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Article

On Brazilian Finger-Net Caddisfly *Chimarra* Stephens, 1829 (Trichoptera: Philopotamidae), I: Two New Species of *Chimarra* (*Curgia*) Walker, 1860 from the Caatinga and Cerrado Biomes, Northeastern Brazil

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Abstract

Despite being the subgenus with the highest number of species within *Chimarra* Stephens, 1829 in Brazil, information about *Chimarra* (*Curgia*) Walker, 1860 is scarce in the Brazilian semi-arid region. Beyond the discussion about the quantity of species reported for this region, there is also a temporal gap concerning original descriptions of this subgenus in Brazil. Thus, 15 years after the last description of *C. (Curgia)* in Brazil, we diagnosed, described, and illustrated two new species based on adult males collected in the Caatinga and Cerrado biomes in the state of Piauí, viz., *Chimarra (Curgia) opala* sp. nov. and *Chimarra (Curgia) prata* sp. nov. They can be recognized mainly by the morphology of tergum X, preanal appendage, and phallotheca spines. Moreover, they do not conform to the characteristics of any species group traditionally known in the genus. While sharing similarities with the species compared in this study, these comparisons are limited to isolated characters and do not encompass all the features representing the groups of their respective species.

Keywords: aquatic insects; Chimarrinae; taxonomy; morphology; Semiarid

1. Introduction

Philopotamidae (finger-net caddisflies) is one of the nine families of Annulipalpia, which diverged as an independent lineage approximately 160 Ma [1,2]. Currently, it contains approximately 1,500 extant species and 28 genera, distributed across three subfamilies: Chimarrinae (three genera), Philopotaminae (24 genera), and Rossodinae (one genus) [3,4]. Although there are variations in the adult genitalia among the subfamilies, the larvae within the family are quite alike [5]. The larvae are found in running waters, where they typically construct long silk nets attached to the underside stones to capture organic particles [3]. The family occurs around the world, with its highest diversity in tropical regions, mainly in the Oriental and Neotropical regions [3].

Chimarrinae is composed of the regionally endemic genera *Chimarrhodella* Lestage, 1925, with 13 species restricted to the Neotropics, and *Edidiehlia* Malicky, 1993, with a single species known only from Sumatra, and the cosmopolitan *Chimarra* Stephens, 1829, considered the most species-rich genus

within caddisflies with ca. 950 species [6,7]. *Chimarra* is divided into four subgenera: *Chimarra* (*Chimarra*) Stephens, 1829, *C. (Chimarrita)* Blahnik, 1997, *C. (Curgia)* Walker, 1860, and *C. (Otarra)* Blahnik, 2002 [8]. The monophyly of *Chimarra* as well as that of its subgenera has been supported by phylogenetic analyses inferred from molecular data [9,10]; however, there are incongruences regarding the relationships within each subgenus based on morphological data [11–14]. The subgenera in this genus can be distinguished in the adult stage by the wing venation, the male tibial spur formula, and genital characters [13].

Chimarra (Curgia) was originally described as a monotypic genus based on the Antillean species, *Curgia braconoides* Walker, 1860. This remained a consensus among researchers until Milne [15], who resurrected *Curgia* as a subgenus of *Chimarra*, which includes tropical and subtropical species with forewings bearing silvery spots and bars. Finally, Flint [11] redefined the subgenus, recognized 40 species, described 52 species, and organized all of them in species groups. Currently, *Chimarra (Curgia)* is the second most species-rich subgenus of *Chimarra*, comprising 94 species exclusively from the New World and distributed mainly in South America [4,11,16]. The subgenus is characterized by forewings ranging in color from dusky, brown, or orange, often with silvery, golden, or white markings. The head has three ocelli, and the maxillary palps have five segments, with the second being the longest. The spur formula is 1-4-4, with the spur on the first pair of legs being highly reduced. The male genitalia exhibit modified segments VIII and IX, including processes, lobes, and simple appendages, as well as a tubular phallus with variable internal structures. In females, segment VIII is generally sclerotized, with projections and setose warts [11].

In Brazil, there are 56 species of *Chimarra*; half of them are assigned to *C. (Curgia)*. Most species in this subgenus are concentrated in the Atlantic Forest (15 spp.) and Amazon (13 spp.) biomes in southeastern and northern Brazil, respectively [17]. This diversity pattern is similar to other caddisflies in Brazil, indicating that the Brazilian Trichoptera fauna is still underestimated, especially in poorly studied biomes, such as Caatinga and Cerrado [18].

The state Piauí is entirely covered by two types of dry vegetation: the Cerrado Savanna, the second largest biome in Brazil [19] and a recognized biodiversity hotspot [20], and the Caatinga, an exclusively Brazilian biome and the largest Seasonally Dry Tropical Forest (SDTF) in the New World [21,22]. To date, only seven species of *C. (Curgia)* have been reported from the Cerrado, and four species from the Caatinga [17] (Table 1). This study aims to address the Linnean [23] and Wallacean [24] shortfalls for *Chimarra (Curgia)* by describing two new species based on adult males from the Caatinga and Cerrado biomes in the state of Piauí, Northeastern Brazil.

Table 1. Distribution of *Chimarra (Curgia)* species recorded from the Caatinga and Cerrado biomes of Brazil.

Species	Biomes (States)	References
<i>C. (Curgia) camposae</i> Flint, 1998	Cerrado (MG)	Flint [1998]
<i>C. (Curgia) conica</i> Flint, 1983	Caatinga (CE); Cerrado (GO, MG)	Flint [1998]
<i>C. (Curgia) cultellata</i> Flint, 1983	Caatinga (CE); Cerrado (DF, MG)	Flint [1998]; Takiya et al. [2016]
<i>C. (Curgia) cipoensis</i> Flint, 1998	Cerrado (MG)	Flint [1998]
<i>C. (Curgia) jugescens</i> Flint, 1998	Caatinga (PI); Cerrado (MA)	Takiya et al. [2016]; Desidério et al. [2017]
<i>C. (Curgia) opala</i> sp. nov.	Caatinga (PI); Cerrado (PI)	This study
<i>C. (Curgia) prata</i> sp. nov.	Cerrado (PI)	This study
<i>C. (Curgia) hyoiedes</i> Flint, 1983	Caatinga (PE)	Souza et al. [2013]
<i>C. (Curgia) parana</i> Flint, 1972	Caatinga (PE, PI); Cerrado (DF, GO, MG)	Flint [1998]; Souza et al. [2013]; Moreno et al. [2020]

C. (<i>Curgia</i>) <i>scopuloides</i> Flint, 1974	Cerrado (GO)	Flint [1998]
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2. Materials and Methods

Adult specimens were collected in streams and rivers of two municipalities in the state of Piauí: Coivaras, situated in the Cerrado Biome, and Pedro II, located in the Caatinga-Cerrado ecotonal area (Figure 1A–C). Specimens were obtained using active collection methods and Pennsylvania light traps [25] and preserved in 80% ethanol. For species identification, the protocol by Blahnik and Holzenthal [26] was followed, where the abdomen of male specimens was removed and cleared in 10% KOH for genitalia examination.

