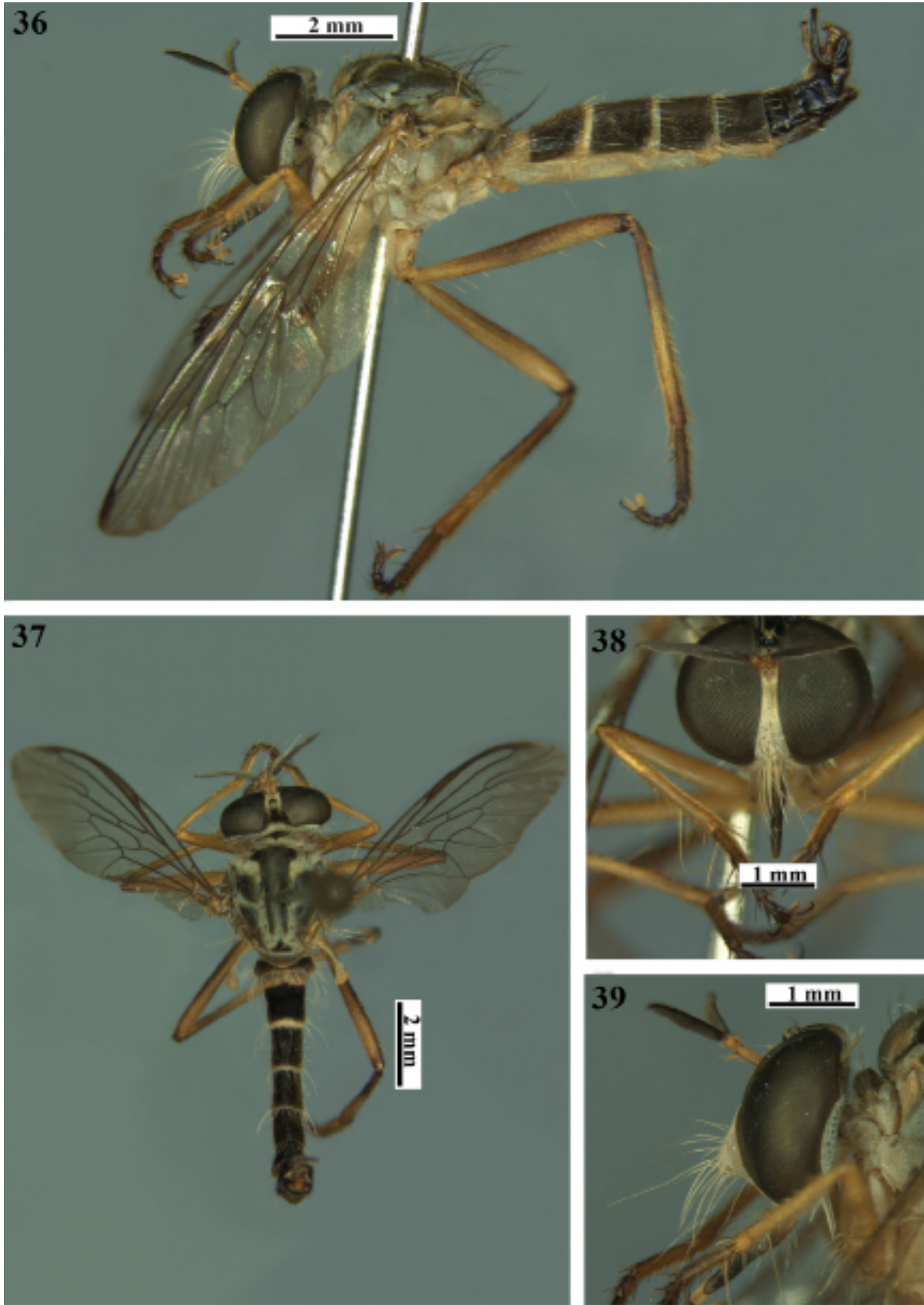
***Mallophora clavipes* Curran, 1941**

(Figs 44–47)

