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Review of *Rhinоторa* (Diptera, Heleomyzidae) with description of a new species and key to all known heleomyzid species from Brazil

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Abstract

Rhinоторa Schiner, 1868, are a rare group of flies, previously including seven species distributed in the Americas, six of them occurring in Brazil. This work aims to provide a taxonomic review for *Rhinоторa* Schiner, with addition of two species in the genus: *Rhinоторa fonsecai*, which is transferred back to its original genus, and *R. paschoali* sp. nov. New distributional records are presented for *R. lopesi* and *R. travassosi*. A key to the all known heleomyzid species recorded from Brazil is provided.

Key words: taxonomy, biodiversity, Diaciini, Rhinotorini, Neotropical region, Brazil

Introduction

Heleomyzidae (Diptera, Muscomorpha) are a cosmopolitan group of ‘acalyprate’ flies, more commonly found in temperate forests and in cooler mountainous areas of the tropics (Sinclair & McAlpine 1995). The larval stages of most of the known species are saprophagous (Garnett & Foote 1966, 1967, Smith 1989), sometimes found with some phytophagous species (Smith, 1989, Šefrová 2008). Several species have been found in bird nests, rodent burrows, or in association with bats (McAlpine 1987, McAlpine & Woodley 2010), and adults are found near larval habitats. Heleomyzid flies comprise over 500 described species, distributed in about 65 genera (Pitkin 2007) and 22 tribes (McAlpine 1985). Only Rhinotorini and Diaciini are recorded to Brazil (Malloch 1933, Papavero 1967, Gill 1968).

The tribe Diaciini was erected by McAlpine (1985) and is represented in Brazil by only two species, *Diacia diadema* (Wiedemann, 1830) and *Dichromya sanguiniceps* (Wiedemann, 1830). Except by the evidence that the latter species is viviparous (Hennig 1971), further data on the biology of Diaciini is nonexistent.

The tribe Rhinotorini has been treated either as subfamily of Ropalomeridae (Williston 1896), or as separate family, Rhinotoridae (e.g., Hendel 1916, Wheeler 1954, Steyskal 1957, Hennig 1958, 1971, 1973, D. McAlpine 1958; J. McAlpine 1987, 1989, Guimarães & Papavero 1966; Papavero 1967; Griffiths 1972). In the last decades, however, this group has been more commonly considered as part of Heleomyzidae (D. McAlpine 1968, 1985; Sinclair & McAlpine 1995, Almeida & Ale-Rocha 2008, Almeida & Ale-Rocha 2011), being divided into three subtribes (McAlpine 1985).

The Rhinotorini, as opposed to most other Heleomyzidae, inhabits the tropical lowlands of the Americas and Australasia, with some groups occurring in temperate regions (Sinclair & McAlpine 1995). Adult rhinotorines have been found at exudations on tree trunks (Sinclair & McAlpine 1995), and attracted by decomposing fruits (Guimarães & Papavero 1966, McAlpine 1987) and sugarcane syrup (Almeida & Ale-Rocha 2008). Brazilian Rhinotorini are rarely found in entomological collections, being represented by three genera: *Neorhinоторa* Lopes,

1934, currently with four described species; *Rhinotoroides* Lopes, 1934, with a single species; and *Rhinotora* Schiner, 1868, with seven species (Papavero 1967). These three genera, along with *Apophoneura* Malloch, 1933, compose the subtribe Rhinotorina (McAlpine 1985).

The genus *Rhinotora* was erected by Schiner (1868) to include *R. pluricellata* Schiner, 1868 and *R. mutica* Schiner, 1868, with the former designated as type species. *Rhinotora diversa* Giglio-Tos, 1893, *R. peruana* Kertész, 1901, *R. aristalis* Fischer, 1932, *R. fonsecai* Lopes, 1934, and *R. travassosi* Lopes, 1934, were later described for the genus, but *R. aristalis* and *R. diversa* were transferred to a new genus, *Neorhinotora*, erected by Lopes in 1934. *Rhinotora diversipennis* Lopes, 1936, was the next to be described, followed by *R. lopesi* Guimaraes & Papavero, 1966, *R. salesopolitana* Guimaraes & Papavero, 1966, and *R. spilopectera* Guimaraes & Papavero, 1966. Finally, Papavero (1967) transferred *R. fonsecai* to *Neorhinotora*, leaving *Rhinotora* with seven species, all except *R. peruana* occurring in Brazil.

This work aims to provide a taxonomic review for *Rhinotora* Schiner, with genus redescription, description of a new Brazilian species from Paraná State, redescription for the Brazilian species, and new distributional records for *R. diversipennis* and *R. lopesi*. A key to the all known Heleomyzidae species recorded from Brazil is presented.

Material and methods

Abbreviations. The following abbreviations are used in the text: HNHM, Hungarian Natural History Museum, Budapest, Hungary; INPA, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil; MNRJ, Museu Nacional do Rio de Janeiro, Rio de Janeiro, Brazil; MZUSP, Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil; NMW, Naturhistorisches Museum Wien, Wien, Austria; S, sternite; T, tergite.

Material studied. The heleomyzid specimens studied are deposited at MZUSP (curator C.J.E. Lamas) and MNRJ (curator M. Couri—paratype of *R. fonsecai* seen in 2004). Photographs of the types of *R. pluricellata* and *D. diadema* were taken by Günther Wöss from the NMW (curator Peter Senhal). Newly collected specimens were caught with entomological nets by Paschoal Grossi and the first author at tree exudations in Paraná State, with additional material from Rio Grande do Sul State donated by P. Grossi. The new material will be deposited at INPA (curator Augusto L. Henriques).

Preparation and study of material. The paratype of *R. fonsecai* was studied under a stereomicroscope Zeiss® SV11. Specimens of the remaining species were examined under stereomicroscope Biosystems Tecnival® (Brazilian Industry) with 80x magnification. Terminalia of *R. diversipennis*, *R. lopesi*, *R. paschoali* sp. nov. and *R. travassosi* were macerated with heated lactic acid 85% for about 40 minutes, then washed in water. The structures were immersed in glycerin to be photographed. After examination, the terminalia were transferred to a microvial with glycerin, which was attached to the specimen pin.

Descriptions. Species descriptions were based on type and non type material, generated with DELTA Editor software, version 1.0 (Dallwitz 1980; Dallwitz *et al.* 1999). The Medial vein ratio, taken to all studied species, refers to the distance from bm-cu to r-m, in relation to the distance from bm-cu to dm-cu.

Images. The paratype of *R. fonsecai* was photographed with Sony Mavica® digital camera coupled with stereomicroscope Zeiss® SV11. The remaining specimens were photographed under a Canon® T3i camera coupled to a two kinds of lens: MP-E 65mm f/2.8 1-5x, and extension tube + microscope objective lens (10.0x magnification). The software Helicon Focus (HeliconSoft) was used for combining images, with the following parameters: method C, 100%, full resolution, and 600 DPI. The illumination of all specimens was performed following Buffington *et al.* (2005), Kerr *et al.* (2008) and Buffington and Gates (2008). For more efficient light diffusion, a dome was used along with a tracing paper ring, which was placed around specimens (Kawada & Buffington 2016). The final images were edited in Adobe Photoshop® using adjustments (e.g., levels and shadows/highlights), tools (healing brush, clone stamp, etc.) and filters (unsharp mask). The highlights used for the characters, including arrows and different vector colors, were edited in Adobe Illustrator®.

Terminology. For general morphology, terminology follows Cumming & Wood (2009). The terms ‘pruinescence’ and ‘pruinose’ follows McAlpine (1981) in reference to the microtrichiae that commonly dull the sclerite surface. The term ‘protandrium’ refers to the abdominal modified sclerites anterior to the male genitalia (Steyskal 1957).

Distribution records and map confection. Distribution records for the Brazilian Heleomyzidae species were obtained from label information on examined material and from the literature (Almeida & Ale-Rocha 2008, 2011, Guimarães & Papavero 1966, Kertész 1901, Lopes 1934, 1935, 1936, Wiedemann 1830). Geographic coordinates were obtained with the software Google Earth version 7.1.5.1557 (<http://earth.google.com>) when not specified on specimen label. All coordinates used for map construction are listed on Table 1. The distribution map was made with the software Quantum GIS version 2.8.3—Wien (<http://www.qgis.org>), with shapefiles from the Instituto Brasileiro de Geografia e Estatística—IBGE (<http://www.ibge.gov.br>).

Taxonomy

Rhinотора Schiner

Rhinотора Schiner, 1868: 233. Type-species, *Rhinотора pluricellata* Schiner, 1868 (orig. des.).

Diagnosis. *Rhinотора*, within the Rhinotorini, is unique by the protuberances on scutellum. It shares with *Neorhinотора* and some Australian species of *Cairnsimyia* Malloch, 1931, the absence of postvertical setae (McAlpine 1985). Likewise most Rhinotorini, *Rhinотора* has the scutellum flattened (not excavated as in *Neorhinотора*), and the pruinescence of scutum is fine, present around setal sockets (in *Neorhinотора* pruinescence is thicker, absent around setal sockets). The genus, along with the remaining Rhinotorina, also has the following features, as observed by McAlpine (1985): genal seta present; presutural intralar seta present; one presutural intralar seta; two well separated postsutural dorsocentral setae; scutellum without setulae (only strong setae present); propleuron without hairs except at lower extremity; hind femur with one strong anterodorsal seta at about apical fifth; spaced costal spines absent; costal break simple; male postabdomen: sternite 5 deeply bilobed; tergite 6 never present as a separate sclerite; surstylus movably articulated at base.

