

## Filling distribution gaps and honoring great taxonomist mentors: three new species of the microcaddisfly *Ochrotrichia* Mosely, 1934 (Trichoptera: Hydroptilidae) from the Brazilian Cerrado and a checklist from Brazil

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### ABSTRACT

Sixteen species of the microcaddisfly *Ochrotrichia* Mosely, 1934 (Hydroptilidae) have been recorded so far in Brazil, mainly distributed in the Atlantic Forest of southeastern Brazil. In order to reduce the Linnean and Wallacean shortfalls for the *Ochrotrichia* Brazilian fauna, we diagnose, describe, and illustrate three new species based on adult males from three protected and preserved areas of the Cerrado biome of Federal District (Central-West region), Minas Gerais (Southeast region) and Tocantins (North region) states; all of them named in honor of three great Brazilian entomologists viz., *Ochrotrichia froehlichii* **sp. nov.**, *Ochrotrichia machadoi* **sp. nov.** and *Ochrotrichia nessimiani* **sp. nov.** They can be recognized mainly by the morphology of the tergum X, number, and position of the spine-like setae of the inferior appendages. This contribution represents the first record of *Ochrotrichia* for the Central-West region, increasing the number of species of this genus in Cerrado biome from one to four, and is the first report of a microcaddisfly for the Federal District. In addition, the genus is reported for the first time from Paraná, São Francisco, and Tocantins hydrographic basins. Finally, we provide a checklist of the *Ochrotrichia* species from Brazil.

### Introduction

Ochrotrichiinae Marshall, 1979 is a large subfamily of microcaddisflies with nine genera, seven of which are found in New World (*Angrisanoia* Özdikmen, 2008, *Metrichia* Ross, 1938, *Nothotrichia* Flint, 1967, *Ochrotrichia* Mosely, 1934, *Ragatrichia* Oláh and Johanson, 2011, and *Rhyacopsyche* Müller, 1879) and other two are endemics, *Maydenoptila* Neboiss, 1977 to Australia and *Caledonotrichia* Sykora, 1967 to New Caledonia (Thomson, 2023).

*Ochrotrichia* is the most species-rich microcaddisfly genus in the Neotropics, with 226 extant species distributed in North, Central, and South America and the West Indies (Holzenthal and Calor, 2017; Harris

and Armitage, 2023; Thomson, 2023; Harris et al., 2023; Rocha et al., 2023). In a preliminary study using molecular data to explore the relationships within and between the microcaddisfly taxa, *Ochrotrichia* were grouped with *Metrichia* and *Rhyacopsyche*, forming a distinct clade in Ochrotrichiinae (Thomson et al., 2022).

In recent years, Brazilian and Panamanian's fauna of *Ochrotrichia* have received much attention, resulting in the description of a large number of species (23 spp.) (Souza et al., 2014; Cavalcante et al., 2018; Harris and Armitage, 2019; Moreno et al., 2021; Thomson and Armitage, 2021; Harris et al., 2023; Harris and Armitage, 2023; Santos et al., 2022). In Brazil, most of species in this genus are concentrated in the Atlantic Forest biome in Northeastern and Southeastern Brazil and only in six

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federal units (Amazonas, Bahia, Ceará, Maranhão, Piauí and Rio de Janeiro states) (Santos, 2023) (Table 1).

The aims of this study are to reduce the Linnean (Brown and Lomolino, 1998) and Wallacean (Lomolino, 2004) shortfalls for *Ochrotrichia* by describing three new species based on adult males from three protected and preserved areas of the Cerrado biome in the states of Federal District, Minas Gerais and Tocantins, respectively in Central-Western, Southeastern and Northern Brazil. These new species are named after three great taxonomist mentors, Prof. Dr. Claudio G. Froehlich, Prof. Dr. Jorge L. Nessimian and Prof. Dr. Angelo B. M. Machado (in memory), for their amazing, life-long contributions to the study of Neotropical aquatic insects' biodiversity, and for inspiring and guiding

many Brazilian students. In addition, a checklist of the *Ochrotrichia* species from Brazil is presented (Table 1). This study also is part of a highly deserved homage to the prolific career of Prof. Claudio Froehlich.

## Material and methods

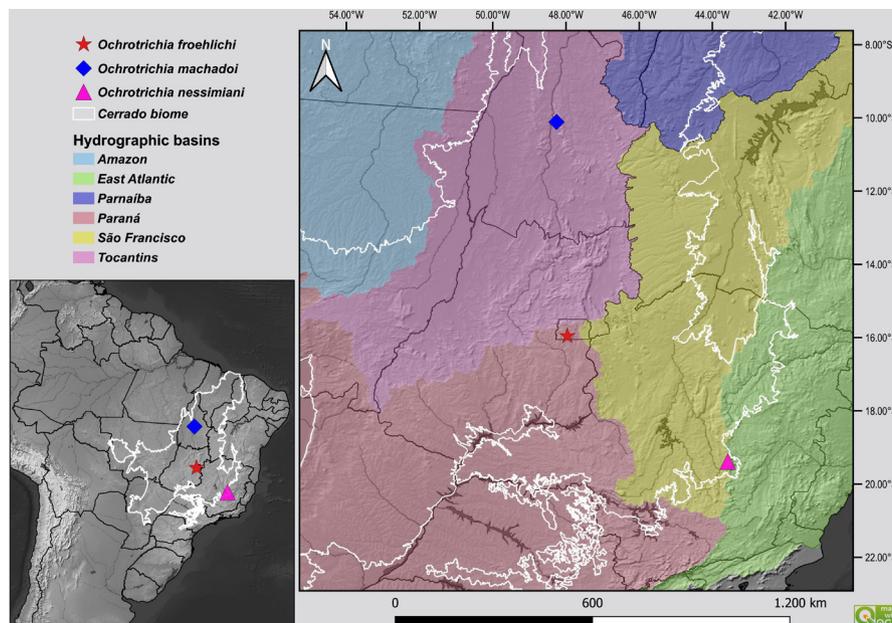
### *Specimen collection, preparation, and observation*

Specimens were collected in three streams in the states of Federal District, Minas Gerais, and Tocantins (Fig. 1) using Collapsible light trap (Nessimian et al., in press) and Malaise trap (Gressitt and Gressitt, 1962). All specimens were preserved in 80% ethanol. To observe male genital

**Table 1**  
Checklist of *Ochrotrichia* Mosely, 1934 from Brazil, with distribution of species on biomes, regions and political states.

