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A remarkable long-antennate new species of *Lamprempis* Wheeler & Melander (Diptera, Empididae, Empidinae) from the Brazilian Amazon

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ABSTRACT

Lamprempis Wheeler & Melander, 1901 is a Neotropical genus of dance flies with 24 described species. Here we describe and illustrate a new species collected in the Amazonian Brazilian states of Amapá, Amazonas, and Pará, *L. amazonida* **sp. nov.** The new species is mainly characterized by its extra long antennae and by the presence of dorsal and ventral pennate setae on the scape and postpedicel.

KEYWORDS: canopy, dance flies, Empidini, Empidoidea, empidid, taxonomy

Uma notável espécie nova com antenas longas de *Lamprempis* Wheeler & Melander (Diptera, Empididae, Empidinae) da Amazônia brasileira

RESUMO

Lamprempis Wheeler & Melander, 1901 é um gênero neotropical com 24 espécies conhecidas. Aqui descrevemos e ilustramos uma nova espécie coletada nos estados amazônicos brasileiros do Amapá, Amazonas e Pará, *L. amazonida* **sp. nov.** A nova espécie se caracteriza principalmente pelas antenas extralongas e por apresentar escapo e pós-pedicelo com cerdas peniformes dorsais e ventrais.

PALAVRAS-CHAVE: dossel, Empidini, Empidoidea, taxonomia

INTRODUCTION

Lamprempis Wheeler & Melander, 1901 is a mainly Neotropical genus of Diptera, presently represented by 24 Neotropical species, with records in Brazil, Bolivia, Colombia, Costa Rica, Cuba, Jamaica, Mexico, and Peru (Smith 1967; Yang *et al*. 2007; Cumming and Sinclair 2009). In Brazil, there are six recorded species in the southeast and central west regions and two from the northeast, restricted to Maranhão state (Câmara and Rafael 2013). The only Amazonian species is *L. triangulata* Câmara & Rafael, 2013 occurring on the extreme eastern border of the region in Gurupi Biological Reserve (Maranhão state) (Câmara and Rafael 2013).

As currently defined, *Lamprempis* is non-monophyletic and needs further clarification, and, together with *Opeatocerata* Melander, 1928, forms a natural lineage endemic to the Neotropical region (Watts *et al*. 2015). Apparently there are two unidentified oriental species of *Lamprempis* from Thailand and Vietnam (Watts *et al*. 2015), but these records need to be verified and have not been examined in here. In this context, it is possible that some described species of *Lamprempis* will be moved to other genera (Watts *et al*. 2015), which may be the case for the long-antennate new species described in here. Accurate diagnosis of Neotropical species, even using Smith's tentative key (Smith 1962,), is difficult, as the diagnostic features for most species are not illustrated (Watts *et al*. 2015).

Presently, *Lamprempis* is diagnosed by its metallic green-blue or metallic black reflections; antennae somewhat elongate, generally inserted high on the head, with the scape often nearly as long as the postpedicel and the postpedicel longer than the stylus (as long as in *L. truncatus* Smith). The vein R_{4+5} is forked, while the vein M is evanescent (not so distinct in the new species described below). The anal lobe of the wing is developed with a deep allular incision. Both in the female and male the legs are peculiarly ornamented (Bezzi 1909; Smith 1962, 1975; Cumming and Sinclair 2009; Câmara and Rafael 2013). Smith (1975) provided a key to all New World species, and Câmara and Rafael (2013) provided a key to Brazilian species.

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Here we extend the geographic distribution of *Lamprempis* in the Amazonian biome by describing a remarkably long-antennate new species from the Brazilian Amazonian states of Amapá, Amazonas, and Pará.

MATERIAL AND METHODS

This study is based on specimens housed in the insect collections of the Invertebrate Collection at Instituto Nacional de Pesquisas da Amazônia (INPA) (Manaus, Amazonas, Brazil) and the Canadian National Collection (CNC) (Ottawa, Canada). Part of the specimens will be later donated to the insect collections at Coleção Zoológica do Maranhão, Caxias, Maranhão, Museu Nacional do Rio de Janeiro, Rio de Janeiro, Museu de Zoologia da Universidade de São Paulo, São Paulo and Museu Paraense Emilio Goeldi, Belém, Pará.

