PENSOFT

SENCKENBERG
world of biodiversity

Leibniz Association

The Neotropical antlion genus *Ameromyia* Banks, 1913 (Neuroptera: Myrmeleontidae), systematics and redefinition under a phylogenetic approach

Leon Gustavo de Miranda Tavares[1,2], Renato Jose Pires Machado[2], Adolfo Ricardo Calor[1]

1 *Laboratório de Entomologia Aquática, PPG Biodiversidade e Evolução, Instituto de Biologia, Universidade Federal da Bahia–UFBA, Campus Universitário de Ondina, Rua Barão de Geremoabo, Rua Barão de Geremoabo, 147, Ondina, CEP 40170-115, Salvador, BA, Brazil*

2 *Departamento de Zoologia, Universidade Federal do Paraná–DZUP, Avenida Coronel Francisco H. dos Santos, 100, Jardim das Américas, CEP 81531-980, Curitiba, PR, Brazil*

https://zoobank.org/E628C8DC-C920-4941-9CDE-818F4B61AF03

Corresponding author: Leon Gustavo de Miranda Tavares (leogtav@gmail.com)

Received 28 June 2022
Accepted 15 February 2023
Published 7 June 2023

Academic Editors André Nel, Klaus-Dieter Klass

Citation: Tavares, LGM, Machado, RJP, Calor, AR (2023) The Neotropical antlion genus *Ameromyia* Banks, 1913 (Neuroptera: Myrmeleontidae), systematics and redefinition under a phylogenetic approach. Arthropod Systematics & Phylogeny 81: 499–553. https://doi.org/10.3897/asp.81.e89641

Abstract

A taxonomic revision and the first phylogenetic hypothesis of the Neotropical genus *Ameromyia* Banks (Myrmeleontidae: Brachynemurini) is herein presented. The phylogeny is based on 45 morphological characters and recovered the traditional *Ameromyia* as paraphyletic in respect to the monotypic genus *Venezueleon* Stange, which is here synonymized under *Ameromyia*. Three species are synonymized (*A. hirsuta* Navás and *A. stevensi* Navás under *A. nigriventris* (Walker), and *A. pentheri* Navás under *A. strigosa* (Banks)) and two new species are described (*A. clepsydra* **sp. nov.** and *A. explicata* **sp. nov.**). *Ameromyia sensu novo* is a valid genus with 12 species restricted to South America, and divided into two species groups. Taxonomic keys are also presented to adults and larvae, as well as a discussion on the genus biology.

Keywords

Brachynemurini, morphology, Myrmeleontinae, phylogeny, taxonomy

1. Introduction

Myrmeleontidae Latreille is currently the most diverse family in the order Neuroptera, comprising nearly 2,150 extant species (Oswald 2021), and divided into four subfamilies and 17 tribes (Machado et al. 2019). Commonly known as antlions and owlflies (the latter only for part of the Ascalaphinae) (Machado et al. 2019). The adults possess characteristic slender bodies and wings, clavate or capitate antennae, and usually are aerial generalist predators, adapted to arid and semiarid regions (Mansell 1999). The larvae, which have two or more mandibular teeth, are sit-and-wait predators that hunt prey while perched on rocks and/or trees, or, more commonly, buried on particulate substrate (Miller and Stange 1985; New 1986; Stange et al. 2003; Stange 2004; Badano and Pantaleoni 2014).

Copyright *Leon Gustavo de Miranda Tavares* et al. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

The tribe Brachynemurini (Myrmeleontinae) currently comprises 117 valid species in 28 genera, which are restricted to the Americas (Stange 1994; Machado et al. 2019). This tribe is highly variable in regard to morphological features such as leg chaetotaxy and wing venation (Stange 1970, 1994), but its most impressive feature is the male genitalia in which the parameres have folds (hinges) and articulate with itself (Addams 1956; Stange 1970).

Banks (1927) erected Brachynemurini to accommodate the New World antlions which didn't exactly fit into his previous taxonomic classifications for the Old World antlions, which mostly relied on the number of hind wing presectoral crossveins. Afterwards, the tribe was divided into two subtribes, Brachynemurina and Austroleontina, based on the number of presectoral and MP2 crossveins in the hind wing (Banks 1943). The first large revision of the tribe focused on the North American species (Stange 1970), and disregarded Banks previous internal classification, as well as erected new diagnostic characters for the tribe: i) curvature of forewing 2A in relation to 3A; ii) forewing with a short CuP; iii) one to five presectoral crossveins on hind wing; iv) tibial spurs absent or smaller than the procoxae; v) female anterior gonapophysis platelike; and vi) hinged parameres of male genitalia. Posteriorly the tribe was reduced to a subtribe of Myrmecaleurini (now restricted to the Old World) based on larval characters (Stange and Miller 1990).

However, the first cladistic analysis of Brachynemurini reinstated its tribal status, but reclassifying its species in three different tribes: Brachynemurini (s.str.), Gnopholeontini and Lemolemini, mainly based on female genitalia and larval characters (Stange 1994). Posterior phylogenetic analysis recovered Brachynemurini (s.str.) sister to Dendroleontini (Michel et al. 2016), both sister to the remaining Myrmeleontinae (Badano et al. 2016), or sister to Gnopholeontini (Winterton et al. 2018). In the first phylogenomic analysis focused on Myrmeleontidae, Brachynemurini was also recovered sister to the remaining Myrmeleontinae sensu Machado et al. (2019). However, the tribe was recovered as paraphyletic in respect to Gnopholeontini, which was deeply placed within Brachynemurini and thus synonymized under the latter, returning to the initial larger concept of Brachynemurini defined by Stange (1970).

Ameromyia Banks, 1913 is a Neotropical genus of Brachynemurini which today comprises 12 valid species (Stange 2004). The genus is diagnosed as having setae on the frons, large pretarsal claws and clavate setae on male genitalia (Stange 1994). The adults live on grasslands and perch on grass stems which reflect their distinctive coloration (Fig. 1), and the known larvae live on sand dunes (Stange 1994, 2004).

Ameromyia was first described circumscribing the Brachynemurini species that present a long CuP in the forewing and a long CuA in the hind wing, as well as the presence of both banksian lines on both wings (Banks 1913). In the same study, *Amazoleon* Banks, 1913 was described to include species with the same features, but with slender wings and longer abdomen. *Amazoleon* was posteriorly synonymized under *Moza* Navás 1912 (Navás 1914), however, this synonymization was not adopted by none of the following studies. Posteriorly, *Foya* Navás 1914 was synonymized under *Amazoleon* (Esben-Petersen 1920) and *Nemotolus* Banks, 1943 was described based on an enlarged pillula axillaris, although similar to *Amazoleon*. Posteriorly *Amazoleon* and *Nemotolus* were synonymized under *Ameromyia* (Stange 1967). Nevertheless, *Ameromyia* was only redescribed afterwards, receiving its current diagnosis together with the description of the male and female genitalia, and the larvae of two species by Stange (1994). In the same study, *Ameromyia* was divided into two species groups (*modesta* and *nigriventris* groups, classified and named after the species with known larvae), placed deep within Brachynemurini, and having *Venezueleon* Stange, 1994 as the sister genus. Although, most recent phylogenetic analyses of Myrmeleontidae recovered *Ameromyia* sister to all remaining Brachynemurini (Machado et al. 2019).

Ameromyia male genitalia was described as bearing the same structure as its sister genus *Venezueleon*. However, both genitalia descriptions were conflicting in regard to the homology of both gonarcus and parameres (Stange 1994). Moreover, almost no photographs or illustrations are available in the literature, and the ones provided do not illustrate the whole insect nor diagnostic features, and even wing illustrations do not depict full wing venation or both wings. All these issues highlight the need for a taxonomic review of *Ameromyia* (Stange 2004), which is presented here, comprising a taxonomic revision with description of new species, including taxonomic key to adults and larvae, a phylogenetic hypothesis for *Ameromyia*, and a discussion about the genus biology.

2. Material and methods

2.1. Specimen collection and identification

A total of 607 *Ameromyia* specimens were herein analyzed. Type specimens analyzed are discussed under "Remarks" for each species. For species with syntypes, lectotypes were designated from the syntypes series according to the better-preserved specimen. Specimens were provenient from several collecting events throughout 2017–2019, and by loans or photographs from institutions. Collected data for the specimens studied is included in the section "Examined Material" for each species. New distributional records at country level are highlighted in bold in the section "Distribution" for each species. A map showing the distribution of each species, per species group and by collection sites was constructed in QGis 3.4.13 Essen using projection unit GCS, datum WGS 84 (QGIS Development Team, 2015). Specimens whose label locations stated only country or state/district/province were plotted on the capital of the stated location. Specimens collected were preserved in 80% ethyl

Figure 1. Live specimens of *Ameromyia*. **A** *A. strigosa*, Argentina, by Quentin Vandemoortele. **B** *A. muralli*, Brazil, by Eli Vieira Araujo-Jnr. **C** *A. modesta*, Surinam, by Tom Murray. **D** *A. pubiventris*, Brazil, by Carlos José Correia de Santana. **E** *A. clepsydra* **sp. nov.**, Brazil. **F** *A. explicata* **sp. nov.**, Brazil. Latter photographs by Leon Tavares.

alcohol, envelopes or pinned. They were identified using the key provided by Stange (2004), as well as the original species descriptions and comparison with type specimens. Male genitalia were prepared using the protocols proposed by Cummings (1992), and together with wing characters were used for identification. The terminology for larval and adult morphology follows that of Miller and Stange (2014) and Badano and Pantaleoni (2014), and for wing venation follows Breitkreuz (2017). The immature stages were collected and kept separate for rearing in the laboratory. Photos were obtained with a Canon EOS 6d Mark ii attached to a Stackshot 3× for automontage and rendered with Helicon Focus 7 and a Leica (M165C) stereomicroscope with a DFC420 digital camera and using the Digital Leica Application Suite v3.7 software. Some of the photographs were taken by their respective museum staff. Genitalia was illustrated with Adobe Illustrator CC 2017.

2.1.1. List of cited institutions

BMNH – Natural History Museum, London, England; **CASC** – California Academy of Sciences; **CEMT** – Coleção Entomológica do Mato Grosso, Cuiabá, Brazil; **CEUFT** – Coleção Entomológica da Universidade do Tocantins, Palmas, Brazil; **CZMA** – Coleção Zoológica do Maranhão, Caxias, Brazil; **DZUP** – Coleção Zoológica Pe. Jesus Santiago Moure, Curitiba, Brazil; **EMAU** – Zoologisches Institut und Museum, Greifswald, Germany; **FML** – Fundación Miguel Lillo, San Miguel de Tucumán, Argentina; **FSCA** – Florida State Collection of Arthropods, Gainesville, United States; **INPA** – Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil; **MCZ** – Museum of Comparative Zoology, Cambridge, United States; **MLPA** – Museo de La Plata, La Plata, Argentina; **MNHN** – Museum National d'Histoire Naturelle, Paris, France; **MPEG** – Museu Paraense Emílio

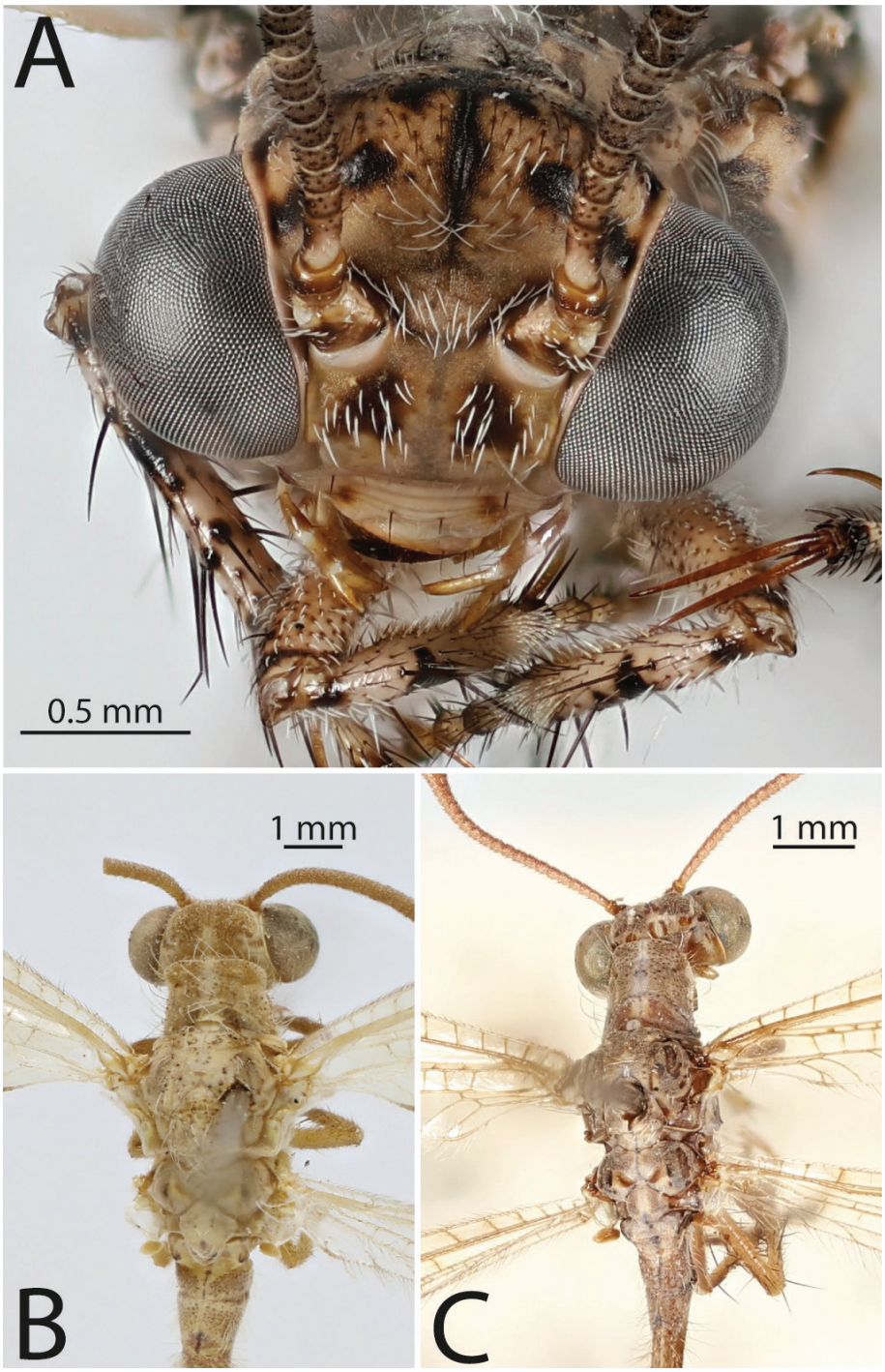

Figure 2. *Ameromyia* specimen views: **A** *A. strigosa*, head and forelegs, frontal view. **B** *A. guarica* and **C** *A. modesta*, head and thorax, dorsal view.

Goeldi, Belém, Brazil; **MRSN** – Museo Regionali di Scienze Naturali, Torino, Italy; **MZFS** – Museu de Zoologia da Universidade Estadual de Feira de Santana, Feira de Santana, Brazil; **MZUSP** – Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil; **SDEI** – Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany; **UFBA** – Museu de História Natural da Bahia, Universidade Federal da Bahia, Salvador, Brazil.

2.2. Live specimen rearing

Immature specimens selected for rearing were placed in individual plastic containers. Plaster or styrofoam plates were fit into each container, and then coated with sand, soil and sometimes small pebbles from the habitat where the larvae were collected. Larvae were fed two to three times per week with either *Drosophila melanogaster* Meigen maggots, first to third instar *Tenebrio molitor* Linnaeus larvae, and/or *Nasutitermes* Dudley nymphs, depending on prey availability. After pupation, cocoons were transferred to a glass rearing cage with sand and vertical wooden sticks. Rearing boxes were kept in air-conditioned rooms with the temperature between 23–25°C. After adult emergence, the pupal exuvia and the larval sclerites were preserved in 80% ethyl alcohol, allowing for direct association between the different life stages of the same species. Cocoons were stored in vials with

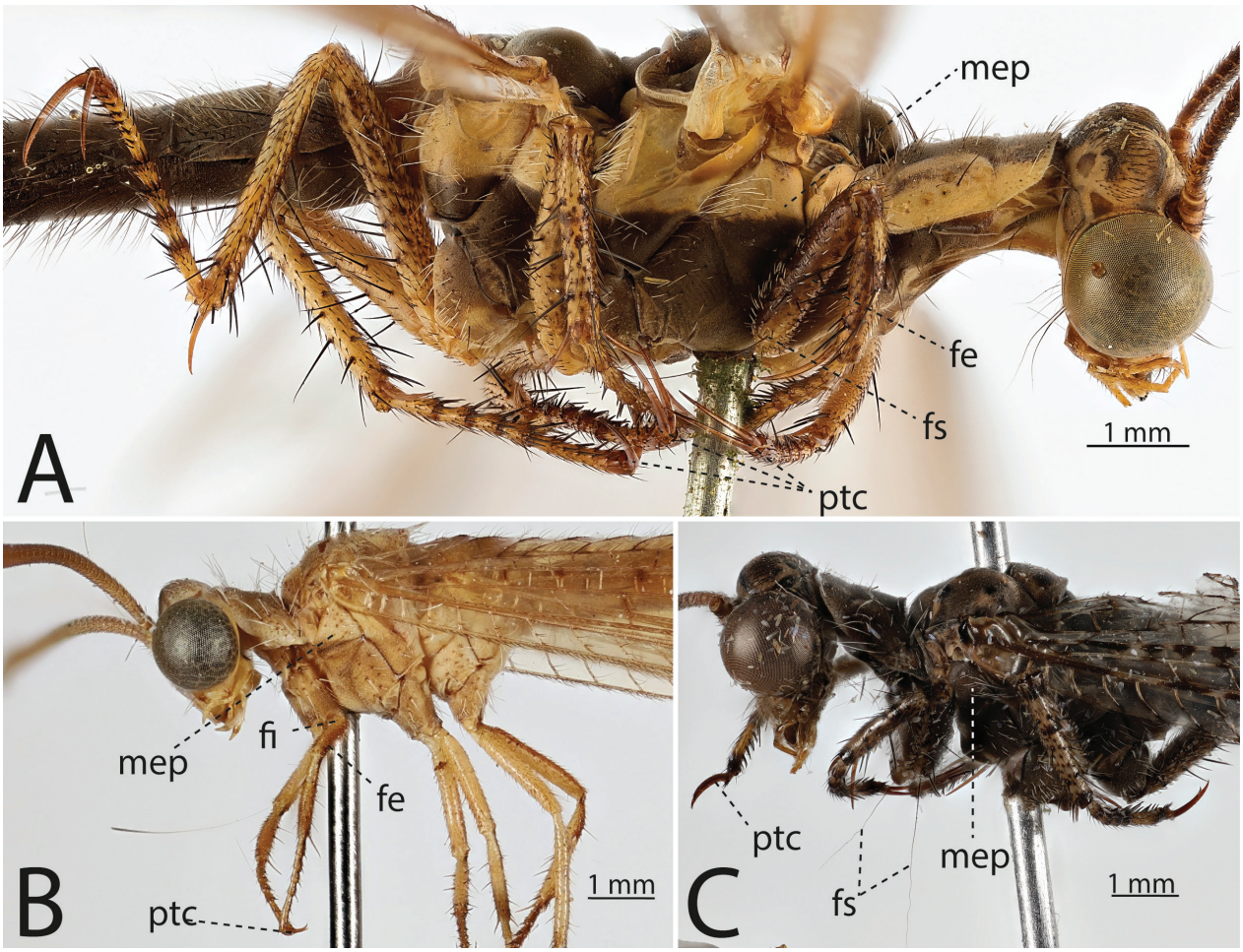

Figure 3. *Ameromyia* specimens, head, thorax and legs, lateral view: **A** *A. tendinosa*, photograph by Lara Lopardo (EMAU). **B** *A. guarica*. **C** *A. explicata* **sp. nov.** — Abbreviations: fe: femur external face; fi: femur internal face; fs: femoral sense hair; mep: mesepisternum; ptc: pretarsal claws.

naphtalene and posteriorly associated with its respective preserved specimens. Adult specimens were placed in voil fabric enclosures of 60 × 60 cm during mornings, and of 2 × 2 m during afternoons and nights. Voil fabric enclosures were enriched with dry bushes and/or branches, and sand, dirt and rocks from the specimen's natural habitats. Adult specimens were fed adult *Drosophila melanogaster* Meigen, and handfed maggots, honey plus water, or gelatin with brown sugar and egg yolk. Hand feeding consists of grabbing adult specimens by their wings, and touching the food to their mouthparts, until they taste, grab the food and start chewing. When senescent, adult specimens were placed into a freezer for posterior pinning, or stored in 80% ethyl alcohol.

2.3. Phylogenetic analyses

Ingroup consisted of all valid *Ameromyia* species, including the new species. Outgroup was sampled upon specimen availability and taxonomic history according to previous systematic studies (Stange 1994; Machado et al. 2019), and consisted of two representatives of non-Myrmeleontinae genera (*Dimares elegans* (Perty, 1833) (Ascalaphinae) and *Dimarella riparia* (Navás, 1918) (Nemoleontinae)), and four Myrmeleontinae genera (an unidentified species of *Myrmeleon* Linnaeus as a non-Brachynemurini; and *Argentoleon irrigatus* (Gerstaecker, 1894), *Austroleon immitis* (Walker, 1853) and the historical sister group of *Ameromyia*, *Venezueleon guaricus* Stange, 1994, as Brachynemurini genera). The data matrix was produced in Microsoft Excel. The symbols '?' and '–' were used for missing data and non-applicability of characters respectively, and cases of polymorphy were coded between brackets. Characters and character states were described according to Sereno (2007), treated as discrete and unordered. The cladistic analysis was performed using TNT v.1.5 (Goloboff et al. 2008) under parcimony by traditional search, using equal and implied weighting, and all trees were rooted using *Dimares elegans* as the outgroup root. Implied weighting procedure followed Mirande (2009), with 15 k-values calculated for an average fit ranging from 50 to 90% of a perfectly hierarchical character. Higher sums of similitud index and Subtree Pruning Regrafting (SPR) indicates more stable k-values, and thus distortion coefficients and SPR distances of the consensus trees were used as criterions for selecting weighting usages. Also, different (consecutive higher) implied weighting k-values were tested until analysis recovered different topologies for comparison

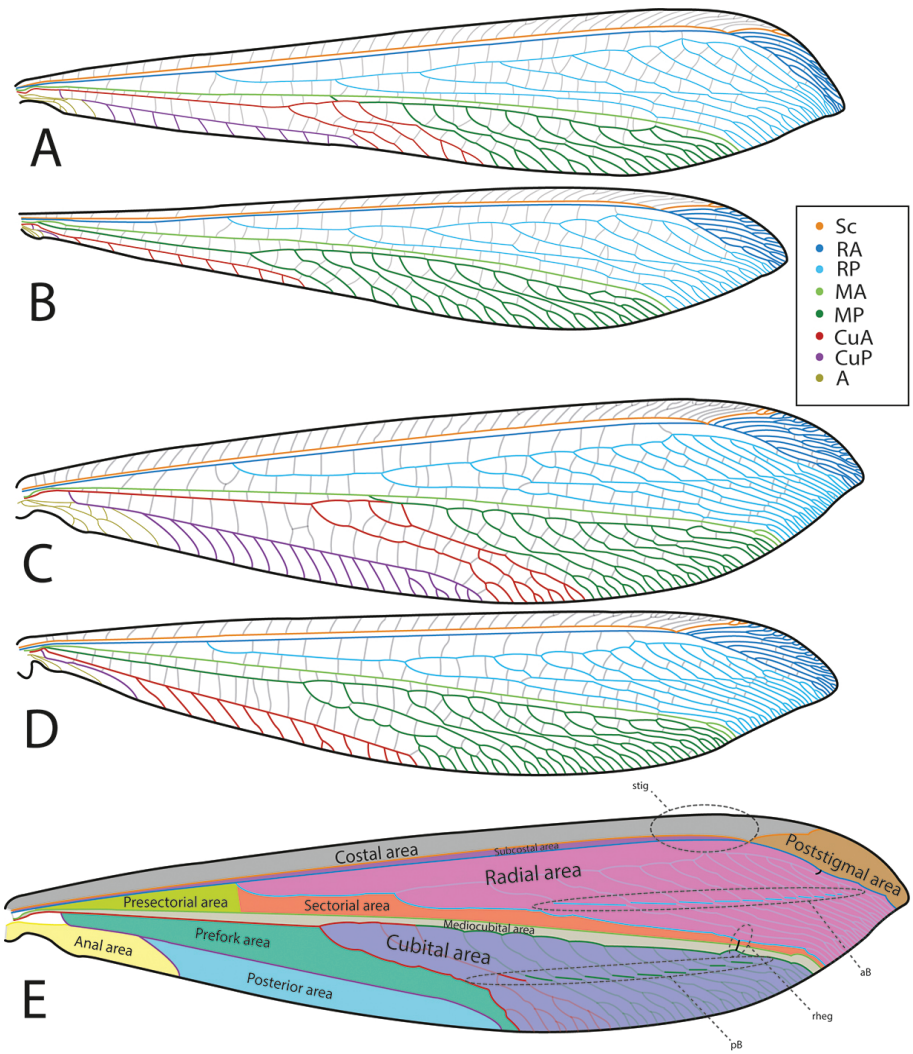

Figure 4. *Ameromyia* wing venation patterns and terminology: **A** forewing and **B** hind wing of *modesta* group. **C** Forewing and **D** hind wing of *nigriventris* group. **E** Forewing with space-filled areas. Legend indicates wing veins terminology with its respective color.

ends. Bremer support absolute and relative values (Goloboff and Farris 2001) were calculated with tree bisection-reconnection retaining 20,000 suboptimal trees with 10 suboptimal steps, and symmetric resampling frequency differences (GC) (Goloboff et al. 2003) with 33% removal probability and 10,000 replicates, were calculated for the trees recovered under equal weighting.

3. Phylogeny

3.1. Characters

A total of 45 morphological characters were coded and included in the character matrix (Supplementary Material Table S1). Some characters were adapted from Stange (1994), as indicated in the characters list below.

Head (characters 1–4)

1. Frons: Setose (0) (Fig. 1A); glabrous (1).
2. Interocular distance, in relation to eye width: shorter (0) (Fig. 2A); larger (1) (Fig. 25B).
3. Interantennal distance, in relation to scape width: shorter (0); longer (1) (Fig. 2A).
4. Vertex–clypeus length, in relation to thorax dorsoventral height: longer (0) (Fig. 3A, C); shorter (1) (Fig. 3B).

Thorax (characters 5–12)

5. Mesothorax, mesepisternum, dorsal and ventral areas, coloration: not contrasting (0) (Fig. 3C); contrasting (1) (Fig. 3A)
6. Prothorax, proportions in dorsal view: broader than long (0) (Fig. 2B); as broad as long or longer than broad (1) (Fig. 2C).
7. Legs, profemoral sense hair: absent (0) (Fig. 3B); present (1) (Fig. 3A, C).
8. Legs, length of profemoral sense hair, in relation to profemur length: shorter than profemur (0); longer or as long as profemur (1) (Fig. 3A, C). (Applicability depending on 7:1)
9. Legs, Pretarsal claws, length, in relation to distal tarsomere length: shorter than distal tarsomere (0) (Fig. 3B); same length or longer than distal tarsomere (1) (Fig. 3A, C).

Figure 5. *Ameromyia* forewing color patterns: **A** *A. pubiventris.* **B** *A. explicata* **sp. nov. C** *A. tendinosa*, photograph by Lara Lopardo. Legend indicates wing vein pattern with associated terminology.

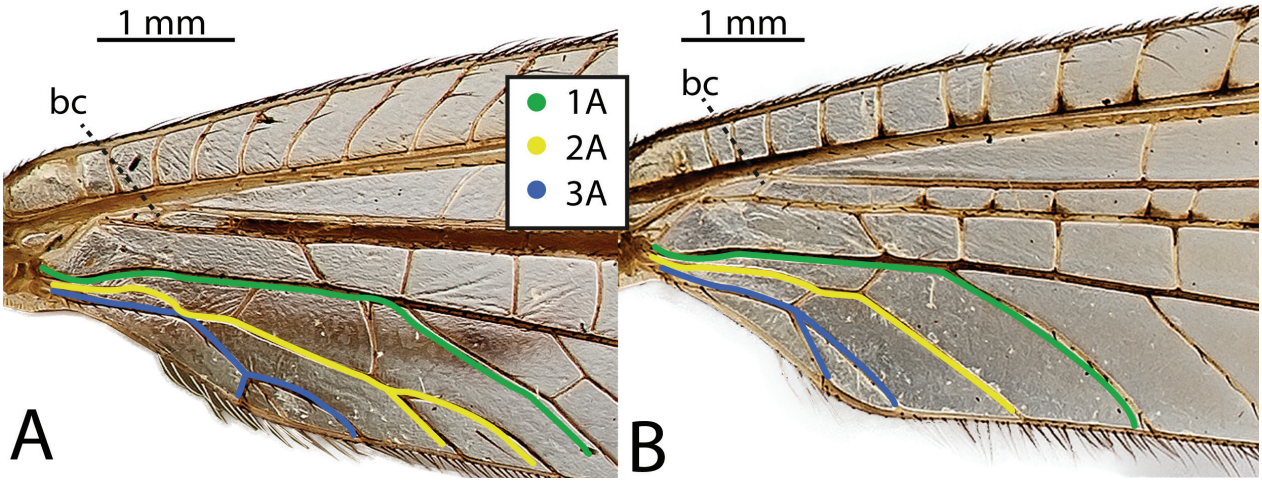

Figure 6. *Ameromyia* forewing base: **A** *A. tendinosa.* **B** *A. protensa*. Photographs by Lara Lopardo (EMAU). Legend indicates Anal veins and its respective color guide. — Abbreviation: bc, basal crossvein.

10. Legs, profemur, decumbent setae, coloration: only black (0) (Fig. 3B); only white (1) (Fig. 2A); black and white (2) (Fig. 3A, C).
11. Legs, profemur, color pattern: without contrast between external and internal face (0) (Fig. 38C, D); external and internal face with contrasting colors (1) (Fig. 3).
12. Legs, tarsus, color pattern: without contrast between external and internal face (0) (Fig. 3A, C); external and internal face with contrasting colors (1) (Fig. 3B).

Wings (characters 13–31)

13. Forewing, origin of RP, in relation to CuA fork: before CuA fork (0) (Fig. 4A, C); after CuA fork (1).
14. Forewing, number of crossveins between CuP and posterior branch of CuA: less than 6 crossveins (0) (Fig. 4A); 6 or more crossveins (1) (Fig. 4C).
15. Forewing membrane, mediocubital area, coloration: clear (0); infuscated (1) (Fig. 5).
16. Forewing membrane, mediocubital area pattern of infuscation: dotted, infuscated at the base of each crossvein (0) (Fig. 5A); dotted, more loosely dotted the farthest from wing base (1) (Fig. 5B); suffused with continuous infuscation (2) (Fig. 5C). (Applicability depending on 15:1)
17. Forewing, presectorial and radial sector area, vertical crossveins, degree of infuscations: not suffused with infuscations (0) (Fig. 5A, C); suffused with infuscations (1) (Fig. 5B).
18. Forewing, Sc vein, color pattern: homogeneous (0) (Fig. 21A); dashed (1) (Fig. 5).
19. Forewing, RA vein, color pattern: homogeneous (0) (Figs 21A, 37B); dashed (1) (Fig. 5).
20. Forewing, CuP origin, in relation to basal crossvein: basad to basal crossvein (0); distad to basal crossvein (1) (Fig. 6).
21. Forewing, CuP vein, color pattern: homogeneous (0) (Fig. 5C); dashed (1) (Fig. 5A, B).
22. Forewing, course of vein 2A, in relation to vein 3A: forming a sharp angle towards 3A (0); forming a smooth curve towards 3A (1) (Fig. 6).
23. Forewing, vein 2A in relation to 3A: independent from 3A (0) (Fig. 6); fused with 3A (1).

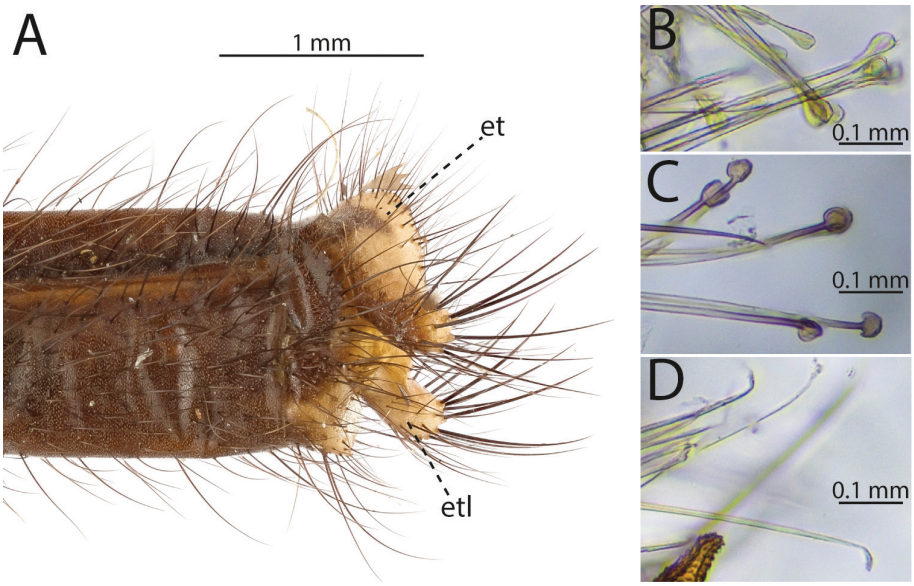

Figure 7. *Ameromyia* male terminalia and genitalia chaetotaxy: **A** *A. protensa* lectotype male terminalia, lateral view, photograph by Lara Lopardo (EMAU). **B** *A. explicata* **sp. nov.**, globose club of genitalic sac clavate setae. **C** *A. guarica*, same but club sickled. **D** *A. clepsydra* **sp. nov.**, same, but club subglobose. — Abbreviations: et, ectoproct; etl, ectoproct postventral lobe.

24. Forewing, independent vein 2A, in relation to 3A: touches vein 3A (0) (Fig. 6A); connected to 3A by a single crossvein (1) (Fig. 6B). (Applicability depending on 23:0)
25. Forewing, Rhegmal area, coloration: hyaline (0) (Figs 20A, 21A); infuscated (1) (Fig. 5).
26. Forewing, Banksian lines: absent (0); present (1) (Figs 4A, C, 5).
27. Hind wing, apex margin, shape: acute (0) (Fig. 4B, D); falcate (1) (Figs 31B, C, 44B).
28. Hind wing, crossveins between vein CuA and posterior branch of MP: absent (0); present (1) (Fig. 4B, D).
29. Hind wing, number of crossveins between CuA and posterior branch of MP: 1–2 crossveins (0); 3–4 crossveins (1) (Fig. 4B); 5+ crossveins (2) (Fig. 4D). (Applicability depending on 28:1)
30. Hind wing, posterior area cells, length/width ratio: longer than high (0) (Fig. 4B); at least as high as long (1) (Fig. 4D).
31. Hind wing, Banksian lines: absent (0); present (1) (Fig. 4B, D).

Abdomen (characters 32–37)

32. Male abdomen, length, in relation to hind wing length: shorter than hind wing (0); barely longer than hind wing (1) (Fig. 1E); hind wing length equals to tergites 3+4+5 (2) (Figs 32C, 45A); hind wing length equals to tergites 3+4 (3) (Figs 1D, 40B).
33. Male terminalia, ectoproct: without postventral lobe (0); with postventral lobe (1) (Fig. 7A).
34. Male terminalia, ectoproct, postventral lobe length, in relation to ectoproct height: shorter (0) (Fig. 7A); longer (1). (Applicability depending on 33:1)

Female genitalia (characters 36–38)

35. Female terminalia, pregenital plate: insconspicuous (0) (Fig. 8); evident (1).
36. Female terminalia, gonapophyseal plate, length in relation to lateral gonapophysis: shorter (0) (Figs 8C, 23D); longer (1).
37. Female terminalia, lateral gonapophyses, distal margins: fused (0) (Fig. 8); separate (1).

Male genitalia (characters 38–45)

38. Male genitalia, genitalic sac, setae: absent (0); present (1) (Figs 9, 10).
39. Male genitalia, genitalic sac, setae, shape of distal end: filiform (0); clavate (1) (Figs 7B, C, D, 9, 10) (Applicability depending on 38:1).
40. Male genitalia, genitalic sac, clavate setae, "club" shape: globose (0) (Figs 7B, 9, 10); sickled (1) (Fig. 7C); subglobose (2) (Fig. 7D) (Applicability depending on 39:1).
41. Male genitalia, parameres hinge, presence: absent (0); present (1) (Figs 9, 10).
42. Male genitalia, parameres, lateral tooth ventrally: absent (0); present (1) (Figs 9, 10).
43. Male genitalia, parameres lateral ventral tooth, placement, in relation to paramere plates: distal (0); basal (1) (Figs 9, 10). (Applicability depending on 42:1)
44. Male genitalia, gonarcus, arching, in relation to parameres: arching dorsad to parameres (0); arching anterior to parameres, barely dorsad (1) (Figs 9, 10).
45. Male genitalia, mediuncus, presence: absent (0) (Figs 9, 10); present (1).

3.2. Cladistic analysis

Analyses under equal weighting resulted in four most parsimonious trees, with 82 steps. Two sets of trees were almost identical, differing only in regard to the outgroup (relationship between *Dimarella riparia* and *Myrmeleon* sp.), and therefore, only two trees with truly different topologies for *Ameromyia* internal relationships were produced (Fig. 11). Different (consecutive higher, k+1)

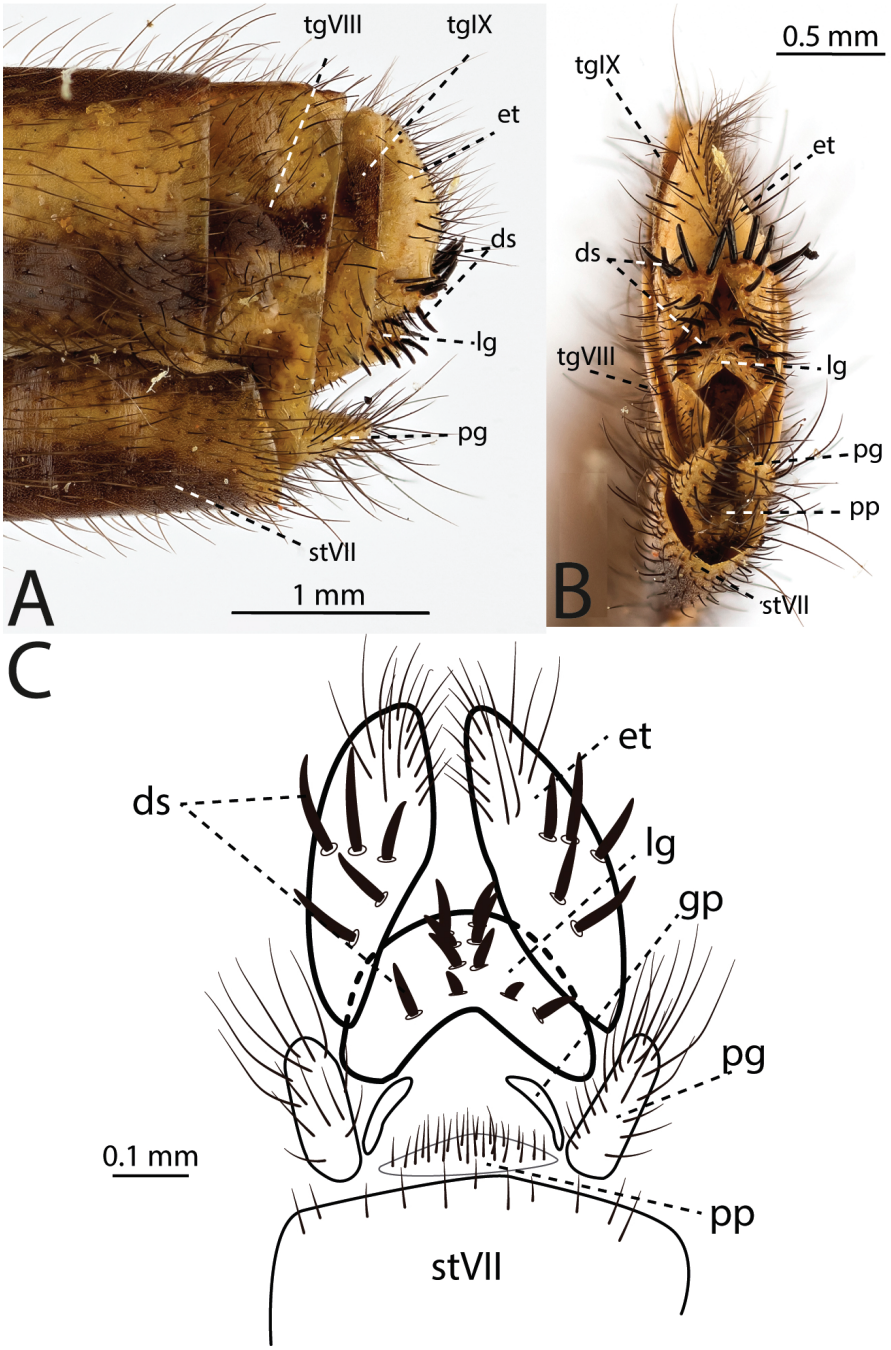

Figure 8. *Ameromyia* female terminalia: **A** *A. protensa*, lateral view. **B** *A. protensa*, posterior view. **C** *A. nigriventris*, ventral view. Photographs by Lara Lopardo (EMAU). — Abbreviations: et, ectoproct; ds, digging setae; gp, gonapophyseal plate; lg, lateral gonapophysis; pg, posterior gonapophysis; pp, pregenital plate; st, sternite, tg, tergite.

k-values for implied weighting always recovered a single tree and with the same topology as one of the trees recovered under equal weighting (Fig. 11A), varying only in consecutive smaller fits, and thus Mirande's (2009) implied weighting procedure recovered the same single identical tree in all groups, with the same sums of SPR similarities and distortion coefficients (Supplementary Material Table S2). Furthermore, the trees recovered under equal weighting differed only in regard to *A. muralli* position within the genus, and thus the tree under equal weighting which had the same topology as the trees recovered under implied weighting was chosen as the current proposed classification for *Ameromyia* (Fig. 11A), but both topologies will be discussed.