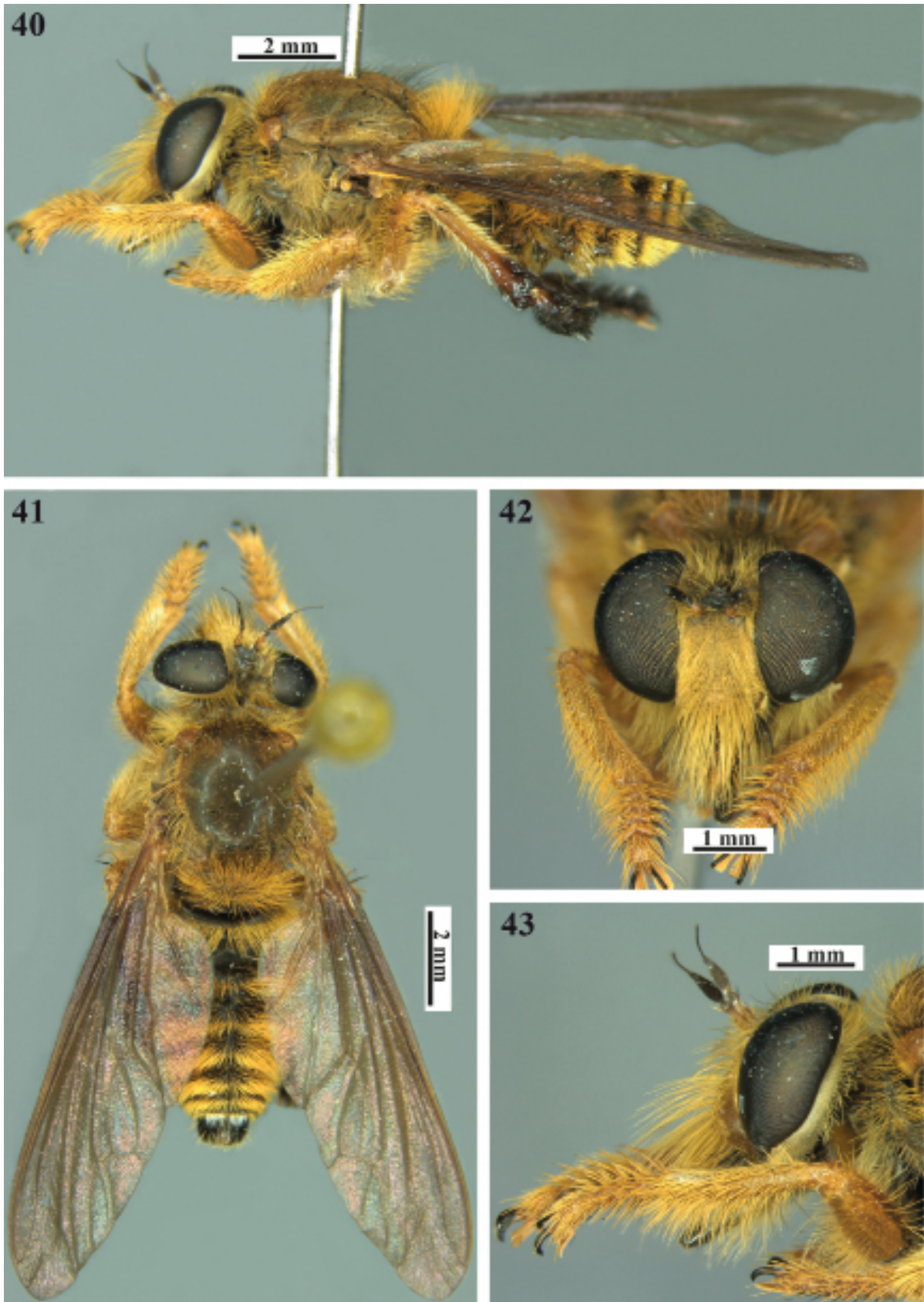
Material examined. BRASIL [BRAZIL], **Tocantins:** Pium, Centro de Pesquisas Canguçu, 09°58'42.47"S –



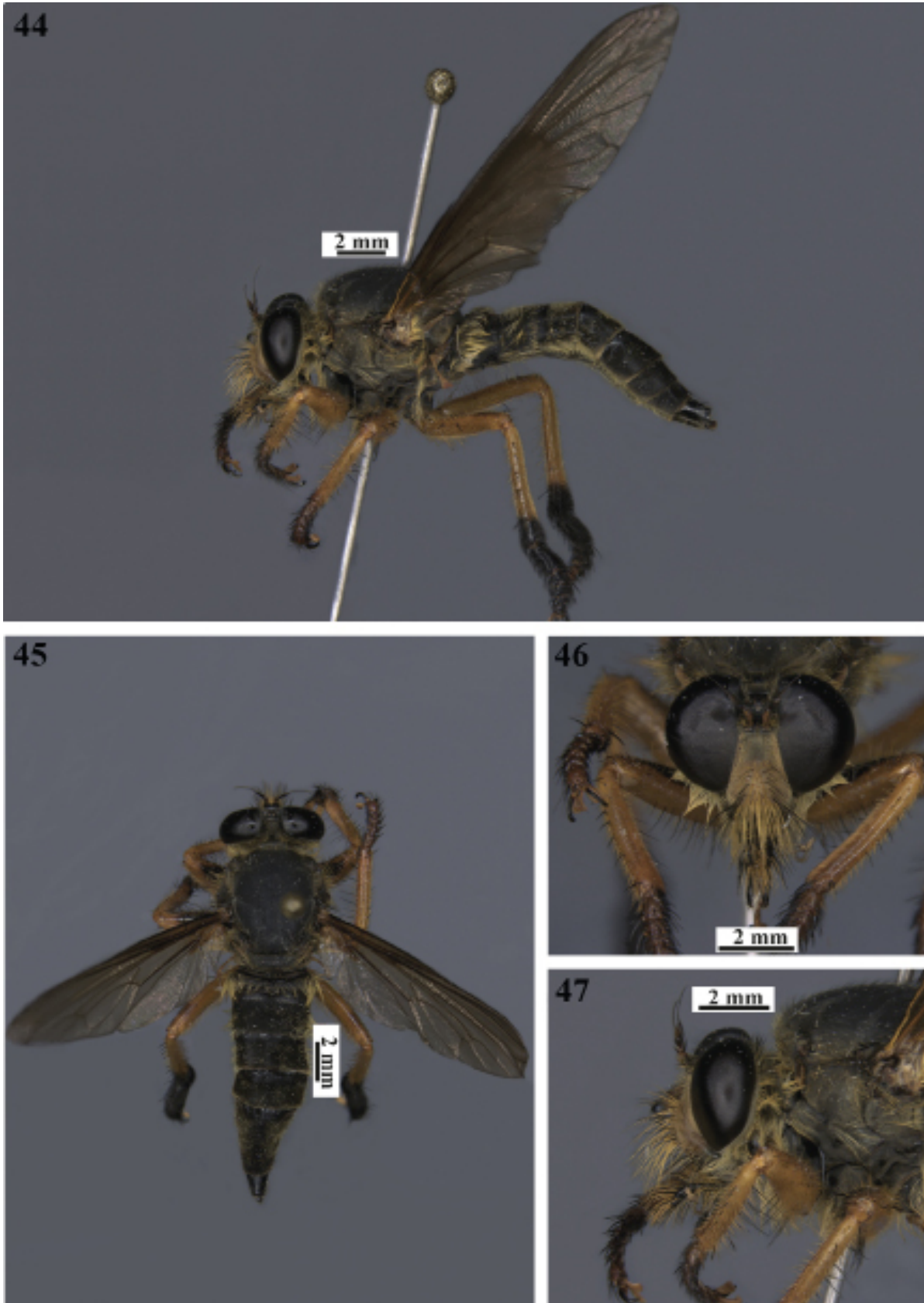
Figs 32–35. *Eraxasilus pruinosus* Carrera, 1959, male, habitus: 32, lateral view; 33, dorsal view; head: 34, frontal view; 35, lateral view.



