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Taxonomic revision of the Neotropical stalk-eyed fly *Plagiocephalus* Wiedemann (Diptera, Ulidiidae, Ulidiinae)

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ABSTRACT

Plagiocephalus is a genus composed of three species mainly recognized by the males with stalked-eyes. *Plagiocephalus lobularis* is distributed from Northeastern Brazil to North of Argentina, *P. latifrons* is distributed from Mexico to Bolivia, and *P. intermedius* occurs in Costa Rica. We review the species of the genus, providing new diagnostic characters, an identification key, and new information on the terminalia of *Plagiocephalus*. Also, we update the geographic distribution of the species of the genus.

Introduction

Among the genera of the Neotropical tribe of ulidiids, Pterocallini, *Plagiocephalus* Wiedemann is one of the most unusual. The male of all three described species, *P. lobularis* (Wiedemann), *P. latifrons* (Hendel) and *P. intermedius* Kameneva, present the eyes stalked. In *P. latifrons*, the eyestalks can reach great proportions, extending until five times the length of the body (Grimaldi and Engel, 2005). The species of *Plagiocephalus* can also be recognized by the brownish body background colour, with grey and yellow microtrichia on the thorax and abdomen, pattern of dark bands on the wing, vein R_1 with setae on the apical half, vein R_{2+3} almost straight and cell cup with a very short posteroapical lobe (Kameneva, 2004b).

Wiedemann (1830a) described the type species of the genus, *Plagiocephalus lobularis*, originally belonging to *Achias* Fabricius (Platystomatidae), another genus of stalk-eyed fly. In the same year, Wiedemann (1830b) described *Plagiocephalus*, considering *A. lobularis* as belonging to this genus. Hendel (1909a) described the second *Plagiocephalus* species, *P. latifrons*, originally on the genus *Terpnomyia* Hendel. Hendel (1936) created a new genus, *Ophryoterpnomyia*, to allocate *T. latifrons*, considering differences in the head while comparing it to other species of *Terpnomyia*. However, *Ophryoterpnomyia* was synonymized with *Plagiocephalus* by Carrera (1950). Kameneva (2004b) described *P. intermedius*, the last described species of *Plagiocephalus*.

Carrera (1950), Steyskal (1963) and Kameneva (2004b) revised the genus, Kameneva (2004b) presented a key to the species of the genus, and only Steyskal (1963) presented an illustration of a terminalia of one of the species, a male terminalia of *P. latifrons*. In the present paper, we provide a general description with new characters from the terminalia of *Plagiocephalus*. In addition, we update the geographical distribution of the species of the genus.

Material and methods

The description of the labels of the type material was obtained from Kameneva (2004b). The type material of *Plagiocephalus* was examined by photos. The pictures of the types were taken from the material deposited in the following colletions (curators are between parentheses): INBio: Instituto Nacional de Biodiversidad, Santo Domingo, Heredia, Costa Rica (sent by Valery Korneyev (Schmalhausen Institute of Zoology, Kyiv, Ukraine)); INTA: Instituto Nacional de Tecnología Agropecuaria, Buenos Aires (Esteban Daniel Saini), Argentina; MTD: Museum für Tierkunde, Dresden, Germany (Uwe Kallweit); MZH: Finnish Museum of Natural History, Helsinki, Finland (Pekka Vilkamaa); NHMW: Naturhistorisches Museum Wien, Vienna, Austria (Peter Sehnal); and ZMUC: Zoological Museum University of Copenhagen, Copenhagen, Denmark (Thomas Pape). Non-type material was provided by the following collections: CEUA: Colección Entomológica, Universidad de Antioquia, Medellín, Colombia (Marta Wolff); CZMA: Coleção Zoológica do Maranhão, Universidade Estadual do Maranhão, Caxias, Maranhão, Brazil (Francisco Limeira-de-Oliveira); DZUP: Coleção Entomológica Padre Jesus Santiago Moure, Departamento

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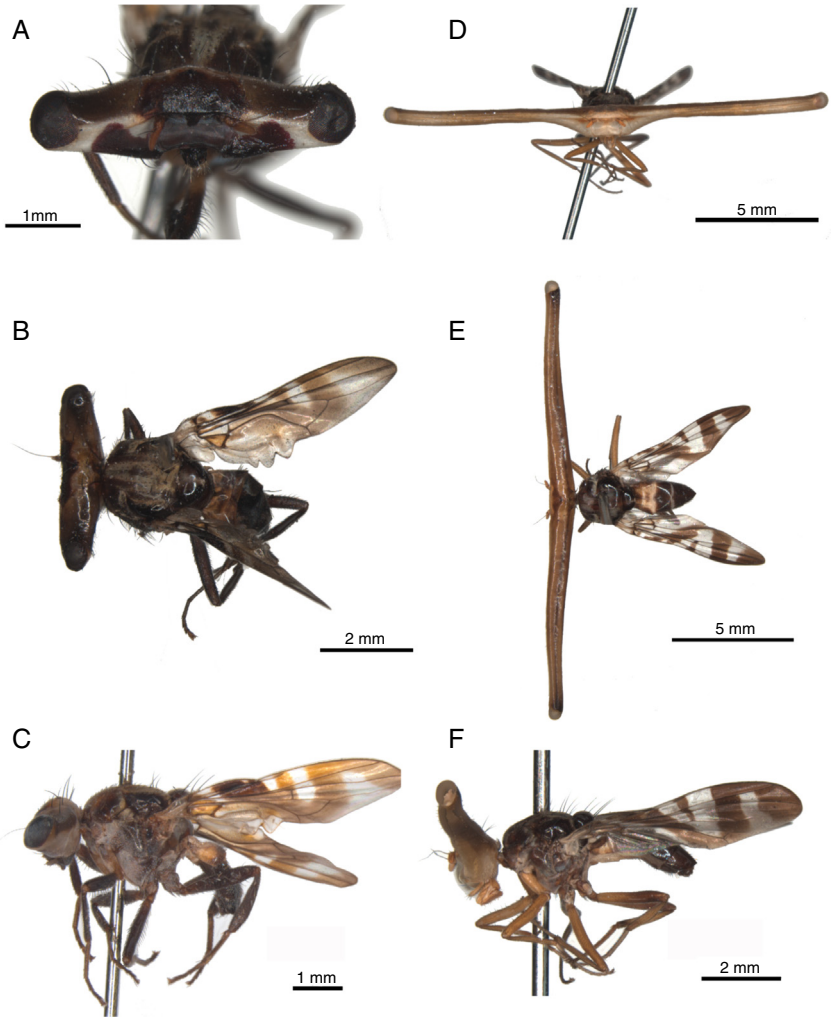