The clade which represents *Ameromyia* was recovered as paraphyletic in all analyses, with *Venezueleon guaricus* (~ *A. guarica* **comb. nov.**) placed deep into internal branches. This clade is supported by eight synapomorphies (29:1 At least four crossveins between hind wing vein CuA and posterior branch of MP; 34:0 Ectoproct postventral lobe shorter than ectoproct height; 36:1 Female gonapophyseal plate elongate; 37:1 Lateral gonapophysis of female genitalia fused; 39:1 clavate setae on male genitalia; 43:1 Parameres lateral tooth basad to paramere plates; 44:1 Male gonarcus positioned anterior to parameres; and 45:0 Male mediuncus absent).

Two well defined groups were recovered inside the *Ameromyia sensu novo* clade. The '*modesta*' group (Fig. 11) is supported by two synapomorphies (32:2 Male abdomen tergites 3+4 equals to hind wing length; 40:1 Male clavate setae with sickled club). *Ameromyia protensa* (Gerstaecker, 1893) was recovered sister to the remaining

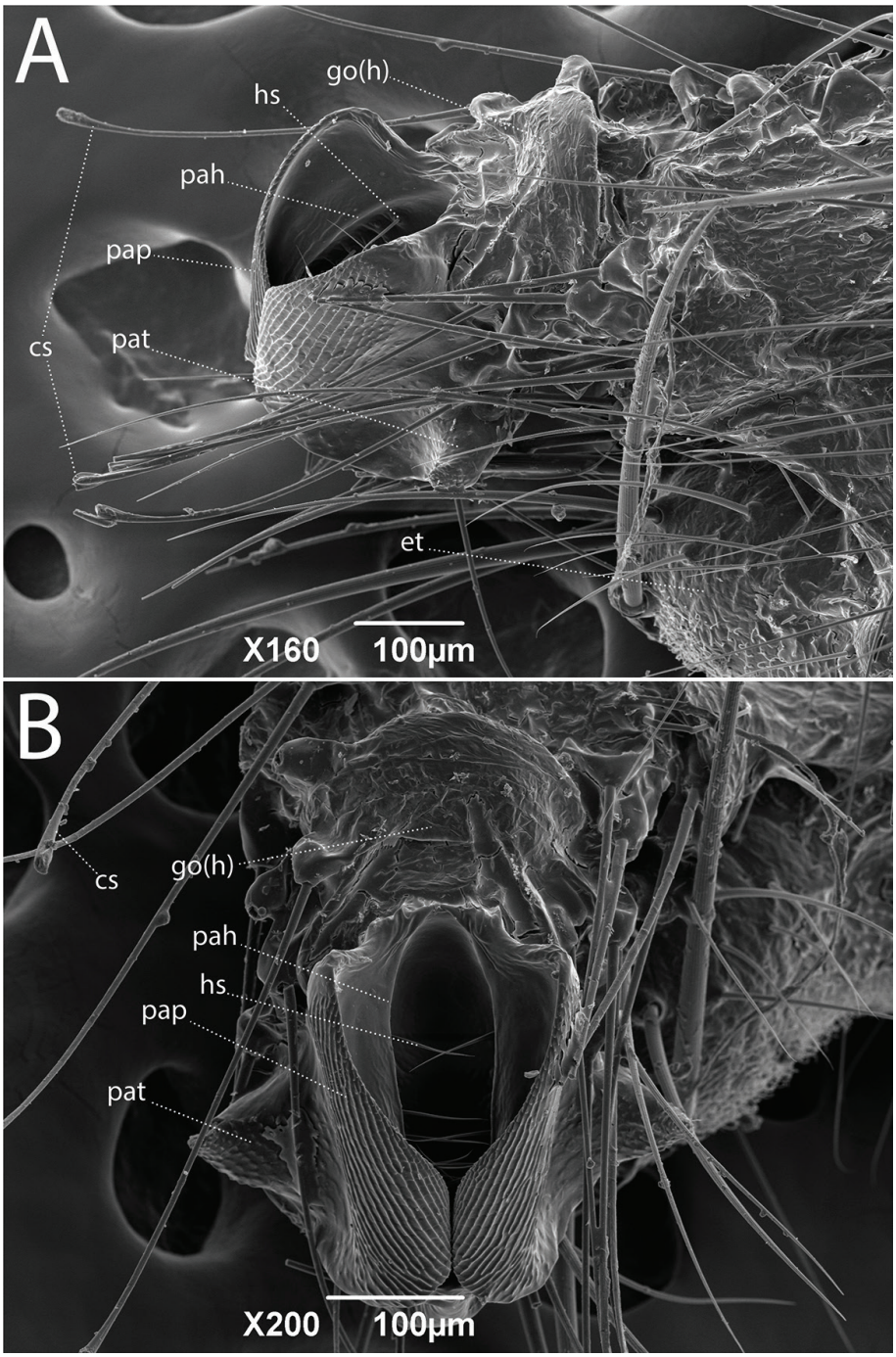

Figure 9. Scanning electron microscope (SEM) micrograph of *Ameromyia nigriventris* male genitalia: **A** lateral view. **B** Posterior view. — Abbreviations: cs, clavate setae; et, ectoproct; go(h), gonarcus, hidden under pleura; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth.

species in this group (clade A, which is supported by one synapomorphy (10:0 Profemur with black decumbent setae only). Within clade A, *A. pubiventris* (Walker, 1860) was recovered sister to *A. modesta* (Banks, 1943) + *V. guaricus* (clade B), the latter supported by two synapomorphies (11:1 Femora with contrasting coloration between external and internal faces; and 12:1 Tarsomeres with contrasting coloration between external and internal faces).

The '*nigriventris*' group (Fig. 11) was recovered monophyletic in all analyses, but supported by different set of synapomorphies in both resulting trees. In our proposed classification for *Ameromyia* (Fig. 11A), this group is supported by a single synapomorphy (29:1 Hind wing posterior area cells at least as high as long), while in the alternative tree (Fig. 11B) this group is supported by two additional synapomorphies (16:1 Forewing mediocubital area with discontinuous infuscations and 17:1 Presectorial and sectorial areas with discontinuous infuscations). In both trees, *Ameromyia clepsydra* **sp. nov.** was recovered sister to all remaining species within this clade.

Regarding the remaining species within the *nigriventris* group clade (clades C and H), our analyses recovered two different topologies. In our proposed classification for *Ameromyia* (Fig. 11A), clade C is supported by three synapomorphies (14:1 Forewing vein CuP connecting with posterior branch of CuA with more than 6 crossveins; 24:0 Forewing vein 2A touches 3A and 29:2 Hind wing vein CuA connecting with posterior branch of MP with more than 5 crossveins). Inside clade C, *A.*

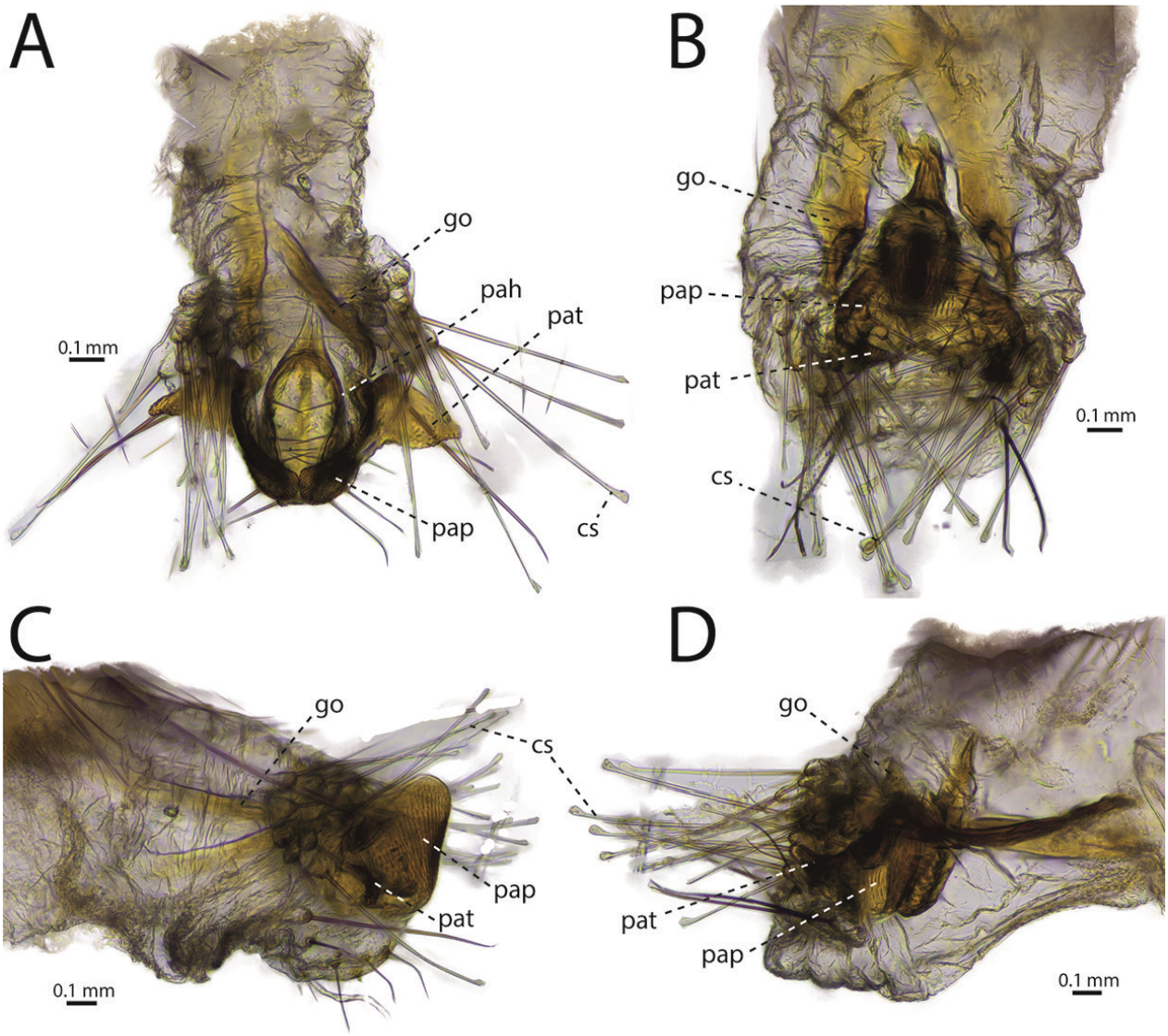

Figure 10. Male genitalia of *Ameromyia explicata* **sp. nov.**, cleared in KOH: **A** dorsal view, in folded conformation. **B** Dorsal view, in unfolded conformation. **C** Lateral view, in folded conformation. **D** Lateral view, in unfolded conformation. — Abbreviations: cs, clavate setae; go, gonarcus; pah, paramere hinge; pap, paramere plate; pat, paramere tooth.

muralli Navás, 1932 was recovered as sister to the remaining species, clade D, which are supported by a single sinapomorphy (11:1 Profemur with contrasting color pattern between external and internal faces). Clade D was recovered containing two sister groups, clade E + clade F, the first being supported by one synapomorphy (17:1 Presectorial and radial forewing areas with infuscation at crossveins), and the latter being supported by two synapomorphies (16:2 Forewing mediocubital area suffused with continuous infuscation and 21:0 Forewing CuP with homogeneous coloration). Clade E was recovered as a polytomy of *A. explicata* **sp. nov.** + *A. nigriventris* (Walker, 1860) + *A. strigosa* (Banks, 1909). Clade F was recovered as almost identical in both trees, with the same support values, and is comprised of *A. tendinosa* (Gerstaecker 1893) + clade G, which is supported by two synapomorphies (18:0 Forewing Sc veins with homogeneous coloration; and 19:0 Forewing R veins with homogeneous coloration), and comprehends *A. dimidiata* Navás, 1915 + *A. pleuralis* Navás, 1926.

In the alternative tree (Fig. 11B), the analyses recovered clade H instead of clade C. Clade H is supported by four synapomorphies (11:1 Profemur with contrasting color pattern between external and internal faces; 14:1 Forewing vein CuP connecting with posterior branch of CuA with more than 6 crossveins; 24:0 Forewing vein 2A touches 3A and 29:2 Hind wing vein CuA connecting with posterior branch of MP with more than 5 crossveins), and is comprised of a politomy of *A. explicata* + *A. nigriventris* + *A. strigosa* + clade I. The latter is a group supported by two synapomorphies (17:0 Presectorial and radial forewing areas without infuscation and 16:2 Forewing mediocubital area suffused with continuous infuscation), and comprehends *A. muralli* + clade F. Clade F is almost identical in this tree as in our proposed classification, but supported by only a single synapomorphy (21:0 Forewing CuP with homogeneous coloration).

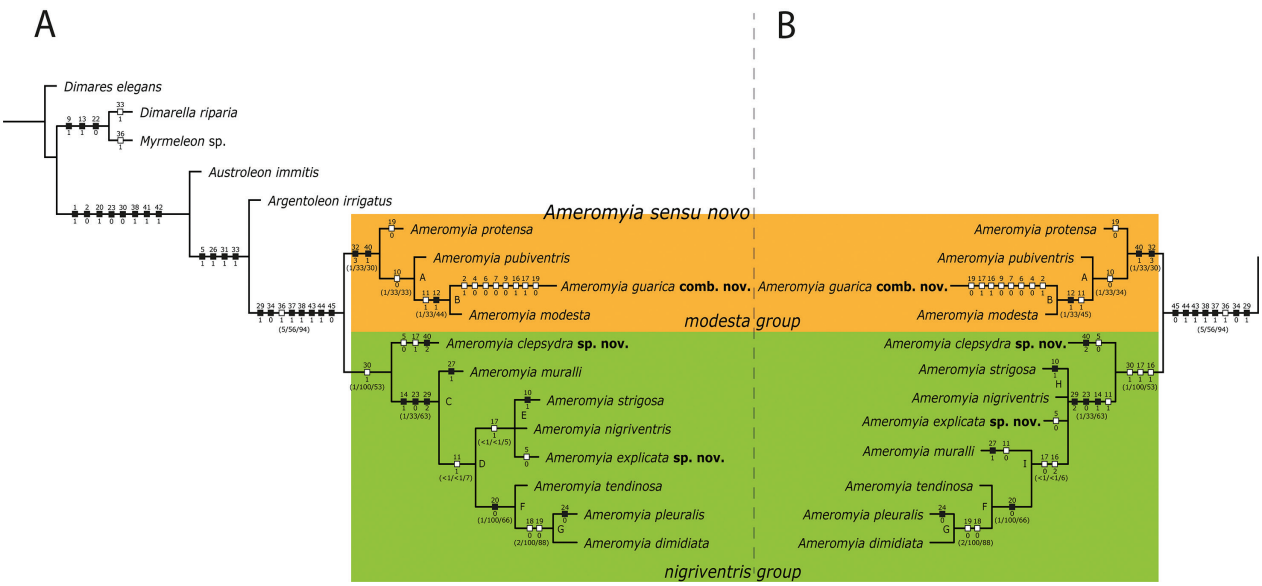

Figure 11. Phylogenetical hypothesis for *Ameromyia*: strict consensus cladogram resulting from analyses under equal weighting. Capital letters next to nodes and colored background around nodes and stems indicates the clades and species groups referred in text, respectively. Squares ordered on stems indicates characters used in the analysis: number above square and number under square indicates number of character and state of character as stated on "Character List" section. Filled squares indicates synapomorphies and blank squares indicates homoplasies. Values under branches indicates their support values for Bremer absolute and relative values, and resampling values (GC) respectivelly. **A** Proposed classificaton for *Ameromyia* sensu novo**. B** Alternative tree.

4. Taxonomy

4.1. *Ameromyia*

Ameromyia Banks 1913: 227. [Type species: *Brachynemurus strigosus* Banks, by original designation]. – Banks 1943: 165 [key]. – Penny 1977: 38 [species list, distribution]. – Stange 1994: 90 [taxonomy, species list, phylogeny of tribe]. – Stange 2004: 227, 383, 392, 393 [species catalog, diagnosis, habitat; genera identification key (adults), genera identification key (larvae)]. – Machado et al. 2019: 4, 7, 14 [family phylogeny]. – Oswald 2021 [in genera catalog]. – Machado and Martins 2022 [faunal catalog].

= *Amazoleon* Banks 1913: 229 [Type species: *Myrmeleon pubiventris* Walker, by original designation]. – Navás 1914a: 205 [*Amazoleon* = *Moza*]. – Banks 1943: 164 [key]. – Stange 1967: 45 [synonymy] – Oswald 2021 [in genera catalog].

= *Foya* Navás 1914b: 53 [Type species: *Foya trapezia* Navás, by original designation and monotypy]. – Esben-Petersen 1920: 190 [synonymy = *Amazoleon*].

= *Nemotolus* Banks 1943: 163 [Type species: *Myrmeleon protensis* Gerstaecker, by original designation]. – Stange 1967: 45 [synonymy].

= *Venezueleon* Stange 1994: 88 [Type species: *Venezueleon guaricus* Stange, by original designation and monotypy]. – Stange 2004: 249 [species catalog, diagnosis, habitat; genera identification key (adults), genera identification key (larvae)]. – Machado et al. 2019: 24 [genera list]. – Oswald 2021 [in genera catalog] [**NEW SYNONYMY**]

Distribution. South America (Figs 12, 13).

Species included. *Ameromyia clepsydra* **sp. nov.**; *A. dimidiata* Navás, 1915a; *A. explicata* **sp. nov.**; *A. guarica* (Stange, 1994) **comb. nov.**; *A. modesta* (Banks, 1943); *A. muralli* Navás, 1932; *A. nigriventris* (Walker, 1860); *A. pleuralis* Navás, 1926b; *A. protensa* (Gerstaecker, 1893); *A. pubiventris* (Walker, 1860); *A. strigosa* (Banks, 1909); *A. tendinosa* (Gerstaecker, 1893).

Diagnosis. Fore and hind wings with both banksian lines well developed; hind wings vein CuA with at least four crossveins connecting with posterior branch of MP; male ectoproct postventral lobe shorter than ectoproct height; female gonapophyseal plate elongate; lateral gonapophysis of female genitalia fused; male genitalic sac with clavate setae; parameres lateral tooth basad to paramere plates; male gonarcus positioned anterior to parameres; and male medincus absent; larvae with thread-like setae.

Larvae known (Figs 14, 15B, C, 16B, C, 19, 26, 27, 30, 36)**.** *Ameromyia clepsydra* **sp. nov.**; *A. guarica* **comb. nov.**; *A. modesta*; *A. nigriventris*.

Description. ADULT. ***Head*:** frons with short setae. Antenna of same length on both sexes, moderately short with about 30 flagellomeres. Antennal fossae separated by about two times pedicel width. Interocular distance less than eye width. Profemur without clavate setae. Vertex with many short decumbent setae. Ocular rim without setae. Clypeus with scattered setae, which are oriented ventrally. Labrum with two rows of short setae on ventral margin, all of which pointing ventrally. — ***Thorax*:** Pronotum broader than long when pretarsal claws are shorter than distal tarsomere, and longer than broad when pretarsal claws are otherwise. Pronotum with many long anteriorly oriented bristles on all margins, which are longer on

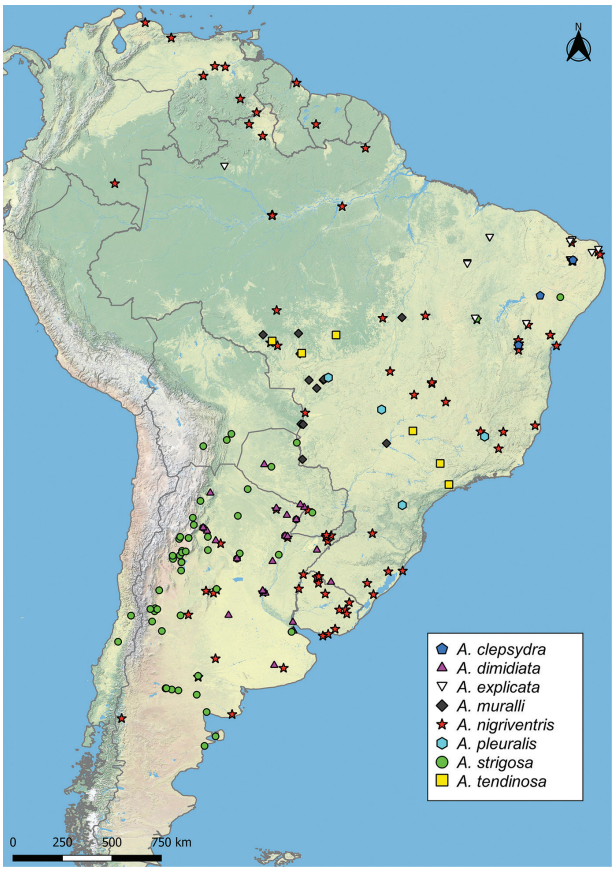

Figure 12. South America map showing the current distributional records for *Ameromyia* species in the *nigriventris* species group.

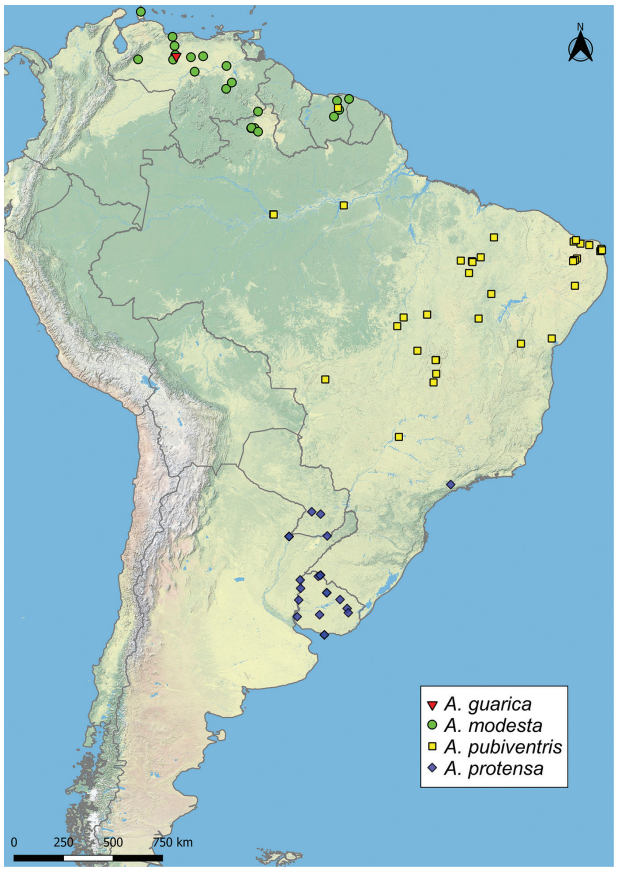

Figure 13. South America map showing the current distributional records for *Ameromyia* species in the *modesta* species group.

lateral margins. Pronotum often with mirrored "P" shaped markings medially. Prescutum 2 and 3, mesoscutum and metascutum with many short, posteriorly-oriented white setae on posterior margins, and meso and metascutella with longer white setae on posterior margins. Thorax with many decumbent setae laterally, and mesepisternum frequently with a sulcus mesally. Lateral side of thorax sometimes with a longitudinal pale band, which covers episternum and epimeron of meso and metathorax, and contrasts with ventral thorax which is darker. Mesonotum without blade-like setae. — ***Legs*:** Legs with many short decumbent setae. Femoral sense hair present or absent. If present, profemoral sense hair as long as femur and much longer than that of mesoleg, which is shorter than mesofemur. Femur with or without black and/or white bristles. Tibiae with many black bristles, which are longer than femoral bristles, when present. Tibial bristles as long as tibial width, when femoral bristles are absent. Tibial spurs present, longer than basitarsus. Five tarsomeres, longer than broad. Distal tarsomere much longer than basitarsus. Pretarsal claws at least 2/3 of distal tarsomere length, more commonly longer than distal tarsomere. — ***Wings*:** Pilula axillaris well developed. Forewing as long as hind wing or slightly longer. Both anterior and posterior banksian line well developed and present in both wings. Wing membrane mostly hyaline, sometimes with a reddish or brownish tint. Forewing costal area simple at least until midwing length. Posterior area of forewing about as broad as that of hind wing. Forewing rhegmal area with brown infuscation on rhegmal crossveins. Forewing vein CuP runs along posterior fork of CuA, with at least four crossveins connecting them. Forewing vein 2A running towards posterior wing margin in a smooth curve. Forewing vein 2A connected to 3A by a crossvein, or touching 3A before running towards posterior wing margin. Hind wing CuA runs along posterior branch of MP fork with at least four crossveins connecting them. — ***Abdomen*:** Male abdomen longer or much longer than wings, female abdomen shorter than wings, or almost 1.5× longer than wings. Male tergite IX with many long, thick setae ventrally. Male tergite IX subquadrangular, with posteroventral margin slightly swollen and with many posterior oriented setae. Male ectoproct with a developed short postventral lobe, which is subequal to half of ectoproct height, without median or secondary lobes. Parameres posteriorly plate-like, arched, striated on external face of paramere plates, with a basal lateral hollow tooth on each side, and high sclerotized posterior folds. Parameres with a hinge mesally on internal face of each paramere plate, and with a row of short setae on each internal margin. Parameres anterior to hinge smooth, "spoon-like", positioned between parameres plates (in "folding" position), and fused dorsally with an anterior bifurcated projection. Gonarcus smooth, membranous, with long anteriorly projected arms which are flat and long. Gonarcus positioned anterior to parameres, arching barely dorsad to parameres

anterior bifurcation and dovetailing or almost dovetailing behind parameres plates lateral tooth. Genitalic sacs lateral to paramere tooth, with many clavate setae that reach beyond and/or above and posteriorly to paramere plates. Female terminalia with pregenital plate membranous with many setae. Gonapophyseal plate elongate, but shorter than posterior gonapophysis. Posterior gonapophysis digitiform, with many setae. Lateral gonapophysis fused, with well-developed digging setae. Ectoproct with well developed digging setae. — **LARVA (third instar). *Head*:** Larvae with three teeth. Mandible with distance between mandible base and basal tooth longer than between teeth. Mandible not enlarged at base. Some setae on external margin of mandibles base with length as long or almost as long as mandible base width. Internal margin of mandibles roughly straight until reaching distal teeth, and roughly about the same width. Distal tooth smaller than basal and medial teeth and oblique in relation to other teeth. Distal tooth closer to medial tooth than medial tooth is to basal tooth. Head capsule on dorsal view as broad as long or slightly broader than long. Head capsule on ventral view longer than broad or as long as broad. Head dorsal surface with thread-like setae near posterolateral margins. Head capsule dorsally with many short, thick, blunt dolichasters and very short, almost "sphere-like" dolichasters, ventrally with short, thin dolichasters, and long and thick setae on lateral margins, which are straight on the anterior portion of head, and curved on posterior portion of head. Labrum with a row of thick, cylindrical dolichasters on posterior margin. Palpi with three segments, distal palpomere bigger than basal palpomere, which is bigger than mid palpomere. Distal palpomere enlarged at base with an acute end. Presence of rowed thick, cylindrical, white dolichasters near base of each palpi. — ***Thorax*:** Dorsal surface sometimes covered with thread-like setae. Dorsal surface prunescent, covered with short dolichasters. Thoraxic dorsal sclerites with short rowed dolichasters on all margins. Thorax ventral surface with long hair-like setae. Prothorax with many short, curved bristles on anterior margin. Mesothoracic spiracle borne on tubercle, tubercle length half of metathorax width at most. Tubercule covered with thread-like setae. Metathorax with two pedunculated setiferous processess on lateral margins, which bear many long bristles. Metathorax with a pair of eliptical dark spots submedially. — ***Abdomen*:** Abdominal tergites with thread-like setae, and sternites sometimes with thread-like setae. Abdominal spiracles not enlarged nor borne on tubercles. Setiferous processes on abdominal lateral margins bearing long white, black, or black and white bristles. Setiferous processes on abdominal lateroventral margins with hair-like setae. First abdominal tergite with two eliptical black spots submedially, almost aligned with metathoraxic dark spots. Odontoid process on sternite VIII longer than basal width. Ninth sternite covered with thread-like setae. Rastra with 4 thick setae, with innermost setae much shorter than remaining setae.

Remarks. At first look, *Ameromyia* species can look similar to *Argentoleon* or to large *Austroleon* specimens, but can be readily differentiated from both genera by the short male postventral ectoproct lobes (which are much longer in *Argentoleon* and absent in *Austroleon*); the presence of both banksian lines in both wings; and the much longer hind wing CuA. Other Brachynemurini species bear a long hind wing CuA vein (such as *Brachynemurus fuscus* (Banks) and *Brachynemurus nebulosus* (Olivier)) or both banksian lines in both wings (*B. nebulosus*), but they are very different regarding distributional ranges and other *Ameromyia* diagnostic characters, such as the simple forewing costal area cells. *Ameromyia* male genitalia is also very conspicuous (Figs 9, 10), as the paramere plates are enlarged and the paramere hooks are short and stout, and basad to paramere plates. The gonarcus is membranous and arches anterior to the parameres, with no mediuncus. The most similar-like genitalia to be found among Brachynemurini in previous studies is in *Peruveleon* Miller and Stange (Stange 1970, 1994), but this genus is easily distinguished from *Ameromyia* by many morphological characters such as leg chaetotaxy, the length of the hind wing CuA vein, and also by molecular data (Machado et al. 2019).

Two species groups are determined based on taxonomical characters of wing veins, male genitalia, and cladistic results: the '*modesta* group' and '*nigriventris* group' (Fig. 11). These two species groups were previously named and identified by Stange (1994), but were classified only by larval characters. The *modesta* group can now be characterized by the abdomen length, which is longer than wings in females and almost double the length of wings in males, as well as the sickled club of the clavate setae on male genitalia (Fig. 7C), while the *nigriventris* group is characterized mostly by the hind wing posterior area cells, which are as high as long or higher than long.

Within groups, however, *Ameromyia* species are very morphologically similar, differing mostly in coloration. Coloration pattern on main wing veins such as Sc, R, Cu and A veins appears to be consistent across species, but markings pattern on wing membrane can be polymorphic within species. Thorax pronotal markings are also usually very similar within *Ameromyia*, but some species bear unique markings which are consistent within specimens, such as *A. modesta* (Figs 1C, 2C, 28A) and *A. protensa* (Fig. 39A). Leg characters are usually informative, and although badly conserved specimens can show misleading color patterns as they can faint or darken over time, leg chaetotaxy is very consistent within species. Genitalic structures are little informative. *Ameromyia* male specimens have hinged parameres (sensu Adams 1956) and a highly membranous gonarcus, and thus genitalic structure can be complex to visualize as the sclerites can bend and flex. At dorsal view, all known species bear almost identical male genitalia (Fig. 10A), and female genitalia presents close to no variation between species, even when across different species groups (Fig. 8). The digging setae on female terminalia can present some slight variation on thickness and/or length across specimens, but this is probably a regional adaptation for the granulometry of available sand pools across different habitats. Due to this great genitalic similarity between species, female termi-

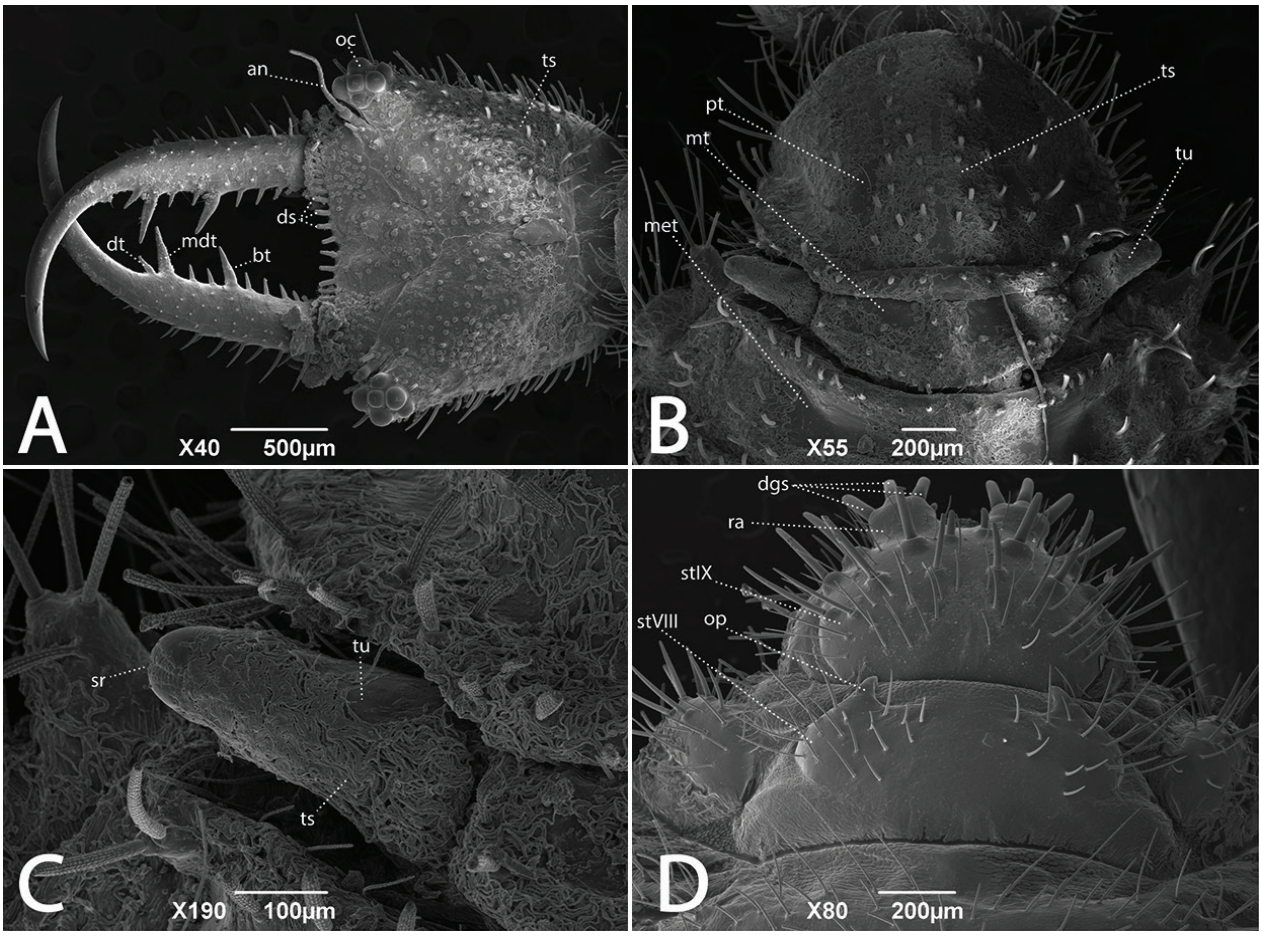

Figure 14. SEM micrograph of *Ameromyia clepsydra* **sp. nov.** third instar larvae: **A** head, dorsal view. **B** Thorax, dorsal view. **C** Mesothoracic tubercle, dorsal view. **D** Abdomen terminalia, ventral view. — Abbreviations: an, antennae; bt, basal tooth; dgs, digging setae; ds, dolichasters; dt, distal tooth; mdt, medial tooth; met, metathorax; mt, mesothorax; oc, occelli; op, odontoid process; pt, prothorax; ra, rastra; sr, spiracle; st, sternite; ts, thread-like setae; tu, tubercle.

nalia and genitalia are only described in each description section when that species bear some morphological variation, and male genitalia is illustrated only in lateral view, in folding position, for each species section, as the lateral view provides more information as to the shape of the parameres (Adams 1956).

The larvae of most *Ameromyia* species are currently unknown, except for *A. clepsydra* **sp. nov.**, *A. guarica*, *A. modesta* and *A. nigriventris*. Stange (2004) described the presence of thread-like setae on dorsal segments (Fig. 14A–C) as a character for differentiating the two groups, as it is present in *A. modesta* but described as absent in *A. nigriventris*. However, it is present in all known *Ameromyia* larvae.

Biology. Very few data have been made available regarding *Ameromyia* biology and/or behaviour. Stange (1994) stated the known larvae lives on sand dunes, and later (2004) stated the adults rests on grass stems during the day. In this study, we have observed and/or reared in captivity adults from four species (*A. clepsydra* **sp. nov.**; *A. explicata* **sp. nov.**; *A nigriventris* and *A. strigosa*), and larvae from two species (*A. clepsydra* **sp. nov.** and *A nigriventris*). Adults from all species observed except for *A. clepsydra* **sp. nov.** were capable of flying high, at at least 2 m above ground, and when in captivity, they almost always perched at the top of the rearing enclosure. In their natural habitat, *A. nigriventris* females were seen flying close to the ground, presumably scouting for good ovipositioning spots, while all observed males which were near the ground were found slowly hovering in place, just above patches of loose earth which were apparently suitable for larvae. It is unknown if this is somehow a courting behaviour. Regardless of sex, when disturbed, specimens would quickly try to outmanouver their catcher, then rapidly ascend in the air and gain speed with the wind. Wild specimens of *A. clepsydra* **sp. nov.** were always observed flying very low, close to the bedrock, and no such ascending behaviour could be seen.

In this work, no feeding behaviour was observed in the wild, but in captivity, adult specimens of *A. explicata* **sp. nov.**, *A. nigriventris* and *A. strigosa* accepted *D. melanogaster* as prey. Aphids, maggots, small catterpillars and green lacewings were offered, but none were succesfully preyed upon. Maggots were only eaten when handfed, and small catterpillars were only eaten when handfed, and if some hemolymph or gut content was exposed. All adult specimens accepted artificial diets such as honey + water, boiled egg white, and gelatin with sugar and egg yolk. However, all artificial foods were only eaten when

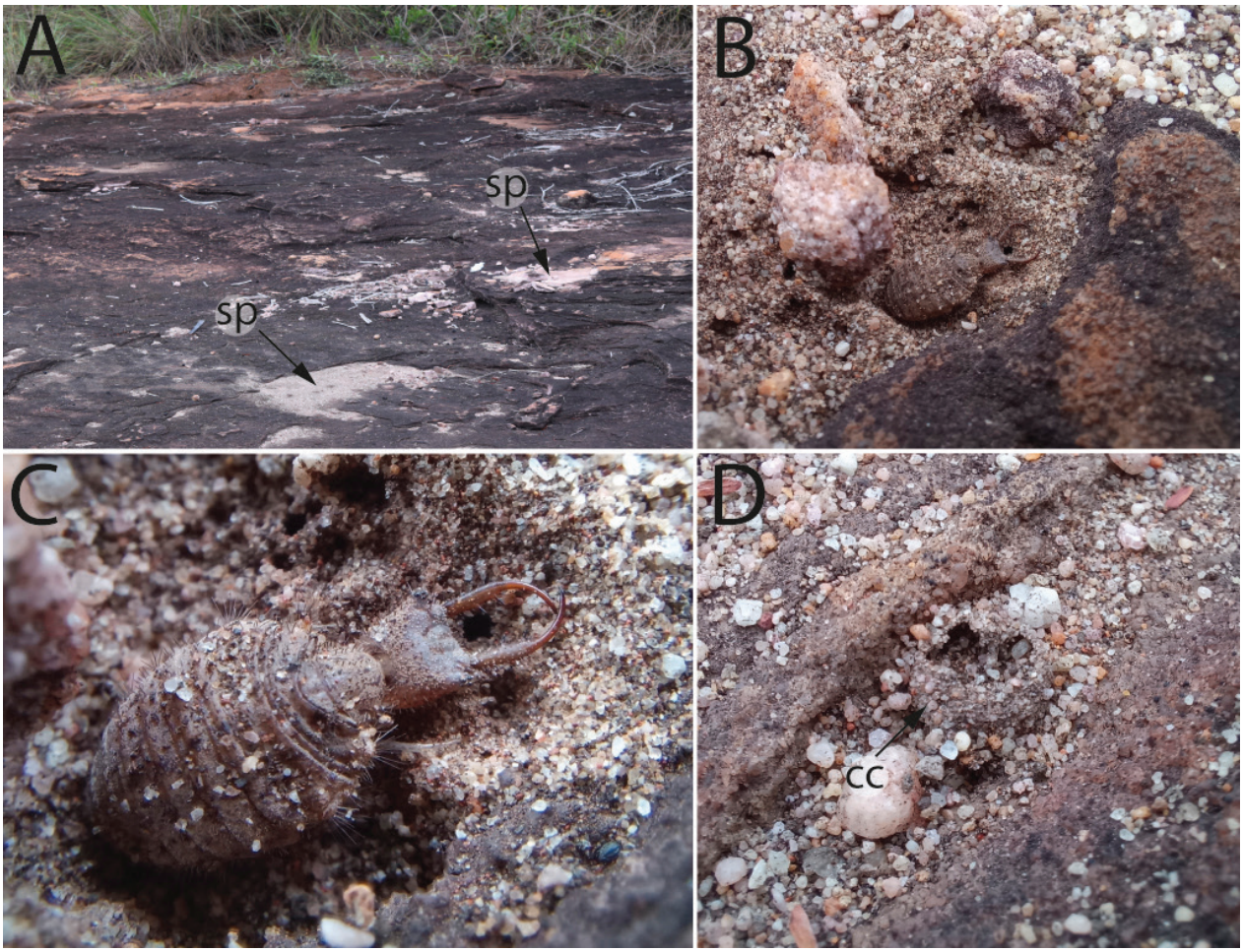

Figure 15. Collection site and habitat of *Ameromyia clepsydra* **sp. nov.**, in Andaraí, Bahia, Brazil: **A** site surroudings and sandy substrate on bedrock. **B** Second-instar larvae exposed in its "trench". **D** Third-instar larvae exposed on its "trench". **D** Empty, open coccoon on bedrock crevice. — Abbreviations: cc, coccoon; sp, sand pools.

handfed and individuals would starve to death otherwise, even if the food was left inside the enclosures. This suggests these *Ameromyia* species might rely solely on aerial hunting for feeding. Diets consisting of only sugar and water would only sustain individuals for a week, whether in every other diet (both natural and artificial) the specimens lived for approximately three weeks. Starving adults would die in two or three days.