Dissected anatomical structures were macerated in heated 85% lactic acid and examined on excavated slides with glycerin according to Cumming (1992). After examination, dissected parts were placed in microvials with glycerine and pinned with their respective specimen. Morphological terminology follows Cumming and Wood (2017). The holotype label data is cited in full with original spelling and punctuation and is enclosed by quotation marks (“”). Label data of paratypes and non-type specimens are cited uniformly with original spelling. Information presented within square brackets is complementary data not present on the labels. The term *Idem* in the section of material examined indicates that the data is identical to the previous label, except where otherwise stated.

Structures were digitally photographed using a Leica MZ205 stereomicroscope fitted with a Leica DFC500 digital camera and connected to a personal computer with Leica Application Suite software including an auto-montage module (Syncroscopy software) to produce the extended focus images. In some photos of the male terminalia, some structures are outlined to facilitate the visualization of their boundaries. Specimen length was measured on a line taken from the front of the head (without antenna) to the tip of the abdomen. Wing length was measured on a line from the base to the wing apex.

RESULTS

Lamprempis amazonida sp. nov. (Figures 1–3)

Zoobank registration: urna:lsid:zoobank.org:act:70B2DEC8-AA69-44BF-8758-21F8985B44BF

Diagnosis (male and female specimens)

Mainly shiny dark brown to black. Scape as long as postpedicel. Scape and pedicel with distinct short dorsal and ventral pennate setae. Male legs: hind femur with a tuft of dorsal pennate setae at extreme apex; hind tibia compressed laterally with dorsal pennate setae for almost the whole length; Female legs: hind femur with a tuft of dorsal pennate setae at extreme apex and ventrally for almost whole length; hind tibia with dorsal and ventral pennate setae along entire length. Cell dm short produced posteriorly. Veins M_1 and M_2 sinuous, both reaching wing margin, although reduced.

Description

Holotype: Male (Figure 1a). Body length: 4.7 mm; wing length: 3.2 mm. Head higher than wide, holoptic on frons. Upper ommatidia larger (Figure 1b,c). Ocellar tubercle protuberant (Figure 1c), with pair of stouter setae and 3–4 shorter ocellar setae; ocelli yellow. Face somewhat parallel sided, slightly wider above, grey pruinose, 1.5 times higher than frons. Postcranium brown to black, mainly gray pruinose (Figure 1c). Postocular setae black, short. Antenna (Figure 1b) dark brown to black, inserted above middle of head; scape as long as postpedicel; scape and pedicel with distinct short dorsal and ventral pennate setae; stylus very short, whitish distally, shorter than apical width of postpedicel. Proboscis (Figure 1a) shorter than head height, shiny black. Palpus brown to black with longer setae ventrally and distally. **Thorax** (Figure 1a,c) with shiny brown-black metallic reflections. Antepronotum with row of distinct setae. Mesonotum without pruinescence anteriorly between postpronotal lobes, remaining brown pruinose. Mesonotum with scutum distinctly short brown setae anteriorly, except at acrostichal area, longer setose posteriorly; notopleuron with two stout black setae; scutellum concolorous with scutum, multisetose; mediotergite brown-reddish, sparsely gray pruinose; laterotergite grey-brown pruinose, with long black setae. Propleuron with proepisternum and proepimeron shiny brown to black, distinctly setose. Mesopleuron (Figure 1c) with anepisternum, anepimeron and katepisternum shiny brown to black punctuate with small gray pruinescent spots; katepimeron and meron gray pruinose. **Legs** (Figure 1a) shiny, brown to black and yellow colored. All coxae, trochanters, and fore femur brown to black; mid femur brown to black