Fig. 1. A–C. *Plagiocephalus lobularis*, male: A. Head in frontal view; B. Body in dorsal view; C. Body in lateral view. D–F. *Plagiocephalus latifrons*, male: D. Head in frontal view; E. Body in dorsal view; F. Body in lateral view.

de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brazil (Claudio J. B. de Carvalho); EMUS: Utah State University, Entomological Museum, Logan, Utah, United States (Wilford J. Hanson (deceased)) (now donated to the LACM); INPA: Instituto Nacional de Pesquisas da Amazônia, Coleção Sistemática de Entomologia, Manaus, Amazonas, Brazil (Márcio Oliveira); LACM: Natural History Museum of Los Angeles County, Los Angeles, California, United States (Brian Brown); MNRJ: Museu Nacional da Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (Márcia S. Couri); MZSP: Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (Carlos J. E. Lamas); NHMUK: National History Museum of London, London, England (Daniel Whitmore); and USNM: United States National Museum of Natural History, Department of Entomology, Washington, District of Columbia, United States (Allen L. Norrbom). The locality cited as Seara (Santa Catarina, Brazil) in the Material examined section of *Plagiocephalus lobularis* is the city correspondent to the district of Nova Teutônia. New records of geographic distribution are marked with an asterisk in the Distribution section of each species.

General terminology is based on Cumming and Wood (2009). The terminology of wing pattern and male terminalia follow White et al. (1999). The "anterior apical band" termed by White et al. (1999) is here named as "apical band". The female terminalia structures follow Norrbom and Kim (1988). The pictures presented in this work were taken from non-type specimens of the DZUP and USNM collections, with exception of the *Plagiocephalus intermedius* male and female wings (Fig. 3E, F), which were taken, respectively, from the holotype and a paratype. The photographs of the specimens and terminalia were taken with an Auto-Montage Imaging System® Leica DFC 500 in the Taxonline (UFPR), and drawings were made with a microscope Zeiss Standard 20 coupled with a camera lucida. The map was constructed on QGIS 2.18.14 using a Latin America political shape and a satellite raster from the Google plugin installed on the QGIS.

Taxonomy

Plagiocephalus Wiedemann, 1830b
(Figs. 1–5)

Plagiocephalus Wiedemann, 1830b: 12, 15; Westwood, 1849: 235; Osten-Sacken, 1881: 478; Hendel, 1911: 4, 52; Cresson, 1923: 258; Frey, 1926: 47; Carrera, 1950: 261; Aczél, 1951: 421; Steyskal, 1963: 511; 1964: 400; 1968: 54.21; Kameneva, 2004b: 15. *Plagiocephala*: Macquart, 1843: 213; Loew, 1873: 26; Hendel, 1909b: 47 (unjustified emendation); *Plagiocephalas*: Frey, 1926: 47 (error).

Stylophthalmyia Frey, 1926. Type species: *Stylophthalmyia fascipennis* Frey, 1926 (by original designation).

Ophryoterpnomyia Hendel, 1936. Type species: *Terpnomyia latifrons* Hendel, 1909a (by original designation).