The larvae of *A. modesta* and *A. nigriventris* were described as living in sand dunes, and *A. guarica* was described as living in shallow sand anchored to bedrock (Stange 1994). Of the larvae reared in the present work, that of *A. clepsydra* **sp. nov.** (Fig. 15B, C), lives in the same microhabitat as described for *A. guarica*: shallow, water-deposited sand on top of a river bedrock (Fig. 15A). The *A. nigriventris* larvae collected during this work were found on patches of loose, sandy wind-deposited earth on top of compacted clay soil (Fig. 16A). Despite the habitat differences, there is much similarity to the analyzed larvae microhabitat. *Ameromia nigriventris* larvae stays submerged in the loose, sandy soil, while using the compacted clay as a hard substrate which they anchor themselves to (Fig. 16B, C), and *A. clespydra* **sp. nov.** anchor themselves to the bedrock itself or the shallow compacted sand on top of the same bedrock (Fig. 15B, C). Almost always, larvae were found on small "trenches", presumably dug out by the larvae themselves (Figs 15B, C, 16B–D). All known *Ameromyia* larvae bear many long bristles on thoracic and abdominal setiferous processes, which would help in escavating suitable holes in hardened substrate. When exposed, the larvae would slightly contract themselves into their holes, and remain still for a while. Then, they would try to dig backwards, or leave their spot and walk forwards, towards a new hiding place. When moving forwards, regardless of instar, *A. nigriventris* larvae are very quick and highly agile, while *A. clepsydra* **sp. nov.** are very slow and lethargic, sometimes refusing to move even if poked or disturbed. Coccoons (empty or with pupae still inside) in the wild were found in the same said "trenches" (Fig. 16D), or protected by bedrock (Fig. 15D). When in captivity, *Ameromyia* larvae were highly sensitive about the presence or absence of both the hard substrate to achor themselves to, and to said "trenches". Larvae from both reared species would easily startle and hardly feed in the absence of a similar hard substrate, and *A. clepsydra* **sp. nov.** larvae in the late third instar would not spin a coccoon nor pupate, and instead walk incessantly until it found an appropriate substrate or until death. To simulate the hard achorage of their natural habitat, plaster or styrofoam was "dug out" and then fit

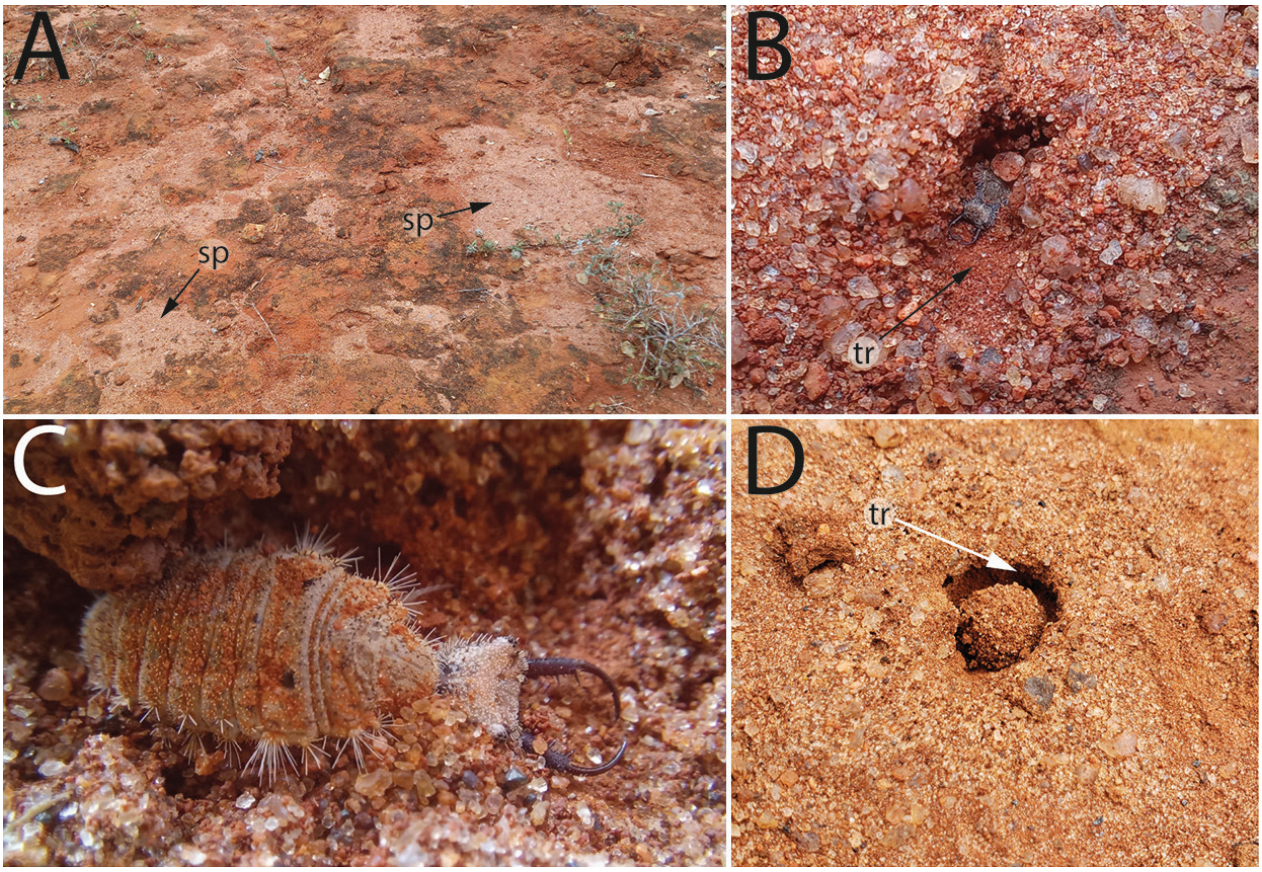

Figure 16. Collection site and habitat of *Ameromyia nigriventris*, in Miguel Calmon, Bahia, Brazil: **A** site surroundings and sandy substrate on compacted soil. **B** First-instar larvae exposed in its "trench". **C** Third-instar larvae exposed on its "trench". **D** Coccoon, exposed on a dug-out "trench". — Abbreviations: sp, sand pools; tr, trenches.

into the larvae plastic enclosures, which highly decreased larvae mortality. This highly suggests *Ameromyia* species are much more sensible to microhabitat selection and alterations, as other larvae collected from the same sites and in similar microhabitats (such as *Austroleon immitis* and *Dimarella riparia*) were able to feed, develop and pupate normally even in the absence of these specific microhabitat conditions. Although larvae from other species were not found during this work, as the morphology and chaetotaxy of female terminalia is consistently similar throughout the genus, larvae habitat might also be similar, as the characteristics of female terminalia affects oviposition and the selection of larvae habitat (Stange and Miller 1990).

4.2. Identification key to *Ameromyia* adults

1 Posterior area of hind wing narrow, cells delimited by crossveins between CuA and hind wing margin are longer than high (Fig. 4B) ..... (*modesta* species group) **2**

1' Posterior area of hind wing broad, cells delimited by crossveins between CuA and hind wing margin are at least as high as long (Fig. 4D) ..... (*nigriventris* species group) **5**

2 Posterior area of forewing at base higher than prefork area at CuA fork; fore and hind wing RP veins dark coloured (southern Brazil; Argentina; Uruguay) ..... ***Ameromyia protensa* (Gerstaecker)** (Figs 38, 39)

2' Posterior area of forewing at base narrower than prefork area at CuA fork (Fig. 4B); forewing RP veins with the same pattern as R vein (Venezuela to central Brazil) (Fig. 5A) **3**

3 Thorax with dorsal part of pleuron pale brown in contrast to dark brown ventral part (Fig. 40C); legs relatively homogeneous in coloration, pale brown with scattered dark brown spots ..... ***Ameromyia pubiventris* (Walker)** (Fig. 40)

3' Thorax with pleuron not contrastingly pale above and dark below; legs with anterior face pale brown and posterior face dark brown (Fig. 3B) **4**

4 Profemoral sense hair present; pretarsal claws longer than distal tarsomere; pronotum at least as broad as long (Fig. 2C) ..... ***Ameromyia modesta* (Banks)** (Figs 28–30)

4' Profemoral sense hair absent; pretarsal claws shorter than distal tarsomere (Fig. 3B); pronotum broader than long (Fig. 2B) ..... ***Ameromyia guarica* (Stange)** (Figs 24–26)

5 Forewing CuP runs parallel to CuA with less than 6 crossveins between them (Fig. 17B); forewing vein 2A connected to 3A only by a crossvein (Fig. 6B); male abdomen barely longer than wings (Fig. 1E); male genitalia with clavate setae short, with a subglobose club (Fig. 7D)..... ***Ameromyia clepsydra* sp. nov.** (Figs 17–19)

5' Forewing CuP runs parallel to CuA with more than 6 crossveins between then (Fig. 4C); forewing vein 2A touches 3A before running to posterior wing margin (Fig. 6A); male abdomen longer than wings (Fig. 32C); male genitalia with clavate setae club globose (Fig. 7B) **6**

6 Forewing with four to five oblique markings along MA vein (Figs 1A, 43C, 44A); frons and profemur decumbent setae all white (Figs 2A, 43B)..... ***Ameromyia strigosa* (Banks)** (Figs 39–44)

6' Forewing without or with one oblique marking; frons and profemur decumbent setae white and black or all black (Fig. 3)..... **7**

7 Fore and hind wings falcate (Figs 1B, 31B, C); profemur without contrast between external and internal faces (Fig. 31A)..... ***Ameromyia muralli* Navás** (Fig. 29)

7' Fore and hind wings not falcate (Fig. 4C, D); profemur with contrast between external and internal faces (Fig. 3A, B)..... **8**

8 Forewing CuP coloration homogeneous (Fig. 5C); lateral side of thorax with an evident pale brown longitudinal band, with dorsal portion of mesepisternum pale in contrast to darker ventral portion (Fig. 3A, B) … **9**

8' Forewing CuP with dashed pattern (Fig. 5B); lateral side of thorax with or without an evident pale brown longitudinal band **11**

9 Forewing CuP pale (Fig. 21A) (Paraguay, Argentina) ..... ***Ameromyia dimidiata* Navás** (Figs 20, 21)

9' Forewing vein CuP dark (Fig. 5C) (Brazil)..... **10**

10 Forewing RA vein pale (Fig. 35B)..... ***Ameromyia pleuralis* Navás** (Fig. 37)

10' Forewing RA vein dark or dashed (Fig. 5C) ..... ***Ameromyia tendinosa* (Gerstaecker)** (Figs 45, 46)

11 Lateral side of thorax with an evident pale brown longitudinal band, with dorsal portion of mesepisternum pale in contrast to darker ventral portion (Fig. 33D) ..... ***Ameromyia nigriventris* (Walker)** (Figs 32–36)

11' Lateral side of thorax without an evident pale brown longitudinal band, with mesepisternum relatively homogeneous in coloration (Fig. 3C) ..... ***Ameromyia explicata* sp. nov.** (Figs 22, 23)

4.3. Identification key to *Ameromyia* larvae

1 Row of dolichasters on clypeolabrum anterior margin all black; presence of black setae on tuft of setae on abdominal setiferous processes; mesothoracic tubercle longer than broad **2**

1' Row of dolichasters on clypeolabrum anterior margin black between mandibles and white at mandibles base; tuft of setae on abdominal setiferous processes with white setae only; mesothoracic tubercle shorter than broad (Figs 16C, 36A, C)..... ***Ameromyia nigriventris* (Walker)** (Figs 16B, C, 36)

2 Thorax and abdominal surface with dark thread-like setae (Figs 14B, C, 15C, 19A, 28A, C) **3**

2' Thorax and abdominal surface with only white or pale thread-like setae.... ***Ameromyia guarica* (Stange)** (Fig. 26)

3 Clypeolabrum conical dolichasters grey/pale (Figs 14A, 15C) (northeastern Brazil)..... ..... ***Ameromyia clepsydra* sp. nov.** (Figs 14, 15B, C, 19)

3' Clypeolabrum conical dolichasters black (Fig. 30A, C) (northern South America: Venezuela, Brazil (Roraima state) ..... ***Ameromyia modesta* (Banks)** (Fig. 30)

4.4. *Ameromyia clepsydra* Tavares sp. nov.

Figs 17–19

Diagnosis. Black and white coloration. Thorax lateral side black with no apparent longitudinal pale band. Wing veins alternating black and white coloration. Wing membrane with many markings and infuscations, mostly on radial, rhegmal and substigmal areas. Sectorial and presectoral area crossveins sometimes with an infuscated biareolate "8" shaped pattern. Male genitalic clavate setae club subglobose.

Description. ADULT. ***Head*:** Antennae clubbed (4 mm) with 31 flagellomeres, light brown with yellow rings between the flagellomeres. Vertex white with grey patches, and dark brown spots on lateral margins; with a transversal and a longitudinal dark brown streak at anterior and posterior row, forming a "T" shape. Vertex decumbent setae white. Interantennal area white with a dark streak in the middle, and dark spots under each scape. Frons light yellow near antennae and light grey near clypeus, and median, transversal dark brown patches. Frons setae black. Interocular distance less than eye width. Clypeus white, with two dark brown marks pointing ventrally. Labrum marginally yellow, dark brown centrally. Mandible dark brown. Palpi dark brown, with white joints. — ***Thorax*:** Thorax black, with white or light brown markings. Thorax on lateral view dark, with no lateral longitudinal band under wings. Pronotum as broad as long, white with a longitudinal dark brown band on each side. Pronotum marginal setae white. Mesonotum dark, with white markings on mesoscutum and mesoscutellum. Metano-

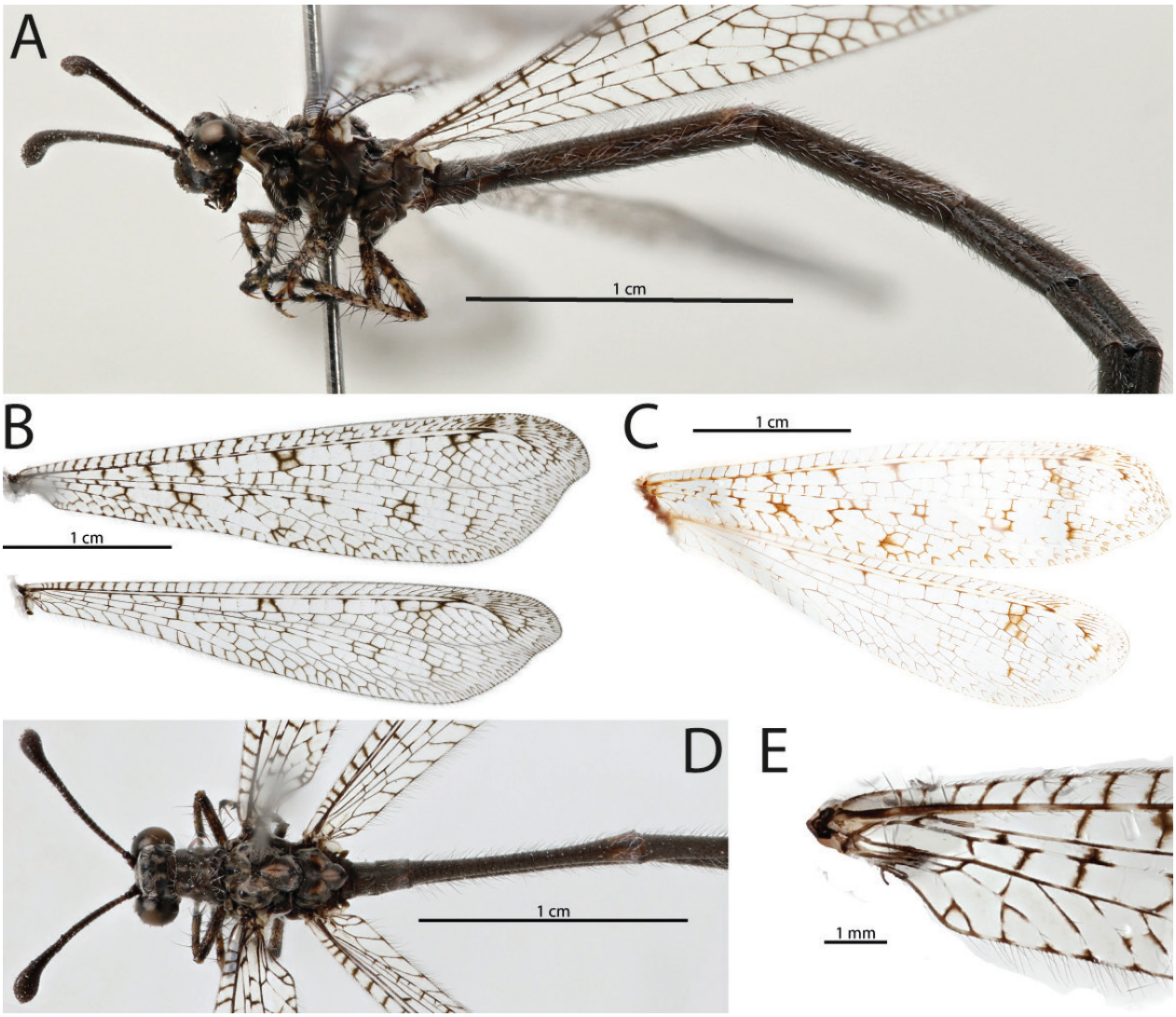

Figure 17. *Ameromyia clepsydra* **sp. nov.**: **A** holotype, habitus, lateral view. **B** Holotype, fore and hind wing. **C** Fore and hind wings with crossvein pattern variation. **D** Holotype, head, thorax, wing base and basal abdomen, dorsal view. **E** forewing base.

tum dark with light brown medially on metascutum and a longitudinal light brown band on metascutellum. — **Wings:** Wing tip acute, frequently notched on posterior margin or with a strongly falcate and sinuous apex posterior margin. Veins with dark brown and white dashed pattern. Wing membrane hyaline, with dark infuscations along crossveins, with more intensity on forewing than on hind wing, except for infuscations on presectoral and on radial areas, which are evident on both wings. Presectorial and radial areas in both wings sometimes with longitudinal crossveins between vertical crossveins, forming a pattern akin to an "8" shape. Forewing mediocubital area with dark infuscations around vertical crossveins which become sparser along MA vein, culminating on rhegmal area. Forewing CuP and hind wing CuA veins extending well before CuA fork and MP fork respectively, with at least four crossveins connecting them and posterior branch of fork. Pterostigma frosted white, encompassing four crossveins. Cells delimited by transversal veins in hind wing posterior area higher than long. — ***Legs*:** Coxae dark. Femur and tibiae with long black bristles. Femur white, suffused with black spots. Femur decumbent setae black. Profemural sense hair longer than profemur, and mesofemural sense hair much shorter than mesofemur. Tibia white with distal joint and near apical joint black. Tibial spurs slightly shorter than pretarsal claws. Five tarsomeres, white, except for distalmost and third to distalmost tarsomeres which are black. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen mostly black, turning dark brown at terminalia. Tergites with scarce white setae, and sternites with black setae. Male ectoproct with many long black setae on posterior face, and a very short, slight round postventral lobe, which is less than 1/3 ectoproct height. Parameres hinge with a row of short setae on each side. Gonarcus arch positioned not above paramere plates on lateral view. Genitalic sac with many short, subclavate setae. — **LARVA (third instar):** ***Head*:** Head capsule as long as broad in dorsal view, slightly longer than broad in ventral view. Head capsule dorsally grey, with dark brown patches medially, and on anterior margin. Clypeolabrum light brown medially, and dark near mandibles. Head capsule ventrally light brown. Short dolichasters on head dorsal surface cone-like. Head cap-

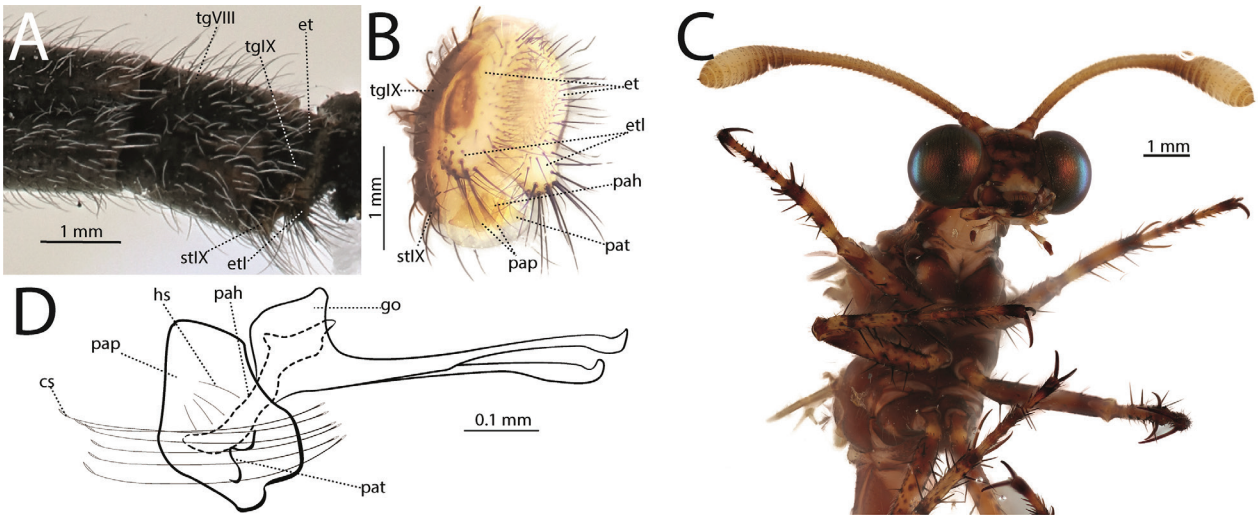

Figure 18. *Ameromyia clepsydra* **sp. nov.**: **A** lateral view and **B** posterior view of male terminalia. **C** Head, thorax and legs, ventral view. **D** Illustration of male terminalia, lateral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

sule dolichasters mostly black, with a few white dolichasters near anterior and lateral margins. Row of dolichasters on labrum anterior margin black. Dorsal surface with mostly white thread-like setae near posterior and posterolateral margins, and sometimes on mandibles. — ***Thorax*:** Thorax dorsally dark, with sparsed light brown patches, and ventrally light brown with small dark spots on setal insertion. Thorax dorsal surface with dark and white thread-like setae, and many short, black dolichasters. Mesothoracic spiracle borne on tubercle, which is about two times longer than broad. — ***Abdomen*:** Abdomen with dark thread-like setae on dorsal surface. Abdomen with prunescence, dorsally dark, with sparsed light brown patches, and ventrally light brown with small dark spots on setal insertion and near each basal abdominal margin. Abdominal setiferous processes with black and white setae.

Examined Material. Holotype: BRAZIL • ♂; BAHIA, Andaraí, Rio Piabas; 12°57′02.3”S 41°16′37.4”W; 25.xi.2018; Coleta Noturna, Lençol; Assmar, A; DZUP. **Paratypes**: BRAZIL • ♂; BAHIA, Andaraí, Rio Piabas; 20.i.2018; Coleta manual noturna; Tavares, L.; MZUSP • 2 ♂; BAHIA, Andaraí, Rio Piabas, rochas à margem do rio; 25.xi.2018 (reared from larval stage); Tavares, L; UFBA • ♂; BAHIA, Andaraí, Rio Piabas, 16.vi.2021 (reared from larval stage/emerged 05.ix.2021), coleta manual; Tavares, L.; UFBA • ♂; BAHIA, Andaraí, Rio Paraguaçu; 15.v.2010; Bandeja; UFBA. **Other material**: (3♀, 11 Larvae) BRAZIL – BAHIA • 11 larvae; Andaraí, Rio Piabas, rochas à margem do rio; 25.xi.2018; coleta manual; Tavares, L.; UFBA. – RIO GRANDE DO NORTE • 1♀; Serra Negra do Norte, ESEc Seridó, casa da entrada; 10–11.xii.2002; api (noite); Varellim, A.A.; UFBA • 1♀; same collection data as for preceding; 06.iv.2003; UFBA • 1♀; same collection data as for preceding; 01–02.xi.1999; Coleta manual; sob luz fluorescente; Varela-Freire, A.; UFBA.

Etymology. “Clepsydra” translates to “hourglass” in Latin. The characteristic pattern formed by transverse crossveins in forewing presectoral and radial sector area resembles an hourglass (Fig. 13B).

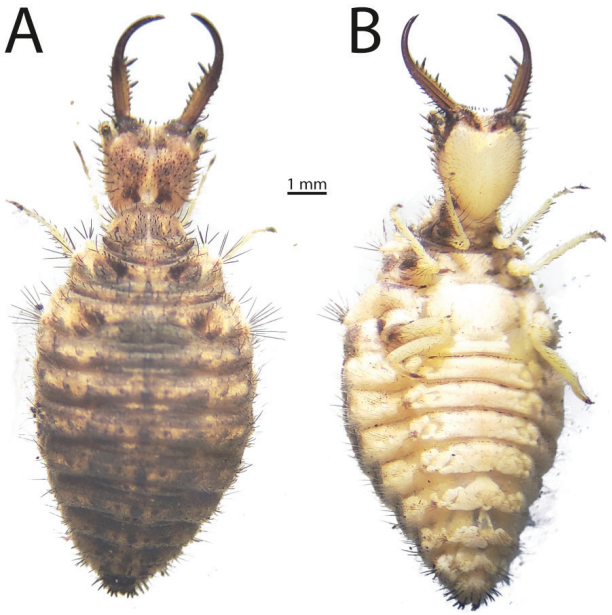

Figure 19. *Ameromyia clepsydra* **sp. nov.**, third instar larvae: **A** dorsal view. **B** Ventral view.

Distribution. Brazil (Fig. 12).

Biology. Larvae were found anchored to bedrock, buried in small pools of shallow water-deposited sand near a river (Fig. 15A). The bedrock was not protected from rain and/or sunlight, and the area is accessible by tourists and susceptible to trampling. The larvae accepted prey at both day and night while reared in captivity. Male adults were observed making quick, short low flights, resting at the bedrock. A third instar larva was collected at 25.xi.2018, began pupating 70 days later, and a male emerged 30 days after pupating. Other larvae collected at the same date (25.xi.2018) from various instars developed up to the third instar before all specimens died until ix.2020, which suggests this species can spend at least near two years at larval stage, although specimens might have not been

able to pupate earlier due to the lack of a hard, suitable achorage. *Dimarella riparia* larvae collected at *A. clepsydra* **sp. nov.** type locality, and in the same microhabitat, were able to develop normally in captivity under the same conditions, which suggests the new species is much more sensible to microhabitat alterations. Other 17 larvae collected in vi.2021 were able to develop normally in captivity when provided with more appropriate microhabitats.

Remarks. This species is remarkably distinguishable from other *Ameromyia* species, mostly because of the contrasting black and white coloration (Fig. 1E) which is only found in *A. explicata* **sp. nov.** (Fig. 1F) and in *A. strigosa* (Fig. 1A) (black and yellow in the latter). The conspicuous "hourglass-shaped" venation patterns were most common to specimens collected over Bahia state. The postventral lobes of the male ectoproct in this species are also much shorter than in other species (Fig. 18A, B), and male genitalic sac bear much shorter, subglobose clavate setae (Figs 7D, 18D), in contrast to other *Ameromyia* species.

This species wing venation patterns and crossvein density on both wings seems to be very plastic. Specimens collected at Bahia state have a biareolate pattern which resembles an hourglass or an "8" shape on presectorial and radial areas of both wings (Fig. 17B), while the specimens from Rio Grande do Norte state lacks this characteristic (Fig. 17C). Stange (1970) suggests that crossvein density may have relation with habitat humidity, with in this case makes sense as the Bahia specimens were all collected near rivers, while Rio Grande do Norte specimens are from deep into a semiarid region on Caatinga biome (Fig. 12).

4.5. *Ameromyia dimidiata* Navás, 1915

Figs 20, 21

Ameromyia dimidiata Navás 1915a: 464. [Holotype female, Chaco de Santa Fe, Argentina (MNHN)]. – Penny 1977: 38 [distribution, species list]. – Stange 1994: 81 [species list]. – Stange 2004: 227 [species catalog]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog].

= *Ameromyia baronei* Navás 1921: 49 [Holotype female, Santa Fe (Rep. Argentina), I.1920, S. Carmelo Barone (NAT)]. – Navás 1926a: 107 [male description and distribution]. – Navás 1928:141 [distribution]. – Navás 1929: 222 [distribution]. – Navás 1933: 80 [distribution]. – Stange 1967:45 [synonymy and distribution].

Distribution. Argentina; Paraguay (Fig. 12).

Diagnosis. Wing veins all pale. Cells in mediocubital area at least half brown suffused until at least 1/3 of wing span. Legs pale colored in contrast with dark abdomen and ventral thorax. Male ectoproct posterior margin with a weak dorsal notch.

Description. ADULT. *Head*: Antennae clubbed, 33 flagellomeres, dark brown with flagellum darker than scapus and pedicel. Vertex dark brown anteriorly, and light brown with dark brown patches posteriorly to anterior row. Vertex decumbent setae black, sometimes white on interantennal area. Interantennal area brown, usually with dark brown patches under scapus, in the middle of frons and just above clypeus. Frons pale brown, dark brown, or pale brown with dark brown patches. Frons setae black. Interocular distance less than eye width. Clypeus and labrum light brown. Mandibles dark brown. Palpi light brown, with external face of palpomeres slightly darker. — ***Thorax*:** Thorax dark brown, with light brown markings. Thorax on lateral view dorsally light brown and ventrally dark brown, with an evident longitudinal pale brown band under wings. Pronotum as broad as long, dark brown, with lateral margins pale brown, and a longitudinal medial pale brown streak. Pronotum marginal setae white. Mesonotum dark brown, with small light brown patches. Mesonotum with scattered white setae and curved white setae pointing posteriorly on mesoscutellum posterior margin. Mesoscutellum with white curved setae pointing posteriorly on posterior margin. Metanotum medially light brown and laterally dark brown, with white setae on posterior margins of metascutum and metascutellum. — ***Wings*:** Wing tip acute. Veins pale brown. Wing membrane hyaline, with dark brown infuscation on forewing mediocubital area, which is heavily suffused at forewing base and fading until apical third. Rhegmal area hyaline. Forewing vein CuP and hind wing vein CuA extending well before CuA fork and MP fork respectively, with at least nine crossveins connecting them and posterior branch of fork. Pterostigma light brown, opaque, encompassing six veins. Cells delimited by transversal veins in hind wing posterior margin higher than long. — ***Legs*:** Coxae pale brown. Femur and tibia with black bristles. Femur pale brown, with external face slightly darker than internal face. Meso and metafemur pale brown with internal face slightly darker than external face. Decumbent setae on basal half of profemur white, and black on distal half. Profemural sense hair longer than profemur and mesofemural sense hair much shorter than mesofemur. Tibia pale brown. Tibial spurs slightly shorter than pretarsal claws. Five tarsomeres, pale brown with distal joint slightly darker. Pretarsal claws at least

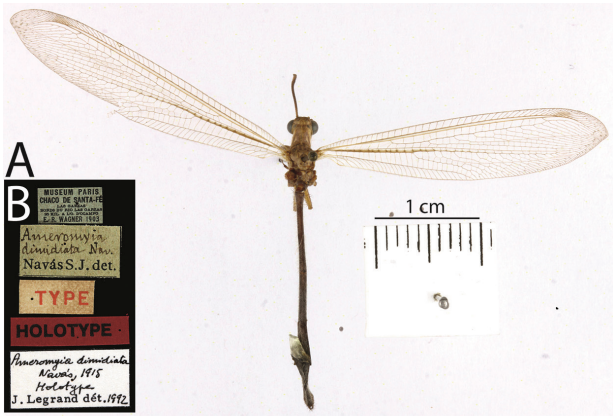

Figure 20. *Ameromyia dimidata*: **A** holotype, habitus, dorsal view. **B** Type labels. Photographs by André Nel (MNHN).

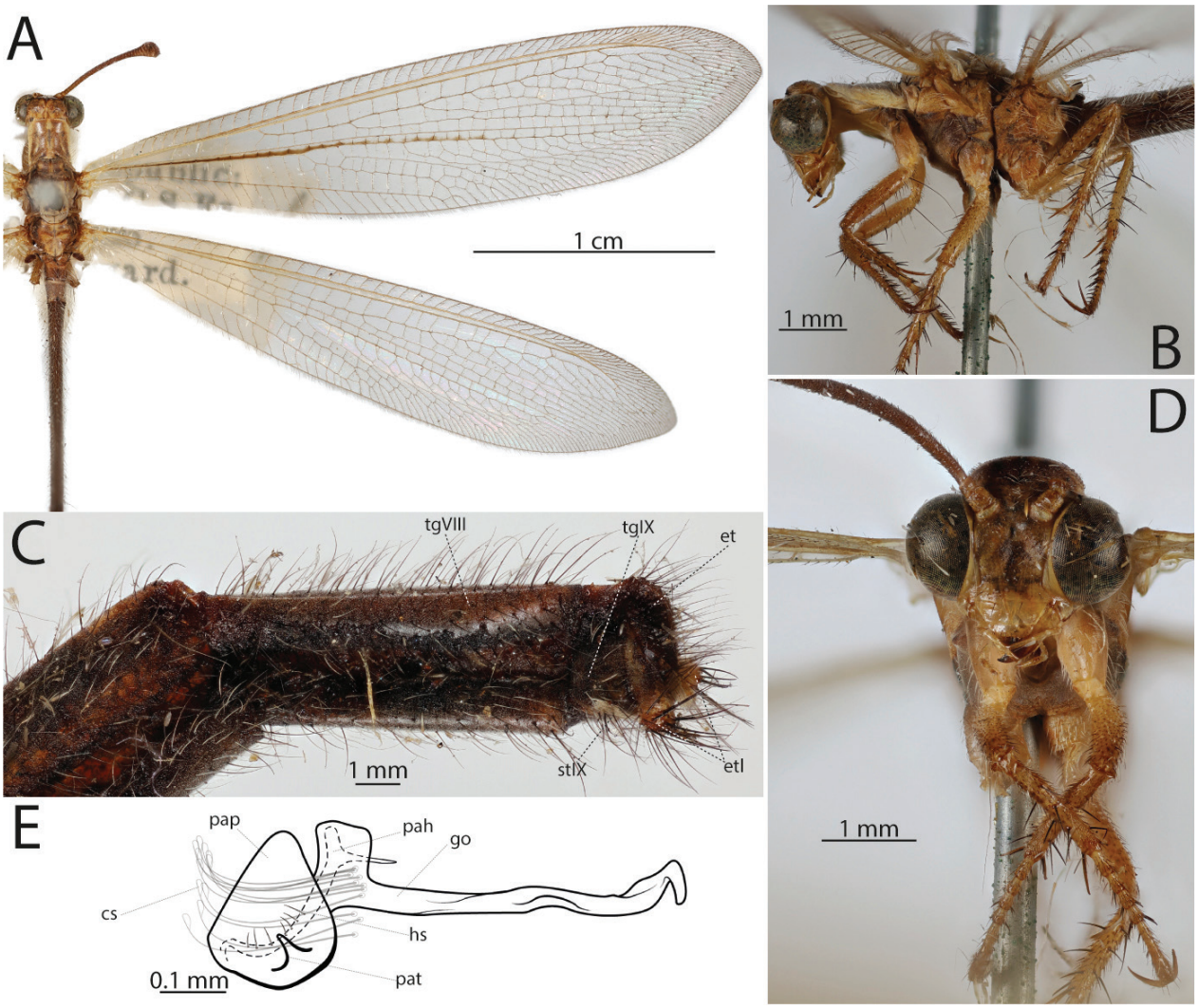

Figure 21. *Ameromyia dimidiata*: **A** male habitus, dorsal view. **B** Head, thorax and legs, lateral view. **C** Male terminalia, lateral view. **D** Head and forelegs, frontal view. **E** illustration of male genitalia, lateral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen dark brown with many setae, which are white on tergites and sternites I–III and black on remaining sclerites. Male ectoproct with a short round postventral lobes on ventral face. Parameres subtriangular on lateral view, when folded. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae with globose club. — **LARVA.** Larvae unknown.

Remarks. The type of *A. dimidiata* has lost both its hind wings (Fig. 20A). The type of *A. baronei* could not be analyzed during this work, but another specimen with this name identified by Navás, who described this species, was analyzed through photographs (from FML collection) and it agrees with *A. dimidiata*. The original description of *A. baronei* also agrees with *A. dimidiata* and therefore, we chose to maintain Stange's (1967) synonymy.

A single male specimen labeled from Colombia were identified from the CASC collection. As Colombia is way beyond *A. dimidiata* distributional range, and this particular batch of specimens (the ones labeled as bought from F. H. Walz.) also had many other label issues, in this sense, we interpret this Colombian record as dubious data. Stange (1967) registered this species for Uruguay (to Colonia and Rivera provinces), but it is unclear where the specimens analyzed in his work are deposited. These specimens are probably deposited in the institutions mentioned in his aknowledgements (Universidad de la República de Montevideo, Museu Argentino de Ciencias Natrales, the MLPA, and Observatorio de Física Cosmica), but as it is currently uncertain, we chose to refrain from register this species to Uruguay, although it is highly probable that *A. dimidiata* can indeed be found in Uruguay. Stange (2004) also previously registered this species for Brazil, but upon analysis of the registered specimen, it was in fact a misidentified specimen of *A. tendinosa* collected at the state of Mato Grosso.

This species is distinguishable from other *Ameromyia* species due to its veins on forewing which are all pale, and the absence of a rhegmal infuscation on forewing (Figs 20A, 21A). *A. pleuralis* and *A. tendinosa* look very similar, but the first has a brown tint on forewing mem-

Figure 22. *Ameromyia explicata* **sp. nov.**: **A** dorsal view and **B** lateral view of holotype habitus.

brane and a dark colored forewing CuP, and the latter has a much darker overall coloration and also has a dark CuP vein.