Redescription. **Head.** Compound eye prominent, obliquely oblong. Vertex wider than face. Median occipital sclerite shiny. Gena about as high as compound eye; one medioventral seta, as strong as oral vibrissa; setulose, silvery pruinose on anterior half and around compound eye. Face deeply concave. Oral vibrissa well developed. Ocellar setae proclinate, well developed. One inner vertical seta. One outer vertical seta. Anterior orbital setae reclinate, shorter than posterior one, sometimes piliform or completely absent (*R. lopesi* and *R. diversipennis*); one well developed reclinate posterior orbital seta. Postocellar setae absent. **Antenna.** Arista preapical, micropubescent. Pedicel with one dorsal seta, besides regular covering setulae. Postpedicel globose, slightly flattened laterally.

Thorax. Scutum with fine pruinescence, present around setal sockets and forming a complex pattern of brown and golden stripes and spots. Two postsutural dorsocentral setae; one presutural intralar seta; one postsutural supralar seta; one postpronotal seta; two notopleural setae; two postallar setae. Scutellum triangular with spiniform and/or lobed protuberances; one pair of apical scutellar seta; one pair of basal scutellar seta. Katepisternum with two strong setae on dorsal margin. **Wing.** Membrane microtrichose, hyaline with dark spots, or brownish with hyaline spots. Cell r_1 with simple or branched supernumerary crossveins. R_{2+3} with one or two simple or branched supernumerary crossveins arising from its middle. Distance from apex of R_{2+3} to R_{4+5} shorter than distance from apex from R_{4+5} to M_1 . Crossvein r-m broken. **Legs.** Fore femur three to four times longer than wide, ventrally with two rows of short strong setae. Hind femur with one strong anterodorsal seta at about apical fifth. Fore tibia with a row of short and strong ventral setae. Mid tibia with one to three distinct ventroapical setae. Hind tibia with one distinct apical anteroventral seta.

Abdomen. Tergites short setulose, setulae longer laterally on posterior margin. **Protandrium.** Tergite 6 indistinct; sternites 7–8 fused; sternite 6 either fused with sternites 7–8 (*R. diversipennis*, *R. lopesi*) or with sternite 5 (*R. paschoali* sp. nov., *R. travassosi*). **Male genitalia.** Epandrium saddle shaped. Cerci fused to each other and to epandrium. Postgonites dorsal to phallus. **Female terminalia.** Two spherical spermathecae.

Distribution. Brazil (Amazonas, Minas Gerais, Paraná, Rio Grande do Sul, São Paulo); Costa Rica (Volcán de Irazú); Peru (Callanga).

TABLE 1. Distribution records for *Rhinotora* species and data source. Coordinates in decimal degrees, datum WGS84 (EPSG 4326). TL: type locality.

Species	Country	State	Locality	Longitude	Latitude	Data source
<i>Rhinotora diversipennis</i>	Brazil	Rio Grande do Sul	São Francisco de Paula	-50.500000	-29.500000	NEW RECORD
<i>Rhinotora diversipennis</i>	Brazil	São Paulo	Campos do Jordão	-45.433333	-22.666667	Almeida & Ale-Rocha (2008)
<i>Rhinotora diversipennis</i>	Brazil	São Paulo	São Paulo, Serra da Cantareira [TL]	-46.616667	-23.450000	Lopes (1936)
<i>Rhinotora fONSECAI</i> nov. comb.	Brazil	São Paulo	São Paulo, Serra da Cantareira [TL]	-46.616667	-23.450000	Lopes (1934)
<i>Rhinotora lopesi</i>	Brazil	Amazonas	Novo Airão, Rio Jaú, Meriti	-61.800000	-1.983333	Almeida & Ale-Rocha (2008)
<i>Rhinotora lopesi</i>	Brazil	Paraná	Piraquara, Mananciais da Serra	-49.025833	-25.508889	NEW RECORD
<i>Rhinotora lopesi</i>	Brazil	Rio Grande do Sul	São Francisco de Paula	-50.500000	-29.500000	Guimarães & Papavero (1966)
<i>Rhinotora lopesi</i>	Brazil	São Paulo	Parque Estadual Campos do Jordão [TL]	-45.433333	-22.666667	Guimarães & Papavero (1966)
<i>Rhinotora lopesi</i>	Brazil	São Paulo	São Paulo, Braz	-46.616667	-23.533333	Almeida & Ale-Rocha (2008)
<i>Rhinotora lopesi</i>	Brazil	São Paulo	Osasco	-46.783333	-23.566667	Almeida & Ale-Rocha (2008)
<i>Rhinotora lopesi</i>	Brazil	São Paulo	São Paulo	-46.600000	-23.583333	Almeida & Ale-Rocha (2008)
<i>Rhinotora lopesi</i>	Brazil	São Paulo	São Paulo, Santo Amaro	-46.700000	-23.650000	Almeida & Ale-Rocha (2008)
<i>Rhinotora paschoali</i> sp. nov.	Brazil	Paraná	Piraquara, Mananciais da Serra [TL]	-49.025833	-25.508889	NEW RECORD
<i>Rhinotora peruana</i>	Peru	Madre de Dios	Callanga [TL]	-76.323181	-12.561176	Kertész (1901)
<i>Rhinotora pluricellata</i>	Brazil [TL]					Schiner (1868)
<i>Rhinotora pluricellata</i>	Brazil	Rio de Janeiro	Rio de Janeiro, Grajaú	-43.250000	-22.916667	Almeida & Ale-Rocha (2008)
<i>Rhinotora pluricellata</i>	Brazil	Rio de Janeiro	Estrada das Painceiras	-43.200000	-22.933333	Almeida & Ale-Rocha (2008)
<i>Rhinotora pluricellata</i>	Brazil	Rio de Janeiro	Rio de Janeiro, Corcovado	-43.200000	-22.933333	Almeida & Ale-Rocha (2008)
<i>Rhinotora pluricellata</i>	Brazil	São Paulo	Bebedouro, povoado Andes	-48.466667	-21.050000	Guimarães & Papavero (1966)
<i>Rhinotora pluricellata</i>	Brazil	São Paulo	Itaporanga	-49.483333	-23.716667	Almeida & Ale-Rocha (2008)
<i>Rhinotora salesopolitana</i>	Brazil	São Paulo	Salesópolis, Estação Biológica da Boracéia [TL]	-45.866667	-23.616667	Almeida & Ale-Rocha (2008)
<i>Rhinotora spilopectera</i>	Brazil	Paraná	São José dos Pinhais	-49.166667	-25.583333	Almeida & Ale-Rocha (2008)
<i>Rhinotora spilopectera</i>	Brazil	São Paulo	Salesópolis, Estação Biológica da Boracéia [TL]	-45.866667	-23.616667	Guimarães & Papavero (1966)
<i>Rhinotora travassosi</i>	Brazil	Minas Gerais	Sapucaí-Mirim, Cidade Azul	-45.750000	-22.750000	Guimarães & Papavero (1966)
<i>Rhinotora travassosi</i>	Brazil	Paraná	Piraquara, Mananciais da Serra	-49.025833	-25.508889	NEW RECORD
<i>Rhinotora travassosi</i>	Brazil	São Paulo	São Paulo, Serra da Cantareira [TL]	-46.616667	-23.450000	Lopes (1935)
<i>Rhinotora travassosi</i>	Brazil	São Paulo	Barueri	-46.866667	-23.500000	Guimarães & Papavero (1966)
<i>Rhinotora travassosi</i>	Brazil	São Paulo	Salesópolis, Estação Biológica da Boracéia	-45.866667	-23.616667	Guimarães & Papavero (1966)

***Rhinotora diversipennis* Lopes**

(Figs 1A–F, 10)

Rhinotora diversipennis Lopes, 1936: 107. Holotype ♂, MNRJ. Type-locality: Brazil, São Paulo, Capital, Cantareira. Distr.—Brazil (São Paulo, Rio Grande do Sul). Refs – Lopes 1936: figs 3–4, 7–9 (male genitalia, crossveins of cell r1, wing); Papavero 1967: 2 (catalogue); Almeida & Ale-Rocha 2011: 54 (male genitalia).



FIGURE 1. *Rhinotora diversipennis* (♂ holotype, MZUSP). **A**, lateral habitus; **B**, dorsal habitus; **C**, head, frontal view; **D**, wing (arrow indicates supernumerary crossvein); **E**, protandrium; **F**, male genitalia, ventral view (arrow indicates posterior margin of cercus).

Diagnosis. *Rhinotora diversipennis*, along with *R. travassosi*, are the only two species having two independent supernumerary crossveins arising from the middle of R_{2+3} . In *R. diversipennis*, however, these crossveins are parallel (sometimes connected posteriorly) and the spot around them are not distinctly darker than the remaining wing spots. In addition, this species differs from *R. travassosi* by the lack of anterior orbital seta (feature also observed in *R. lopesi*). As in most *Rhinotora* species, the male fore femur is about three times longer than wide (slightly narrower on female).

Redescription. Head (Figs 1A–C). Yellow to brown, silvery to golden pruinose. Anterior reclinate orbital seta absent. Mouthparts brown, clypeus and palpus yellowish.