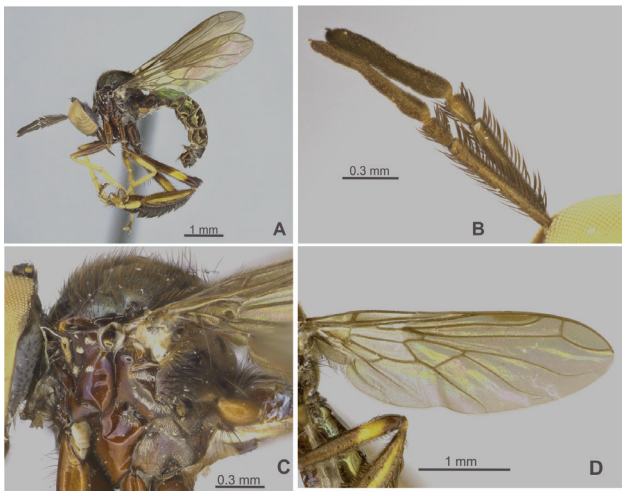

Figure 1. *Lamprempis amazonida* **sp. nov.** holotype male. A – habitus, lateral view; B – antennae, lateral view; C – thorax, lateral view; D – wing. This figure is in color in the electronic version.

on basal half, yellow distally; hind femur brown to black with wide yellow subapical ring. Fore and mid tibiae and tarsi yellow, except distal tarsomeres 3–5 brown. Hind tibia brown to black along lateral margins, yellow midlongitudinally. Hind tarsus yellow, except distal tarsomeres 4–5 brown. Fore and hind first tarsomeres slightly thickened. Legs distinctly setose; fore and mid tibiae with simple longer dorsal setae; hind femur with tuft of dorsal pennate setae at extreme apex; hind tibia compressed laterally with dorsal pennate setae for almost whole length, subequal to width of tibia. **Wing** (Figure 1a,d) light brown infuscate with pterostigma slightly darker, brown; vein R_{4+5} fork nearly at right angle; veins M_1 and M_2 sinuous, both reaching wing margin, although reduced; cell dm short, subpentagonal, produced posteriorly, ending at level of vein R_1. Halter brown. **Abdomen** (Figure 1a) shiny brown with metallic reflections, almost entirely glabrous. Tergite 7 (Figure 2a,d) with subrectangular apical protuberance bearing small basal lobe on each side. Sternite 7 angled anteromesially (Figure 2b), subquadrate, more sclerotized than preceding sternite. Tergite 8 (Figure 2c,d) narrow, somewhat irregular dorsally (in anterior or posterior view), fused to anteroventral region of respective sternite. Sternite 8 (Figure 2d) divided into two subtriangular broad plates, with setae mainly distally. **Terminalia**. Epandrium widely fused to cerci dorsally (Figure 2e,f), with posterodorsal rounded lobe. Cercus (Figure 2e–h) with three projections, one being shorter more anteriorly, followed by one medially and one longer down and mesially projected distally. Cercus setose, with medial dorsal setae widened (Figure 2g,h). Subepandrial sclerite stout, rectangular, with two clusters of small setae posteriorly (Figure 2i). Bacilliform sclerite widened, extending to near apex of epandrium/cercus. Hypandrium (Figure 2j,k) narrow, flattened, somewhat horseshoe-shaped with lateral branches fused posteriorly (Figure 2k). Ejaculatory apodeme tetralamellar, ventral lamella narrower (Figure 2k). Phallus stout, aedeagus as long as parameral sheath (Figure 2k).

Paratype: Female (Figure 3). As in the male, except head dichoptic on frons; all ommatidia subequal in size; frons shiny brown to black, very small, slightly wider than high, as wide as face; hind femur with tuft of dorsal pennate setae at extreme apex and ventrally for almost entire length; hind tibia with dorsal and ventral pennate setae along entire length (Figure 3a–c). **Terminalia** (Figure 3g–j). Tergite 8 subtrapezoidal, darker basally, with shallow basal sinus and