Examined material. (32♀21♂) ARGENTINA • 1♂; 16.ii.2014; sweep; BMC; FSCA • 1♂1♀ 1901; O.W. Thomas; BMNH • 1♀; 1903; Wagner; BMNH. – ENTRE RIOS • 2♀; El Palmar; i.1959; Bought by F.H. Walz; CASC • 5♀2♂; ii.1960; Bought by F.H. Walz; CASC. – CORDOBA • 1♂1♀; La Carlota; 22.i.1971; L.A. Stange; FSCA. – FORMOSA • 1♀; Gran Guardia; 8.xii.1952; Bought by F.H.Walz; CASC • 1♀; same collection data as for preceding; ii.1953 • 1♂; same collection data as for preceding; 16.ii.1953 • 1♂; same collection data as for preceding; xii.1952 • 1♀; same collection data as for preceding; 23.i.1953 • 1♀; same collection data as for preceding; ii.1953 • 1♀; same collection data as for preceding; i.1953. – SANTA FE • 1♀; i.1927; FSCA • 1♂; El Piquete; M.i.1927; Bridarolli S.J.; FSCA • 1♀; same collection data as for preceding; FML • 1♂; same collection data as for preceding; F.i.1927; FSCA • 1♀; Villa Ana; xiii.1924; K.J.Hayward; BMNH • 1♀; same collection data as for preceding; ii.1926; K.J.Hayward • 1♀; Villa Ana; i.1925; BMNH • 1♀; Villa Ana; 27.xi.1923; K.J.Hayward; BMNH • 1♀; same collection data as for preceding; 10–30.i.1927 • 1♂; same collection data as for preceding; xii.1924 • 1♂; same collection data as for preceding; xii.1925 • 1♂; same collection data as for preceding; i.1925 • 1♂; same collection data as for preceding; 10–31.x.1926 • 1♂; Ruta 11; Arroyo Malabirgo; 25.ii.1965; C.S.Carbonell and A.Mesa; FSCA. – SANTIAGO DEL ESTERO • 1♂; El Pinto; xii.1956; F.H. Walz; FSCA. – TUCUMAN • 1♂1♀ 12km sw Aráoz (station); 15.iv.1967; L.A. Stange; FSCA. – PARAGUAY: • 1♂; 1924; Bridarolli S.J.; FSCA • 1♀; Paraguayan Chaco; Nanabua; iii.1927; G.S. Carter; BMNH. – HAYES: • 8♀3♂; Puerto Falileo; 25°04′S 57°52′W; 5–8.iii.2008; U. Dreschel; FSCA. – PROBABLE MISLABELS: COLOMBIA • 1♂; Cumaral; 20.i.1959; Bought by F.H.Walz; CASC.

4.6. *Ameromyia explicata* Tavares sp. nov.

Figs 1E, 3C, 5B, 7B, 10, 22, 23

Diagnosis. Thorax lateral black, without a lateral pale band; forewing CuP alternating black and white, with nine or more crossveins between CuA posterior fork branch; female terminalia with pregenital plate slightly gibbous.

Description. ADULT. *Head*: Antennae with 32–34 flagellomeres. Flagellomeres black, dorsal face sometimes yellow, light brown between flagellomeres. Vertex yellowish brown, vertex rows with large dark spots and/or patches. Vertex decumbent setae black. Interantennal area mostly dark, sometimes marginally yellowish brown. Frons setae black, or white. Frons dark near antennae, and yellowish brown near clypeus. Frons setae black. Interocular distance less than eye width. Clypeus yellowish brown, sometimes with dark brown patches on lateral margins. Labrum yellowish brown. Mandibles dark brown. Palpi light brown, much darker on external face of palpomeres. — ***Thorax*:** Thorax dark with yellowish brown markings. Thorax dark on lateral view, with no evident longitudinal band. Pronotum as broad as long, dark, with yellowish brown on markings and lateral margins. Pronotum marginal setae white. Mesonotum dark, with a medial longitudinal yellowish-brown stripe on each side of mesoscutum and medially on mesoscutellum. Metanotum dark, with yellowish-brown patches on metascutum. — ***Wings*:** Wing tip acute. Veins with dashed black and white pattern, except for hind wing CuA, which is dark. Wing membrane mostly hyaline, with many markings. Forewing presectorial area and on RP first branch area with dark infuscation alternating on vertical crossveins. Forewing mediocubital area with dark infuscations around vertical crossveins which become sparser along MA vein, culminating on rhegmal area. Brown faint infuscations around forewing general crossveins and gradates, and on hind wing poststigmal area. Forewing CuP and hind wing CuA veins extending before forewing CuA and hind wing MP fork respectively, with nine or more crossveins connecting them and posterior branch of fork. Pterostigma opaque, dark brown on basal half and white on distal half, encompassing six to seven crossveins. Cells delimited by transversal crossveins in hind wing posterior area higher than long. — ***Legs*:** Coxae dark. Legs internal face yellowish brown and external face dark, with many dark brown spots on setal insertion. Femur and tibia with black bristles. Femur decumbent setae white and black. Tibiae with three evident or subtle basal, medial and distal dark brown rings around tibiae circumference. Tibial spurs slightly shorter than pretarsal claws. Tarsomeres light brown, with dis-

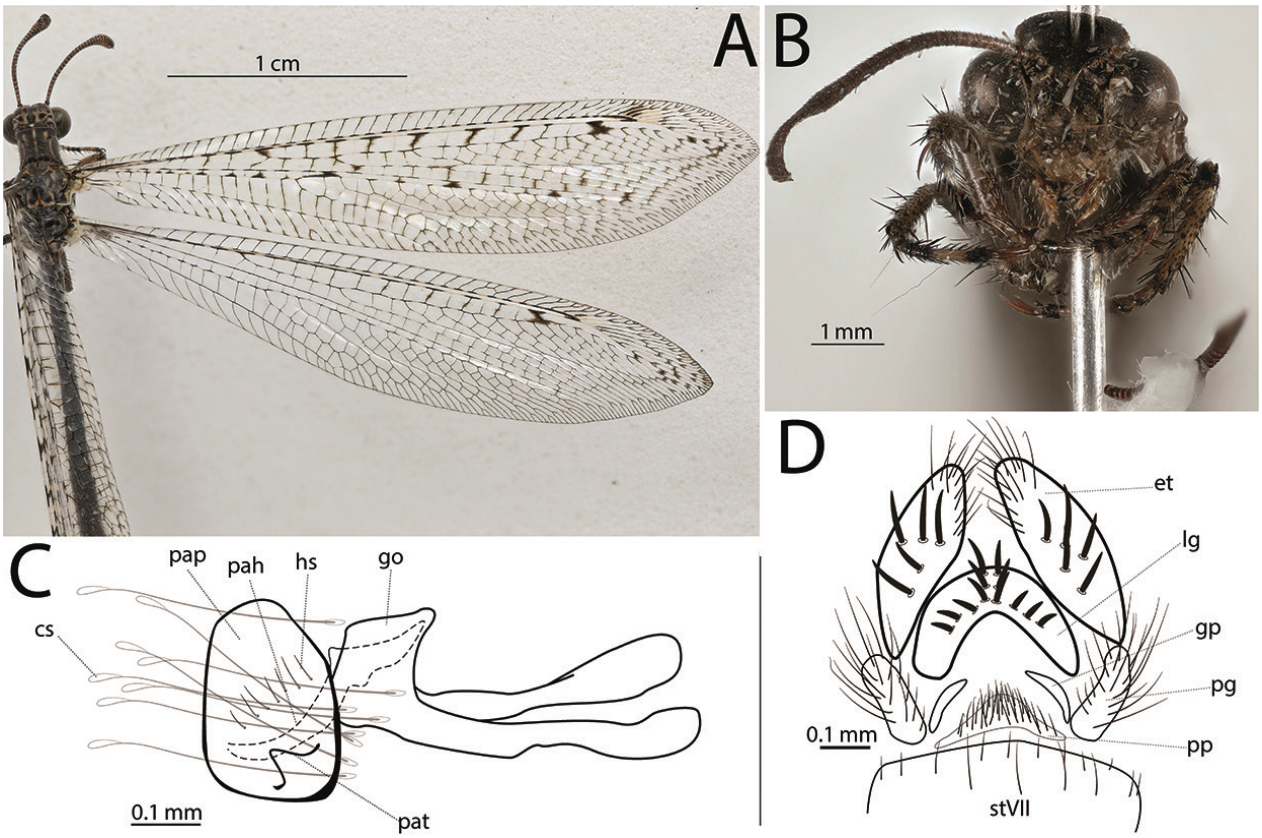

Figure 23. *Ameromyia explicata* **sp. nov.**: **A** female paratype, habitus, dorsal view. **B** Holotype, head and forelegs, frontal view. **C** Illustration of male genitalia, lateral view. **D** illustration of female genitalia, ventral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; gp, gonapophyseal plate; hs, hinge setae; lg, lateral gonapophysis; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; pg, posterior gonapophysis; pp, pregenital plate; st, sternite; tg, tergite.

tal fourth dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen sclerites dark, with yellowish or light brown in posterior margin near terminalia, with brown setae. Male paramere plates subtriangular on lateral view. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae with globose club. — **LARVA.** Larvae unknown.

Examined material. Holotype: BRAZIL • ♂; MARANHÃO, Caxias, Res. Ecol. Inhamum; 31.x–02.xi.2005; Lençol luz mista; F. Limeira-de-Oliveira; CZMA. **Paratypes**: BRAZIL – BAHIA • ♂; Miguel Calmon, Mulungu do Chiola; 02.i.2021; 11°24′15.9″S 40°38′58.9″W; Luz; Vieira-Silva, V.; DZUP • ♀; Santa Rita de Cássia, A.P.A. Rio Preto; 06.vi.2019; Calor, A.R.; Tavares, L; UFBA. – RIO GRANDE DO NORTE • 2♂; Serra Negra do Norte, ESEc Seridó, casa da entrada; 08 – 09.v.2003; API (noite); Varela-Freire, A.A.; DZUP • 2♂; same collection data as for preceding; 22–23.v.2000; Coleta manual, sob luz fluorescente; UFBA.

Distribution. Brazil (Fig. 12).

Other material. (17♀7♂) BRAZIL – AMAZONAS • 3♂2♀; Barcelos, Em Campina; 0°28′38″N 63°28′18″W; vii–viii.2007; Malaise; A.S.Filho and T.Krolow; INPA. – MARANHÃO • 2♀; Mirador, Parque Est. Mirador, Base dos Cágados; 06°48′29″S 45°06′34″W; 27.ix–02.x.2011; Armadilha luminosa; F. Limeira de Oliveira, A.A. Santos and T.M.A. Lima; CZMA • 1♀; Caxias, Res. Ecol. Inhamum; 31.x–02.xi.2005; Lençol luz mista; F.Limeira-de-Oliveira; CZMA • 1♀; Caxias, Reserva Ecol. Inhamum, Povoado Coités; 04°54′43″S 43°25′30″W; 6.x.2011; armadilha luminosa; J.T. Câmara, M.K.A. Santos and C.M.S. Sumber; CZMA. – RIO GRANDE DO NORTE • 1♀; Mossoró, Canto do Amaro; 23.viii.1996; BL (noite); Varela-Freire, A.A.; UFBA • 1♂; Mossoró, Central de Resíduos; 27–28.xi.1995; BL (noite) vegetação; Varela-Freire, A.A.; UFBA • 1♀; Natal, Tirol; 15.v.2014; Coleta manual, sob luz fluorescente; Oliveria, J.R.; UFBA • 1♀; Senador Eloi de Souza, Sitio lagoa do bola; 11.iv.2015; Manual, Morais F.C.; UFBA • 1♀; Serra Negra do Norte, Açude Campos 1, margem ocidental; 05–06.vi.1997; BL (noite); Varela-Freire, A.A.; UFBA • 1♀; Serra Negra do Norte, ESEc Seridó, casa da entrada; 30–31.viii.2002; API (noite); Varela-Freire, A.A.; UFBA • 1♀; same collection data as for preceding; 08–09.v.2003 • 3♀; same collection data as for preceding; 22–23.v.2000; Coleta manual, sob luz fluorescente.

Etymology. The name "explicata", which means "unfolded". This refers to the fact that, during this work, the only males whose genitalia were in an "unfolded" state (Fig. 10B, D) were of this species.

Biology. A live female specimen was observed in the wild at Santa Rita de Cássia, BA, Brazil (Fig. 1F), and posteriorly reared in captivity. The location where the specimen was collected is located at the Cerrado biome, with dry vegetation and hard, compacted soil. The specimen observed was a high flyer, flying almost two meters above ground. It came towards the light trap, but apparently it wasn't strongly attracted to light. When reared in-lab,

Figure 24. *Ameromyia guarica* **comb. nov.**: **A** holotype, habitus, lateral view. **B** Holotype, dorsal view.

this adult specimen accepted as food a mixture of honey and water and also live maggots when handfed. It fed and hunted by itself when offered *D. melanogaster* as prey.

Remarks. This species is very similar to *A. nigriventris*. The most evident distinction is the completely dark coloration of the thorax lateral sides (Fig. 3C). Even so, it can be hard to differentiate poorly conserved specimens, as specimens become paler over time. Male genitalia of both species are also similar, but *A. explicata* **sp. nov.** has shorter gonarcus membranous arms, and the shape of the paramere teeth is broader than in *A. nigriventris* (Fig. 10). Females can be promptly distinguished without need of genitalia dissection by its slightly convex pregenital plate margin (Fig. 23D), while males need to be dissected for a proper identification when devoid of coloration. This species is the only species whose males were found with "unfolded" parameres (Fig. 10B, D).

This species has a northern distribution in Brazil, from the Amazon Forest to the Northeastern region. Specimens collected in Miguel Calmon, Bahia, Brazil, cohabit this locality with *A. nigriventris*. However, all *A. explicata* **sp. nov.** specimens were collected at January, and during a field trip to Miguel Calmon in June, only *A. nigriventris* specimens were able to be found in the wild, which might suggest these species are separated by seasons. The specimens collected in the Amazon were found in "campinas", which are open areas with sandy soil distributed within the Amazon rainforest. Those specimens have a few differences from the northeastern brazilian specimens, but those are mostly slight variations in thorax and leg coloration and are hereby considered to be the same species despite the biome and geographical disparity. A few female specimens from Maranhão state bear a noticeable posterior projection on the pregenital plate, slender and longer digging setae on ectoproct and lateral gonapophysis, and a different pattern on wing coloration. It is possible those females are in fact a different species. However, until a male specimen is analyzed, we chose to identify these specimens as *A. explicata* **sp. nov.**, and opted to not include them among the paratypes.

4.7. *Ameromyia guarica* (Stange, 1994) comb. nov.

Figs 2B, 3B, 7C, 24–27

Venezueleon guaricus Stange 1994: 87. [Holotype male, Rio Orituco. 15 km S Calabozo, Guarico, Venezuela, February 27, 1988, R. B. Miller and L. A. Stange (FSCA)]. – Stange 2004: 229, 383, 392 [species catalog, genera identification key (adults), genera identification key (larvae)]. – Oswald 2021 [species catalog].

Distribution. Venezuela (Fig. 13).

Diagnosis. Pronotum broader than long; femoral sense hairs absent; profemur without leg bristles; tibiae leg bristles equal or subequal to tibial width; pretarsal claws shorter than distal tarsomere; forewing with long rhegmal infuscation connecting both banksian lines.

Description. ADULT. *Head*: Antennae with 30–31 flagellomeres. Antennae dark brown, flagellomeres darker than scape and pedicel. Vertex light brown, with dark brown patches medially, dark brown spots on anterior and posterior rows and light brown markings on middle row. Vertex decumbent setae white, sometimes black on interantennal area. Frons pale brown, sometimes with dark brown patches medially. Frons setae black. Clypeus pale brown, slightly lighter near labrum. Labrum pale brown, slightly darker than clypeus. Mandibles black, completely covered by clypeolabrum. Palpi pale brown, distal palpomeres darker around sensory area. — ***Thorax*:** Thorax on lateral view dark brown, with an evident or faint longitudinal pale brown band under wings. Pronotum broader than long, pale brown with longitudinal dark brown markings laterad of a longitudinal medial pale brown stripe. Mesonotum pale brown, with dark

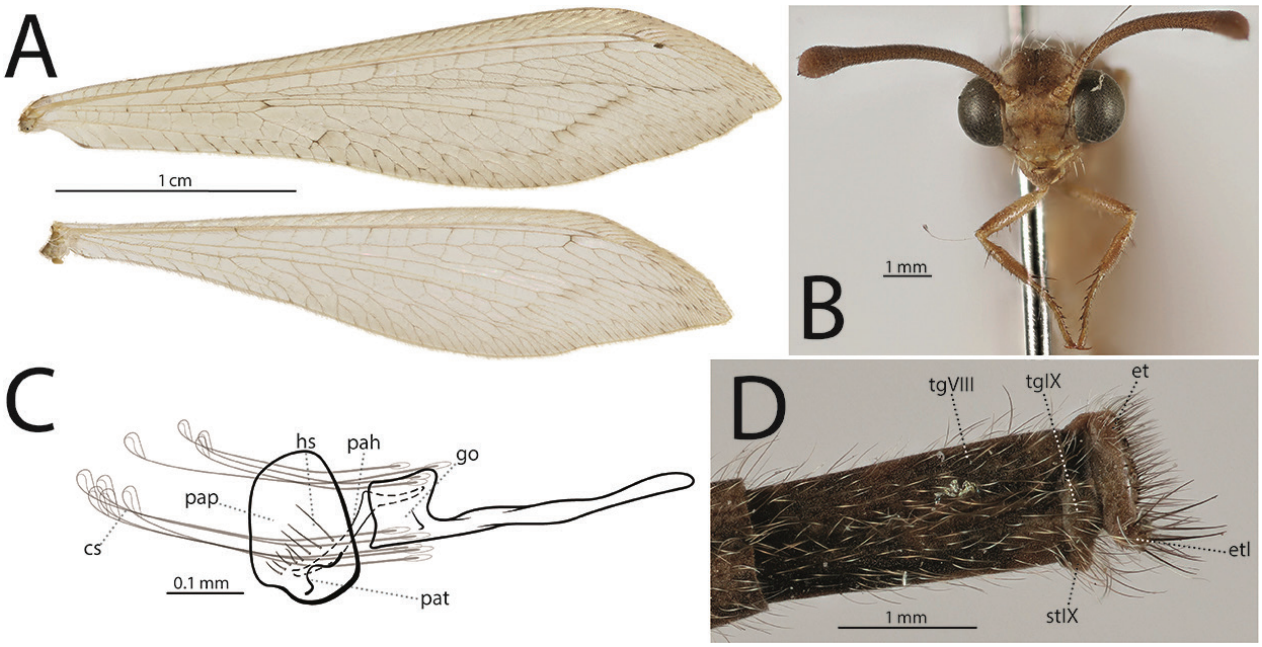

Figure 25. *Ameromyia guarica*: **A** paratype fore and hind wings, dorsal view. **B** Holotype, head and forelegs, frontal view. **C** Illustration of male genitalia, lateral view. **D** Holotype male terminalia, lateral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

brown laterally on mesoscutum. Metanotum pale brown with dark brown laterally on metascutum. Thorax with dark brown spots on setal insertions. — ***Wings*:** Wing tip acute. Forewing membrane with a slight brown tint, hind wing membrane hyaline. Dark brown infuscations along forewing crossveins which form the banksian lines; along rhegmal area connecting both banksian lines; along dashed crossveins on radial area; along few crossveins on mediocubital area after CuA fork; along crossveins connecting with CuA posterior branch of fork posterior margin; and on general crossveins and gradates near wing margin. Forewing mediocubital area with dark infuscations around vertical crossveins which become sparser along MA vein, culminating on rhegmal area. Forewing CuP vein and hind wing CuA extending well before forewing CuA fork and hind wing MP fork respectively, with at least four crossveins connecting them and posterior branch of fork. Pterostigma brown on basal half and pale on distal half, opaque, encompassing five to six crossveins. Cells delimited by transversal veins in hind wing posterior area longer than high. — ***Legs*:** Coxae brown. Legs pale brown, with posterior face much darker than anterior face. Profemur without black bristles. Meso and metafemur with very few black bristles which are shorter than femoral width. Femoral sense hairs absent. Tibiae with black bristles that are shorter than tibial width. Tibial spurs longer than pretarsal claws. Tarsomeres pale brown, dark brown on ventral surface. Pretarsal claws shorter than distal tarsomere. — ***Abdomen*:** Abdomen dark brown, with many brown setae. Male parameres plates on lateral view with a round dorsoposterior margin. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae with sickled clubs. — **LARVA (third instar).** ***Head*:** Head capsule slightly broader than long in dorsal view, slightly longer than broad in ventral view. Head capsule dorsally dark brown, with few light brown patches medially. Clypeolabrum dark, darker near mandibles. Head capsule ventrally light brown. Short dolichasters on head dorsal surface cone-like. Head capsule dolichasters mostly black, with a few white dolichasters near anterior and lateral margins. Row of dolichasters on labrum anterior margin black. Head dorsal surface covered with white thread-like setae, mostly on head capsule posterolateral margins, and mandibles base. — ***Thorax*:** Thorax dorsally dark brown, with sparsed light brown patches, and ventrally light brown with small dark spots on setal insertion. Thorax dorsal surface with many short, black dolichasters, and white thread-like setae. Mesothoracic spiracle borne on tubercle, which is about two times longer than broad. — ***Abdomen*:** Abdomen covered with white thread-like setae dorsally. Abdomen dorsally light brown, with sparsed grey and dark brown patches, and ventrally dark brown with large triangular light brown patches medially at each sternite, with small dark spots on setal insertion and near each basal abdominal margin. Lateral face ventrad of the ventral setiferous processes of spiracles with white thread-like setae. Abdominal setiferous processes with black and white setae.

Remarks. This species is known only by the specimens presented in the original description. Previously a monotypic genus, *Venezueleon* is hereby synonymized under *Ameromyia*. Both genera had very similar diagnosis, differing only in regard of the size of the pretarsal claws (large in *Ameromyia* and small in *Venezueleon*) and profemoral sense hairs (long in *Ameromyia* and absent in *Venezueleon*) (Fig. 3B). *Ameromyia guarica* **comb. nov.**

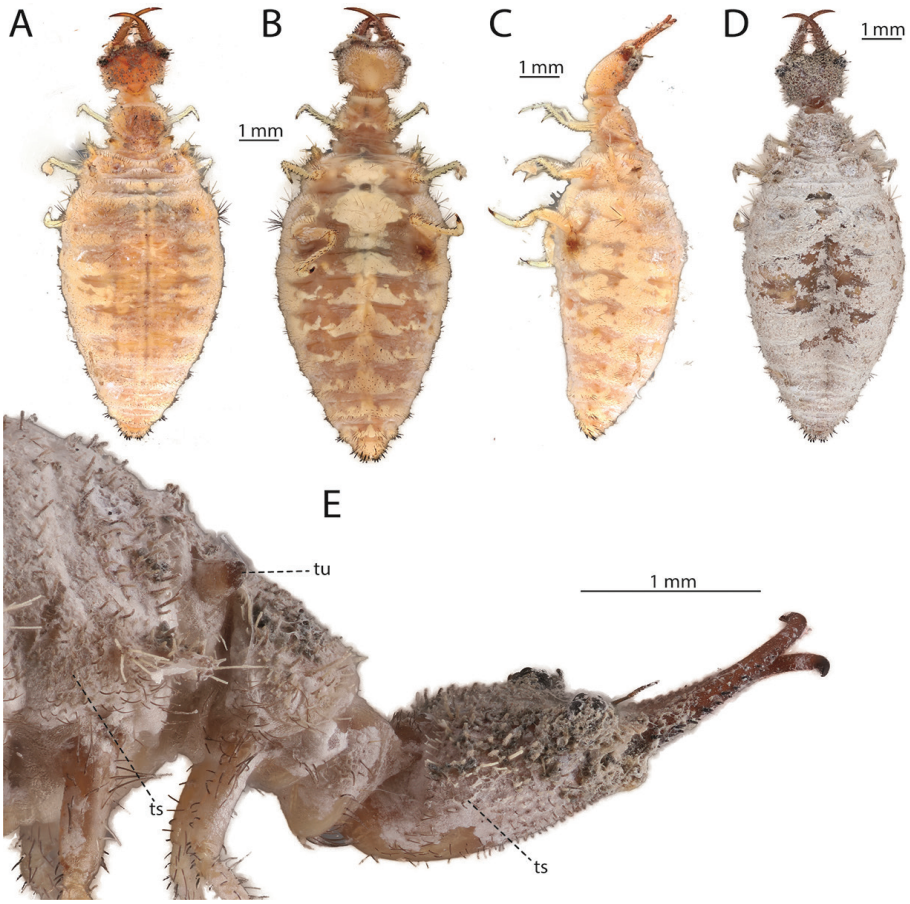

Figure 26. *Ameromyia guarica*, preserved in alcohol, third instar larval specimen: **A** Dorsal view. **B** Ventral view. **C** Lateral view. **D** Dorsal view, dried up. **E** Lateral view of head and thorax, dried up. Photographs by Jonathan Bremer (FSCA). — Abbreviations: ts, thread-like setae; tu, tubercle.

also had some other differences such as the reduction of leg setae in general, but those characters are highly variable within Brachynemurini species, and in Myrmeleontidae in general as discussed by former authors (Stange 1970). *Ameromyia guarica* also has the male genitalia extremely similar to the *Ameromyia* species, and shares the clavate setae with a sickled club with other species in the *modesta* species group (Fig. 7C). Stange (1970) also suggests that, in Brachynemurini, a reduction of leg setae and tibial spurs size could be an adaptation to a diet of aphids and pollen (although no gut sampling was performed in this study).

According to Stange (1994; 2004), there are three undescribed species, all known from single specimens, which were collected near *A. guarica* type locality. Two of these specimens, collected at Falcon, Venezuela, have been analyzed but it is uncertain whether they are indeed new species. They differed mostly in coloration on pronotal and abdominal markings. Furthermore, only two larval specimens of *Venezueleon* sensu Stange were located and analyzed (Figs 26, 27). Both specimens were not labeled as *V. guaricus*, but one as "*Venezueleon* **sp. nov.**", preserved in alcohol (Fig. 26), and the other was pinned and unlabeled (Fig. 27), but placed in the same tray as other *A. guarica* specimens, in which the tray itself had a "*V. guaricus*" label. Both larval specimens appear to be from different species, but it was unclear which one was actually the larvae of *A. guarica*. Although *Venezueleon* was previously described as having no thread-like setae, both specimens bear this character. White or pale thread-like setae are very difficult to be visualized in alcohol (Fig. 26A–C), but very evident when the specimen is dry (Figs 26D, E, 27). Additionally, the alcohol preserved specimen appears to be covered in a mold-like substance, which is tangled in the thread-like setae and further difficults the visualization of the latter structure (Fig. 27D, E). Furthermore, as the specimen labeled as "*Venezueleon* **sp. nov.**" is the one that could fit *A. guarica* original description in this scenario (Fig. 26), we are assuming this is the one reared and associated by the author (Stange 1994), which is here included among *A. guarica* examined material, but more data is needed to further confirm the association.

Examined material. Paratype: (1♂, 1 larvae) VENEZUELA – GUARICO • 1♂[paratype], 1 larvae; 15 km S Calabozo, Rio Orituco; 27.ii.1988; R. B. Miller and L. A. Stange; FSCA.

4.8. *Ameromyia modesta* (Banks, 1943)

Figs 1C, 2C, 28–30

Amazoleon modesta Banks 1943: 163. [Holotype female, Akuriman, Venezuela, X (Oct), Anduze (MCZ)]. – Stange 1967: 45 [new combination].

Ameromyia modesta (Banks). – Stange 1967:45 [new combination]. – Penny 1977: 38 [distribution]. – Stange 1994: 81 [species list, larvae diagnosis]. – Stange 2004: 228, 392 [species catalog, genera identification key (larvae)]. – Oswald 2021 [species catalog].

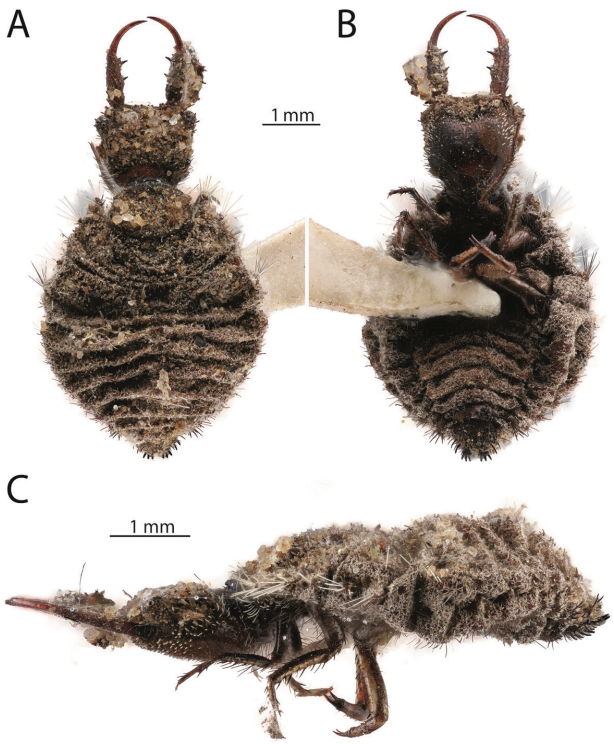

Figure 27. Larval specimen of an unknown species of *Venezueleon* (sensu Stange): **A** dorsal view. **B** Ventral view. **C** Lateral view. Photographs by Jonathan Bremer (FSCA).

Distribution. Brazil; Suriname; Venezuela (Fig. 13).

Diagnosis. Prothorax dark brown with a single longitudinal white line in the middle. Dark brown streak in rhegmal area, formed by infuscation around rhegmal crossveins. External and internal face of legs with visible contrast between dark brown and light brown.

Description. ADULT. *Head*: Antennae with 31–35 flagellomeres. Flagellum pale brown, turning dark brown near the club. Vertex dark brown, slightly pale brown laterally. Vertex decumbent setae black, sometimes white on interantennal area. Interantennal area with a large brown spot. Frons pale brown with slight brown medial patches, and grayer near clypeus. Frons setae black. Interocular distance less than eye width. Clypeus and labrum light brown. Mandible light brown on basal half and black on distal half. Palpi light brown, and slightly darker on external face of palpomeres. Head without thread-like setae. — ***Thorax*:** Thorax mostly dark brown with a medial longitudinal white band, and light brown around thorax sutures. Thorax on lateral view dark brown, with an evident or faint longitudinal pale brown band under wings. Pronotum as broad as long. Pronotum dark brown, with a longitudinal medial white streak. Pronotum marginal setae white. Mesonotum dark brown, sometimes with pale brown on prescutum, and mesoscutellum with pale brown medially and on posterior margin. Mesonotum with scattered white setae and curved white setae pointing posteriorly on mesoscutellum posterior margin. Metanotum dark brown, with metascutellum with pale brown medially and on posterior margin. Metanotum with scattered white setae and curved white setae pointing posteriorly on metascutellum posterior margin. — ***Wings*:** Wing tip acute. Veins with dashed dark and pale brown pattern. Wing membrane hyaline, except on most vein junctures which have brown infuscation, along forewing CuA vein, and on rhegmal area which have dark brown infuscations. Forewing mediocubital area with dotted pattern, with dark infuscations around vertical crossveins. Forewing CuP and hind wing CuA veins extending before CuA and MP fork respectively, with at least four crossveins connecting them and posterior branch of fork. Pterostigma opaque, white, encompassing three to four crossveins. Cells delimited by transversal veins in hind wing posterior area longer than high. — ***Legs*:** Coxae dark brown. Femur and tibia with black bristles. Legs with external face of femur, tibiae and tarsomeres dark brown contrasting to internal face which is light brown. Femur decumbent setae black. Profemural sense hair longer than profemur and mesofemural sense hair much shorter than mesofemur. Tibial spurs slightly shorter than pretarsal claws. Five tarsomeres. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen sclerites dark brown medially and slightly paler on basal and apical margins, with many dark setae. Male parameres plates on lateral view with a round dorsoposterior margin. Paramere tooth curved upwards on lateral view. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae with sickled club. — **LARVA (third instar). *Head*:** Head capsule slightly broader than long in dorsal view, slightly longer than broad in ventral view. Head capsule dorsally dark brown, with few light brown patches medially. Clypeolabrum dark, darker near mandibles. Head capsule ventrally light brown. Short dolichasters on head dorsal surface cone-like. Head capsule dolichasters mostly black, with a few white dolichasters near anterior and lateral margins. Row of dolichasters on labrum anterior margin black. Dorsal surface on posterolateral margins with dark thread-like setae. — ***Thorax*:** Thorax dorsally dark brown, with sparsed light brown patches, and ventrally light brown with small dark spots on setal insertion. Thorax dorsal surface with dark thread-like setae, and many short, black dolichasters. Mesothoracic spiracle borne on tubercle, which is about two times longer than broad. Metathoraxic surface with whitish prunescence medially. — ***Abdomen*:** Abdomen with dark thread-like setae dorsally. Abdomen with a whitish prunescence, dorsally light brown, with sparsed grey and dark brown patches, and ventrally light brown with small dark spots on setal insertion and near each basal abdominal margin. Abdominal setiferous processes with black and white setae.

Remarks. *Ameromyia modesta* is recorded from Brazil and Suriname for the first time. The type locality known as "Akuriman" or "Acurima", refers to a mountain near the border between Venezuela and Brazil (Roraima), on the municipality of Gran Sabana. Stange (1994) describes *A. modesta* larvae as bearing thread-like setae, but on the remarks for the *Venezueleon* larvae, states that in *A. modesta*, the thread-like setae are absent. Upon analysis

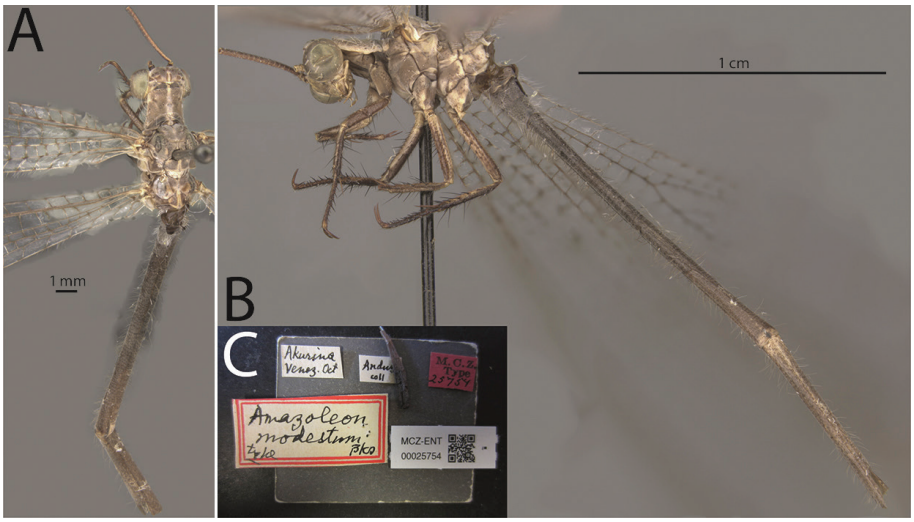

Figure 28. *Ameromyia modesta* holotype: **A** dorsal view. **B** Lateral view. **C** Type labels. Photographs by Charles Farnum, Museum of Comparative Zoology, Harvard University.

of this larval specimen, it is evident that the larvae of this species indeed bear thread-like setae on head capsule, and thoraxic and abdominal dorsal surfaces (Fig. 30).

This species is very similar in coloration to *A. guarica*, but it bears profemoral and mesofemural sense hairs, larger pretarsal claws and a longer than broad pronotum. Regarding other species in the same group, *A. modesta* differs from *A. pubiventris* in the pronotal markings (in which the pronotum is mostly light brown with a longitudinal stripe) (Figs 1C, 2C, 28A) and in leg coloration (Fig. 28B), while *A. protensa* is much larger in size, and is restricted to southern South America.

Examined material. (24♀8♂, 1 larva): BRAZIL – RORAIMA • 1♀; Beira do rio Uraricoera; 25.iii.2016; 3°20′59″N 61°25′22.3″W; 83m; luz móvel; CC Gonçalves; INPA • 1♀1♂; Alto Alegre, ESEC Maracá; 10–12.xii.2015; 3°20′59″N 61°25′22.3″W; Arm. Luz; J.A. Rafael, R. Boldrini, F.F. Xavier; INPA • 1♀1♂; Alto Alegre, ESEC Maracá (base); 21–24.ii.2017; N 03°21′42″ W 61°26′08″; Lençol iluminado; Aquino R., Rafael J., Mendes D., Agudelo A.; INPA • 2♀; Ilha de Maracá, Estação Ecológica de Maracá, Ponto 4, Lavrado; 05–20.xii.2015; 03°23.413′N 61°26.036′W; 105m; Arm. Malaise; Bitfi, Falaschi, Mandulão, Marinho, Pinheiro e Riccardi col.; DZUP • 1♀; Ilha de Maracá, 19.xi.76, I.S. Gorayeb; INPA • 1♀; Ilha de Maracá; 02.xi.78; Malaise trap; I.S. Gorayeb; INPA • 1♀; Alto Alegre, ESEC Maracá; 10–12.xii.2015; Arm. Luz; J.A. Rafael, D. Takiya, F.F. Xavier; INPA • 1♀; Ilha de Maracá, Rio Uraricoera; 21–30.xi.1987; Inseticida (fogging); J.A. Rafael e equipe; INPA • 1♀; Alto Alegre, ESEC Maracá; 24.iii.2016; Arm. Luz; J.A. Rafael, D. Takiya, F.F. Xavier; INPA • 1♀; Ilha de Maracá;10.xi.1980; Eliana Fernandez; INPA. – SURINAME • 1♂; Zanderij 1; 26.ix.1963; Dr. D.C. Geijskes; FSCA • 1♀; Brokopondo; 5.viii.1965; GF Mees; FSCA. – MOENGOTAPOE • 1♀; Wia wia, 3º kamplÿn km 15.8; 13.x.1948; D.C. Cjeijskes; FSCA. – SARAMACA • 1♀; Gansee; 09.ix.1957; J. Belle; BMNH. – VENEZUELA – ARAGUA • 2♀; El limon; 15.ii.1986; 450m; Miller and L.A. Stange; FSCA • 1♂; El limon; 18.xii.1982; L.J. Joly; FSCA. – BARINAS • 1♀; Rio Sto Domingo; 17.ii.1976; C.M. and O.S. Flint Jr; FSCA. – BOLIVAR • 1♀; CD-Bolivar V-31, Bridge–Orinoco; 3.iii.1984; R. Miller, L.A. Stange; FSCA • 1 Larvae; Ciudad Bolivar; 3.iii.1987 (v.31 – Reared); Miller and L.A. Stange; FSCA • 1♀ Rio Paragua e Rio Chiguso; 3–7.viii.1983; Exp. Instituto de Zoologia Agricola; FSCA • 1♀; Mantecal, Rio Cuchivero; 23–27.iii.1970; 150m; F. Fernandez and C.J. Rosales; FSCA. – FALCÓN • 1♀; Guayacancito, 9km oeste del Cabo san Roman; 28.xi.1980; J. Gonzalez; FSCA. – GUARICO • 1♂; 44km S. Calabozo; 28.ii.1986; 8°34′N 67°35′W; Hato Masaguaral, Miller and L.A. Stange; FSCA • 1♀; 44km S. Calabozo, Hato Masaguaral; 9–11.xi.1986; 8°34′N 67°35′W; Miller and L.A. Stange; FSCA • 1♀; 44km S. Calabozo; 11.ii.1986; Blacklight Trap; Miller and L.A. Stange; FSCA • 1♀; Calabozo, La Encrucijada, Rd between El Sombrero; 15.xii.1947; F. Fernandez; FSCA • 1♂; La Palmita orfiz; 14.iii.1982; J.L.Garcia; FSCA • 1♂; Sta maria de Ipire, Est. Exp La iguana; 16.xi.1982; J.L. Garcia; FSCA • 1♂; Rio Guariquito; 20.vii.1958; Yepez and C. Rosalez; FSCA.

4.9. *Ameromyia muralli* Navás, 1932

Figs 1B, 31

Ameromyia muralli Navás 1932: 11, figure 9 (vertex, pronotum). [Holotype female, Urucum (MRSN)]. – Penny 1977: 38 [species list, distribution]. – Stange 1994: 81 [species list]. – Stange 2004: 228 [species catalog]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog].

Distribution. Bolivia; Brazil (Fig. 12).

Diagnosis. Forewing mediocubital area with evident continuous or dotted dark suffusion at least until reaching CuA fork. Hind wing shape falcate. Profemur with homogeneous color pattern, with no contrast between external and internal face.

