

REVISION OF *TRYPETIDOMIMA* (DIPTERA: RHINOPHORIDAE) WITH DESCRIPTION OF A NEW BRAZILIAN SPECIES

SILVIO SHIGUEO NIHEI* AND MARCOS RIBEIRO DE ANDRADE

Department of Zoology, Institute of Biosciences, University of São Paulo, Rua do Matão, Trav. 14, n. 101, 05508-900, São Paulo, SP, Brazil

*Corresponding author: silvionihei@gmail.com

A pdf file with supplementary material for this article in Florida Entomologist 97(2) (2014) is online at <http://purl.fcla.edu/fcla/entomologist/browse>.

ABSTRACT

Trypetidomima Townsend is a Neotropical Rhinophoridae genus with a single species, *T. lutea* Townsend, from southeastern Brazil. Based on comprehensive material from Atlantic Forest localities, we found a new species of *Trypetidomima*, herein described and named as *T. fusca* **sp. nov.**, with geographical occurrence in the State of São Paulo, southeastern Brazil. With the addition of this new species, the genus is redefined, and an identification key is provided to distinguish between the 2 known species. The type-species, *T. lutea* Townsend, is redescribed, including the description of the previously unknown female.

Key Words: Neotropical region, systematics, taxonomy

RESUMO

Trypetidomima Townsend é um gênero neotropical de Rhinophoridae com somente uma espécie, *T. lutea* Townsend, do sudeste do Brasil. Com o estudo de um abrangente material proveniente de localidades da Mata Atlântica, encontramos uma nova espécie de *Trypetidomima*, aqui descrita e nomeada *T. fusca* **sp. nov.**, com distribuição geográfica conhecida para o Estado de São Paulo, sudeste do Brasil. Com a adição desta segunda espécie, o gênero é redefinido, e uma chave de identificação é fornecida para distinguir as duas espécies conhecidas até o momento. A espécie-tipo, *T. lutea* Townsend, é redescreta, incluindo a descrição da fêmea, antes desconhecida.

Palavras Chave: Região Neotropical, sistemática, taxonomia

Rhinophoridae is a small family of calyptrate Diptera with about 150 species and 23 genera in the world (Pape et al. 2004; Pape et al. 2011). The family is poorly known in the Neotropical region and taxonomic studies are still incipient. Until 2000, the Neotropical rhinophorid fauna was represented by only 4 species: the type-species of *Bezzimyia* Townsend, 1919 described from Panama; the type-species of the monotypic genera *Shannoniella* Townsend, 1939 and *Trypetidomima* Townsend, 1935 both from Brazil; and the introduced Palearctic species *Melanophora roralis* (Linnaeus, 1758). In 2001, the publication by Pape & Arnaud (2001) brought to our knowledge 13 new species of *Bezzimyia* from several countries where the rhinophorid fauna have never been studied before, as Mexico, Belize, Costa Rica, Jamaica, Venezuela and Ecuador. Since then, except for the record of the introduced Palearctic species *Stevenia deceptoris* (Loew, 1847) in Argentina by Mulieri et al. (2010), no other contribution has been published describing/recording

valid Neotropical taxa. In summary, there are 18 species known in the Neotropics.

Collecting data of the described species suggest the Neotropical rhinophorids preferentially inhabit tropical forested areas. Most species of *Bezzimyia* inhabit rain forests in altitudes ranging from 500 to 2300 m from Mexico to Ecuador (Pape & Arnaud 2001), and similar condition occur with *Shannoniella cuspidata* Townsend, 1939 and *Trypetidomima lutea* Townsend, 1935, 2 endemic species from southeastern Brazil. The biology of rhinophorids is scarcely known, except for some Afrotropical and Palearctic records, which larval stages are reported as endoparasitoids of woodlice (Crustacea: Isopoda: Oniscidea) (Bedding 1973; Pape 1986). There are no host records for the Australasian, Nearctic, Neotropical and Oriental species, although it is being generally assumed that the whole family parasitizes terrestrial isopods, mainly based on the similar larval morphology (Pape et al. 2004).

For a long time, Rhinophoridae was regarded as infra-familial rank within Calliphoridae, Sarcophagidae or Tachinidae, and only recently the group has been treated as a separate family (Hennig 1973; Crosskey 1977; Wood 1987). The member of the family can be recognized by the following combination of characters: lower calypters glossiform or ovate, diverging from scutellum; posterior spiracle triangular without a distinct operculum, with both anterior and posterior fringes reduced; subscutellum distinctly developed, but not strongly developed as in Tachinidae. Additionally, larval features provide evidence for the monophyly of the group: first instar cephalopharyngeal skeleton with the mandibles toothed on anterior margin, cephalopharyngeal sclerite (parastomal bar) extremely elongate and slender, and parasitism of terrestrial Isopoda (Crosskey 1977; Pape 1986, 1992, 2010).

Trypetidomima was described by Townsend (1935a) to include his new species *T. lutea* from Brazil (State of São Paulo). Townsend (1935a) described the genus in a brief five-lined paragraph and based on the male sex only, mainly differentiating it from the tachinid *Ptilopsina* Villeneuve, 1920 (= *Anthomyiopsis* Townsend, 1916) as they run out together in the key in his Manual of Myiology (Townsend 1935b). In the present work, we could study comprehensive material of Rhinophoridae from the Atlantic Forest, most of it newly collected by Malaise traps and sweep nets from Paranapiacaba and Boracéia, State of São Paulo. In that material, we found several specimens of *T. lutea* (males and females) and also a significant series of specimens representative of a new species, named here *T. fusca* **sp. nov.**

Here we provide the following contributions to the taxonomy of *Trypetidomima*: 1) redescription of the male and description of the female of *T. lutea* Townsend, including illustrations of terminalia; 2) description of the new species, *T. fusca* **sp. nov.**; 3) generic description; and 4) identification key to the species.