Species	Biome	Region (state)
<i>O. belodes</i> Moreno, Desidério, Pes & Hamada, 2021	Amazon	North (AM)
<i>O. buenosoria</i> Moreno, Desidério, Pes & Hamada, 2021	Amazon	North (AM)
<i>O. caatinga</i> Souza, Santos & Takiya, 2014	Atlantic Forest, Caatinga	Northeast (CE, PI), Southeast (RJ)
<i>O. concha</i> Bueno-Soria & Santiago-Fragoso, 1992	Amazon	North (AM)
<i>O. constricta</i> Souza, Santos & Takiya, 2014	Atlantic Forest	Northeast (BA)
<i>O. ducke</i> Moreno, Desidério, Pes & Hamada, 2021	Amazon	North (AM)
<i>O. froehlichii</i> <b>sp. nov.</b>	Cerrado	Central-West (DF)
<i>O. igrapuiuna</i> Souza, Santos & Takiya, 2014	Atlantic Forest	Northeast (BA)
<i>O. limeirai</i> Souza, Santos & Takiya, 2014	Caatinga	Northeast (CE)
<i>O. machadoi</i> <b>sp. nov.</b>	Cerrado	North (TO)
<i>O. manuensis</i> Flint & Bueno-Soria, 1999	Atlantic Forest	Northeast (BA)
<i>O. nematomorpha</i> Cavalcante, Dumas & Nessimian, 2018	Atlantic Forest	Southeast (RJ)
<i>O. nessimiani</i> <b>sp. nov.</b>	Cerrado	Southeast (MG)
<i>O. papel</i> Santos, Marques, Henriques-Oliveira, Alves & Dumas, 2022	Atlantic Forest	Southeast (RJ)
<i>O. patulosa</i> (Wasmund & Holzenthal, 2007)	Atlantic Forest, Caatinga	Northeast (CE), Southeast (RJ)
<i>O. priapo</i> Souza, Santos & Takiya, 2014	Atlantic Forest	Northeast (BA)
<i>O. sagitta</i> Cavalcante, Dumas & Nessimian, 2018	Atlantic Forest	Southeast (RJ)
<i>O. sino</i> Santos, Marques, Henriques-Oliveira, Alves & Dumas, 2022	Atlantic Forest	Southeast (RJ)
<i>O. taunay</i> Cavalcante, Dumas & Nessimian, 2018	Atlantic Forest	Southeast (RJ)

Abbreviations for Brazilian states: AM = Amazonas; BA = Bahia; CE = Ceará; DF = Distrito Federal; MG = Minas Gerais; PI = Piauí; RJ = Rio de Janeiro; TO = Tocantins.



**Figure 1** Geographical distribution map of the new species of *Ochrotrichia* with their respective states and hydrographic basins in Brazil.

structures, the abdomen of each specimen was removed and diaphanized using hot 10% KOH (Blahnik and Holzenthal, 2004). After clearing, the abdomen was mounted on a temporary slide using glycerin alcohol gel and examined under a Leica DM5500 B compound microscope. After examination, it was permanently stored in a microvial with glycerin, together with the remains of the respective specimen in a plastic vial with 80% ethanol.

#### Photographs, illustrations, map, and description

Photographs of the habitus of adults were obtained with a Leica DMC4500 digital video camera attached to a Leica M205A stereomicroscope. The genitalia were photographed using a Leica DFC295 digital video camera attached to a Leica DM5500B. Stacks of images were produced and combined automatically with Helicon Focus Pro® stacking software (version 7.6.4). High-resolution stacked images of the genital structures were used as templates for vectorization in Adobe Illustrator®, as well as to complement detailed photographic illustrations of diagnostic characters. Plates for each species were assembled using Adobe Photoshop®.

The distribution map was made using QGIS Las Palmas ver. 2.18.10 software (QGIS Development Team, 2016). Vector and raster maps used IBGE (2019) and Natural Earth (2020) data. To promote consistency and standardization in descriptive taxonomy the species description was generated through the DELTA (Description Language for Taxonomy) software (Dallwitz et al., 2016) using the database of Moreno et al. (2021).

#### Morphological terminology and depositories

Morphological terminology follows Oláh and Johanson (2007) for the head setal warts and Marshall (1979) for the male genitalia. Terminology for wing venation follows the Comstock-Needham system as interpreted for Trichoptera by Mosely and Kimmins (1953) and for *Ochrotrichia* by Moreno et al. (2021).

Type material of the species are deposited in the following collections: Coleção de Invertebrados, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (INPA), Coleção Entomológica do Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (MNRJ), Coleção Entomológica Professor José Alfredo Pinheiro Dutra, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (DZRJ) and Museu de História Natural da Bahia, Universidade Federal da Bahia, Salvador, Brazil (UFBA).

#### Results

*Integripalpia* Martynov, 1924  
*Hydroptilidae* Stephens, 1836  
*Ochrotrichiinae* Marshal, 1979  
*Ochrotrichia* Mosely, 1934

#### *Ochrotrichia froehlichii* Desidério, Moreno & Hamada, sp. nov.

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**Differential diagnosis.** This new species is clearly a member of the *O. aldama* group by having elongated inferior appendages, with black peg-like setae mostly at the apex, and a simple divided tergum X. *Ochrotrichia froehlichii* sp. nov. is most similar to *O. priapo* Souza, Santos and Takiya, 2014 by tergum X, elongated and apically divided into two processes, the left one chelated and the right one almost straight; and

by the presence of one small, subtriangular subapicolateral process on the phallus. However, in the new species the segment IX, in ventral view, is long, about 1/2 the length of inferior appendage, while in *O. priapo* it is very short, about 1/4 the length of this structure. Additionally, in *O. froehlichii* sp. nov. the inferior appendage, in lateral view, has an almost straight dorsal margin and a rounded apex, whereas in *O. priapo* it has an undulated dorsal margin and a slightly truncated apex. Finally, *O. froehlichii* sp. nov. can be distinguished from all other congeners by the tergum X with sinuous, ribbon-shaped apodeme along its entire length and inferior appendages bearing two clusters of medium-sized spines on the inner margin (one thicker at 1/3 basal and another basally).