Photographs were taken using a Leica DFC420 digital video camera mounted on a Leica M165C stereomicroscope, utilizing a LED illumination dome [27]. Genitalia were photographed with a Leica DFC295 digital video camera attached to a Leica DM5500B compound microscope. Image stacks were created and merged automatically using Helicon Focus Pro® stacking software (version 7.6.4). Illustrations were generated by vectorizing the stacked images in Adobe Illustrator CC®. All figure plates were assembled in Adobe Photoshop CC®.

The distribution map was generated using QGIS 3.10.1 A Coruña [28], incorporating shapefiles from IBGE [19] and raster data from Natural Earth [29]. To ensure consistency in descriptive taxonomy, species descriptions were generated through the DELTA editor (Description Language for Taxonomy) software (version 1.02) [30] based on a morphological character matrix.

Morphological terminology for the head setal warts follows Oláh and Johanson [31], while male genitalia terminology is based on Nielsen [32], as interpreted for *Chimarra* by Flint [11] and Blahnik and Holzenthal [8]. Wing venation terminology adheres to the Comstock-Needham system, as applied to Trichoptera by Mosely and Kimmins [33].

Type specimens are deposited in the following collections: Coleção de Invertebrados, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (INPA); Coleção Zoológica do Maranhão, Centro de Estudos Superiores de Caxias, Universidade Estadual do Maranhão, Caxias, Brazil (CZMA); Coleção Entomológica Prof. José Alfredo Pinheiro Dutra, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (DZRJ); Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (MNRJ); Museu de Entomologia, Universidade Federal de Viçosa, Viçosa, Brazil (UFVB); and Coleção de História Natural, Universidade Federal do Piauí, Florianópolis, Brazil (CHNUFPI).

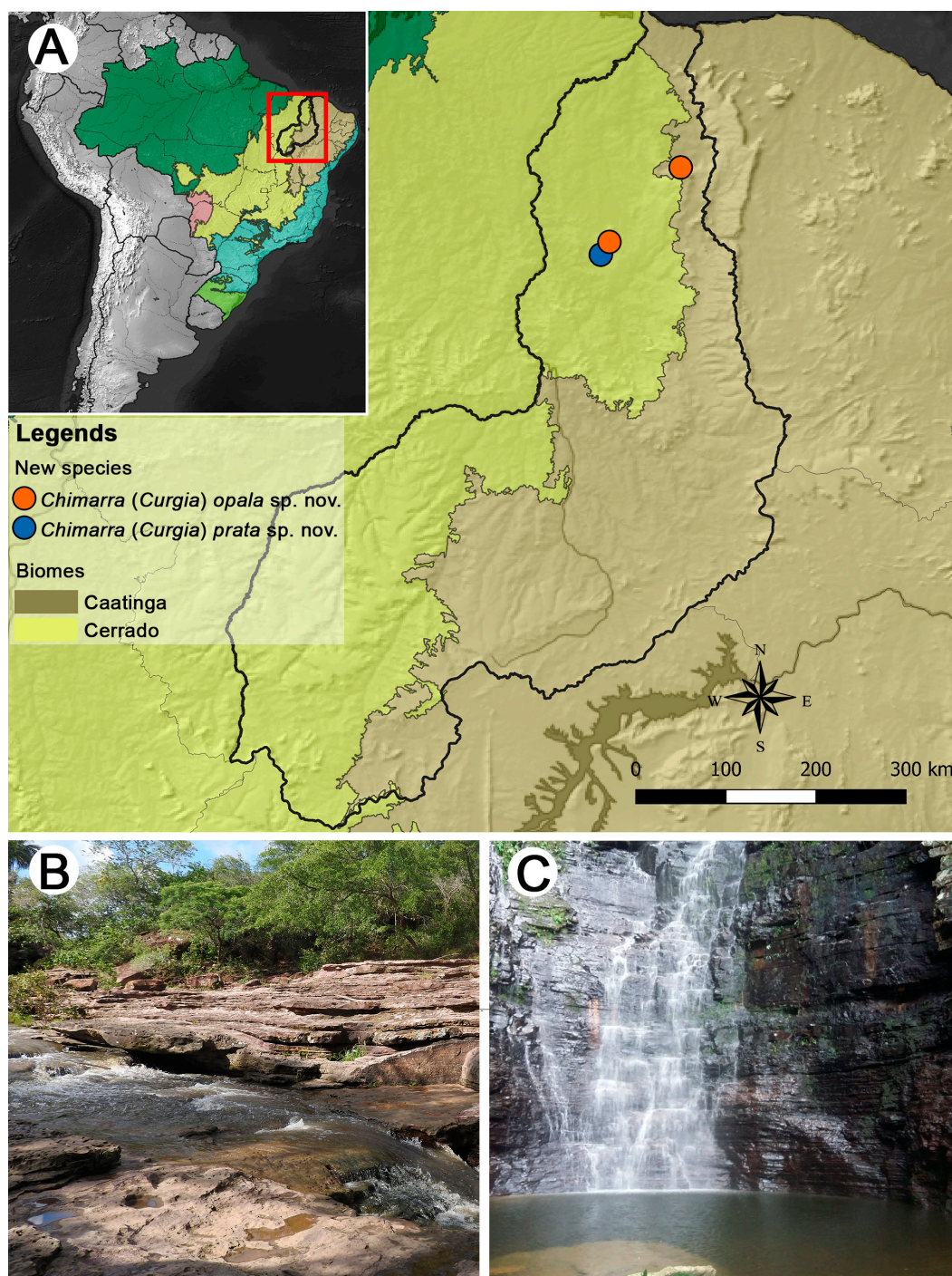


Figure 1. Distribution and general view of the collection sites of the new species of *Chimarra (Curgia)* Walker, 1860 treated in this study: (A) Distribution of the new species in the Piauí state, Brazil; (B) Cachoeira da Campeira, Coivaras municipality, type locality of *C. (Curgia) prata* sp. nov. (photo by Lucas Moreno); (C) Cachoeira do Urubu Rei, type locality of *C. (Curgia) opala* (photo by Lucas Moreno).