Figs 36–39. *Glaphyropyga pollinifera* Carrera, 1945, male, habitus: 36, lateral view; 37, dorsal view; head: 38, frontal view; 39, lateral view.



Figs 40–43. *Mallophora calida* (Fabricius, 1787), male, habitus: 40, lateral view; 41, dorsal view; head: 42, frontal view; 43, lateral view.



Figs 44–47. *Mallophora clavipes* Curran, 1941, female, habitus: 44, lateral view; 45, dorsal view; head: 46, frontal view; 47, lateral view.

50°02'16.54"W, malaise [malaise trap], 11-14.IX.2015, Krolow, T. K. & team (♀, CEUFT); Palmas, Distrito de Taquaruçu, Fazenda Encantada, 10°14'45.21"S – 48°07'24.07"W, malaise [malaise trap], 10-18.I.2013, Krolow, T. K. & Lima, H. I. L. (♀, CEUFT).

Distribution. Panama, Venezuela, Guyana, French Guiana, Ecuador, Peru, Brazil (Amapá, Amazonas, Pará, Tocantins*, Mato Grosso, São Paulo, Rio de Janeiro) (ARTIGAS & ANGULO, 1980).

Comments. *Mallophora clavipes* is characterized by having the black mystax interspersed with yellow setae (Figs 44, 46, 47), black thorax with gray toment, yellow legs, fore and mid femora with a large dark spot on the dorsal part, hind tibiae with black apex, brown tarsi anteriorly and medially, black tarsi posteriorly, abdomen black with whitish setae that gradually diminish with each tergite and terminalia shiny black (Figs 44, 45).

Mallophora tibialis Macquart, 1838

(Figs 48–51)

Material examined. BRASIL [BRAZIL], **Tocantins:** Brejinho de Nazaré, 11°00'00"S – 48°33'56"W, coleta manual [manual collection], 23.XI.2002, Julia, M. S. (♀, CEUFT).

Distribution. Colombia, Venezuela, Guyana, Suriname, French Guiana, Peru, Brazil (Amazonas, Amapá, Pará, Maranhão, Tocantins*), Bolivia, Argentina (ARTIGAS & ANGULO, 1980).

Comments. Although *M. tibialis* is widely distributed in South America, this is the fourth record for the northern region of the country (Amazonas, Amapá, Pará and Tocantins). *Mallophora tibialis* is characterized by having the black head and mystax (Figs 50, 51), black legs with black setae, hind tibiae with a set of yellow setae dorsally (Fig. 48), black abdomen (Fig. 49), all tergites with yellow setae on the posterior half, tergites 5 and 6 with bright orange setae and shiny black female terminalia (ARTIGAS & ANGULO, 1980).

Proctacanthus group

Eccritosia barbata (Fabricius, 1787)

(Figs 52–55)

Material examined. BRASIL [BRAZIL], **Tocantins:** Wanderlândia, 06°50'55.680"S – 48°7'8.400"W, malaise [malaise trap], 10-13.XI.2012, Krolow, T. K. & Oliveira, L. A. (♂, ♀ CEUFT).

Distribution. Costa Rica, Panama, Colombia, Venezuela, Guyana, Suriname, French Guiana, Peru, Brazil (Roraima, Amazonas, Pará, Ceará, Rio Grande do Norte, Tocantins*, Paraíba, Bahia, Mato Grosso, Goiás, Minas Gerais, São Paulo, Espírito Santo, Rio de Janeiro), Bolivia, Paraguay, Argentina (LAMAS, 1973).

Comments. *Eccritosia barbata* has a wide distribution in most of South America, extending from Venezuela to Argentina, with records in most Brazilian states (LAMAS, 1973). In this species the females are larger in length than the males, the females are approximately 24 mm and the males 22 mm. It is characterized by having a white or yellowish mystax (Figs 54, 55), black thorax (Fig. 53), black forelegs and median, black hind femur, yellow tibiae and hind tarsi with white setae, abdomen with black tergite 1 with a white stripe ventrally and white macrosetae laterally, tergite 2 brown with white lateral setae, remaining tergites light brown, terminalia reddish (Fig. 52).

Ommatiinae

costatus Group

Ommatius costatus Rondani, 1850

(Figs 56–59)

Material examined. BRASIL [BRAZIL], **Tocantins:** Palmas, Distrito de Taquaruçu, Fazenda Encantada, 10°14'45.21"S – 48°07'24.07"W, malaise [malaise trap], 16-23.XI.2012, Krolow, T. K. & Lima, H. I. L. (♂, CEUFT); idem, 11-14.VII.2018, Fernandes, A. S. (♂, CEUFT); idem, 19-26.X.2012, Krolow, T. K. & Lima, H. I. L. (♀, CEUFT); idem, Fazenda Ecológica, Cachoeira da Roncadeira, 10°18'12.60"S – 48°8'20.43"W, malaise [malaise trap], 25-26.V.2012, Gomes, L. A. (♀, CEUFT).

Distribution. Ecuador, Colombia, Venezuela, Trinidad, Guyana, Suriname, French Guiana, Peru, Brazil (Amazonas, Pará, Tocantins*, Mato Grosso, Goiás, Minas Gerais, Mato Grosso do Sul, Espírito Santo, Rio de Janeiro, São Paulo to Rio Grande do Sul), Bolivia, Paraguay, Argentina (VIEIRA, 2015).

