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REVISION OF THE GENUS *PHYSOCLYPEUS* HENDEL, 1907 (DIPTERA, LAUXANIIDAE), WITH DESCRIPTION OF SEVEN NEW SPECIES

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ABSTRACT

The genus *Physoclypeus* Hendel, 1907 has its distribution restricted to the Neotropical region. In this study, its species have been redescribed, three new combinations have been proposed, three lectotypes have been designated, seven new species have been described, and an identification key to the species is presented. An updated list of species of *Physoclypeus* is presented as: *P. annulatus* Hendel, 1925; *P. coquilletti* (Hendel, 1908); *P. farinosus* (Hendel, 1925); *P. flavus* (Wiedemann, 1830); *P. hendeli* sp. nov. (Type locality, Jamaica, N. Irish Town); *P. lineatus* (Williston, 1896) new comb.; *P. montanus* (Becker, 1919) new comb.; *P. plaumanni* sp. nov. (Type locality, Brazil, Santa Catarina); *P. risaraldensis* sp. nov. (Type locality, Colombia, Risaralda); *P. saltensis* sp. nov. (Type locality, Argentina, Salta); *P. scutellatus* (Curran, 1926) new comb.; *P. unimaculatus* sp. nov. (Type locality, Mexico, Vera Cruz); *P. vitattus* sp. nov. (Type locality, Brazil, Santa Catarina) and *P. zebrinus* sp. nov. (Type locality, Costa Rica, Limón).

KEYWORDS: Diptera; Lauxaniidae; *Physoclypeus*; Neotropical Region; new species.

INTRODUCTION

The genus *Physoclypeus* Hendel, 1907 has its distribution restricted to the Neotropical region. Hendel (1907) proposed the genus to include the species *Chlorops flavus* Wiedemann, 1830, upon analyzing a specimen from Montevideo, Uruguay. Since then, three other species have been described: Hendel (1908) included in the genus *P. coquilletti*, a new name proposed for *Lauxania lutea* Coquillett (previously occupied by *Lauxania lutea* Wiedemann); Hendel (1925) described two new species, *P. annulatus*

and *P. farinosus*, from specimens from Bolivia. Other species that were described in other genera but in this revision they are included in *Physoclypeus* are *Sapromyza lineata*, described by Williston (1896) from St. Vincent (West Indies); *Sapromyza montana*, described by Becker (1919) from Ecuador; and *Calliope scutellata*, described by Curran (1926) from Puerto Rico. Few data are available concerning the biology of these flies. Mello & Silva (2007) presented some data about the ultrastructural morphology of the labellum of *P. lineatus* and Silva & Mello (2008) presented data of *P. farinosus* occurring in the flowerheads of Astera-

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ceae in Brazil. Seven new species of *Physoclypeus* are described here, three new combinations are proposed, three lectotypes are designated and an identification key is presented for these species along with illustration of the principal diagnostic features.

MATERIAL AND METHODS

The specimens used in this study are housed in the following institutions: American Museum of Natural History, New York, USA (AMNH); The Bohart Museum, Department of Entomology, University of California, Davis, USA (UCD); California State Collection of Arthropods, Sacramento, USA (CSCA); Carnegie Museum of Natural History, Pittsburgh, USA (CMNH); "Instituto de Investigación de Recursos Biológicos Alexander von Humboldt", Bogotá, Colombia (IAHB); "Instituto Nacional de Biodiversidad", Santo Domingo de Heredia, Costa Rica (INBC); "Museu de Zoologia da Universidade de São Paulo", São Paulo, Brazil (MZUSP); Museum of Zoology, Lund University, Lund, Sweden (MZLU); National Collection of Insects, "Museum National d'Histoire Naturelle", Paris, France (MNHN); United States National Entomological Collection, The National Museum of Natural History, Washington, DC, USA (USNM); Utah State University Insect Collection, Logan, USA (EMUS); "Naturhistorisches Museum Wien", Vienna, Austria (NHMW); The Natural History Museum, London, England (BMNH); Walter Rossi Collection, "Università degli Studi dell'Aquila", L'Aquila, Italy (WRC).

This study has been greatly improved with data from three studies that extensively collected insects in Brazil, through collections made by Dr. Thomas Lewinsohn (Lewinsohn, 1991; Almeida *et al.*, 2004, 2006) and from Project "BIOTA/Hymenoptera, Isoptera" (Amorim *et al.*, 2006; Silva & Yabuchi, 2006), and in Colombia, by Dr. Michael Sharkey's project (Sarmiento, 2000; Campos & Fernández, 2002; Sharkey, 2006), which made available their material for dipterists. The Brazilian material is housed in MZUSP and the Colombian at IAHB.

While visiting the collections of AMNH, BMNH, MNHN and NHMW, the junior author has studied and labeled specimens as lectotypes (designated herein, see below); also, the holotype of *P. farinosus* was labeled as such. The examination of the type material led to the proposed new combinations of species previously in *Sapromyza* (*S. lineata* and *S. montana*) and *Calliope* (*C. scutellata*).

For the terminalia analysis the post-abdomen was removed and placed in a 10% KOH solution to

soften, then rinsed in distilled water and dehydrated in an increasing ethanol series (30%, 50%, 70% and 95%). It was then bleached with lactophenol and stored in a vial with glycerin, which was fixed to the insect pin.

The analysis and illustrations were made using a Leica DM 2500 microscope and Leica MZ 12,5 stereomicroscope; both equipped with camera lucida.

The terminology follows McAlpine (1981) and Shewell (1987).

RESULTS

Physoclypeus Hendel, 1907

Physoclypeus Hendel, 1907: 226. Type species, *Chlorops flavus* Wiedemann (orig. des). Ref. – Hendel, 1908: 19; 1925: 120 (key); Malloch, 1933: 355; Stuckenberg, 1971: 510.

Redescription

Head: frons rectangular, wider than long. Face convex, without spots. Eye oval or rounded, posteroventral outline slightly concave. Antenna: scape shorter than pedicel; arista pubescent or short plumose. Occiput yellowish brown. Chaetotaxy: orbital setae reclinate, posterior seta larger than anterior; ocellar seta weak, divergent; postocellar seta strong, convergent; outer vertical seta divergent; inner vertical seta reclinate.

Thorax: Mesonotum convex; scutellum trapezoidal, posterior region with a central longitudinal groove. Chaetotaxy: dorsocentral setae arranged 0+2 or 0+3; 1 postpronotal seta; 2 notopleural setae; intra-alar seta absent; 2 supra-alar setae; 2 postalar setae; 1 acrostichal seta; 1 anepisternal seta; 1 to 2 katepisternal setae; anepimeron bare; 2 scutellar setae. *Legs*: yellow; tarsomeres 3-5 blackish to yellow. *Wing*: basal part of R_s bare; crossvein *r-m* in the middle of discal cell; crossvein *dm-cu* in the basal middle of cell r_{4+5} almost 4 times longer than *r-m*; R_{2+3} diverging from R_{4+5} in the apex; longitudinal veins R_{4+5} and M_1 parallel; CuA_2+A_1 short, ending before wing margin; A_2 ending far from wing margin.

Abdomen: yellow to brown. Male terminalia: epandrium narrow to round in apex, aedeagus with two or more inner teeth. Female terminalia with three sclerotized spermathecae.

Updated list of species of *Physoclypeus*: *P. annulatus* Hendel, 1925; *P. coquilletti* (Hendel, 1908); *P. farinosus* (Hendel, 1925); *P. flavus* (Wiedemann, 1830); *P. hendeli* sp. nov. (Type locality, Jamaica, N. Irish Town); *P. lineatus* (Williston, 1896) new comb.; *P. montanus* (Becker, 1919) new comb.; *P. plaumanni* sp. nov. (Type locality, Brazil, Santa Catarina); *P. risaraldensis* sp. nov. (Type locality, Colombia, Risaralda); *P. saltensis* sp. nov. (Type locality, Argentina, Salta); *P. scutellatus* (Curran, 1926) new comb.; *P. unimaculatus* sp. nov. (Type locality, Mexico, Vera Cruz); *P. vitattus* sp. nov. (Type locality, Brazil, Santa Catarina) and *P. zebrinus* sp. nov. (Type locality, Costa Rica, Limón).

Physoclypeus annulatus Hendel, 1925

annulatus Hendel, 1925: 121. Type locality, Bolivia, Mapiro, Lorenzopata, 2000 m.

Diagnosis

This species is distinguished from other congeners by the following combination of characters: the arista pubescent; dorsocentral setae arranged 0+3; 1 katepisternal seta; pleura dark brown; dark lateral basal spots in abdominal tergites 4-6; abdominal tergites 5-6 with apical margins darker and also with a black central stripe.

Redescription

Head: vertex rounded, ocellar triangle brown, close to vertex. Frons brownish to yellow, two central pale blackish stripes; rectangular, wider than long; anterior margin weakly concave in dorsal view; anterior region almost in the same plane as face. Face convex, oral margin wide. Parafacial and gena narrow. Eye oval, higher than wide, posteroventral outline slightly concave. Antenna: first flagellomere 1.5 times longer than wide, apex rounded, with short dorsal pubescence; arista pubescent. Occiput brown. Chaetotaxy: outer vertical seta 2/3 the length of inner vertical seta.

Thorax: Mesonotum brown, arched; pleura dark brown; scutellum short, flat. Chaetotaxy: 0+3 dorsocentral setae; 1 katepisternal seta. *Legs*: yellow, with basal 2/3 of femora and apical ring in mid and hind tibiae brown; subbasal ring in mid tibia and tarsomeres 3-5 brownish. *Wing*: yellowish hyaline, with a spot between apex of *Sc* and *R1*; veins yellow, bare;

longitudinal veins parallel; crossveins *r-m* and *dm-cu* before the middle of adjacent cells. Halter yellow.

Abdomen: yellow; base of the tergites with lateral brown areas after tergite 4; with a central brown stripe after tergite 5; anterior margin brown after tergite 5.

Distribution: Bolivia.

Material studied: BOLIVIA: Lectotype male, paralectotype female; Mapiro, Lorenzopata, 2000 m, Hendel col, 10.v.1903 (NHMW).

Comments: The syntypes in the NHMW collection were examined and a male labelled "Bolivia, Mapiro, 2000 m, 10.v.03, Lorenzopata/Coll. Hendel" is designated lectotype; a female with the same labels is designated paralectotype.

Physoclypeus coquilletti (Hendel, 1908) (Figs. 1A-J)

lutea (Coquillett, 1902: 179; *Lauxania*) (previously occupied by *Lauxania lutea* Wiedemann, 1830: 472).

coquilletti (Hendel, 1908: 30; *Lauxania* (a new name for *Lauxania lutea* Coquillett)). Type locality, United States, Florida, Lake Worth and Biscayne Bay. Ref. – Curran, 1928: 83.

Diagnosis

This species is distinguished from other congeners by the following combination of characters: arista short plumose; 0+2 dorsocentral setae; abdomen spotted medially in the basal regions of tergites 3 to 6.

Redescription

Head: (Figs. 1A-B) ocellar triangle brownish yellow. Frons brownish, without spot or stripe. Face yellow. Parafacial narrow, yellow. Gena narrow, brownish. Eye oval, higher than wide; posteroventral outline almost straight. Antenna: first flagellomere 1.5 times longer than wide; arista short plumose. Occiput brown. Chaetotaxy: outer vertical seta 2/3 the length of inner vertical seta.

Thorax: mesonotum brownish, unspotted; scutellum triangular; pleura yellow. Chaetotaxy: 0+2 dorsocen-

tral setae; 2 katepisternal setae. *Legs*: yellow; tarsomeres 3-5 dark. Fore and mid coxae with 4 anterodorsal setae; hind coxa, 2 dorsal setae; fore femur, 3 apical ventral setae, 1 row of dorsal setae; mid femur, 1 row of dorsal setae, 1 basal ventral seta; hind femur, 1 api-

cal dorsal seta; fore tibia, 1 apical dorsal seta, 1 apical ventral seta; mid tibia, 1 apical dorsal seta, 1 apical ventral seta; hind tibia, 1 apical dorsal seta, 1 apical ventral seta. *Wing* (Fig. 1C): yellowish hyaline, without spot. Halter brownish yellow.

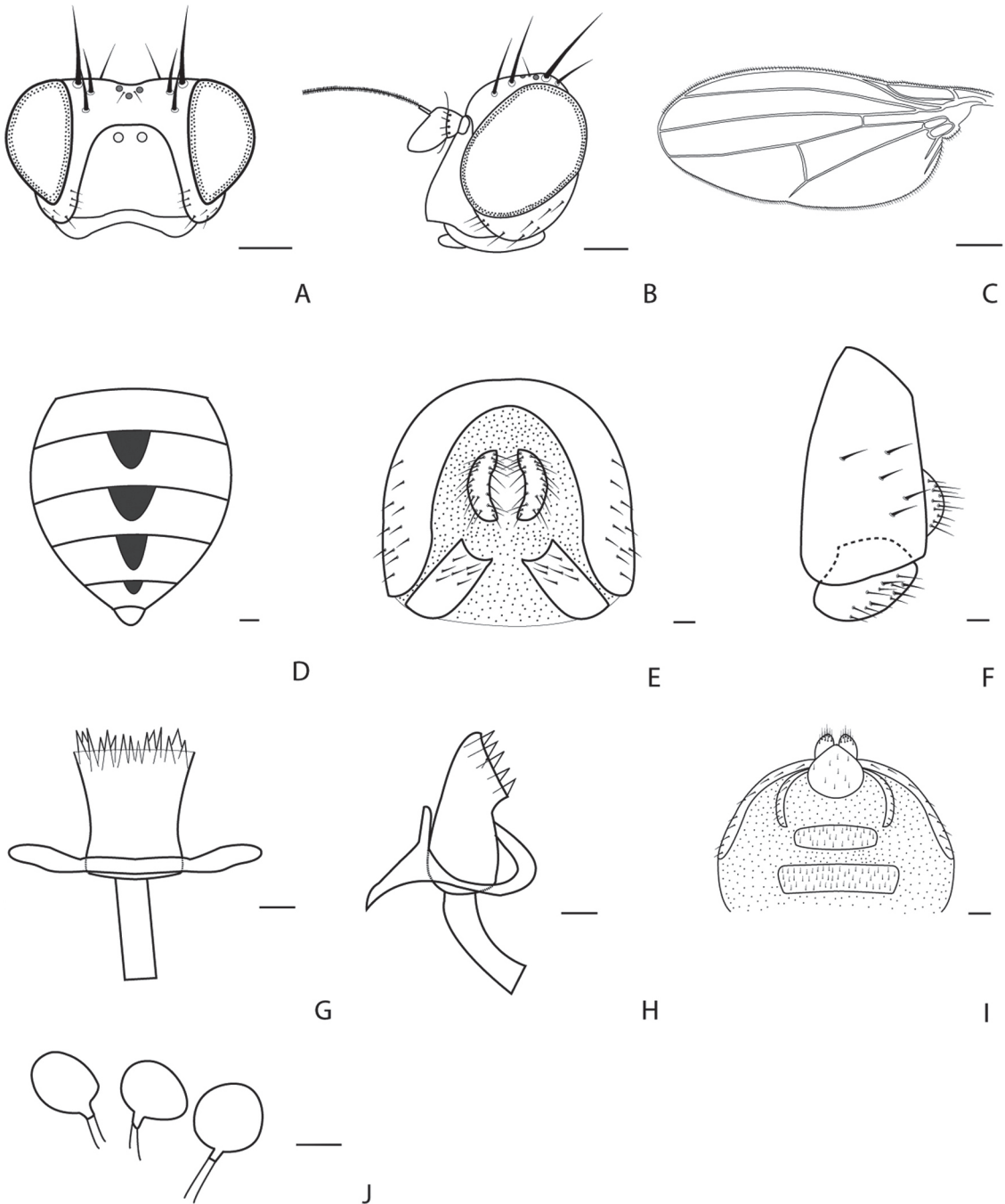


FIGURE 1: A-J. *Physoclypeus coquilletti*. A, head, frontal view; B, head, lateral view; C, wing; D, abdomen, dorsal view; E, epandrium, dorsal view; F, epandrium, lateral view; G, aedeagus, ventral view; H, aedeagus, lateral view; I, female terminalia, ventral view; J, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

Abdomen: (Fig. 1D) brownish, tergites 3 to 6 with a spot medially in the basal region. Male terminalia: epandrium horseshoe-shaped, apex narrow in dorsal view (Fig. 1E); basal region slender and apex convex in lateral view (Fig. 1F); surstylus articulated with epandrium, well developed, apical margin concave; membranous region between cercus and epandrium, narrow; aedeagus (Figs. 1G-H) well developed, ventral apex with many inner teeth, in lateral view apical region with a weak concavity; aedeagal apodeme long; hypandrium as a complete ring, narrow, around ventral base of aedeagus, with a medial cylindrical projection directed downward; cercus well developed. Female terminalia: (Fig. 1I) tergite 7 small, arch-shaped, sternite 7 slightly smaller, tergite and sternite 7 not fused; sternite 8 broad, drop-shaped, strongly sclerotized; hypoproct well developed; epiproct not observed; cercus long. Three spherical spermathecae with smooth surface (Fig. 1J).