**Description. Adult male.** Total body length 2.80 mm (n = 1) (Fig. 2A); forewing length 2.36 mm (n = 1). General color yellowish brown (in alcohol) (Fig. 2A). Head with three ocelli; dorsally with two pairs of setal warts; ocellar pair appressed on midline, each subtriangular; posterolateral pair large, ellipsoid (Fig. 2C). Metascutellum subpentagonal (Fig. 2B). Forewing with forks I, II, III; discoidal cell absent; R<sub>3</sub> fused with basal 3/4 of R<sub>4+5</sub>; M<sub>1+2</sub> partially fused with subapical portion of R<sub>4+5</sub>; M<sub>1</sub> partially fused with basal 1/3 of R<sub>5</sub>, ending on wing margin almost at level of end of R<sub>5</sub>; M<sub>2</sub> completely independent of R<sub>4+5</sub>, ending on wing margin almost at level of end of R<sub>4</sub>; fork of M<sub>1+2</sub> and M<sub>3+4</sub> near origin of independent R<sub>3</sub>; r and r-m crossveins present (Fig. 2D). Hind wing with forks II and V; C with row of short spines on proximal region; R<sub>2+3</sub> originating midway between origins of R<sub>1</sub> and R<sub>4+5</sub>; base of M<sub>1+2</sub> not fused to R, branching from M<sub>3+4</sub> near middle of wing; and Cu1 subdivided apically into 2 branches (Fig. 2E). Tibial spur formula 0, 3, 4. Abdominal sternum VII with oblique mesoventral process (Fig. 3C).

**Male genitalia.** Segment IX, in lateral view, with upper anterolateral margin slightly concave, mesoventrally produced; upper posterolateral margin slightly produced posterad (Fig. 3A, D); in dorsal view, with deep subquadrangular cleft posteriorly (Fig. 3F); in ventral view, subrectangular (Fig. 3H, I). Tergum X, in lateral view, triangular, 2/3 as long as inferior appendages, apically bearing two strong acute processes: left one directed dorsad and right one claw-shaped directed ventrad (Fig. 3A–B, D); in dorsal view, narrow, with long, slightly sclerotized, subpentagonal base, bearing sinuous, ribbon-shaped apodeme along its entire length, apically divided into two sclerotized processes; without basodorsal process or projection; apex with deep U-shaped cleft mesally and lateral, pointed lobes (Fig. 3F). Inferior appendage, in lateral view, oblong; 3.5X as long as wide, apically rounded (Fig. 3A, D); in dorsal view, surpassing tergum X, with inner surfaces bearing numerous short, dark, peg-like setae grouped subapically and on the mid-basal ridge (Fig. 3F); in ventral view, with two clusters of medium-sized spines on inner margin: (i) row of mesal, thick spines at 1/3 basal; (ii) cluster of thin spines basally (Fig. 3H, I). Phallus simples, tubular, 3× longer than inferior appendages, thread-like, subapicolaterally with a pair of large semimembranosus flaps and another pair of small triangular process (Fig. 3E, G).

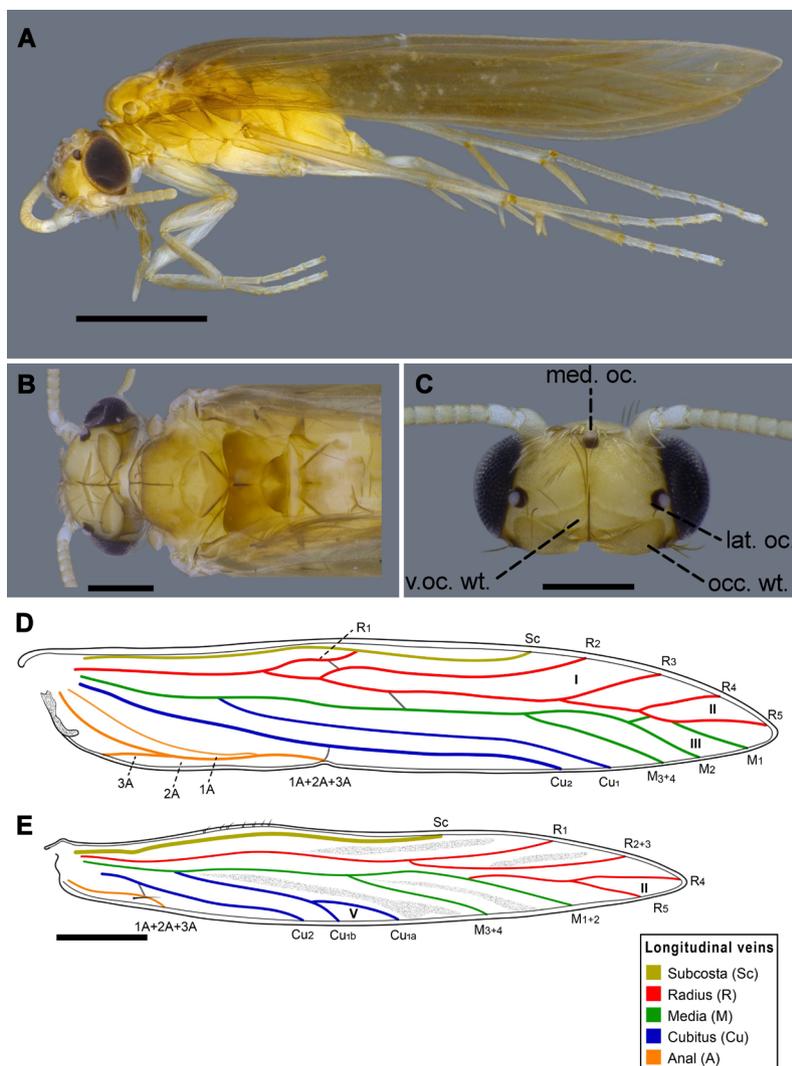
**Holotype. Male. BRAZIL: Federal District:** Brasília, Fazenda Água Limpa (FAL), Córrego Gama (#03-DF), 15°57'17.7"S, 47°57'46.0"W, 1071 m, 17–19.vi.2017, N. Hamada, G.R. Desidério, G. Amora legs., Pennsylvania trap (INPA). **Paratype:** Same data as for holotype, 1 male (MNRJ).

**Etymology.** The new species is named in honor of Prof. Dr. Claudio Gilberto Froehlich (Universidade de São Paulo, Brazil) in recognition of his contributions to the study of the Neotropical aquatic insects, especially stoneflies (Plecoptera).