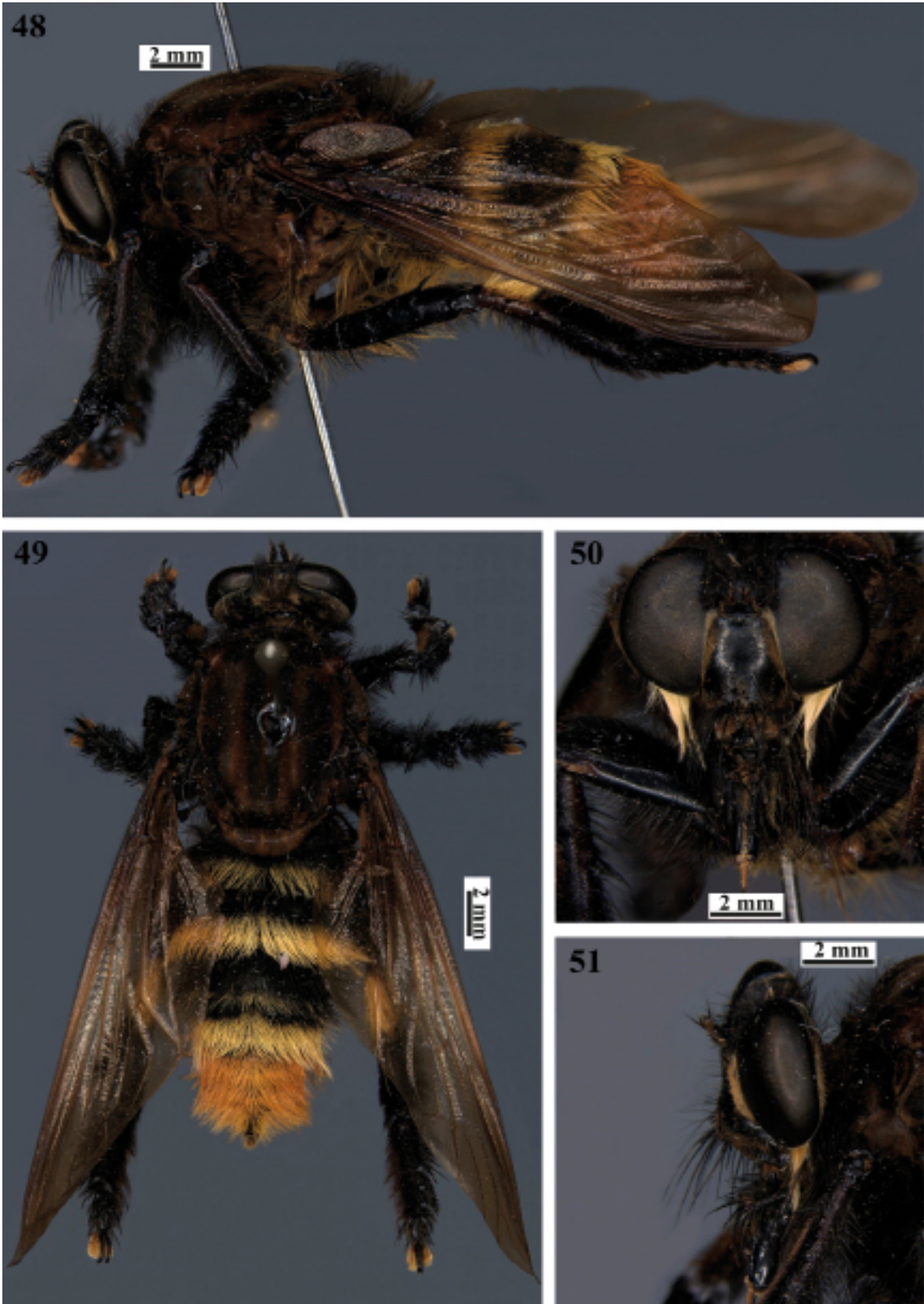
Comments. The species has a wide distribution in the Neotropical Region. In Brazil, occurs from north to south. In addition, according to VIEIRA (2015), the species is often found in Brazilian entomological collections. This species is characterized by having white mystax interspersed with yellow setae (Figs 58, 59), dark wings with a costal vein with dilatation in the median portion, yellow femur with black anteroventral and posteroventral setae, gray abdomen, tergites with whitish setae (Figs 56, 57), shiny black male terminalia, epandrium with a spiniform projection at the apex in dorsal view. Females of this species are similar to males except for the terminalia: tergite 9 narrow and sternite 8 with three indentations on the anterior margin.