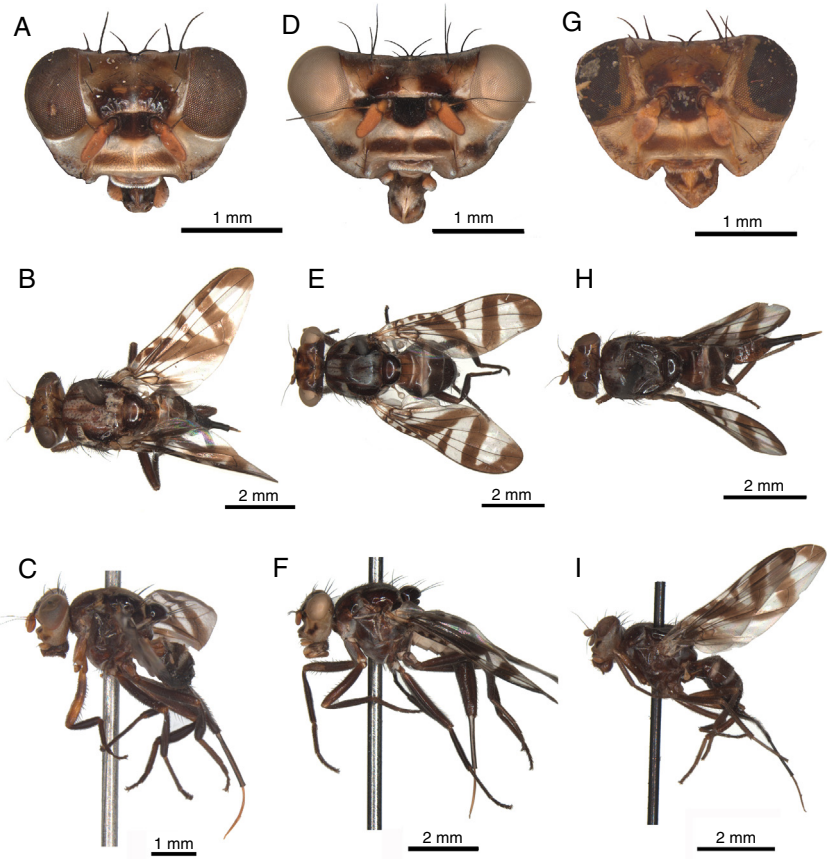

Fig. 2. A–C. *Plagiocephalus lobularis*, female: A. Head in frontal view; B. Body in dorsal view; C. Body in lateral view. D–F. *Plagiocephalus latifrons*, female: D. Head in frontal view; E. Body in dorsal view; F. Body in lateral view. G–I. *Plagiocephalus intermedius*, female: G. Head in frontal view; H. Body in dorsal view; I. Body in lateral view.

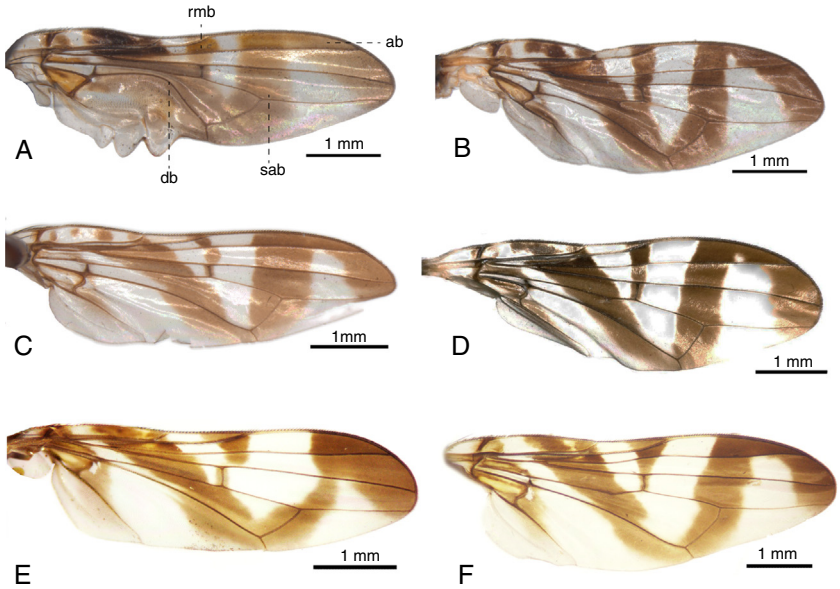

Fig. 3. A–B. *Plagiocephalus lobularis*: A. Male wing; B. Female wing. C–D. *Plagiocephalus latifrons*: C. Male wing; D. Female wing. E–F. *Plagiocephalus intermedius*: E. Male wing; F. Female wing. Abbreviations: ab: apical band; db: discal band; sab: subapical band; rmb: radial-medial band.

Paragoniaeola Blanchard, 1938a. Type species: *Paragoniaeola tanycephala* Blanchard, 1938a (by original designation).

Eupterocerina Blanchard, 1938b. Type species: *Eupterocerina conjucta* Blanchard, 1938b (by original designation).

Willineria Blanchard, 1951. Type species: *Willineria orfilai* Blanchard, 1951 (by original designation).

Type species: *Achias lobularis* Wiedemann, 1830a(by monotypy).

Diagnosis. Male with stalked eyes, frons wider than long (moderately wide in female). Thorax and abdomen brownish with pattern of yellowish-grey microtrichia; one supra-alar and two dorsocentral setae. Vein R_1 setulose on apical half; vein R_{2+3} almost