3. Results

Chimarra (Curgia) opala Moreno, Desidério & Lima, 2025

(Figures 2 and 3)

Diagnosis. This new species shares a few similarities in the genitalia, in lateral view, with *Chimarra (Curgia) truncatiloba* Flint, 1974. These similarities include the preanal appendage, which has a dorsal process, and the presence of endothecal spines in a hook-shaped arrangement. Nevertheless,

there are notable differences between the two species. In the new species, the preanal appendage features a long dorsal process projecting posteriorly, while in *Chimarra (Curgia) truncatiloba*, it is the same length as the ventral process. Additionally, *C. (Curgia) opala* sp. nov. displays a single pair of hook-shaped endothecal spines, whereas *Chimarra (Curgia) truncatiloba* has two pairs. Another distinctive characteristic is observed in the dorsal view of tergite X, which has ellipsoidal subapical processes on each lateral margin.

Description. Adult male: General color dark brown (in alcohol) (Figure 2A). Head dorsally with seven setal warts; medioantennal setal wart (ma. sw.) large, diamond-shaped; lateroantennal pair (la. sw.) large, ellipsoid; ocellar pair (oce. sw.) small, ovoid; occipital pair (occ. sw.) very large, ellipsoid (Figure 2C). Frontal grooves (ft. g.) V-shaped anteromesally, well-pronounced; coronal groove (cn. g.) thread-shaped, well-pronounced on entire length of head (Figure 2C). Labial palp (lb. pp.) segment length formula $(I=II)<III$; maxillary palp (mb. pp.) segment length formula $I>II=III>IV<V$; 2nd segment with 7–10 long and medium-sized, stout setae on apicomesal margin (Figure 2B). Forewing uniformly brown; forewing length 5.6–5.8 mm ($n = 3$); forks I, II, III and V present; basal crossvein between Sc and R system present; stem of Rs straight; crossveins *s*, *r-m* and *m* nearly linearly arranged and unpigmented; crossvein *m-cu* and apex of Cu2 hyaline, with crossvein *m-cu* arising near base of median cell (MC); discoidal cell (DC) almost length of medial cell; MC same length of thyridial cell (TC) (Figure 2D). Hindwing brown; venation not reduced, forks I, II, III, and V present; fork I and II sessile; Sc not fused to R₁; crossveins *r-m*, *m-cu*, stem of M and Cu2 unpigmented (Figure 2E). Legs uniformly brown; male pretarsal claws symmetrical, unmodified (Figure 2A).

Male genitalia: Tergum VIII, in lateral view, about 2X longer than wide, with posterior margin projecting in a small dorsal lobe (Figure 3A); in dorsal view, anterior margin with deep, mesal, U-shaped cleft (Figure 3B). Segment IX, in lateral view, subtriangular; with anterior margin projected and tapering anteroventad; posterior margin sinuous; ventral process triangular, subtruncate (Figure 3A); in dorsal view, 2X wider than long (Figure 3B). Tergum X long, fused to segment IX; in lateral view, subtriangular, with apicodorsal margin rounded (Figure 3A); in dorsal view, as long as wide, with apicomesal margin concave, forming two apical lobes on each side (Figure 3B). Preanal appendage fused to basolateral margin of lateral lobe of tergum X; elongated, bilobed, with a dorsal lobe almost 3X longer than the ventral lobe (Figure 3A,B). Inferior appendage, in lateral view, medium-sized, about same length of segment X, apical half about 1.6X wider than basal; subretangular, apically truncated (Figure 3A); in ventral and dorsal views, inflated basally, distal region produced into a dorsally directed spoon, with a cluster of 7–9 short-sized mesal setae in inner face (Figure 3D). Phallosome elongate, tubular, with broad phallobase; endothecal membranes with four cluster of spine: (i) a pair of medium-sized, curved, spine, emerging basally, (ii) a pair of long, stout, hook-shaped, emerging basally, (iii) a pair of stout, straight, emerging in medial portion, (iv) and two pair apical, long, curved and directed anterodorsally (Figure 3C,E); phallotremal sclerite, in dorsal view, with a lateral lobe on each side and medial lobe with a apicomesal cleft in V-shaped (Figure 3E).