Distribution: United States, Puerto Rico, Dominican Republic, Cuba, Dominica and Guatemala.

Material studied: UNITED STATES: *Florida.* Lake Worth, Mrs. Slosson col., type no 6334, syntype ? (USNM); Biscayne Bay, Mrs. Slosson col., 1 male (USNM); R. Palm Park, 1.ii.1938, A.L. Melander col., A.L. Melander collection 1961, 1 male (USNM); Sebring, 24.xii.1952, H.V. Weems Jr col., 1 male (USNM); Orange Co., Rock Springs, 21.iv.1970, W.W. Wirth col., 1 male (USNM). DOMINICAN REPUBLIC: *Pedernales.* La Abeja, 38 km NNW Cabo Rojo, 18°09'N, 71°38'W, 1250 m, John E. Rawlins & Robert L. Davidson col, 15.vii.1987, 4 males, 3 females (CMNH); *idem*, Uper Las Abejas, 38 km Cabo Rojo, (18°09'N, 71°38'W), 1350 m, L. Masner col, 22.vii.1990, mesic deciduous forest, sweeping, 2 males, 3 females (CMNH); *idem*, Barahona Paraíso, 5 km N, 18°01,5'N, 71°11,6'W, 150 m, W.N. Mathis col, 21.iii.1999, 1 male and 1? (USNM). DOMINICA: (W. I.). Trflgr Falls, 1200 m, R.J. Gagne col, 5-6.iv.1966, 1 male (USNM). CUBA: *Sancti Spiritus.* Topes de Collantes, 21°55,2'N, 80°0,2'W, 350 m, Wayne N. Mathis col, 10.xii.1994, 2 males (USNM); *idem*, San Juan Mts, i.1927, Brues col., A.L. Melander collection, 6 males (USNM); *idem*, Columbia, Isle of Pines, Berg & Link col., 29.vi.1950, 1 male and 1 female (USNM). GUATEMALA: Yepoca, H.T. Dalmat col, v.1948, 1 male (USNM).

Comments: Coquillett (1902) described this species based upon two specimens from Florida. The only one available at USNM collection is the one from

Lake Worth; as the specimen was glued by its body underside, it was not possible to determine its sex as Coquillett made no mention on it. The number in the label (6334) does not agree with the one cited by the author in the original description- 6634, but the specimen agrees in all other respects with the descriptions so we assume that this was a lapse of Coquillett while handwriting the label.

Physoclypeus farinosus Hendel, 1925
(Figs. 2A-I)

farinosus Hendel, 1925: 121. Type locality, Bolivia, Sorata, 2300 m. Ref. – Silva & Mello, 2008.

Diagnosis

This species is distinguished from other congeners by the following combination of characters: head with two pale brownish stripes at central frontal region; arista long pubescent; 0+3 dorsocentral setae; wing spotted slightly between apex of *Sc* and *R₁*; abdomen dark, without spots.

Redescription

Head: (Figs. 2A-B) yellowish brown; ocellar triangle brown. Frons yellow, with two pale brownish central stripes. Face yellow. Parafacial and gena narrow, yellowish brown. Eye oval, longer than high; posteroventral outline almost straight. Antenna: first flagellomere two times longer than wide; arista long pubescent. Occiput yellowish brown. Chaetotaxy: ocellar seta weak; outer vertical seta 2/3 length of inner vertical seta.

Thorax: mesonotum arched, yellowish brown, without spot or stripe; pleura yellowish; scutellum trapezoidal with shallow longitudinal apical groove. Chaetotaxy: 0+3 dorsocentral setae; 2 katepisternal setae (anterior smaller and thinner). *Legs:* yellow; tarsomeres 3-5 dark. Fore and mid coxae with 4 anterior dorsal setae; hind coxa, 1 posterior seta; fore femur, 2 rows of posterior setae, 1 row of ventral setae; mid femur, 1 row of ventral setae, 1 row of posterior setae; hind femur, 4 apical dorsal setae, 1 row of ventral setae; fore tibia, 1 apical dorsal seta, 1 apical ventral seta; mid tibia, 1 apical ventral seta; hind tibia, 2 apical ventral setae. *Wing* (Fig. 2C): yellowish hyaline, with a slight dark spot between apex of *Sc* and *R₁*. Halter yellow.

Abdomen: dark brown, without spot or stripe. Male terminalia: epandrium horseshoe-shaped, apex convex and base narrow in dorsal view (Fig. 2D), apical region wide and rounded in lateral view (Fig. 2E); surstylus articulated with epandrium, well developed; membranous region between cercus and epandrium wide; aedeagus (Figs. 2F-G) well developed, apex with many inner teeth; aedeagal apodeme long; hypandrium forming a complete ring, narrow around ventral base of aedeagus, in lateral view with a down-

ward projection; cercus well developed. Female terminalia: (Fig. 2H) segment 7 not fused; tergite 7 small arch-shaped, sternite 7 with a median projection directed towards sternite 8; sternite 8 broad, shield-shaped, strongly sclerotized; hypoproct well developed; epiproct not observed; cercus short, papillate. Three (1+2) spherical spermathecae, smooth surface (Fig. 2I); paired spermathecae with extremely short duct branch from long common duct ending at third spermatheca.

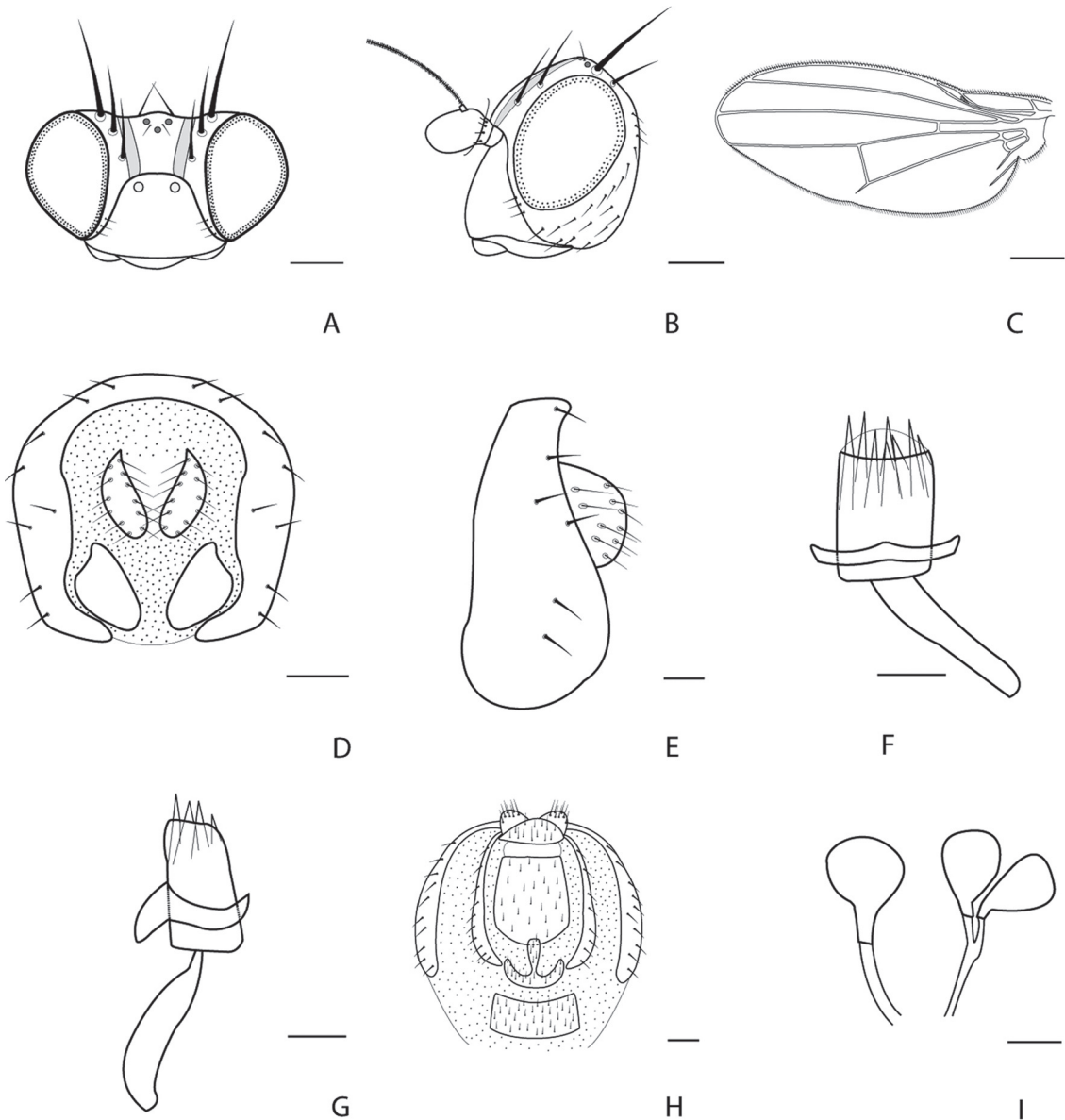


FIGURE 2: A-I. *Physoclypeus farinosus*. A, head, frontal view; B, head, lateral view; C, wing; D, epandrium, dorsal view; E, epandrium, lateral view; F, aedeagus, ventral view; G, aedeagus, lateral view; H, female terminalia, ventral view; I, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

Distribution: Colombia, Brazil, Bolivia and Argentina.

Material studied: BOLIVIA: Sorata, 2300 m, xii.02, holotype male (NHMW). COLOMBIA: *Boyacá*. SFF Iguaque, El Nispero, 5°38'N, 73°31'W, 2730 m, Malaise, P. Reina col., 28.x-14.xi.2001, 2 males and 1 female (IAHB); SFF Iguaque, Qda. Los Francos, 5°25'N, 73°27'W, 2860 m, Malaise, P. Reina col., 2 females (IAHB). BRAZIL: *Minas Gerais*. Grão Mogol, trilha da Tropa, 16°32,08'S, 42°56,22'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 09.xii.1995, 1 female and 3? (MZUSP); *idem*, 16°36,35'S, 42°6,22'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 09.xii.1995, 1? (MZUSP). Joaquim Felício, Serra do Cabral, 17°41,04'S, 44°11,09'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 07.xii.1995, 2 males and 2? (MZUSP); *idem*, 17°41,37'S, 44°11,88'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 03.ix.1996, 3? (MZUSP); *idem*, 17°41,84'S, 44°15,69'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 07.xii.1995, 3? (MZUSP); Vale Córrego do Jucão, 17°41,94'S, 44°16,79'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 06.xii.1995, 3? (MZUSP). S.J. Chapada, Serra da Guiné, 18°06,55'S, 43°44,08'W, P. Prado, T. Lewinsohn, M. Lopes col, 12.xii.1995, 1 male, 1 female and 1? (MZUSP); *idem*, 18°11,29'S, 43°33,98'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 09.ix.1996, 2? (MZUSP); Estr. p/Mendanha, 18°11,44'S, 43°33,98'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 14.xii.1995, 1 male and 4? (MZUSP); Estr. Guinda, 18°11,94'S, 43°42,45'W, T. Lewinsohn, P. Prado, B. Buys col, 17.ii.1995, 2 males (MZUSP). Diamantina, Estr. Cons. Matta, 18°17,58'S, 43°45,05'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 13.xii.1995, 1 male, 1 female and 5? (MZUSP). Santana do Riacho, Serra do Cipó, 19°13,91'S, 43°30,37'W, Lewinsohn, P. Prado, M. Lopes, J. Silva col, 15.xii.1995, 4 males and 3? (MZUSP); *idem*, 19°13,96'S, 43°30,49'W, T. Lewinsohn, P. Prado, Santos, Silva col, 10.ix.1996, 1 male and 1? (MZUSP); *idem*, 19°17,68'S, 43°34'W, T. Lewinsohn, P. Prado, Santos, Silva col, 11.ix.1996, 1? (MZUSP). Ouro Branco, 20°30,23'S, 43°38,09'W, T. Lewinsohn, P. Prado, M. Lopes, J. Silva col, 17.xii.1995, 1 female (MZUSP); *idem*, 20°30,44'S, 43°38,09'W, T. Lewinsohn, P. Prado, B. Buys col, 20.ii.1995, 1? (MZUSP). Ibitipoca, Lima Duarte 21°41,65'S, 43°54,77'W, Almeida, Macedo, Rosa col, 05.iv.1998, 2? (MZUSP); *idem*, 21°42,68'S, 43°53,76'W, Almeida, Macedo, Rosa col, 05.iv.1998, 4 males, 2 females and 6? (MZUSP); *idem*, 21°43,25'S, 43°55,06'W, Almeida, Macedo, Rosa col, 21.vi.1998, 1 male and 2? (MZUSP). Itatiaia, 22°21,96'S, 44°44,23'W, Almeida, Macedo, Rosa col, 17.ii.1998, 3 males and 7?

(MZUSP); *idem*, 22°22,08'S, 44°44,43'W, Almeida, Macedo, Rosa col, 08.iv.1998, 2? (MZUSP). Passa Quatro, 22°25,38'S, 44°59,85'W, Almeida, Macedo, Rosa col, 16.ii.1998, 1? (MZUSP); *idem*, 22°24,91'S, 44°58,85'W, Almeida, Macedo, Rosa col, 09.vi.1998, 1 male and 1 female (MZUSP); *idem*, 22°28,67'S, 45°0,72'W, Almeida, Macedo, Rosa col, 16.ii.1998, 2? (MZUSP). *Espírito Santo*. Baixo Guandu, P.C. Elias col, iv.1970, 2 females (MZUSP). *Rio de Janeiro*. Visconde de Mauá, 22°9,8'S, 44°27,53'W, Almeida, Macedo, Rosa col, 06.v.1998, 1 male and 3? (MZUSP); *idem*, 22°12,69'S, 44°29,34'W, Almeida, Macedo, Rosa col, 06.v.1998, 1 male, 1 female and 2? (MZUSP); *idem*, 22°14,38'S, 44°29,21'W, Almeida, Macedo, Rosa col, 20.vi.1998, 2 males and 1 female (MZUSP); *idem*, 22°16,24'S, 44°30,47'W, Almeida, Macedo, Rosa col, 06.v.1998, 1 male and 5? (MZUSP); *idem*, 22°17,09'S, 44°31,66'W, Almeida, Macedo, Rosa col, 19.ii.1998, 1? (MZUSP); *idem*, 22°19,23'S, 44°33,5'W, Almeida, Macedo, Rosa col, 06.v.1998, 2 males and 1? (MZUSP); *idem*, 22°19,55'S, 44°36,14'W, Almeida, Macedo, Rosa col, 18.ii.1998, 1? (MZUSP); *idem*, 22°20,35'S, 44°35,52'W, Almeida, Macedo, Rosa col, 07.v.1998, 2 males and 2? (MZUSP); *idem*, 22°21,17'S, 44°34,82'W, Almeida, Macedo, Rosa col, 07.v.1998, 1 male and 1? (MZUSP). Itaguaí, H.S. Lopes col, 22.viii.1964, 1 male (MZUSP). Petrópolis, H.S.Lopes col, 26.iii.1964, 1 male (MZUSP). *São Paulo*. Campos do Jordão, Cidade Azul, xi.1953, L.T.F. & C. Gans col, 3 females (MZUSP); Engenheiro Lefèvre, 1.300 m, L.T.F., Papavero, Rabello, L. Silva & Zanetin col, 28.ix.1962, 1 male (MZUSP); *idem*, L.T.F., L.T., Rabello & Dente col., 26.x.1962, 1 male (MZUSP); Campos do Jordão, 22°40,19'S, 45°40,45'W, Almeida, Macedo, Rosa col, 16.ii.1998, 1? (MZUSP); *idem*, 22°41,39'S, 45°29,79'W, Almeida, Macedo, Rosa col, 11.v.1998, 1 female (MZUSP); *idem*, 22°42,73'S, 45°32,46'W, Almeida, Macedo, Rosa col, 15.ii.1998, 1? (MZUSP). *Paraná*. Rio Negro, i.1929, 1 male (MZUSP). *Santa Catarina*. Matos Costa, 26°27,67'S, 51°13,04'W, Lewinsohn, Prado, Almeida col, 08.x.1995, 2 males and 2 females (MZUSP). Santa Cecília, 26°42,79'S, 50°17,07'W, Lewinsohn, Prado, Macedo col, 17.iv.1995, 1? (MZUSP). Seara, Nova Teutônia, 27°11'S, 52°23'W, 300-500 m, Fritz Plaumann col, vi.1970, 8 males, 3 females and 2? (MZUSP); *idem*, viii.1970, 5 males, 2 females and 1? (MZUSP); *idem*, ix.1970, 4 males, 2 females (MZUSP); *idem*, xii.1970, 1 female (MZUSP); *idem*, ix.1971, 1 male (MZUSP); *idem*, x.1971, 1 male, 1 female (MZUSP); *idem*, vi.1972, 1? (MZUSP). Lages, Estr. de São José do Cerrito, 27°41,88'S, 50°32,56'W, Lewinsohn, Prado, Macedo col, 15.ii.1996, 1 male