MATERIAL AND METHODS

The study was mainly based on newly collected material from 2 localities in the State of São Paulo: (i) the Boracéia Biological Station, Salesópolis city, collected during a series of expeditions from Feb 2008 and Jan 2009, altitude 900 m; and (ii) the Reserve Alto da Serra de Paranapiacaba, Santo André city, collected from Aug 2009 to Jul 2011, altitude 750-860 m. In both localities the material was collected using Malaise traps and sweep nets, and the specimens were deposited at the Museu de Zoologia da Universidade de São Paulo, São Paulo (MZSP). We also examined additional material of Rhinophoridae from other Atlantic Forest localities deposited in the following institutions: Coleção Entomológica

Padre Jesus Santiago Moure do Departamento de Zoologia da Universidade Federal do Paraná, Curitiba (DZUP); Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA); Museu Nacional do Rio de Janeiro, Rio de Janeiro (MNRJ); and Museu de Zoologia da Universidade de São Paulo, São Paulo (MZSP). Another museum acronym cited in the text is that of the United States National Museum, Washington (USNM).

Morphological terminology follows mainly Cumming & Wood (2009), except for the antennal morphology, which follows Stuckenberg (1999).

Specimens were examined by Leica EZ4 and Leica MZ9.5 stereomicroscopes. Photographs were captured by a Leica DFC420 digital camera coupled to a stereomicroscope Leica MZ16 and prepared (mounted) with the Leica LAS 4.1 software. Photographs were edited with Corel Photo-paint and Corel Draw.

For the study of male terminalia, the terminalia were detached from the abdomen and cleared in a 10% KOH solution at room temperature for about 24 h, and then washed with distilled water and in a series of ethanol solutions of increasing concentrations. The terminalia were examined on temporary slides with glycerin, and subsequently stored in plastic microvials with glycerin and attached to the respective specimen.

All figures in this paper are reproduced in color in the online supplementary material available in Florida Entomologist 97(2) (2014) at <http://purl.fcla.edu/fcla/entomologist/browse>. The figures in the supplementary document are referred to in the text below as Suppl. Figs. 1A-G, Suppl. Figs. 2A-F, and Suppl. Figs. 3A-D.

TRYPETIDOMIMA TOWNSEND, 1935

Trypetidomima Townsend 1935a: 68 (genus description), type-species: *Trypetidomima lutea* Townsend 1935; Townsend 1935b: 251 (key to Melanophoridae-Melanophorini genera); Townsend 1938: 206 (generic diagnosis); Guimarães 1971: 112 (catalogue, as Tachinidae-Dexiinae-Shanoniellini); Pape 1998: 685 (manual of Palaearctic Rhinophoridae); Peris & González-Mora 2007: 54 (catalogue, as Calliphoridae-Rhinophorinae); Kutty et al. 2010: 617 (citation); Pape 2010: 1341 (key to Neotropical Rhinophoridae genera); Mulieri et al. 2010: 66 (comments on habitat), 68 (key to New World Rhinophoridae genera); Cerretti & Pape 2012: 287 (phylogenetic relationships among Rhinophoridae genera).

Description

Eye bare. Antenna short; first and second aristomeres reduced and hardly recognizable; arista pubescent. Inner vertical setae strong, reclinate and slightly divergent; no outer vertical seta. No

fronto-orbital seta. Parafacial bare and very narrow. Face short and sunken. Facial ridge bare, except for some setulae above vibrissa. Vibrissa long, strong, and inserted at level of lower facial margin; vibrissal angle weakly projected or not projected forward, at the midway between level of lower margin of eye and lower margin of gena. No developed acrostichals; dorsocentrals 2+3, the posteriormost presutural and the posteriormost postsutural setae longer. Postpronotum with 2 setae and fine ground setulae. No posthumeral seta. Notopleurals 2, the anterior nearly 1.5 × the length of the posterior, no ground setulae. Prosternum and proepisternum bare. One upcurved proepisternal and one upcurved proepimeral seta. Katepisternals 2, the posterior a little longer and stronger. Six anepisternal setae. Katepimeron (barrette) bare. Anatergite with fine setulae. Scutellum with one pair of cruciate apical setae, one pair of lateral divergent setae, and no discal setae. Wing infuscated with light brown, but 3 clear (non-infuscated), hyaline spots on cells r4+5, dm and m. Fore femur with posterodorsal and posteroventral rows of setae, and 1-2 developed anteroventral setae on basal third. Fore tibia with one median anterodorsal, one median posterodorsal and one submedian posteroventral setae. Mid femur with 2 strong anterior setae on mid third, posteroventral face with some developed setae irregularly spaced on basal half, and one preapical posterodorsal seta. Hind tibia with 2 posterodorsal setae and one submedian anteroventral seta. Female with fore tarsus compressed laterally. Abdominal tergites covered by long fine setulae. Syntergite 1+2 without the mid-dorsal depression, with several strong lateral setae, one pair of lateral marginals and one pair of median submarginals. Tergite 3 with one pair of median submarginal setae and one pair of lateral marginals. Tergites 4 and 5 each with a row of marginal setae, and one pair of median submarginals on tergite 4.

Recognition

The key to New World genera of Rhinophoridae by Mulieri et al. (2010) works very well to distinguish *Trypetidomima* from the other genera, even considering the broader generic definition provided above to include the new species. The only change required is to exclude the first character in couplet 2 “Head, body and legs extensively yellow”, since *T. fusca* **sp. nov.** is not extensively yellow as it is *T. lutea*.

Dimorphism

Townsend (1935a) described the genus based solely on male specimens. Here the study of comprehensive series of both sexes allowed morpho-

logical comparison and distinction. Males and females of *Trypetidomima* closely resemble each other, and despite the superficial examination of the terminalia that promptly allows determining the sex of the observed specimen, no striking differences are recognizable in the external morphology. The clear, hyaline spots on wing are slightly larger in females than in males, but this can be easily noted if one has both sexes for comparison, especially to note that difference in *T. fusca* **sp. nov.** But, in *T. lutea*, while the male has the usual single hyaline spot on cell r4+5, the female has 2 hyaline spots on cell r4+5 that seem to be partially fused. Another feature, which is useful for both species, although it also occurs in other Rhinophoridae, is that the female fore tarsus is compressed laterally. The heads of males and females are very similar, although in *T. fusca* **sp. nov.** the male frons narrows gradually upwards to vertex and the female frons has subparallel margins. The frons in *T. lutea* is characterized by subparallel margins in both sexes.