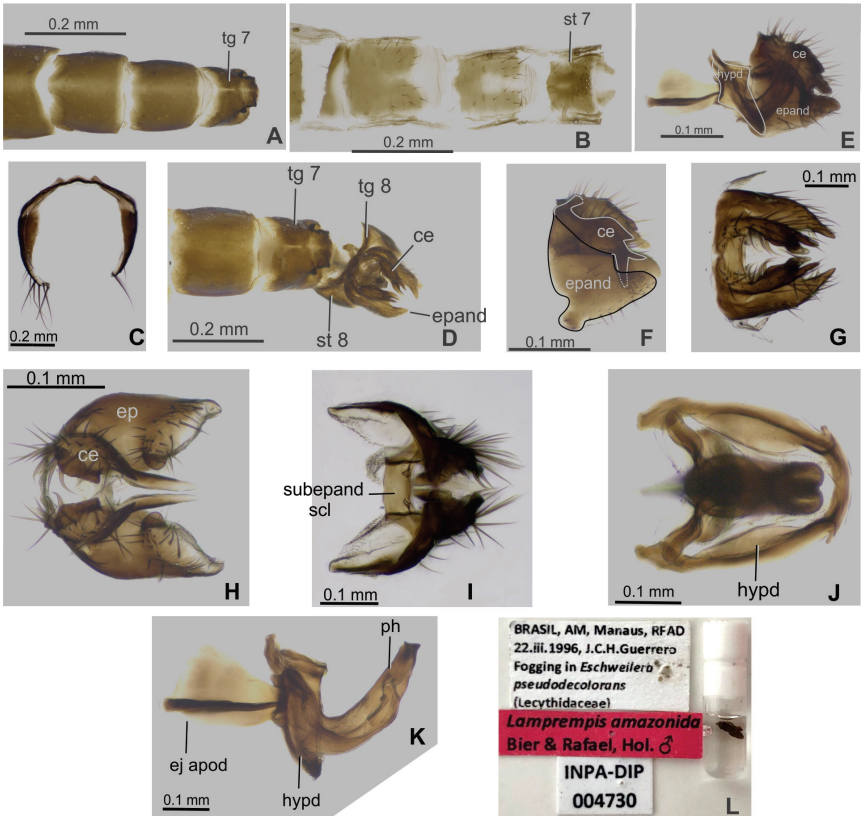

Figure 2. *Lamprempis amazonida* **sp. nov.** holotype male. A – tergites 4–7 of abdomen, dorsal view; B – sternites 4–7, ventral view; C – tergite 8, anterior view; D – apex of abdomen and terminalia, dorsal view; E – epandrium, cercus and hypandrium, lateral view; F – epandrium and cercus (detached), lateral view; G – epandrium and cercus, dorsal view; H – epandrium and cercus, ventral view; I – subepandrial sclerite, anterior view; J – hypandrium, ventral view; K – hypandrium, ejaculatory apodeme, and phallus, lateral view; L – holotype labels. Abbreviations: ce = cercus; ej apod = ejaculatory apodeme; epand = epandrium; hypd = hypandrium; st = sternite; subepand scl = subepandrial sclerite; tg = tergite. This figure is in color in the electronic version.