and 1? (MZUSP); *idem*, 27°44,42'S, 50°30,73'W, Lewinsohn, Prado, Macedo col, 15.ii.1996, 1 male and 3? (MZUSP). Urupema, Estr. Paniel-Urupema, 27°55,66'S, 50°0,97'W, Lewinsohn, Prado, Almeida col, 06.x.1995, 1 female (MZUSP). São Joaquim, 28°13,72'S, 49°52,09'W, Lewinsohn, Prado, Macedo col, 15.iv.1995, 1 female (MZUSP). Bom Jardim da Serra, 28°17'S, 49°36,76'W, Lewinsohn, Prado, Macedo col, 14.ii.1996, 2 males and 3? (MZUSP); *idem*, 28°18,09'S, 49°37,03'W, Lewinsohn, Prado, Macedo col, 14.iv.1995, 1 male (MZUSP); *idem*, 28°18,14'S, 49°37,36'W, Lewinsohn, Prado, Macedo col, 13.iv.1995, 1 male and 2 females (MZUSP); Serra Vale do Rio Pelotas, 28°18,71'S, 49°49,06'W, Lewinsohn, Prado, Macedo col, 14.iv.1995, 1 female (MZUSP); Estr. de Santa Bárbara, 28°20,03'S, 49°37,55'W, Lewinsohn, Prado, Macedo, Batista col, 14.ii.1996, 1 male (MZUSP). *Rio Grande do Sul*. Cambará do Sul, 29°3,02'S, 50°6,26'W, Lewinsohn, Prado, Macedo col, 11.ii.1996, 2 males (MZUSP); *idem*, 29°3,17'S, 50°6,07'W, Lewinsohn, Prado, Macedo col, 29.ix.1995, 2? (MZUSP); *idem*, 29°11,48'S, 50°13,63'W, Lewinsohn, Prado, Macedo col, 10.iv.1995, 1 female (MZUSP); *idem*, 29°52,21'S, 50°01,21'W, Lewinsohn, Prado, Macedo col, 12.iv.1995, 1? (MZUSP). São Leopoldo, N. Papavero col, vii.1965, 1 male (MZUSP). Gravataí,

Estr. Morunguava-Caveiras, 29°54,76'S, 50°54,34'W, Lewinsohn, Prado, Macedo col, 10.iv.1995, 1 male and 2? (MZUSP). Guaíba, Sítio S. Maximiano, BR 116 km 307, 30°10,84'S, 51°23,52'W, Lewinsohn, Prado, Macedo col, 01.x.1995, 2 males, 1 female and 1? (MZUSP). ARGENTINA: *Misiones*. Iguazu, R.C. & E.M. Shannon col, 4-10.x.1967, 1 male and 1 female (USNM); *idem*, San Ignacio, Kraus col, v.1961, 1? (USNM).

Comments: The holotype was not labelled by Hendel, so the second author added two labels "Holotype/labelled by VCSilva, 95".

Physoclypeus flavus (Wiedemann, 1830)
(Figs. 3 A-E)

flavus (Wiedemann, 1830: 595; *Chlorops*). Type locality, Uruguay, Montevideo. Ref. – Hendel, 1908: 20; 1925: 120; 1936: 82; Malloch, 1933: 356.

Diagnosis

This species is distinguished from other congeners by the following combination of characters:

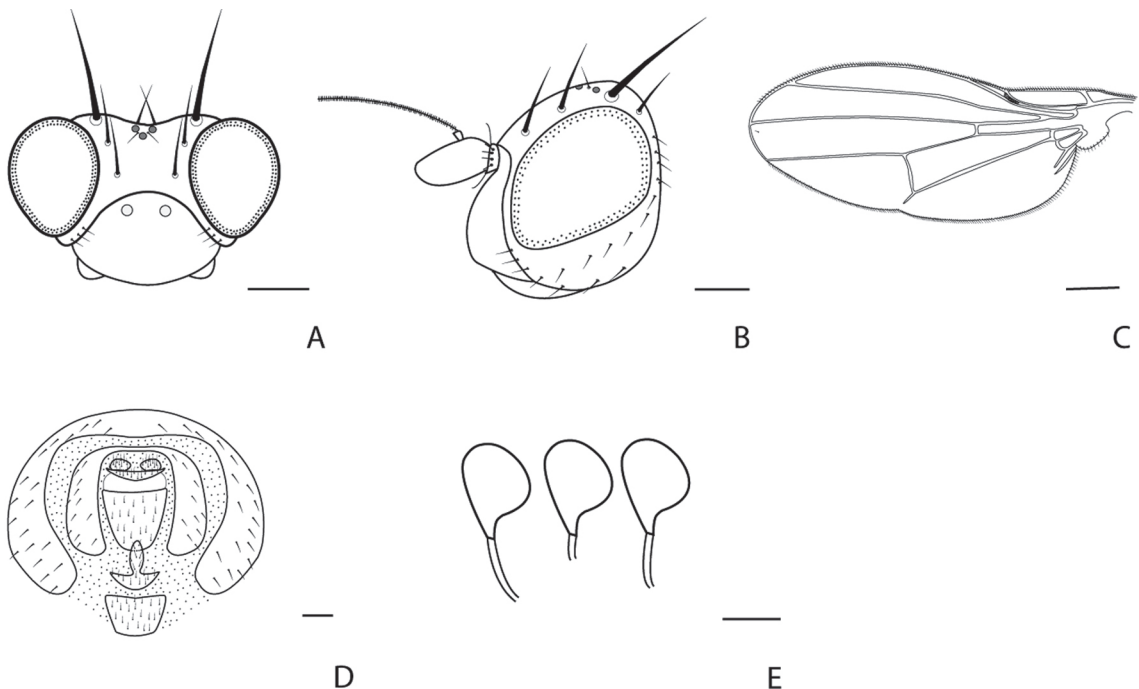


FIGURE 3: A-E. *Physoclypeus flavus*. A, head, frontal view; B, head, lateral view; C, wing; D, female terminalia, ventral view; E, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

arista pubescent; 0+3 dorsocentral setae; wing spotted between apex of *Sc* and *R*₁; frons, thorax and abdomen without spot or stripe.

Redescription

Head: (Figs. 3A-B) ocellar triangle brown. Frons yellowish brown, without spot or stripe. Face yellow. Parafacial narrow, brown. Gena narrow, yellow. Eye oval, higher than wide. Antenna: first flagellomere two times longer than wide; arista pubescent. Occiput yellow. Chaetotaxy: ocellar seta weak; outer vertical seta 1/2 length of inner vertical seta.

Thorax: mesonotum and pleura yellowish brown, without spot or stripe; scutellum triangular, flat, apical longitudinal groove not well developed, without spot. Chaetotaxy: 0+3 dorsocentral setae; 2 katepisternal setae (anterior smaller and thinner). *Legs:* yellow; tarsomeres 3-5 dark. Fore and mid coxae with 4 apical setae; hind coxa, 1 posterior seta; fore femur, 2 rows of posterior setae, 1 row of ventral setae; mid femur, 1 row of ventral setae, 1 row of posterior setae; hind femur, 4 apical dorsal setae, 1 row of ventral setae; fore tibia, 1 row of apical dorsal setae, 1 apical ventral setae; mid tibia, 1 apical ventral seta; hind tibia, 2 apical ventral setae. *Wing* (Fig. 3C): yellowish hyaline, spotted between apex of *Sc* and *R*₁. Halter yellowish brown.

Abdomen: yellowish brown, without spot or stripe. Female terminalia: (Fig. 3D) tergite 7 small, arch-shaped, sternite 7 with medial projection directed toward sternite 8, tergite and sternite 7 not fused; sternite 8 broad, shield-shaped, strongly sclerotized; hypoproct well developed; epiproct not observed; cercus small, papillate. Three spherical spermathecae, smooth surface (Fig. 3E).

Male: material not available for study.

Distribution: Colombia, Brazil, Bolivia, Argentina and Uruguay.

Material studied: URUGUAY: Montevideo, Holotype female (NHMW). COLOMBIA: *Boyacá*. SFF Iguaque, El Níspero, 5°38'N, 73°31'W, 2730 m, Malaise, P. Reina col., 13-28.x.2001, 1 female (IAHB). *Risaralda*. SFF Otún Quimbaya, El Molinillo, 4°43'N, 75°34'W, 2220 m, Malaise, G. López col., 17.ii-04.iii.2003, 1 female (IAHB). BRAZIL: *São Paulo*. Campos do Jordão, Cid. Azul, N. Papavero col., xi.1953, 2 females (MZUSP); *idem*, Eng. Lefevre, 1200 m, N.

Papavero col, 28.ix.1962, 1 female (MZUSP). *Paraná*. Morretes, Parque Estadual do Pau Oco, 25°34'27,9"S, 48°53'46,7"W, 10-13.iv.2002, Armadilha Malaise, trilha 1, M.T.Tavares & eq. col, 1 female (MZUSP). *Santa Catarina*. Seara, Nova Teutônia, 27°11'S, 52°23'W, 300-500 m, Fritz Plaumann col, vi.1970, 1 female (MZUSP); *idem*, ix.1970, 1 female (MZUSP); *idem*, xi.1970, 1 female (MZUSP).

Physochlypeus hendeli sp. nov. (Figs. 4A-I)

Diagnosis

This species is distinguished from other congeners by the following combination of characters: parafacial narrow; arista plumose; 0+2 dorsocentral setae; apical margin of abdominal tergites dark striped.

Description

Head: (Figs. 4A-B) brown, ocellar triangle black. Frons without spot or stripe. Parafacial narrow. Gena broad, yellow. Eye oval, higher than wide. Antenna: first flagellomere two times longer than wide; arista plumose. Occiput yellowish brown. Chaetotaxy: ocellar setae weak; outer vertical seta 1/3 length of inner vertical seta.

Thorax: mesonotum brown, without spot or stripe; pleura yellow; scutellum trapezoidal. Chaetotaxy: 0+2 dorsocentral setae; 2 katepisternal setae. *Legs:* yellow; tarsomeres 3-5 dark. Fore and mid coxae, with 4 apical setae; hind coxa, 1 apical seta; fore femur, 2 rows of dorsal setae, 1 row of posterior setae; mid femur, 1 row of anterior setae, 1 apical dorsal seta; hind femur, 2 apical dorsal setae, 1 apical posterior seta; fore tibia, 1 apical dorsal seta, mid and hind tibia, 1 apical ventral seta. *Wing* (Fig. 4C): yellowish hyaline, without spot. Halter brown.

Abdomen: (Fig. 4D) brown, apical margin of tergites with a complete dark stripe. Male terminalia: epandrium horseshoe-shaped, apex narrow in dorsal view (Fig. 4E) but broad with convex apex in lateral view (Fig. 4F); surstylus articulated with epandrium, well developed, rounded apex; membranous region between cercus and epandrium, broad; aedeagus (Figs. 4G-H) well developed, short, with many long inner teeth; aedeagal apodeme long; hypandrium as a complete ring, narrow around ventral base of aedeagus; paramere well

developed, fused with hypandrium at ventral region; cercus small, papillate. Female terminalia: (Fig. 4I) segment 7 arch-shaped, tergite and sternite 7 not fused; sternite 8 Y-shaped, strongly sclerotized; hypoproct short; epiproct not observed; cercus papillate.

Distribution: Mexico, Costa Rica, Jamaica, St. Lucia and Grenada.

Etymology: the species is named in honor of the great dipterist Friedrich Hendel.

Type material: *Holotype:* male; JAMAICA, N. Irish Town, M. Sörensson & B. Mårtensson col, 08.vi.1989 (MZLU). *Paratypes:* MEXICO: Vera Cruz, Cordoba, J.S. Buckett, M.R. & R.C. Gardner col, 20.vii.1966, 1 female (UCD). COSTA RICA. *Heredia.* Santo Do-

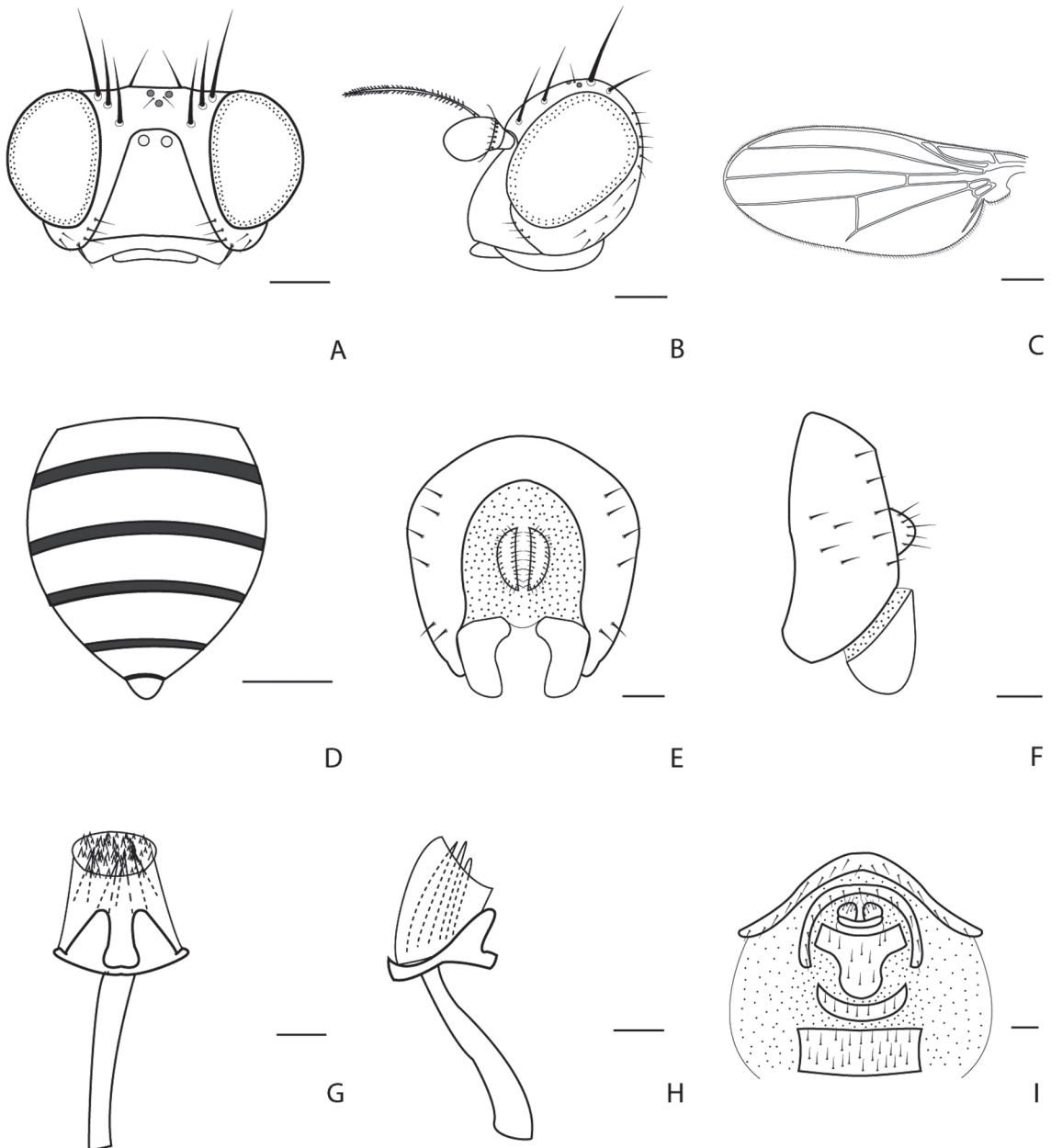


FIGURE 4: A-I. *Physoclypeus hendeli* sp. nov. A, head, frontal view; B, head, lateral view; C, wing; D, abdomen, dorsal view; E, epandrium, dorsal view; F, epandrium, lateral view; G, aedeagus, ventral view; H, aedeagus, lateral view; I, female terminalia, ventral view. Scales: 0.1 mm,

mingo, 9°59'N, 85°05'W, Parque INBio, 23.vi.2001, A. Freidberg col, 1 female (USNM). JAMAICA. St. Andrew, Hardawar Gap, 1200 m, M. Sörensson & B. Mårtensson col, 08.vi.1988, 1 male, 2 females and 1? (MZLU), 1 female (MZUSP); Holliwell Park at M. Sörensson & B. Mårtensson col, 11.vi.1989, 2 males, 1 female (MZLU), 1 male and 1 female (MZUSP); *idem*, 13.vi.1989, 1 male, 1 female and 3? (MZLU), 1 female (MZUSP); 8 km N Irish Town 1000 m, M. Sörensson & B. Mårtensson col, 08.vi.1989, 1 female (MZLU); St. Thomas, Blue Mountain Peak, 2250 m, M. Sörensson & B. Mårtensson col, 17.vi.1989, 1 male and 1 female (MZLU). ST. LUCIA: *Micoud*. Quillesse Forest Reserve, 9 km W. Micoud, 300 m, M. Sörensson & B. Mårtensson col, 03.vii.1989, 1 male (MZLU); *Vieux Fort*, Rain Forest Walk, 10 km E. Soufriere 475 m, M. Sörensson & B. Mårtensson col, 2.vii.1989, 1 male (MZLU). GRENADA: *St. Andrew*, Mt Hope 10 km, NW Grenville, 450 m, 19.vii.1989, 1? (MZLU).