Habitat and Habits

The first note about the habitat of *Trypetidomima* is from Townsend (1938: 207) who commented that *T. lutea* is “known only from the south Brazilian highlands” but without providing any additional record other than the type-locality (Itaquaquecetuba, State of São Paulo). The collecting labels of specimens of *T. lutea* studied here indicate that this species occurs at altitudes varying from 600 to 1200 m, and all localities wherein the specimens were collected are within the Atlantic Forest domain. Collecting labels of specimens of *T. fusca* **sp. nov.** confirm those same habitat preferences, altitudes between 750 and 900 m and Atlantic Forest localities. During all the expedition trips we conducted in Boracéia and Paranapiacaba (see Material and Methods) we did not collect any specimen of *T. lutea* or *T. fusca* **sp. nov.** during our diurnal activities with sweep nets. All collected material was captured by Malaise traps. Additional material was collected using light traps during the night, which suggests that *Trypetidomima* species may be crepuscular or nocturnal.

Hosts

Unknown.

Phylogenetic Relationships

Cerretti & Pape (2012) carried out a cladistic analysis including 17 valid genera out of 23 world genera of Rhinophoridae. This can be considered the first attempt towards a comprehensive study to understand the phylogenetic relationships

among infra-familial groups of Rhinophoridae, despite the poor taxon sampling of representatives from outside the family. All the Neotropical genera were included in the data matrix, and *Trypetidomima*, represented by *T. lutea*, formed a clade along with *Bezzimyia* and *Shannoniella*, and an undescribed New Guinean genus (named

as “GenB”). The phylogenetic position of *Trypetidomima* varied among the different analyses performed by the authors, and whether applying equal or implied weighting, *Trypetidomima* was placed as a sister-group of (*Bezzimyia* + (GenB + *Shannoniella*)) or as a sister-group of *Shannoniella*, and therefore forming a Neotropical clade.

IDENTIFICATION KEY TO *TRYPETIDOMIMA* SPECIES

1. General coloration yellow (Figs. 1A-B, Suppl. Figs. 1A-B); male frons with subparallel margins (Fig. 1D, Suppl. Fig. 1D); no intralar setae; prealar not developed; meron with some long setae in single row; section of Costal vein immediately before subcostal break straight; vein M ending at or immediately after wing apex; distance between M and R4+5 at wing margin about 2.5 × length of r-m crossvein; mid tibia with one posterodorsal and one anteroventral seta; hind tibia with one anterodorsal seta *T. lutea* Townsend
- General coloration black (Figs. 2A-B, Suppl. Figs. 2A-B); male frons narrowing gradually towards vertex (Fig. 2C, Suppl. Fig. 2C); intralar setae 1+2; prealar developed; meron with some long setae in irregular rows; section of Costal vein immediately before subcostal break slightly convex; vein M ending before wing apex; distance between M and R4+5 at wing margin as long as length of r-m crossvein; mid tibia with 2 posterodorsal setae and without anteroventral seta; hind tibia with 2 anterodorsal setae *T. fusca* **sp. nov.**

TRYPETIDOMIMA LUTEA TOWNSEND, 1935 (Figs. 1A-G, 2F, 3A-B, and Suppl. Figs. 1A-G, 2F, 3A-B)

Trypetidomima lutea Townsend 1935a: 68 (male description), HOLOTYPE male (USNM), type-locality: Itaquaquecetuba, São Paulo, Brazil; Townsend 1935b: 251 (key to Melanophorini genera); Guimarães 1971: 112 (catalogue); Peris & González-Mora 2007: 54 (catalogue); Mulieri et al. 2010: 66 (comments on habitat), 68 (as “*luteola*”, in error; citation in the key to New World genera of Rhinophoridae); Cerretti & Pape 2012: 287 (phylogenetic relationships among Rhinophoridae genera).

Redescription of Male

Body length: 6.3 mm (5.8-7.0) ($n = 3$); wing length: 5.9 mm (5.6-6.3) ($n = 3$).

Color. Body mostly yellow. Head (Fig. 1D, Suppl. Fig. 1D) mostly yellow, with silver pruinosity on lower half of fronto-orbital plate, parafacial, postocular region, gena and postgena; fronto-orbital plate yellow and lustrous on upper half; frontal vitta black; antenna yellow, but third aristomere brown; median occipital sclerite brown with silver pruinosity; proboscis and palpus yellow. Thorax yellow, but brown on scutellum dorsally and on posterior half of anepisternum, with silver pruinosity on katepisternum and anepisternum. Legs yellow, with silver pruinosity on coxae. Wing (Fig. 1G, Suppl. Fig. 1G) infuscated with light brown, and 3 clear (non-infuscated), hyaline spots on cells r4+5, dm and m. Upper and lower calypters entirely infuscated. Halter yellow,

the knob brown. Abdomen yellow, but all tergites with dark brown triangle along mid dorsal line.

Head (Fig. 1D, Suppl. Fig. 1D). Arista about 2.4x length of pedicel; postpedicel 1.4x length of pedicel. Frons with subparallel margins, its width at level of vertex about 0.7x eye width in dorsal view, and about 0.3x head width. No ocellar setae, and without any coverage setulae. Inner vertical seta very strong, reclinate and slightly divergent; no outer vertical seta. Five or 6 frontal setae from upper portion downwards until level of pedicel. Parafacial bare and very narrow. Face short and sunken. Vibrissal angle weakly projected forward. Proboscis and palpus short.

Thorax. Scutum with long, fine sparse ground setulae; no intra-alars; supra-alars 1+2, the posterior postsutural seta short, the prealar absent (the first postsutural supra-alar before wing insertion). Anepimeron setulose on upper portion, with one setula more developed. Katepimeron (barrette) bare. Meron with some long setae in a row. Scutellum with one pair of cruciate apical setae; one pair of posterior lateral setae long, strong and divergent, about 1.5x length of the apicals; no discal setae, but some scattered setulae.

Legs. Mid femur with one developed anteroventral seta on basal third. Mid tibia with one median anterodorsal, one median posterodorsal, one submedian anteroventral and one submedian posteroventral setae. Hind femur with 3-4 long, sparse setae along anteroventral face; 5-6 long, sparse setae along anterodorsal face; 1-3 developed setae on mid third of posteroventral face; and posterodorsal face with one long seta at the apical fourth, and without a preapical seta. Hind tibia with one median anterodorsal seta.