**Distribution.** BRAZIL: Cerrado biome (Federal District) (Fig. 1).

#### *Ochrotrichia machadoi* Desidério, Moreno, Carvalho & Hamada, sp. nov.

urn:lsid:zoobank.org:act:538B87A6-5D74-4D14-989F-8B17869C00BC (Figs 4A–E & 5A–I)



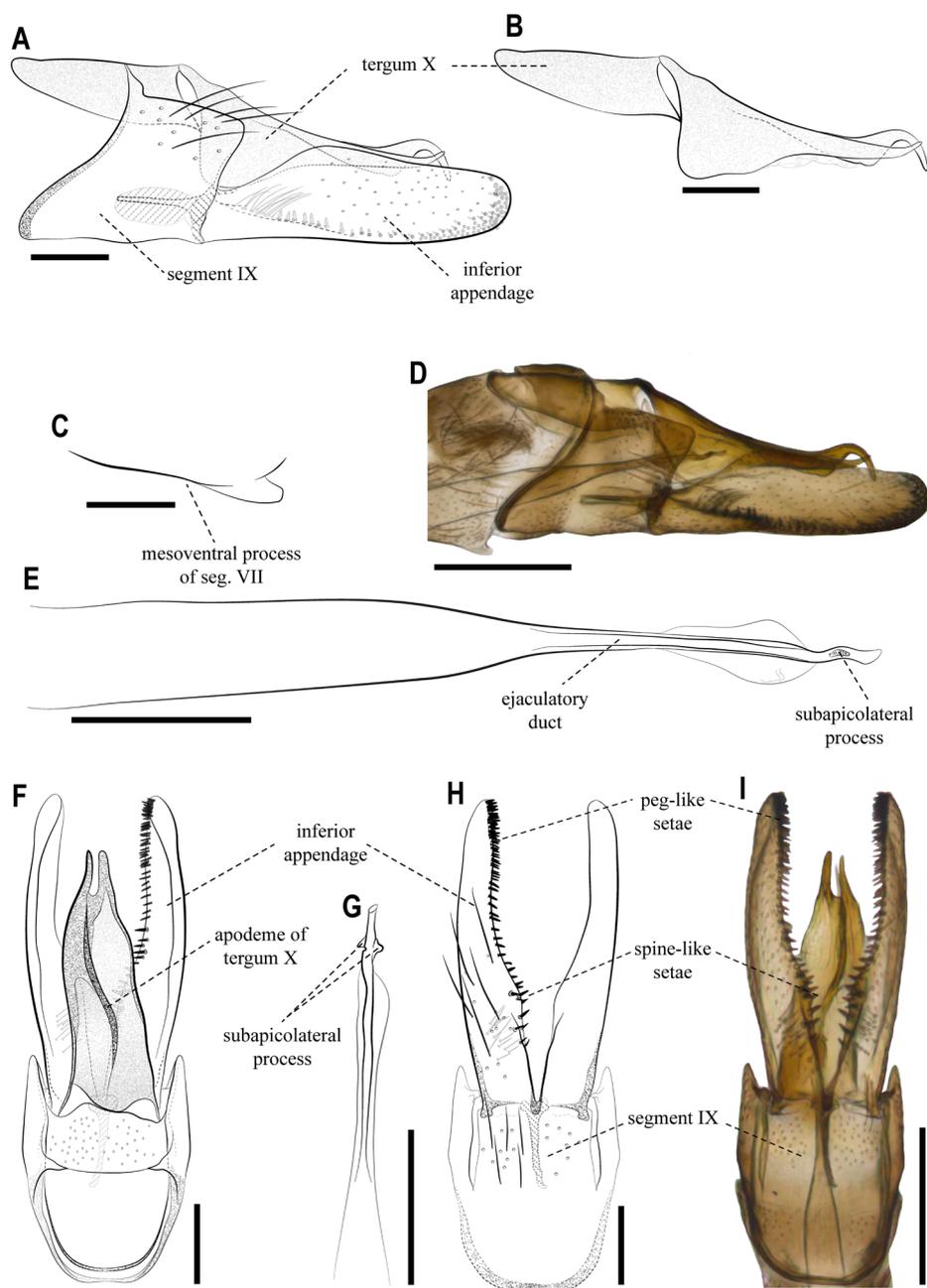
**Figure 2** *Ochrotrichia froehlichii* sp. nov., holotype, ♂ (INPA). **A**, lateral habitus; **B**, head and thorax, dorsal view; **C**, head, dorsal view; **D**, forewing, right dorsal view; **E**, hind wing, right dorsal view. Cephalic setal warts abbreviations: Lateral ocellus = l. oc.; median ocellus = m. oc.; occipital setal wart = occ. wt.; vertexal ocellar setal wart = v. oc. wt. Scale bars: 0.5 mm (A); 0.2 mm (B, C, D, E).

**Differential diagnosis.** *Ochrotrichia machadoi* sp. nov. belongs to the *O. xena* group by having elongated, simple, tergum X. It is most similar to *O. belodes* Moreno, Desidério, Pes and Hamada, 2021 by the shape of the inferior appendage in lateral view, oblong, long (3.5X as long as wide) and apex rounded with inner surfaces bearing numerous slender, dark, peg-like setae grouped subapically. However, in *O. belodes* the tergum X has a pair of sclerotized claw-like basodorsal process, which is absent in *O. machadoi* sp. nov. Although both species present the tergum X subsagittate to sagittate in dorsal view, the apex is pointed directed on left side, whereas it is pointed directed posterad in *O. belodes*. Furthermore, *O. machadoi* sp. nov. can be recognized by having only two clusters of spines on the inner surfaces of the inferior appendages, while *O. belodes* has three clusters.

**Description. Adult male.** Total body length 2.16 mm ( $n = 1$ ) (Fig. 4A); forewing length 1.85 mm ( $n = 1$ ). General color yellowish brown (in alcohol) (Fig. 4A). Head with three ocelli; dorsally with two pairs of setal warts; ocellar pair closely appressed on midline, each subtriangular; posterolateral pair large, ellipsoid (Fig. 4C). Metascutellum subpentagonal (Fig. 4B). Forewing with forks I, II, III present; discoidal cell absent;  $R_3$  fused with basal 3/4 of  $R_{4+5}$ ;  $M_{1+2}$  partially fused with

subapical portion of  $R_{4+5}$ ;  $M_1$  partially fused with basal 1/3 of  $R_5$ , ending on wing margin almost at level of end of  $R_5$ ;  $M_2$  completely independent of  $R_{4+5}$ , ending on wing margin almost at level of end of  $R_4$ ; fork of  $M_{1+2}$  and  $M_{3+4}$  branching from each other near origin of independent  $R_3$ ; r and r-m crossveins present (Fig. 4D). Hind wings with forks II and V C with row of short spines on proximal region;  $R_{2+3}$  originating midway between origins of  $R_1$  and  $R_{4+5}$ ; base of  $M_{1+2}$  not fused to R, branching from  $M_{3+4}$  near middle of wing; and  $Cu_1$  subdivided apically into 2 branches (Fig. 4E). Tibial spur formula 0, 3, 4. Abdominal sternum VII with pointed mesoventral process (Fig. 5C).