Description. ADULT. *Head*: Antennae with 31–33 flagellomeres. Flagellomeres light brown with slightly darker brown patches. Vertex light brown with a latitudinal dark brown dotted streak. Middle and posterior row of vertex with dark brown spots. Vertex decumbent setae black. Interantennal area light brown. Frons marginally dark brown and light brown centrally. Frons setae black. Clypeus and labrum light brown. Mandibles light brown on basal half, and black on distal half. Palpi light brown, with external face of palpomeres much darker. — ***Thorax*:** Thorax dark brown with yellowish-brown markings. Thorax on lateral view dark brown, with an evident longitudinal pale

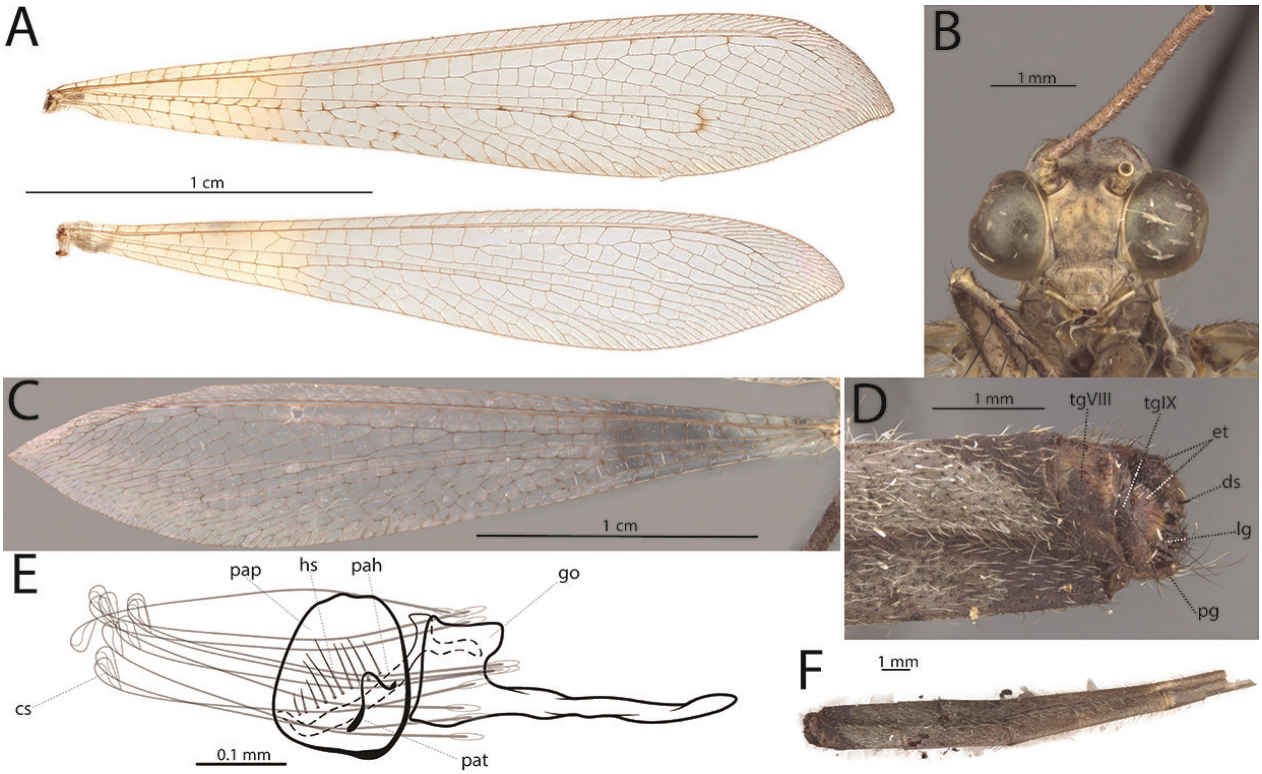

Figure 29. *Ameromyia modesta*: **A** fore and hing wing, dorsal view. **B** Holotype head and foreleg, frontal view. **C** Holotype's hind wing, dorsal view. **D** Holotype terminalia, lateral view. **E** Illustration of male genitalia, lateral view. **F** Holotype abdomen. Holotype photographs by Charles Farnum, Museum of Comparative Zoology, Harvard University. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; lg, lateral gonapophysis; pah, paramere hinge, pap, paramere plate; pat, paramere tooth; pg, posterior gonapophysis; st, sternite; tg, tergite.

brown band under wings. Pronotum as broad as long. Pronotum dark brown, with a yellowish-brown longitudinal stripe medially and near lateral margins. Mesonotum dark brown, with yellowish-brown on notal junctures, and medially on mesoscutellum. Metanotum dark brown with yellowish-brown on notal junctures. — ***Wings*:** Forewing apex weakly falcate, and hind wing falcate. Veins with dashed dark and pale brown pattern. Wing membrane hyaline, with a dark infuscations on crossveins of forewing mediocubital area, along CuA vein, and on rhegmal area. Forewing mediocubital area with continuous or dotted dark infuscations around vertical crossveins at least until CuA fork. Forewing CuP and hind wing CuA veins extending before CuA and MP fork respectively, with nine or more crossveins connecting them. Pterostigma opaque, dark brown on basal half and white on apical half, encompassing six to seven crossveins. Cells delimited by transversal veins on hind wing posterior area higher than long. — ***Legs*:** Coxae dark brown. Femur and tibiae with black bristles. Legs light brown, with many dark brown spots. Femur decumbent setae white and black. Profemural sense hair longer than profemur and mesofemural sense hair much shorter than mesofemur. Tarsomeres light brown, with distal fourth dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen dark brown, with white setae on first sclerites, and brown setae on remaining sclerites. Male parameres oblong or subtriangular on lateral view. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae with globose club. — **LARVA.** Larvae unknown.

Remarks. *Ameromyia muralli* is recorded from Bolivia for the first time, more precisely in Puerto Suárez, right on the border with Mato Grosso do Sul state in Brazil. The analysis of the holotype was based on old photo slides (Fig. 31C), but the original description greatly fits the analyzed specimens, as *A. muralli* has a conspicuous combination of a falcate hind wing and homogeneous coloration on profemora. The type's label only states "Urucum" (without other information such as date and collector), and Navás (1932) believed it actually refered to "Urucumacuã", a municipality located in the state of Rondônia (RO), Brazil. However, there is a locality named Urucum in the state of Mato Grosso do Sul (MS). This displacement may be explained because at that time both RO and MS were considered part of the same large state Mato Grosso (MT), which was posteriorly divided in the three current states. We believe that Urucum (MS) is the actual type location (instead of Urucumacuã as interpreted by Navás), as it is the literal label locality and other specimens herein analyzed, and today also housed in European collections, were collected at Urucum around the same time the holotype was probably collected.

This species can be readily recognized by the falcate hind wings (Fig. 31B), which are only shared by some specimens of *A. strigosa* (Fig. 44B) (not very common-

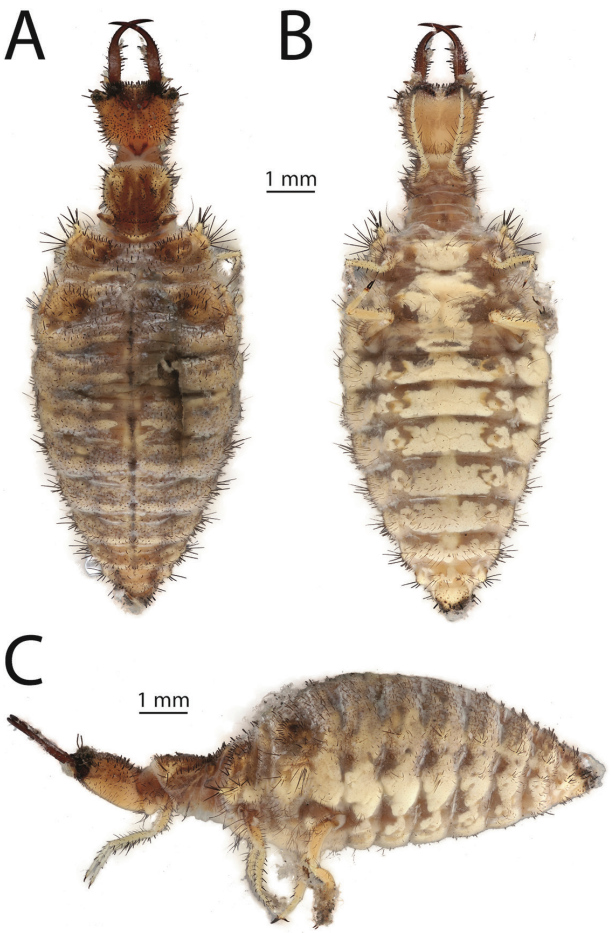

Figure 30. *Ameromyia modesta*, third instar larva: **A** dorsal view. **B** Ventral view. **C** Lateral view.

ly) and *A. clepsydra* (much more strongly falcate at wing apex) (Fig. 17B). It also presents a dark longitudinal infuscation on forewing, which can appear as a continuous streak (Fig. 31C) or as an evident dotted line on forewing mediocubital area (Fig. 31B), which differentiates it from *A. strigosa* characteristic oblique wing markings. Another difference from *A. strigosa* is the presence of both white and dark decumbent setae on profemur.

Examined material. (19♀3♂): BOLIVIA – GERMÁN BUSCH • 1♀; Puerto Suarez; J. Steinbach; FSCA. – BRAZIL – MATO GROSSO • 2♂; Faz. Ribanceira; 01.iv.2018; Varzer et. Al; DZUP • 1♀; Brasnorte; 08.ix.2017; Ventura, R; CEMT • 2♀; C.N. Parecis; 15.x.2017; Fedrizzi, R.M.; CEMT • 1♀; Cuiabá; 17.ii.2013; Manual, R. Oliveira; CEMT • 1♀; Cuiabá, Recanto das sementes; vii–viii.2018; Coleta manual; L.G.O. Nunes; CEMT • 1♀; Cuiabá, P. de Ferro, Rio Coxipó; 28.ii.1986; Rosangela Costa; CEMT • 1♀; Poconé; 25.x.1994; Elesbão Vitor da Silva-Neto; DZUP • 4♀; Porto Estrela: Serra das Araras, Heliporto; 15°39′15″S 57°12′51″W; 20.xi.2017; luz; RJP Machado; DZUP • 1♀; Varzea Grande; 13.ix.2017; Pereira, B.R.S.; CEMT • 1♀; V. Grande; 12.x.2017; Andrade, M.P.; CEMT. – MATO GROSSO do SUL • 1♂; Urucum, Nr. Corumbá; 650ft; 19.iv.1927; at light; Miss C. Longfield; BMNH. – SÃO PAULO • 1♀; Ilha Solteira, Urban area; 20.x.2018; Attracted to light; Galvani, J. P. col.; DZUP. – TOCANTINS • 1♀; Santa Isabel, Ilha do bananal, Rio Araguaia; 5–10. viii.1957; Berrys Malkin; CASC • 1♀; same collection data as for preceding; FSCA.

4.10. *Ameromyia nigriventris* (Walker, 1860)

Figs 9, 16B, C, D, 32–36

Myrmeleon nigriventris Walker 1860: 188. [Lectotype, female, Amaz, Saunders, NHMUK010288178 (BMNH) [current designation] and paralectotypes 1 female, Amazon, Colombia (BMNH) NHMUK010288176; 1 male, Amaz, Saunders, NHMUK010288177 (BMNH)].

Ameromyia nigriventris (Walker). – Banks 1913: 228 [redescription and new combination]. – Penny 1977: 38 [species list, distribution]. – Stange 1994: 81, figure 37 (adult face) [species list, larvae diagnosis]. – Stange 2004: 228, 393 [species catalog, genera identification key (larvae)]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog].

= *Ameromyia hirsuta* Navás 1914b: 50 [Holotype female, Rio Grande do Sul, Brazil, Sieglmayr (NHMW)]**.** – Esben-Petersen 1920: 193 [synonymy = *A. nigriventris*]. – Penny 1977: 38 [species list, distribution]. – Stange 1994: 81 [in *Ameromyia* species list]. – Stange 2004: 227 [in *Ameromyia* catalog]. – Stange 2010: 6 [diagnosis and distribution]. – Oswald 2021 [species catalog]. [**NEW SYNONIMY**].

= *Ameromyia stevensi* Navás 1914b: 51, figure 3 (vertex, pronotum, female terminalia) [Holotype female, Amazon, Brazil, 1860, Stevens (NHMW)]. – Navás 1916: 19 [distribution]. – Navás: 1919: 296 [distribution]. – Navás 1923a: 189 [distribution]. – Navás 1926a: 107 [distribution]. – Navás 1927: 26 [distribution]. – Navás 1928: 141 [distribution]. – Navás 1933: 80 [distribution]. – Penny 1977: 38 [distribution]. – Stange 1994: 81 [in *Ameromyia* species list]. – Stange 2004: 228 [in *Ameromyia* species list]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog]. [**NEW SYNONIMY**].

= *Moza longiventris* Navás 1917: 194, figure 4 (vertex, pronotum) [Holotype male, Tehuel Malal, Rio Negro, Argentina, 3.II.1915, R. Lehmann-Nitsche (MLPA)]. Stange 1967: 46 [new combination, distribution]; Stange 2010: 6 [synonymy = *A. hirsuta*].

= *Ameromyia longiventris* (Navás). – Stange 1967: 46 [new combination = *Ameromyia*, distribution]. – Penny 1977: 38 [distribution]. – Stange 1994: 81 [in *Ameromyia* species list].

= *Ameromyia stevensi striolata* Navás 1922: 360 [Holotype female, no data given]. – Stange 1967: 46 [synonymy = *A. longiventris*].

Distribution. Argentina; Brazil; Colombia; Guyana; Suriname; Uruguay; Venezuela (Fig. 12).

Diagnosis. Forewing veins Sc, RA and CuP with alternating coloration; lateral side of thorax with an evident longitudinal pale band; male gonarcus positioned obliquus to paramere plates.

Description. ADULT. *Head*: Antennae with 34 flagellomeres. Flagellomeres dark brown, with ventral face of the club light brown. Vertex brown with dark brown spots on all vertex rows, and a dark brown transversal streak on anterior and posterior rows forming a "T" shape. Vertex decumbent setae black, sometimes white on interantennal area. Interantennal area usually brown, with dark brown patches. Frons varies, from completely light brown, to light brown with oblique dark brown

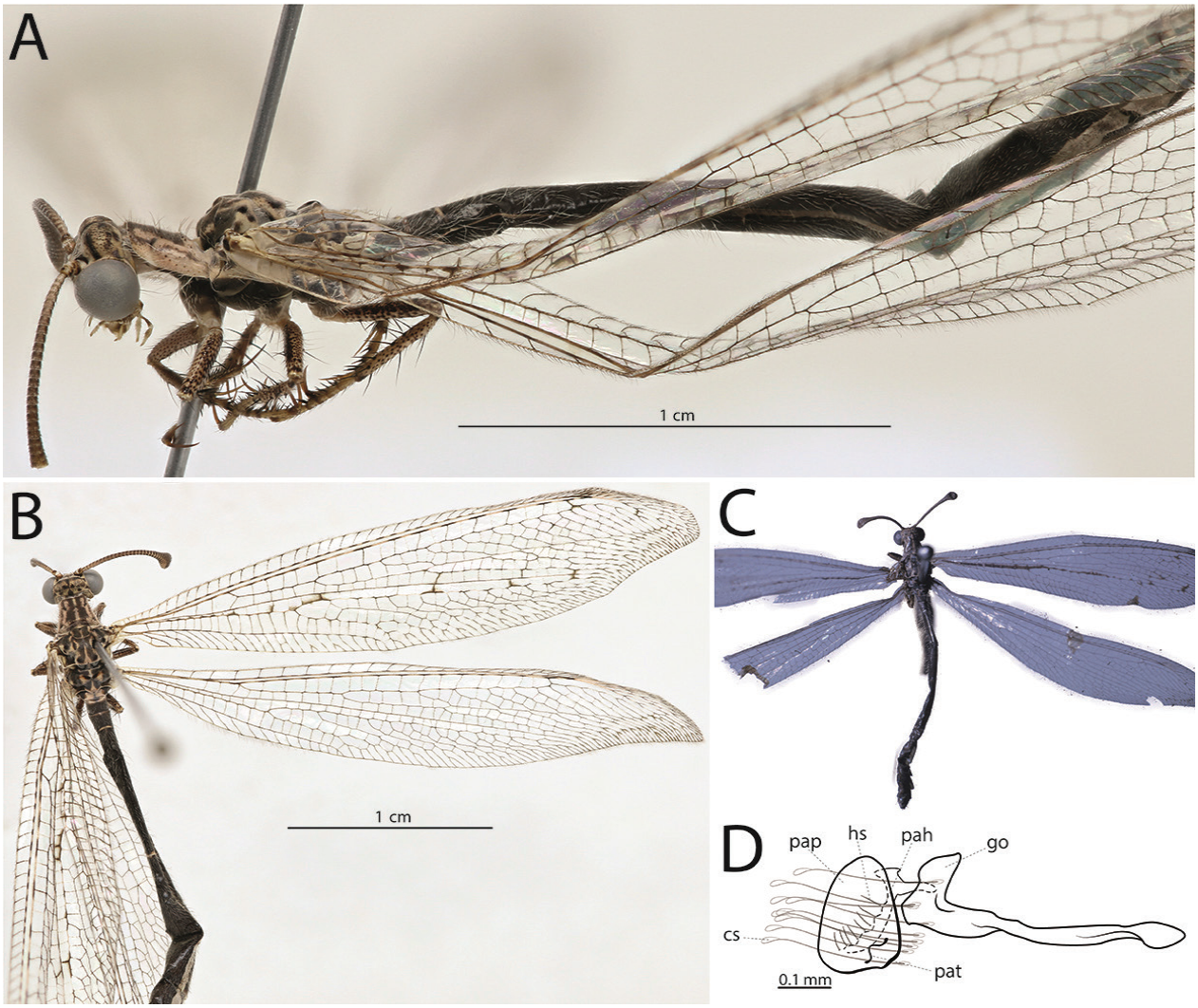

Figure 31. *Ameromyia muralli*: **A** habitus, lateral view. **B** Dorsal view. **C** Holotype habitus, dorsal view, photographed by Lionel Stange. **D** Illustration of male genitalia, lateral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

streaks and completely dark brown. Frons setae all dark, all white, or both dark and white. Interocular distance less than eye width. Clypeus pale brown. Labrum pale brown. Mandibles light brown on basal half and dark brown on distal half. Palpi pale brown, slightly darker on external face of palpomeres. — ***Thorax*:** Thorax dark brown, with pale brown markings. Thorax on lateral view dark, with an evident lateral longitudinal band under wings. Pronotum as broad as long, pale brown with two mirrored longitudinal dark brown "P" shaped bands, and two lateral small dark brown streaks. Pronotum marginal setae white or dark brown. Mesonotum dark brown with a longitudinal light brown streak on mesoscutellum. Metanotum dark brown with two longitudinal light brown patches on metascutum. — ***Wings*:** Tip acute. Veins with dashed dark brown and light brown pattern, except for forewing MA vein which has dark brown and white pattern. Wing membrane hyaline, with or without brown infuscations along radial, mediocubital and/or cubital areas. When infuscated, forewing mediocubital area with dark infuscations around vertical crossveins with a dotted uniform pattern, or with a dotted pattern which become sparser along MA vein, culminating on rhegmal area. Wing membrane sometimes with a slight brown tint along costal and radial areas. Forewing CuP vein and hind wing CuA extending well before forewing CuA fork and hind wing MP fork respectively, with nine or more crossveins them and posterior fork branch. Pterostigma frosted white, encompassing three to four crossveins. Cells delimited by transversal veins in hind wing posterior area higher than long. Female hind wing sometimes with an opaque longitudinal streak on apex. — ***Legs*:** Coxa dark. Femur and tibiae with black bristles. Profemur pale brown with exterior face dark brown. Meso and metafemur exterior face pale brown and interior face dark brown. Femur decumbent setae white and black. Profemural sense hair longer than profemur, and mesofemural sense hair much shorter than mesofemur. Tibial spurs slightly shorter than pretarsal claws. Tarsomeres pale brown with distal tip dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen dark brown, except for tergite 9 and ectoprocts which are pale brown with dark brown patches. Tergites 1, 2, and 3 with many short white setae, and subsequent tergites with many short dark

Figure 32. *Ameromyia nigriventris* type series: **A** female lectotype, dorsal view, with type labels. **B** Female paralectotype, dorsal view, with type labels and **C** male paralectotype, dorsal view, with type labels. Photographs by Ben Price (BMNH).

brown setae. Sternite I with many short white setae, and male sternite III sometimes with many stout white setae. Sternite II, female sternite III and subsequent sternites with short dark brown setae. Male ectoproct with a short, globose postventral lobe. Male paramere plates subtriangular, almost subquadrangular on lateral view. Gonarcus arch positioned slightly above paramere plates on lateral view. Male genitalia clavate setae with globose club. — **LARVA (third instar).** ***Head*****:** Head capsule as broad as long in dorsal view, slightly longer than broad in ventral view. Head capsule dorsally brown, with few dark brown patches near posterior margin. Clypeolabrum light brown, darker near mandibles. Head capsule ventrally light brown. Short dolichasters on head dorsal surface cylindrical, or almost spherical. Head capsule dolichasters black and white, mostly white near anterior and lateral margins. Dorsal surface on posterior and posterolateral margins covered with short, white thread-like setae. Row of dolichasters on clypeolabrum posterior margin white, black between mandibles. — ***Thorax*****:** Thorax prunescent, dorsally brown or light brown, with very sparsed brown patches which have no prunescence, and ventrally light brown with small dark spots on setal insertion. Thorax dorsal surface with sparse, short white thread-like setae, and with many short, black dolichasters medially, and many white dolichasters around lateral margins. Dorsal surface covered with very short "star-shaped" dolichasters. Mesothoracic spiracle borne on tubercle, which is much broader than long. Tubercule covered with short, white dolichasters. — ***Abdomen*****:** Abdomen with white thread-like setae, which are sparse on dorsal surface, and ventrally are present on sternites I–VII, and tangled in circle-like shapes. Dorsal surface covered with very short "star-shaped" dolichasters. Abdomen prunescent, dorsally brown or light brown, with three equally spaced black patches medially on each abdominal segment, and ventrally light brown with small dark spots on setal insertion and near each basal abdominal margin. Abdominal tergites with many short white and black dolichasters, and sternites with white and black dolichasters. Abdominal setiferous processes with only white setae.

Biology. Specimens were observed in their natural habitat at the municipality of Miguel Calmon, Bahia, Bra-

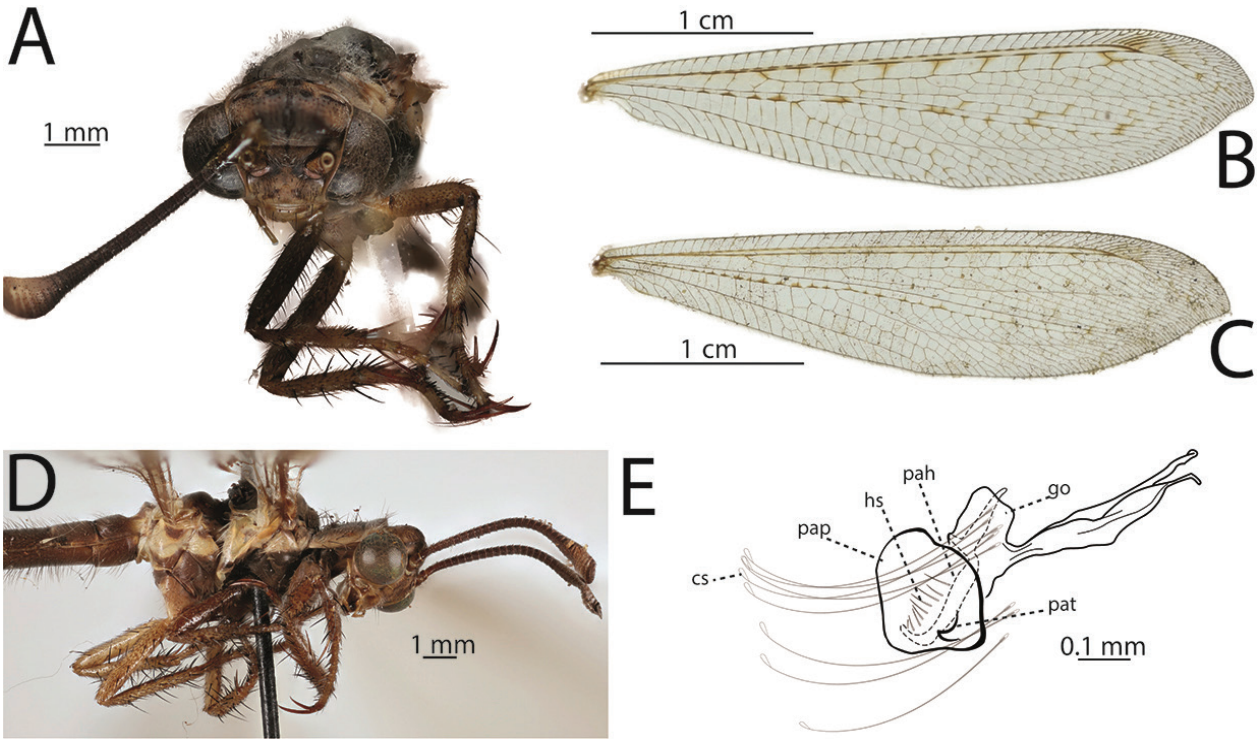

Figure 33. *Ameromyia nigriventris*: **A** male paralectotype, frontal view. **B** Lectotype forewing. **C** Female paralectotype forewing. **D** *A. hirsuta* holotype, head, thorax and legs, lateral view. **E** Illustration of male genitalia, lateral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

zil. Eight adult specimens (three males and five females) and 14 larvae were captured and subsequently reared in captivity. Adults were paired in different sex couples in order to observe possible matings, and females were provided with earth and sand from their natural habitat in order to observe possible oviposition. A single captive female was observed in posture, similar to what as described by Stange (1970) and Miller (1990), with raised wings, and curved abdomen with the terminalia buried in the substrate, but no eggs were found. No mating behaviour was observed. All adult specimens were capable of flying high, and whenever disturbed while flying near the ground, would quickly ascend and get dragged by the wind, without losing control of their flight. Adults would start actively flying and hunting at dusk, significantly reducing their activity approximately one hour later, limiting their flight to only flying from place to place. Whenever perched or resting, specimens would fold their wings over the abdomen or keep their wings raised, with the hind wings twisted in a slightly different angle than those of the forewings. Wings rested in different positions were usually a sign of senescence or health issues.

Larvae were found on patches of sandy, loose earth above compacted clay soil. Almost always, the larvae were inside a dug out "trench", achored to the hard substrate (Fig. 16B–D). These "trenches" usually had a slope side, in which the larvae would stay anchored and submerged in the sandy soil, but with the mandibles open and exposed (Fig. 16B). All suitable patches of loose earth in which the larvae were found were isolated and considerably distant from vegetation or any kind of protection, such as shade, rocks or overhangs (Fig. 16A). Patches of loose earth with debris, such as sticks, leaves or pebbles were usually devoid of *A. nigriventris* larvae. These debris, whenever moved by the wind, would "dig out" the sand and the hard soil, which probably disturbs *A. nigriventris* microhabitat and pushes the larvae away to a new location.

Remarks. All the type specimens were analyzed, except for *A. stevensi striolata* holotype. *Ameromyia nigriventris* previous syntypes consists of one male (paralectotype) (Fig. 32C) and one female (lectotype) (Fig. 32A) with the same label, and another female with a different label (paralectotype) (Fig. 32B). Although all three are stated to be from "Amazon", only the female paralectotype has the country of origin (Colombia). The lectotype was chosen in regard to the most common morphotype among the specimens analyzed. Each type series specimen has a different degree of wing infuscation, reflecting this species great plasticity regarding wing characters. The female paralectotype have broader wings, has a clear forewing membrane on presectorial area, and bear a dotted infuscation pattern on forewing mediocubital area (Fig. 33C), which resembles the same pattern found on *A. pubiventris* (Fig. 5A). The male paralectotype shows a black CuP vein and an almost completely suffused mediocubital area on the forewing (Fig. 34A).

In this work, we partially agree with Walker circumscription for *A. nigriventris*. The female paralectotype morphotype is most common in central Brazil, and this is the only specimen analyzed with this morphotype

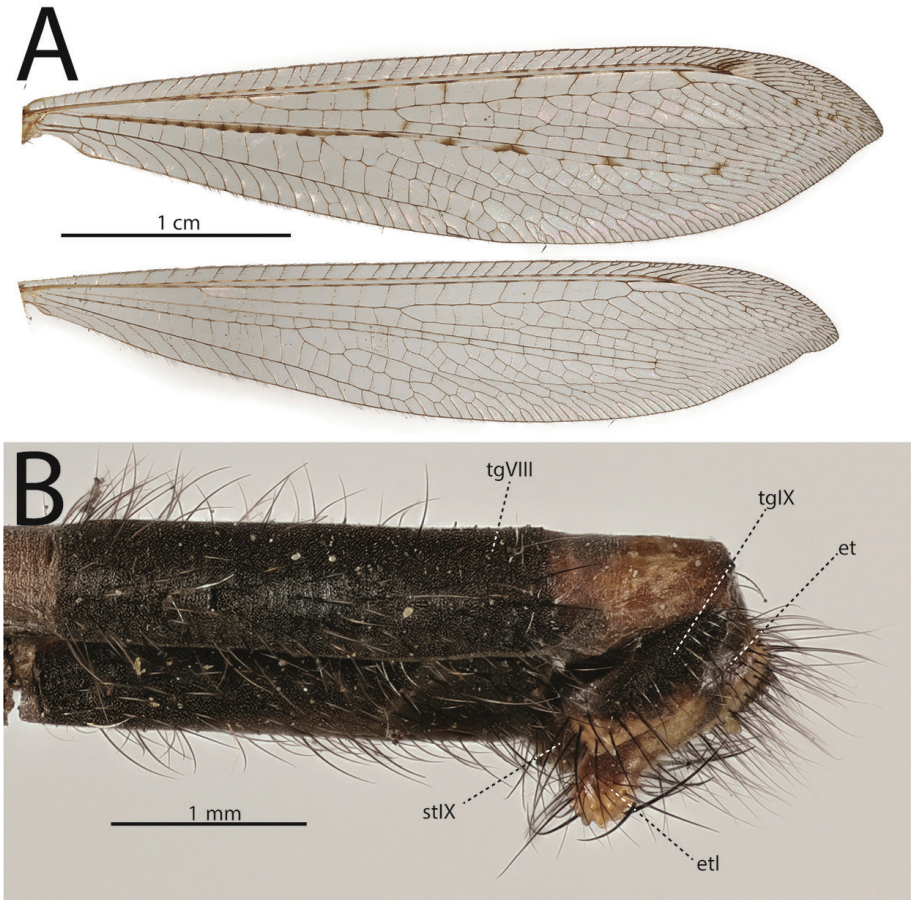

Figure 34. *Ameromyia nigriventris*, male paralectotype: **A** fore and hindwing. **B** Terminalia. — Abbreviations: et, ectoproct; etl, ectoproct postventral lobe; st, sternite; tg, tergite.

outside Brazil. A single male specimen with this morphotype was analyzed, and male genitalia agrees with *A. nigriventris*. However, the male paralectotype is enigmatic. It has a dark forewing CuP and hind wing CuA, as well as a suffused forewing mediocubital area, which agrees with *A. tendinosa*, but forewing RP and hind wing MA and MP have dashed patterns, in contrast to *A. tendinosa* respective wing veins that are completely dark. The completely suffused mediocubital area on forewing was present only in this specimen among all *A. nigriventris* analyzed during this work. Additionally, *A. tendinosa* has not been found outside central South America. In fact, no other species that bear a complete suffusion of forewing mediocubital area has been registered for Colombia. Nonetheless, despite the inconsistencies, we are still identifying the male paralectotype as an anomalous specimen of *A. nigriventris*. However, it is possible that this specimen in fact does represent a different species and further analyses could better elucidate the identity of this specimen. Unfortunately, we were not able to analyse its genitalia.

Ameromyia stevensi holotype (Fig. 35B), a female also from Amazon, agrees exactly with the lectotype of *A. nigriventris* and is hereby synonymized. Regarding *A. stevensi striolata*, albeit the type specimen was not seen, the original description agrees with *A. nigriventris* and therefore, in this work we chose to maintain this species as a synonym as proposed by Stange (1967).

We also agree with Stange's synonymy of *A. longiventris* under *A. hirsuta* (Stange 2010) as both type specimens are extremely similar, however, in addition, we are proposing the synonymy of *A. hirsuta* under *A. nigriventris*, a synonymy that was proposed before by Esben-Petersen (1920). *Ameromyia hirsuta* (Fig. 35A) does not show any exclusive consistent characteristic from *A. nigriventris* while also exhibiting extremely similar male genitalia. The brown tint on forewing membrane along the costal area, which is somewhat characteristic of specimens from Argentina and Paraguay, can also be found in many specimens of *A. nigriventris*, which were collected far beyond *A. hirsuta* previous distributional range, such as northeastern Brazil. In fact, many other species of *Ameromyia* can bear a tinted wing membrane as a polymorphic character. Female specimens from Argentina and southern Brazil sometimes bear an opaque streak on hind wing apex (Fig. 35A), but this is not a consistent character as it is not present in all females. The broad wing areas of the holotype is also not present in all specimens.

Ameromyia nigriventris larvae was previously described as not having thread-like setae (Stange 1994). However, all analyzed larvae indeed beared short, white thread-like setae on head, thorax and abdomen dorsal surface (Fig. 36D). White thread-like setae are very difficult to be visualized in alcohol, but very evident when the specimen was dried, which could explain the apparent absence of these setae on previous descriptions.

Ameromyia nigriventris is the species with the largest degree of variation regarding wing infuscation patterns within the genus. Wings can bear color pattern equal to that of the lectotype, equal to that of the female paralec-

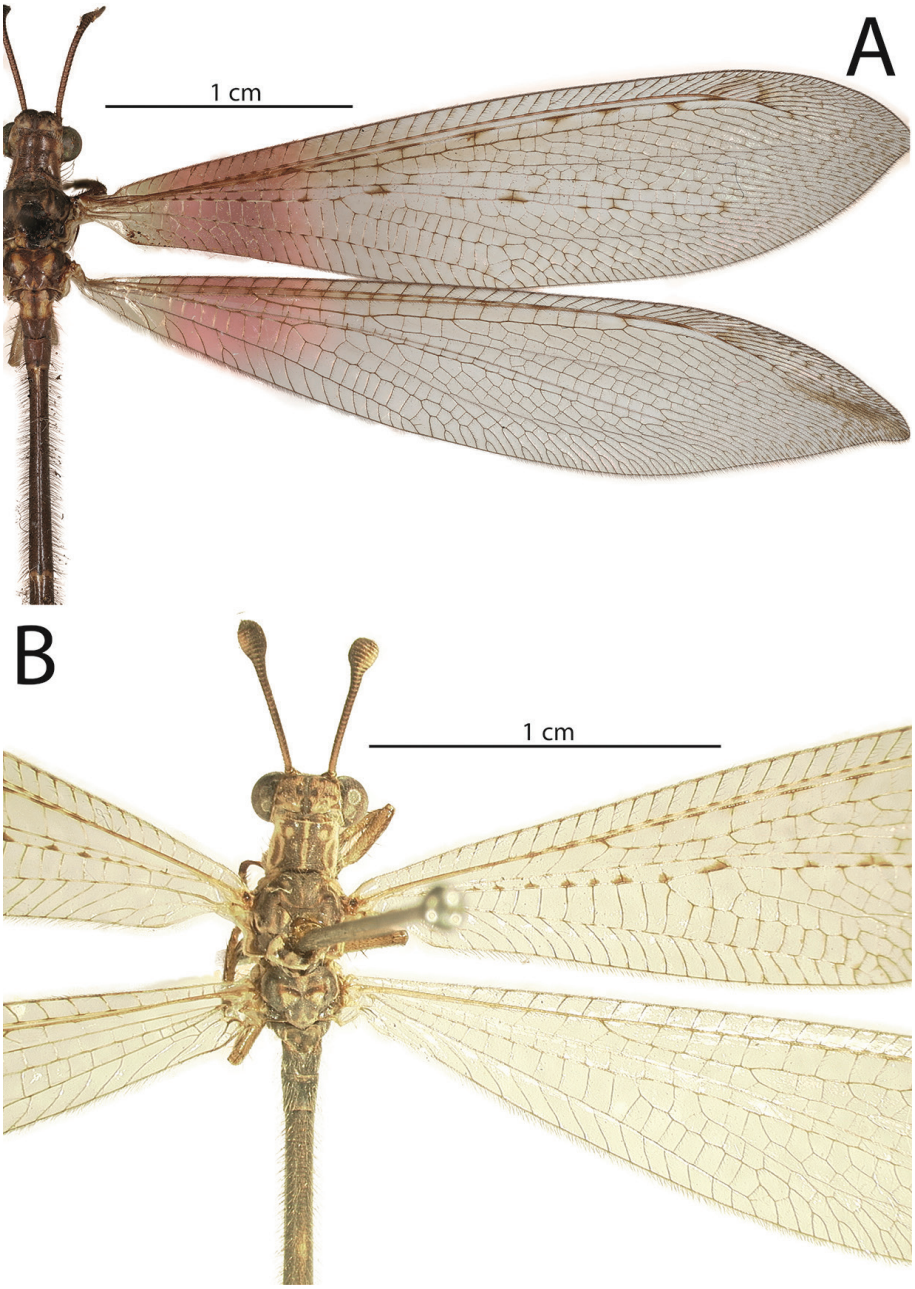

Figure 35. *Ameromyia nigriventris*, new synonyms: **A** Holotype of *A. hirsuta*, dorsal view. **B** Holotype of *A. stevensi*, dorsal view, photographed by Lionel Stange.

totype; a combination of both; devoid of infuscation or with an almost imperceptible infuscation in the aforementioned patterns. *Ameromyia explicata* **sp. nov.** and *A. tendinosa* are very morphologically similar to *A. nigriventris*. However, the first has a fully dark meso and metathorax on latheral view, while *A. nigriventris* has an evident lateral pale band, and the latter has a complete suffusion on forewing mediocubital area, as well as a dark colored forewing CuP vein, in contrast to *A. nigriventris*, which suffusion on forewing mediocubital area varies, and has a dashed pattern on forewing CuP.

Examined material. (115♀62♂4?, 3 larvae) ARGENTINA • 1♀; MISIONES, Loreto; iii.1953; Bought by F.H.Walz; CASC • 1♂; MISIONES, Posadas, 10.xi.1970; C. Porter, L. Stange; CASC. – BUENOS AIRES • 1♂; Tandil; 250m; CASC • 1♂; Tandil; 250m; 13.i.1954; Bought by F.H.Walz; CASC • 1♂; Tandil; 13.ii.1954; CASC • 1♂; Tandil; 200m; 15.i.1954; Bought by F.H.Walz; CASC • 1♀; Tandil; xii.1953–i.1954; Bought by F.H.Walz; CASC • 1♀; Tandil; ii.1960; Bought by F.H.Walz; CASC • 3♀2♂; Tandil; xii.1953; Bought by F.H.Walz; CASC – CORRIENTES • 1♀; Monte Caseros; 12–14.i.1956; Ajmat Bennezr; FSCA. – ENTRE RIOS • 1♂; Concordia, Salto Grande; i.1975; FSCA. – LA PAMPA • 1♀; Lihuel; 12.i.1977; L.A. Stange; FSCA • 1♀; Celelel, Sierra Lihuel; 11.i.1968; L.A.Stange; FSCA • 1♀; Celelel; 11.i.1968; L.A.Stange; FSCA. – MISIONES • 1♀; 2.iii; 500m; Juan Foetster; FSCA • 1♂; Pindapoy; 1.viii.1942; FSCA • 1♂; Pindapoy; 26.xii.42; Williner S.J.; FML • 1♀; Pindapoy; 3.i.1943; Williner S.J.; FSCA • 1♀1♂; Posadas; 10.xi.1970; C.Porter, L.Stange; FSCA. – BRAZIL • 2♀; Bates; BMNH • 2♂; Bates; BMNH. – AMAZONAS • 1♀; Manaus; 24.viii.1977; B.C.Patcliffe; DZUP • 1♂; Manaus; 18.vi.1980; Eloy Castellon; INPA • 1♀; Manaus, Conj. Petro; 04.vii.1982; J.A. Rafael; INPA • 1♀; Manaus, Campus UFAM; 18.vi.1982; J.A. Rafael ; INPA • 1♂; Manaus, Estrada M1, km16; 07.vii.1960; EV Silva; INPA • 2♂; Manaus, Estrada M1, km51, Igarapé do Aron; 22.vii.1960; Nunes de Mello; INPA • 1?; Manaus, FUA; 06.x.1978; J.A. Rafael; INPA • 1♀; Manaus, INPA; 14.v.1977; F. Rufino; INPA. – BAHIA • 1♀;

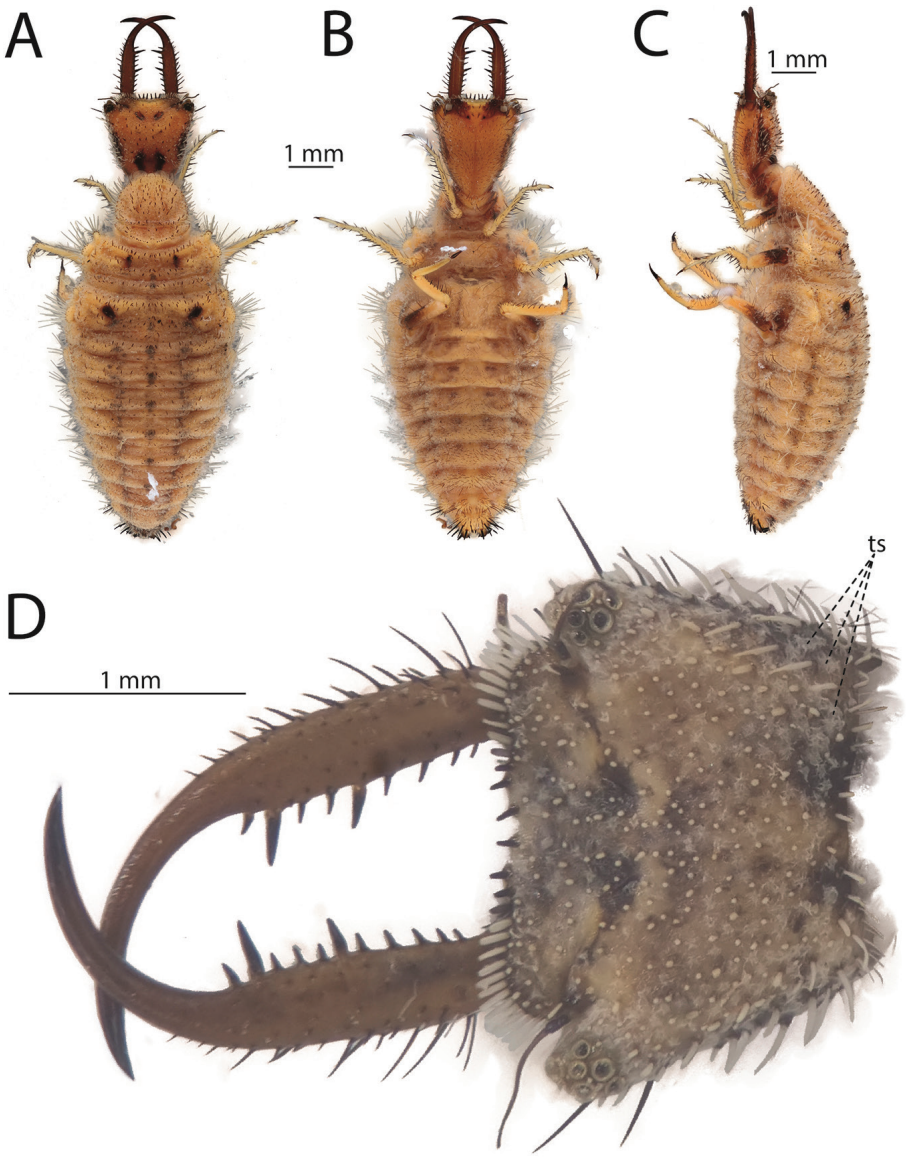

Figure 36. *Ameromyia nigriventris*, third instar larvae, preserved in alcohol: **A** dorsal view, **B** ventral view and **C** lateral view, photographed by Jonathan Bremer (FSCA). **D** head capsule dorsal view, dried specimen. — Abbreviation: ts, thread-like setae.