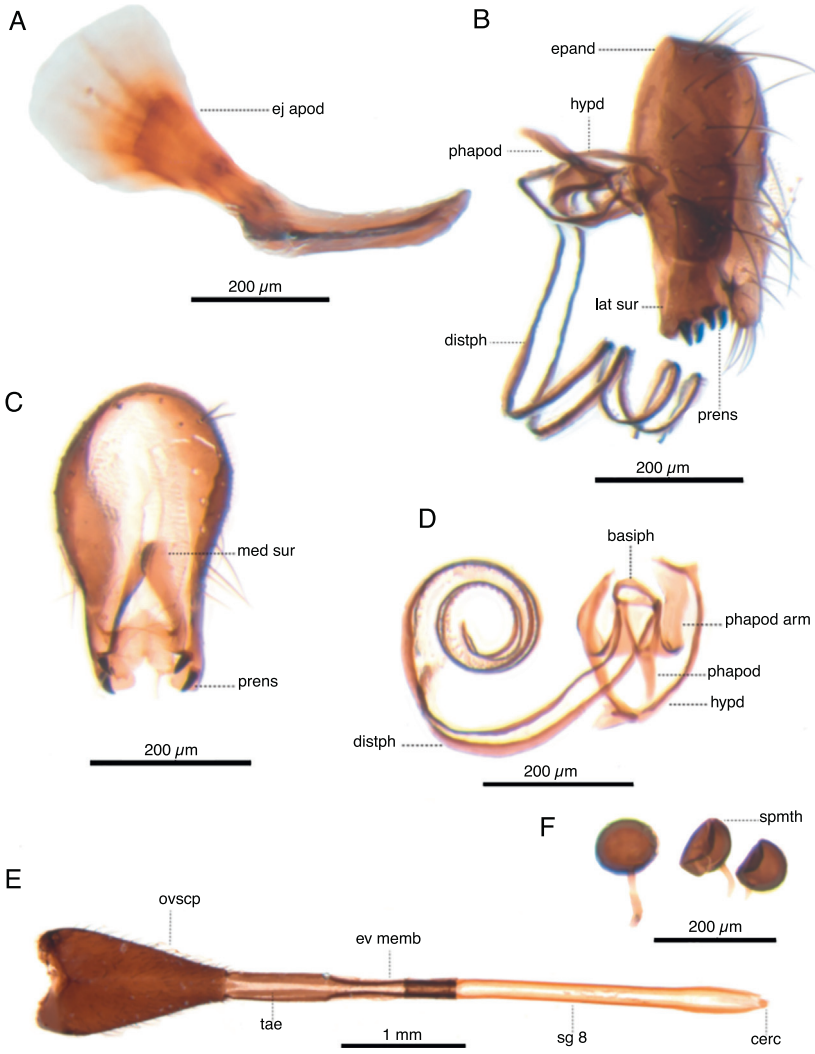

Fig. 4. A–D. General morphology of the male terminalia of *Plagiocephalus*: A. Ejaculatory apodeme in lateral view (*P. lobularis*); B. Male terminalia in lateral view (*P. lobularis*); C. Epandrium in posterior view (*P. latifrons*); D. Hypandrium, phallapodeme, phallapodemic arms, basiphallus and distiphallus (*P. latifrons*). E–F. General morphology of the female terminalia of *Plagiocephalus*: E. Female terminalia in dorsal view (*P. lobularis*); F. Spermathecae (*P. lobularis*). Abbreviations: basiph: basiphallus; cerc: cerci; distph: distiphallus; ej apod: ejaculatory apodeme; epand: epandrium; ev memb: eversible membrane; hypd: hypandrium; lat sur: lateral surstylus; med sur: medial surstylus; ovscp: oviscape; phapod: phallapodeme; phapod arm: phallapodemic arm; prens: prensiseta; sg 8: segment 8; spmth: spermathecae; tae: taeniae.

straight; crossvein r-m at apical 2/5 of d-m cell; cell cup with short posterior lobe; wing hyaline with four main dark-brown bands: discal band, radial-medial band, subapical band and apical band. Abdominal tergites 3–5 subequal in both sexes. Female with tergite 6 short, hidden under tergite 5, with several short marginal setulae; sternites 4–6 without apodemes. Male terminalia with distiphallus microtrichose at apical 2/3, elongated; ejaculatory apodeme with apical portion at least as long as its fan-like portion; epandrium elongate oval and setulose; medial surstylus bearing two subequal prensisetae with small denticles on inner surface. Female with oviscape brown, setulose, longer than the four preceding tergites together; segment 8 long; cerci oval, slightly turned upwards, dorsally with one basal, one subapical and two apical pairs of setae; three rounded, brown and smooth spermathecae.

Redescription. *Head*: Male (Fig. 1A, D): Wider than thorax; in frontal view wider than high (at least five times the width of the eye); eyes stalked, entirely microtrichose; eye higher than gena; inner vertical setae parallel; outer vertical, postocellar and ocellar setae divergent; orbital setae reclinate; ocellar triangle brown to black; dorsolateral and anterior portions of occiput brown; frons gold, with darker spot, wider than long and with sparsely distributed black setulae; gena with black setulae and developed vibrissa; antennal groove absent; scape, pedicel and first flagellomere yellow to gold; first flagellomere oval, about 2.5 times the length of pedicel; arista brown with very short pubescence, about 3.5 times the length of first flagellomere; clypeus with white microtrichia; palpus not extending beyond anterior oral margin, with black setulae on apex; proboscis capitate, covered with setulae. Female (Fig. 2A, D, G): Similar to male, except: in frontal view wider than high (less than four times the width of eye); eyes not stalked; frons with two brown to black spots anterior to ocellar triangle; face convex, with black spot between antennae and two transversal brown spots above clypeus; gena with C-shaped spot of brown microtrichia.