Physoclypeus lineatus (Williston, 1896) new comb.
(Figs. 5A-J)

lineatus (Williston, 1896: 385; *Sapromyza*). Type locality, St. Vincent (West Indies). Ref. – Mello & Silva, 2007.

Diagnosis

This species is distinguished from other congeners by the following combination of characters: arista long pubescent; 0+2 dorsocentral setae; mesonotum with two pairs of brown stripes; abdomen brownish yellow, without spot or stripe.

Redescription

Head: (Figs. 5A-B) ocellar triangle brownish black. Frons reddish yellow, without spot or stripe. Face reddish yellow, oral margin wide. Parafacial and gena narrow, reddish yellow. Eye oval, higher than wide, posterior outline concave. Antenna: first flagellomere two times longer than wide; arista long pubescent. Occiput brown. Chaetotaxy: ocellar setae weak; outer vertical seta 2/3 length of inner vertical seta. Proboscis and palpus yellow.

Thorax: (Fig. 5D) mesonotum arched, reddish yellow, with two pairs of narrow brown stripes; pleura

yellow; scutellum triangular, without stripe or longitudinal groove. Chaetotaxy: 0+2 dorsocentral setae; 2 katepisternal setae (anterior smaller and thinner). *Legs:* yellow; tarsomeres 3-5 brown. Fore coxa, 2 dorsal setae; mid coxa, 1 row of dorsal setae, hind coxa, 2 dorsal setae; fore femur, 2 rows of posterior setae; 1 row of ventral setae; mid femur, 1 row of ventral setae; hind femur, 3 apical dorsal setae, 2 dorsal setae; all tibiae with 1 apical dorsal seta and 1 apical ventral seta. *Wing* (Fig. 5C): yellowish hyaline; without spot. Halter brownish yellow.

Abdomen: brownish yellow, without spot or stripe. Male terminalia: epandrium horseshoe-shaped, apex strongly narrow in dorsal view (Fig. 5E) and broad in lateral view (Fig. 5F); surstylus articulated with epandrium, well developed; membranous region between cercus and epandrium broad; aedeagus (Figs. 5G-H) well developed, cylindrical, with many apical inner teeth; aedeagal apodeme short; hypandrium as a complete ring, narrow, around ventral base of aedeagus, without projection; paramere absent; cercus well developed, papillate. Female terminalia: (Fig. 5I) tergite 7 well developed and little modified, not fused with sternite 7; sternite 8 broad, little modified, weakly sclerotized; hypoproct well developed; epiproct not observed; cercus long. Three spherical spermathecae, smooth surface (Fig. 5J).

Distribution: St Vincent (West Indies), Colombia.

Material studied: ST. VINCENT AND THE GRENADINES: St. Vincent, Winward side, H.H. Smith, 1907, lectotype male, 2 female paralectotypes (BMNH). COLOMBIA: *Tolima*. Mun. Fresno, Vda. Fca. Las Perlas, 5°12'N, 75°2'W, 1508 m, T. Arias, D. Arias & S. Arias col, 23-26.xii.2002, 2 males (IAHB). *Boyacá*. SFF Iguaque, El Nispero, 5°38'N, 73°31'W, 2730 m, P. Reina col, 28.x-14.xi.2001, 2 males (IAHB), 1 male (MZUSP); *idem*, 03-18.ii.2002, 1 male (IAHB). *Huila*. PNN Cueva de Los Guácharos, Alto el Mirador, 1°38'N, 76°6'W, 1980 m, J. Urbano col, 21.i-4.ii.2002, 1 male (IAHB). *Risaralda*. SFF Otún Quimbaya, Cuchilla Camino, 4°43'N, 75°35'W, 2050 m, R. Walker col, 17.xii.2002-3.i.2003, 1 female (IAHB); SFF Otún Quimbaya, Robledal, 4°44'N, 75°35'W, 1980 m, R. Walker col, 20.xii.2002-4.i.2003, 1 male (IAHB). *Putumayo*. PNN La Paya, Cabaña La Paya, 0°2'S, 75°12'W, 330 m, A. Morales col, 1-15.ix.2002, 1 male (IAHB). *Vaupés*. R.N. Mosiro-Itajura (Caparú), Centro Ambiental, 1°4'S, 69°31'W, 60 m, Red, M. Sharkey & D. Arias col, 20.i-1.ii.2003, 1 male and 1 female (IAHB). *Cundinamarca*. PNN Chingaza,

Charrascales, 4°31'N, 73°45'W, 2990 m, Malaise, F. Guzmán col, 27.iii-4.iv.2002, 2 females (IAHB), 1 female (MZUSP); *idem*, 4-24.iv.2002, 1 male and 1 female (IAHB), 1 male (MZUSP); *idem*, 08-22.v.2002, 1 male and 1 female (IAHB); *idem*, A. Pérez col, 24.iv-8.v.2002, 2 females (IAHB).

Comments: A male in the BMNH collection, labeled "Cotype", "*Sapromyza lineata*" (red label, handwritten), with a label of designation "*Physoclypeus/lineatus* (Will.)/Lectotype/Shewell, 62" is herein designated lectotype, as this previous designation was not published by Dr. Shewell.

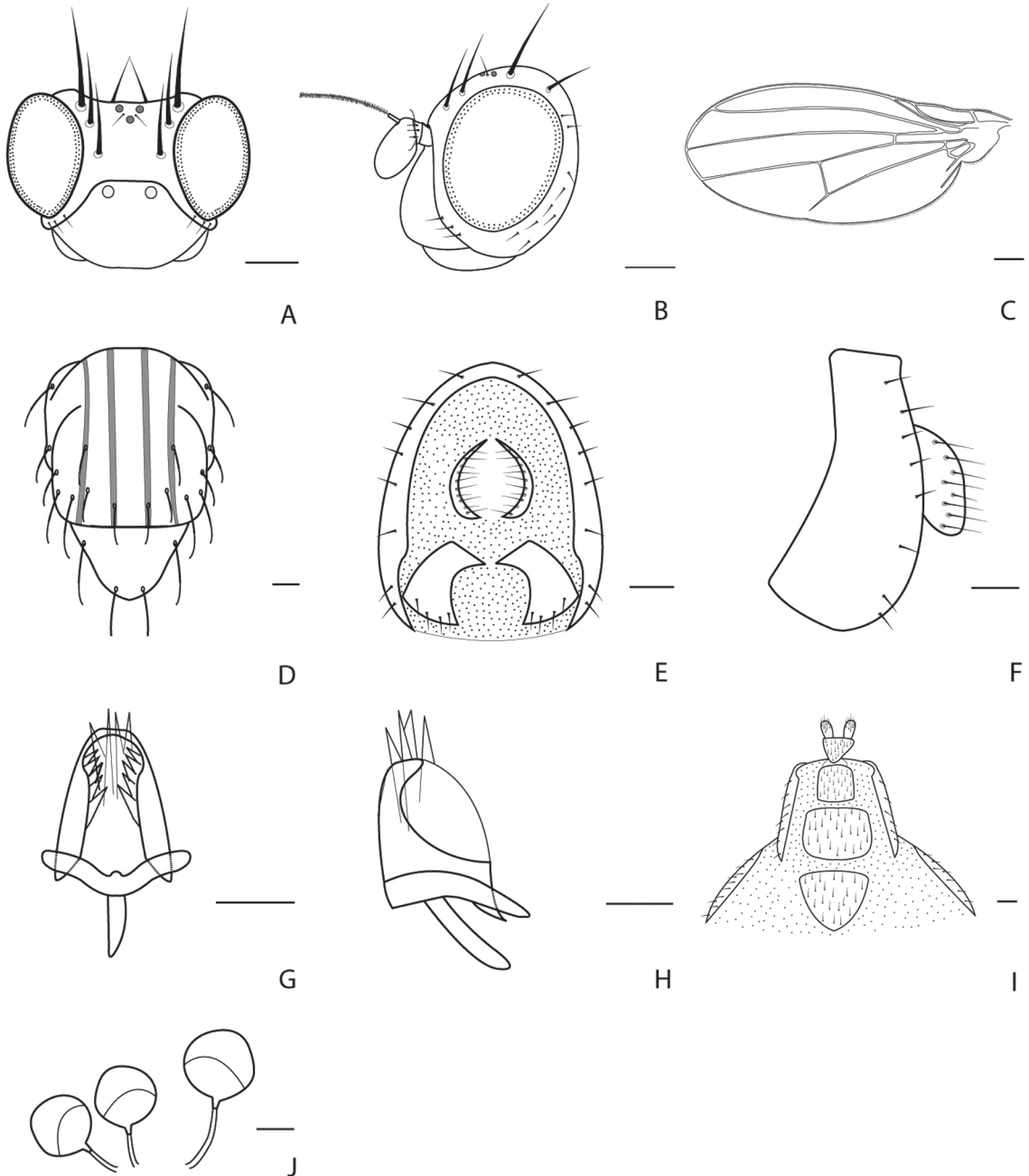


FIGURE 5: A-J. *Physoclypeus lineatus*. A, head, frontal view; B, head, lateral view; C, wing; D, thorax, dorsal view; E, epandrium, dorsal view; F, epandrium, lateral view; G, aedeagus, ventral view; H, aedeagus, lateral view; I, female terminalia, ventral view; J, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

Physoclypeus montanus (Becker, 1919) new comb.
(Figs. 6A-C)

montanus (Becker, 1919: 187; *Sapromyza*). Type locality, Ecuador, El Angel, 300 m.

Diagnosis

This species is distinguished from other congeners by the following combination of characters: frons with two central stripes; arista pubescent; 0+3 dorso-central setae; thorax and wing without spot; abdomen brownish black, without spot or stripe.

Redescription

Head: (Figs. 6A-B) brownish yellow; ocellar triangle brown. Frons yellow, with two central brownish stripes. Face convex, shining brown; oral margin wide. Parafacial and gena wide. Eye rounded oval, posterior outline concave. Antenna: first flagellomere 1.5 times longer than wide; arista pubescent. Chaetotaxy: ocellar setae weak; outer vertical seta 2/3 length of inner vertical seta.

Thorax: mesonotum brown, without spot or stripe, slightly arched; scutellum trapezoidal, flat but with shallow longitudinal groove, without stripe. Chaetotaxy: 0+3 dorsocentral setae; 2 katepisternal setae (anterior smaller and thinner). *Legs:* brownish yellow, mid and hind tarsomeres 3-5 darker. Fore coxa, 1 preapical dorsal seta, 2 apical setae; mid coxa, 3 apical dorsal setae; hind coxa, 1 apical dorsal seta, 1 apical lateral seta; fore femur, 3 rows of posterior setae; mid femur, anterior row of 6 apical setae; hind femur, 1 preapical seta, 2 apical dorsal setae; fore tibia, 1 preapical dorsal seta; mid tibia, 1 preapical dorsal seta, 1 apical ventral seta; hind tibia, 1 preapical dorsal seta. *Wing* (Fig. 6C): yellowish hyaline, without spot; longer than body length. Halter brownish yellow.

Abdomen: dark brown, segments 1 and 2 yellow; without spot or stripe. Terminalia not studied.

Distribution: Ecuador.

Material studied: ECUADOR: Cuenca, Dr. G. Rivet, 1905, lectotype male (MNHN); El Angel, 3000 m, P. Rivet col, 1903, 1 paralectotype male, 1 paralectotype ? (MNHN); Tulcán, 3002 m, P. Rivet col, 1902, 7 paralectotypes ? (MNHN); *idem*, 1905, 1 paralecto-

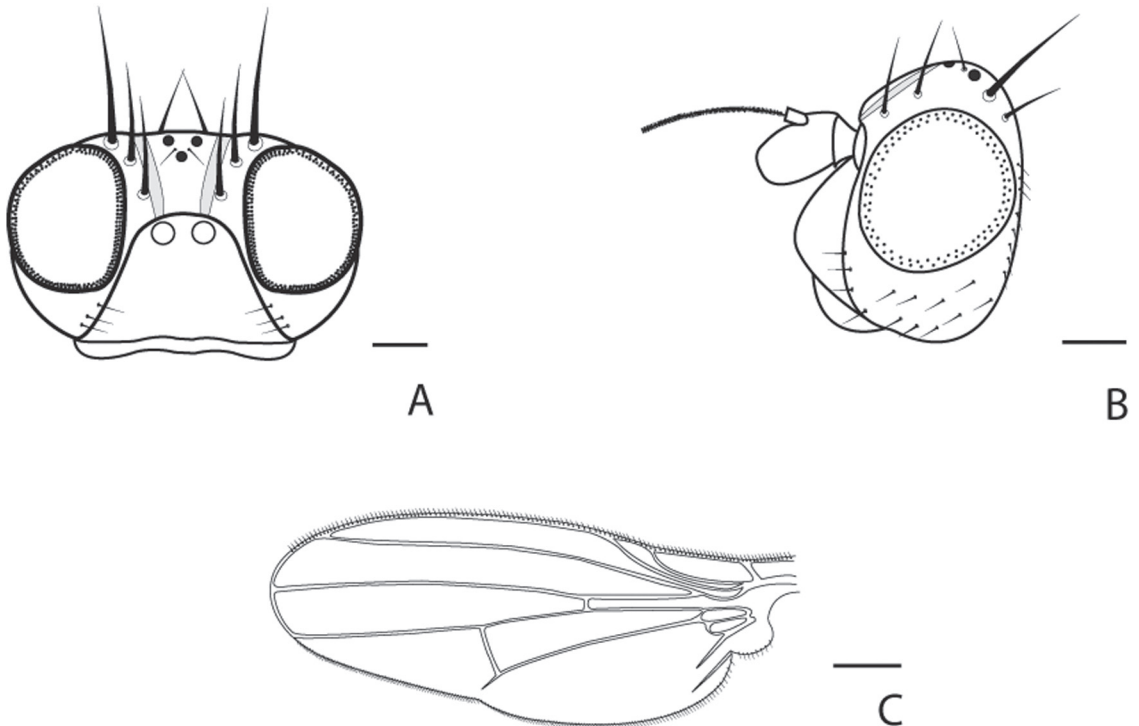


FIGURE 6: A-C. *Physoclypeus montanus*. A, head, frontal view; B, head, lateral view; C, wing. Scales: 0.1 mm, except C, 0.5 mm.

type ? (MNHN); Borma, 3100 m, P. Rivet col, 1905, 2 paralectotypes ? (MNHN); La Rinconada, 3100 m, P. Rivet col, i.1903, 4 paralectotypes ? (MNHN).