Thorax (Fig. 1B). Scutum yellowish to reddish brown, golden setulose, golden pruinose. Scutellum triangular with apical and lateral spiniform protuberances; base of apical seta protuberant; yellowish brown, golden pruinose, apex and protuberances shiny. **Wing** (Fig. 1D). Medial vein ratio: 0.46. Veins mostly dark brown with white and yellow areas; C mostly yellow, dark brown on distal two thirds of cell c. Membrane hyaline with dark spots. Cell r_1 with seven to eight simple supernumerary crossveins. Cell r_{2+3} with two parallel, often posteriorly connected supernumerary crossveins arising from the middle of R_{2+3} . **Legs** (Fig. 1A). Male fore femur about three times longer than wide (slightly narrower on female). Distal third of mid femur with short strong anteroventral setae. Distal third of hind femur with anteroventral row of strong setae. Mid tibia with two or three distinct ventroapical setae. **Abdomen.** Tergites dark brown, sternites yellowish brown; yellow setulose. **Protandrium** (Fig. 1E). Sternite 5 evenly sclerotized. Sternites 6–8 fused, encircling the abdomen without a break. **Male genitalia** (Fig. 1F). Cerci fused to each other, with shallow indentation on distal margin. Surstylus single lobed, hook shaped in ventral view, inner surface setulose. Phallus with membranous, spherical apex.

Distribution (Fig. 10). Brazil (Rio Grande do Sul, São Paulo).

Examined non-type material. BRAZIL. Rio Grande do Sul: São Francisco de Paula—PROMATA, 14–18.xii.2009, P. Grossi col. (1♂, INPA). São Paulo: Salesópolis, Boraceia, 850m, xii, 1949, L. Travassos Fo., E. Rab., det. J.C. Almeida, compared with holotype (1♂ MZUSP).

Rhinotora fonsecai Lopes

(Figs 2A–B, 10)

Rhinotora fonsecai Lopes, 1934: 517. Holotype ♀, MNRJ. Type-locality: Brazil, São Paulo, Capital, Cantareira. Ref.—Lopes 1935: 22, fig. 8, pl. 1, fig. 2 (scutellum, wing).

Neorhinotora fonsecai: Ref. —Papavero 1967: 2; Almeida & Ale-Rocha 2008: 1936, figs 1c (wing), 5a (female terminalia), 6a (egg).

Diagnosis. *Rhinotora fonsecai* is the only *Rhinotora* species with lobed, instead of spiniform, protuberances on scutellum. This species shares with some specimens of *R. travassosi* and also with *Rhinotoroides* the presence of branched supernumerary crossveins on r_1 . Likewise *R. pluricellata*, *R. salesopolitana*, *R. spilopectera*, and many exemplars of *R. lopesi*, this species has one simple supernumerary crossvein arising from the middle of R_{2+3} . As in most *Rhinotora* species, the anterior orbital seta is present.

Redescription. Head (Fig. 1A). Mostly yellow, silvery to golden pruinose. Anterior reclinate orbital seta short, piliform. Mouthparts brown, clypeus and palpus yellowish. **Thorax** (Fig. 1A). Scutum reddish brown with yellowish regions. Scutellum trapezoidal, with lateral and apical roundish protuberances; base of apical seta prolonged posteriorly. Scutellum mostly reddish brown, yellow at the base of apical seta; silvery pruinose, shiny at the base of apical setae. **Wing.** Medial vein ratio: 0.46. Veins yellow to brown; C mostly yellow, dark brown on distal two thirds of cell c. Membrane brownish, with many hyaline spots. Cell r_1 with three branched and two simple supernumerary crossveins. Cell r_{2+3} with one simple supernumerary crossvein arising from the middle of R_{2+3} , sometimes another one arising from the apical third of R_{2+3} . **Legs.** Distal third of mid femur with two rows of short strong ventral setae. Distal third of hind femur with anteroventral and posteroventral rows of strong short setae. Mid tibia with one distinct ventroapical seta. **Abdomen.** Tergites brown, sternites yellowish brown; brown setulose. **Female terminalia.** Sternite 8 bilobed, with two rows of setulae; two spherical spermathecae (Almeida & Ale-Rocha 2008).

Distribution (Fig. 10). Brazil (São Paulo).

Examined type material (seen in 2004). HOLOTYPE ♀ [wing mounted on slide]. “Instituto Biológico/Rhinotora/ fonsecai Lopes/ Aza do holotypo/ Cantareira/ S. Paulo/ F. Fonseca col.”. PARATYPE ♀. “Typus” [red label]; “Serra Cantareira/ H. Florestal S. Paulo/ F. Fonseca 18-7-934”; “Rhinotora fonsecai Lopes/ H. S. Lopes—det 9-934”.

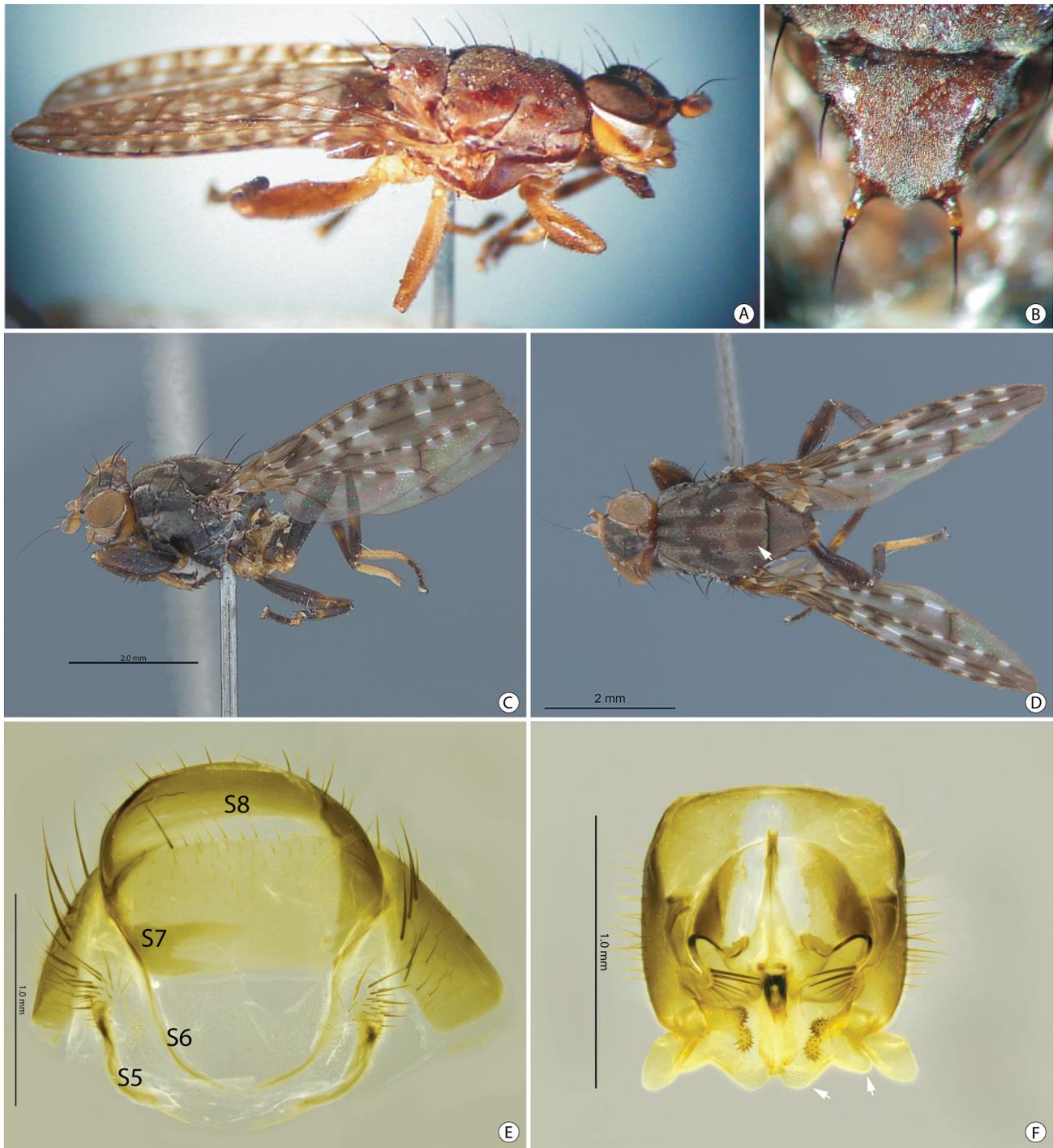


FIGURE 2. A–B, *Rhinotora fonsecai* (♀ paratype, MNRJ). A, lateral habitus; B, scutellum. C–D, *R. lopesi* (♂ holotype, MZUSP); C, lateral habitus; D, dorsal habitus (arrow indicates parallel posteromedial spots on scutum). E–F, *R. lopesi* (♂, INPA). E, protandrium; F, male genitalia, ventral view (arrows indicate greater and smaller lobes of cercus).

Remarks. *Rhinotora fonsecai* was transferred to *Neorhinotora* Lopes, 1934, by Papavero (1967) based on the lack of spines on scutellum. In the last review of *Neorhinotora* species, however, Almeida & Ale-Rocha (2008) argued that the lobed protuberances found in the scutellum of *R. fonsecai* (two lateral and one apical) are in a similar position to the spiniform protuberances of the scutellum of *Rhinotora*, suggesting homology between those

structures. The authors, despite not having transferred *R. fonsecai* back to *Rhinotora*, also stated many features that separate this species from the remaining *Neorhinotora*, namely head relatively wider, compound eye more obliquely disposed, clypeus not as well developed, pruinescence finer, scutellum not excavated, female sternite 8 with two rows of setulae instead of one and egg with widespread chorionic reticulation. Considering all these aspects, *R. fonsecai* is here transferred back to its original genus.

***Rhinotora lopesi* Guimarães & Papavero**

(Figs 2C–F, 10)

Rhinotora lopesi Guimarães & Papavero, 1966: 264. Type-locality: Brazil, São Paulo, Campos do Jordão, Alto da Boa Vista, Fazenda da Guarda. Distr.—Brazil (São Paulo, Rio Grande do Sul). Ref.—Guimarães & Papavero, 1966: figs 3–4 (male genitalia); Papavero 1967: 2 (catalogue).