normus Group

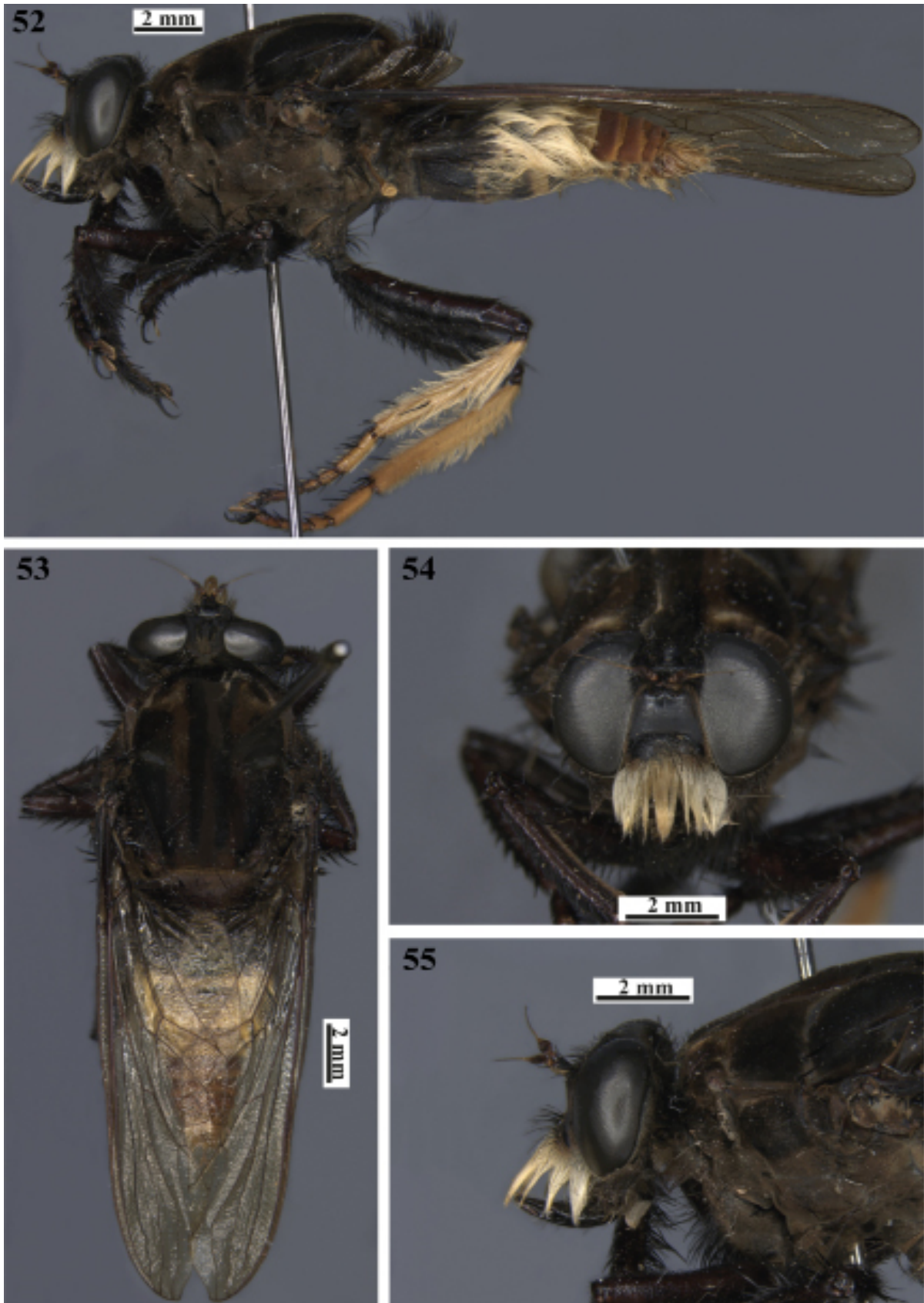
Ommatius normus Curran, 1928

(Figs 60–63)

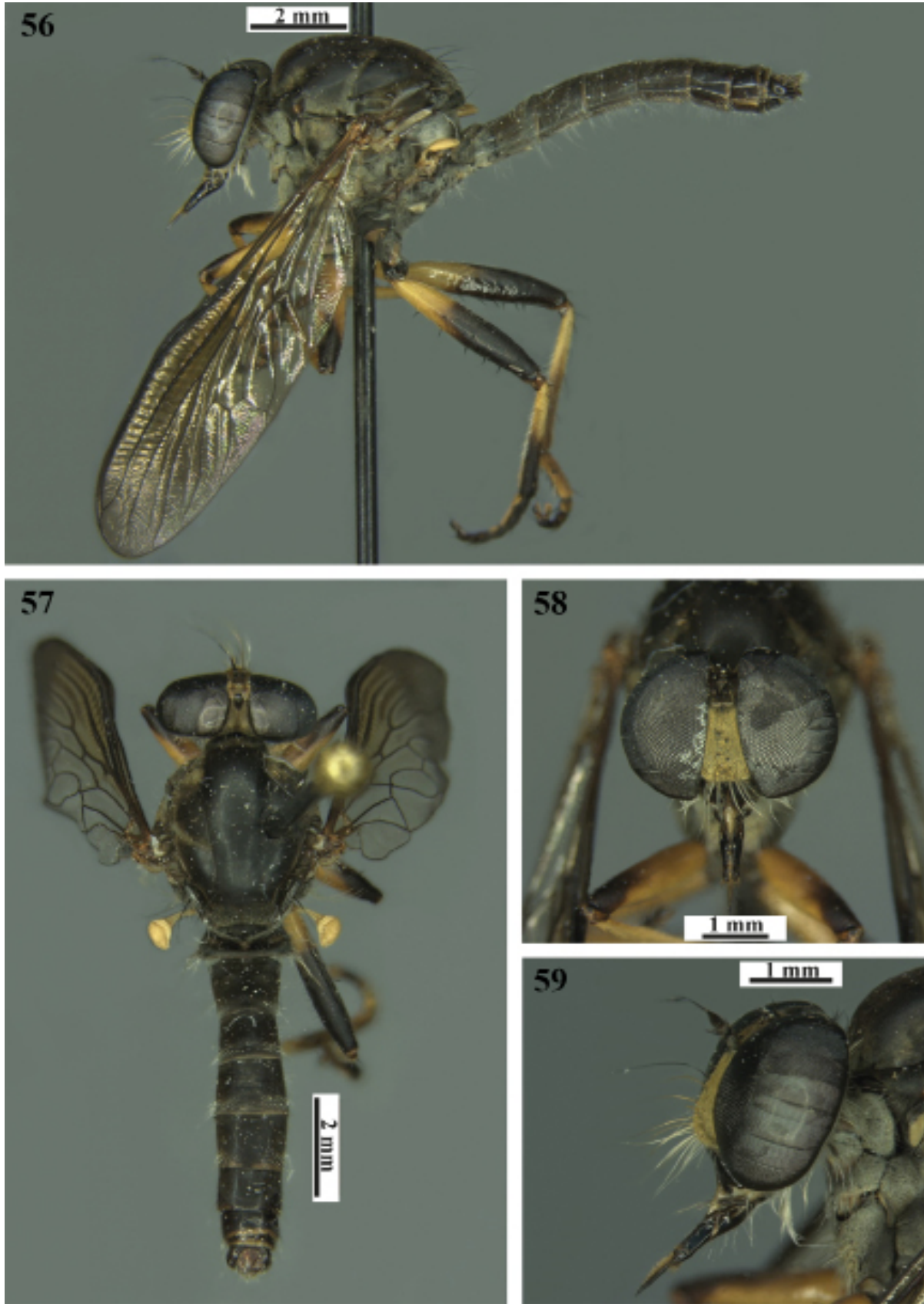
Material examined. BRASIL [BRAZIL], **Tocantins:** Monte do Carmo, Fazenda Dona Maria, 10°46'21.49"S, 48°5'19.80"W, lençol iluminado [light sheet], 03-08.IV.2019,



Figs 48–51. *Mallophora tibialis* Macquart, 1838, female, habitus: 48, lateral view; 49, dorsal view; head: 50, frontal view; 51, lateral view.