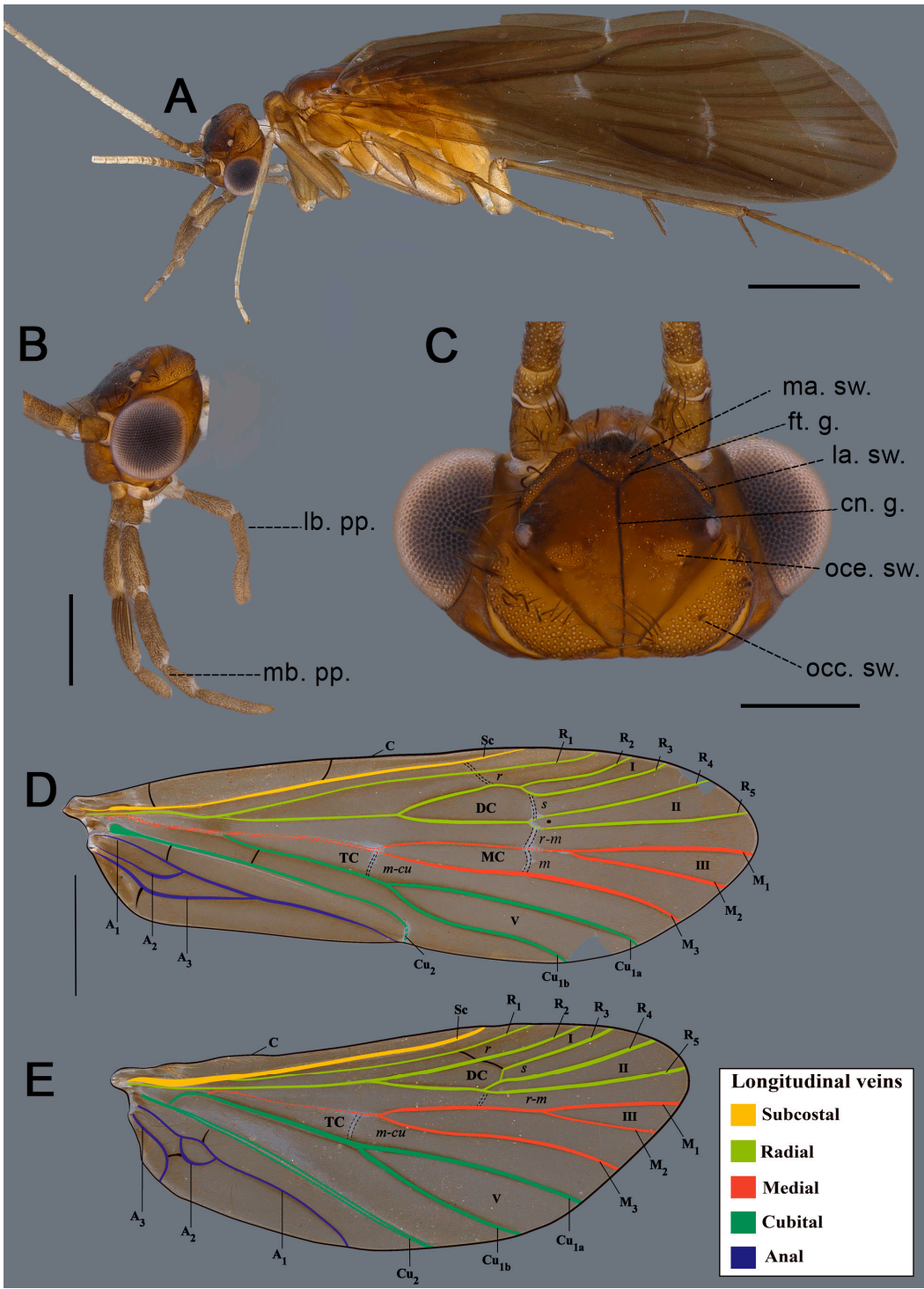


Figure 2. *Chimarra (Curgia) opala* sp. nov., holotype male: (A) Left lateral habitus; (B) Head, left lateral view; (C) Head, dorsal view; (D) Venation of the right forewing, dorsal view (longitudinal veins highlighted in colors); (E) Venation of the right hindwing, dorsal view (longitudinal veins highlighted in colors). Scale bars in mm: a, d, e = 1; b = 0.2; c = 0.5.

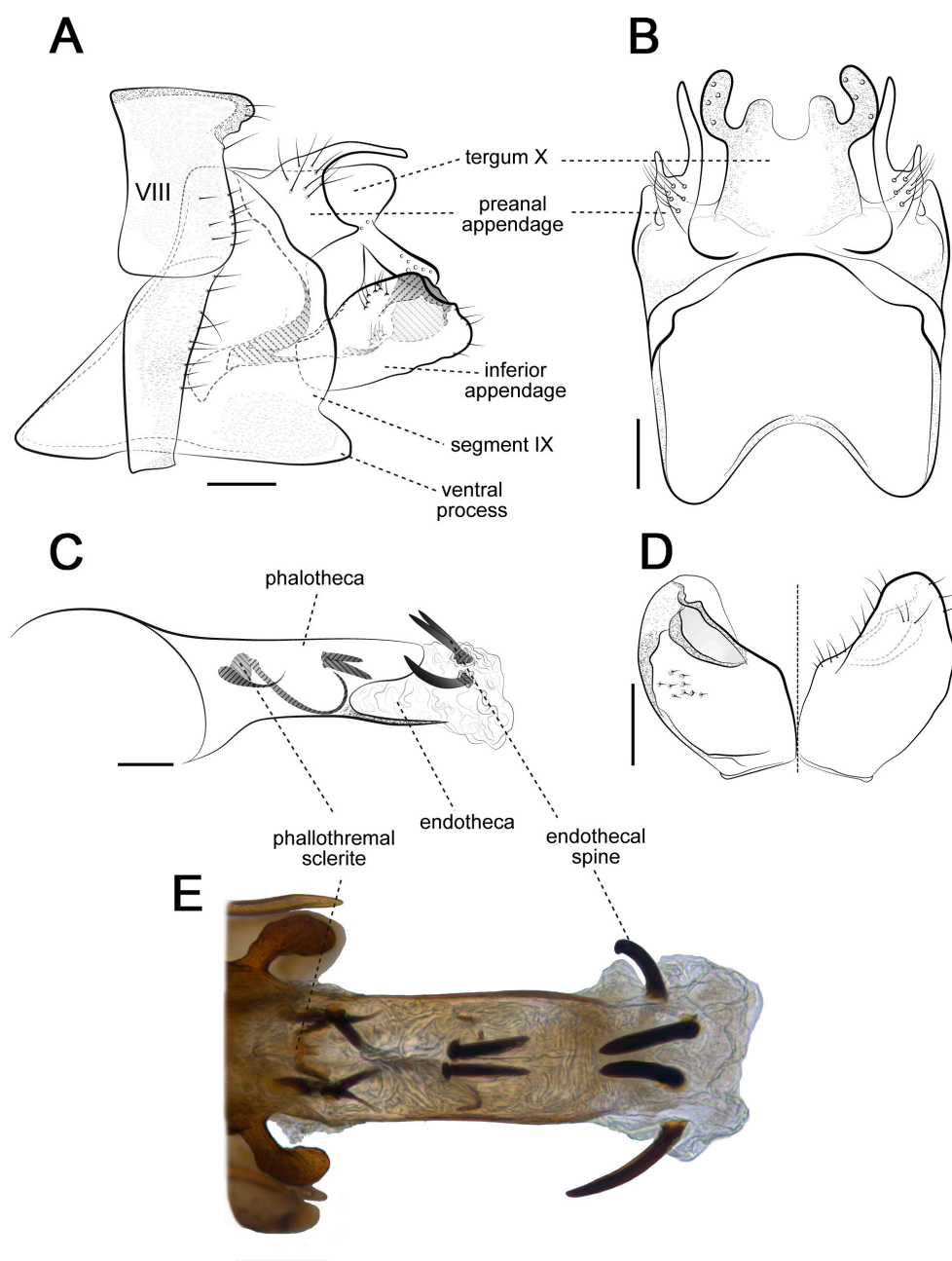


Figure 3. *Chimarra (Curgia) opala* sp. nov., male genitalia (holotype): (A) Segments VIII, IX, tergum X and inferior appendage, left lateral view; (B) Segment IX and tergum X, dorsal view; (C) Phallic apparatus, left lateral view; (D) Left inferior appendage, dorsal view (left) and ventral view (right); (E) Phallic apparatus, dorsal view (photograph). Scale bars in mm: 0.1.

Material examined. HOLOTYPE MALE. BRAZIL: Piauí, Pedro II, Riacho da Ipuera, Cachoeira do Urubu Rei, 04°19'34.2"S, 41°27'45.5"W, 419 m a.s.l., 22.ii.2018, L. Moreno, L.R.C. Lima legs., Entomological net (INPA). PARATYPES. BRAZIL: Piauí, Coivaras, Riacho do Boi, Cachoeira da Campeira, 05°11'45.1"S, 42°15'33.9"W, 177 m a.s.l., 06.iv.2017, L. Moreno leg., Pennsylvania trap, 1 male (CZMA); Pedro II, Riacho da Ipuera, Cachoeira do Urubu Rei, 04°19'34.2"S, 41°27'45.5"W, 419 m a.s.l., 12.i.2016, L.R.C Lima leg., Pennsylvania trap, 2 males (UFBA); same collection data as for preceding, except 22.ii.2018, L. Moreno, L.R.C Lima legs., Entomological net, 1 male (DZRJ), 1 male (MNRJ); same collection data as for preceding, except 28.ix–03.x.2024, L.R.C. Lima, M.L.O. Aguiar legs., Malaise trap, 6 males (MNRJ), 6 males (UFVB), 7 males (CHNUFPI).