Diagnosis. *Rhinotora lopesi*, along with *R. diversipennis*, are the only species on which the anterior orbital seta are completely absent. These species are easily distinguished from each other by the number of supernumerary crossveins arising from the middle of R_{2+3} (one crossvein in *R. lopesi*, two in *R. diversipennis*). *Rhinotora diversipennis* resembles *R. travassosi* regarding the presence of parallel posteromedial paired spots on scutum., but these spots are well separate in *R. lopesi*, and connected to each other in *R. travassosi*. As in most *Rhinotora* species, the male fore femur is about three times longer than wide (slightly thinner on female). *Rhinotora lopesi* is easily distinguishable from the remaining congeneric species by the male genitalia, specially by the cerci shape.

Redescription. **Head** (Figs 2C–D). Yellow to brown, silvery to golden pruinose. Anterior reclinate orbital seta absent. Mouthparts brown, clypeus and palpus yellowish. **Thorax** (Figs 2C–D). Scutum brown, with complex pattern of brown and golden pruinose stripes and spots; posteromedial paired spots parallel. Scutellum triangular with apical and lateral spiniform protuberances; base of apical seta protuberant; yellowish brown, golden pruinose, apex and protuberances shiny. **Wing** (Fig. 2D). Medial vein ratio: 0.46. Veins mostly dark brown with white and yellow areas; C mostly yellow, dark brown on distal two thirds of cell c. Membrane hyaline with dark spots. Cell r_1 with six to nine simple supernumerary crossveins. Cell r_{2+3} with a simple or branched supernumerary crossvein arising from the middle of R_{2+3} . **Legs** (Fig. 2C). Fore femur on male about three times longer than wide (slightly thinner on female). Distal third of mid femur with short strong anteroventral setae. Distal third of hind femur with anteroventral row of strong setae. Mid tibia with one distinct apical ventral seta. **Abdomen.** Tergites dark brown, sternites yellowish brown; brown setulose. **Protandrium** (Fig. 1E). Sternite 5 medially membranous. Sternites 6–8 fused, encircling the abdomen without a break. **Male genitalia** (Fig. 1F). Cerci fused to each other, distally free, each of them comprising a greater medial lobe, and a smaller lateral lobe. Surstylus with outer long projection and pair of small microtrichose inner lobes. Phallus with membranous, oval apex.

Distribution (Fig. 10). Brazil (Amazonas, Paraná, Rio Grande do Sul, São Paulo).

Examined type material. HOLOTYPE ♂. BRAZIL. São Paulo, Campos do Jordão, 1650m., Faz. Guarda [Parque Estadual Campos do Jordão], Alto Boa Vista, 31.iii.1963, N. Papavero, J. Guimarães, L.T.F. [L. Travassos Fo.] colls.

Examined non-type material. BRAZIL. Paraná: Piraquara, Mananciais da Serra, 08.x.2008, P. Grossi & J. Calhau colls (1♂, 1♀, INPA). Rio Grande do Sul: São Francisco de Paula—PROMATA, 14–18.xii.2009, P. Grossi col. (3♂, 2♀, INPA).

Remarks. The species is recorded for the first time from Paraná States.

***Rhinotora paschoali* Calhau & Coelho sp. nov.**

(Figs 3A–G, 10)

Diagnosis. *Rhinotora paschoali* sp. nov. is the only species in the genus that lacks strong ventral seta on mid and hind femora, besides having the most developed anterior orbital seta in the genus. It shares with *R. spilopectera* the fore femur proportions (about four times longer than wide). On the other hand, this species is similar to some specimens of *R. lopesi* concerning the branched supernumerary crossvein arising from the middle of R_{2+3} . Likewise *R. lopesi*, *R. spilopectera* and *R. travassosi*, the scutum has a complex pattern of brown and golden pruinose stripes

and spots. The male genitalia in this new species is very distinctive, with cerci laterally expanded in fingerlike projections and phallus flattened, laterally L-shaped.

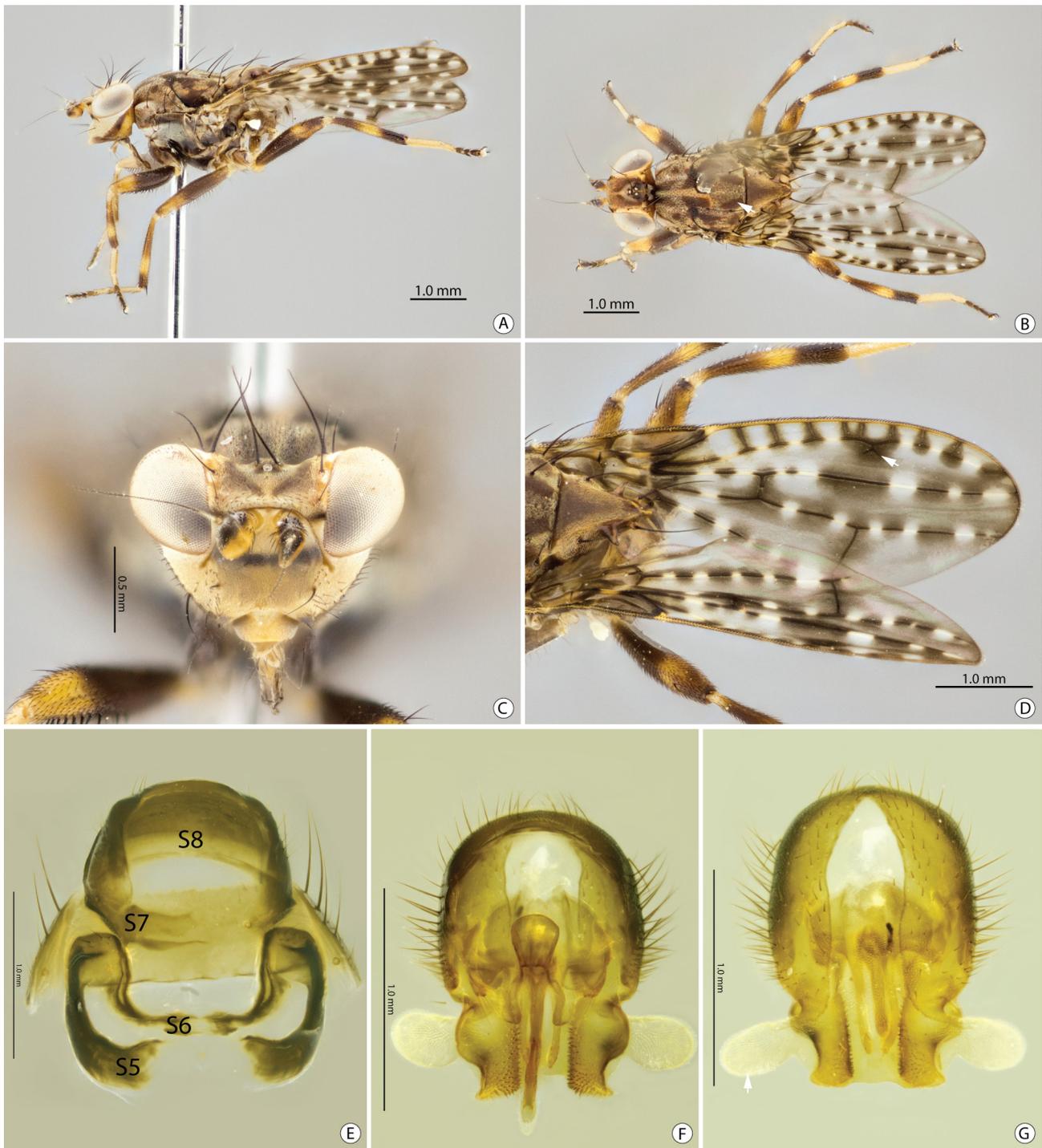


FIGURE 3. A–G, *Rhinotora paschoali*, sp. nov. (♂ holotype, INPA). **A**, lateral habitus; **B**, dorsal habitus (arrow indicates convergent posteromedial spots on scutum); **C**, head, frontal view; **D**, wing (arrow indicates supernumerary crossvein); **E**, protandrium; **F**, male genitalia, ventral view; **G**, male genitalia, dorsal view (arrow indicates digitiform projection of cercus).

Description. Male. Body length, excluding antenna and abdomen: 3.40 mm. **Head** (Figs 3A–C). Height: 0.83 mm, width: 1.53 mm. Yellow to brown, silvery to golden pruinose. Compound eye yellowish. Frons and vertex medially brown, yellow around compound eye, with a pair of lateral dark spots on anterior margin of frons. Frons golden pruinose. Anterior reclinate orbital seta about as long as one third of posterior seta. Ocellar triangle brown. Face yellow with a dark brown band below antennae. Gena yellow with an oblique medial brown stripe. Subgena

yellow to brown. Postgena yellow. Median occipital sclerite brown, shiny. Occiput yellow, black setulose. Mouthparts yellowish. Antennae ventrally yellow, dorsally brown. Arista preapical, micropubescent. **Thorax** (Figs 3A–B). Yellow to brown. Scutum brown with yellowish areas; black setulose, with complex pattern of brown and golden pruinose stripes and spots; posteromedial paired spots converging posteriorly. Pleura mostly dark brown with paler areas and a wide pruinose band from anepisternum to postpronotal lobe. Scutellum triangular with apical and lateral spiniform protuberances; base of apical seta protuberant. Scutellum yellowish brown, golden pruinose, shiny at apex and on lateral spines. **Wing** (Fig. 3D). Length: 4.80 mm, width: 1.44 mm, Medial vein ratio: 0.51. Veins mostly dark brown with white and yellow areas; C mostly yellow, dark brown on distal two thirds of cell c. Membrane hyaline with dark spots. Cell r_1 with seven to eight simple supernumerary crossveins. Cell r_{2+3} with a branched supernumerary crossvein arising from the middle of R_{2+3} . **Legs** (Fig. 3A). Mid and hind coxae yellow to brown, black setulose. Fore femur brown on proximal two thirds, yellow on distal third, black setulose, with longer setulae on posterodorsal surface. Fore femur about four times longer than wide. Mid femur brown on proximal two thirds and yellow on distal third. Mid femur with black setulae, ventrally longer. Mid femur without strong ventral setae. Hind femur brown with a subapical yellow spot. Hind femur without strong ventral setae. Fore tibia yellow on first and third quarters, brown on second and fourth quarters. Mid tibia brown, yellow at base and third quarter. Mid tibia with one distinct apical ventral seta. Hind tibia brown, yellow at base and on medial third. **Abdomen**. Tergites dark brown, sternites yellowish brown; tergites short brown setulose, setulae longer laterally on posterior margin. **Protandrium** (Fig. 3E). Sternite 5 medially membranous. Sternite 6 fused with sternite 5. **Male genitalia** (Figs 3F–G). Cerci fused to each other and to epandrium; laterally expanded in a pair of fingerlike projections. Surstylus rectangular in lateral view, inner surface microtrichose. Phallus flattened, laterally L-shaped, apex thin.