Comments: A male in the general collection of MNHN, labelled "Museum Paris, Equateur, Cuenca, Dr. G. Rivet, 1905", is designated lectotype; the other specimens from the syntypic series (3 males and 14 females), except the one from Yausai not located, are designated paralectotypes.

Physoclypeus plaumanni sp. nov.
(Figs. 7A-J)

Diagnosis

This species is distinguished from other congeners by the following combination of characters: arista pubescent; frons with two wide lateral spots; 0+2 dorsocentral setae; mesonotum with a pair of central dark stripes; wing spotted between apex of *Sc* and *R*₁; abdomen without spot or stripe.

Description

Head: (Figs. 7A-B) ocellar triangle black. Frons brown, with two wide lateral spots. Face yellow. Parafacial broad, yellowish brown. Gena broad, yellow. Eye oval, higher than long. Antenna: first flagellomere two times longer than high; arista pubescent. Occiput yellowish brown. Chaetotaxy: ocellar setae weak; outer vertical seta 1/2 length of inner vertical seta.

Thorax: (Fig. 7D) mesonotum brown, with two central dark stripes; pleura yellowish brown; scutellum trapezoidal, without stripe, with longitudinal groove. Chaetotaxy: 0+2 dorsocentral setae; 2 katepisternal setae. *Legs:* yellow, tarsomeres 3-5 dark. Fore coxa, 3 apical dorsal setae; mid coxa, 3 dorsal setae; hind coxa, 1 posterior seta; fore femur, 2 rows of dorsal setae, 1 row of ventral setae; mid femur, 1 row of posterior setae, 1 apical posterior seta; hind femur, 1 row of ventral setae, 2 apical posterior setae; 1 apical dorsal seta; all tibiae, 1 apical dorsal seta and 1 apical ventral seta. *Wing* (Fig. 7C): yellow, with a small spot between apex of *Sc* and *R*₁. Halter brown.

Abdomen: yellow, without spot. Male terminalia: epanthrium horseshoe-shaped, apical region weakly pointed and slender in dorsal view (Fig. 7E), and equally wide in both extremities in lateral view (Fig. 7F); sur-

stylus articulated with epanthrium; membranous region between cercus and epanthrium, broad; aedeagus (Figs. 7G-H) well developed, cylindrical, with a long pair of inner longitudinal teeth; hypandrium as a complete ring, around base of aedeagus, slender laterally, and broad dorsally; paramere absent; cercus small, papillate. Female terminalia: (Fig. 7I) tergite 7 narrow, arch-shaped, sternite 7 smaller, tergite and sternite 7 not fused; sternite 8 broad, shield-shaped, strongly sclerotized; hypoproct well developed; epiproct not observed; cercus small, papillate. Three spherical spermathecae, smooth surface (Fig. 7J); paired spermathecae with extremely short duct branch from short common duct ending at third spermatheca.

Distribution: Brazil.

Etymology: named in honor of Fritz Plaumann, a great Brazilian naturalist who collected this species.

Type material: *Holotype:* male; BRAZIL: *Santa Catarina.* Seara, Nova Teutônia, 27°11'S, 52°23'W, 300-500 m, Fritz Plaumann col, ix.1971 (MZUSP). *Paratypes:* BRAZIL: *Santa Catarina.* Seara, Nova Teutônia, 27°11'S, 52°23'W, 300-500 m, Fritz Plaumann col, iv.1967, 4 females and 3? (MZUSP); *idem*, vii.1967, 2 females and 2? (MZUSP); *idem*, viii.1967, 5 males, 4 females and 3? (MZUSP); *idem*, ix.1967, 3 males, 5 females and 7? (USNM); *idem*, x.1967, 2 males (MZUSP).

Physoclypeus risaraldensis sp. nov.
(Figs. 8A-J)

Diagnosis

This species is distinguished from other congeners by the following combination of characters: arista pubescent; 0+2 dorsocentral setae; tarsomeres 3-5 yellow; wing slightly spotted at crossvein *dm-cu*; apical margin of abdominal tergites with incomplete black bands.

Description

Head: (Figs. 8A-B) ocellar triangle brown. Frons brown, without stripe. Face convex, yellow. Parafacial broad, brown. Gena broad, yellow. Eye oval, higher than wide. Antenna: first flagellomere two times longer than wide; arista pubescent. Occiput brown. Chaetotaxy: ocellar setae weak; outer vertical seta 1/2 length of inner vertical seta.

Thorax: mesonotum brown, without spot or stripe; pleura brown; scutellum triangular, without stripe, with a shallow longitudinal groove apically. Chaetotaxy: 0+2 dorsocentral setae; 1 katepisternal seta. *Legs*: yellow. Fore coxa, 2 dorsal setae; mid coxa, 1 row of

dorsal setae; hind coxa, 2 apical dorsal setae; fore femur, 2 rows of posterior setae, 1 row of ventral setae; mid femur, 2 apical dorsal setae, 1 row of posterior setae; hind femur, 3 apical dorsal setae, 2 dorsal central setae; all tibiae, with 1 preapical dorsal seta and 1

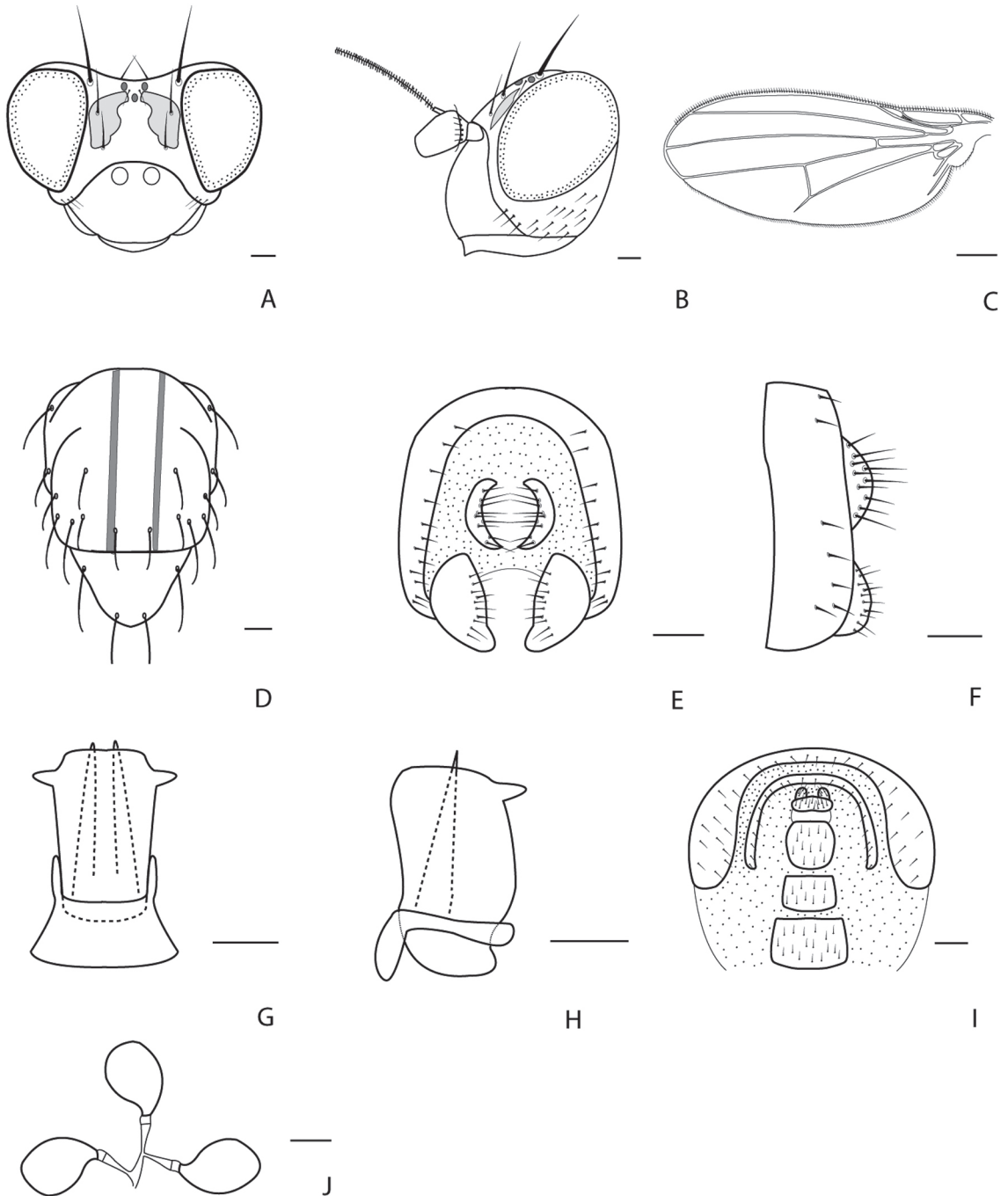


FIGURE 7: A-J. *Physochypeus plaumanni* sp. nov. A, head, frontal view; B, head, lateral view; C, wing; D, thorax, dorsal view; E, epandrium, dorsal view; F, epandrium, lateral view; G, aedeagus, ventral view; H, aedeagus, lateral view; I, female terminalia, ventral view; J, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

apical ventral seta. *Wing* (Fig. 8C): yellowish hyaline, slightly spotted at crossvein *dm-cu*. Halter brown.

Abdomen: (Fig. 8D) yellow, apical margin of tergites with black bands incomplete at center. Male termi-

nalia: epandrium horseshoe-shaped, basal extremity wide, in dorsal view (Fig. 8E); apical extremity broad and almost square in lateral view (Fig. 8F); surstylus differentiated, articulated with epandrium; aedeagus (Figs. 8G-H) well developed, cylindrical, with many

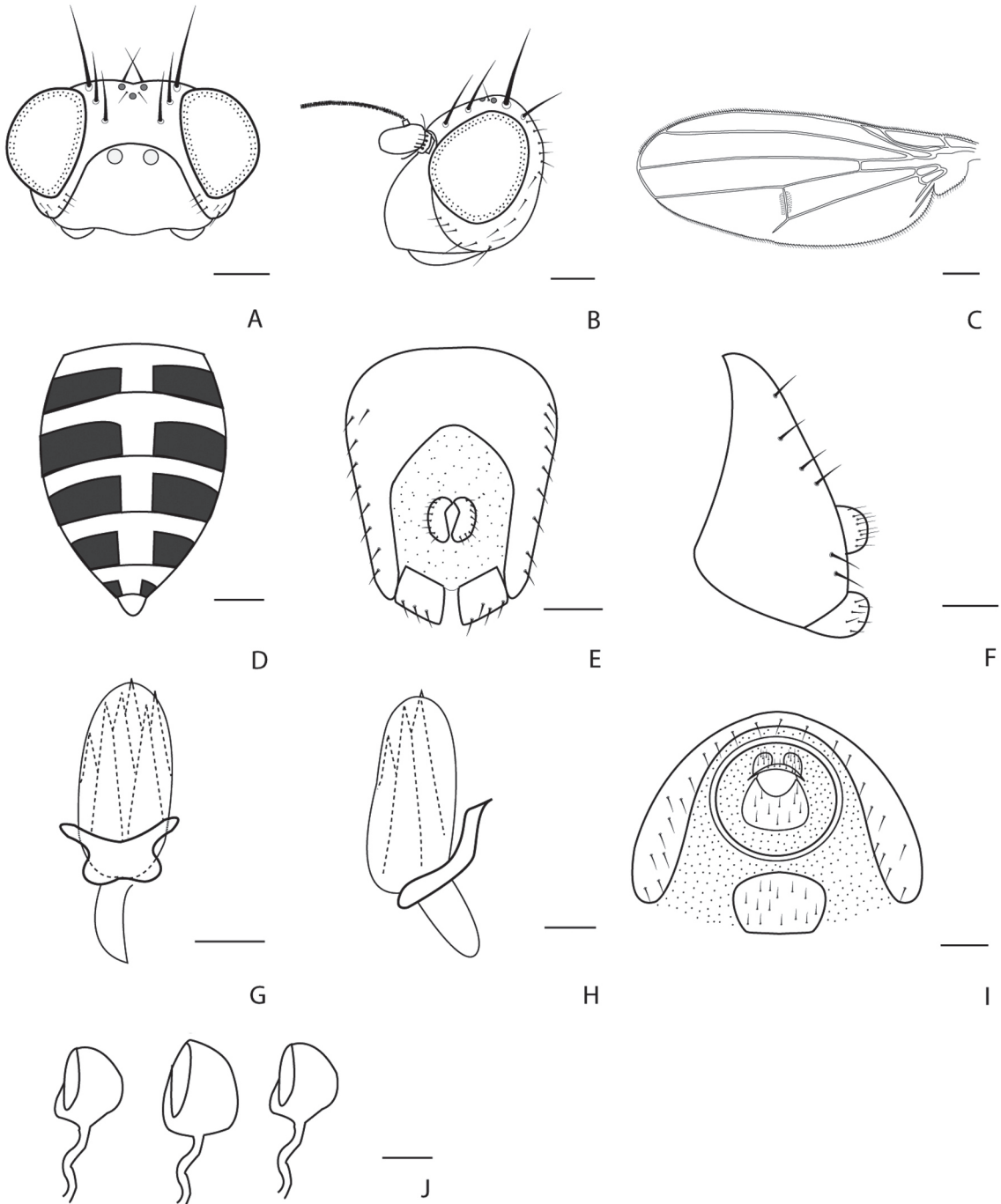


FIGURE 8: A-J. *Physoclypeus risaraldensis* sp. nov. A, head, frontal view; B, head, lateral view; C, wing; D, abdomen, dorsal view; E, epandrium, dorsal view; F, epandrium, lateral view; G, aedeagus, ventral view; H, aedeagus, lateral view; I, female terminalia, ventral view; J, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

long inner teeth; aedeagal apodeme short; hypandrium as a complete ring, broad ventrally; cercus small, papillate. Female terminalia: (Fig. 8I) segment 7 narrow, tergite and sternite 7 fused, forming a complete ring; sternite 8 shield-shaped, strongly sclerotized; hypoproct small; epiproct not observed; cercus small, papillate. Three cup-shaped spermathecae, smooth surface (Fig. 8J).

Distribution: Colombia, Ecuador.

Etymology: the species name refers to the type locality.

Type material: *Holotype:* male; COLOMBIA: *Risaralda*. SFF Otún Quimbaya, Robledal, 4°44'N, 75°35'W, 1960 m, Malaise, G. López col, 19.iv-08.v.2003 (IAHB). *Paratypes:* COLOMBIA: *Magdalena*. El Chuscal, PNN Sierra Nevada de Santa Marta, 10°48'N, 73°39'W, 2300 m, J. Cantillo col, 27.xi-15.xii.2001, 1 male (IAHB). *Nariño*. R.N. La Planada, Vía Hondón, 1°15'N, 78°15'W, 1930 m, Malaise, G. Oliva col, 16.ix-2.x.2001, 1 female (IAHB); R.N. La Planada, Parcela Permanente, 1°15'N, 78°15'W, 1885 m, G. Oliva col, 2.ix-16.ix.2001, 1 female (IAHB), 2 females (MZUSP). *Huila*. PNN Cueva de Los Guácharos, Alto el Mirador, 1°38'N, 76°6'W, 1980 m, J. Fonseca col, 6.iv-21.iv.2002, 1 female (IAHB); *idem*, 21.iv-5.v.2002, 1 male (IAHB), 1 male (MZUSP). *Risaralda*. SFF Otún Quimbaya, Urapanera, 4°44'N, 75°35'W, 1960 m, Malaise, G. López col, 04-18.ii.2003, 1 male (IAHB); *idem*, 04-20.iii.2003, 1 female (IAHB); *idem*, 4°43'N, 75°34'W, 2220 m, 17.ii-04.iii.2003, 2 females (IAHB); *idem*, Cuchilla/Camino, 1960 m, 04-19.iv.2003, 1 male (IAHB); *idem*, Urapanera, 19.iv-08.v.2003, 1 female (IAHB). *Boyacá*. SFF Iguaque, Qda. Los Mudos, 5°44'N, 73°26'W, 2840 m, G. López col, 27.ii-17.iii.2002, 1 male (IAHB).

Other material studied (after completion of the description): ECUADOR: *Cotopaxi*. Canton Sigchos, Las Pampas, Bosque integral Otonga, 11-12.vii.2007, W. Rossi col, [green label: Laboulbeniales no 3107 Walter Rossi], 1 female (WRC).