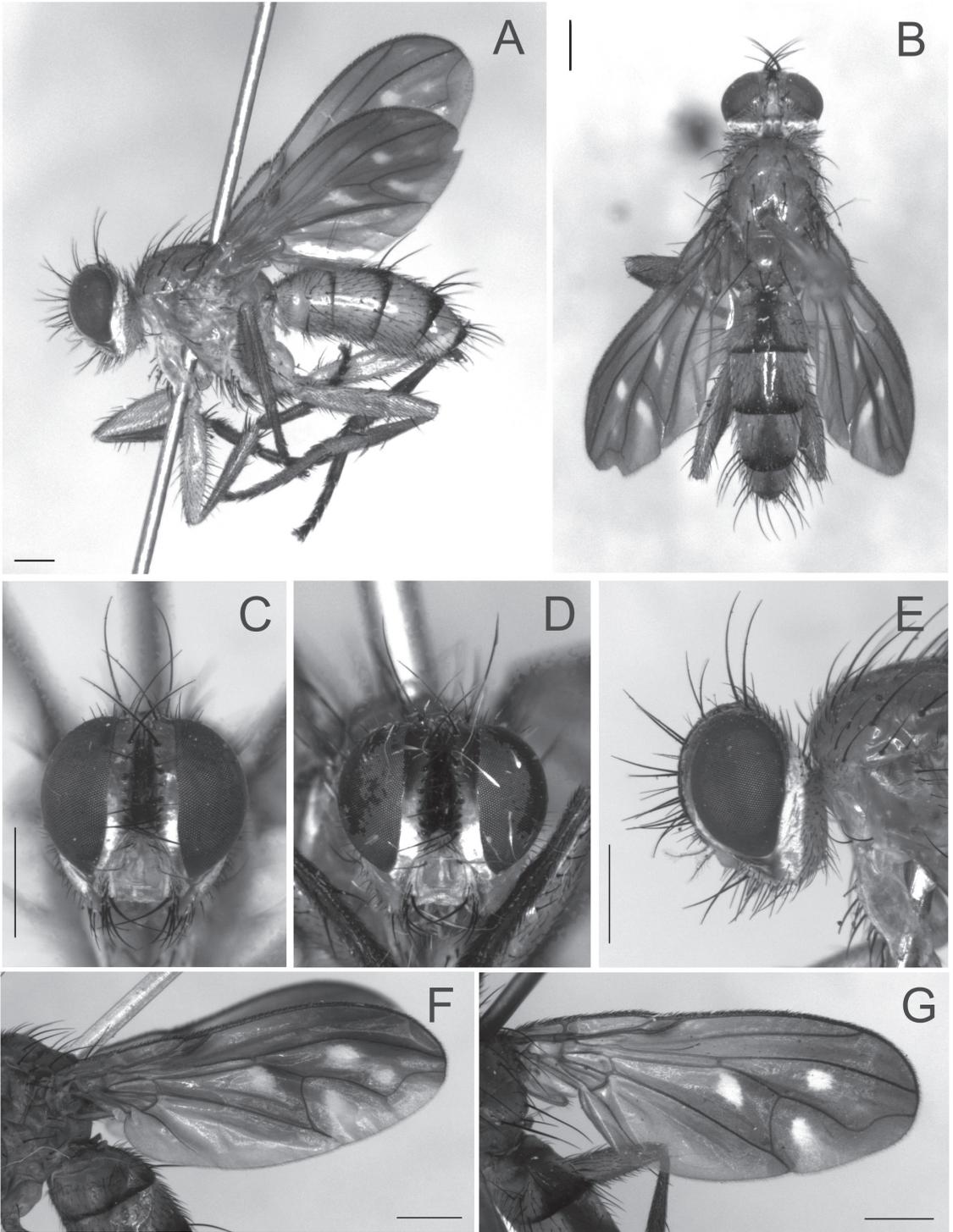


Fig. 1. *Trypetidomima lutea* Townsend. A, female, lateral habitus. B, female, dorsal habitus. C, female head, frontal view. D, male head, frontal view. E, female head, lateral view. F, female wing. G, male wing. (Scale bars = 1 mm) [See supplementary document with color plates online at <http://purl.fcla.edu/fcla/entomologist/browse/>.]

Wing (Fig. 1G, Suppl. Fig. 1G). Costal spine not differentiated. Section of Costal vein immediately before subcostal break straight. R4+5 few setulose at base only ventrally. Section of M between dm-cu crossvein and apical bend about 1.4x length of preceding section (between dm-cu and r-m crossveins). M ending at wing margin at or immediately after wing apex; cell r4+5 open, distance between M and R4+5 at wing margin about 2.5x length of r-m crossvein. R4+5 diverging from R2+3, their distance at wing margin as long as length of dm-cu crossvein. Crossvein r-m slightly thickened (swollen).

Terminalia (Figs. 3A-B, Suppl. Figs. 3A-B). Cercal plate, in posterior view (Fig. 3A), broadening downwards to mid level and then narrowing to form an acuminate apex; cerci not fused medially. Surstylus tongue-shaped, very broad and rounded in lateral view, and placed ventrally to the epandrium (Fig. 3B, Suppl. Fig. 3B). In posterior view, surstyli slightly convergent, and with subtruncate apex (Fig. 3A, Suppl. Fig. 3A). Pregonite developed, elongate (much longer than broad), with 2 long setulae at apex (Fig. 3B, Suppl. Fig. 3B); pregonites neither fused to hypandrium nor each other. Postgonite developed, elongate, tapering from middle and with its apex curved downwards, with a long setula on apical third (Fig. 3B, Suppl. Fig. 3B). Distiphallus at apex with numerous sclerotized spinules (Fig. 3B, Suppl. Fig. 3B).

Female (Figs. 1A-C, 1E-F, and Suppl. Figs. 1A-C, 1E-F)

Differs from male as follows: Body length: 5.8 mm (5.3-6.6) ($n = 8$); wing length: 5.9 mm (5.2-6.5) ($n = 7$). Wing (Fig. 1F, Suppl. Fig. 1F) infuscated, but 4 clear (non-infuscated), hyaline spots on cells r4+5, dm and m; cell r4+5 with 2 spots which seem partially fused; all spots slightly larger than in males; some specimens have one small spot on cell r2+3. *Thorax*. Katapimeron (barrette) bare (but one single specimen from Paranapiacaba with 1-2 setulae). Legs. Fore tarsus compressed. Wing. R1 with 1-2 short setulae at end of apical bend dorsally.