Andaraí, Pousada Ibitirama, Cidade; 12.xii.1998; STP Amarante col.; MZUSP • 1♂; Feira de Santana; 3.v.1971; Exp. ABC; MZUSP • 1♀; Feira de Santana, Matinha; 3.vii.1999; Marcia; MZFS • 2♀; Ibicoara, CTC Faz. Bagisa; 06.xi.2012; T. Mahlmann leg.; INPA • 1♀; Lençóis, Cerrado; 16.xii.2003; LASIS; MZFS • 1♂; Lençóis, 14km NE de Lençois; 4–5.v.2000; Bravo, F.; MZFS • 1♀; Miguel Calmon, Mulungu do Chiola; 07.v.2021; 11°24′15.9”S 40°38′58.9”W; Luz; Vieira-Silva, V. UFBA • 3♂4♀; 3 larvae; Miguel Calmon, Mulungu do Chiola; 09–16.vi.2021; 11°24′15.9”S 40°38′58.9”W; Rede entomológica; Tavares, L., Miranda, M., Batista L., Vieira-Silva, V. UFBA • 1♀; Mucugê; 23.xii.1979; F.P.Benton; BMNH • 1♀; Santa Rita; iv.1958; E.Dente; MZUSP. – DISTRITO FEDERAL • 1♂; Brasilia; 27.iii.1964; C.E., E.S. Ross; CASC. – ESPÍRITO SANTO • 1♀; Parque Sooretama; x.1962; M. Alvarenga; FSCA. – GOIÁS • 1♀; Aruanã, Rio Araguaia; ii.61; Dirings; MZUSP • 1♀; Campinas; 1935; R. Spitz; MZUSP. – MATO GROSSO • 1♀; Aripuanã; 16.vi.1976; Altamiro Soares; INPA • 3♀; Comodoro, TI Nambiquara; 19.3093S 59.4226W; 26.iv.2006; Arm luz; J.A. Rafael and F.F. Xavier Fº; INPA. – MATO GROSSO DO SUL • 1♀; Amolar, R. Paraguay, Rio Amolar; 30.v.1927; at light; Miss C. Longfield; BMNH. – MINAS GERAIS • 1?; 7 lagoas, Ipeaco; 20.x.69; Becker leg; DZUP • 1♀; Paracatu; 28.x.1962; Evangelista; INPA • 1♀; Paracatu; x.1962; Evangelista; INPA • 1♀; Viçosa; 1931; Mre. Y. Mexia; CASC • 1♀; Parque Estadual do Rio Doce; 06–23.iv.1978; Maria Vulcano; INPA. – PARÁ • 2♀; Santarem; BMNH • 2♂; Santarem; BMNH • 1?; Tumucumaque; viii.1965; MPEG. – RIO GRANDE DO NORTE • 1♀; Macaíba; Mata do Colégio Agrícola de Jundiaí; 11–12.ii.2000; BL (noite); Varela-Freire, A., Chen Chao; UFBA • 2♀; Mossoró, Central de Resíduos; 27–28.xi.1995; Varela-Freire, A.; UFBA • 1♀; Nisia floresta, Morrinhos, r. bela vista; 27.v.2015; Manual, Oliveira I; UFBA • 1♀; Serra Negra do Norte, ESEc Seridó, Casa Familia Rural; 14.vii.1999; Coleta noturna; Alihon/Carlos, Cds; UFBA • 1♀; Serra Negra do Norte, ESEc Seridó, sede; 11–13.vi.1999; Coleta manual; sob luz fluorescente; Varela-Freire, A.; UFBA • 1♀; Serra Negra do Norte, ESEc Seridó, casa da entrada; 02–03.xi.2000; Col. Manual noturna; Varela-Freire, A.; UFBA • 1♀; same collection data as preceding; 21–27.iv.2000; sob luz fluorescente • 1♂; same collection data as preceding; 08–09.v.2003; API • 1♂; same collection data as preceding; 26–27.v.2000; Coleta manual; sob luz fluorescente • 1♀; same collection data as preceding; 12–13.v.2002; API • 3♀; same collection data as preceding; 15–16.v.2003 • 2♀1♂; same collection data as preceding; 13.vi.2004; API (noite); Dias da Silva, J.P. • 3♀; same collection data as preceding; 14–15.viii.2002; Varela-Freire, A. • 3♀1♂; same collection data as preceding; 05–06.vii.2003 • 1♀; same collection data as preceding; 21.vii.2003; API (00:00–03:00) • 1♀; same collection data as pre-

ceding; 09–10.v.2003; API (noite) • 1♂; Serra Negra do Norte, Esec Seridó. Sede; 28–30.vi.1999; Coleta manual, noturna; Varela-Freire, A.; UFBA • 1♀; same collection data as preceding; 05.iv.1996 • 1♂; same collection data as preceding; 15–16.vi.1999; API; Oliveira Irmão • 1♂; same collection data as preceding; 03–07.vi.1999; Coleta manual, noturna; Oliveira (irmao), Varela-Freire, A • 2♂; same collection data as preceding; 17–18.vii.1999; Coleta manual, sob luz fluorescente • 1♀; same collection data as preceding; 17–18.vii.1999 • 2♂; same collection data as preceding; 15–15.vi.1999; Oliveira Irmão, V.A • 1♀; same collection data as preceding; 1990; BL (margem oriental do açude campos II; Equipe Trilhos Pol. • 1♀; same collection data as preceding; 03–07.vi.1999; Coleta manual noturna; Varella, A.A.; Freire, C.A.V.; Oliveira irmão V.A. • 1?; same collection data as preceding; 15–16.vi.1999; API; Oliveira Irmão • 1♂; Serra Negra do Norte, Açude Campos, margem ocidental; 30.iii.1994; Rede entomológica; Varela-Freire, A.; UFBA • 1♀1♂; Serra Negra do Norte, Açude Campos 1, margem ocidental; 06–07.iv.1997; BL (Noite); Varela-Freire, A.; UFBA • 1♀; same collection data as preceding; 04–05.vii.1997 • 3♀; Serra Negra do Norte, ESEc Seridó; 22–23.viii.2002; API (noite); Varela-Freire; UFBA – RIO GRANDE DO SUL • 1♀; Pelotas; 10.ii.1964; Carbonell, Mesa, Monné; FSCA • 1♀; Quaraí, Cerro de Jarro; 27.i.1963; C.S.Carbonell; FSCA • 1♀; Tamandaí; 13.ii.1964; Carbonell, Mesa, Monné; FSCA • 1♂; Tramandaí; 13.ii.1969; C.S.Carbonell, M.A.Monne, A.Meia; FSCA • 1♀; Rio Camaquã; 11.xi.1964; FSCA. – RONDÔNIA • 1♀; Porto Velho, Rio Tapirape; x.1962; R. Pinheiros; CASC • 4♂; Vilhena; 5.xi.1979; N.D. Penny, J.R. Arias; INPA • 5♀; same collection data as for preceding. – RORAIMA • 1♀; Amajari Tepequem, Estrada do Mirante do Paiva; 03º46′14″N 61º44′22″W; 30.iii.2016; Lençol iluminado; J.A. Rafael, D. Takiya, C. Gonçalves, A. Ferreira, C. Maldaner; INPA • 1♀; Boa Vista, Campus UFRR; 02º52′31″N 60º42′45″W; 13.vii.2010; Arm. Luminosa; J.A.Rafael, F.F.Xavier Fº, T.K.Krolow, R.Freitas, R. Machado; INPA • 1♀; Uranduique [sic], Rio Maú; vii.1960; Machado; INPA. – SANTA CATARINA • 1♂; Nova Teutonia; 27°11″8 552°23′t; 300–500m; 11.xi.1955; Fritz Pleumann; CASC • 1♀; Nova Teutonia; 27°11″9 552°23′t; 300–500m; 11.xi.1955; Fritz Pleumann; CASC. – TOCANTIS • 1♂; Porto Nacional, Rua Absalon Fernandes, Jardins dos Ipês; 28.iii.2017; Rippel, M.L.S. leg.; INPA • 1♀; Porto Nacional, Faz. São Judas Tadeu; 27–29.iii.2015; Luminosa; Krolow e equipe; DZUP. – GUYANA • 1♂; 1937; L. Fitzgerald; BMNH. – PARAGUAY • CENTRAL • 1♀; Ypacarai, 4km E Ypacarai; 6.iii.1979; G. Buckingham; FSCA. – URUGUAY • 1♀; Antigas cuchilla belen; 21.ii.1961; C.S. Carbonell; CASC. – ARTIGAS • 1♂; Arroyo, Tres Cruces Grande; 24.xi.1960; RT4, C.S. Carbonell; FSCA • 2♂; Arroyo, Ruta 4, Tres Cruces Chico; 23.xi.1961; C.S. Carbonell; FSCA. – CANELONES • 1♂; Atlantida; 7.ii.1969; J. and L.A. Stange; FSCA. – TREINTA Y TRES • 4♀1♂; Santa Clara de Olimar; 19–22.xii.1960; C.S.Carbonell, L.C.Zolessi; FSCA • 1♂; Santa Clara de Olimar; 12–15.i.1960; L.Zolessi, A. Spiritoso; FSCA • 1♂; Treinta y Tres, Quebrada de los Cuervos; 14.xii.1952; On Grasses; C.S.Carbonell; FSCA. – VENEZUELA • ARAGUA • 1♀; El Limon, Ar.; F. Fernandez Yepez; FML. – BOLÍVAR • 1♀; Uruyen; 12.v.1956; F.F.Fernandez and C.J.Rosales; FSCA • 1♂; Uruyen; 12.iv.1956; F.F.Fernandez and C.J.Rosales; FSCA. – FALCÓN • 1♀; Coro, Sabana Larga; 19.ii.1986; Miller and L.A. Stange; FSCA • 1 larvae; Coro, Sabana Larga; 24.ii.1986; (reared #8); R. Miller and L.Stange; FSCA.

4.11. *Ameromyia pleuralis* Navás, 1926

Fig. 37

Ameromyia pleuralis Navás 1926b: 61, Fig. 13 (base forewing) [Holotype female, Minas Geraes, Brasil V.24, Le Moulth (SDEI)]. – Penny 1977: 38 [species list, distribution]. – Stange 1994: 81 [species list]. – Stange 2004: 228 [species catalog]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog].

Distribution. Brazil (Fig. 12).

Diagnosis. Forewing veins C, Sc, and RA all pale, in contrast to MA which has a dashed pale brown and dark brown pattern, and CuP which are dark brown.

Description. ADULT. ***Head*****:** Antennae with 31 flagellomeres. Flagellomeres dark brown, with ventral face of the club light brown. Vertex light brown with dark brown spots on setae insertion, and dark brown spots and patches on anterior and posterior rows. Vertex decumbent setae black. Interantennal area dark brown. Frons light brown, usually with dark brown medially and under scape. Frons setae black. Interocular distance less than eye width. Clypeus light brown, slightly darker medially. Labrum light brown, slightly darker on ventral margin. Mandibles dark brown. Palpi light brown, with exterior face slightly darker. — ***Thorax*****:** Thorax on lateral view darker ventrally, with an evident longitudinal pale brown band under wings. Pronotum as broad as long, light brown, with two longitudinal dark brown markings medially. Pronotum marginal setae white. Mesonotum dark, with longitudinal light brown streaks on each side of mesoscutum, and one medially on mesoscutellum. Metanotum light brown, with metascutum laterally dark. — ***Wings*****:** Wing tip acute. Forewing veins Sc and RA vein pale; CuA, anterior branch of CuA fork and MP with a dashed dark and light brown pattern, and remaining veins are dark brown. Hind wing veins C, Sc and RA vein pale, and remaining veins are dark brown. Wing membrane hyaline, except on Costal and Radial areas, which have a brown tint. Forewing mediocubital area with dark infuscations around vertical crossveins, in a continuous pattern or apparently dotted but with connecting suffusions pattern, at least until apical third. Forewing CuP vein and hind wing CuA extending well before forewing CuA fork and hind wing MP fork respectively, with nine or more crossveins connecting them and posterior branch of fork. Pterostigma opaque, light brown, encompassing five to six crossveins. Cells delimited by transversal veins in hind wing posterior area higher than long. — ***Legs*****:** Coxae light brown on posterior face and slightly darker on anterior face. Femur and tibiae with black bristles. Legs light brown, dark brown on exterior face. Femur decumbent setae white and black. Profemural sense hair longer than profemur, and mesofemural sense hair much shorter than mesofemur. Tibiae with dark brown spots on bristle insertion. Tibial spurs slightly shorter than pretarsal claws. Tarsomeres light brown, with posterior tip dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*****:** Abdomen dark brown with many dark brown setae. — **LARVA.** Larvae unknown.

Remarks. *Ameromia pleuralis* holotype is labelled as "syntypus" (Fig. 37A), but is stated as holotype in the

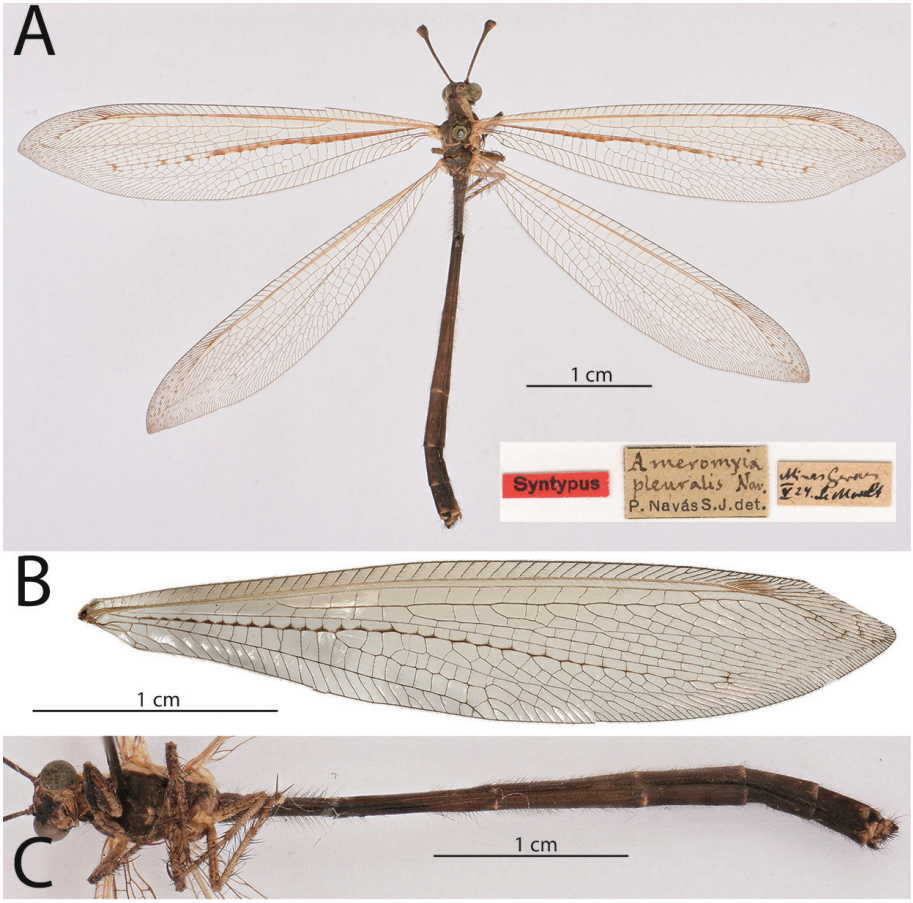

Figure 37. *Ameromyia pleuralis*: **A** holotype, dorsal view, with type labels. **B** Forewing of *A. pleuralis*. **C** Holotype, ventral view. Holotype photographs by Mandy Schröter, Senckenberg.

original description, as it is the only specimen being described. *A. pleuralis* was by far the less sampled species by the current work. Specimens analyzed were restricted to central Brazil. All sampled male specimens have lost their terminalia. It is possible that the analyzed specimens of *A. pleuralis* are simply decoloured or badly preserved specimens of *A. tendinosa*, but without a larger sampling or without analysing the male genitalia, it is difficult to ascertain if *A. pleuralis* is in fact a valid species or if it's a synonym of *A. tendinosa*. Through photographs of the type specimen (Figs 37A, C), the forewing CuP is clearly dark, but, while the RA vein appears to be pale, distalmost sections appears to be dashed and thus it is difficult to discern. Analyzed specimens had fully pale RA veins (Fig. 37B). Nonetheless, based on the analysis of the type specimen photographs and the differences in the wing coloration, we decided to keep *A. pleuralis* as a valid species.

This species is very similar to *A. tendinosa* and *A. dimidiata*, but the latter has a southern distribution and has a pale forewing CuP vein, while *A. tendinosa* has a forewing R vein with a dashed coloration distally.

Examined material. (3♀3♂) BRAZIL – GOIÁS • 1♀1♂; Jataí, Faz. Nova Orlandia; i.1964; Martins, Morgante and Silva; MZUSP. – MATO GROSSO • 1♂; C[hapada]. dos Guimarães; 01.x.2016; Ativa; B. Martins; CEMT • 1♀; Chapada dos Guimarães; xi.1963; M. Alvarenga; FSCA • 1♀; Buriti, Chapada dos Guimarães; x.1978; G.R.Kloss and F. Val; MZUSP. – PARANÁ • 1♂; P[onta]. Grossa; xii.49; á luz [sic]; DZUP.

4.12. *Ameromyia protensa* (Gerstaecker, 1893)

Figs 6B, 8A, B, 38, 39

Myrmeleon protensis Gerstaecker 1893: 138 [Lectotype female, São Paolo, Brasil, II 27445b [current designation], and 2 paralectotypes females, São Paolo, Brasil, II 27445a, II 27445c (EMAU)]. – Banks 1943: 163 [new combination = *Nemotolus protensis*].

Nemotolus protensis (Gerstaecker). – Banks 1943: 163 [new combination = *Nemotolus protensis*]. – Stange 1967: 46 [distribution, new combination = *Ameromyia protensis*].

Ameromyia protensa (Gerstaecker). – Stange 1967: 46 [distribution, new combination = *Ameromyia protensis*]. – Penny 1977: 38 [species list, distribution]. – Stange 1994: 81 [species list]. – Stange 2004: 228 [species catalog]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog].

= *Foya trapezia* Navás 1914b: 54, fig. 4 (base hind wing) [Holotype male, Brasil (NHMW)]. – Esben-Petersen 1920: 193 [synonymy = *Amazoleon pubiventris*]. – Stange 1967: 47 [synonymy = *A. protensis*].

= *Ameromyia alterna* Navás 1919: 296 [Syntypes male, female, Banda Oriental, Argentina (not located)]. – Navás 1934: 14 [distribution]. – Banks 1943: 163 [synonymy].

= *Ameromyia decarloi* Navás 1923a: 189 [Holotype male, Corrientes, Argentina, i.1921, De Carlo (not located)]. – Stange 1967: 47 [synonymy].

Distribution. Argentina, Brazil, Paraguay; Uruguay (Fig. 13).

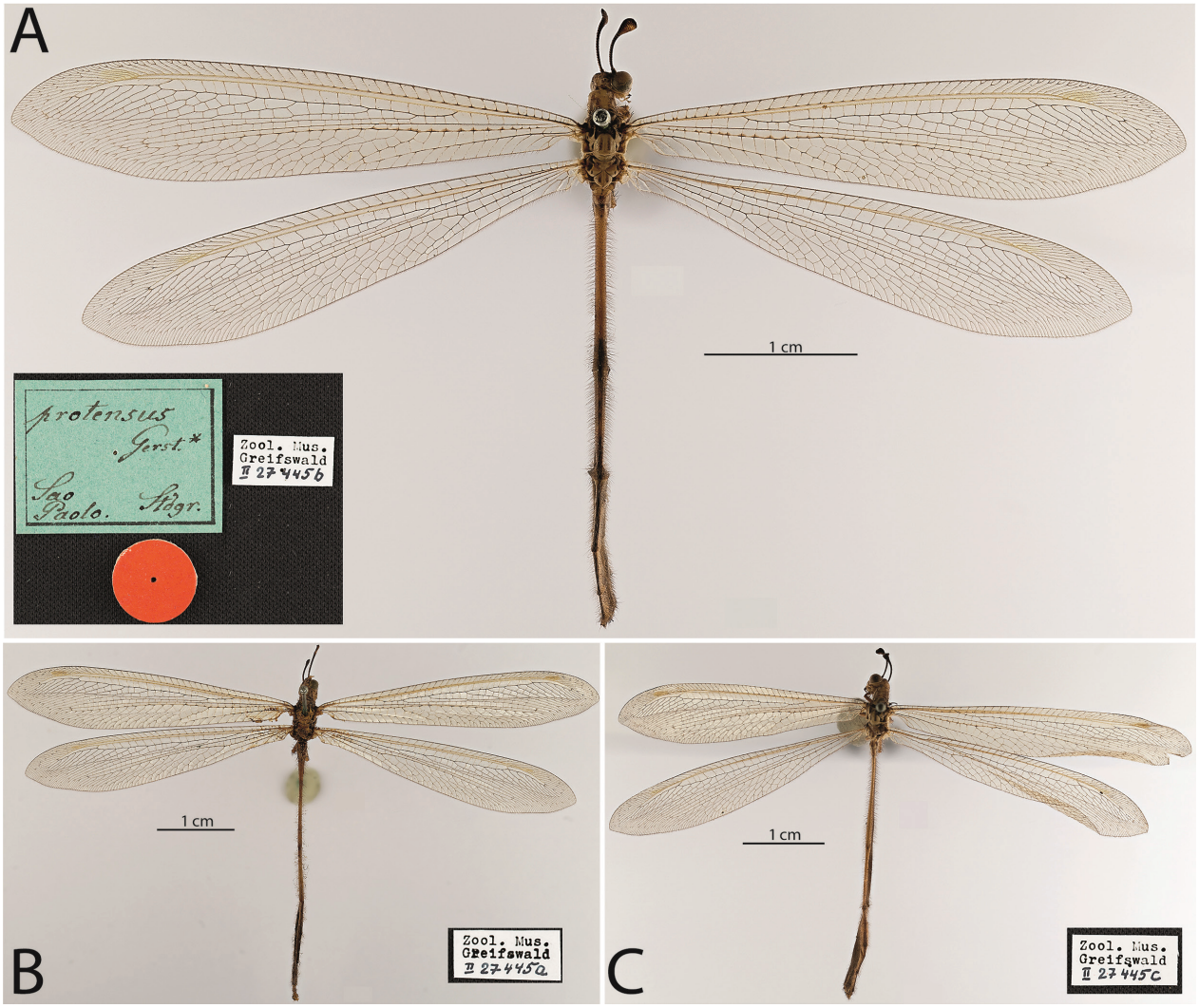

Figure 38. *Ameromyia protensa*, type series, habitus on dorsal view, with respective type labels: **A** lectotype. **B** and **C** paralectotypes. Photographs by Lara Lopardo (EMAU).

Diagnosis. Forewing RP veins, basal half of CuP and banksian lines black in contrast to other veins which are mostly pale. Forewing mediocubital area cells at basal third at least 1/3 suffused with dark brown. Hind wing RP and banksian lines veins and black in contrast to other hind wing veins which are mostly pale. Clavate setae on male genitalic sac very long.

Description. ADULT. *Head*: Antennae with 27–29 flagellomeres. Flagellomeres dark brown, except the ones at the club, which are light brown ventrally. Vertex light brown, with dark brown anterior and middle rows, and two brown spots in posterior row. Vertex decumbent setae black. Interantennal area dark brown. Frons light brown, with dark brown patches medially. Frons setae black. Interocular distance less than eye width. Clypeus light brown, with two medial dark brown markings. Labrum light brown, with very faint dark brown patches that connect with clypeus dark brown markings. Mandibles with external face light brown, and internal face dark brown. Palpi light brown, with external face slightly darker. Mandibular and labial distalmost palpomeres with dark brown tip. — ***Thorax*:** Thorax light brown, with dark brown markings. Thorax on lateral view dark brown, with an evident longitudinal light brown band under wings. Pronotum as broad as long, light brown with dark brown markings. Pronotum marginal setae white and/or black. Mesonotum light brown, with dark brown patches on prescutum and dark brown laterally on mesoscutum. Metanotum light brown, mesoscutum dark brown laterally. — ***Wings*:** Wing tip acute. Forewing RA, MA and A veins pale; RP and Banksian Lines veins dark; CuP dark on basal half and dashed near posterior wing margin; CuA and MP veins with dark and pale sections; remaining veins with dashed pattern. Hind wing veins R and MA pale; RP veinsdark; remaining veins with dashed pattern. Wing membrane hyaline, or sometimes with a faint brown tint. Forewing mediocubital area with dark brown infuscations along CuA vein until at least half of forewing distance, which cover at least 1/3 of the cells. Forewing CuP and hind wing CuA veins extending before forewing CuA and hind wing MP fork respectively, with at least four crossveins connecting them and posterior branch of fork. Pterostigma opaque, dark yellow, encompassing three to four crossveins. Cells delimited by transversal veins on hind wing posterior area longer

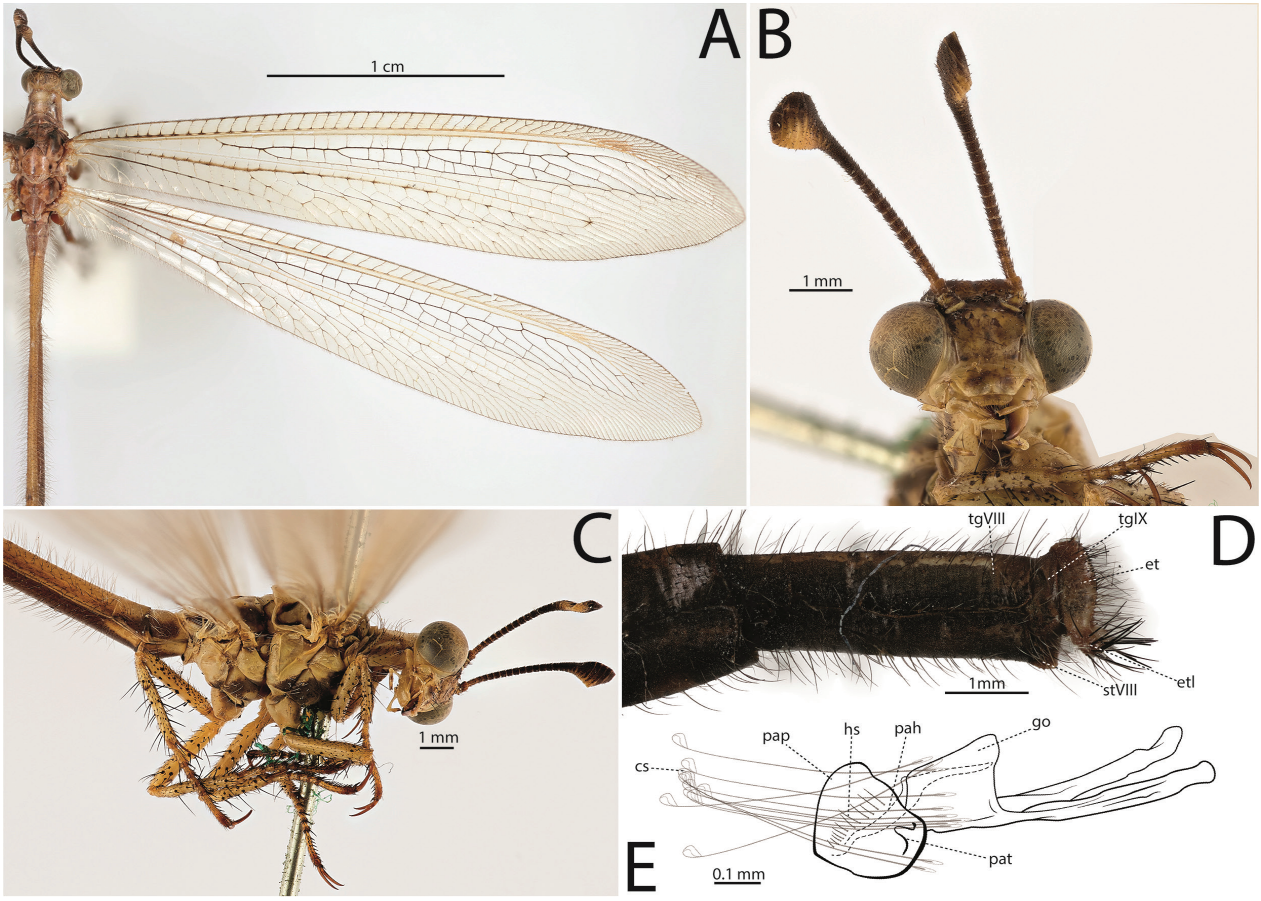

Figure 39. *Ameromyia protensa*: **A** male specimen, dorsal view. **B** Lectotype head and forelegs, frontal view. **C** Lectotype head, thorax and legs, lateral view. **D** Male terminalia, lateral view. **E** Illustration of male genitalia, lateral view. Type photographs by Lara Lopardo (EMAU). — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

than high. — ***Legs*:** Coxae dark brown anteriorly and light brown posteriorly. Legs light brown and with many dark brown spots on setae insertion. Femur and tibiae with black bristles. Femur light brown, with external face slightly darker than internal face. Femur decumbent setae white and black. Profemural sense hair longer than profemur and mesofemural sense hair much shorter than mesofemur. Tibial spurs slightly shorter than pretarsal claws. Tarsomeres light brown, with distal fourth dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen dark brown ventrally, with brown setae. Tergites I–III light brown, and remaining tergites dark brown. Male paramere plates quadrangular on lateral view. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae very long, with a sickled club. — **LARVA.** Larvae unknown.

Remarks. The type specimen of *Foya trapezia* was not analyzed in this work. *Foya trapezia* has a controversial taxonomical background as it was synonymized under *Amazoleon pubiventris* along with *Myrmeleon tendinosus* by Esben-Petersen (1920), according to the author they were of the same species. However, the hind wing illustration provided by the author in *F. trapezia* original description, makes it clear that *F. trapezia* and *M. tendinosus* type specimens cannot be of the same species as the hind wing posterior area are very different. Thus, the original description for *F. trapezia* agrees much more with *A. protensa* than *A. pubiventris*, as mentioned in the diagnostic black forewing veins RP and both banksian lines (Fig. 39A), which are absent for *A. pubiventris*. Therefore, in this work we agree and maintain Stange's (1967) synonymy of *F. trapezia* under *A. protensa*.

The type specimens of *A. alterna* and *A. decarloi* were not located, and are still missing as previously mentioned by Stange (2004; 2010) and Oswald (2021). However, the original description for those species also agrees with *A. protensa*, in the same way as *F. trapezia*, and therefore we chose to maintain both species as synonyms.

Ameromyia protensa is the only species from the *modesta* group that occurs in Argentina, Paraguay and Uruguay (Fig. 13). This species is restricted to southern South America, and its northermost distribution record continues to be its type locality, in São Paulo state, Brazil.

Examined material. (7♀9♂) ARGENTINA • 1♂; S of Corrientes, Parana River; 16.i.2009, M.Snizek; FSCA • 1♂; Entre Rios, 1º de mayo;10.iii.1961; FSCA. – BRAZIL – RIO GRANDE DO SUL • 1♀; Quaraí, Cerro do Javali; 25–27.i.1963; C.S.Carbonell; FSCA. – PARAGUAY – PARAGUARÍ • 1♂; Cerro Hu, vic. Posada Del Cerro; 05–06.ii.2019; 25°36.087′S 057°705′W; 531ft; J. E. Eger; L. G Bezark;

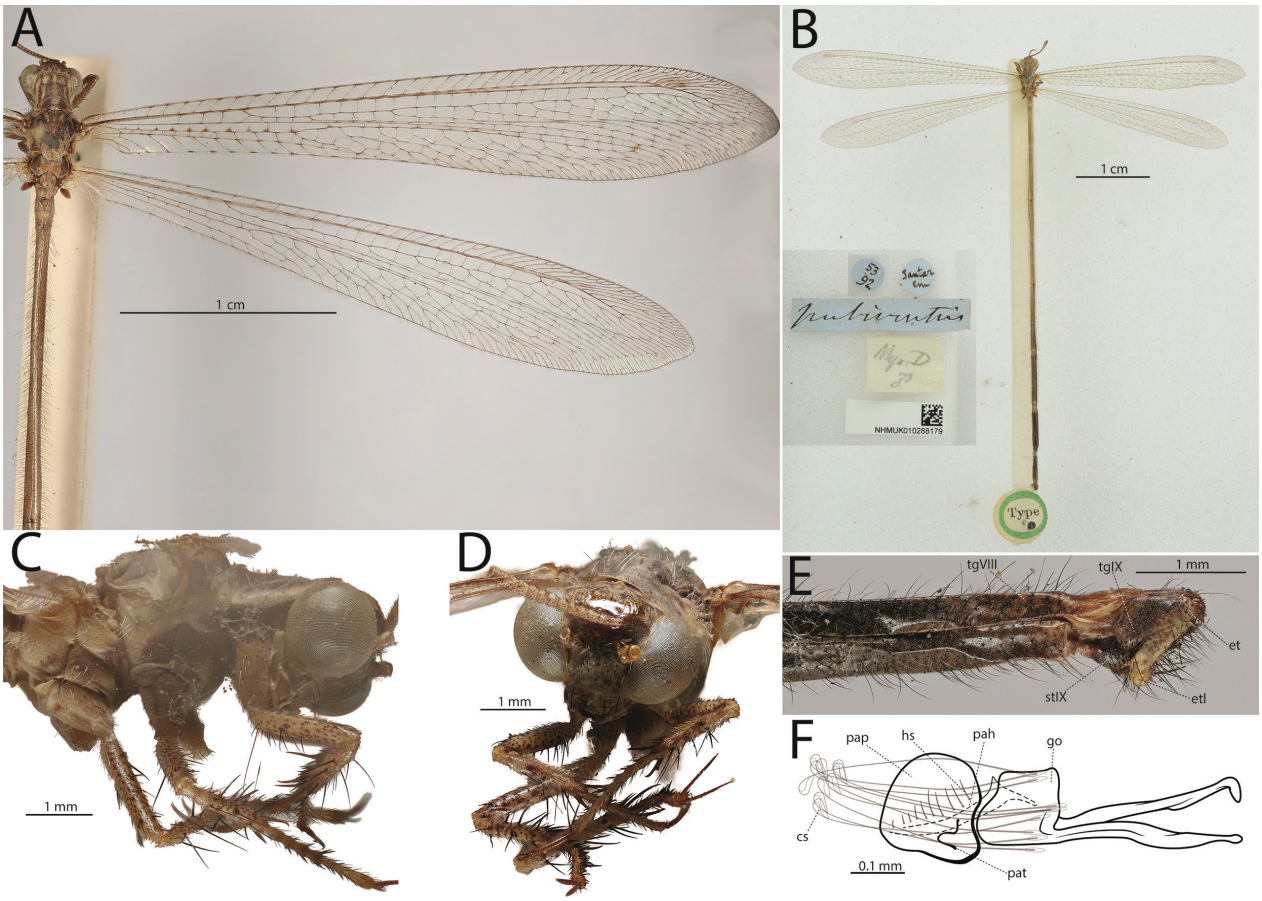

Figure 40. *Ameromyia pubiventris*: **A** Lectotype, dorsal view. **B** Lectotype, habitus, dorsal view, with type labels, photographed by Ben Price (BMNH). **C** Lectotype, head, thorax and legs, lateral view. **D** Lectotype, head and legs, frontal view. **E** Lectotype terminalia, lateral view. **F** Illustration of male genitalia, lateral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

FSCA. – VILLA RICA: 2♀1♂; xi; BMNH. – URUGUAY • 2♂; Paysandu, Puerto Pepeají; 30.xi.1959; C.S.Carbonell, A. Mesa; FSCA • 2♀2♂; Tacuarembó, Tacuarembó enico; 20–25.i.1960; C.S.Carbonell; FSCA) • 1♀; same collection data as for preceding. – ARTIGAS • 1♀; Tres Cruces Chico (ruta 4), Arraya; 23.xi.1961; C.S. Carbonell, FSCA. – TREINTA Y TRES • 1♂; Quebrada de los cuervos; 14–15.xii.1952; C.S. Carbonell; FSCA.

4.13. *Ameromyia pubiventris* (Walker, 1860)

Figs 1D, 5A, 40

Myrmeleon pubiventris Walker 1860: 189 [Lectotype male, Santarem 5392 (BMNH) NHMUK010288179] [current designation]. – Banks 1913: 229 [new combination = *Amazoleon pubiventris*].

Amazoleon pubiventris (Walker). – Banks 1913: 229 [new combination = *Amazoleon pubiventris*]. – Banks 1943: 164 [key, distribution]. – Esben-Petersen 1920: 193 [*Foya trapezia* and *Myrmeleon tendinosus* = *Amazoleon pubiventris*]. – Markl 1954: 197, Fig. 15 (forewing base) [wing venation]. – Stange 1967: 45 [new combination = *Ameromyia pubiventris*].

Ameromyia pubiventris (Walker). – Stange 1967: 45 [new combination = *Ameromyia pubiventris*]. – Penny 1977: 38 [species list, distribution]. Stange 1994: 81 [species list]. – Stange 2004: 228 [species catalog]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog].

Distribution. Brazil; Suriname (Fig. 13).

Diagnosis. All wing veins with dashed dark brown and pale brown coloration pattern. Thorax dorsally pale in contrast to ventral face which is dark brown. Legs pale brown, with scattered dark brown spots. Abdomen pale brown with the distal third dark brown. Male genitalic sac extending laterally, and slightly dorsally above the gonarcus.