Physochypeus saltensis sp. nov.
(Figs. 9A-K)

Diagnosis

This species is distinguished from other congeners by the following combination of charac-

ters: arista pubescent; central frontal region with two pale brown stripes; 0+3 dorsocentral setae; mesonotum with five longitudinal stripes; wing slightly spotted between apex of Sc and R₁; abdominal tergites 5 and 6 with a small central black spot.

Description

Head: (Figs. 9A-B) ocellar triangle brown. Frons yellow, with two dark central stripes. Face yellow. Parafacial narrow, yellow. Gena broad, yellow. Eye oval, higher than wide. Antenna: first flagellomere two times longer than wide; arista pubescent. Occiput yellow. Chaetotaxy: ocellar setae weak; outer vertical seta 1/2 length of inner vertical seta.

Thorax: (Fig. 9D) mesonotum arched, yellow; with five longitudinal, narrow, dark stripes; pleura yellow; scutellum triangular, without stripe. Chaetotaxy: 0+3 dorsocentral setae; 2 katapisternal setae. *Legs:* yellow, tarsomeres 3-5 dark. Fore coxa, 1 apical dorsal seta, 1 row of anterior setae; mid coxa, 1 row of dorsal setae; hind coxa, 1 apical posterior seta; fore femur, 2 rows of posterior setae, 1 row of ventral setae; mid femur, 1 row of posterior setae, 1 apical anterior seta; hind femur, 1 apical dorsal seta; fore tibia, 1 apical dorsal seta; mid tibia, 1 apical dorsal seta, 1 apical ventral seta; hind tibia, 1 apical ventral seta. *Wing* (Fig. 9C): yellow; slightly spotted between apex of Sc and R₁. Halter yellow.

Abdomen: (Fig. 9E) yellow, tergites 5 and 6 with a small black spot at center. Male terminalia: epandrium horseshoe-shaped, apical region slender and pointed in dorsal view (Fig. 9F), apical region rounded and wider than basal region in lateral view (Fig. 9G); surstylus articulated with epandrium; membranous region between cercus and epandrium, broad; aedeagus (Figs. 9H-I) well developed, short cylindrical, with few long inner teeth; aedeagal apodeme long; hypandrium as a complete ring, narrow around base of aedeagus, posteriorly with a downward projection; paramere absent; cercus large, papillate. Female terminalia: (Fig. 9J) segment 7 little modified, arch-shaped, tergite and sternite 7 not fused; sternite 8 slender and long, shield-shaped, strongly sclerotized; hypoproct small; epiproct not observed; cercus small, papillate. Three spherical spermathecae, smooth surface (Fig. 9K).

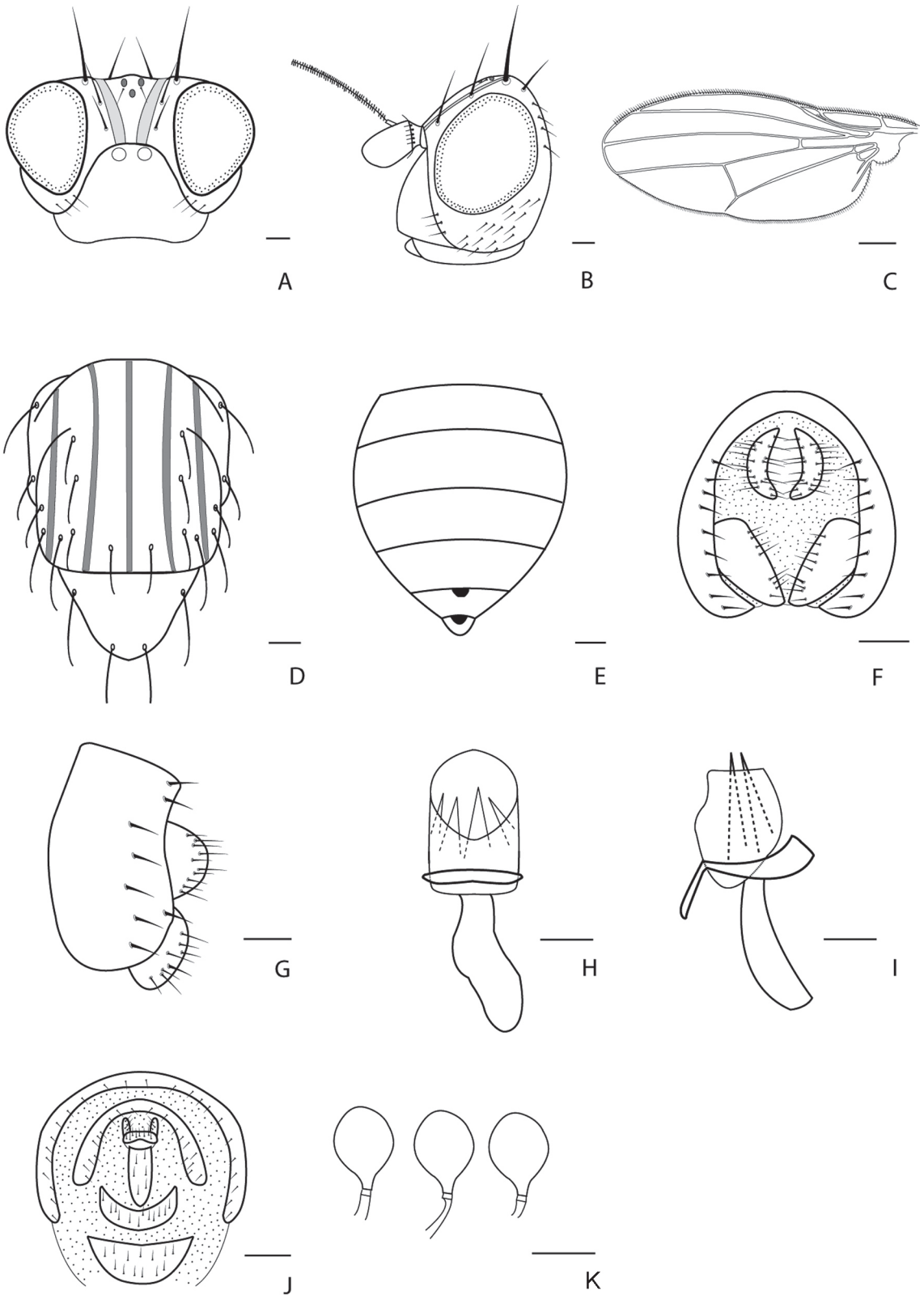


FIGURE 9: A-K. *Physoclypeus saltensis* sp. nov. A, head, frontal view; B, head, lateral view; C, wing; D, thorax, dorsal view; E, abdomen, dorsal view; F, epandrium, dorsal view; G, epandrium, lateral view; H, aedeagus, ventral view; I, aedeagus, lateral view; J, female terminalia, ventral view; K, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

Distribution: Argentina.

Etymology: the species name refers to the type locality.

Type material: *Holotype:* male; ARGENTINA: Salta. Rosário de Lerma, M. Wasbauer col, 10-14.xi.1983 (CSCA). *Paratypes:* ARGENTINA: same data as holotype, 10-14.xi.1983, Malaise trap, 1 female (CSCA); *idem*, 16-18.xii.1983, 2 males, 2 females (CSCA); *idem*, 21-23.xii.1983, 4 females (USNM); *idem*, 24-27.xii.1983, 2 males and 4 females (CSCA), 1 male and 1 female (MZUSP).

Physoclypeus scutellatus (Curran, 1926) new comb.

scutellatus (Curran, 1926: 14; *Calliope*). Type locality, Puerto Rico, Naguabo.

Diagnosis

This species is distinguished from other congeners by the following combination of characters: frons with a pale central stripe; arista plumose; 0+2 dorsocentral seta; mesonotum with two brown longitudinal stripes; scutellum spotted at apex; base of abdominal tergites dark.

Redescription

Head: yellowish brown; ocellar triangle brownish. Frons shining yellow, anterior margin slightly concave at central region and with a slender pale stripe; in profile slightly convex. Face broad, slightly convex at lower region, yellowish. Parafacial and gena narrow, pale. Eye oval, posterior outline slightly concave. Antenna: first flagellomere oval, long; arista plumose, long. Chaetotaxy: ocellar setae weak; outer vertical seta 2/3 length of inner vertical seta.

Thorax: mesonotum yellowish brown, slightly arched, with two narrow brown stripes close to dorsocentral setae; pleura yellow; scutellum with a large dark spot at apex, between base of apical scutellar setae. Chaetotaxy: 0+2 dorsocentral setae; 2 katepisternal setae (anterior seta smaller and thinner). *Legs:* yellow, tarsomeres 3-5 brown. Fore coxa, 1 apical dorsal seta; mid coxa, with many apical setae; hind coxa, 1 apical seta; fore femur, 3 rows of posterior setae, 1 row of ventral setae; mid femur, 1 apical seta; hind femur,

1 apical dorsal seta; all tibiae with 1 preapical dorsal seta. *Wing:* hyaline; without spot.

Abdomen: yellowish brown, base of segments black.

Male: not known.

Distribution: Puerto Rico.

Material studied: PUERTO RICO: Naguabo. 7-9.iii.1914, Holotype female (AMNH).

Physoclypeus unimaculatus sp. nov.
(Figs. 10A-J)

Diagnosis

This species is distinguished from other congeners by the following combination of characters: arista pubescent; ocellar setae weak; 0+2 dorsocentral setae; abdominal tergite 6 with a central spot.

Description

Head: (Figs. 10A-B) ocellar triangle brown. Frons and face brown, without spot or stripe. Parafacial and gena broad, brown. Eye oval, slightly higher than wide. Antenna: first flagellomere two times longer than wide; arista pubescent. Occiput brown. Chaetotaxy: ocellar setae short and weak; outer vertical seta 1/3 length of inner vertical seta.

Thorax: mesonotum brown, without spot or stripe; pleura brown; scutellum trapezoidal. Chaetotaxy: 0+2 dorsocentral setae; 2 katepisternal setae. *Legs:* brown; tarsomeres 3-5 darker. Fore and mid coxae, with 4 apical setae; hind coxa, 2 dorsal setae; fore femur, 2 rows of posterior setae, 1 row of ventral setae; mid femur, 1 row of anterior setae, 1 apical ventral seta; hind femur, 1 row of dorsal setae, 2 apical dorsal setae, 1 row of apical ventral setae; mid tibia, 1 preapical dorsal seta, 1 apical ventral seta; hind tibia, 1 preapical dorsal seta, 1 apical ventral seta. *Wing* (Fig. 10C): yellowish hyaline, without spot. Halter brown.

Abdomen: (Fig. 10D) brown, tergite 6 spotted at central region. Male terminalia: epandrium horse-shoe-shaped, apex narrow and rounded in dorsal view (Fig. 10E), equally large in both extremities in lateral view (Fig. 10F); surstylus articulated with

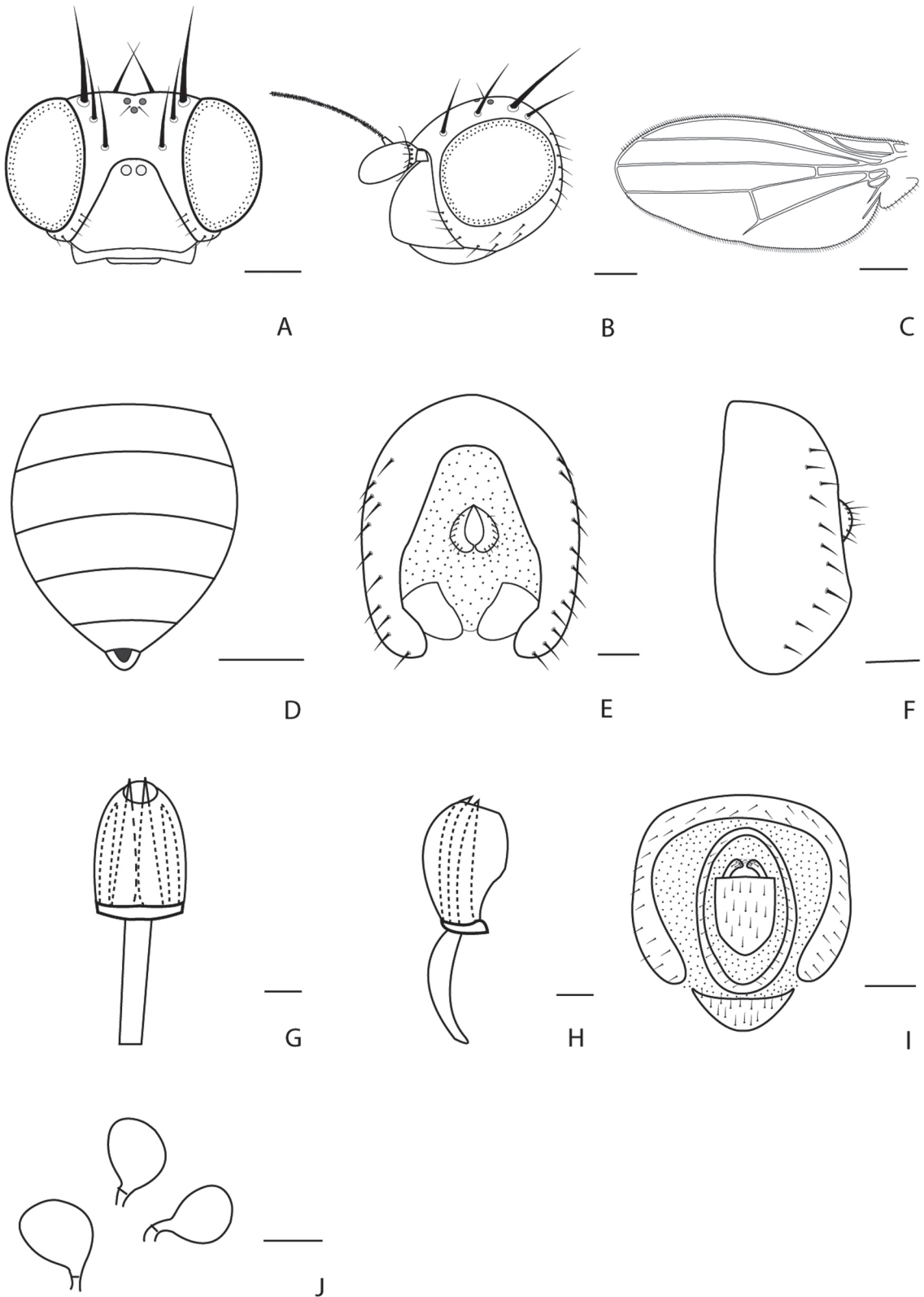


FIGURE 10: A-J. *Physoclypeus unimaculatus* sp. nov. A, head, frontal view; B, head, lateral view; C, wing; D, abdomen, dorsal view; E, epandrium, dorsal view; F, epandrium, lateral view; G, aedeagus, ventral view; H, aedeagus, lateral view; I, female terminalia, ventral view; J, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

epandrium, well developed; membranous region between cercus and epandrium, broad; aedeagus (Figs. 10G-H) well developed, cylindrical, with two pairs of long inner teeth; aedeagal apodeme long; hypandrium as a complete ring, narrow, around ventral base of aedeagus; paramere absent; cercus small, papillate. Female terminalia: (Fig. 10I) segment 7 slender, tergite and sternite 7 fused, forming a complete ring; sternite 8 shield-shaped, strongly sclerotized; hypoproct and epiproct not observed; cercus long. Three spherical spermathecae, smooth surface (Fig. 10J).

Distribution: Mexico and Costa Rica.

Etymology: From Latin *unus* meaning one and *macula* meaning spot; refers to the condition of the abdomen with only one spot at tergite 7.

Type material: *Holotype:* male; MEXICO: Vera Cruz. Córdoba, J.S. Buckett, M.R & R.C Gardner col, 20.vii.1966 (UCD). *Paratypes:* MEXICO: Vera Cruz. Orizaba, J.S. Buckett, M.R & R.C Gardner col, 28.vi.1966, 1 female (UCD); Córdoba, J.S. Buckett, M.R & R.C Gardner col, 29.vi.1966, 1 male (UCD), 1 male (MZUSP); *idem*, 06.vii.1966, 1 male, 1 female (UCD); *idem*, 13.vii.1966, 1 male, 2 females (UCD), 1 female (MZUSP); *idem*, 14.vii.1966, 1 male, 1 female (UCD); *idem*, 20.vii.1966, 1 male, 2 females and 1? (UCD); *idem*, 24.vii.1966, 1 female (UCD); *idem*, J.S. Buckett, M.R & R.C Gardner col, 25.vii.1966, 1 male, 1 female (UCD), 1 male (MZUSP); *idem*, Alfredo B. col, 05.ix.1966, 1 male (UCD). COSTA RICA: *Heredia.* Santo Domingo; Parque INBIO, 9°59'N, 85°05'W, A. Freidberg col, 23.vi.2001, 2 males, 5 females (USNM), 1 male and 1 female (MZUSP); *Puntaneras.* Golfito, P. N. Corcovado, salida de la Estac. a Rio Rincón, 75 m, K. Caballero col, 16.x.2002, 2 males (INBC).