Figs 52–55. *Eccritosia barbata* (Fabricius, 1787), male, habitus: 52, lateral view; 53, dorsal view; head: 54, frontal view; 55, lateral view.

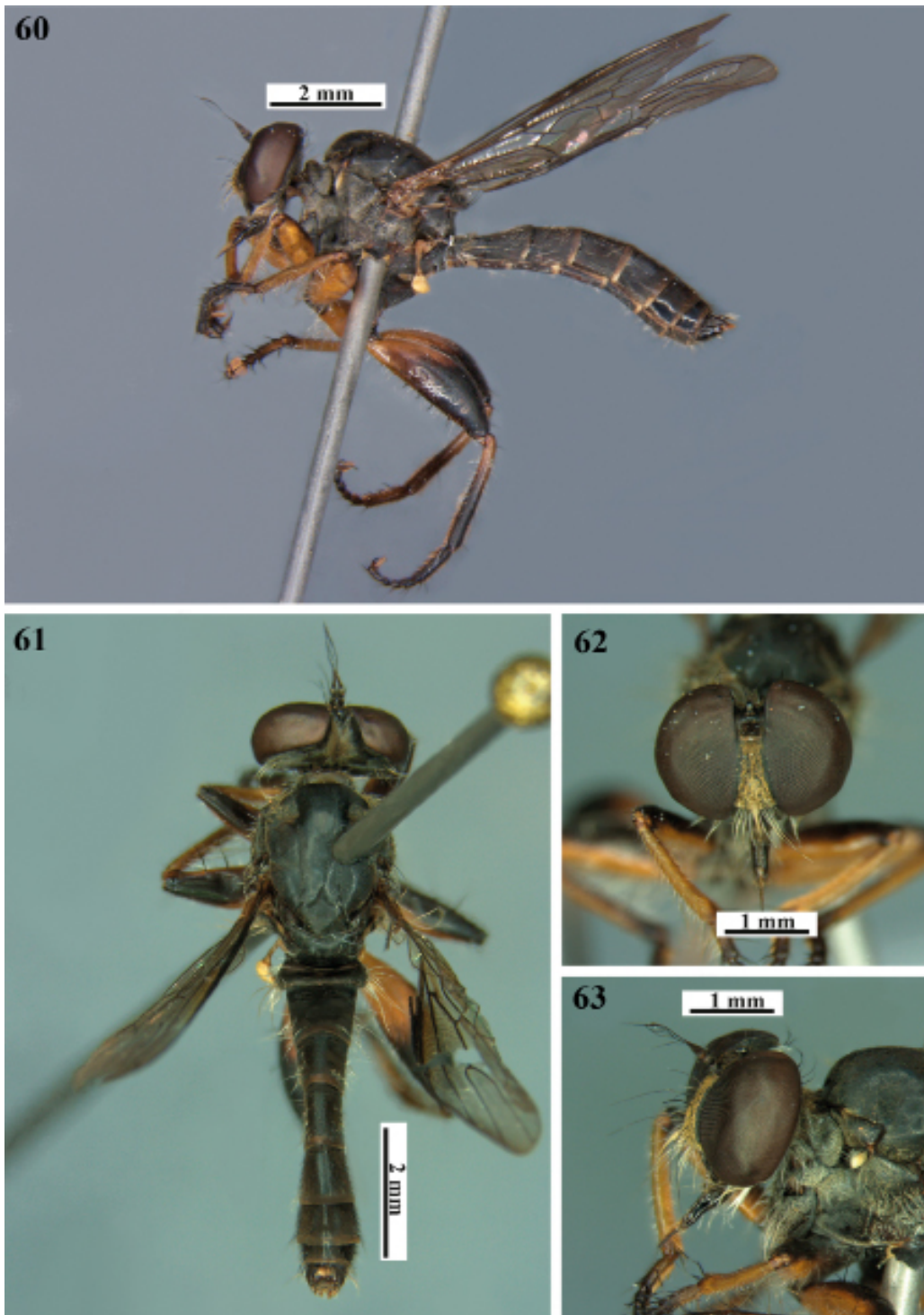


Figs 56–59. *Ommatius costatus* Rondani, 1850, male, habitus: 56, lateral view; 57, dorsal view; head: 58, frontal view; 59, lateral view.

Fernandes, A. S. & equipe (♀, CEUFT); Novo Acordo, Chácara Três Irmãos, 09°57'50.04"S - 47°40'46.83"W, coleta manual [manual collection], 17.VII.2019, Almeida, L. R. (♂, CEUFT); Palmas, Distrito de Taquaruçu, Fazenda Encantada, 10°14'45.21"S - 48°07'24.07"W, malaise Gressitt & Gressitt [malaise trap six meters], 26-31.VIII.2017, Krolow, T. K. (♀, CEUFT).

Distribution. Venezuela, Guyana, Suriname, French Guiana, Brazil (Roraima, Amapá, Amazonas, Pará, Maranhão, Tocantins*, Acre, Rondônia, Mato Grosso, Goiás; Minas Gerais, Mato Grosso do Sul, São Paulo, Santa Catarina), Paraguay (VIEIRA *et al.*, 2010).