Etymology. The specific epithet is a patronym honoring Paschoal Grossi, Brazilian coleopterist and eminent insect collector.

Examined type material. HOLOTYPE ♂. BRAZIL. Paran : Piraquara, Mananciais da Serra, 24.x.2008, P. Grossi & J. Calhau colls (1♂, INPA).

***Rhinotora peruana* Kert sz**

(Fig. 10)

Rhinotora peruana Kert sz, 1901: 415, pl. 20, figs 8–9 (scutellum, wing). Holotype ♀, HNHM. Type-locality: Peru, Callanga. Distr.—Peru (Callanga). Ref. —Papavero, 1967: 2 (catalogue).

Remarks. This is the only known *Rhinotora* species not recorded from Brazil, and it was not studied. According to the illustrations of Kert sz (1901), this species possess quite long spiniform lateral protuberances (distinctly longer than the apical one), along with a well-developed protuberance at base of apical seta, as also observed by Lopes (1935). The wing spot pattern of this species seems to approximate it to *R. pluricellata*.

***Rhinotora pluricellata* Schiner**

(Figs 4A–F, 10)

Rhinotora pluricellata Schiner, 1868: 233. Syntypes 2♂, 2♀, NWM. Type-locality: "Brazil". Distr.—Brazil (Guanabara, S o Paulo). Refs—Fischer 1932: 425, figs 8–9, 20 (antenna, scutellum, wing); Lopes, 1935: 20, figs 1, 4–7 (egg, male genitalia, ovipositor); Papavero 1967: 2 (catalogue); Almeida & Ale-Rocha 2011: 54 (male genitalia).

Diagnosis. This species resembles *R. lopesi*, *R. salesopolitana*, *R. paschoali* **sp. nov.** and *R. spilopectera* by the single supernumerary crossvein arising from the middle of R_{2+3} . On the other hand, it resembles *R. dirversipennis* and *R. salesopolitana* by the scutum without dark pruinose spots, having a uniform golden pruinose cover. *Rhinotora pluricellata* differs from all remaining *Rhinotora* by the male genitalia with bottle-shaped cerci and phallus with microtrichose apex.

Redescription. **Head** (Figs 4A–B, D–F). Yellow to brown, silvery to golden pruinose. Anterior reclinate orbital seta about as long as one fourth of posterior seta. Mouthparts brown, clypeus and palpus yellowish. **Thorax** (Figs 4 A–B, D–E). Scutum yellowish to reddish brown, golden setulose, golden pruinose. Scutellum triangular with apical and lateral spiniform protuberances; base of apical seta protuberant; yellowish brown, golden pruinose,

apex and lateral spines shiny. **Wing** (Fig. 4B,D). Medial vein ratio: 0.49. Veins mostly dark brown with white and yellow areas; C mostly yellow, dark brown on distal two thirds of cell c. Membrane hyaline with dark spots. Cell r_1 with five to six simple supernumerary crossveins. Cell r_{2+3} with a simple or branched supernumerary crossvein arising from the middle of R_{2+3} . **Legs** (Figs 4A, D). Fore femur on male about three times longer than wide. Distal third of mid femur with short strong anteroventral setae. Distal third of hind femur with anteroventral row of strong setae. Mid tibia with one distinct ventroapical seta. **Abdomen**. Tergites brown, sternites yellowish brown; brown setulose. **Protandrium** (Almeida & Ale-Rocha 2011). Sternite 5 medially membranous; laterally fused with sternite 6. **Male genitalia** (Almeida & Ale-Rocha 2011). Cerci fused to each other, abruptly narrowing from base to apex (bottle-shaped). Surstylus single lobed, foot-shaped in lateral view. Phallus short, slender, with microtrichose apex.



FIGURE 4. A–C, *Rhinotora pluricellata* (♂ syntype, NMW). A, lateral habitus; B, dorsal habitus; C, abdomen, ventral view. D–F, *R. pluricellata* (♂, MZUSP). D, lateral habitus; E, dorsal habitus; F, head, frontal view.

Distribution (Fig. 10). Brazil (Rio de Janeiro, São Paulo).

Examined type material. SYNTYPES. “Novara R.; Brasilia / pulricellata; Alte Sammlung / Type” (photographs of 1♂, 1♀, NMW).

Examined non-type material. BRAZIL. São Paulo: Itaporanga, N. B. Antonina, i.1946, Barretto col. (1♂, MZUSP).

***Rhinotora salesopolitana* Guimarães & Papavero**

(Figs 5A–C, 10)

Rhinotora salesopolitana Guimarães & Papavero, 1966: 266, figs 5–7 (male genitalia). Type-locality: Brazil, São Paulo, Salesópolis, Estação Biológica de Boracéia. Distr.—Brazil (São Paulo, Salesópolis). Refs—Papavero 1967: 2 (catalogue); Almeida & Ale-Rocha 2011: 54 (male genitalia). Holotype ♂, MZUSP.

Diagnosis. *Rhinotora salesopolitana* resembles *R. dirversipennis* and *R. pluricellata* by the scutum uniformly golden pruinose, without dark pruinose spots. This species resembles most *Rhinotora* species by the presence of anterior orbital seta, by the single supernumerary crossvein arising from the middle of R₂₊₃, and by the male fore femur about four times longer than wide. *Rhinotora salesopolitana* can be distinguished from the remaining species of the genus by the male genitalia.

Redescription. **Head** (Figs 5A–C). Mostly yellow, silvery to golden pruinose. Anterior reclinate orbital seta about as long as one fourth of posterior seta. Mouthparts brown, clypeus and palpus yellowish. **Thorax** (Figs 5A–B). Scutum reddish brown with dark brown regions, golden pruinose. Scutellum triangular with apical and lateral spiniform protuberances; base of apical seta protuberant; yellowish brown, golden pruinose; apex and protuberances yellow, shiny. **Wing** (Fig. 5A). Medial vein ratio: 0.51. Veins mostly dark brown with white and yellow areas; C mostly yellow, dark brown on distal two thirds of cell c. Membrane hyaline with dark spots. Cell r₁ with eight to nine simple supernumerary crossveins, the apical most, occasionally branched. Cell r₂₊₃ with one simple supernumerary crossvein arising from the middle of R₂₊₃; sometimes one additional vein arising from the apical third of R₂₊₃. **Legs** (Fig. 5A). Fore femur on male about three times longer than wide. Distal third of mid femur with two rows of short strong ventral setae. Distal third of hind femur with anteroventral row of strong setae. Mid tibia two or three distinct ventral apical setae. **Abdomen.** Generally brown in color, brown setulose. **Male genitalia** (Guimarães & Papavero 1966). Male cerci fused to each other, curved in lateral view, apex slightly concave. Surstylus single lobed, rectangular in lateral view, apex slightly concave. Phallus robust with pointed apex.

Distribution (Fig. 10). Brazil (São Paulo).

Examined type material. HOLOTYPE ♂. BRAZIL. São Paulo: Salesópolis, Boraceia, 850m, xii, 1949, L. Travassos Fo., E. Rab. (MZUSP).

***Rhinotora spilopectera* Guimarães & Papavero**

(Figs 5D–F, 10)

Rhinotora spilopectera Guimarães & Papavero, 1966: 266. Holotype ♂, MZUSP. Type-locality: Brazil, São Paulo, Salesópolis, Estação Biológica de Boracéia. Distr.—Brazil (São Paulo, Salesópolis). Refs—Guimarães & Papavero, 1966: figs 8–10 (male genitalia). Papavero 1967: 2 (catalogue); Almeida & Ale-Rocha 2011: 54 (male genitalia).

Diagnosis. *Rhinotora spilopectera*, similarly to *R. paschoali* **sp. nov.**, has the male fore femur about four times longer than wide (*i.e.* narrower than in the remaining species). *Rhinotora spilopectera* shares with most *Rhinotora* species the presence of anterior orbital seta, the single supernumerary crossvein arising from the middle of R₂₊₃, and the strong ventral setae on mid and hind femora. In addition, this species shares with *lopesi*, *R. paschoali* **sp. nov.**, and *R. travassosi*, the complex pattern of brown and golden pruinose stripes and spots on scutum. *Rhinotora spilopectera* differs from its congeneric species by the triangular male cerci as shown by Guimarães & Papavero (1966).