Thorax (Figs. 1B, E, 2B, E, H): Brownish black with patterns of yellow-grey microtrichia; scutum with brown microtrichose pattern; postpronotal lobe, scutellum, subscutellum and mediotergite mostly shiny brown; scutellum with a yellow-grey microtrichose stripe reaching the subscutellum; one postsutural supra-alar seta, one postalar seta, one intra-alar seta, two dorsocentral setae, and two scutellar setae; anepisternum setulose and with up to 10 setae; katepisternum with one seta.

Wing (Fig. 3A–F): Humeral break distinct; vein C between veins Sc and R_1 almost straight; cell c with brown spots; pterostigma

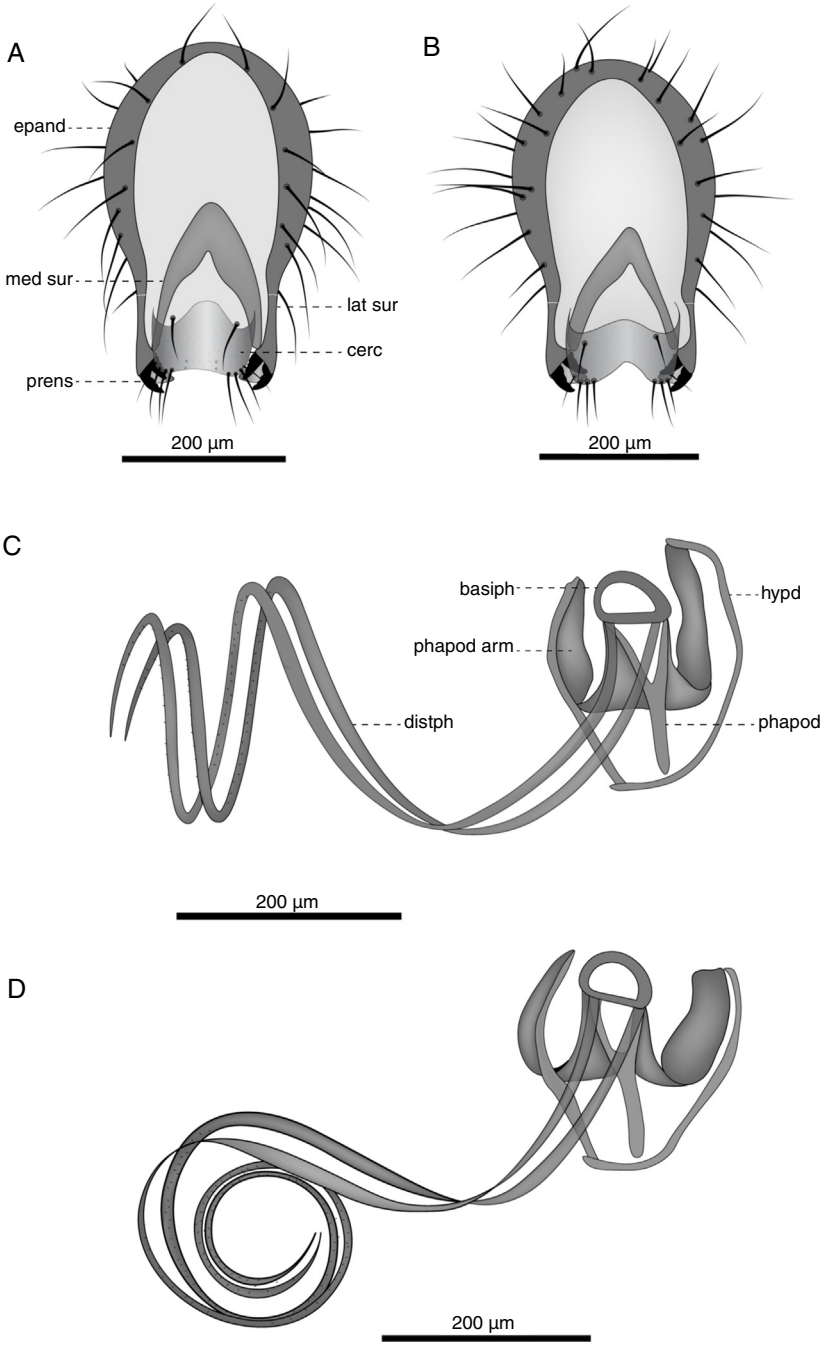

Fig. 5. A–D. *Plagiocephalus*, male terminalia: A. Epandrium of *P. lobularis*; B. Epandrium of *P. latifrons*; C. Hypandrium, basi- and distiphallus of *P. lobularis*; D. Hypandrium, basi- and distiphallus of *P. latifrons*. Abbreviations: basiph: basiphallus; cerc: cercus; distph: distiphallus; epand: epandrium; hypd: hypandrium; lat sur: lateral surstylus; med sur: medial surstylus; phapod: phallapodeme; phapod arm: phallapodemic arm; prens: prensiseta.

unmodified, five to seven times as long as wide; vein R_1 setulose on apical half; vein R_{2+3} bare and almost straight; vein R_{4+5} bare, ending in the middle of wing apex; crossvein r-m at apical 2/5 of cell d-m; cell cup with very short posterior lobe; vein $A_1 + CuA_2$ reaching the posterior margin; wing hyaline, with pattern of four main bands; discal band from middle of cell sc inclined to posterior margin close to vein CuA_1; radial-medial band from apex of cell sc reaching the crossvein r-m; subapical band from vein CuA_1 crossing the wing to the 5/6 of vein C; apical band from final portion of vein C bypassing the apex. Upper calypter slightly longer than lower calypter, white and with white fringe. Halter white to yellow.