Comments. This species may show variation in the number of macrosetae (VIEIRA *et al.*, 2010). This species has



Figs 60–63. *Ommatius normus* Curran, 1928, male, habitus: 60, lateral view; 61, dorsal view; head: 62, frontal view; 63, lateral view.

black mystax interspersed with yellow setae (Figs 62, 63), translucent wings; brownish r1 and r2+3 cells, legs black, abdomen black with yellow setae (Figs 60, 61), epandrium short with truncate apex and base triangular, gonocoxite with an apical projection. The females are similar to males, except for the shiny black terminalia, sternite 8 with slightly developed mid-apical margin.

***Ommatius pulcher* (Engel, 1885)**

(Figs 64–67)

Material examined. BRASIL [BRAZIL], Tocantins: Palmas, Distrito de Taquaruçu, Fazenda Encantada, 10°14'45.21"S – 48°07'24.07"W, malaise [malaise trap], 01-08.II.2013, Krolow, T. K. & Lima, H. I. L. (♂, CEUFT);



Figs 64–67. *Ommatius pulcher* (Engel, 1885), male, habitus: 64, lateral view; 65, dorsal view; head: 66, frontal view; 67, lateral view.

idem, 07-14.XII.2012, Krolow, T. K. & Lima, H. I. L. (♂, CEUFT); idem, 16-23.XI.2012, Krolow, T. K. & Lima, H. I. L. (♂, CEUFT); idem, 13-20.IV.2012, Krolow, T. K. & Lima, H. I. L. (♂, CEUFT); Palmas, Parque Estadual do Lajeado, 10°06'05.00"S - 48°14'46.00"W, malaise trap, 09-16.XI.2019, Oliveira, J. W. (5♂, CEUFT).

Distribution. Brazil (Pará, Tocantins*, Rondônia, Alagoas, Mato Grosso, Bahia, Goiás, Distrito Federal, Minas Gerais, Mato Grosso do Sul, São Paulo, Rio de Janeiro, Paraná, Santa Catarina), Paraguay (VIEIRA *et al.*, 2010; LIMA *et al.*, 2017).

Comments. This species can present great variation in size, color and number of macrosetae (VIEIRA, *et al.*, 2010). This species is characterized by having black mystax (Figs 66, 67), dark wings with apically wide r2 cell with rounded apex, apical scutellar macrosetae absent, yellow legs (Figs 64, 65), extremely robust hind femur with nine anteroventral macrosetae, clavate abdomen, dark brown male terminalia, wide epandrium in the median portion, epandrium with long cercus and truncated apex, gonostylus narrow, gonocoxite with the mid-basal portion of the inner margin curved inward, oval hypandrium.

Acknowledgments. The first author thanks *Universidade Federal do Tocantins* (UFT) for the grant and the structure provided. Third author thanks to *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq, process #310214/2021-1). We thank to Laboratório de Sistemática from UFT for the support for image acquisition, granted by the *Financiadora de Estudos e Projetos* (FINEP), process #01.18.0077.00. We also thank the CEUFT team for support.