FIGURE 5. A–C, *Rhinotora salesopolitana* (♂ holotype, MZUSP). A, lateral habitus; B, dorsal habitus (arrow indicates absence of posteromedial spots on scutum); C, head. D–F, *R. spilopectera* (♂ holotype, MZUSP). D, lateral habitus; E, dorsal habitus; F, head, frontal view.

Redescription. **Head** (Figs 5D–F). Mostly yellow, silvery to golden pruinose. Anterior reclinate orbital seta about as long as one fourth of posterior seta. Mouthparts brown, clypeus and palpus yellowish. **Thorax** (Figs 5D–E). Scutum brown with yellowish and reddish areas, golden setulose, with complex pattern of brown and golden pruinose stripes and spots; posteromedially golden pruinose. Scutellum triangular with apical and lateral spiniform protuberances; base of apical seta protuberant; yellowish brown, golden pruinose, apex and protuberances shiny. **Wing** (Figs 5E). Medial vein ratio: 0.44. Veins mostly dark brown with white and yellow areas; C mostly yellow, dark brown on distal two thirds of cell c. Membrane hyaline with dark spots. Cell r_1 with eight simple

supernumerary crossveins. Cell r_{2+3} with one simple supernumerary crossvein arising from the middle of R_{2+3} . **Legs** (Figs 5D). Male fore femur about four times longer than wide. Distal third of mid femur with two rows of short strong ventral setae. Distal third of hind femur without strong ventral setae. Mid tibia with two or three distinct ventroapical setae. **Abdomen**. Generally brown in color, brown setulose. **Male genitalia** (illustrated by Guimarães & Papavero, 1966). Male cerci fused to each other, triangular in dorsal view. Surstylus single lobed, rectangular in lateral view, distal margin slightly concave. Phallus short, slender (Almeida & Ale Rocha 2011).

Distribution (Fig. 10). Brazil (Paraná, São Paulo).

Examined type material. HOLOTYPE ♂. BRAZIL. São Paulo: Salesópolis, Boraceia, 850m, xii, 1949, L. Travassos Fo., E. Rab. (MZUSP).

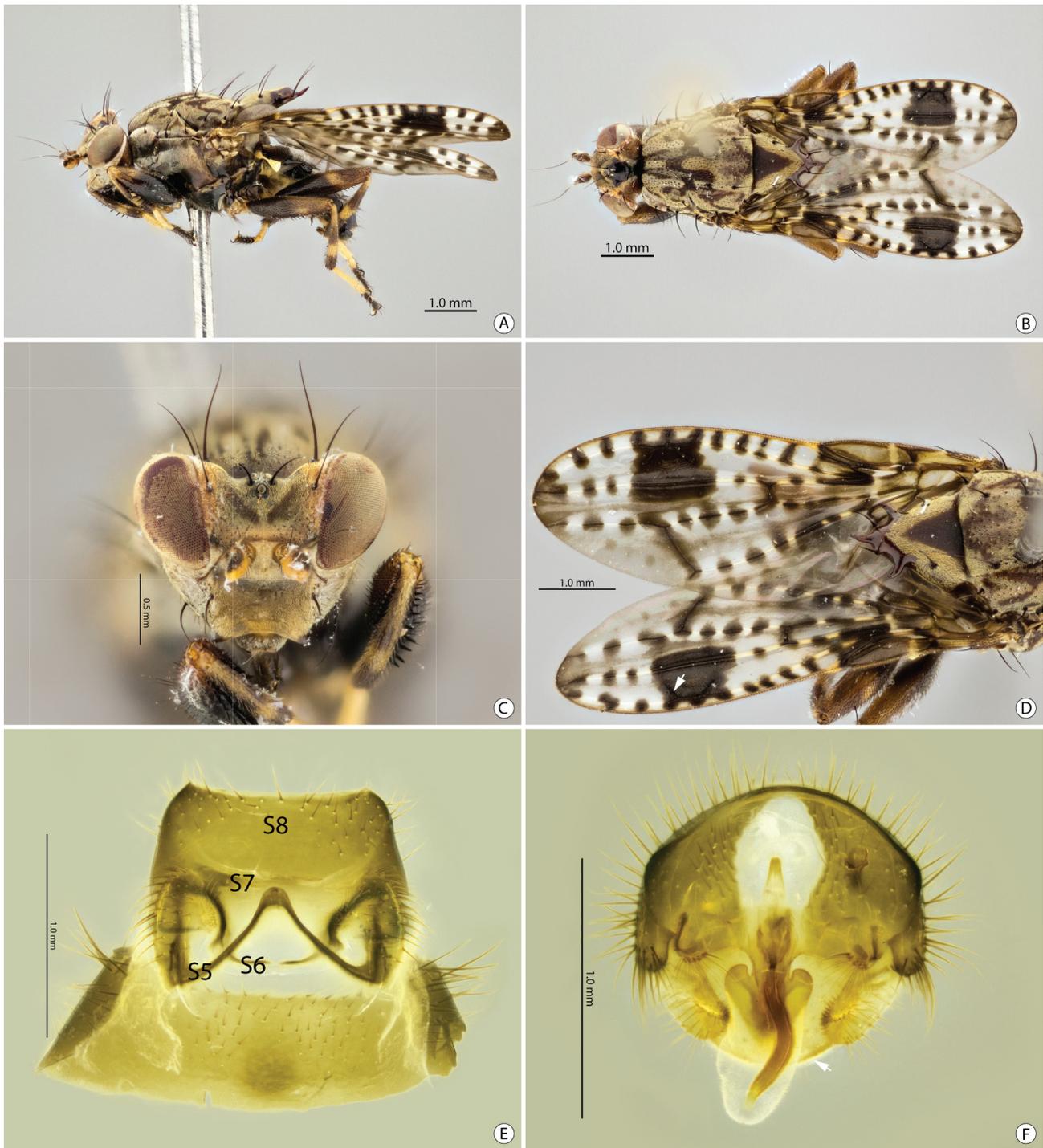


FIGURE 6. A–F, *Rhinotora travassosi* (♂, INPA). **A**, lateral habitus; **B**, dorsal habitus; **C**, head; **D**, wing (arrow indicates supernumerary crossvein); **E**, protandrium; **F**, male genitalia, ventral view.

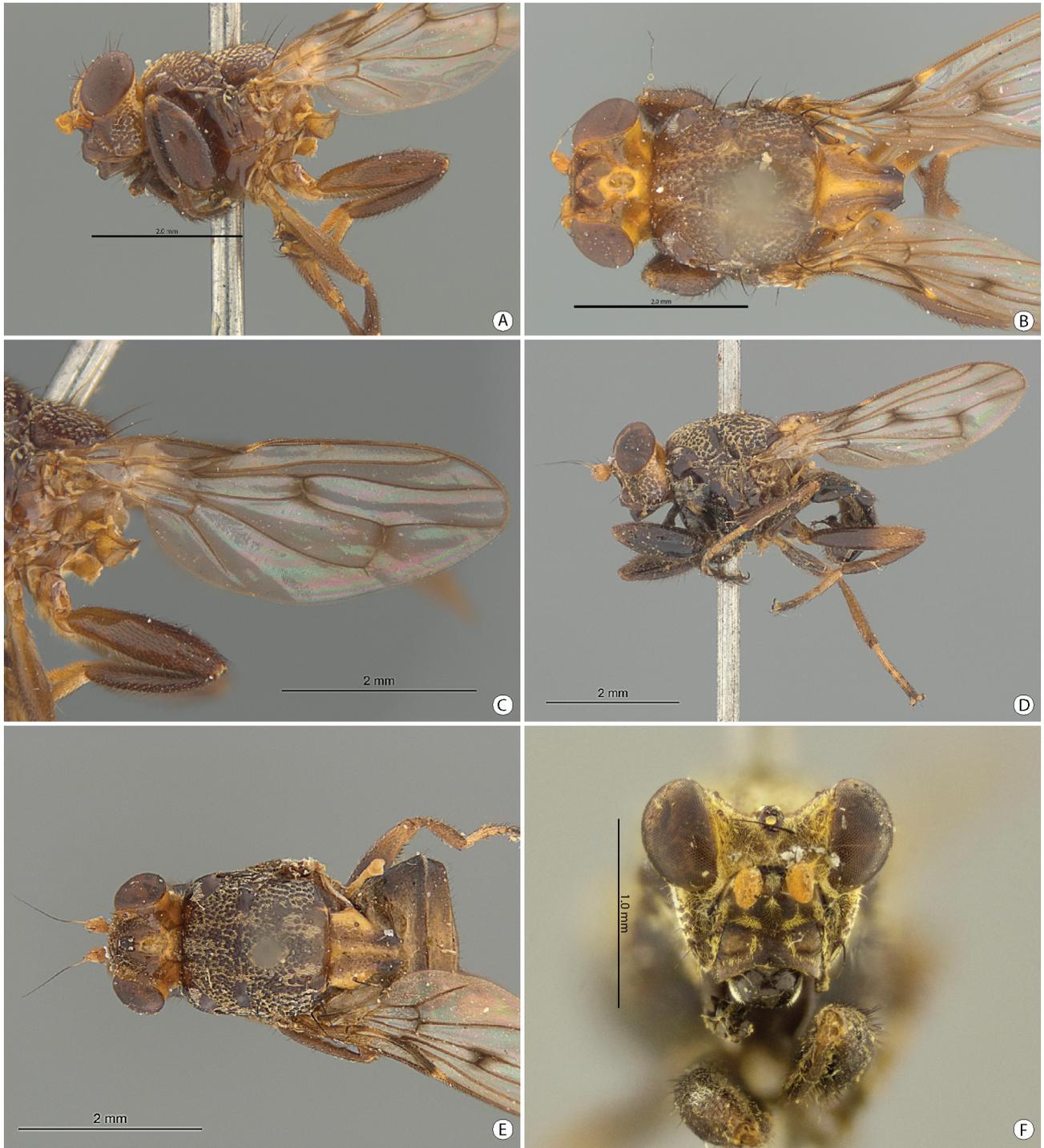


FIGURE 7. A–C, *Neorhinotora amapaensis* (♂ holotype, MZUSP). A, lateral habitus; B, dorsal habitus; C, wing. D–F, *Neorhinotora aristalis* (♂ holotype, MZUSP). D, lateral habitus; E, dorsal habitus; F, head, frontal view.