Legs (Figs. 1C, F, 2C, F, I): Unmodified, moderately setulose and with brown or yellow colouration.

Abdomen: Dark brown, with areas of yellow-grey and brown microtrichia at anterior and posterior margins of tergites; uniformly setulose; male with tergite 5 without microtrichia; female tergite 5 shorter than the 4th, and tergite 6 smaller, hidden under the 5th, without microtrichias and with 4–5 short marginal setulae; sternites 4–6 without apodemes.

Terminalia: Male (Figs. 4A–D, 5A–D): Ejaculatory apodeme with apical portion at least as long as its fan-like portion; epandrium elongate oval and setulose; medial surstylus "V" shaped, with each apex connected to lateral surstylus; two subequal prensisetae with small denticles on the inner surface, positioned subapically on medial surstylus; lateral surstylus with anterior lobe longer than the posterior; basiphallus D-shaped, connected to phallapodeme;

phallapodeme Y-shaped, with apex slightly surpassing the hypandrium; phallapodemic arms connected to hypandrium, with few small setulae; phallus with microsetulae at the apical 2/3, elongated and with no glans-like structures on apex. Female (Fig. 4E, F): Oviscape brown, setulose, longer than the four preceding tergites together; segment 8 long; cerci oval, slightly turned upwards, and dorsally with one basal, one subapical and two apical pairs of setae; three spermathecae rounded, brown, with smooth surface.

Observation. The male terminalia of *P. intermedius* could not be analyzed, because no male specimens were found in the material provided by the collections that supported our study. The female terminalia of all three species of *Plagiocephalus* were analyzed.

Distribution. Neotropical (Mexico, Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Trinidad, Venezuela, Colombia, Brazil, Ecuador, Peru, Bolivia, Paraguay and Argentina) (Fig. 6).

Identification key to the species of *Plagiocephalus*

1. – Wing with radial-medial band well connected with discal band (Fig. 3A, B); male wing with three lobes on the hind margin (Fig. 3A); male face blackish (Fig. 1A) .... *P. lobularis*
1' – Wing with radial-medial band not connected with discal band (Fig. 3C–E); male wing without lobes on the hind margin (Fig. 3C, E); male face yellowish white (Fig. 1D) 2
2. – Wing with radial-medial band with similar width along the base and apex (Fig. 3C, D); crossvein r-m almost at the level of apex of vein R_1 (Fig. 3C, D); female parafacialia black (Fig. 2D)..... *P. latifrons*
2' – Wing with radial-medial band with base much wider than apex (Fig. 3E, F); crossvein r-m located distinctly before the apex of vein R_1 (Fig. 3E, F); female parafacialia yellow (Fig. 2G)..... *P. intermedius*

Plagiocephalus lobularis (Wiedemann, 1830a)

(Figs. 1A–C, 2A–C, 3A, B, 4A, B, E, F, 5A, C)

Plagiocephalus lobularis (Wiedemann, 1830a): Wiedemann, 1830b: 15; Macquart, 1843: 213 (*Plagiocephala lobularis*); Hendel, 1909b: 47; Westwood, 1849: 235; Frey, 1926: 47; Carrera, 1950: 262, 265 (*Plagiocephalus latifrons* (misidentification; see Steyskal, 1963); Aczél, 1951: 422; Hennig, 1952: 616; Steyskal, 1963: 512, 1968: 54.21; Kameneva, 2004b: 16.

Achias lobularis Wiedemann, 1830a: 555 (Lectotype male, ZMUC; Type locality: Brasilia (Brazil)) (examined by photographs); Macquart, 1835: 260.

Paragoniaeola tanycephala Blanchard, 1938a: 371 (Holotype male, INTA; Type locality: Argentina: Misiones) (synonymized by Aczél, 1951: 399) (examined by photographs).

Eupterocerina conjuncta Blanchard, 1938b: 91 (Holotype female, unknown collection; Type locality: Argentina: Misiones, Puerto Bemberg) (synonymized by Steyskal, 1968: 54.21).

Ophryoterpnomyia zikani Capoor, 1954: 205 (Holotype female, Instituto Oswaldo Cruz (no. 5787, 4541–4543); Type locality: Brazil: Rio de Janeiro, Itatiaia) (synonymized by Steyskal, 1963: 512).

Type material. Lectotype of *Achias lobularis* (designed by Kameneva, 2004b) (male): "P. lobularis / Wied. / Brazils / Lund", "Mus./Westerm.", "Syntype male / Achias lobularis / Wiedemann / 1830 / des. V. Korneyev / XII.2003", "Syntypus", "ZMUC 00025500".