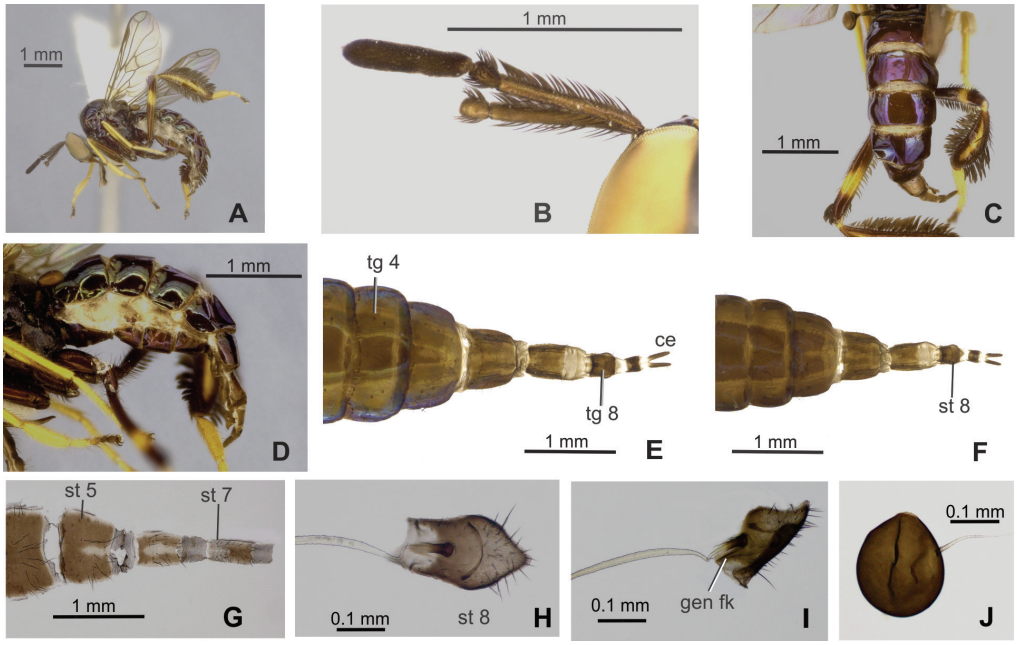

Figure 3. *Lamprempis amazonida* **sp. nov.** paratype female. A – habitus, lateral view; B – antennae, lateral view; C – abdomen and hind legs, dorsal view; D – abdomen and hind legs, lateral view; E – abdomen with apex distended, dorsal view; F – abdomen with apex distended, ventral view; G – sternites 3–7, ventral view; H – sternite 8, genital fork and base of spermathecal duct, ventral view; I – sternite 8, genital fork and base of spermathecal duct, lateral view; J – spermatheca. Abbreviations: ce = cercus; gen fk = genital fork; st = sternite; tg = tergite. This figure is in color in the electronic version.

straight on posterior margin (Figure 3e). Cercus cylindrical, elongate (Figure. 3e,f). Sternites 3–5 wider than long, with last sternite translucid posteromedially (Figure 3g); sternites 6 and 7 longer than wide (Figure 3g); sternite 8 pentagonal, with shallow basal sinus and apex somewhat narrowed (Figure 3h). Genital fork short and narrow (Figure 3h), more distinct when seen laterally (Figure 3i); genital chamber arched-shaped, very narrow. Spermathecal duct with base more sclerotized; spermatheca spherical (Figure 3j).

Geographical records (Figure 4): Brazil (states of Amapá, Amazonas, Pará), French Guiana.

Material examined. HOLOTYPE: Male. "BRASIL, AM[azonas], Manaus, RFAD [Reserva Florestal Adolpho Ducke], 22.iii.1996, J. C. H. Guerrero, fogging in *Eschweilera pseudodecolorans* (Lecythidaceae)" / "*Lamprempis amazonida* Bier & Rafael ♂" / INPA-DIP 004730" (Figure 2l) (INPA). **PARATYPES**: BRAZIL: **Amazonas** Manaus, Reserva Ducke, 13.x.1981, J. A. Rafael (1♀ INPA, DIP 004753); *Idem*, 20.ix.1982 (1♂ INPA, DIP 004754); *Idem*, iv.1995, Arm. Malaise (2♀ INPA, DIP 004761, DIP 004762); Manaus, PDBFF/WWF, Proj. Bert Klein, x.1984, Reserva 1112 (4♀ INPA, DIP 004742-004747, 004750, 004751); *Idem*, xi.1984 (1♀ INPA, DIP 004847); *Idem*, iii.1985 (1♀ INPA, DIP 004848); *Idem*, Reserva 1208 (1♀ INPA, DIP 004846); *Idem*, Reserva 1210 (1♀ INPA, DIP 004766); *Idem*, iv.1985, Reserva 1208 (1♀ INPA, DIP 004767); *Idem*, v.1985, Reserva 1112 (3♀ INPA, DIP 004849, DIP 004850, DIP 004851); *Idem*, vi.1985 (1♀ INPA, DIP 004746); *Idem*, Reserva 1301 (1♀ INPA, DIP 004745); *Idem*, Reserva 1210 (1♀ INPA, DIP 004739); *Idem*, vii.1985, Reserva 1208 (1♀ INPA, DIP 004744); *Idem*, viii.1985, Reserva 1301 (1♀ INPA, DIP 004735); *Idem*, viii.1985, Reserva 1112 (1♀ INPA, DIP 004743); *Idem*, ix.1985, Reserva 1208 (2♀ INPA, DIP 004736, 004737); *Idem*, x.1985, Reserva 1210 (2♀ INPA, DIP 004741, 004748); *Idem*, xii.1985, Reserva 1112 (2♀ INPA, DIP 004740, 004749); *Idem*, i.1986, Reserva 1112 (3♀ INPA, DIP 004732-004734); *Idem*, ii.1986 (1♂ INPA, DIP 004852); *Idem*, v.1986 (2♀ INPA, DIP 004731, 004738); *Idem*, viii.1986 (1♂ INPA, DIP 004752); *Idem*, ix.1986 (3♀ INPA, DIP 004853, DIP 004854, DIP 004855); *Idem*, x.1986 (1♂ INPA, DIP 004856); *Idem*, 15–30.iii.1996, L.R.F.Rocha e Silva (3♀ INPA, DIP 004756-004758); *Idem*, vii.2004, Armadilha Suspensa, L.R.F.Silva & J.A.Rafael (1♀ INPA, DIP 004759); *Idem*, viii.2004 (1♀ INPA, DIP 004764); *Idem*, xii.2004 (1♀ INPA, DIP 004760); Manaus, ZF2, km 14, Torre 023521S – 600655W, 18–21.v.2004, lençol: luz mista e BLB, 40 mts altura, J. A. Rafael, F. B. Baccaro, F. F. Xavier Fº & A. Silva Fº (1♀ INPA, DIP 004755); **Amapá**: Amapá, Oiapoque, BR 156, Km 25, 3°39'35"N – 51°46'17"W 6-20. ix.2019, Malaise, floresta, J. A. Rafael, S. P. Lima & F. F. Xavier Fº (3♀ INPA, DIP 004769, 004771, 004772); *Idem*, 20.ix–4.x.2019 (1♀ INPA, DIP 004768); *Idem*, 1–16.i.2020 (1♀ INPA, DIP 004773); *Idem*, iii.vii.2020 (1♀ INPA, DIP 004770); **Pará**: Pará, Tucuruí, Rio Tocantins, Chiqueirão, 07-09.iv.1984, Armadilha 1.6m, Suspensa, MPEG (1♀ INPA, DIP 004844); *Idem*, Serra Norte, N–1, CANGA, 9-12.ii.1985,