***Rhinotora travassosi* Lopes**
(Figs 6A–F, 10)

Rhinotora travassosi Lopes, 1934: 517. Holotype ♂, MNRJ. Type-locality: Brazil, São Paulo, Capital, Cantareira. Distr.—Brazil (Minas Gerais, São Paulo). Refs—Lopes 1935: 20, pl. 1, fig. 1 (wing); 1936: 106, figs 1–2, 5–6 (male genitalia, crossveins of cell r1); Papavero 1967: 2 (catalogue); Almeida & Ale-Rocha 2011: 54 (male genitalia).

Diagnosis. *Rhinotora travassosi* can be identified by the distinct brown pruinose triangle on scutellum, along with

a dark spot surrounding the supernumerary crossvein of cell r_{2+3} , covering part of cell r_{4+5} . This is the only species with two independent, divergent, supernumerary crossveins arising from the middle of R_{2+3} . *Rhinotora travassosi* shares with *lopesi*, *R. paschoali* *sp. nov.*, and *R. spiloptera*, the complex pattern of brown and golden pruinose stripes and spots on scutum. Moreover, *Rhinotora travassosi* resemble most *Rhinotora* species regarding the presence of anterior orbital seta, the male fore femur about three times longer than wide, and the strong ventral setae on mid and hind femora.



FIGURE 8. A–C, *Neorhinotora mutica* (♂, MZUSP). A, lateral habitus; B, dorsal habitus; C, head, frontal view. D–F, *Rhinotoroides bifurcata* (♂, INPA). D, lateral habitus (arrow indicates postocellar setae); E, dorsal habitus; F, head, frontal view.

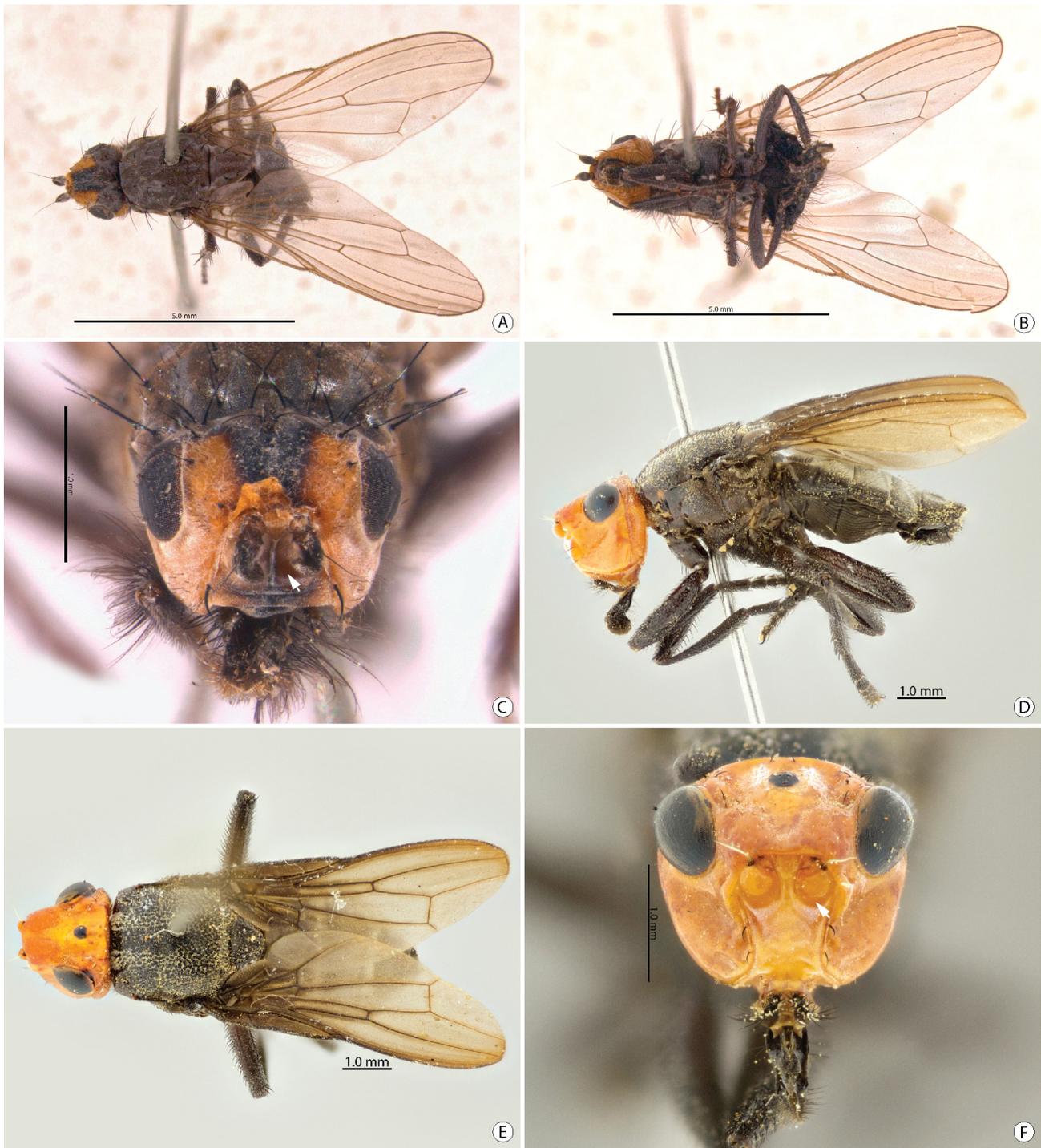


FIGURE 9. A–C, *Diacia diadema* (♂ holotype, NMW). A, dorsal habitus; B, ventral habitus; C, head, frontal view (arrow indicates subantennal pit). D–F, *Dichromyia sanguiniceps* (♂, MZUSP). D, lateral habitus; E, dorsal habitus; F, head, frontal view (arrow indicates subantennal pit).

Redescription. Head (Figs 6A–C). Yellow to brown, silvery to golden pruinose. Anterior reclinate orbital seta about as long as one fourth of posterior seta. Mouthparts brown, palpus yellow. **Thorax** (Figs 6A–B). Scutum dark brown with paler areas, golden setulose, with complex pattern of brown and golden pruinose stripes and spots; acrostichal paired stripes brown, medially connected; posteromedial paired spots parallel, posteriorly connected. Scutellum triangular with apical and lateral spiniform protuberances; base of apical seta protuberant; dark brown, pruinescence golden on lateral margin with distinct dorsal brown pruinose triangle; lateral spines and apex shiny. **Wing** (Fig. 6D). Medial vein ratio: 0.47. Veins mostly dark brown with white and yellow areas; C yellow between sc break and apex, with base and apex brown. Membrane hyaline with dark spots, including a darker one

surrounding the supernumerary crossvein of cell r_{2+3} , covering part of cell r_{4+5} . Cell r_1 with seven to nine simple supernumerary crossveins, some of them occasionally branched. Cell r_{2+3} with two divergent, sometimes connected, supernumerary crossvein arising from the middle of R_{2+3} . **Legs** (Fig. 6A). Fore femur on male about three times longer than wide (slightly thinner on female). Distal third of mid femur with two rows of short strong ventral setae. Distal third of hind femur with anteroventral row of strong setae. Mid tibia with one distinct ventroapical seta. **Abdomen**. Generally brown in color, brown setulose. **Protandrium** (Fig. 6E). Male sternite 5 medially with an acute posterior projection. Sternite 6 fused with sternite 5. **Male genitalia** (Fig. 6F). Cerci fused to each other, with discrete medial tubercle at apex. Surstylus single lobed, rectangular in lateral view, apex slightly concave. Phallus robust, rotated to left, with membranous apex.

Distribution (Fig. 10). Brazil (Minas Gerais, Paraná, São Paulo).

Examined non-type material. BRAZIL. Paraná: Piraquara, Mananciais da Serra, 20.viii.2008, P. Grossi & J. Calhau colls (1♂, INPA); same data, 08.x.2008 (2♂, 2♀, INPA); same data, 24.x.2008 (5♂, 3INPA); same data, 04.xi.2008 (2♂, 2♀, INPA).

Remarks. *Rhinотора travassosi* is recorded for the first time from Paraná State.