Etymology. This new species is named in apposition, referring to its type locality in the municipality of Pedro II, Piauí. The city is known for its economic focus on the extraction of precious stones, particularly opal, which inspired the species epithet.

Distribution. BRAZIL: Cerrado (Piauí state) and Caatinga (Piauí state) biomes (Figure 1A,B).

***Chimarra (Curgia) prata* Moreno, Desidério & Lima, 2025**

(Figures 4 and 5)

Diagnosis. This new species resembles *C. (Curgia) plaumanni* due to the presence of tergum X, in dorsal view, with the apicomesal region projecting and tapering posteriorly, forming two lateral lobes. However, in *C. (Curgia) prata* sp. nov., the apicomesal region of the tergum is triangular, whereas in *C. (Curgia) plaumanni*, it is slightly rounded at the apex. In lateral view, *C. (Curgia) plaumanni* has a posteroventral projection reaching the middle height of segment IX, while in the new species, the ventral margin of tergum X is partially fused with segment IX, lacking a posteroventral projection. Additionally, *C. (Curgia) prata* sp. nov. has a phallotremal sclerite different from all species in the subgenus, with a narrow, deeply excavated mesal region, and each lateral forming a wing-shaped lobe.

Description. *Adult male:* General body color yellowish brown (in alcohol) (Figure 4A). Head dorsally with seven setal warts; medioantennal setal wart (ma. sw.) large, diamond-shaped; lateroantennal pair (la. sw.) large, ellipsoid; ocellar pair (oce. sw.) small, ovoid; occipital pair (occ. sw.) very large, ellipsoid (Figure 4C). Frontal grooves (ft. g.) V-shaped anteromesally, well-pronounced; coronal groove (cn. g.) thread-shaped, well-pronounced on entire length of head (Figure 4C). Labial palp (lb. pp.) segment length formula (I=II)<III; maxillary palp (mb. pp.) segment length formula I>II=III>IV<V; 2nd segment with 7–10 long and medium-sized, stout setae on apicomesal margin (Figure 4B). Forewing uniformly brown; forewing length 4.9–5.2 mm ($n = 3$); forks I, II, III and V present; basal crossvein between Sc and R system present; stem of Rs straight; crossveins *s*, *r-m* and *m* nearly linearly arranged and unpigmented; crossvein *m-cu* and apex of Cu2 hyaline, with crossvein *m-cu* arising near base of median cell (MC); discoidal cell (DC) almost length of medial cell; MC same length of thyridial cell (TC) (Figure 4D). Hindwing brown; venation not reduced, forks I, II, III, and V present; fork I and II sessile; Sc not fused to R₁; crossveins *r-m*, *m-cu*, stem of M and Cu2 unpigmented. Legs brown; male pretarsal claws symmetrical, unmodified (Figure 4E).

Male genitalia. Tergum VIII, in lateral view, about 1.25X wider than long, with posterior margin truncated (Figure 5A); in dorsal view, anterior margin with shallow, mesal, U-shaped cleft (Figure 5B). Segment IX, in lateral view, subtriangular; with anterior margin projected and rounded anteroventrad; posterior margin undulate; ventral process subellipsoid, tapering apically (Figure 5A); in dorsal view, 2X wider than long (Figure 5B). Tergum X long, fused to segment IX; in lateral view, subrectangular, with apicodorsal margin strongly produced, pointed apically (Figure 5A); in dorsal view, wide basally, with apicomesal margin produced, forming two side flaps (Figure 5B). Preanal appendage non-fused to basolateral margin of lateral lobe of tergum X; elongated, rounded and slightly enlarged apically (Figure 5A,B). Inferior appendage, in lateral view, medium-sized, slightly shorter length of segment X, basal half about 1.8X wider than apical; subovate, apically rounded (Figure 5A); in ventral and dorsal views, slightly inflated basally, with apex produced into a dorsally directed tooth (Figure 5D). Phallosome elongate, tubular, with broad phallobase; endothecal membranes with two medium-sized spines arising medially (Figure 5C,E); phallotremal sclerite, in dorsal view, with a lateral lobe on each side and medial lobe strongly excavated (Figure 5E).