F. Ramos & J. Dias (1♀ INPA, DIP 004845); *Idem*, Guarita, 15-18.ii.1985 (1♀ INPA, DIP 004763); *Idem*, Amazônia, 9-11. ii.2022, ARG col. (1♀ DIP 004765). FRENCH GUIANA: PK35, 4°32.663'N 52°09.371'W, 230 m, xii.2007, J. Cerda, rainforest, MT [Malaise trap] (1♀ CNC 1078340).

Holotype condition. Specimen glued to a triangular card point. Mid left leg glued to the same card point; abdomen dissected, in microvial with glycerin, pinned beneath the specimen.

Etymology. The specific epithet *amazonida* derives from the biome Amazonia and here it is used as a name in apposition.

Variation. Male specimens with body length varying from 4.6 to 5.0 mm (n = 7); some paratypes with palpi yellow and presutural area of the mesonotum more extensively shiny, without pruinosity; vein M_1 weaker distally, apparently incomplete.

Bionomy. Most specimens were collected in all months, from 1984 to 1986, in the reserves of the Biological Dynamics of Forest Fragments Project (BDFFP) (PDBFF on the labels), 100 kilometers north of Manaus, indicating a continuous annual occurrence. A few specimens were collected in the canopy, using fogging and light traps to collect high in the tropical rainforest ecosystem.