**Male genitalia.** Segment IX, in lateral view, with upper anterolateral margin slightly concave, mesoventrally produced; upper posterolateral margin slightly produced posterad (Fig. 5A, D); in dorsal view, with U-shaped cleft posteriorly (Fig. 5F); in ventral view, subquadrangular (Fig. 5H, I). Tergum X, in lateral view, subtriangular, 2/3 as long as inferior appendages, bearing one subapical acute process on the left side directed posteroventrad, apically with shallow cleft and subacute process directed lateroventrad (Fig. 5A–B, D); in dorsal view, narrow, not divided, subsagittate, with slightly sclerotized base bearing ventral, stick-shaped apodeme at midlength; without basodorsal process or projection; apex strongly sclerotized, pointed directed on left side



**Figure 3** *Ochrotrichia froehlichii* sp. nov. **A**, genitalia, left lateral; **B**, tergum X, left lateral; **C**, mesoventral process of segment VII, left lateral; **D**, genitalia, left lateral (photograph); **E**, phallus, left lateral; **F**, genitalia, dorsal; **G**, apex of phallus, ventral; **H**, genitalia, ventral; **I**, genitalia, ventral (photograph). Scale bars = 0.2 mm.

(Fig. 5F). Inferior appendage, in lateral view, oblong; 3.5X as long as wide, apically rounded (Fig. 5A, D); in dorsal view, surpassing tergum X, with inner surfaces bearing numerous slender, dark, peg-like setae grouped subapically (Fig. 5F); in ventral view, with row of 5–9 medium-sized, thick spines at 1/3 basal on inner margin (Fig. 5H, I). Phallus simple, tubular, 3.2x longer than inferior appendages, thread-like (Fig. 5E, G).

**Holotype. Male. BRAZIL: Tocantins:** Palmas, Parque Estadual do Lajeado, Igarapé da Onça (#01-TO), 10°06'44.50"S, 48°15'31.10"W, 596 m, 28.xii.2017, J.O. Silva, G. Amora legs., Malaise trap (INPA). **Paratypes:** Same data as for holotype, 1 male (MNRJ), 1 male (DZRJ); same collection data as for preceding, except 30.i.2018, 1 male (INPA), 1 male (UFBA).

**Etymology.** This new species is named in memory of the late Prof. Dr. Angelo Barbosa Monteiro Machado (1934–2020) (Universidade Federal

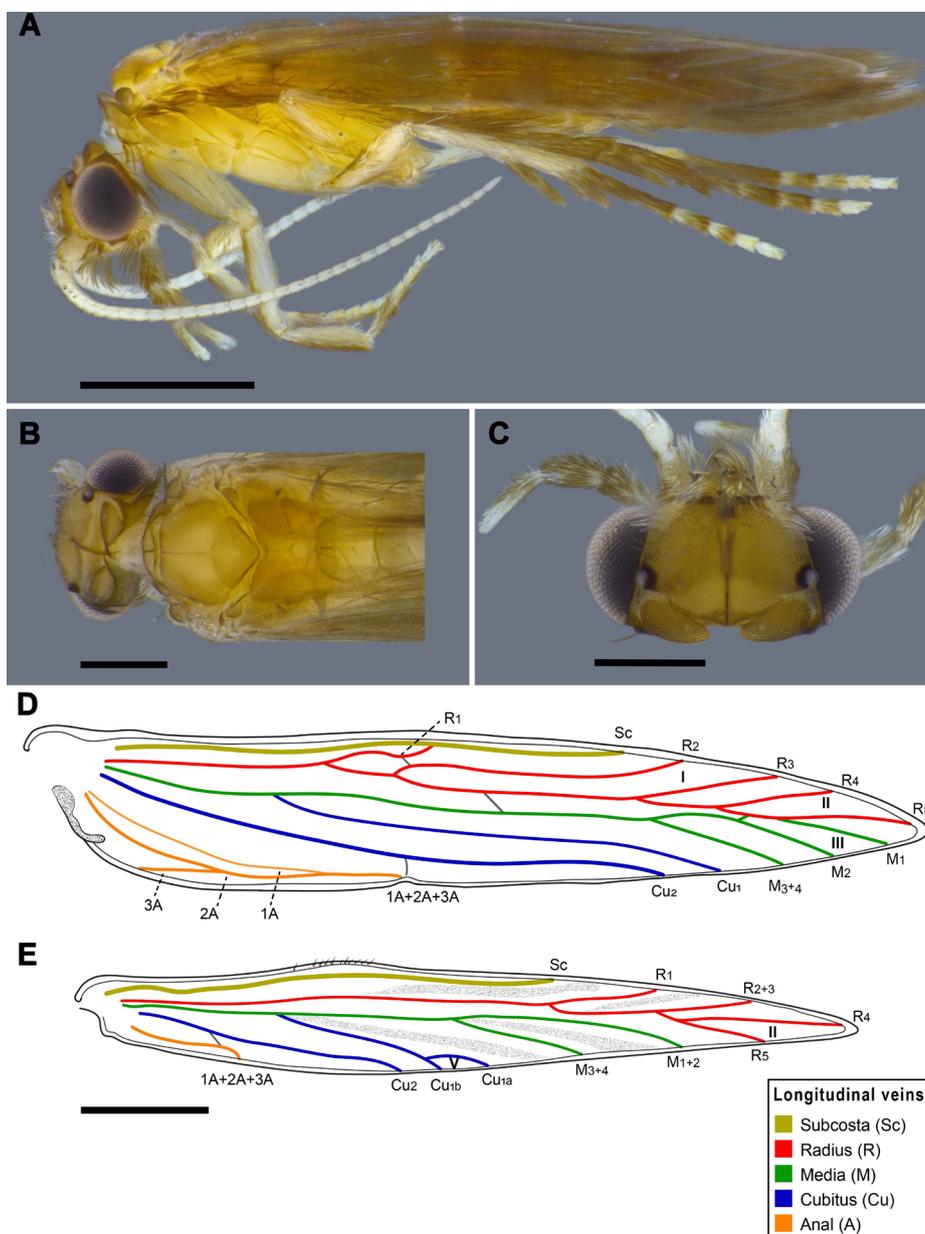
de Minas Gerais, Brazil) in recognition of his contributions to the study of the Neotropical aquatic insects, especially dragonflies (Odonata).