Type Material Examined

HOLOTYPE male (USNM) labeled "Itq. 27.VII"; "Type / Ht [male symbol]" [red label]; "Townsend / Genotype / Collection"; "Trypetidomima / lutea TT. / [male symbol] / Det. CHTT". Specimen in excellent condition.

Additional Material Examined

BRAZIL: Rio de Janeiro: Itatiaya [Itatiaia], 700 m, xi.1947, W. Zikán col. (1 female, MNRJ); Rio de Janeiro, Corcovado, viii.1960, Seabra e

Alvarenga col. (1 male, DZUP); São Paulo: Boracéia [Salesópolis], Est. Biol. Boracéia, malaise, 21.v-28.vi.2008, Nihei, Figueiredo & Andrade col. (1 female, MZSP); C. Jordão [Campos do Jordão], 1200m, 26.x.1962, L.T.F., L.T., Rabello & Dente col. (1 male, MNRJ); Campos da Serra, Cach. M'boy Guassú [Cachoeira Embu-Guaçu], xii.1940, D'Amico col. (1 female, MNRJ); Ibiúna, 25.vii.1965, C.G. Froehlich col. (1 female, MZSP); Paranapiacaba [Santo André], REBIO [Reserva Biológica] Alto da Serra de Paranapiacaba, malaise, 22.iii-19.iv.2011, Moll & Nihei col. (2 females, MZSP); Salesópolis, Est. Biol. Boracéia, malaise, 21.v-28.vi.2008, Nihei, Figueiredo & Andrade col. (1 male, MZSP), 28.vi-02.viii.2008, Nihei, Andrade & Moll col. (1 male, 2 females, MZSP), 02.viii-01.ix.2008, Nihei, Figueiredo & Leite col. (1 male, 4 females, MZSP), 24.xii.2008-07.i.2009, Nihei col. (1 female, MZSP); São Paulo, Capital, 5.viii.1937, Schvebel col. (1 male, MZSP); São Paulo, S. Cantareira [Serra da Cantareira], i.1945, Barretto col. (1 male, MZSP); São Paulo, Serra da Cantareira, Cuca, 5-9.xii.1940, Trav. e Guim. col. (1 female, MZSP); *Paraná*: Guaratuba, Estr. Castelhanos, Serra do Mar, Arm. Luz (lençol) [light], 600m, 1.ii.2007, J.A. Rafael & P. Grossi col. (1 male, INPA), São José Pinhais, BR 277, Km 54, luminosa [light], 22.iii.1985, C.I.I.F col. (1 male, DZUP), 31.v.1985, C.I.I.F col. (2 males, DZUP).

Distribution

Brazil (States of Rio de Janeiro, São Paulo, and Paraná).

TRYPETIDOMIMA FUSCA SP. NOV.

(Figs. 2A-E, 3C-D, and Suppl. Figs. 2A-E, 3C-D)

Description

Male

Body length: 6.1 mm (5.6-6.7) ($n = 3$); wing length: 5.0 mm (4.7-5.2) ($n = 3$).

Color (Figs. 2A-B, Suppl. Figs. 2A-B). Body mostly black. Head black and widely covered by silver pruinosity; antenna yellow, arista brown; proboscis black; palpus and labellum brown. *Thorax* black, widely covered by silver pruinosity. Legs dark brown with silver pruinosity on coxae; trochanters and apex of femora yellow. Wing (Fig. 2E, Suppl. Fig. 2E) infuscated with light brown, but 2 yellowish anterior areas, one basal (at level of subcostal cell) and one median (from apex of R1 until r-m), besides 3 wide clear (non-infuscated), hyaline spots on cells r4+5, dm and m, and the posterior margin non-infuscated. Upper and lower calypters whitish, but the later with infuscated