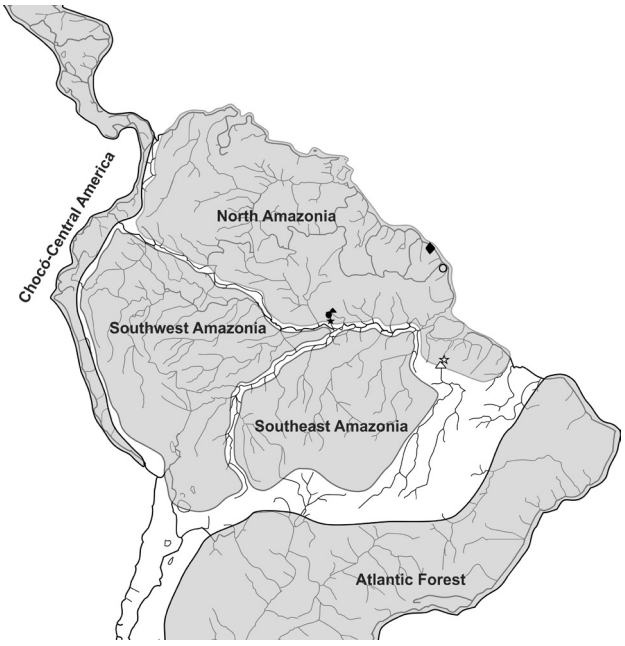

Figure 4. Continental Northern Neotropical Region (modified from Amorim 2009). Record map of *Lamprempis amazonida* **sp. nov.** Symbols represent the known collection localities as follows: solid diamond = French Guiana; open circle = Oiapock, Amapá, Brazil; solid triangle = Biological Dynamics of Forest Fragments Project (BDFFP), Manaus, Amazonas, Brazil; solid circle = ZF2 Reserve, Manaus, Amazonas, Brazil; solid star = Ducke Reserve, Manaus, Amazonas, Brazil; open star = Tucuruí, Pará, Brazil. open triangle = Serra Norte, Pará, Brazil.

DISCUSSION

Lamprempis amazonida **sp. nov.** differs from all other known *Lamprempis* species by the extremely elongated scape and postpedicel (shorter in other species), scape and pedicel with distinct pennate setae dorsally and ventrally (no pennate setae), the very short stylus, and the pentagonal, very short, cell dm. These morphological characters are recorded for the first time in *Lamprempis*. There are similar specimens to *L. amazonida* sp. nov. from Napo, Ecuador (one female, CNC) (Bradley Sinclair, pers. inf.) and from São Paulo, southeastern Brazil (two females recently seen, MZUSP, JAR). The specimens from both localities, together with the species described here, form a distinct group that may be transferred to a different genus or subgenus to be described in the future upon further investigation.

The geographical records of *Lamprempis amazonida* sp. nov. (Figure 4) fit the area cladogram proposed by Amorim (2009), and this species appears to be restricted to the biogeographic North Amazonia subregion, a pattern previously recorded for some species of *Macrostomus* Wiedemann (Empididae, Empidini), as discussed by Rafael and Cumming (2009, 2010, 2012, 2015). The female specimens from Ecuador and south of Brazil are undoubtedly related to *L. amazonida* sp. nov. and probably are different species based on their occurrence in the Southwest Amazonia and Atlantic Forest subregions.

Lamprempis amazonida sp. nov. runs to couplet 3 in the key of Smith (1975) and fits better to the Cuban species, *L. superba* (Loew) due to the hind femur with a broad yellow pre-apical ring. *Lamprempis amazonida* sp. nov. differs from *L. superba* by having extremely elongate antennae, as long as or longer than the head height (shorter in *L. superba*) and with the scape and postpedicel with dorsal and ventral pennate setae (pennate setae absent), the proboscis shorter than the head and thorax length combined (equal to head and thorax combined), the mesonotum and scutellum mainly brown pruinose (entirely shiny) and the long setose (short setose), the anepisternum, katepisternum and anepimeron shiny, with small spots of grey pruinescence (entirely brownish, opaque), the hind leg with femur, tibia and tarsomere 1 with pennate setae (no pennate setae), the mid femur yellow at the distal half and the hind femora circled by a subapical, yellow ring (mid and hind femora circled by a subapical, yellow ring), wings light brown (wings black).

CONCLUSIONS

The description of this new long-antennate empidid species from the Amazon Basin is relevant for morphology, diversity, biogeography, and evolution studies, contributing to a better understanding of the local entomofauna in its regions of occurrence. Its collection only in preserved environments may indicate a susceptibility of the species to environmental alteration, which may be significant for the development

of local conservation strategies. The placement of the *L. amazonida* sp. nov. within the non-monophyletic *Lamprempis* is tentative and illustrates a possible intra-generic pattern of great significance, meaning the genus is so well distributed and diversified that species groups evolved independently across the New World, mainly in the Neotropics, where they are more abundant.

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DATA AVAILABILITY

The data that support the findings of this study were published in this article.