**Distribution.** BRAZIL: Cerrado biome (Tocantins state) (Fig. 1).

***Ochrotrichia nessimiani* Desidério, Alves, Moreno & Hamada, sp. nov.**

urn:lsid:zoobank.org:act:ABD4B0CC-91EE-4CF1-8AB9-AA49C7732FB7 (Figs 6A–E & 7A–I)

**Differential diagnosis.** *Ochrotrichia nessimiani* sp. nov. can be designated to the *O. cruces* group from Flint Junior (1972) by having triangular inferior appendages, in lateral view. It is most similar to *O. vieja* Bueno-Soria and Holzenthal, 1998 based on the rounded apically



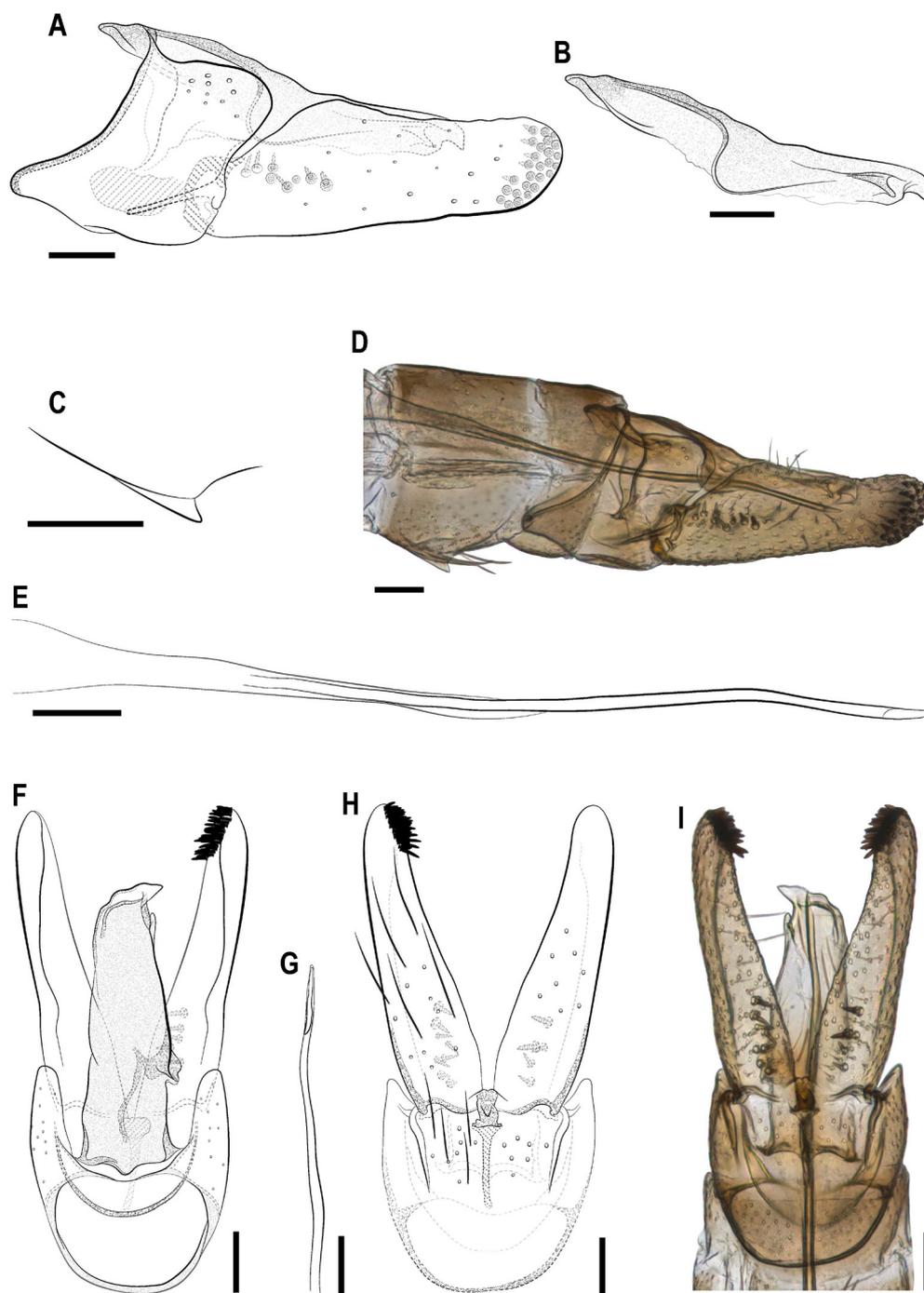
**Figure 4** *Ochrotrichia machadoi* sp. nov., holotype, ♂ (INPA). **A**, lateral habitus; **B**, head and thorax, dorsal view; **C**, head, dorsal view; **D**, forewing, right dorsal view; **E**, hind wing, right dorsal view. Scale bars: 0.5 mm (A); 0.2 mm (B, C, D, E).

inferior appendages, in lateral view; with inner surface bearing numerous medium-sized, dark, peg-like setae grouped subapically. However, they can be easily distinguished by the shape of the X tergum, which in the new species is apically divided into two sclerotized processes, in dorsal view, bearing left process with pointed, downturned apex, in lateral view, while in *O. vieja* it is divided into more processes and the left process is sinuous with rounded apex, in lateral view.

**Description. Adult male.** Total body length 2.90–3.20 mm (mean = 3.04 mm, SD = 0.12, n = 5) (Fig. 6A); forewing length 2.70–3.00 mm (n = 5). General color brown (in alcohol) (Fig. 6A). Head with three ocelli; dorsally with two pairs of setal warts; ocellar pair closely appressed on midline, each subtriangular; posterolateral pair large, ellipsoid (Fig. 6C). Metascutellum subpentagonal (Fig. 6B). Forewing with forks I, II, III; discoidal cell absent;  $R_3$  fused with basal 3/4 of  $R_{4+5}$ ;  $M_{1+2}$  partially fused with subapical portion of  $R_{4+5}$ ;  $M_1$  distinct from mid-length of  $R_5$ ;  $M_2$  distinct from  $R_{4+5}$  immediately before origin of

fork II; fork of  $M_{1+2}$  and  $M_{3+4}$  near origin of independent  $R_3$ ; r and r-m crossveins absent (Fig. 6D). Hind wing with forks II, III and V; C with row of short spines on proximal region;  $R_{2+3}$  originating near level of apex of  $M_{1+2}$ ; base of  $M_{1+2}$  not fused to R, branching from  $M_{3+4}$  near middle of wing; and Cu1 subdivided apically into 2 branches (Fig. 6E). Tibial spur formula 0, 3, 4. Abdominal sternum VII with pointed mesoventral process (Fig. 7C).