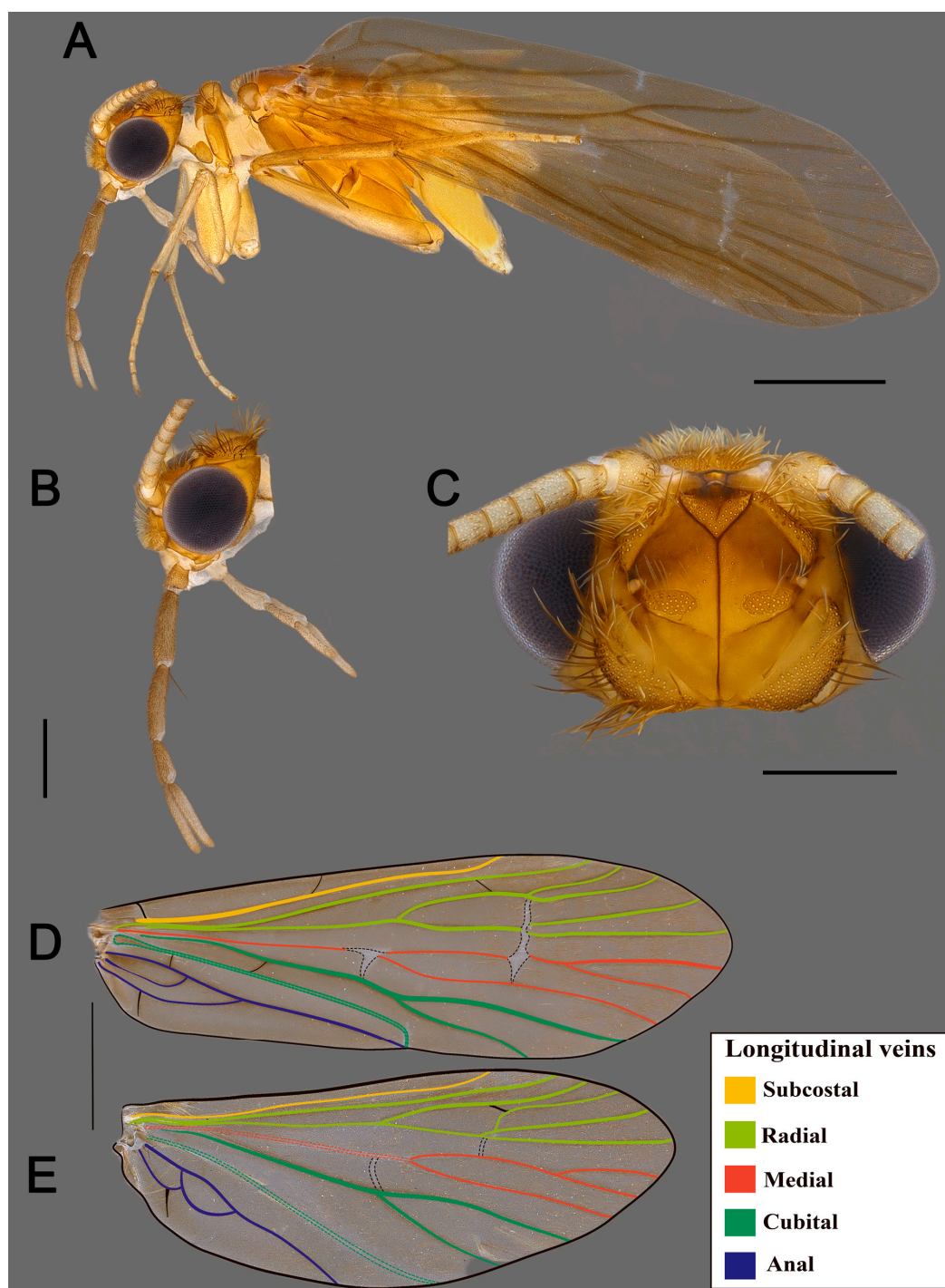


Figure 4. *Chimarra (Curgia) prata* sp. nov., holotype male: (A) Left lateral habitus; (B) Head, left lateral view; (C) Head, dorsal view; (D) Venation of the right forewing, dorsal view (longitudinal veins highlighted in colors); (E) Venation of the right hindwing, dorsal view (longitudinal veins highlighted in colors). Scale bars in mm: a, d, e = 1; b = 0.2; c = 0.5.

Material examined. HOLOTYPE MALE. BRAZIL: Piauí, Coivaras, Riacho do Boi, Cachoeira da Campeira, 05°11'45.1"S, 42°15'33.9"W, 177 m a.s.l., 05.iv.2017, L. Moreno, L.R.C. Lima, T. Costa, J.A.O. Rodrigues legs., Pennsylvania trap (INPA). PARATYPES. Same data as for holotype, 1 male (INPA); same collection data as for preceding, except 27.vi.2017, L. Moreno, L.R.C Lima legs., Pennsylvania trap, 1 male (CZMA).

Etymology. This new species is named in honor of the renowned writer and poet from northern Piauí, José Fernandes Carvalho (*in memoriam*), affectionately known as “Zé da Prata”. Born on June 1, 1871, in the city of Altos, Piauí, he passed away on March 14, 1945, in the community of Canto

Alegre, now part of the municipality of Coivaras, Piauí, the type locality of this species. This dedication pays tribute to his cultural contributions to the region.

Distribution. BRAZIL: Cerrado biome (Piauí state) (Figure 1A,C).

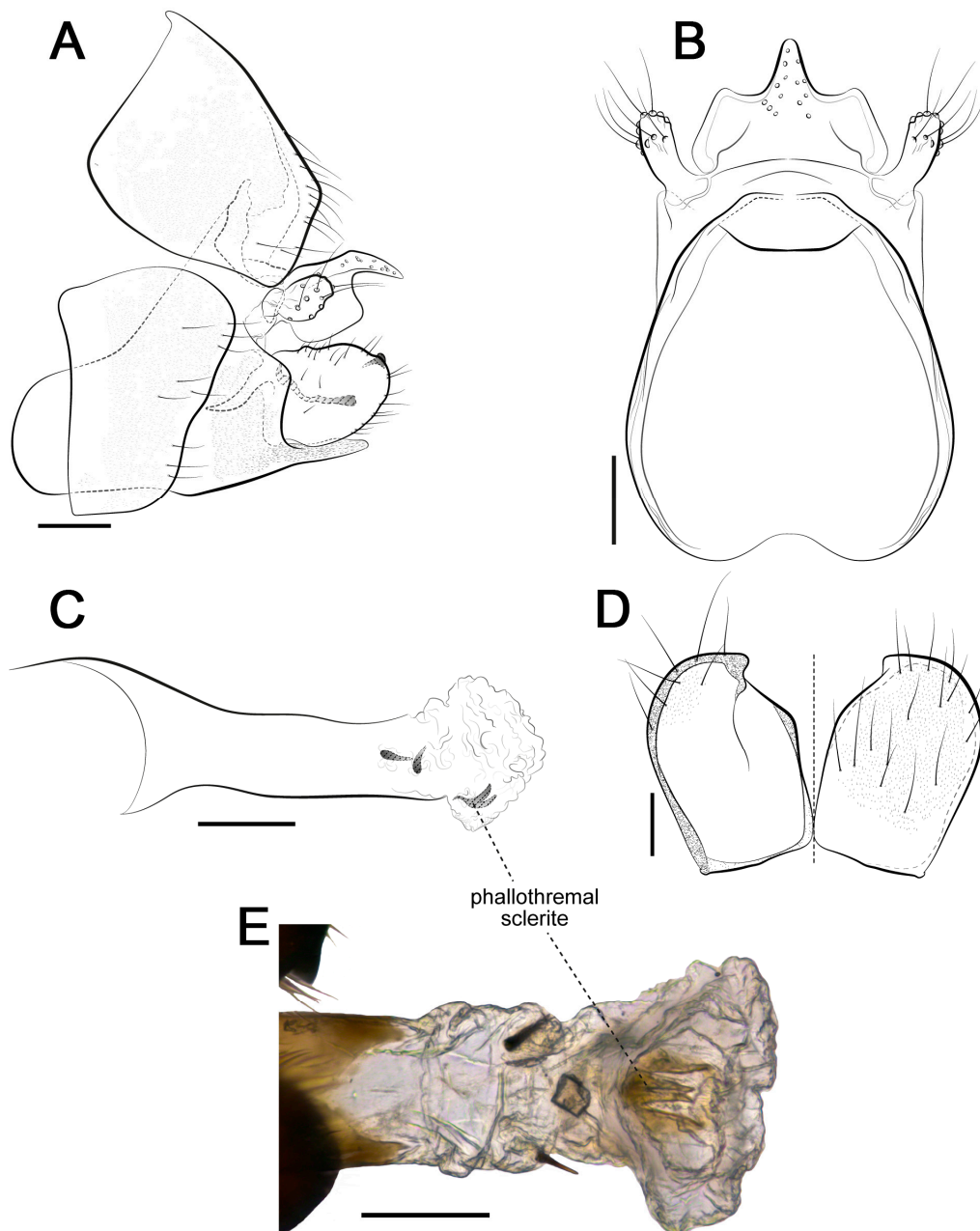


Figure 5. *Chimarra (Curgia) prata* sp. nov., male genitalia (holotype): (A) Segments VIII, IX, tergum X and inferior appendage, left lateral view; (B) Segment IX and tergum X, dorsal view; (C) Phallic apparatus, left lateral view; (D) Left inferior appendage, dorsal view (left) and ventral view (right); (E) Phallic apparatus, dorsal view (photograph). Scale bars in mm: 0.1.