Description. ADULT. *Head*: Antennae with 26–29 flagellomeres. Flagellomeres pale brown, the ones at the club with many dark brown spots. Vertex light brown, with latitudinal dark brown streaks in anterior and middle row, and two brown spots in posterior row. Vertex decumbent setae black. Interantennal area pale or dark brown. Frons pale brown, frequently with dark brown patches centrally. Frons setae black. Interocular distance less than eye width. Clypeus pale brown. Labrum pale brown with gray patches medially. Mandibles light brown on basal half and dark brown on distal half. Palpi pale brown, with external face slightly darker. — ***Thorax*:** Thorax pale brown, with two dark brown longitudinal streaks dorsal-

ly. Thorax on lateral view dark brown, with an evident longitudinal pale brown band under the wings. Pronotum as broad as long, pale brown, with small dark brown spots and dark brown markings appearing as three longitudinal pale brown streaks. Mesonotum dark brown, mesoscutellum pale brown. Metascutum pale brown. — ***Wings*:** Wing tip acute. Veins with dashed dark and pale brown pattern. Wing membrane hyaline or with a brown tint, and dark brown infuscations on crossvein junctures. Forewing mediocubital area with dark infuscations around vertical crossveins in a uniform dotted pattern, culminating on rhegmal area. Forewing rhegmal area with an evident dark brown insfuscation. Forewing CuP and hind wing CuA veins extending before CuA and MP fork respectively, with at least four crossveins connecting them and posterior branch of fork. Pterostigma opaque, white, dark brown centrally, encompassing three to four crossveins. Cells delimited by transversal veins on hind wing posterior area longer than high. — ***Legs*:** Coxae dark brown on anterior face and pale brown on posterior face. Legs light brown with dark brown spots on setae insertion. Femur and tibiae with black bristles. Femur decumbent setae dark brown. Profemural sense hair longer than profemur and mesofemural sense hair much shorter than mesofemur. Tibial spurs slightly shorter than pretarsal claws. Tarsomeres light brown, with distal fourth dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen pale and dark brown, sometimes banded, with many small dark brown spots. Tergites I–IV pale brown with, turning dark brown from tergite V onwards. Sternites II and III pale brown and marginally dark brown, and remaining sternites dark brown. Male paramere plates quadrangular with a round posterodorsal margin, on lateral view. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae with a sickled club. — **LARVA.** Larvae unknown.

Remarks. Walker (1860), in *Myrmeleon pubiventris* original description, did not designate a holotype, but he provided species measurement variations, "Length of the body 19–23 lines; of the wings 27 lines". This suggests he analyzed more than one specimen as interpreted by Stange (2004), who mentioned syntypes in his catalog. We agree with Stange's interpretation of syntypes, however, at the BMHN there is only one male specimen labeled as type (Fig. 40B), and thus we are hereby designating this specimen as the lectotype. Furthermore, Walker (1860) did not state any data label, but only mentioned "Amazon Region". The lectotype label states "Santarem" which is a municipality in Pará state, located at the Brazilian Amazon region.

During this work, only specimens from Brazil were analyzed. However, Banks (1943) registered this species from Surinam (which was posteriorly mentioned by Stange (2004)). Stange (2004) also mentioned that the species occur in Venezuela, but without further details. Furthermore, we did not find this Venezuelan specimen in Stange's collection, but we found one specimen of *A. modesta* from Venezuela misidentified as *A. pubiventris*. Therefore, we are considering this distribution data as dubious and we are not displaying it on our distributional map.

Despite the records for Surinam and the type locality in the Amazon Region, this species appears to be more abundant in open areas in the Cerrado and Caatinga biomes in Brazil.

Ameromyia pubiventris can be easily differentiated from *A. modesta* and *A. guarica* by leg coloration, and from *A. protensa* by the much smaller posterior area of forewing, and dashed Radial sector veins (Figs 5A, 40A). *Ameromyia pubiventris* also has slender wings in comparison to *A. protensa*.

Examined material. (124♀43♂8?) BRAZIL • 3♀3♂; Bates; BMNH. – AMAZONAS • 1♀1♂; BMNH. – BAHIA • 1♂; Iaçu, Rio Paraguaçu; 15.v.2010; Bandeja; UFBA • 1♀; Santa Rita; iv.1958; E.Dente; MZUSP • 1♀; Curaçá, Riacho do Zé, Ponto MCUR5; 05.v.2011; Bandeja; França, D.; UFBA. – GOIÁS • 2♀1♂; Alto Paraíso de Goiás, P.N.Chapada dos Veadeiros; 14°07′44″S 47°44′04″W; 31.vii.2018; Cerrado queimado/Malaise/P.3; Perioto and Lara cols.; DZUP • 1♀1♂, 2?; Alto Paraíso de Goiás, P.N.Chapada dos Veadeiros; 14°08′36″S 47°46′04″W 03.vii.2018; Cerrado/Malaise/Ponto 3; Perioto and Lara cols.; DZUP • 1♀; Porangatu; 22.iv.2017; Col. Ativa; Andrade, Iury; DZUP. – MARANHÃO • 1♀; Caxias, Faz. Bode; 24–31.vii.1999; Arm. Malaise; F.L.Oliveira leg; CZMA • 1♀1♂; Mirador, Parque Est. Mirador, Base da Geraldina; 06°37′25″S 45°52′08″W; 13–19.viii.2012; armadilha luminosa; L.L.M. Santos, J.S.Pinto, Junior and L.S. Santos; CZMA • 1♀; Mirador, Parque Est. Mirador, Base da Geraldina; 06°37′25″S 45°52′08″W; 09–16.v.2013; armadilha luminosa; F. limeira de oliveira, C.F.Barros and A.A.Santos; CZMA • 1♀; same collection data as for preceding; 10–16.v.2013; Malaise; L.L.M. Santos, J.S.Pinto, Junior and L.S. Santos • 1?; same collection data as for preceding; 01–13.viii.2013; Armadilha de luminosa; F. Limeira de Oliveira, A.A. Santos and C.F. Barros; CZMA • 1♂; Mirador, Povoado Pindaíba (Mel); 06°39′44″S 45°01′37″W; 01–05.vi.2011; armadilha luminosa; F.Limeira de oliveira, G.A Reis and M.S; CZMA • 1♀; Mirador, Parque Est. Mirador, Posto Avançado do Mel; 06°43′50″S 44°58′59″W; 30–31.v.2011; armadilha luminosa; F. Limeira de Oliveira, A.A.Santos and T.T.A.Silva; CZMA • 1?; same collection data as for preceding; 02–08.v.2011; F.Limeira de oliveira, G.A Reis and M.S; CZMA • 1♀; Mirador, Parque Est. Mirador, Base da Geraldina; 21–26.viii.2006; Arma. Luminosa; F. limeira de oliveira; CZMA • 1♀;same collection data as for preceding; 30.vi–04.vii.2008; M.J. Almeida Holanda • 1?; same collection data as for preceding; 21–25.vi.2007; F. limeira de oliveira • 1♀1♂; same collection data as for preceding; 21–26.viii.2006 – MATO GROSSO • 2♀; Cuiabá, Recanto das sementes; vii–viii.2018; Coleta manual; L.G.O. Nunes; DZUP. – MINAS GERAIS • 1♀1♂, 1? Chapada Gaúcha, P.N. Grande Sertão Veredas; 15º10′26.8″S 47º43′19.9″W; 17.v.2018; A.luminosa 3/Cerrado; Perioto and Lara cols.; DZUP. – PARÁ • 1♀; Santarem; BMNH. – PERNAMBUCO • 2♀; Buique, Catimbau; 08°31′26″S 37°15′12″W; 950m; 04.vi.2015; armadilhas; Almeida, Lucena, Tavares; DZUP. – PIAUÍ • 1♀; Guaribas, Parque Nacional Serra das Confusões; 09°08′28″S 43°33′42″W; 515m; 05.vi.2013; Arm. Luz; J.A.Rafael; INPA • 1?; Ribeira Gonçalves, E.E. Uruçuí-uma; 17–23.vi.84; Malaise cerrado; J.Graf; DZUP. – RIO GRANDE DO NORTE • 2♂; Serra Negra do Norte, Açude Campos; 14.v.1994; Varela-Freire, A.; UFBA • 1♀1♂; Serra Negra do Norte, Açude Campos 1, margem ocidental; 5–06.vi.1997; BL (noite); Varela-Freire, A.; UFBA • 1♀1♂; same collection data as for preceding; 6–07.iv.1997 • 1♂; Serra Negra do Norte, Açude Campos, margem ocidental; 30.iii.1994; Rede entomológica;

Varela-Freire, A.; UFBA • 2♀1♂; Mossoró, Aqueduto; 18–19.vi.1996; BL (noite); Varela-Freire, A.; UFBA • 4♂; Mossoró, Aqueduto; 19–20.vi.1996; BL (noite) [illegible] de mata; Varela-Freire, A.A.; Mendonça, K; Nannorino, R.; UFBA • 1♀1♂; Mossoró, Canto do Amaro, Central de Resíduos; 18–19.vi.1996; BL (noite); Equipe ASS--A [illegible]; UFBA • 1♀; same collection data as for preceding • 3♀; Serra Negra do Norte, ESEc Seridó; 22–23.viii.2002; API (noite); Varela-Freire; UFBA • 2♀; Serra Negra do Norte, ESEc Seridó, casa da entrada; 15.vi.2003; API; Varela-Freire A.A. Col.; UFBA • 1♀; same collection data as for preceding; vii–vii.2006 • 1♀; same collection data as for preceding; 02–03.xi.2000; Col. Manual noturna • 2♀; same collection data as for preceding; 21.v.2003; API (18 • 00–24 • 00) • 1♀; same collection data as for preceding; 30.v.1997; Coleta manual, noturna • 2♀; same collection data as for preceding; 13.vi.2004; API (noite); Dias da Silva, J.P. • 1♂; same collection data as for preceding; 13.vi.2004 • 3♀; same collection data as for preceding; 14–15.viii.2002; Varela-Freire, A. • 3♀; same collection data as for preceding; 05–06.vii.2003 • 2♀; same collection data as for preceding; 21–22.vii.2002 • 1♀; same collection data as for preceding; 30–31.viii.2002 • 1♀; same collection data as for preceding; 13–14.ix.2002 • 1♀; same collection data as for preceding; 08–09.v.2003 • 1♀; same collection data as for preceding; 23.v.2003 • 1♀; same collection data as for preceding; 09–10.v.2003 • 1♂; same collection data as for preceding; 5–06.vii.2003 • 2♂; same collection data as for preceding; 08–09.v.2003 • 1♂; same collection data as for preceding; 23.v.2003 • 1♀; same collection data as for preceding; 28–29.vi.2003; API • 2♀; same collection data as for preceding; 22.v.2003 • 4♀; same collection data as for preceding; 20–22.vii.2003 • 2♀; same collection data as for preceding; 15–16.v.2003 • 3♀; same collection data as for preceding; 06.iv.2003 • 4♀; same collection data as for preceding; 07–08.vii.2003 • 3♀; same collection data as for preceding; 13–14.vii.2003 • 2♂; same collection data as for preceding; 7–08.vii.2003 • 1♂; same collection data as for preceding; 15–16.v.2003 • 5♀; same collection data as for preceding; 22–23.v.2004; API (18–24h) • 1♂; same collection data as for preceding; 22–23.v.2005 • 2♀; same collection data as for preceding; 05–10.v.2003; API (noturno) • 1♂; same collection data as for preceding; 05–10.v.2003 • 3♀; same collection data as for preceding; 22–23.v.2000; Coleta manual, sob luz fluorescente • 1♀; same collection data as for preceding; 23.viii.1991; Coleta manual, sob luz fluorescente • 1♀; same collection data as for preceding; 17–18.vii.1999 • 2♂; same collection data as for preceding; 22–23.v.2000 • 1♀; same collection data as for preceding; 10–12.v.2000 • 1♂; same collection data as for preceding; 21–27.iv.2000 • 1♀; same collection data as for preceding; 07–08.iv.2002; Armadilha luminosa • 1♀; same collection data as for preceding; 21.vii.2003; API (00 • 00–03 • 00) • 1♀; Serra Negra do Norte, ESEc Seridó, Sede; 11.vi.1993; Manual noturna; Varela-Freire, A.; UFBA • 1♀; Serra Negra do Norte, ESEc Seridó, sede; 03–07.vi.1999; Coleta manual, noturna; Oliveira (irmão), Varela-Freire, A; UFBA • 1♂; same collection data as for preceding; 25–26.vi.1999; Varela-Freire, A. • 1♀; same collection data as for preceding; 03–07.vi.1999; Varella, A.A.; Freire, C.A.V.; Oliveira irmão V.A. • 1♀; Serra Negra do Norte, Rio Espinharas, Chácara Nova Vida; 26.vii.2009; Luz; Calor e Lecci; UFBA • 1♂; Natal, Guararapes; 21.viii.2008; Manual; Ribeiro KG; UFBA • 1♀; Natal, UFRN Centro Biociências; 20.xi.2013; Coleta Manual; Machado, M.C.N.; UFBA • 1♂; Caicó, Ponte Rio Sabugi; 22.vii.2009; Lençol; UFBA • 2♀; Lajes; 20.vii.1990; armadilha luminosa; vegetação; Varela-freire; UFBA. – SÃO PAULO • 1♀; Populina; 09.vi.2021; 19°56′31.1”S 50°32′24.3”W; Luz (fogão); Calor, A.R.; UFBA • 1♀; Populina; 14.vi.2021; 19°56′31.1”S 50°32′24.3”W; Coleta Manual; Calor, A.R.; UFBA. – TOCANTINS • 1♂; Porto Nacional, Faz. São Judas Tadeu; 04.vii.2011; Lençol iluminado; T.K., Krolow e equipe leg.; CEUFT • 1? Porto Nacional; 20.v.2005; Rocha S.B.; CEUFT • 22♀5♂; S. Isabel do Morro, Ilha do Bananal; vi.1961; M.Alvarenga; FSCA • 1♀; S. Isabel do Morro, Rio Araguaia, Ilha do Bananal; 12–22.viii.1957; Borys Malkia; FSCA • 1♀; Santa Isabel, Ilha do bananal, Rio Araguaia; 15–22.vii.1957; Berrys Malkin; CASC • 1♀; Santa Isabel, Ilha do Bananal; vi.1961; M. Alvarenga; CASC.

4.14. *Ameromyia strigosa* (Banks, 1909)

Figs 1A, 2A, 41–44

Brachynemurus strigosus Banks 1909: 2 [Lectotype male, Pedregal, Argentina, 15.i.1906 (MCZ)]. – Banks 1913: 228 [new combination = *Ameromyia strigosa*].

Ameromyia strigosa (Banks). – Banks 1913: 228 [new combination = *Ameromyia strigosa*]. – Navás 1917: 194 [new combination = *Moza strigosa*]. – Navás 1923b: 22 [distribution as *A. strigosa*]. – Navás 1926c: 326 [distribution]. – Navás 1926a: 107 [distribution]. – Stange 1961: 677 [lectotype designation]. – Stange 1967: 47 [distribution]. – Stange 1994:81 [species list]. – Stange 2004: 228 [species catalog]. – Oswald 2021 [species catalog].

= *Ameromyia pentheri* Navás 1914b: 52 [Holotype male, Santa Rita, Brazil, 1903, Exped. Penther (NHMW)]. – Penny 1977: 38 [species list, distribution]. – Stange 2004: 228 [species catalog]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog]. [**NEW SYNONYMY**].

= *Ameromyia fidelis* Navás 1915a: 463 [Holotype female, Chaco de Santa Fe, Las Garzas, Argentina (MNHN)]. – Navás 1915b: 10 [distribution]. – Navás: 1919: 296 [distribution]. – Navás 1920: 58 [distribution]. – Stange 1967: 47 [synonymy].

Distribution. Argentina; Brazil; Bolivia; Chile; Paraguay (Fig. 12).

Diagnosis. Dark and yellow coloration. Thorax setae all white. Profemur with decumbent setae all white. Wing veins with dashed dark brown and yellowish-brown pattern. Four to five obliquous streaks in forewing, around MA vein. Male ectoproct obliquus in relation to tergite IX.

Description. ADULT. *Head*: Antennae with 34 flagellomeres. Flagellomeres black, slightly lighter at antennae club, with yellow between segments. Vertex yellow, with dark latitudinal bands on anterior and middle rows, and dark spots on posterior row. Vertex decumbent setae all white, or black with white only on interantennal area. Frons yellow, with dark brown patches that can extend to interantennal area. Frons setae white. Interocular distance less than eye width. Clypeus yellow, sometimes with dark brown patches. Labrum yellow, with slightly darker ventral margin. Mandibles dark brown. Palpi yellow, slightly darker on external face of palpomeres. — ***Thorax*:** Thorax dark with yellow markings. Thorax dark on lateral view, with a faint longitudinal pale band under wings. Pronotum as broad as long, dark with two lateral and one medial longitudinal yellow stripe. Pronotum marginal setae white. Mesonotum dark, with yellowish-brown on notal junctures. Metanotum dark, with yellowish brown

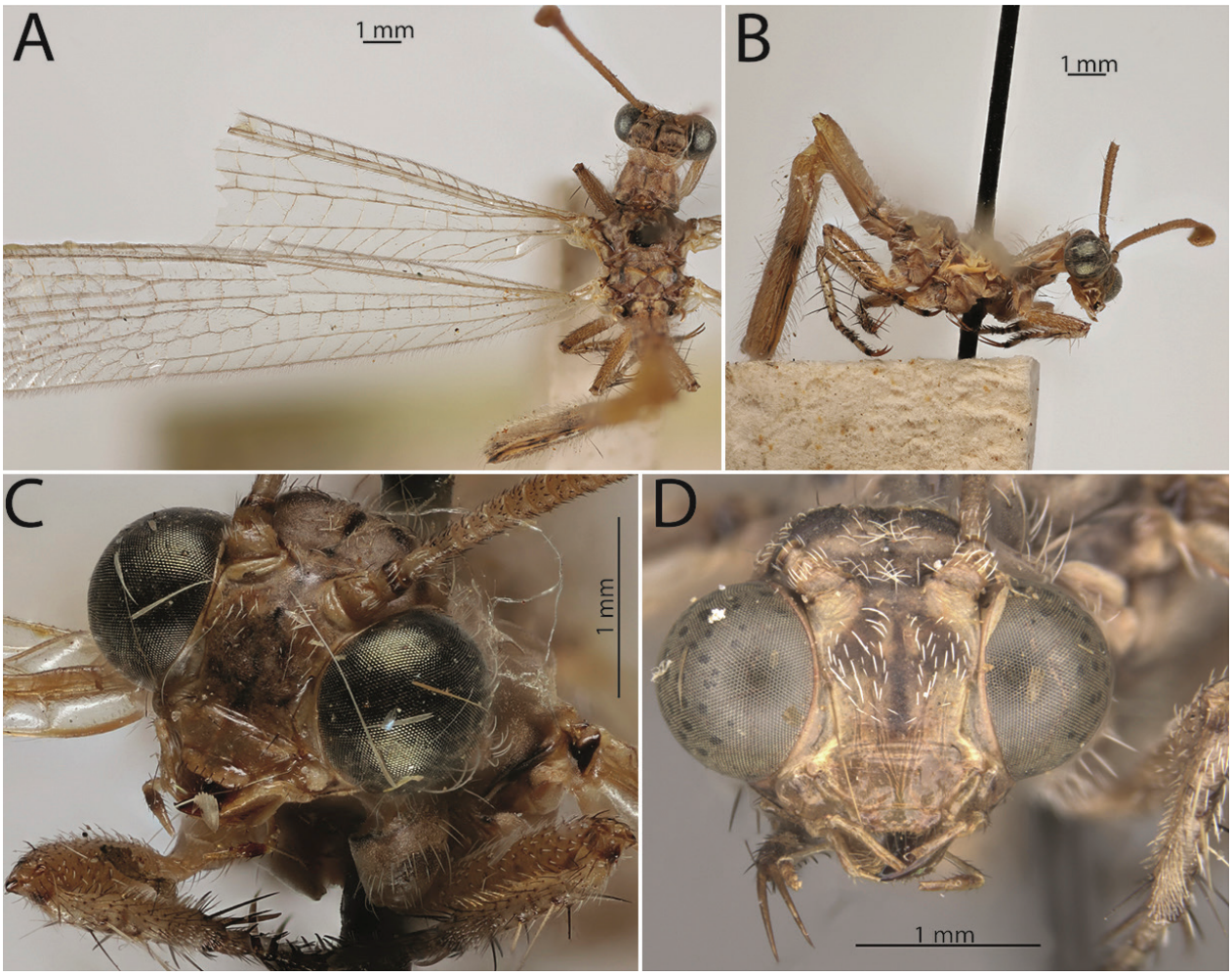

Figure 41. *Ameromyia pentheri* and *A. strigosa*: **A** dorsal view and **B** lateral view of *A. pentheri* holotype, habitus. **C** Head and forelegs of *A. pentheri* holotype, frontal view. **D** Head and foreleg of *A. strigosa* lectotype, frontal view, photographed by Charles Farnum, Museum of Comparative Zoology, Harvard University.

medially on metascutum. — ***Wings*:** Wing tip acute. Hind wing rarely falcate. Veins with dashed dark brown and pale yellow or white pattern. Wing membrane hyaline. Forewing with dark brown infuscations in wing membrane alternating around crossveins on presectorial and radial areas, and along crossveins on sectorial, mediocubital and rhegmal areas, forming five evident oblique streaks around MA vein. Forewing mediocubital area with dark infuscations around vertical crossveins which become sparser along MA vein, culminating on rhegmal area. Forewing CuP and hind wing CuA veins extending well before forewing CuA and hind wing MP fork respectively, with nine or more crossveins connecting them and posterior branch of fork. Pterostigma opaque, dark brown on basal half and white on apical half, encompassing six to seven crossveins. Cells delimited by transversal veins on hind wing higher than long. — ***Legs*:** Coxae dark. Femur and tibiae with black bristles. Femur dark on external face and light yellow on internal face. Profemur decumbent setae white. Meso and metafemur decumbent setae white and black. Profemural sense hair longer than profemur and mesofemural sense hair much shorter than mesofemur. Tibia light yellow with dark spots on setae insertion. Tibial spurs slightly shorter than pretarsal claws. Tarsomeres light yellow, with distal fourth dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen sclerites black, sometimes with yellow on posterior margins. Abdomen with white setae, brown near terminalia. Male ectoproct obliquous in relation to tergite IX, with postventral lobe slightly elevated. Male paramere plates subtriangular on lateral view. Parameres hinge anterior projections not entirely covered by gonarcus. Gonarcus arch positioned not above parameres plates. Male genitalia clavate setae with globose club. — **LARVA.** Larvae unknown.

Biology. A live male specimen was observed in wild at Santa Rita de Cássia, Bahia state, Brazil. The location where the specimen was collected was at the Cerrado biome, with dry vegetation and hard, compacted soil. This specimen hovered in the air almost two meters above the ground.

Remarks. This species, previously restricted to Chile, Paraguay and Argentina, is now registered for the first time to Bolivia. It is also now recorded to Brazil, as *Ameromyia pentheri* is hereby proposed as a synonym of *A. strigosa*. The holotype of *A. pentheri* (Fig. 41A–C)

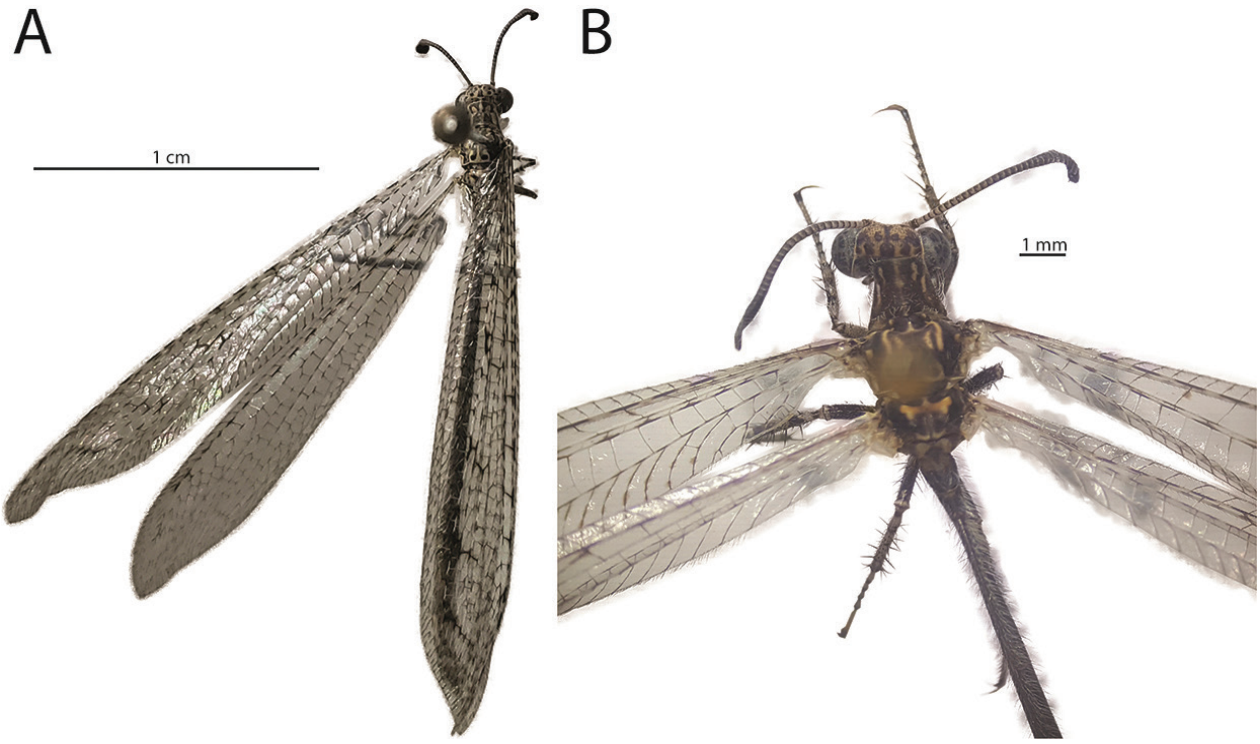

Figure 42. *Ameromyia strigosa* specimens collected at Bahia state, Brazil: **A** male specimen from Santa Rita de Cássia municipality, habitus, dorsal view. **B** Female specimen from Raso da Catarina ecological region, dorsal view.

seems to be a teneral specimen and is devoid of coloration, which is problematic for identifying *Ameromyia* specimens. It also has lost its terminalia. However, the holotype chaetotaxy agrees with *A. strigosa*, as it bears only white setae on frons, thorax and profemur. *Ameromyia strigosa* distribution, though, was previously restricted to southern South America, with no records from Brazil, and the only brazilian specimens identified previously to the synonymy were from Mato Grosso do Sul state, which borders Bolivia and therefore are very close to *A. strigosa* previous distributional range. The locality on *A. pentheri* holotype label only stated it was from "Santa Rita" in Brazil, which relates to more than a dozen municipalities with the same name. Nevertheless, upon analyzing the course of the expedition that collected the type specimen (dubbed as "Penther expedition" by Navás), as detailed in Bohme (1996), it became clear that "Santa Rita" referred to the municipality of Santa Rita de Cássia, Bahia state, Brazil. To ascertain the occurrence of *A. strigosa* in Bahia, a field trip was made to that same locality, which after three days resulted in a single collected male specimen that agrees with both *A. pentheri* and *A. strigosa* type specimens (Fig. 42A). A female specimen that agrees with both *A. strigosa* lectotype and the male specimen found at Santa Rita de Cassia, was located at the MZFS collection, also collected from Bahia state, Brazil (Fig. 42B).

The type specimen of *A. fidelis* was not analyzed in this current work, but the original description greatly fits that of *A. strigosa*, and therefore we chose to maintain the synonymy proposed by Stange (1967). Regarding the combination *Moza strigosa* by Navás (1917), although this combination was never officially undone, it seems that the author himself disregarded his nomenclatural changes as he kept referring to this species as *A. strigosa* in all of his following publications.

Ameromyia strigosa is very distinctive as it bears four to five oblique markings along MA vein in the forewing (Figs 1A, 43C, 44A). Also, frons (Figs 2A, 41D) and leg short decumbent setae (Figs 2A, 41B, C, 43B) are almost all white, and body coloration is black and yellow or yellowish-brown (Figs 1A, 42). The only other species that looks somewhat similar is *A. muralli*, which can also show some yellowish-brown coloration. Some *A. strigosa* specimens bear a falcate hind wing (Fig. 44B), which makes them even more similar to *A. muralli*, but the latter lacks all other aforementioned diagnostic characters for *A. strigosa*.

Examined material. (59♀27♂) ARGENTINA • 1♀; Rio Negro, Cipoletti; 20.i.1960; Bought by F.H.Walz; CASC • 3♀; Rio Negro, Cipoletti; 23.i.1960; Bought by F.H.Walz; CASC • 1♀; same collection data as for preceding; 30.i.1960 • 1♀[misidentified as a male]; Salta, Yacochuya; 22.i.69; A. Willnk; FML. – CATAMARCA • 1♂; 6km N Belen; 1–15.i.1969; 1240m; Malaise; Willinsk, Teran, Stange; FSCA • 2♀; 3km N Belén; 5.xii.1970; C. Porter, L. Stange; FSCA • 1♂; 13km R. Belen; 6.x.1971; C.Porter, L.Stange; FSCA • 1♀; Andalgalá, 30kms Kacia Belén; 11.x.1968; A. Willink and L. Stange; FSCA • 1♀; Andalgalá, 12km O de Andalgalá; 28.iii.2005; c/Luz; J.Torréns y P.Fidalgo; FSCA • 1♀; Ruta 46, 12km O de Andalgalá; 28.iii.2005; c/Luz; J. Torrens y P. Fidalgo; FSCA. – CHACO • 1♀; Nanava; 25.xi.1927; A. Pride; BMNH. – CHUBUT • 1♀; Pto. Piramides, P.Valdez; 17.i.1968; L.A.Stange; FSCA. – FORMOSA • 1♀; Ingeniero Juarez; 27.i.1949; R.Golbach; FSCA. – LA PAMPA • 1♀; Sierra Lihuel Calelel; 11.i.1968; L.A.Stange; FSCA • 1♀; Lihuel Calel; 12.i.1977; L.A.Stange; FSCA. – LA RIOJA • 1♀; 5km S de Udpinango; 16.ii.2006; c/Luz; P.Diez y

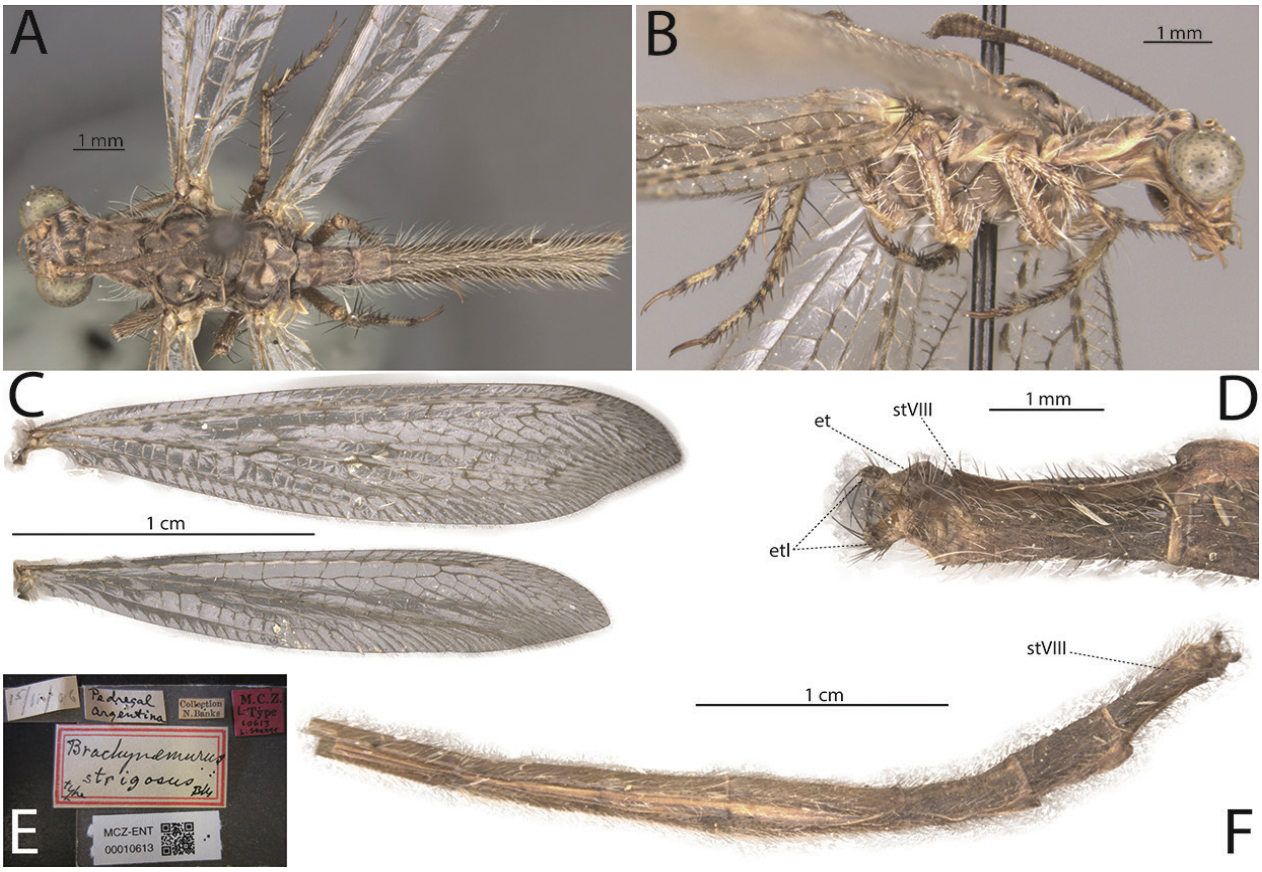

Figure 43. *Ameromyia strigosa* lectotype: **A** head, thorax and abdomen (broken), dorsal view. **B** Head, thorax and legs, lateral view. **C** Fore and hind wing. **D** Male terminalia, ventral view. **E** Type labels. **F** Detached abdomen, ventral view. Photographs by Charles Farnum, Museum of Comparative Zoology, Harvard University. — Abbreviations: et, ectoproct; etl, ectoproct postventral lobe; st, sternite.

P.Fidalgo; FSCA • 1♂; 5km S de Udpinango; 20.ii.2006; c/Luz; Gonzalo Fidalgo; FSCA • 1♀; 7km N Santa Teresita; 18.ii.2006; c/Luz; G. y P. Fidalgo; FSCA • 1♂; Aimogasta, Huaco–Agro; 18.iii.2006; C.Porter; FSCA • 1♀2♂; Chilecito; 10.ii.1966; L.A.Stange; FSCA • 2♀; Chuquia; 6.xii.2003; 1500m; At light; L.A. Stange; FSCA • 1♀; El Barrial, 7km ca El Barrial; 21.ii.2006; c/Luz; Torréns-G.Fidalgo y P.Diez; FSCA • 1♂; Famatima; 23.xi.1975; L.A.Stange; FSCA • 1♀; Patquia; xii.1932–i.1933; K.J. Hayward; BMNH • 1♀; Patquia; x.1932; K.J.Hayward; BMNH • 2♂; Ruta 7 ca El Barrial; 17.ii.2006; c/Luz; Torrens-Fidalgo; FSCA • 4♀; Santa Teresita; 18.ii.2006; c/Luz; G. y P.Fidalgo, J.Torréns; FSCA • 1♀; Santa Teresita; 19.ii.2005; Noche c/luz; G. y P.Fidalgo, J.Torréns; FSCA • 2♀; Sta Teresita; 7km N Santa Teresita; 18.ii.2006; c/Luz; G. y P. Fidalgo; FSCA • 1♀1♂; Termas de Santa Teresita; 15.xii.2004; Malaise; C.Porter, L. Stange; FSCA. – MENDOZA • 1♀; Agrelo; 23.ii.1966; FSCA • 1♂; Mendoza; 22.ii.1966; L.A. Stange; FSCA • 1♂; San Rafael; 6.xii.1983–07.xii.1980; Luis E. Pena; INPA. – NEUQUEN • 8♀4♂; Bardas de Senillosa; 18.xi.1970; M. Gentili; FSCA • 1♀; Neuquen, Al centro; 2.xii.1970; M.Gentili; FSCA. – RIO NEGRO • 5♀; San Antonio Oeste; 14.i.1968; J. and L.A.Stange; FSCA • 1♂; Cipoletti; 20.i.1960; FSCA • 1♂; Cipoletti; 30.i.1960; FSCA • 1♂; La Marque; 4.iii.1958; M.A.Fritz; FSCA • 1♀; General Roca; i.1980; N. Papavero; MZUSP • 1♀; Villa Regina; xii.1962; FSCA • 1♂; Villa Regino; xii.1963; FSCA – SALTA • 1♂; Coronel Olleros; 1.ii.1970; M.Coria; FSCA – SAN JUAN • 1♀; 20km N Calingaster; 13.ii.1966; L.A.Stange; FSCA – SAN LUIS • 1♂; Alto Pencosa; 6.ii.1951; Ross and Michelbacher; FSCA. – SANTIAGO DEL ESTERO • 1♀; Los Tigres; 11–16.i.1970; R. Golbach; FSCA • 1♂; Termas de Rio Hondo; 18–19.iv.1970; C.Porter, L.Stange; FSCA • 1♀; Choya; 3.xi.1961; F.H.Walz; FSCA • El Pinto; xi.1956; F.H.Walz; (1♂ – FSCA • 1♀; same collection data as for preceding. – TUCUMAN • 1♂; Amaicha del Vale; 7.i.1968; Colbach, Terán, Willink; FSCA – BOLIVIA – CAMARGO • 1♀; 21.i.1967; 2400m; W. Wegrauth; FSCA – CHUGUISACA" [sic] • 1♀; "Carandaity" [sic], 80km S.E. Carandayti; ix.1957; Stephen C. Bremley; FSCA. – SANTA CRUZ • 1♀; Camiri, Bridge 20km S. Camiri; 1.iii.1999; 20°10.569′S 63°25.733′W; L.A. Stange; FSCA. – BRAZIL – BAHIA • 1♀; Raso da Catarina, Vizinhanças do alojamento da ESEC; 55.84767 89.31611; 06.xi.2005; Lopes, P.P.; MZFS • 1♂; Santa Rita de Cássia, A.P.A. Rio Preto; 05.vi.2019; Rede entomológica; Calor, A.R., Tavares, L.; UFBA. – MATO GROSSO do SUL • 2♀; Porto Murtinho, Fazenda Campo Florido; 21°38′20.12″S 57°42′20.33″W; 10–15.xii.2013; Malaise pequena; Lamas e eq. Col.; DZUP. – CHILE • 1♂; Rees; BMNH. – PARAGUAY – BOQUERON • 1♀; Estancia Iparoma, 19km N Filadelfia; 26.ix.1978; K.L. Anderson; FSCA. – PARAGUARY • 1♀; Sapucay; 1903; W. Foster; BMNH.

4.15. *Ameromyia tendinosa* (Gerstaecker, 1893)

Figs 3A, 5C, 6A, 7A, 45, 46

Myrmeleon tendinosus Gerstaecker 1893: 139. [Lectotype male, São Paolo, Brasil, II 27449a [current designation], and 3 paralectotypes females, São Paolo, Brasil, II 27449b, II 27449c, II 27449d

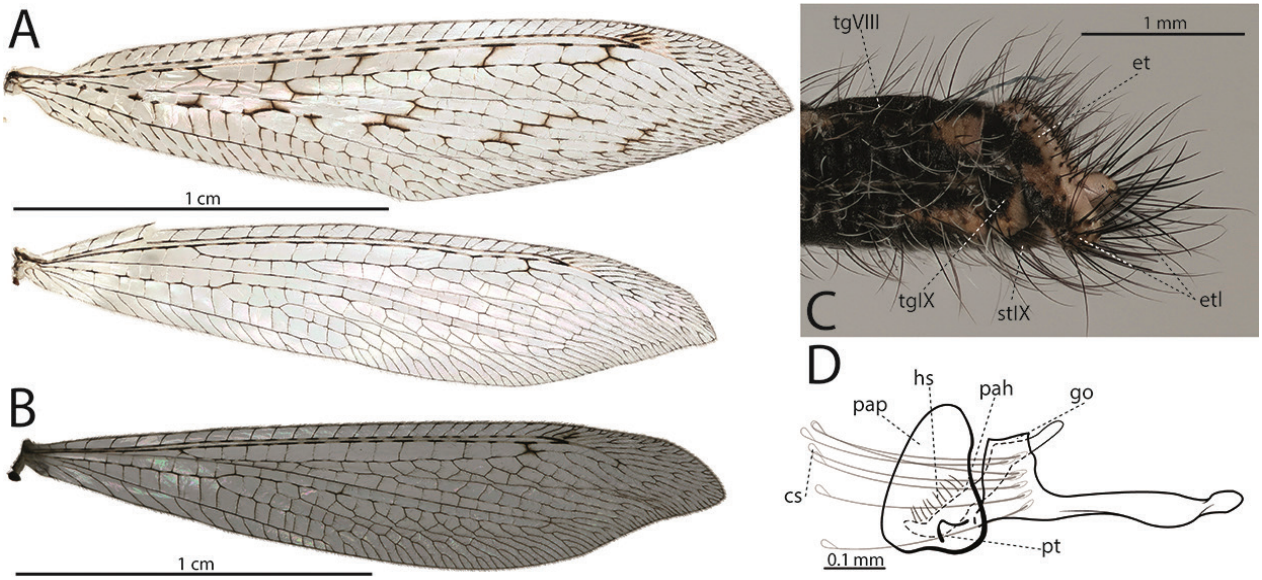

Figure 44. *Ameromyia strigosa*: **A** fore and hindwing, general shape and color. **B** Falcate hind wing variation. **C** Male terminalia. **D** Illustration of male genitalia, lateral view. — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

(EMAU)]. – Esben-Petersen 1920: 193 [*Myrmeleon tendinosus* = *Amazoleon pubiventris* and *Ameromyia nigriventris*].