Physoclypeus vittatus sp. nov.
(Figs. 11A-I)

Diagnosis

This species is distinguished from other congeners by the following combination of characters: arista plumose; frons with two dark stripes at central region; mesonotum with three pairs of dark stripes; 0+2 dorsocentral setae; abdomen brown, without spot or stripe.

Description

Head: (Figs. 11A-B) ocellar triangle brown. Frons brown, longer than wide, with two dark stripes at central region. Face yellow. Parafacial narrow, brown. Gena broad, yellowish brown. Eye oval, higher than wide. Antenna: first flagellomere two times longer than wide; arista plumose. Occiput yellowish brown. Chaetotaxy: ocellar setae weak; outer vertical seta 1/3 length of inner vertical seta.

Thorax: (Fig. 11D) mesonotum brown, with three pairs of dark stripes; pleura brown; scutellum brown, trapezoidal. Chaetotaxy: 0+2 dorsocentral setae; 1 katepisternal seta. *Legs:* brown; tarsomeres 3-5 darker. All coxae, with 4 apical setae; fore femur, 2 rows of posterior setae, 1 row of ventral setae; mid femur, 1 row of ventral setae, 1 row of posterior setae; hind femur, 2 apical dorsal setae; fore tibia, 1 preapical dorsal seta, 1 apical ventral seta; mid tibia, 1 preapical dorsal seta, 1 apical ventral seta; hind tibia, 1 apical ventral seta. *Wing* (Fig. 11C): yellowish hyaline, unspotted; halter yellow.

Abdomen: tergites brown, without spot or stripe; sternites whitish yellow; in male, sternite 5 forming a genitalic pouch for the surstyli. Male terminalia: epandrium horseshoe-shaped, narrow at apical region in dorsal view (Fig. 11E), and broad in lateral view (Fig. 11F); surstylus articulated with epandrium, well developed; membranous region between cercus and epandrium, broad; aedeagus (Figs. 11G-H) well developed, short and wide cylindrical, with only one pair of long inner teeth, which have serrilated base; hypandrium as a broad plate; paramere absent; cercus wide, papillate. Female terminalia: (Fig. 11I) segment 7 slender, tergite and sternite 7 fused, forming a complete ring; sternite 8 shield-shaped, strongly sclerotized; hypoproct and epiproct well developed; cercus long.

Distribution: Venezuela, Colombia, Brazil.

Etymology: From Latin *vitta* meaning ribbon, stripe; refers to the pattern of stripes present at mesonotum.

Type material: *Holotype:* male; BRAZIL: Santa Catarina. Seara, Nova Teutônia, 27°11'S, 52°23'W, 300-500 m; Fritz Plaumman col; viii.1970 (MZUSP). *Paratypes:* VENEZUELA: *Aragua.* Girardot, Rancho Grande, 14.vii.1971, R.W. Brooks, A.A. Grigarick, J. McLaughlin, R.D. Schuster col, 6 females (UCD). BRAZIL: *Minas Gerais.* Ouro Preto, 12-13.iv.1968,

F.C. Val col., 1 female (MZUSP). *Santa Catarina*. Se-
ara, Nova Teutônia, 27°11'S, 52°23'W, 300-500 m,
Fritz Plaumman col, 6.viii.1938, 1 female (MZUSP);
idem, vi.1967, 1 female (MZUSP); *idem*, vii.1970, 1
male (MZUSP); *idem*, viii.1970, 13 males, 25 females
(MZUSP), 4 males, 4 females (USNM); *idem*, xi.1970,
1 male, 1 female (MZUSP); *idem*, xii.1970, 1 female
(MZUSP); *idem*, v.1971, 1 female (MZUSP); *idem*,

ix.1971, 1 female (MZUSP); *idem*, x.1971, 5 males, 2
females (MZUSP); *idem*, xi.1971, 5 males, 8 females
(MZUSP); *idem*, xii.1971, 1 female (MZUSP).

Material studied after completion of description: CO-
LOMBIA: *Risaralda*. SFF Otún Quimbaya, Urapa-
nera, 4°44'N, 75°35'W, 1960 m, Malaise, R. Walker
col, 20.xii.2002-03.i.2003, 2 females (IAHB).

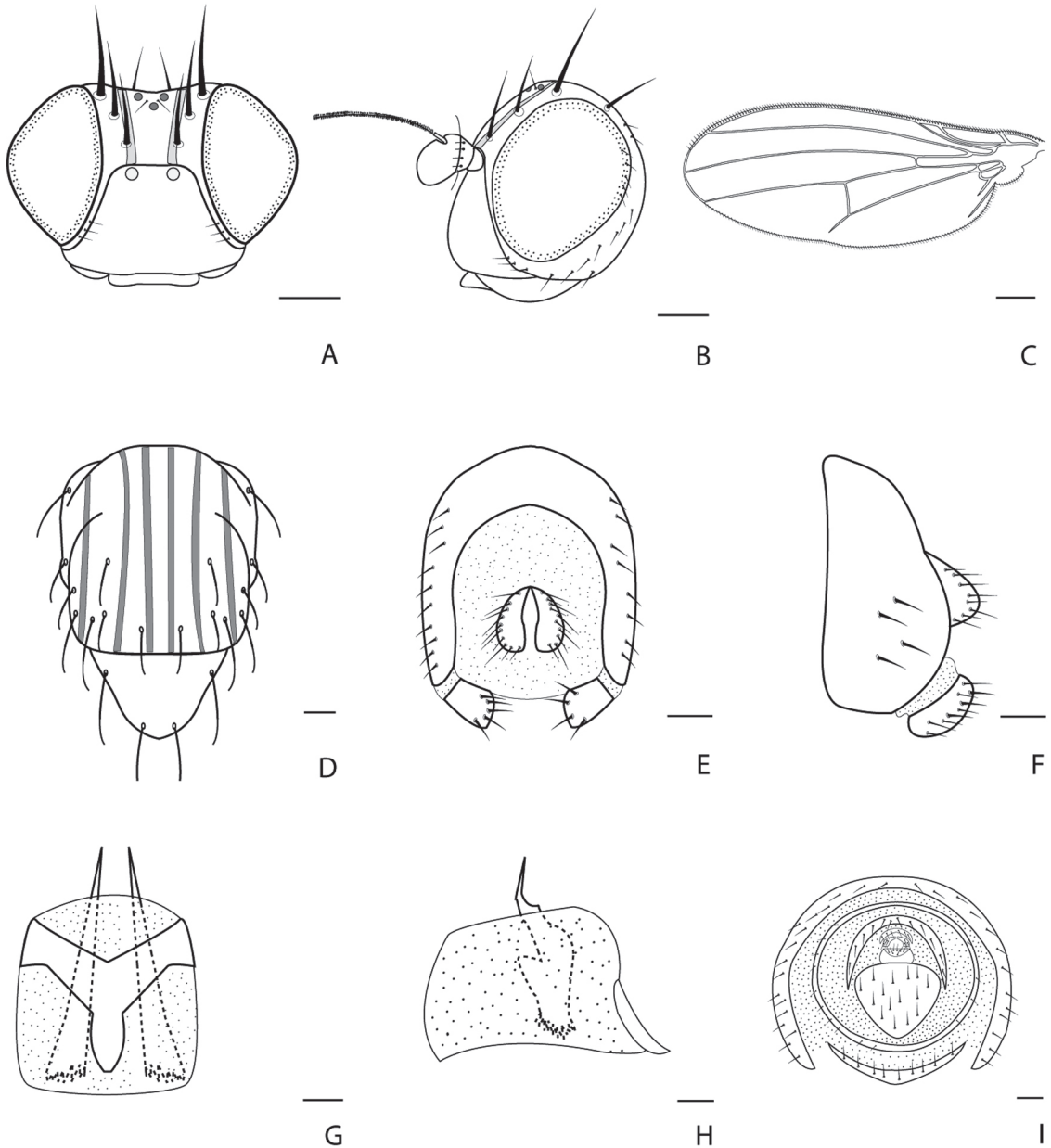


FIGURE 11: A-I. *Physoclypeus vittatus* sp. nov. A, head, frontal view; B, head, lateral view; C, wing; D, thorax, dorsal view; E, epandrium, dorsal view; F, epandrium, lateral view; G, aedeagus, ventral view; H, aedeagus, lateral view; I, female terminalia, ventral view. Scales: 0.1 mm, except C, 0.5 mm.

Physochlypeus zebrinus sp. nov.
(Figs. 12A-K)

Diagnosis

This species is distinguished from other congeners by the following combination of characters: arista pubescent; frons with two central stripes; 0+3 dorsocentral setae; 2 katepisternal setae; mesonotum with two central stripes, and two short lateral stripes; apical margin of abdominal tergites 3-6 dark, and central black stripes.

Description

Head: (Figs. 12A-B) ocellar triangle brown. Frons yellow, with two central stripes. Face yellow. Parafacial narrow and gena broad, yellow. Eye oval, higher than wide. Antenna: first flagellomere two times longer than wide; arista pubescent. Occiput yellow. Chaetotaxy: ocellar weak; outer vertical seta 1/3 length of inner vertical seta.

Thorax: (Fig. 12C) mesonotum yellowish brown, with two central stripes, and two short lateral stripes; pleura yellowish brown; scutellum triangular. Chaetotaxy: 0+3 dorsocentral setae; 2 katepisternal setae. *Legs:* yellow, tarsomeres 3-5 dark. Fore coxa, 4 anterior setae, 1 dorsal seta; mid coxa, 1 row of dorsal setae; hind coxa, 1 posterior seta; fore femur, 2 rows of dorsal setae, 1 row of posterior setae; mid femur, 1 row of anterior setae, 1 apical posterior seta; hind femur, 1 apical anterior seta; fore tibia, 1 apical ventral seta, 1 preapical dorsal seta; mid tibia, 1 apical anterior seta, 1 apical posterior seta; hind tibia, 1 apical posterior seta. *Wing* (Fig. 12D): yellow; with a pale spot between apex of Sc and R₁. Halter brown.

Abdomen: (Fig. 12E) brown, apical margin of tergites dark; tergites 3-6 with a black stripe at central region. Male terminalia: epandrium horseshoe-shaped, apical region rounded and broad in dorsal view (Fig. 12F), apical region convex and wider than basal region in lateral view (Fig. 12G); surstylus differentiated, articulated with epandrium; membranous region between cercus and epandrium, broad; aedeagus (Figs. 12H-I) well developed, with many inner longitudinal teeth; hypandrium as a complete ring, with a downward projection; paramere absent; cercus well developed, papillate. Female terminalia: (Fig. 12J) segment 7 little modified, arch-shaped tergite and sternite 7 not fused; sternite 8 shield-shaped, strongly sclerotized; hypo-

proct small; epiproct not observed; cercus small. Three spherical spermathecae, smooth surface (Fig. 12K).

Distribution: Mexico, Costa Rica, Venezuela, Ecuador and Bolivia.

Etymology: From *zebra*, the Abyssinian name for the striped equine of Africa; refers to the pattern of stripes present at abdomen.

Type material: *Holotype:* male; COSTA RICA: *Limón*. P.I.L. A Ref Valle Del Silencio, 2484 m, D. Rubí, R. Delgado, M. Alfaro col., 17.iii-02.iv.2003 (INBC). *Paratypes:* MEXICO: D.F., Desierto Leones, N.L.H. Kraus col, iii-v.1965, 1 female (USNM). COSTA RICA: San José, Rio Savergre, 9°33'N, 83°48,5'W, 2180 m, 29-30.vi.2001, A. Freidberg col, 2 males and 1 female (USNM); *idem*, 9°35'N, 83°48'W, 2450 m, A. Freidberg col, 29.vi.2001, 3 males and 1 female (USNM); San José, Tres de Junio, 9°39,5'N, 83°54'W, 2800 m, A. Freidberg col, 29.vi.2001, 2 females (USNM); Cartagena: Trinidad, 9°41,3'N, 83°54'W, 2530 m, A. Freidberg col, 29.vi.2001, 1 male (USNM). *Limón*. P.I.L. A Ref Valle Del Silencio, 2484 m, R. Gonzalez, D. Rubí, R. Delgado, M. Alfaro col, Malaise, 17.iii-02.iv.2003, 2 males and 1 female (INBC), 1 male and 1 female (MZUSP); *idem*, Area abierta, 2484 m, Malaise, 19.vi-5.vii.2003, 1 female (INBC); *idem*, Send. Andariel, 2472 m, Amarilla, 19-27.vi.2003, 1 female (INBC); Send. a Hoffman, 2475 m, D. Rubí, R. Gonzalez, R. Delgado, M. Alfaro col, Malaise, 19.vi-5.vii.2003, 1 male and 3 females (INBC); *idem*, Alred Refugio, 2406 m, D. Rubí, R. Gonzalez, R. Delgado, M. Alfaro col, 19-27.vi.2003, Amarilla, 1 male (INBC). *Puntarenas*. Potrero Grande, Cerro Kasir, 2959 m, M. Alfaro col, 19.vii-19.viii.2000, Malaise, 1 male (INBC). *Heredia*. R.V.S. Jaguarandi, Cerro Chompipe, 2100 m, M. A. Zumbado col, 25.ii.2003, 1 male (INBC); Estac. Barva, Braulio Carrillo, N.P., 2500 m, iii.1990, G. Rivera col, 1? (INBC). VENEZUELA: T.F. Amaz., Cerro de la Neblina, Camp II, 2100 m, 0°50'N, 65°59'W, 30.i.1985, Malaise trap at edge of open bog and *Bonettia* scrub, W. E. Steiner col, 1 female (USNM); *idem*, Camp vii, 1800 m, 0°51'N, 65°58'W, 30.i-10.ii.1985, Malaise trap in cloud forest ravine near stream, P.J. & P.M. Spangler & R. A. Faitute col, 1 female (USNM). ECUADOR: *Pinchincha*. Santo Domingo (76 km E), 2380 m, W.N. Mathis col, 07.i.1978, 1 female (USNM); *Loja*. Sur de Saraguro, 2900 m, L. E. Pena col, xi.1970, 2 females (MZUSP). BOLIVIA. *La Paz*. Cumbre Alto Beni, vicinity of Caranavi, 1685 m, 15°40'19'S, 67°29'35'W, S. D. Gaimari col, 19.iv.2004, 1 male (CSCA).