4. Discussion

The subgenus *Chimarra (Curgia)* was revised by Flint [11], resulting in the recognition of 92 species, 52 of which were newly described, with the majority distributed across South America. Flint [11] classified these species into 16 species groups, primarily based on forewing coloration and male genitalia characteristics. These species groups are the *C. aurivittata* Group, *C. banksi* Group, *C. braconoides* Group, *C. canoaba* Group, *C. disterrina* Group, *C. ensifera* Group, *C. fernandezi* Group, *C. immaculata* Group, *C. laguna* Group, *C. margaritae* Group, *C. medioloba* Group, *C. mexicana* Group, *C.*

morio Group, *C. otuzcoensis* Group, *C. pulchra* Group, and *C. tucuna* Group. Following this comprehensive review, only two additional species of *Chimarra* (*Curgia*) have been described: *Chimarra* (*Curgia*) *amigo* Holzenthal, Blahnik & Rios-Touma, 2022 from the Ecuadorian Andes, assigned to the *C. fernandezi* Group, and *Chimarra* (*Curgia*) *paucispina* Santos & Nessimian, 2009 from the Brazilian Amazon, placed within the *C. aurivittata* Group [4,16].

The species described herein differ morphologically from all previously known of *C.* (*Curgia*) and from species groups, although they share certain traits with species in the subgenus. For this reason, none of them were assigned to the species groups proposed by Flint [11]. For example, *C.* (*Curgia*) *opala* sp. nov., although compared to *C.* (*Curgia*) *truncatiloba*, could not be allocated to the *C. medioloba* Group, as it lacks, for example, the medially excavated tergum X, instead having an apicomeral concavity. Similarly, *C.* (*Curgia*) *prata* sp. nov., like the previous species, was not assigned to any species group, even though it was compared to *C.* (*Curgia*) *plaumanni* from the *C. morio* Group. A distinctive feature of this species group is a ventral process, situated along the posterior margin of segment IX, typically produced posteriorly. In *C.* (*Curgia*) *prata* sp. nov., however, this characteristic is absent.

In Brazil, *Chimarra* (*Curgia*) is the most species-rich subgenus of *Chimarra*. However, it remains underrepresented in semiarid regions such as the Caatinga and Cerrado biomes, where only eight species were previously recorded [17]. This study raises the number of species known in these regions to ten (see Table 1). The species were collected in locations from the Caatinga and Cerrado biomes. This region, characterized by a mosaic of vegetation types, represents a significant center of biodiversity that integrates elements from the Cerrado, Dry Forest, Caatinga, and pre-Amazonian flora [34]. These ecotonal zones are experiencing rapid and ongoing loss of native vegetation, primarily due to agricultural expansion [20,35,36]. In light of this environmental degradation, it is essential to prioritize biodiversity research in these areas. Such efforts are crucial for filling knowledge gaps and for identifying key regions for conservation planning and management.

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Abbreviations

The following abbreviations are used in this manuscript:

cn. g.	coronal groove
ft. g.	frontal groove
la. sw.	lateroantennal wart
lb. pp.	labial palp
ma. sw.	medioantennal wart
mb. pp.	maxillary palp
occ. sw.	occipital wart
oce. sw.	ocellar wart
CE	Ceará
DF	Distrito Federal
GO	Goiás
MA	Maranhão
MG	Minas Gerais
PE	Pernambuco
PI	Piauí

References

1. Thomas, J.A.; Frandsen, P.B.; Prendini, E.; Zhou, X.; Holzenthal, R.W. A multigene phylogeny and timeline for Trichoptera (Insecta). *Syst. Entomol.* **2020**, *45*, 670–686. DOI: 10.1111/syen.12422

2. Frandsen, P.B.; Holzenthal, R.W.; Espeland, M.; Breinholt, J.; Thomas Thorpe, J.A.; Simon, S.; Kawahara, A.Y.; Plotkin, D.; Hotaling, S.; Li, Y.; et al. Phylogenomics recovers multiple origins of portable case making in caddisflies (Insecta: Trichoptera), nature’s underwater architects. *Proc. R. Soc. B-Biol. Sci.* **2024**, *291*, 20240514. DOI: 10.1098/rspb.2024.0514

3. Morse, J.C.; Frandsen, P.B.; Graf, W.; Thomas, J.A. Diversity and ecosystem services of Trichoptera. *Insects* **2019**, *10*, 1–25. DOI: 10.3390/insects10050125

4. Holzenthal, R.W.; Blahnik, R.J.; Ríos-Touma, B. A new genus and new species of Ecuadorian Philopotamidae (Trichoptera). *ZooKeys* **2022**, *1117*, 95–122. DOI: 10.3897/zookeys.1117.86984

5. Holzenthal, R.W.; Blahnik, R.J.; Prather, A.L.; Kjer, K.M. Order Trichoptera Kirby, 1813 (Insecta), caddisflies. *Zootaxa* **1668**, 639–698.

6. Holzenthal, R.W.; Blahnik, R.J.; Ríos-Touma, B. New species and a new genus of Philopotamidae from the Andes of Bolivia and Ecuador (Insecta, Trichoptera). *ZooKeys* **2018**, *780*, 89–108. DOI: 10.3897/zookeys.780.26977

7. Blahnik, R.J.; Andersen, T. New species of the genus *Chimarra* Stephens from Africa (Trichoptera, Philopotamidae) and characterization of the African groups and subgroups of the genus. *ZooKeys* **2022**, *1111*, 43–198. DOI: 10.3897/zookeys.1111.77586

8. Blahnik, R.J.; Holzenthal, R.W. New Neotropical species of *Chimarra* (Trichoptera, Philopotamidae). *ZooKeys* **2012**, *184*, 1–33. DOI: 10.3897/zookeys.184.2911.