Ameromyia tendinosa (Gerstaecker): Stange 1994: 81 [species list (as *Ameromyia tendinosus*)]. – Stange 2004: 229 [species catalog]. – Oswald 2021 [species catalog]. – Machado and Martins 2022 [faunal catalog].

Distribution. Brazil (Fig. 12).

Diagnosis. Wing veins CuP completely dark brown in contrast to other veins which have a dashed dark brown and pale brown pattern. Forewing cells in mediocubital area almost completely suffused until at least the middle of wing span.

Description. ADULT. ***Head*:** Antennae with 30–32 flagellomeres. Flagellomeres dark brown, except for the ones at the club, which are light brown dorsally or ventrally. Vertex light brown, with latitudinal dark brown streaks in anterior and middle row, or completely dark brown with faint light brown laterally. Vertex decumbent setae black. Interantennal area dark brown. Frons light brown, frequently with dark brown patches centrally, or entirely dark brown, light brown near clypeus. Frons setae black. Interocular distance less than eye width. Clypeus light brown brown with dark brown patches. Labrum light brown brown. Mandibles light brown on basal half, and dark brown on apical half. Palpi light brown, with external face of palpomeres slightly darker. — ***Thorax*:** Thorax dark brown with few light brown markings. Thorax dark brown on lateral view, with an evident longitudinal pale brown band under wings. Pronotum as broad as long, dark brown, with light brown anteriorly and laterally. Pronotum marginal setae white, or dark brown. — ***Wings*:** Wing tip acute. Veins with dashed dark and pale brown pattern, except for forewing and hind wing veins CuP which are dark brown. Wing membrane hyaline, except for forewing mediocubital area which is almost completely dark brown infuscated until forewing apical third, and the rhegmal area which is faintly dark brown infuscated. Forewing and hind wing sometimes with a faint dark brown infuscation alongside gradates. Forewing CuP and hind wing CuA veins extending before forewing CuA and hind wing MP fork respectively, with nine or more crossveins connecting them and posterior branch of fork. Pterostigma opaque, dark brown on basal half and white on distal half, encompassing six to seven crossveins. Cells delimited by transversal veins on hind wing posterior area higher than long. — ***Legs*:** Coxae dark brown. Legs internal face light brown and external face dark brown, with many dark brown spots on setal insertion, and on internal face in meso and metalegs. Femur and tibiae with black bristles. Femur decumbent setae white and black. Profemural sense hair longer than profemur and mesofemural sense hair much shorter than mesofemur. Tibial spurs slightly shorter than pretarsal claws. Tarsomeres light brown, with distal fourth dark brown. Pretarsal claws at least 1.5 times longer than basitarsus. — ***Abdomen*:** Abdomen sclerites dark brown, with light brown in posterior margin near the terminalia, with brown setae. Male paramere plates oblong on lateral view. Gonarcus arch positioned not above paramere plates on lateral view. Male genitalia clavate setae with globose club. — **LARVA.** Larvae unknown.

Remarks. The taxonomic background for this species is confusing. Decades after its original description by Gerstaecker, Esben-Petersen (1920) synonymizes this species (as *Myrmeleon tendinosus*) under *Amazoleon pubiventris* along with *Foya trapezia*. In his words, *M. tendinosus* "is the same species" according to the type specimen. However, on the following paragraph the author also seemingly synonymizes it again, but under another species, *A.*

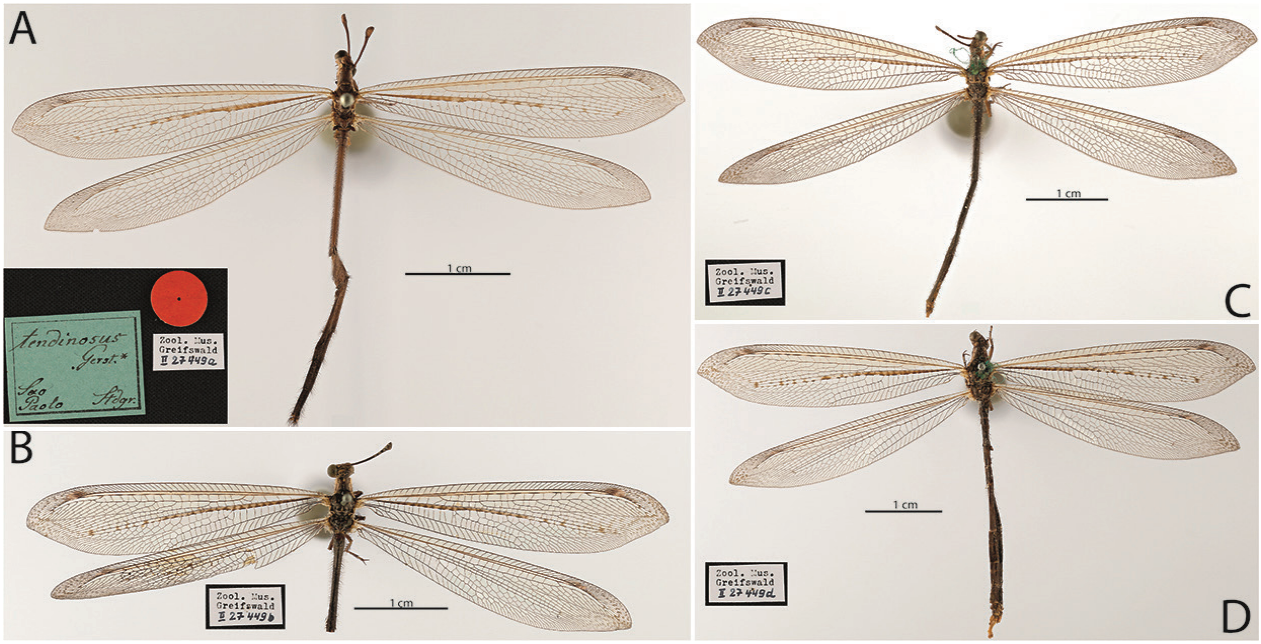

Figure 45. *Ameromyia tendinosa* type series, habitus on dorsal view, with respective type labels: **A** male lectotype. **B–D** Female paralectotypes. Photographs by Lara Lopardo (EMAU).

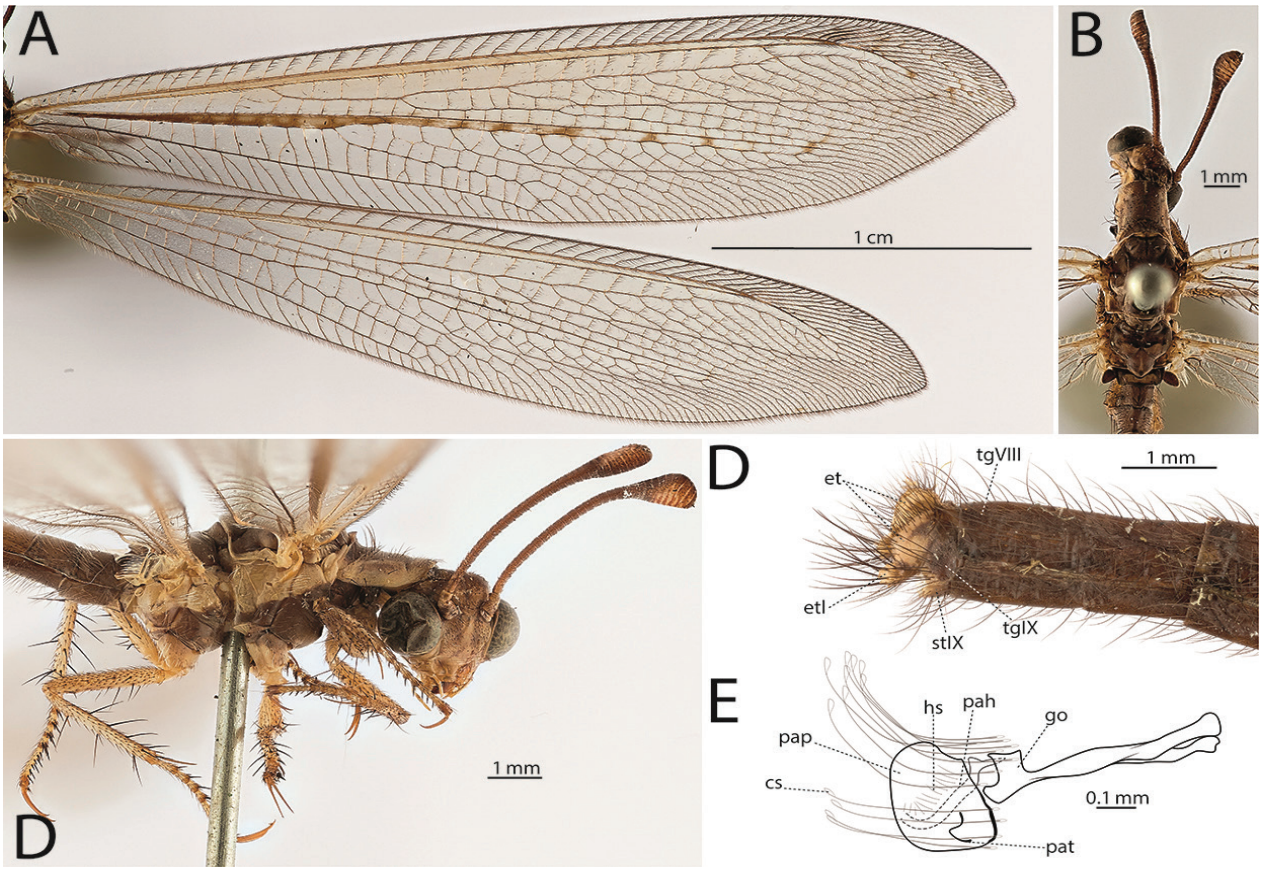

Figure 46. *Ameromyia tendinosa*: **A** fore and hind wings, **B** head and thorax, dorsal view, **C** head, thorax and legs, lateral view and **D** male terminalia of lectotype. **E** illustration of male genitalia, lateral view. Photographs by Lara Lopardo (EMAU). — Abbreviations: cs, clavate setae; et, ectoproct; etl, ectoproct postventral lobe; go, gonarcus; hs, hinge setae; pah, paramere hinge; pap, paramere plate; pat, paramere tooth; st, sternite; tg, tergite.

nigriventris (along with *A. hirsuta*). Years later, Stange (1967) cites Esben-Petersen nomenclatural decisions for *A. tendinosa*, but only regarding *F. trapezia*, and Penny (1977) does not mention *A. tendinosa* at all. It is only twenty-seven years later that *A. tendinosa* is mentioned again as a valid species (Stange 1994).

This species is restricted to Brazil. The male paralectotype of *A. nigriventris* somewhat agrees with this species and can possibly be a specimen of *A. tendinosa*, which would expand this species distribution to the Amazon region including Colombia. Additionaly, three female specimens labeled as from Colombia were identified from the CASC collection. However, as *A. nigriventris* male paralectotype genitalia was not analyzed in the present work, and as this particular batch from where these Colombia female specimens come from (the ones labeled as "bought from F. H. Walz.") had some other label issues, we interpreted these Colombia records as dubious data.

Ameromyia tendinosa can be distinguished from other species in the *nigriventris* group by the dark forewing CuP and by the forewing mediocubital area which is completely suffused with dark brown infuscation from wing base at least to CuA fork (Figs 45, 46A). *A. pleuralis*, *A. dimidiata* and *A. muralli* shows the same suffusion on mediocubital area, but the first two species have pale forewing Sc and RA veins, and the latter shows a dashed forewing CuP with alternating coloration, as well as a falcate hindwing.

Examined material. (5♀4♂) BRAZIL: MATO GROSSO • 1♀; Campo Novo do Parecis; xii.1960; M. Alvarenga; FSCA • 1♂; Vera; x.1973; Alv. and Roppa; MZFS. – MINAS GERAIS • 1♂; Campina Verde; x.1962; M. Alvarenga; FSCA. – RONDÔNIA • 1♂; Vilhena, xi.1960, M. Alvarenga; FSCA. – SÃO PAULO • 1♀1♂; Pirassununga; 24.i.1962; FSCA. – PROBABLE MISLABELS: COLOMBIA • 3♀; Cumaral; 20.i.1959; Bought by F.H.Walz; CASC.

5. Discussion

Previously, *Ameromyia* sensu Banks (1943) circumscribed the Brachynemurini species with a long hind wing CuA and a forewing CuP that is parallel to the posterior branch of CuA fork for a distance greater than forewing height at CuA fork (Fig. 4). Later, Stange considered as part of the genus the species which had large pretarsal claws, setose frons and clavate setae on male genitalia (Stange 1994, 2004). Here, this *Ameromyia* sensu novo (Fig. 11) is recovered as a monophyletic group based on eight synapomorphies (29:1 At least four crossveins between hind wing vein CuA and posterior branch of MP; 34:0 Male ectoproct postventral lobe shorter than ectoproct height; 36:1 Female gonapophyseal plate elongate; 37:1 Lateral gonapophysis of female genitalia fused; 39:1 Clavate setae on male genitalia; 43:1 Parameres lateral tooth basad to paramere plates; 44:1 Male gonarcus positioned anterior to parameres; and 45:0 Male mediuncus absent).

The setose frons as well the enlarged pretarsal claws were found to be synapomorphies of the more inclusive group, the sampled Brachynemurini genera (*Ameromyia*, *Argentoleon* and *Austroleon*), and although *Ameromyia* specimens frequently have much more density of setae on the frons than *Argentoleon* and *Austroleon*, this appears to be a variable character and some specimens appear to have fewer setae than others. On the other hand, character state 39:1 "Clavate setae on male genitalia appears as a synapomorphy of *Ameromyia* by the present analyses.

The long CuA of the hind wing was discussed by Stange (1970) as an evolutionary trend in some species of Brachynemurini, which caused the broadening of the hind wing posterior area. In his observations, species with broader posterior area of the hind wings were more rapid fliers than those with narrower wings, and this character was associated as a possible adaptation to live in arid regions, with less vegetation and less air humidity, which would pose more difficult flight conditions. However, *Ameromyia* comprises species with both narrow (*modesta* group species) and broad (*nigriventris* group species) hind wing posterior areas, and species with either wing patterns are able to cohabit in many localities (Figs 12, 13), despite the characteristics of vegetation and air humidity. Among studies of wing functional morphology, broader wing bases are usually indication of a grater capability for acceleration, while slender bases are more characteristic of slower, hovering flight (Ennos 1989; Wootton 1992, 2003). This agrees with field observations. *Ameromyia explicata* **sp. nov.**, *A. nigriventris* and *A. strigosa* specimens were able to fly slowly and hover, but were relatively quick to gain speed whenever disturbed. No species from the *modesta* group were observed live in the wild during this work, but *A. clepsydra* **sp. nov.**, which has a short hind wing CuA similar to specimens from *modesta* group, and *Argentoleon irrigatus* specimens, which also bear somewhat similar, slender posterior wings, were observed in flight. *Ameromyia clepsydra* **sp. nov.** specimens were always flying close to the bedrock, making short, slow flights, and *Argentoleon irrigatus* specimens observed had similar behaviour, but were flying a bit higher and maintaining hovering flight. Some *A. irrigatus* specimens tried to flee by flying upwards, but once they were caught by the wind, they quickly lost control of their flight and dropped to the ground, in contrast to *Ameromyia* specimens from the *nigriventris* group which flied high up normally, even when caught by the wind. It is possible that species from *nigriventris* group are more adapted to flying and hunting higher up in the air, while species from *modesta* group might specialize in flying closer to the ground and in the vegetation, and that the different size of the hind wing CuA, and subsequently of the posterior area, reflects these adaptations between these species' groups.

Ameromyia male genitalia was previously described as having no "hinge" (sensu Adams 1956); having modified rod-like parameres; a reduced gonarcus and an enlarged mediuncus which covered the parameres (Stange 1994). Extensive examination of *Ameromyia* male genitalia, however, revealed that the male genitalia is indeed hinged like most Brachynemurini genera, including *Argentoleon* and *Austroleon* male genitalia, which were also previously described as unhinged (Stange 1994). The structure described as a "reduced gonarcus", as it happens, are the parameres anterior to the hinge (which has two parallel rows of setae), and are fused anterodorsally (Figs 9, 10);

the "rod-like parameres" are in fact the gonarcus (Fig. 10); and the enlarged mediuncus is actually the enlarged paramere plates (Figs 9, 10).

In Brachynemurini males, parameres have folds that, upon genitalia evertion, produces a movement in which the parameres fold upon themselves and greatly changes the genitalic complex apparent conformation (Addams 1956; Stange 1970). *Ameromyia* male genitalia is most commonly found in an "folded state" (Figs 9, 10A, C), in which the paramere plates are parallel to each other and posterior to the gonarcus. After genitalia eversion, the paramere plates unfold upon the hinge, in a way such that: the paramere plates dorsoposterior margins touch the genitalia ventral surface; the external striated faces of the paramere plates faces one another; and the paramere ventral hooks move posteriorly, in a "pinch" movement (Fig. 10B, D). Of the many dissected male specimens, only two specimens of *A. explicata* **sp. nov.** were found with the genitalia in the "unfolded" state (Fig. 10B, D), and it is unknown what provokes or could provoke the parameres movement upon or after specimen collection.

The cladistic analyses recovered two species groups as it were previously suggested by Stange (*modesta* and *nigriventris* groups) (Stange 1994), which can be readily separated by the height of the cells on hind wing posterior margin. The first species group, named by Stange (1994) as *modesta* group, is supported in resulted analyses by the abdomen much longer than wings (tergite 3+4 length equals to hind wing length) and the sickled club of the clavate setae on male genitalia. *Ameromyia protensa* was recovered sister to the remaining species in this group, and the latter group was supported by the presence of black-only decumbent setae on profemur. *Ameromyia pubiventris* was found sister to *A. modesta* + *A. guarica* in all analyses, with the latter group sharing the same state for characters 11 and 12 (contrasting coloration on external and internal face of profemora and tarsomeres, respectively). Although this result shows little branch support, it makes sense geographically considering that both *A. modesta* and *A. guarica* are restricted to the same distributional range (northernmost South America), while *A. pubiventris* ranges from the Amazon rainforest to southeastern Brazil, and *A. protensa* is restricted to southern South America (Fig. 13). Even with the sheer number of modifications and homoplasies, *A. guarica*, previously placed in *Venezueleon*, was recovered nested deep within the *modesta* group in all present analyses, which suggests that the congruency of main wing veins and genitalic characters that supports the genus outweights the leg and chaetotaxy adaptations which diagnoses *Venezueleon*, as suggested by previous studies when in regard to Brachynemurini characters (Stange 1970, 1994). Stange (1994) also stated that wing venation in *Venezueleon* is different from *Ameromyia*, as is the latter the CuP follows the posterior branch of CuA fork for a longer distance, but the venation pattern in *Venezueleon* is not different from any *Ameromyia* species from the *modesta* group. Furthermore, it is also stated that the absence of thread-like setae on abdominal tergites in *Venezueleon* larvae could be a convergence with *A. modesta*. This was probably a mistake, since *A. modesta* larvae is the one described by the author as bearing thread-like setae on abdominal tergites. Additionally, all *Venezueleon* larvae analyzed in this work bear thread-like setae not only on the abdomen (tergites and sternites), but on the thorax as well (Figs 26, 27).

The functionality of the thread-like setae is not fully understood, but it might be related to helping the larvae camouflage by holding debris in the same way as conical dolichasters and plumose setae (Acevedo-Ramos et al. 2021; New 1986), as many larvae analyzed had thread-like setae tangled together with many small sand grains. However, some species also bear thread-like setae on the abdomen ventral surface (Fig. 27B), which suggests this structure might serve another function not yet comprehended, such as thermoregulative or mechanosensorial functions.

The *modesta* group corresponds to *Amazoleon*, previously delimited by Banks (1913). However, the high consistency of genitalic structures and chaetotaxy strongly suggests that both groups are indeed very closely related and are comprised in the same genus, agreeing with *Amazoleon* synonymy under *Ameromyia* (Stange 1967). Other *Amazoleon* key wing character, such as a hind wing CuP following posterior branch of MP for a short distance (Figs 4A, B, 5A), are found in the nigriventris group in *Ameromyia clepsydra* (Fig. 17B), further supporting the strong relationship between these groups.

The second species group, *nigriventris* group, is composed of species that bear a broad posterior area of hind wing, with cells that are as high as long, or higher than long (Figs 4C, D, 5B, C). This group inner relationships were different between the two recovered trees, as they disagreed on steps and state transformations of three characters (11 Profemur color pattern; 16 Forewing mediocubital area infuscation pattern and 17 Forewing presectorial and radial area infuscation pattern), and ultimately, the internal placement of *A. muralli*.

The first species to branch off inside the *nigriventris* group, *A. clepsydra* **sp. nov.**, features wing synapomorphies that are common to both groups while having conspicuous autapomorphies. *Ameromyia clepsydra* has the forewing CuP and hind wing CuA following posterior branch of CuA and MP fork respectivelly for a short distance, which agrees with the *modesta* group, but hind wing posterior area is much broader, which agrees with the *nigriventris* group. The course of forewing vein 2A also fits the pattern of the *modesta* group species (forewing vein 2A connected to 3A by a crossvein). However, a single analyzed specimen had both patterns, one in each wing (Fig. 17D, E). Although this is most probably a mutation, as this population showed a higher density and intraspecific heterogeneity of wing crossveins, it raises the question if this might be an acquired modification that can ontogenetically influence the behaviour of venation patterns, even characters historically considered as conserved such as how forewing vein 2A relates to 3A (Banks 1927; Stange 1967; New 1984). An autapomorphy of *Ameromyia*, the clavate setae on male genitalic sac, is apparently modified in *A. clepsydra*, as in this species the tip of the genitalic setae is not clubbed, but slight-

ly swollen (Fig. 7D). All analyses recovered *A. clepsydra* as more related to the *nigriventris* group, stemming from the clade base.

The remaining species, as in clade C in our proposed classification (Fig. 11A), can be diagnosed by the long forewing vein CuP and hind wing vein CuA, and forewing 2A vein which touches 3A vein. Although this clade seems to be a well established group, with well defined synapomorphies and good resampling supports, inner relationships do not seem to be well solved. In this group, remaining basal relationships in both trees are recovered based on the state of wing marking patterns on presectorial, radial and mediocubital areas, which is a very variable character both for *Ameromyia* as for Brachynemurini in general. In fact, those characters have evolved independently in *A. protensa* and *A. guarica*, and are polymorphic for every other species that presents it, with the exception of *A. dimidiata*, *A. pleuralis* and *A. tendinosa* (clade F).

The placement of *A. muralli* is different between both trees. In our proposed classification, this species was recovered as sister to clade D, while in the alternative tree it was recovered as sister to clade F. This rogue placement is the result of the great plasticity and homoplasy of the aforementioned forewing characters, which in the case of *A. muralli*, could allocate this species as sister to either clade under equal weighting analyses. *Ameromyia muralli* bear a profemur without contrasting colors, a suffused mediocubital area on forewing, and is polymorphic in relation to the state of the presectorial area infuscation pattern. In the proposed classification, the cladistic analysis indicates the profemur with contrasting coloration evolved independently, in both *modesta* and *nigriventris* groups (in clades B and D), while the presence of infuscation on forewing presectorial and radial area crossveins, and the multistate character of forewing mediocubital suffusion changed states many times inside *Ameromyia*. The alternative tree (Fig. 11B), however, suggests that the contrasting leg coloration also evolved once in both groups, but was reversed in *A. muralli*, and that the forewing mediocubital area infuscation with a dotted pattern that becomes sparser along the wing span, as well as the presectorial and radial crossvein infuscations would be in fact plesiomorphic states within the *nigriventris* group, but the first was afterwards modified into a complete suffusion of forewing mediocubital area, and the latter afterwards reversed in clade I.

All weighted analyses recovered the same tree as our proposed classification for the genus, suggesting that, although both results under equal weighting show the same number of steps, the character of leg coloration (11) has more congruency than those of wing membrane coloration (16 and 17). Indeed, whilst not verified by many phylogenies, historically, Brachynemurini taxonomy is heavily biased towards leg morphology, and the pattern of wing markings and crossvein infuscation are very variable across the tribe, as it is within *Ameromyia* as well (Stange 1970, 1994). Some patterns, as the complete suffusion of forewing mediocubital area, seems to be consistent within species, and even some Brachynemurini species diagnoses hinges on such characteristic (as in *Argentoleon longitudinalis* (Navás) or *Scotoleon niger* (Currie)), but forewing presectorial and radial crossvein infuscations seems very widespread, polymorphic and not very informative in regard to relatonship between groups.

Clade E, although supported by a single synapomorphy (character state 17:1 Forewing presectorial and radial area crossveins with infuscations), is recovered as an unresolved polytomy of *A. explicata* **sp. nov.**, *A. nigriventris* and *A. strigosa*, reflecting the large morphological similarity of the species in this group. Clade F on the other hand is supported by two forewing synapomorphies: a forewing CuP vein with homogeneous coloration and a clear forewing presectorial and radial areas, although the latter is in fact a reversion of the state transformation of this character for the *nigriventris* group. In clade F, *A. tendinosa* is sister to a clade comprising *A. dimidiata* and *A. pleuralis* (clade G). Although both *A. tendinosa* and *A. pleuralis* possess a dark forewing vein CuP, the analysis recovered the latter more related to *A. dimidiata* based on the pale forewing veins Sc and R.

6. Conclusion

In this work, we present *Ameromyia* as a valid Brachynemurini genus, with 12 valid species in two well defined species groups. *Venezueleon* was recovered deep inside *Ameromyia* and thus synonymized under the latter, which in retrospect makes taxonomical sense as the two genera had an overlap of their previously diagnostic characters, with some exceptions such as the size of pretarsal claws, which is a known plastic character at species level for Brachynemurini in general. Adult specimens from different species (but from the same species groups) bear almost identical male and female genitalia and are morphologically very similar, differing mostly in leg and wing vein coloration and wing marking patterns, although the latter appears to be very homoplasic and polymorphic within some species. More extensive analysis which utilizes different datasets such as larval morphology and/or molecular data could hopefully better elucidate *Ameromyia* internal relationships. This study also enlightens the need of better understanding the South American Brachynemurini genera, as results of this work partly contradict some statements from previous works, such as the case of all analyzed genera bearing hinged genitalia.

7. Acknowledgements

We would like to thank all the museums and collection curators that made the specimens available to this study by loan or pictures: Ben Price (BMNH), Harald Bruckner (NHMW), Norma Ganho (DZUP), Francisco Limeira de Oliveira (CZMA), Emilia Perez (FML), Marcio Oliveira (INPA), Orlando Silveira (MPEG), Freddy Bravo (MZFS), Eliana Cancello (MZUSP), André Nel (MNHN), Charles Farnum (MCZ),

Stephan Blank, Christian Kutzscher and Mandy Schröter (SDEI) and Lara Lopardo and Peter Michalik (EMAU). The authors are also thankful to Lionel A. Stange for valuable insights during the course of this work, and Robert B. Miller for great insights on larvae rearing. We are very thankful to Fernando Z. Vaz de Mello for allowing the visit to the CEMT collection, as well as Paul E. Skelley and Elijah J. Talamas, for making the visit to FSCA collection possible (which included the material from CASC, previously borrowed by Stange). Additionally, many thanks to Vitor Vieira-Silva and Cristovão Oliveira Silva, for allowing a visit and field work on their land at Miguel Calmon. This work was supported by Conselho Nacional de Devolvimento Científico e Tecnologico (CNPq), proc. 504038/2012-5, Bahia Research Foundation (FAPESB, proc. RED0022/2013) and Coordenação de Aperfeiçoamento de Pessoal de Nivel Superior (CAPES, proc. 1432793/2014 and 88887.569801/2020). We also thanks Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001 (PROAP). A.R. Calor thanks to the grant (CNPq, proc. 307794/2015-6 PQ). This work was supported by the Research Program in Biodiversity of Semiarid Region (PPBio Semiárido/MCTi), by the Coordenação de Aperfeiçoamento de Pessoal de Nivel Superior (CAPES /PROAP), Fundação de Amparo à Pesquisa da Bahia (FAPESB) under Grant 0022/2013. R.J.P. Machado thanks to the grant CNPq/MCTI/FNDCT No 18/2021 (Proc.: 402785/2021-5).

8. References

Acevedo-Ramos F, Monserrat VJ, Contreras-Ramos A, Pérez-González S (2020) Comparative study of sensilla and other tegumentary structures of Myrmeleontidae larvae (Insecta, Neuroptera). Journal of Morphology 281(10): 1191–1209. https://doi.org/10.1002/jmor.21240

Adams PA (1956) New ant-lions from the southwestern United States (Neuroptera: Myrmeleontidae). Psyche 63: 82–108. https://doi.org/10.1155/1956/54623

Badano D, Pantaleoni RA (2014) The larvae of European Myrmeleontidae (Neuroptera). Zootaxa 3762: 01–71. https://doi.org/10.11646/zootaxa.3762.1.1

Badano D, Aspöck U, Aspöck H, Cerretti P (2016) Phylogeny of Myrmeleontiformia based on larval morphology (Neuropterida: Neuroptera). Systematic Entomology 42: 94–117. https://doi.org/10.1111/syen.12200

Banks N (1913) Synopses and descriptions of exotic Neuroptera. Transactions of the American Entomological Society 39: 201–242.

Banks N (1927) Revision of the Nearctic Myrmeleonidae [sic]. Bulletin of the Museum of Comparative Zoology 68: 1–84.

Banks N (1943) Neuroptera of northern South America. Part II. Myrmeleonidae. Boletín de Entomología Venezolana 2: 161–173.

Böhme K (1996) Briefe Franz Steindachners von der Brasilien-Expedition 1903. Annalen des Naturhistorischen Museums in Wien, Serie B für Botanik und Zoologie 98: 545–568. https://www.jstor.org/stable/41767560

Cummings JM (1992) Lactic acid as an agent for macerating Diptera specimens. Fly Times 8: 7.

Ennos AR (1989) Comparative functional morphology of the wings of Diptera. Zoological Journal of the Linnean Society 96(1): 27–47. https://doi.org/10.1111/j.1096-3642.1989.tb01820.x

Esben-Petersen P (1920) Revision of some of the type-specimens of Myrmeleonidae, described by Navas and placed in the Vienna Museum. Annales de la Société Entomologique de Belgique 60: 190–196.

Gerstaecker A (1893) Ueber neue und weniger gekannte Neuropteren aus der Familie Megaloptera Burm. Mitt[h]eilungen aus dem Naturwissenschaftlichen Verein für Neu-Vorpommern und R*ü*gen 25: 93–173.

Goloboff PA, Farris JS (2001) Methods for quick consensus estimation. Cladistics 17(1): S26–S34. https://doi.org/10.1111/j.1096-0031.2001.tb00102.x

Goloboff PA, Farris JS, Källersjö M, Oxelman B, Ramírez MJ, Szumik CA (2003) Improvements to resampling measures of group support. Cladistics 19: 324–332. https://doi.org/10.1111/j.1096-0031.2003.tb00376.x

Goloboff PA, Carpenter JM, Arias SA, Esquivel DRM (2008) Weighting against homoplasy improves phylogenetic analysis of morphological data sets. Cladistics 24: 758–773. https://doi.org/10.1111/j.1096-0031.2008.00209.x

Machado RJP, Gillung JP, Winterton SL, Garzón-Orduña IJ, Lemmon AR, Lemmon EM, Oswald JD (2019) Owlflies are derived antlions: anchored phylogenomics supports a new phylogeny and classification of Myrmeleontidae (Neuroptera). Systematic Entomology 44: 418–450 [pre-volume: 1–33]. https://doi.org/10.1111/syen.12334

Machado RJP, Martins CC (2022) The extant fauna of Neuroptera (Insecta) from Brazil: diversity, distribution and history. Revista Brasileira de Entomologia 66. https://doi.org/10.1590/1806-9665-RBENT-2022-0083

Mansell MW (1999) Evolution and success of antlions (Neuropterida: Neuroptera: Myrmeleontidae). Stapfia 60: 49–58.

Markl W (1954) Vergleichend-morphologische Studien zur Systematik und Klassifikation der Myrmeleoniden (Insecta, Neuroptera). Verhandlungen der Naturforschenden Gesellschaft in Basel 65: 178–263 [Errata: 66: 140].

Michel B, Clamens AL, Bérthoux O, Kergoat GJ, Condamine FL (2016) A first higher-level time-calibrated phylogeny of antlions (Neuroptera: Myrmeleontidae). Molecular Phylogenetics and Evolution 107: 103–116. https://doi.org/10.1016/j.ympev.2016.10.014

Miller RB (1990) Reproductive characteristics of some western hemisphere ant-lions (Insecta: Neuroptera: Myrmeleontidae). In: Advances in Neuropterology. Proceedings of the Third International Symposium on Neuropterology (pp. 171–179). Pretoria: Department of Agricultural Development.

Mirande JM (2009) Weighted parsimony phylogeny of the family Characidae (Teleostei: Characies). Cladistics 25: 574–613. https://doi.org/10.1111/j.1096-0031.2009.00262.x

Navás L (1914a) Neurpteros nuevos o poco conocidos (Segunda y Tercera series). Memorias de la Real Academia de Ciencias y Artes de Artes (3)11(8): 105–119, figures 1–6; (13): 193–205, figures 1–14.

Navás L (1914b) Neuropteros sudamericanos. Primera [I] Broteria (Serie Zoológica) 12: 45–56, 215–234, 5 resp. 6 figures.

Navás L (1915a) Neuropteros nuevos ó poco conocidos (Series IV–VI). Memorias de la Real Academia de Ciencias y Artes de Artes Barcelona (3)11(23): 373–398, 11 figures; (3)11: 455–480, 10 text figures and 1 Plate with 6 figures; (3)12: 119–136, 9 figures.

Navás L (1915b) Neurópteros sudamericanos. Segunda (II) serie. Bróteria (Serie Zoológica) 13: 5–13, figures 1–6.

Navás L (1916) Les Myrméléonides d'Europe et des contrées limitrophes IV. Insecta (Revue illustrie d'Entomologie) Rennes 6: 12–18, 11 figures.

Navás L (1917) Algunos Insectos Neurópteros de la Argentina. Serie I. Physis. Revista de la Sociedad Argentina de Ciencias Naturales (Buenos Aires) 3: 186–196, figures 1–4.

Navás L (1919) Algunos Insectos Neurópteros de la Republica Argentina. Serie tercera (III). Revista de la Real Academia de Ciencias Exactas Fisicas y Naturales de Madrid 17: 287–305, figures 1–6.

Navás L (1920) Insectos Sudamericanos (1a–3a series). Annales de la Sociedad Cientifica Argentina 90: 33–43, figures 1–9; 44–51, figures 1–4; 52–72, figures 4–11.

Navás L (1921) Algunos Insectos de Santa Fe (República Argentina). Estudios (Buenos Aires) 21: 49–53, figures 1–3.

Navás L (1922) Insectos de la Argentina y Chile. Estudios. Revista Mensual (Academia literaria de La Plata) (Buenos Aires) 22(5): 358–368, 4 figures.

Navás L (1923a) Estudis sobre Neuròpters (lnsectes). Arxius de l'lnstitut (d'Estudis, Catalans, Seccio) de Ciencias (Barcelona) 7: 179–203, 2 figures.

Navás L (1923b) Algunos lnsectos del Museo de Paris. (1.a serie). Revista de la Academia Ciencias Exactas Fisico-Quimicas y Naturales de Zaragosa 7: 15–51, figures 1–6.

Navás L (1926a) Insectos de la Argentina y Chile. Segunda (II) serie. Estudios (Buenos Aires) 32: 102–111, figures 4–8.

Navás L (1926b) Trichoptera, Megaloptera und Neuroptera aus dem Deutsch. Entomolog. Institut (BerlinDahlem). II serie. Entomologische Mitteilungen 15: 57–63, figures 7–16.

Navás L (1926c) Insectos neotropicos 2.a serie. Revista Chilena de Historia Natural 30: 326–336, figures 44–49.

Navás L (1927) Insectos de la Argentina y Chile. Tercera (III) series. Estudios (Buenos Aires) 33: 22–28, 2 figures.

Navás L (1928) Insectos de la Argentina. Cuarta (IV) serie. Estudios (Buenos Aires) 18: 139–146, figures 11–15.

Navás L (1929) Insecta nova (Series XIII–XIV). Memorie dell'Accademie Pontifica dei Nuovi Lincei (Roma) 12: 15–23, figures 48–50; 24–32; 133–144, figures 51–53.

Navás L (1932) Spedizione scientifica all'oasi di Cufra (Marzo-Luglion 1931). lnsetti Neurotteri ed affini. Annali del Museo Civicio di Storia Naturale Giacomo Doria, Genoa 55: 409–421, figures 1–5.

Navás L (1933) Insectos de la Argentina y Chile. 3.a serie. Revista de la Sociedad Entomologica Argentina 5(22): 79–86, figures 9–15.

Navás L (1934) Insectos suramericanos. Octava (VIII) & Novena (IX) serie. Revista de la Academia de Ciencias Exactas Fisicas y Naturales de Madrid (2)31(1–2): 9–28, figures 26–30; 155–184, figures 25–34.

New TR (1985) A revision of the Australian Myrmeleontidae (Insect: Neuroptera). II.* Dendroleontini. Australian Journal of Zoology, Supplementary Series 33(105): 1–170. https://doi.org/10.1071/AJZS105

New TR (1986) A review of the biology of Neuroptera Planipennia. Neuroptera International, Supplemental Series 1: 1–57.

Oswald JD (2021) Neuropterida Species of the World. Version 6.0. URL: http://lacewing.tamu.edu/SpeciesCatalog/Main. (accessed 24 June 2021)

Penny ND (1977) Lista de Megaloptera, Neuroptera e Raphidioptera do México, América Central, ilhas Caraíbas e América do Sul. Acta Amazonica 7(4): 5–61.

Sereno PC (2007) Logical basis for morphological characters in phylogenetics. Cladistics 23: 565–587. https://doi.org/10.1111/j.1096-0031.2007.00161.x

Stange LA (1961) Lectotype designations in the New World Myrmeleontidae. Canadian Entomologist 93: 674–677. https://doi.org/10.4039/Ent93674-8

Stange LA (1967) Catalogo de Neuroptera de Argentina y Uruguay. Acta Zoológica Lilloana 22: 5–87.

Stange LA (1970) Revision of the ant-lion tribe Brachynemurini of North America (Neuroptera: Myrmeleontidae). University of California Publications in Entomology 55: vi + 1–192.

Stange LA, Miller RB (1985) A generic review of the Acanthaclisine antlions based on larvae (Neuroptera: Myrmeleontidae). Insecta Mundi 1: 29–42.

Stange LA, Miller RB (1990) Classification of Myrmeleontidae based on larvae (Insecta: Neuroptera). Advances in Neuropterology. Proceedings of the Third International Symposium on Neuropterology (3–4 February 1988, Berg en Dal, Kruger National Park, South Africa) (ed. by M.W. Mansell and H. Aspöck), pp. 151–169.

Stange LA (1994) Reclassification of the New World antlion genera formerly included in the tribe Brachynemurini (Neuroptera: Myrmeleontidae). Insecta Mundi 8: 67–119.

Stange LA, Miller RB, Wang HY (2003) Identification and biology of Myrmeleontidae (Neuroptera) in Taiwan. I-Lan County Museum of Natural History 160.

Stange LA (2004) A systematic catalog, bibliography and classification of the world antlions (Insecta: Neuroptera: Myrmeleontidae). Memoirs of the American Entomological Institute 74: [iv] + 565.

Stange LA (2010) Preliminary report on the Myrmeleontidae (Neuroptera) of Paraguay. Insecta Mundi 114: 1–14.

Walker F (1860) Characters of undescribed Neuroptera in the collection of W. W. Saunders. Transactions of the Entomological Society of London 10[= (N.S.)5]: 176–199.

Winterton SL, Lemmon AR, Gillung JP, Garzon IJ, Badano D, Bakkes DK, Breitkreuz LCV, Engel MS, Lemmon EM, Liu X, Machado RJP, Skevington JH, Oswald JD (2018) Evolution of lacewings and allied orders using anchored phylogenomics (Neuroptera, Megaloptera, Raphidioptera). Systematic Entomology 43: 330–354. https://doi.org/10.1111/syen.12278

Wootton RJ (1992) Functional morphology of insect wings. Annual Review of Entomology 37(1): 113–140. https://doi.org/10.1146/annurev.en.37.010192.000553

Wootton RJ (2003) Reconstructing insect flight performance from fossil evidence. Acta Zoologica Cracoviensia 46(suppl. Fossil Insects): 89–99.

Supplementary Material 1

Tables S1, S2

Authors: Tavares, LGM, Machado, RJP, Calor, AR (2023)
Data type: .docx
Explanation note: Table S1. Character matrix (45 characters and 17 terminal taxa). Abbreviations for polymorphies: A = [0&1]; B = [0&2]. — **Table S2.** Mirande's (2009) implied weighting values and spr distances.
Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.
Link: https://doi.org/10.3897/asp.81.e89641.suppl1