Key to the known species of Heleomyzidae occurring in Brazil

1. Face without subantennal pits (Figs 1C, 7F, 8F). Compound eyes large and prominent. Vertex slightly to deeply excavated. Head brown to yellow. *Rhinotorini*... 2
- 1'. Face with pair of deep, oval subantennal pits (Figs 9C,F). Compound eyes reduced. Vertex horizontal or slightly convex. Head at least partially bright orange. *Diaciini* ...13
- 2(1). Postvertical setae absent (Fig. 1C). Scutellum with longitudinal excavation or with protuberances (Figs 1B, 2B). Vertex deeply excavated (Figs 1C, 7F) 3
- 2'. Postvertical setae weak, convergent (Fig. 8D). Scutellum without longitudinal excavation or protuberances (Fig. 8E). Vertex slightly excavated (Fig. 8F) *Rhinotoroides bifurcata* Lopes, 1934.
- 3(2). Scutellum flattened, not excavated, with spiniform or lobed protuberances (Figs 1B, 2B). Pruinescence of scutum fine, present around setal sockets (Figs 1B,D). *Rhinотора*... 4
- 3'. Scutellum inflated and longitudinally excavated (Fig. 7B). Pruinescence of scutum thick, absent around setal sockets (Figs 7A–B,D–E). *Neorhinотора* ...11
- 4(3). Scutellum with apical and lateral spiniform protuberances (Fig. 1B). Wing membrane hyaline with dark spots; cell r_1 with several supernumerary crossveins, occasionally some of them branched (Figs 1D, 3D, 6D) 5
- 4'. Scutellum with discrete apical and lateral lobed protuberances (Fig. 2B). Wing membrane dark with hyaline spots; cell r_1 with several supernumerary crossveins, most of them branched (per Almeida & Ale-Rocha 2011) *R. fonsecai*
- 5(4). Cell r_{2+3} medially with 2–3 supernumerary crossveins, arising independently from R_{2+3} (sometimes connected posteriorly) (Figs 1D, 6D). 6
- 5'. Cell r_{2+3} medially with a single (either simple or branched) supernumerary crossvein (Fig 3D). 7
- 6(5). Wing with a distinct spot around crossveins arising from R_{2+3} , darker than remaining wing spots (Fig 6D). Scutellum centrally with a dark pruinose triangle; margin golden pruinose. Male cerci with convex apical margin (Fig 6F) *R. travassosi*
- 6'. Wing with two parallel, often posteriorly connected supernumerary crossveins arising from the middle of R_{2+3} ; dark spot around those crossveins not darker than the remaining wing spots (Fig 1D). Pruinescence of scutellum golden to brown, not forming a distinct pattern. Male cerci with indented apical margin (Fig 1F) *R. diversipennis*
- 7(6). Scutum with complex pattern of dark pruinose spots (Figs 2D, 3B, 5E) 8
- 7'. Scutum golden pruinose, without dark pruinose spots (Figs 4E, 5B) 10
- 8(7). Male fore femur about three times longer than wide. Scutum with two parallel dark pruinose spots on posteromedial region (Fig. 2D). Mid tibia with one distinct ventroapical seta. Cerci with a greater medial lobe, and a smaller lateral lobe (Fig. 2F) *R. lopesi*
- 8'. Male fore femur about four times longer than wide. Pruinosc pattern of scutum not as above. Mid tibia with 1–3 distinct ventroapical setae 9
- 9(8). Scutum without dark pruinose spots on posteromedial region (Fig. 5E). Mid tibia with two or three distinct ventroapical setae. Male cerci triangular in dorsal view (per Guimarães & Papavero, 1966). *R. spilopectera*
- 9'. Scutum with two converging dark pruinose spots on posteromedial region (Fig. 3B). Mid tibia with one distinct ventroapical seta. Male cerci short, fused all along its apex, prolonged laterally into two digitiform lobes (Fig. 3G). *R. paschoali* sp. nov.
- 10(7). Cell r_1 with five to six supernumerary crossveins (Fig. 4B,D). Mid tibia with one ventroapical distinct seta. Male cerci abruptly narrowing from base to apex, bottle-shaped in dorsal view (per Almeida & Ale-Rocha 2011) *R. pluricellata*
- 10'. Cell r_1 with eight to nine supernumerary crossveins (Fig. 5A). Mid tibia with two or three ventroapical distinct seta. Male cerci trapezoidal in dorsal view (Guimarães & Papavero, 1966) *R. salesopolitana*
- 11(3). Arista micropubescent (Fig. 8C). Wing with two well-defined spots around dm-cu and on the distal extremities of R4+5 and M (Figs 8A–B) *N. mutica* (Schiner, 1868)

- 11'. Arista bare (Fig. 7B, E). Vein dm-cu and the distal extremities of R_{4+5} and M with inconspicuous spots (Figs 7C, D) 12
- 12(11). Surstylus robust, dorsoventrally elongated and laterally flattened (illustrated by Almeida & Ale-Rocha 2008) *N. amapaensis* Guimarães & Papavero, 1966
- 12'. Surstylus slender, trifid (illustrated by Almeida & Ale-Rocha 2008). *N. aristalis* (Fischer, 1932)
- 13(1). Head bristles strong; ocellar bristles present; oral vibrissa distinct; face, gena and lateral thirds of frons orange, remaining head areas black (Fig. 9C). Scutellar bristles about as long as scutellum (Fig. 9A). Wing membrane hyaline (Figs 9A–B) *Diacia diadema* (Wiedemann, 1830)
- 13'. Head bristles reduced; ocellar bristles absent; oral vibrissa and subvibrissal seta present, both weak; head orange, mouthparts dark brown (Figs 9D–F). Scutellar bristles less than half as long as scutellum (Fig. 9E). Wing membrane blackish (Figs 9D–F) *Dichromyia sanguinceps* (Wiedemann, 1830)

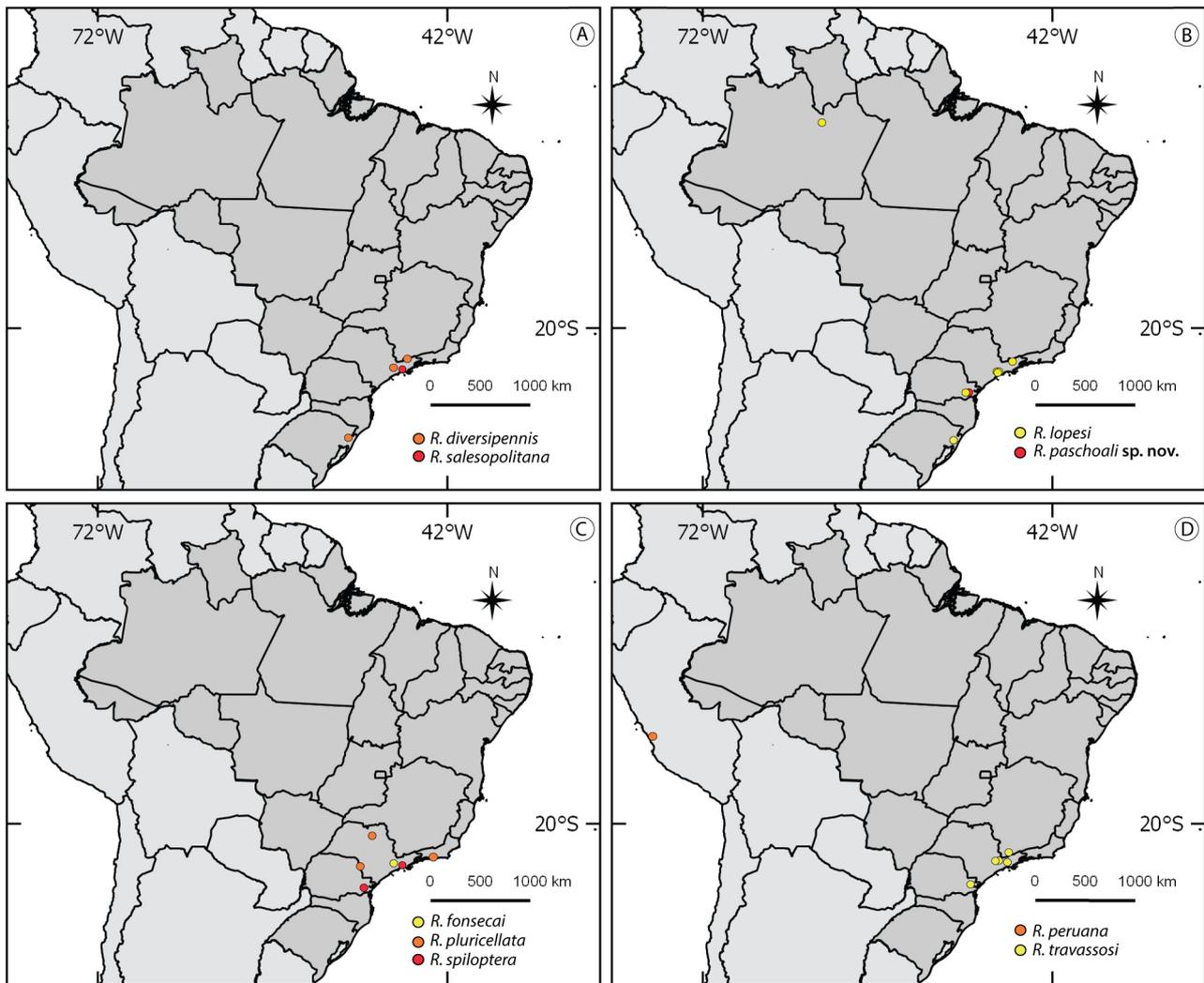


FIGURE 10. Distribution maps for *Rhinotora* species. **A**, *R. diversipennis* and *R. salesopolitana*; **B**, *R. lopesi* and *R. paschoali* sp. nov.; **C**, *R. fonsecai* nov. comb., *R. pluricellata*, and *R. spilopectera*; **D**, *R. peruana* and *R. travassosi*.

Summary

Two species are added to *Rhinotora*: *R. fonsecai*, which is transferred back to its original genus, and *R. paschoali* sp. nov. Thirteen heleomyzid species are recorded from Brazil, with *R. lopesi* and *R. travassosi* newly recorded from Paraná State.

Rhinotora is separated from the remaining Rhinotorini by the presence of lobed or spiniform protuberances on scutellum, sharing with *Neorhinotora* and some Australian species of *Cairnsimyia* Malloch the absence of postvertical setae. *Rhinotora* also differ from *Neorhinotora* by the pruinescence on scutum (fine, present around setal sockets in *Rhinotora*, thick and absent around setal sockets in *Neorhinotora*).

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