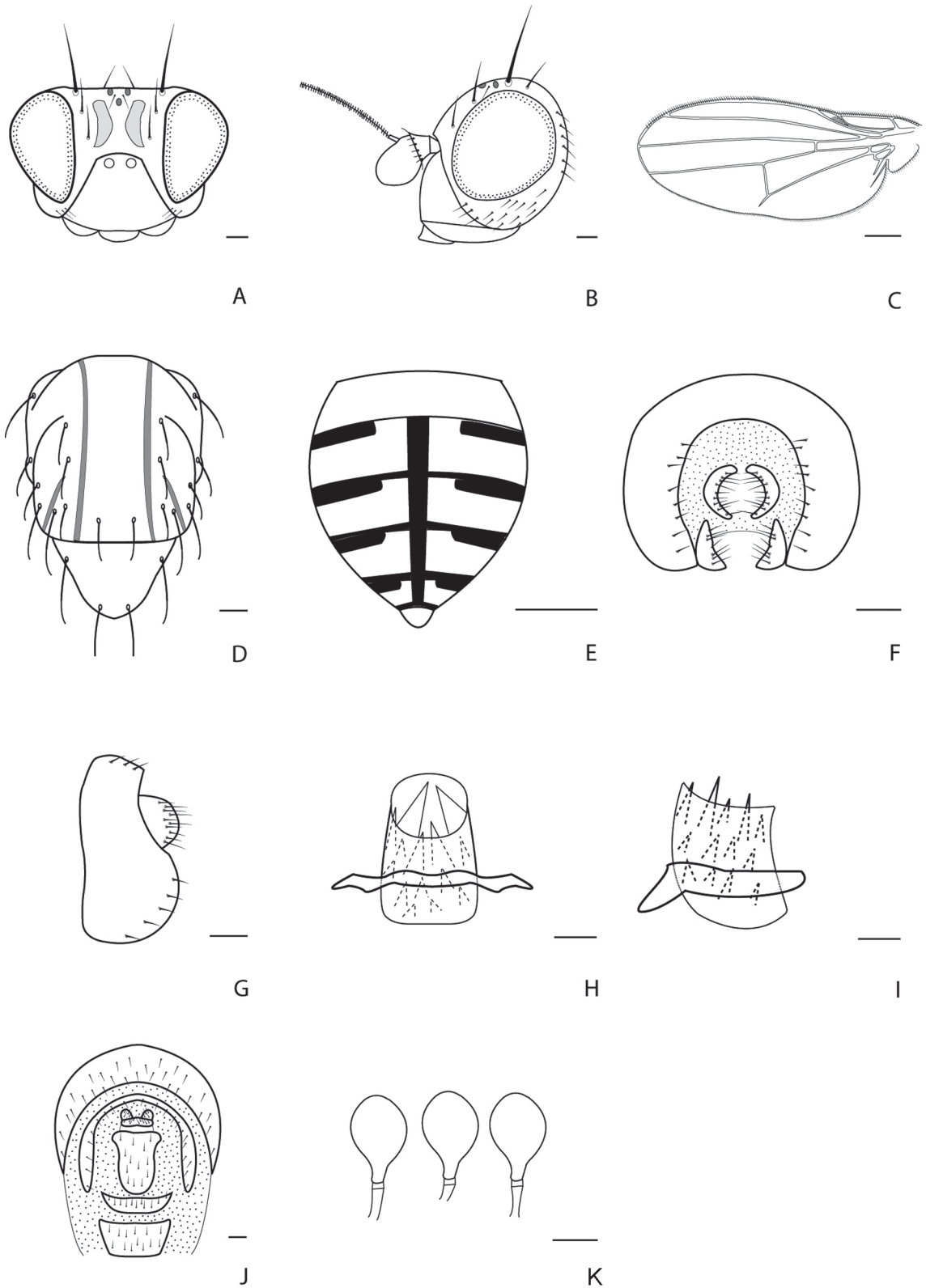


FIGURE 12: A-K. *Physoclypeus zebrinus* sp. nov. A, head, frontal view; B, head, lateral view; C, wing; D, thorax, dorsal view; E, abdomen, dorsal view; F, epandrium, dorsal view; G, epandrium, lateral view; H, aedeagus, ventral view; I, aedeagus, lateral view; J, female terminalia, ventral view; K, spermathecae. Scales: 0.1 mm, except C, 0.5 mm.

Key to the species of *Physochypeus* Hendel

1. Dorsocentral setae arranged 0+22
 Dorsocentral setae arranged 0+39
2. Scutellum with a dark spot at apex.....*P. scutellatus* (Curran) new comb. 3
 Scutellum without a spot at apex3
3. Mesonotum with two to six stripes4
 Mesonotum without stripes6
4. Frons without stripes (Fig. 5A)*P. lineatus* (Williston) new comb. 5
 Frons with two stripes.....5
5. Mesonotum with two stripes (Fig. 7C) *P. plaumanni* sp. nov. 7
 Mesonotum with six stripes (Fig. 11C) *P. vittatus* sp. nov. 7
6. Abdomen without spots; apical margin of tergites with a dark band, complete or incomplete at center...7
 Abdomen with spots at tergites 3 to 6 or only at tergite 6; apical margin of tergites without dark band ..8
7. Abdomen with apical margin of tergites with a broad dark stripe incomplete medially (Fig. 8D)
*P. risaraldensis* sp. nov. 11
 Abdomen with apical margin of tergites with a thin dark stripe complete medially (Fig. 4D).....
*P. hendeli* sp. nov. 11
8. Tergites 3 to 6 with spots (Fig. 1D)..... *P. coquilletti* (Hendel) 10
 Only tergite 6 with a spot (Fig. 10D)..... *P. unimaculatus* sp. nov. 10
9. Mesonotum with two or five stripes.....10
 Mesonotum without stripe.....11
10. Mesonotum with two pairs of stripes (Fig. 12C); abdomen with a dark strip medially on tergites 3 to 6;
 apical margin of tergites with a dark band incomplete at central region (Fig. 12) ...*P. zebrinus* sp. nov. 12
 Mesonotum with five stripes (Fig. 9C); abdomen with a small black spot at center of tergites 5 and 6;
 apical margin of tergites without a band.....*P. saltensis* sp. nov. 12
11. Abdomen with a stripe medially through tergites..... *P. annulatus* (Hendel) 12
 Abdomen without medial stripe on tergites.....12
12. Abdomen with few hairs, tergites 1 and 2 yellow, others brown; wing without spot (Fig. 6C)
*P. montanus* (Becker) new comb. 13
 Abdomen with many hairs; entirely yellow or brown; wing with a discrete spot between apex of Sc and
 R₁.....13
13. Frons with two faint stripes; abdomen dark brown*P. farinosus* Hendel 13
 Frons without stripe; abdomen yellow *P. flavus* (Wiedemann) 13

DISCUSSION

The majority of the species of *Physochypeus* can be identified through the presence and pattern of distribution of spots and stripes on the frons, thorax and abdomen. It is an important feature that allows identification of species without dissection and analysis of terminalia. Of course genitalic features would be potentially important for the discovery of additional new species.

Male terminalia of *Physochypeus* showed differences in shape and size of structures such as epandrium, surstylus, hypandrium, aedeagus and aedeagal apodeme. The aedeagus have differences in size and number of teeth. Probably these teeth have an important function in the sexual behavior of these flies, as is known to happen in Sepsidae (Eberhard & Huber 1998).

Female terminalia have morphological variations as well, that according to Kotrba (1995) are an excellent source of characters for the establishment of phylogenetic relationships among species. Some *Physochypeus* have the tergite 7 fused to the sternite 7 forming a complete ring while in others, the tergite and sternite of segment 7 can be separated. Sternite 8 is modified and strongly sclerotized as occurs in other Lauxaniidae genera (Shewell 1987).

In Lauxaniidae few species possess variation in number of spermathecae. Kim (1994) registered in three Australian species, *Australinina geniseta* (Malloch), *Homoneura (Homoneura) angustigena* Kim and *H. (H.) eurymelon* Kim the presence of four spermathecae (2+2). Likewise, some species of the Neotropical genus *Neogriphoneura* Malloch also present four spermathecae (2+2) (Mello & Silva, unpubl. data).

Silva (1999) registered for the first time the occurrence of only two spermathecae in *Cephaella* Malloch. In *Physoclypeus*, the number of spermathecae follows the ground plan of the family of three (2+1).

Examining the distributional range of the seven already known and described species of the genus is possible to detect that three (*Physoclypeus annulatus*, *P. montanus* and *P. scutellatus*) were studied only through their type material and new specimens were not found in the collections studied by the authors. Apparently, they are taxa with restricted distribution and/or with a biology that make them difficult to collect and are rare in collections. On the other hand, the other four species (*Physoclypeus coquilletti*, *P. farinosus*, *P. flavus* and *P. lineatus*) had their distributions widened. In part, this is due to data from the studies that extensively collected insects in Brazil and in Colombia, already cited at "Materials and Methods".

The data suggest that *P. farinosus* besides having a wide distribution, has its biology associated to Asteraceae, without host specificity – their adults were reared from plants of 56 different plant species belonging to eight tribes of Asteraceae (Silva & Mello 2008). As only flowerheads of Asteraceae were collected, is not possible to say that this lauxaniid species do not use flower resources from other plants for its larval development.

In the Colombian survey, *P. lineatus* was the most common species of the genus found in the samples, occurring in altitudes from 60 m to 2990 m (Silva, unpubl. data).

These results emphasize the need for further collecting, using various sample methods, to get a real knowledge of the occurrence areas of neotropical lauxaniids in general, and of *Physoclypeus* in particular.

RESUMO

O gênero *Physoclypeus* Hendel, 1907 apresenta distribuição restrita à Região Neotropical. Neste estudo, suas espécies foram redescritas, três novas combinações foram propostas, três lectótipos foram designados, sete novas espécies foram descritas e uma chave de identificação para as espécies foi apresentada. Uma lista atualizada das espécies de *Physoclypeus* inclui: *P. annulatus* Hendel, 1925; *P. coquilletti* (Hendel, 1908); *P. farinosus* (Hendel, 1925); *P. flavus* (Wiedemann, 1830); *P. hendeli* sp. nov. (localidade tipo, Jamaica, N. Irish Town); *P. lineatus* (Williston, 1896) new comb.; *P. montanus* (Becker, 1919) new comb.; *P. plaumanni* sp. nov. (localidade tipo, Brasil, Santa Catarina); *P. risaraldensis* sp. nov. (localidade tipo,

Colômbia, Risaralda); *P. saltensis* sp. nov. (localidade tipo, Argentina, Salta); *P. scutellatus* (Curran, 1926) new comb.; *P. unimaculatus* sp. nov. (localidade tipo, México, Vera Cruz); *P. vitattus* sp. nov. (localidade tipo, Brasil, Santa Catarina) e *P. zebrinus* sp. nov. (localidade tipo, Costa Rica, Limón).

PALAVRAS-CHAVES: Diptera; Lauxaniidae; *Physoclypeus*; Região Neotropical; novas espécies.

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REFERENCES

- ALMEIDA, A.M.; FONSECA, C.R.; PRADO, P.I.; ALMEIDA-NETO, M.; DINIZ, S.; KUBOTA, U.; BRAUN, M.R.; RAIMUNDO, R.L.G.; ANJOS, L.A.; MENDONÇA, T.G.; FUTADA, S.M. & LEWINSOHN, T.M. 2006. Assemblages of endophagous insects on Asteraceae in São Paulo cerrados. *Neotropical Entomology*, 35:458-468.
- ALMEIDA, A.M.; PRADO, P.I. & LEWINSOHN, T.M. 2004. Geographical distribution of Eupatorieae (Asteraceae) in South-eastern and South Brazilian Mountain ranges. *Plant ecology*, 174:163-181.
- AMORIM, D.S.; PAPAVERO, N.; SILVA, V.C.; LAMAS, C.J.E. & NIHEI, S.S. 2006. Geographic limits and causal factors for endemisms in the Atlantic Forest, Brazil: biogeography and a HomePage for the Neotropical Diptera. In: 6th International Congress of Dipterology, Fukuoka. *Abstracts*, p. 5-6.
- BECKER, T. 1919. Diptères. Brachycères. In: *Mission de L'Arc Méridien en Amérique du Sud*. Paris, v. 10, p. 163-215, pls. 14-17.

- CAMPOS, D.F. & FERNÁNDEZ, F. 2002. El Proyecto "Diversidad de Insectos en Colombia". In: Costa, C.; Vanin, S.A.; Lobo, J.M. & Melic, A. *Proyecto de Red Iberoamericana de Biogeografía y Entomología Sistemática PrIBES 2002*. Monografías Tercer Milenio, Zaragoza, España, v. 2, p. 297-300.
- COQUILLET, D.W. 1902. New acalyptrate Diptera from North America. *Journal of the New York Entomological Society*, 10(4):177-191.
- CURRAN, C.H. 1926. New Diptera from the West Indies. *American Museum Novitates*, 220:1-14.
- CURRAN, C.H. 1928. *Insects of Porto Rico and the Virgin Islands: Diptera or two-winged flies. Scientific Survey of Porto Rico and the Virgin Islands*. New York Academy of Sciences, New York, v. 11, part 1.
- EBERHARD, W.G. & HUBER, B.A. 1998. Copulation and sperm transfer in *Archiseptis* flies (Diptera, Sepsidae) and the evolution of their intromittent genitalia. *Studia dipterologica*, 5(2):217-248.
- HENDEL, F. 1907. Neue und interessante Dipteren aus dem kaiserl. Museum in Wien (Ein Beitrag zur Kenntnis der acalyptraten Musciden). *Wiener entomologische Zeitung*, 26:223-245.
- HENDEL, F. 1908. Diptera. Fam. Muscaridae, Subfam. Lauxaniinae. *Genera Insectorum*, 68:1-66.
- HENDEL, F. 1925. Neue Übersicht über die bisher bekannt gewordenen Gattungen der Lauxaniidae, nebst Beschreibung neuer Gattungen und Arten. *Encyclopedie entomologique*, Serie B. Dipt., II, p. 103-142.
- HENDEL, F. 1936. Ergebnisse einer zoologischen Sammelreise nach Brasilien, insbesondere in das Amazonas gebiete, ausgeführt von Dr. H. Zerny. X. Teil: Diptera. Muscidae acalyptratae (excl. Chloropidae). *Annalen des Naturhistorischen Museum in Wien*, 47:61-106.
- KIM, S.P. 1994. *Australian Lauxaniid flies: revision of the Australian species of Homoneura van der Wulp, Trypetisoma Malloch, and allied genera (Diptera: Lauxaniidae)*. Monographs on invertebrate taxonomy, Csiro, Australia, v. 1.
- KOTRBA, M. 1995. The internal female genital organs of *Chaetodiopsis* and *Diasemopsis* (Diptera: Diopsidae) and their systematic relevance. *Annals of the Natal Museum*, 36:147-159.
- LEWINSOHN, T.M. 1991. Insects in flower heads of Asteraceae in Southeast Brazil: A tropical case study on species richness. In: Price, P.W.; Lewinsohn, T.M.; Fernandes, G.W. & Benson, W.W. (Eds.), *Plant-Animal Interactions: Evolutionary Ecology in Tropical and Temperate Regions*. Wiley/Interscience, New York, p. 525-560.
- MALLOCH, J.R. 1933. Acalyptrata. In: Schmitz, H. (Ed.), *Diptera of Patagonia and South Chile*. British Museum Natural History, London, v. 6, p. 177-391.
- MCALPINE, J.F. 1981. Morphology and terminology – adults. In: McAlpine, J.F.; Peterson, B.V.; Shewell, G.E.; Teskey, H.J.; Vockeroth, J.R. & Wood, D.M. (Coords.), *Manual of Nearctic Diptera*. Research Branch, Agriculture Canada, Ottawa, v. 1, Monograph n° 27, p. 9-63.
- MELLO, R.L. & SILVA, V.C. 2007. Morphological ultra-structure of the labellum in three Neotropical Lauxaniidae (Diptera, Muscomorpha). *Studia dipterologica*, 37(2):397-403.
- SARMIENTO, C. 2000. Insectos. *Boletín del Proyecto Insectos de Colombia IAHV-UK-UAESPNN*, 1:1-19. Available at: <www.sharkeylab.org/biodiversity/docs/colombia/insecto.pdf>. Access date: 05/ Apr/ 2008.
- SHARKEY, M. 2006. *The Colombian Biodiversity Inventory – Project Overview*. Available at: <www.sharkeylab.org/biodiversity/static.php?app=colombia&page=overview>. Access date: 05/ Apr/ 2008.
- SHEWELL, G.E. 1987. Lauxaniidae. In: McAlpine, J.F. (Ed.), *Manual of Nearctic Diptera*. Research Branch, Agriculture Canada, Ottawa, v. 2, Monograph n° 28, p. 951-964.
- SILVA, V.C. 1999. Systematic review of Neotropical Lauxaniidae genera: *Cephalella* Malloch, 1926 (Diptera, Schizophora). *Revista Brasileira de Zoologia*, 16(1):133-137.
- SILVA, V.C. & MELLO, R.L. 2008. Occurrence of *Physoclypeus farinosus* Hendel (Diptera: Lauxaniidae) in flowerheads of Asteraceae (Asterales). *Neotropical entomology*, 37(1):92-96.
- SILVA, V.C. & YABUCHI, V.T.N. 2006. Distributional patterns of Lauxaniidae species (Diptera, Schizophora) along the Atlantic Forest, Brazil. In: 6th International Congress of Dipterology, Fukuoka. *Abstracts*, p. 233-234.
- STUCKENBERG, B.R. 1971. A review of the Old World genera of Lauxaniidae (Diptera). *Annals of the Natal Museum*, 20(3):499-610.
- WIEDEMANN, C.R.W. 1830. *Aussereuropäische zweiflügelige Insekten*. Schulzischen, Hamm.
- WILLISTON, S.W. 1896. On the Diptera of St. Vincent (West Indies). *Transactions of the Entomological Society of London*, 1896:253-446.

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