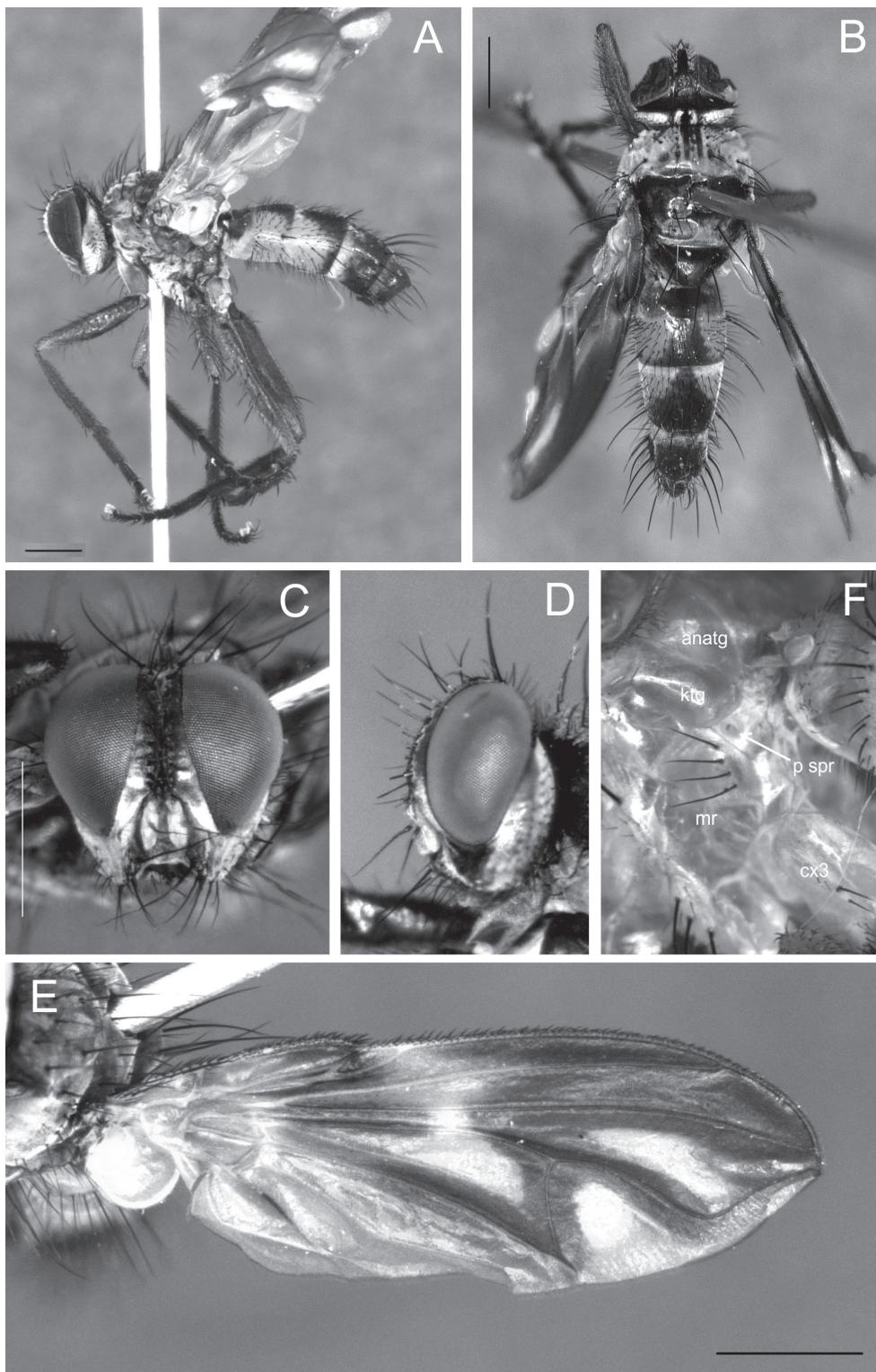


Fig. 2. *Trypetidomima fusca* sp. nov. A, male, lateral habitus. B, male, dorsal habitus. C, male head, frontal view. D, male head, frontal view. E, male wing. *Trypetidomima lutea* Townsend: F, posterior spiracle. (Legends: *anatg*, anatergite; *cx3*, hind coxa; *ktg*, katatergite; *mr*, meron; *p spr*, posterior spiracle) (Scale bars = 1 mm) [See supplementary document with color plates online at <http://purl.fcla.edu/fcla/entomologist/browse>.]

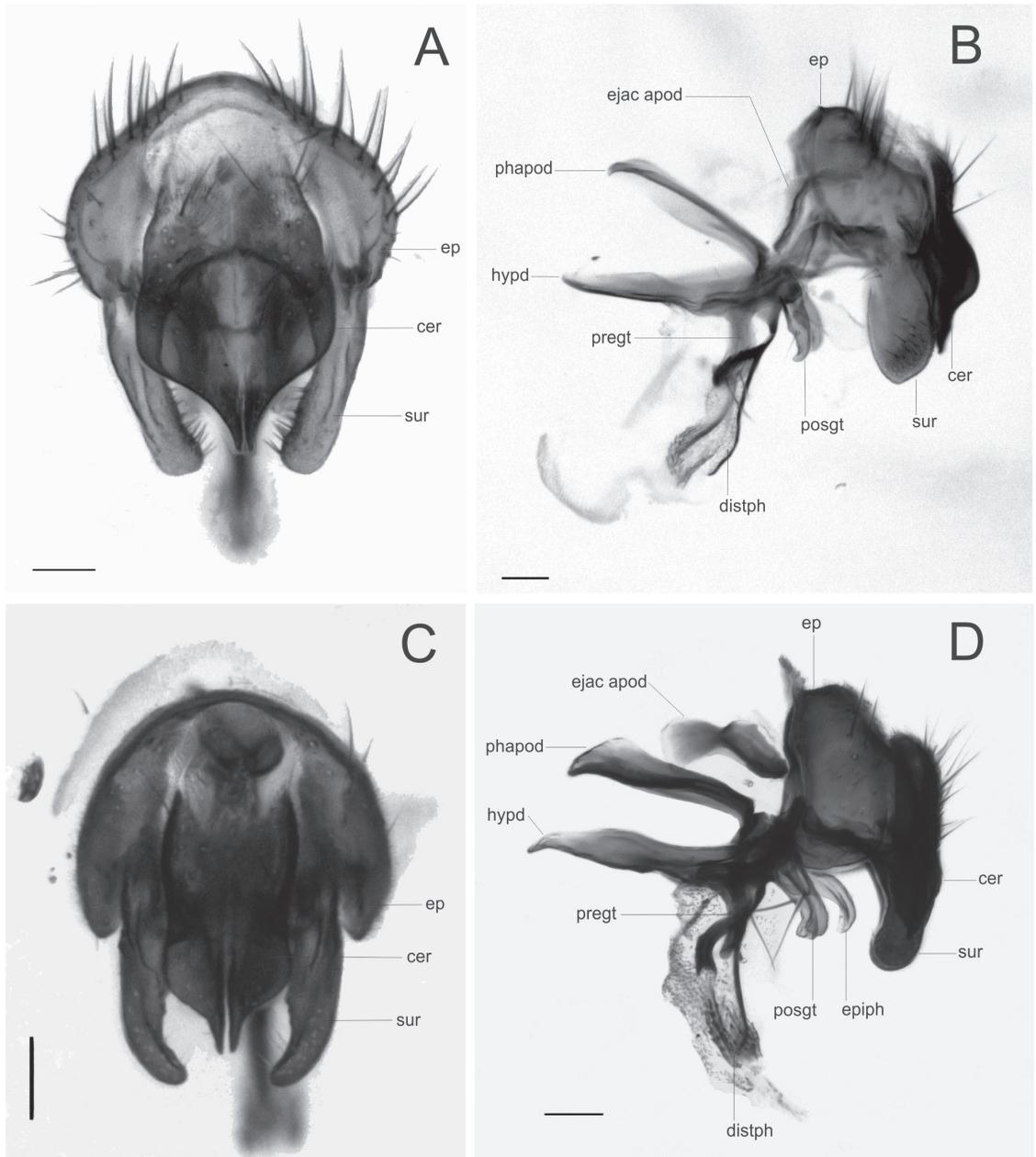


Fig. 3. *Trypetidomima lutea* Townsend. A, male, epandrium, cercal plate and surstyli, posterior view. B, male terminalia, lateral view. *Trypetidomima fusca* **sp. nov.** C, male, epandrium, cercal plate and surstyli, posterior view. D, male terminalia, lateral view. (Legends: *cer*, cercal plate; *distph*, distiphallus; *ejac apod*, ejaculatory apodeme; *ep*, epandrium; *epiph*, epiphallus; *hypd*, hypandrium; *phapod*, phallapodeme; *pregt*, pregonite; *posgt*, postgonite; *sur*, surstyli) (Scale bars: 0.1 mm) [See supplementary document with color plates online at <http://purl.fcla.edu/fcla/entomologist/browse>.]