**Male genitalia.** Segment IX, in lateral view, with upper anterolateral margin slightly concave, mesoventrally produced; upper posterolateral margin tapering dorsally (Fig. 7A, D); in dorsal view, with U-shaped cleft posteriorly (Fig. 7F); in ventral view, subhexagonal (Fig. 7H, I). Tergum X, in lateral view, subtriangular, long, almost reaching midlength of inferior appendages, apex of left process with a strong downturned curvature (Fig. 7A–B, D); in dorsal view, subpentagonal base, apically divided into two sclerotized processes; without basodorsal process or projection; apex strongly sclerotized, left process broad, with a



**Figure 5** *Ochrotrichia machadoi* sp. nov. **A**, genitalia, left lateral; **B**, tergum X, left lateral; **C**, mesoventral process of segment VII, left lateral; **D**, genitalia, left lateral (photograph); **E**, phallus, left lateral; **F**, genitalia, dorsal; **G**, apex of phallus, ventral; **H**, genitalia, ventral; **I**, genitalia, ventral (photograph). Scale bars = 0.1 mm (**A, B, D, E, F, G, H, I**); 0.05 mm (**C**).

constriction subbasally, subtriangular at midlength, with acute apex; right process triangular, tapering to subacute apex (Fig. 7F). Inferior appendage, in lateral view, subtriangular; 2X as long as wide, apically rounded (Fig. 7A, D); in dorsal view, surpassing tergum X, with inner surfaces bearing numerous medium-sized, dark, peg-like setae grouped subapically and on the mid-basal ridge (Fig. 7F); in ventral view, with row of 2–3 medium-sized, slender mesal spines on inner margin (Fig. 7H, I). Phallus simple, tubular, 2.7× longer than inferior appendages, thread-like, with triangular, subapicolateral process (Fig. 7E, G).

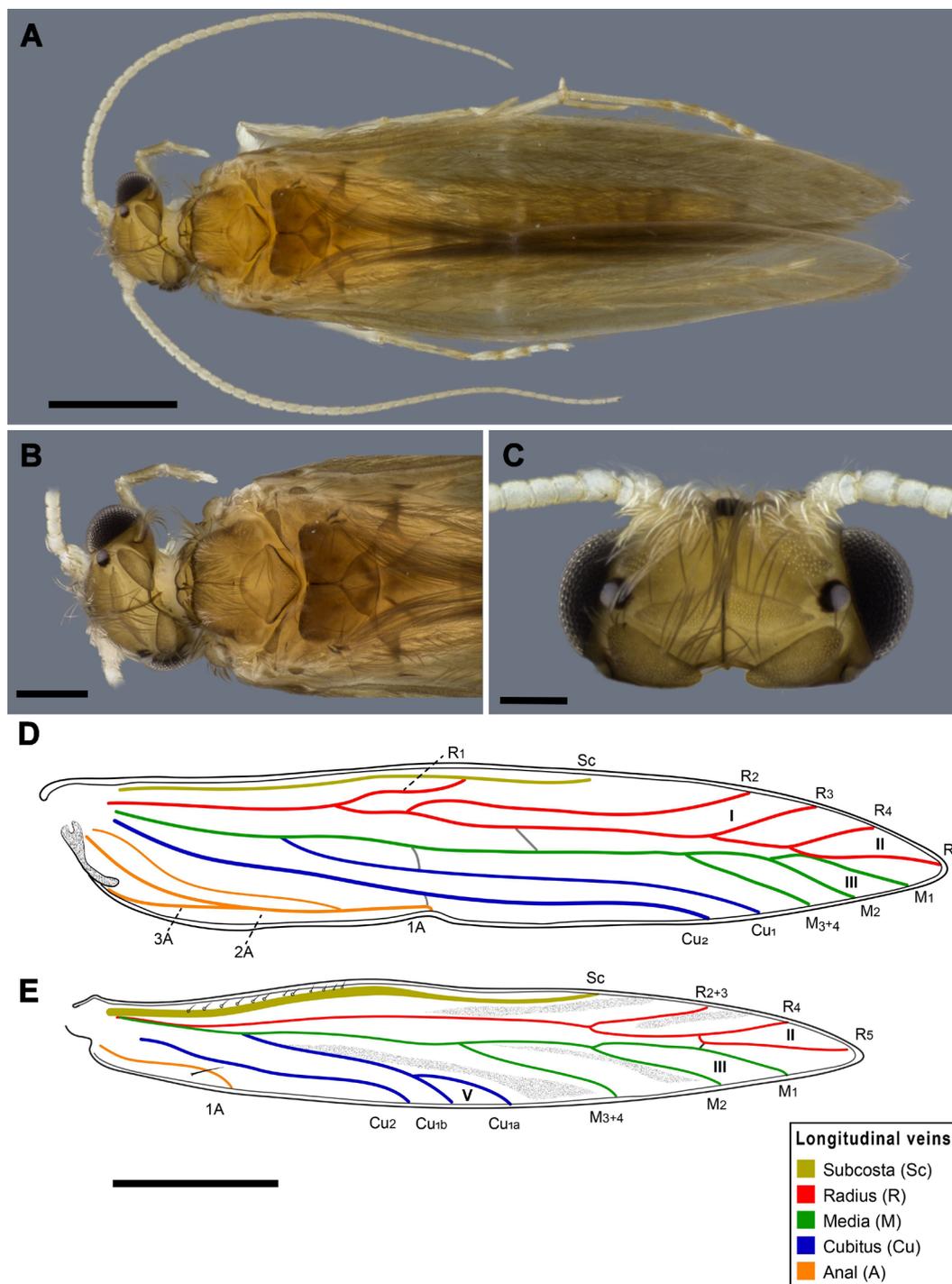
**Holotype. Male. BRAZIL: Minas Gerais:** Jaboticatubas, Parque Nacional da Serra do Cipó, Trilha para Cachoeira da Farofa, Córrego da

Farofa, 19°23'02.6"S, 43°34'49.1"W, 812 m, 06–09.i.2019, A.A. Alves, J.L. Nessimian, L. Hoehne, A.L. Henriques-Oliveira legs., Malaise trap (DZRJ).

**Paratypes:** Same data as for holotype, 2 males (DZRJ); same collection data as for preceding, except 3 males (INPA); same collection data as for preceding, except 2 males (MNRJ).

**Etymology.** This new species is named in honor of Prof. Dr. Jorge Luiz Nessimian (Universidade Federal do Rio de Janeiro, Brazil) who helped collect the type specimens and in recognition of his contributions to the study of the Neotropical aquatic insects, especially caddisflies (Trichoptera).