Diagnosis. *Plagiocephalus lobularis* can be differentiated from *P. latifrons* and *P. intermedius* by the shortest eyestalks (1.42–3.94 mm) (Fig. 1A, B); female parafacialia yellow (Fig. 2A); radial–medial band well connected to discal band (Fig. 3A, B), and male wing with three posterior lobes (Fig. 3A). The species can also be distinguished by male frons with dark gold spot on anterior portion of ocellar triangle (Fig. 1B); male with purplish black spot from ventral side of the head up to face and part of the parafacialia (Fig. 1A); scape dark gold to brown (Figs. 1A, 2A); pedicel and first flagellomere gold, sometimes with darker marks (Figs. 1A, 2A); male palpus brown, and female palpus yellow; proboscis brown, with brown and yellow setulae. Wing with crossvein r-m located distinctly before apex of vein R_1 (Fig. 3A, B); cell cup yellow and, in males, closed by an almost straight vein (Fig. 3A); cells c and sc, and base of discal band with colouration darker than in the other bands (Fig. 3A, B); male discal and subapical bands forming a rounded angle (Fig. 3A). Legs brown, with tarsi lighter and fore coxa yellow; male fore femur with base yellow (Fig. 1C); female fore femur yellow, with a subbasal brown ring (Fig. 2C).

Measurements: Male: Body: 2.37–3.52 mm; Wing: 4.35–5.34 mm. Female: Body: 2.49–3.75 mm; Wing: 4.35–5.82 mm; Oviscape: 1.0–1.5 mm.

Material examined. ARGENTINA: Misiónes, Iguazú (25.6036 S, 54.5558 W), 04–10.x.1927, R. C & E. M. Shannon *leg.*, 1 male (Det.: E. Kameneva, 2001) (USNM). BRAZIL: Ceará: Ibiapaba, Cachoeira Samambaia, 21.x.2011, Gomes & Duarte *leg.*, 1 female (DZUP); Ubajara, Parque Nacional do Ubajara, Cachoeira do Cafundó (3.8369 S, 40.9097 W), 01–15.i.2013, F. Limeira-de-Oliveira & J. S. Pinto Júnior *leg.*, 1 male (CZMA). Goiás: (Est. Goyaz), Campinas, i–1936, R. Spitz *leg.*, 1 female (MNRJ) and 5 females (MZSP); Goianesia, ix.1969, H. Ebert *leg.*, 2 females (MZSP). Mato Grosso do Sul: Aquidauana (20.4344 S, 55.6558 W), 15–26.x.2011, Lamas, Nihei & eq. *leg.*, 1 female (MZSP); Maracaju, ii.1937, 1 female (USNM). Paraná: Antonina, Reserva Rio Cachoeira (25.3119 S, 48.6717 W), 50 m, 23–27.i.2017, A. C. Domahovski *leg.*, 1 male and 1 female (DZUP); Curitiba, Jardim Botânico (25.4421 S, 49.2388 W), 05.iv.2015, O. Aguirre-Obando *leg.*, 1 male (DZUP); idem, Universidade Federal do Paraná, Centro Politécnico, Mata Viva (25.4458 S, 49.2324 W), 921 m, 28.vii–11.viii.2015, L. Wendt *leg.*, 1 male (DZUP); ibidem, 11–25.viii.2015, 2 females (DZUP); ibidem, 09–24.ix.2015, 1 female (DZUP); ibidem, 09–23.x.2015, 1 male (DZUP); ibidem, 18.xi–03.xii.2015, 1 female (DZUP); ibidem, 08–25.i.2016, 1 male and 2 females (DZUP); ibidem, 11–25.ii.2016, 1 male and 2 females (DZUP); ibidem, 26.ii–14.iii.2016, 2 males and 1 female (DZUP); ibidem, 14–28.iii.2016, 3 males and 2 females (DZUP); ibidem, 28.iii–13.iv.2016, 2 males and 2 females (DZUP); ibidem, 13–28.iv.2016, 2 males and 4 females (DZUP); ibidem, 25.viii–09.ix.2016, 1 female (DZUP); idem, 6–9.xii.2016, A. C. Vasconcelos *leg.*, 1 female (DZUP); ibidem, 21–23.ii.2017, 1 male and 1 female (DZUP); ibidem, 28.iii–03.iv.2017, 1 male (DZUP); idem, 15.ix.2017, S. Silva *leg.*, 3 females (DZUP); Paranaguá, Floresta Estadual do Palmito (25.5688 S, 48.5355 W), 16–17.vii.2014, Leviski, Siewert & Queiroz-Santos *leg.*, 2 males (DZUP); São José dos Pinhais (25.6047 S, 49.1933 W), 897 m, xi.2016, A. C. Domahovski *leg.*, 2 females (DZUP); ibidem, xii.2016, 1 female (DZUP). Pernambuco: Bonito, Cachoeira Véu da Noiva (8.5423 S, 35.715 W), 510 m, 25.iii.2015, F. Bravo *leg.*, 1 male (DZUP). Rio de Janeiro: Angra, Japuíba "Japuhyba" (22.9949 S, 44.2920 W), i.1985, E. Dorio & T. Travasso *leg.*, 1 female (MNRJ); Casimiro de Abreu, Reserva Biológica da União, Trilha Buracão (22.4240 S, 42.0391 W), 14.i–14.ii.2014, Eq. Col. Biota Diptera Fluminense *leg.*, 1 female (MNRJ); Rio de Janeiro, x–xii.1937–1.1938, R. C. Shannon *leg.*, 2 females (USNM); idem, ix.1938, 1 female (USNM); idem, x.1938, YelFevServ. MESBrazil, 9 females (Det.: G. Steyskal, 1962) (USNM); ibidem, i.1939, 1 female (USNM); idem, 08.xi.1933, H. Lopes Souza *leg.*, "*Terpnomyia latifrons*", 1 female (MNRJ); idem, ix.1938, Serv. Febre Amarela MESBrazil, 1 female (USNM); idem, "Dist. Federal", x.1937, Serv. Febre Amarela MESBrazil, 1 male (USNM); idem, xii.1938, Serv. Febre Amarela MESBrazil, 1 female (USNM); ibidem, xiii.1938, 1 female (USNM); idem, ix.1938, R. C. Shannon *leg.*, YelFevServ. MESBrazil, 1 female (USNM); Jacarepaguá, Repr. Rio Grande, iii.1968, M. Alvarenga *leg.*, 1 female (MZSP); Nova Friburgo, Caledônia, 2219 m, ii.2001, E. & P. Grossi *leg.*, 1 male (DZUP). idem,