9. Kjer, K.M.; Zhou, X.; Frandsen, P.B.; Thomas, J.A.; Blahnik, R.J. Moving toward species-level phylogeny using ribosomal DNA and COI barcodes: an example from the diverse caddisfly genus *Chimarra* (Trichoptera: Philopotamidae). *Arthropod Syst. Phylogeny.* **2014**, *72*(3), 345–354. DOI: 10.3897/asp.72.e31795

10. Wahlberg, E.; Johanson, K.A. The age, ancestral distribution and radiation of *Chimarra* (Trichoptera: Philopotamidae) using molecular methods. *Mol. Phylogenet. Evol.* **2014**, *79*, 433–442. DOI: 10.1016/j.ympev.2014.06.023

11. Flint, O.S. Jr. Studies of Neotropical caddisflies, LIII: A taxonomic revision of the subgenus *Curgia* of the genus *Chimarra* (Trichoptera: Philopotamidae). *Smithson. Contrib. Zool.* **1998**, *594*, i–v, 1–131. DOI: 10.5479/si.00810282.594
12. Blahnik, R.J. Systematics of *Chimarrita*, a new subgenus of *Chimarra* (Trichoptera: Philopotamidae). *Syst. Entomol.* **1997**, *22*, 199–243.
13. Blahnik, R.J. A revision of the Neotropical species of the genus *Chimarra*, subgenus *Chimarra* (Trichoptera: Philopotamidae). *Mem. Amer. Ent. Inst.* **1998**, *59*, 1–318.
14. Blahnik, R.J. Systematics of *Otarra*, a new Neotropical subgenus of *Chimarra* (Trichoptera: Philopotamidae). *Syst. Entomol.* **2002**, *27*, 65–130. DOI: 10.1046/j.0307-6970.2001.00166.x
15. Milne, L.J. Studies in North American Trichoptera. In *Studies of North American Trichoptera [1934–36]*, v. 3; Private printing: Cambridge, USA, 1936; pp. 56–128.
16. Santos, A.P.M.; Nessimian, J.L. New species and records of *Chimarra* Stephens (Trichoptera, Philopotamidae) from Central Amazonia, Brazil. *Rev. Bras. Entomol.* **2009**, *53*(1), 23–25. DOI: 10.1590/S0085-56262009000100006
17. Dumas, L.L. Philopotamidae in Catálogo Taxonômico da Fauna do Brasil. Available online: <http://fauna.jbrj.gov.br/fauna/faunadobrasil/17484> (accessed on 28 May 2025).
18. Santos, A.P.M.; Dumas, L.L.; Henriques-Oliveira, A.L.; Souza, W.R.M.; Camargos, M.C.; Calor, A.R.; Pes, A.M.O. Taxonomic catalog of the Brazilian Fauna: order Trichoptera (Insecta), diversity and distribution. *Zoologia* **2020**, *37*, 1–13. DOI: 10.3897/zoologia.37.e46392
19. Instituto Brasileiro de Geografia e Estatística – IBGE. Biomas. Available online: <https://www.ibge.gov.br/geociencias/informacoes-ambientais/> (accessed on 22 June 2024).
20. Myers, N.; Mittermeier, R.A.; Mittermeier, C.G.; Fonseca, G.A.B.; Kent, J. Biodiversity hotspots for conservation priorities. *Nature* **2000**, *403*, 853–858. DOI: 10.1038/35002501
21. Pennington, T.; Prado, D.E.; Pendry, C.A. Neotropical seasonally dry forests and Quaternary vegetation changes. *J. Biogeogr.* **2000**, *27*, 261–273. DOI: 10.1046/j.1365-2699.2000.00397.x
22. Queiroz, L.P.; Cardoso, D.; Fernandes, M.F.; Moro, M.F. Diversity and Evolution of Flowering Plants of the Caatinga Domain. In *Caatinga*; Silva, J.M.C., Leal, I.R., Tabarelli, M., Eds.; Springer Nature: Berlin, Germany, 2017; pp. 23–63. DOI: 10.1007/978-3-319-68339-3_2
23. Brown J.H.; Lomolino M.V. *Biogeography*, 2nd ed.; Sinauer Associates, Inc, Sunderland: Massachusetts, USA, 1998; pp. 1–691.
24. Lomolino, M.V. Conservation biogeography. In *Frontiers of Biogeography: New Directions in the Geography of Nature*; Lomolino, M.V., Heaney, L.R., Eds.; Sinauer: Sunderland, England, 2004; pp. 293–296.
25. Nessimian, J.L.; Santos, A.P.M.; Sampaio, B.H.L.; Dumas, L.L.; Pes, A.M.; Ferreira-Jr, N. The collapsible light tarp: a portable Pennsylvania light trap for collecting aquatic insects. *An. Acad. Bras. Ciênc.* **2024**, *96*(3), 1–12. DOI: 10.1590/0001-3765202420230784
26. Blahnik, R.J.; Holzenthal, R.W. Collection and curation of Trichoptera, with an emphasis on pinned material. *Nectopsyche*, Neotropical Trichoptera Newsletter **2004**, *1*, 8–20.
27. Kawada, R.; Buffington, M.L. A scalable and modular dome illumination system for scientific microphotography on a budget. *PLOS ONE* **2016**, *11* (5), e0153426. DOI: 10.1371/journal.pone.0153426
28. QGIS Development Team. QGIS geographic information system. Open Source Geospatial Foundation Project. Available online: <https://qgis.osgeo.org/> (accessed on 12 July 2021).
29. Natural Earth. Available online: <https://www.naturalearthdata.com/downloads/> (accessed on 29 May 2025).
30. Dallwitz, M.L.; Paine, T.A.; Zucher, E.J. 2020. User's guide to the DELTA editor. Available online: <https://www.delta-intkey.com/www/delta-ed.htm> (accessed on 13 November 2020).
31. Oláh, J.; Johanson, K.A. Trinominal terminology for cephalic setose warts in Trichoptera (Insecta). *Braueria Luns Am See Austria* **2007**, *34*, 43–50.
32. Nielsen, A. A comparative study of the genital segments and their appendages in male Trichoptera. *K. dansk. Vidensk. Selsk. Skr.* **1957**, *23*, 1–200.
33. Mosely, M.E.; Kimmins, D.E. *The Trichoptera (Caddisflies) of Australia and New Zealand*; British Museum: London, England, 1953; pp. 1–550.

34. da Silva, J.M.C.; Lacher, T.E. Caatinga—South America. In *Encyclopedia of the World's Biomes*; Goldstein, M.I., DellaSala, D.A., Eds.; Elsevier: Oxford, England, 2000; pp. 554-561. DOI: 10.1016/B978-0-12-409548-9.11984-0
35. Klink, C.A.; Machado, R.B. A conservação do Cerrado brasileiro. *Megadiversidade* **2005**, *1*, 147–155.
36. Colli, G.R.; Vieira, C.R.; Dianese, J.C. Biodiversity and conservation of the Cerrado: recent advances and old challenges. *Biodivers. Conserv.* **2020**, *29*, 1465–1475. DOI: 10.1007/s10531-020-01967-x

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