**Distribution.** BRAZIL: Cerrado biome (Minas Gerais state) (Fig. 1).

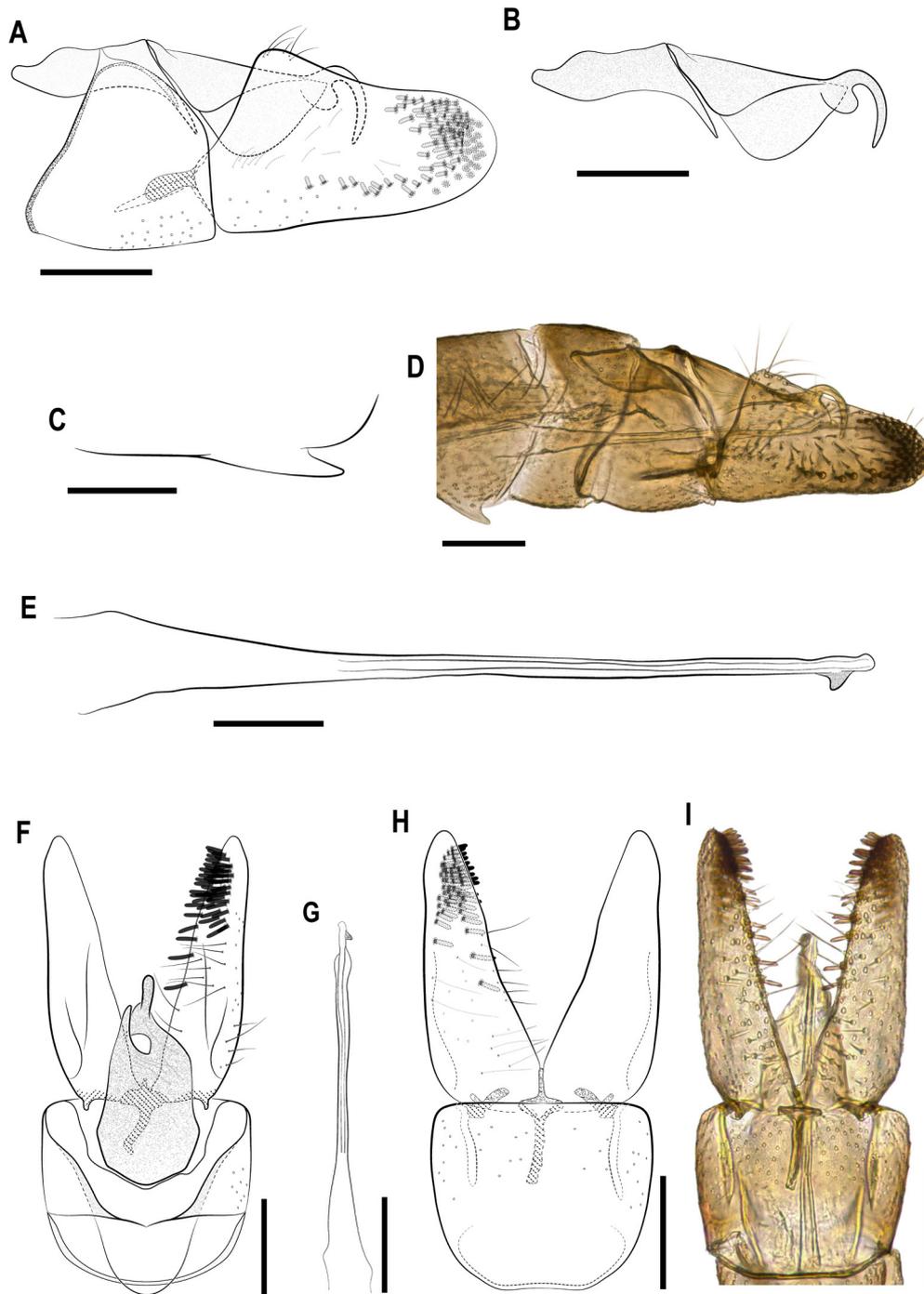


**Figure 6** *Ochrotrichia nessimiani* sp. nov., holotype, ♂ (DZRJ). **A**, dorsal habitus; **B**, head and thorax, dorsal view; **C**, head, dorsal view; **D**, forewing, right dorsal view; **E**, hind wing, right dorsal view. Scale bars: 0.5 mm (**A**, **D**, **E**); 0.2 mm (**B**); 0.1 mm (**C**).

## Discussion

Knowledge about the diversity of *Ochrotrichia*, similar to other caddisflies in Brazil (Santos et al., 2020), is concentrated in the Atlantic Forest biome. The genus has 11 species reported in this biome, followed by the Amazon and Caatinga, with four and three species registered, respectively (Table 1). To date, only one species of *Ochrotrichia* has been recorded in the Cerrado biome, *O. igrapuana* Souza, Santos and Takiya, 2014 (Desidério et al., 2017; Santos, 2023), with the three new species

described in this work the number of species increases significantly for this biome. The genus is reported for the first time in the Brazilian Central-West region, indicating the need to expand sampling in poorly sampled geographic regions. Other regions where species of *Ochrotrichia* have not yet been recorded are the Pampa and Pantanal biomes (Santos, 2023). Herein, *Ochrotrichia* is recorded for the first time to Federal District, Minas Gerais and Tocantins states, as well as for the hydrographic basins of Paraná, São Francisco, and Tocantins Rivers, and *O. froehlichii* sp. nov. represent the first species of Hydroptilidae in Federal District.



**Figure 7** *Ochrotrichia nessimiani* sp. nov. **A**, genitalia, left lateral; **B**, tergum X, left lateral; **C**, mesoventral process of segment VII, left lateral; **D**, genitalia, left lateral (photograph); **E**, phallus, left lateral; **F**, genitalia, dorsal; **G**, apex of phallus, ventral; **H**, genitalia, ventral; **I**, genitalia, ventral (photograph). Scale bars = 0.1 mm.

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### Conflicts of interest

The authors declare no conflicts of interest.

### Author contribution statement

GRD, LM, BLC, and AAA contributed to the study conceptualization and design. GRD, AAA, and NH collected the specimens. GRD, LM, BLC, AAA and NH described the species. GRD, LM, and AAA produced the photographs, illustrations, and maps. The first draft of the manuscript was written by GRD, LM, BLC, AAA, AMP and NH. All authors commented on previous versions of the manuscript, read and approved the final manuscript.

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