border. Halter yellow. Abdomen mostly yellow, but syntergite 1+2 and tergite 3 with dark brown triangle along mid dorsal line, tergite 4 almost entirely dark brown, its anterior margin yellow laterally, and tergite 5 entirely dark brown.

Head (Figs. 2C-D, Suppl. Figs. 2C-D). Arista about 2.8x length of pedicel; postpedicel 1.4x length of pedicel. Frons narrowing gradually towards the vertex, its width at level of vertex about 0.5x eye width in dorsal view, and about

0.2 × head width. Ocellar setae present but weak, accompanied by some few coverage setulae. Inner vertical setae strong, reclinate and slightly divergent; no outer vertical seta. Eight or 9 frontal setae from upper portion downwards until level of pedicel. Vibrissal angle not projected forward. Proboscis and palpus short.

Thorax. Scutum with long, fine ground setulae; intra-alars 1+2; supra-alars 1+2, prealar present (first postsutural supra-alar). Anepimeron setulose on both upper and lower portions, with one developed seta. Katepimeron (barrette) bare. Meron with several long setae in irregular rows. Scutellum with one pair of strong cruciate apical setae; one pair of anterior lateral setae long, strong and divergent, about 1.3 × length of the apicals; no discal setae, but some setulae developed.

Legs. Mid femur with 3 developed anteroventral setae on basal half. Mid tibia with one median anterodorsal, 2 posterodorsal, one submedian posterior seta. Hind femur with 3-4 long, sparse setae along anteroventral face; 5-6 long, sparse setae along anterodorsal face; 4 developed setae on mid third of posteroventral face; and posterodorsal face with one long seta at the apical fourth and one preapical seta (this later located between posterodorsal and dorsal faces). Hind tibia with 2 anterodorsal setae.

Wing (Fig. 2E, Suppl. Fig. 2E). Costal spine weak. Section of Costal vein immediately before subcostal break slightly convex. R4+5 few setulose at base dorsally and ventrally. Section of M between dm-cu crossvein and apical bend about 1.5 × length of preceding section (between dm-cu and r-m crossveins). M ending at wing margin before wing apex; cell r4+5 open (but closed in one specimen with M finishing at end of R4+5), distance between M and R4+5 at wing margin as long as length of r-m crossvein. R4+5 diverging from R2+3, their distance at wing margin as long as length of dm-cu crossvein. Crossvein r-m normally developed (not thickened).

Terminalia (Figs. 3C-D, Suppl. Figs. 3C-D). Cercal plate narrow, in posterior view (Fig. 3C, Suppl. Fig. 3C), with subparallel margins and then abruptly forming an acuminate apex; cerci not fused medially. Surstylus broad and curved in lateral view, the anterior margin concave (Fig. 3D, Suppl. Fig. 3D); surstylus placed posteroventrally to the epandrium. In posterior view, surstyli straight but the apex distinctly curved inwards (Fig. 3C, Suppl. Fig. 3C). Pregonite developed, elongate (much longer than broad), with 2 long setulae at apex (Fig. 3D, Suppl. Fig. 3D); pregonites neither fused to hypandrium nor each other. Postgonite developed, elongate, not tapering from middle, with its enlarged apex curved downwards, with a very long setula on middle (Fig. 3D, Suppl. Fig. 3D). Distiphallus at apex with numerous sclerotized spinules (Fig. 3D, Suppl. Fig. 3D).

Female

Differs from male as follows: Body length: 5.3 mm (5.0-5.5) ($n = 2$); wing length: 5.1 mm (4.8-5.4) ($n = 2$). Color: Abdomen mostly dark brown, but the syntergite 1+2 and tergite 3 with lateral yellow spots. Head: Frons with subparallel margins, its width at level of vertex about 0.8x eye width in dorsal view, and about 0.3 × head width. Seven frontal setae from upper portion towards level of pedicel. Legs: Fore tarsus compressed.

Type Material Examined

HOLOTYPE male (MZSP), "Brasil, SP [São Paulo state], Paranapiacaba [Santo André] / REBIO [Reserva Biológica] Alto da Serra de / Paranapiacaba – malaise /S 23° 46' 46"-W 46° 18' 29"/ 22.iii-19.iv.2011/Moll, Priscylla & Nihei, Silvio" (printed white label); "Holótipo" (printed red label). PARATYPES: same as holotype, but 19.iv-23.v.2011, Moll & Gudín col. (1 male, 2 females, MZSP) (this male dissected for the study of terminalia); Salesópolis, Est. Biol. Boracéia, 24.xi.2008-07.i.2009, malaise, Nihei col. (1 male, MZSP), 23-29.xi.2008, luz [light], F. Fernandes col. (1 male, MZSP).

Type Locality

Paranapiacaba district, Santo André, São Paulo state, Brazil.

Distribution

Brazil (State of São Paulo).

Etymology

The species name "fusca" is a Latin adjective and refers to the dark general coloration of the body.

Remarks

This is the second species in the Neotropical rhinophorid genus *Trypetidomima*, which has been recognized as monotypic since 1935 when Townsend first described the genus and its genotype. This new species joins the other 18 Neotropical species. This still represents only a fraction (12%) of the Rhinophoridae of the world and is significantly low to a region so diverse for any taxon. As for the other monotypic genus *Shannoniella*, it will soon be added a second species: a new Brazilian species was discovered and is being described (Nihei et al., in prep). These still incipient studies have demonstrated that the actual Neotropical Rhinophoridae diversity is much greater than the currently known. The most recent publi-

cations since the last studies by Townsend in the 1930's added 15 species (14 of them new) and the small number of studies have been restrict to an equally small number of countries and localities. Besides increasing the collecting efforts over several countries and environments in South America, The obvious solution is to boost the training of new local taxonomists in the group, which would consequently increase the collecting efforts over several countries and environments in South America. Nevertheless, none of this will happen if taxonomy keeps being devalued by funding agencies and the governance in control of universities and natural history museums.