REFERENCES

- ARTIGAS, J. N. & ANGULO, A. O. 1980. Revision del genero *Mallophora* Macquart por sistemática alfa y taxonomía numérica (Diptera-Asilidae). *Gayana Zoología* **43**:1-182.
- ARTIGAS, J. N. & PAPAVERO, N. 1997. The American genera of Asilidae (Diptera): Key for identification with an atlas of female spermathecae and other morphological details. IX. I. Subfamily Asilinae Leach (Including Apocleinae Lehr): Key to generic group. *Arquivos de Zoologia* **34**(2):57-63. <https://doi.org/10.11606/issn.2176-7793.v34i1-4p57-63>
- CAMARGO, A.; VIEIRA, R. & RAFAEL, J. A. 2022. Taxonomic review of *Cerozodus* Bigot, 1857 (Diptera: Asilidae: Asilinae) with the description of two new species. *Zootaxa* **5209**:151-186. <https://doi.org/10.11646/zootaxa.5209.2.1>
- CARRERA, M. 1945. Estudo sobre os gêneros *Glaphyropyga* e *Senoprosopis* com descrição de novo gênero e novas espécies. *Papéis Avulsos do Departamento de Zoologia* **5**(12):175-192.
- CARRERA, M. 1959. Sobre alguns Asilídeos neotropicais (Diptera) do "Zoologische Sammlung des Bayrischen Staates". *Opuscula Zoologica* **30**:1-13.
- CASTRO, I.; BRAVO, F. & VIEIRA, R. 2016. Four new species of *Triorla* Parks (Diptera, Asilidae, Ailinae) from Brazil. *Revista Brasileira de Entomologia* **60**:137-149. <https://doi.org/10.1016/j.rbe.2015.11.013>
- CUMMING, J. M. & WOOD, D. M. 2017. Adult morphology and terminology. In: KIRK-SPRIGGS, A. H. & SINCLAIR, B. J. eds. *Manual of Afrotropical Diptera. Vol. I. Introductory chapters and keys to Diptera families*. Suricata 4, Pretoria, South African National Biodiversity Institute, p. 89-133.
- DIKOW, T. 2009. *Asilidae generic classification sensu Dikow 2009*. Available at <<https://asiloidflies.si.edu/asilidae-generic-classification-dikow2009/>>. Accessed on January 2023.
- FISHER, E. M. 2009. Asilidae (Robber flies, Assassin flies, Moscas Cazadoras, Moscas Ladronas) In: BROWN, B. V.; BORKENT, A.; CUMMING, J. M.; WOOD, D. M.; WOODLEY, N. E. & ZUMBADO, M. A. eds. *Manual of Central American Diptera*. Volume I. Ottawa, National Research Council Research Press, p. 585-632.
- KOHLER, A.; KLEIN, J. T. & LEMES, J. R. A. 2013. Novas ocorrências de *Mallophora* Macquart, 1834 (Diptera, Asilidae) no Rio Grande do Sul, Brasil: chave de identificação e distribuição. *Revista Brasileira de Biociências* **11**:432-438.
- LAMAS, G. M. 1973. A revision of *Eccritosia* Schiner, 1866 (Diptera, Asilidae). *Papéis Avulsos de Zoologia* **27**(4):45-68.
- LAMAS, C. J. E. & CAMARGO, A. 2023. Asilidae in *Catálogo Taxonômico da Fauna do Brasil*. PNUD. Available at <<http://fauna.jbrj.gov.br/fauna/faunadobrasil/564/>>. Accessed on 18 January 2023.
- LIMA, S.; VIEIRA, R.; CAMARGO, A. & CHAGAS, C. 2017. *Ommatius*: synonyms, new record, redescription of *Ommatius erythropus* and description of the female of *Ommatius trifidus* (Diptera: Asilidae: Ommatiinae). *Zoology* **34**:1-11. <https://doi.org/10.3897/zoologia.34.e20784>.
- MARCUZZO, F. F. N. & GOULARTE, E. R. P. 2013. Caracterização do ano hidrológico e mapeamento especial das chuvas nos períodos úmidos e seco do Estado do Tocantins. *Revista Brasileira de Geografia Física* **6**:91-99. <https://doi.org/10.26848/rbgf.v06.1.p091-099>
- PAMPLONA, D. M. & AIRES, C. C. C. 1999. Revisão de *Triorla* Parks e descrição de uma espécie nova, enfatizando o valor sistemático da espermateca (Diptera, Asilidae). *Revista Brasileira de Zoologia* **16**(4):1127-1134.
- PAPAVERO, N. 2009. Catalogue of Neotropical Diptera. Asilidae. *Neotropical Diptera* **17**:1-178.
- PAPAVERO, N.; ARTIGAS, J. N. & LAMAS, C. J. E. 2009. Manual of Neotropical Diptera. Asilidae. *Neotropical Diptera* **18**:1-320.
- PAPE, T.; BLAGODERO, V. & MOSTOVSKI, M. B. 2011. Order DIPTERA Linnaeus, 1758. In: ZHANG, Z. Q. ed. *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*. *Zootaxa* **3148**:222-229.
- SCARBROUGH, A. G. 1990. Revision of the New World *Ommatius* Wiedemann (Diptera: Asilidae). I. The *pumilus* species group. *Transactions of the American Entomological Society* **116**:65-102.
- SCARBROUGH, A. G. 1993. Revision of the New World species of *Ommatius* Wiedemann (Diptera: Asilidae): the Neotropical *costatus* species group. *Revista de Biologia Tropical* **41**:729-753.
- SCARBROUGH, A. G. 2000. Two additional species of robber flies of the genus *Ommatius* Wiedemann (Diptera: Asilidae) from the Bahamas and with replacement names for two other species. *Proceedings of the Entomological Society of Washington* **102**: 912-918.
- SCARBROUGH, A. G. 2002. Synopsis of the Neotropical *holosericeus* complex of the genus *Ommatius* Wiedemann (Diptera): *ampliatius* and *holosericeus* species groups. *Transactions of the American Entomological Society* **128**:133-222.
- SCARBROUGH, A. G. 2003. The Afrotropical *Ommatius flavipennis* species group (Diptera: Asilidae), with descriptions of six new species. *Proceedings of the Entomological Society of Washington* **105**(3):611-629.
- SCARBROUGH, A. G. 2008. New *Ommatius* Wiedemann from the Americas with two new species group, keys, and taxonomic notes (Diptera: Asilidae). *Insecta Mundi* **32**:1-14.
- SCARBROUGH, A. G. & PEREZ-GELABERT, D. E. 2006. A review of the asilid (Diptera) fauna from Hispaniola with six genera new to the island, fifteen new species, and checklist. *Zootaxa* **1381**:1-91.
- SEPLAN, NATURATINS. 2003. *Plano de manejo do Parque Estadual do Lajeado. Encarte 4: a APA da Serra do Lajeado*. Palmas, DBO ENGENHARIA LTDA. Available at <<http://gesto.to.gov.br/uc/50/zoneamento/>>. Accessed at 18 January 2023.

- VIEIRA, R. 2012. New distribution records of six species of Asilinae (Diptera: Asilidae) Latreille, 1802. **Check List** **8**(4):779-781. <https://doi.org/10.15560/8.4.779>
- VIEIRA, R. 2015. O Grupo *costatus* de *Ommatius* Wiedemann (Diptera, Asilidae) no Brasil: Novos Registros e Distribuição de *Ommatius costatus* Rondani e *Ommatius orenoquensis* Bigot. **EntomoBrasilis** **8**(1):58-64. <https://doi.org/10.12741/ebrasilis.v8i1.461>
- VIEIRA, R.; CASTRO, I.; ALMEIDA, D.; ALVIM, E. & BRAVO, F. 2006. Asilidae (Diptera) da Bahia, Brasil: Sinopse das espécies e chave de identificação. **Sitientibus**, Série Ciências Biológicas **6**(4):243-256.
- VIEIRA, R.; BRAVO, F. & RAFAEL, J. A. 2010. *Ommatius* Wiedemann, 1821, *normus* species-group (Diptera, Asilidae): description of two new species and comments on Brazilian species. **Zootaxa** **2344**:39-51. <https://doi.org/10.11646/zootaxa.2344.1.4>
- VIEIRA, R. & RAFAEL, J. A. 2014. *Longivena*, a new robber-fly genus from Brazil (Diptera, Asilidae, Asilinae). **Zookeys** **443**:119-138. <https://doi.org/10.3897/zookeys.443.8324>
- VIEIRA, R.; RAFAEL, J. A. & LIMEIRA-DE-OLIVEIRA, F. 2013. Revision of *Cerozodus* Bigot, 1857 (Diptera, Asilidae, Asilinae) with description of a new species from Brazil. **Zootaxa** **3646**(2):180-188. <https://doi.org/10.11646/zootaxa.3646.2.6>