ACKNOWLEDGMENTS

Thanks to the curators for the loan of studied material: Augusto L. Henriques (INPA), Carlos J.E. Lamas (MZSP), Cátia Melo-Patiu (MNRJ) and Claudio J.B. Carvalho (DZUP). Special thanks to Norman Woodley and Torsten Dikow (USNM) for the facilities and kind assistance during my visit. Financial support from FAPESP (proc. n. 2007/50836-7 and 2013/05131-6).

REFERENCES CITED

- BEDDING, R. A. 1973. The immature stages of Rhinophorinae (Diptera: Calliphoridae) that parasitise British woodlice. *Trans. R. Entomol. Soc. London* 125: 27-44.
- CERRETTI, P., AND PAPE, T. 2012. Phylogenetics and taxonomy of *Ventrops* – the largest genus of Afro-tropical Rhinophoridae (Diptera). *Invertebr. Syst.* 26: 274-292.
- CROSSKEY, R. W. 1977. A review of the Rhinophoridae (Diptera) and a revision of the Afrotropical species. *Bull. British Mus. Nat. Hist. (Entomol.)* 36: 1-66.
- CUMMING, J. M., AND WOOD, D. M. 2009. Adult morphology and terminology, pp. 9-50. *In* B. V. Brown, A. Borkent, J. M. Cumming, D. M. Wood, N. E. Woodley and M. A. Zumbado [eds.], *Manual of Central American Diptera*, vol.1. NRC Research Press, Ottawa.
- HENNIG, W. 1973. Ordnung Diptera (Zweiflügler). *Handbuch der Zoologie* 4(2)2/31: 1-337.
- GUIMARÃES, J. H. 1971. 104. Family Tachinidae, vol. 104, 333 pp. *In* A catalogue of the Diptera of the Americas South of the United States. Museu Zool., Univer. São Paulo, São Paulo.
- KUTTY, S. N., PAPE, T., WIEGMANN, B. M., AND MEIER, R. 2010. Molecular phylogeny of the Calyptratae (Diptera: Cyclorrhapha) with an emphasis on the superfamily Oestroidea and the position of Mystacinobiidae and McAlpine's fly. *Syst. Entomol.* 35: 614-635.
- MULIERI, P. R.; PATITUCCI, L. D.; MARILUIS, J. C., AND PAPE, T. 2010. Long-distance introduction: first New World record of *Stevania deceptor* (Loew) and a key to the genera of New World Rhinophoridae (Diptera). *Zootaxa* 2524: 66-68.
- PAPE, T. 1986. A phylogenetic analysis of the woodlouse-flies (Diptera, Rhinophoridae). *Tijdschr. Entomol.* 129: 15-34.
- PAPE, T. 1992. Phylogeny of the Tachinidae family-group (Diptera: Calyptratae). *Tijdschr. Entomol.* 135: 43-86.
- PAPE, T. 1998. Rhinophoridae, pp. 679-689 *In* L. Papp and B. Darvas [eds.], *Contributions to a Manual of Palaearctic Diptera*. Science Herald, Budapest.
- PAPE, T. 2010. Rhinophoridae, pp. 1337-1341 *In* B. V. Brown, A. Borkent, J. M. Cumming, D. M. Wood, N. E. Woodley and M. A. Zumbado [eds.], *Manual of Central American Diptera*, vol. 2. NRC Research Press, Ottawa.
- PAPE, T., AND ARNAUD, P. H. JR. 2001. *Bezzimyia* – a genus of New World Rhinophoridae (Insecta, Diptera). *Zool. Scr.* 30: 257-297.
- PAPE, T., WOLFF, M., AND AMAT, E. C. 2004. Los califóridos, éstridos, rinofóridos y sarcófágidos (Diptera: Calliphoridae, Oestridae, Rhinophoridae, Sarcophagidae) de Colombia. *Biota Colombiana* 5 (2): 201-208.
- PAPE, T., BLAGODEROV, V. AND MOSTOVSKI, M. B. 2011. Order Diptera Linnaeus, 1758. *In* Z.-Q. Zhang [ed.], *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*. *Zootaxa* 3148: 222–229.
- PERIS, S. V., AND GONZÁLEZ-MORA, D. 2007. Claves de identificación para los géneros de Calliphoridae del mundo. Subfamilias con vena *remigium* desnuda: Subfamilia Rhinophorinae (Diptera, Calliphoridae). *Bol. Real Soc. Espan. Hist. Nat. (Sec. Biol.)* 102 (1-4): 35-60.
- STUCKENBERG, B. R. 1999. Antennal evolution in the Brachycera (Diptera) with a reassessment of terminology relating to the flagellum. *Studia Dipterologica* 6: 33-48.
- TOWNSEND, C. H. T. 1935a. New muscoid genera, mainly from the Neotropical Region. *Rev. Entomol.* 5: 68-74.
- TOWNSEND, C. H. T. 1935b. *Manual of Myiology*, part II. Charles Townsend & Filhos, Itaquaquecetuba, 289 pp.
- TOWNSEND, C. H. T. 1938. *Manual of Myiology*, part VI. Charles Townsend & Filhos, Itaquaquecetuba, 242 pp.
- TOWNSEND, C. H. T. 1939. New striking melanophorid tribe and gymnosomatid genera from Rio de Janeiro (Diptera, Oestromuscaria). *Rev. Entomol.* 10: 249-254.
- WOOD, D. M. 1987. Rhinophoridae, pp. 1187-1191 *In* J. F. McAlpine, B. V. Peterson, G. E. Shewell, H. J. Teskey, J. R. Vockeroth and D. M. Wood [eds.], *Manual of Nearctic Diptera*, vol. 2. Agric. Canada Res. Branch, Monograph 28, Ottawa.