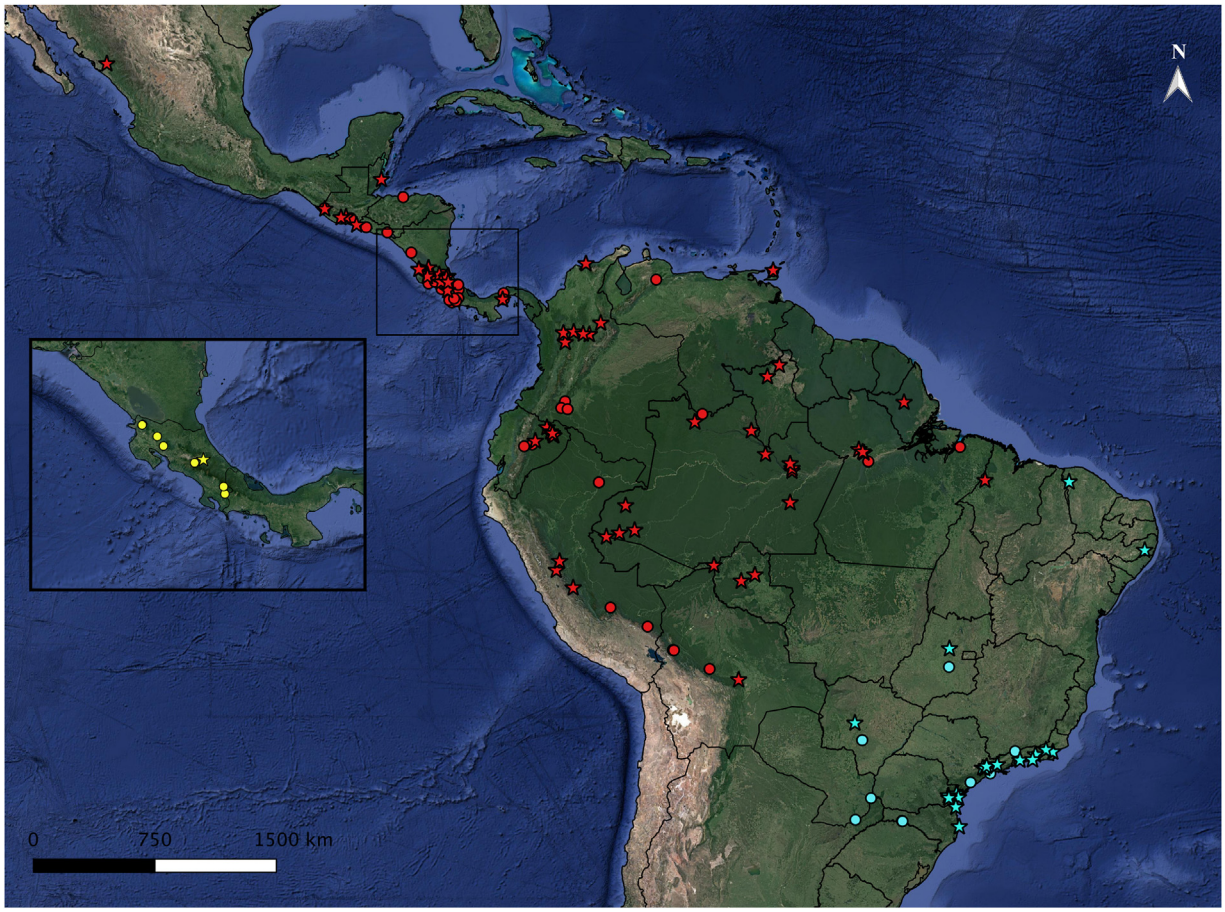

Fig. 6. Distribution map of *Plagiocephalus* with Costa Rica detached. Circles show distribution records from the literature. Stars show new distribution records. Yellow: *P. intermedius*; Red: *P. latifrons*; Light blue: *P. lobularis*.

Sans Souci (22.2808 S, 42.5121 W), 06.i.2010, 2 males (DZUP). idem, Sítio Caturama, 1050 m, 30.xii.2008, P. Grossi *leg.*, 1 male (DZUP); Petrópolis, Taquara (22.6185 S, 43.2301 W), 28.xii.197?, H. S. Lopes *leg.*, 1 male (MZSP); ibidem, 13.xii.1970, 1 female (MZSP); ibidem, 28.xii.1970, 1 female (MZSP); ibidem, 01.i.1971, 1 female (MZSP); ibidem, 03.i.1971, 3 females (MZSP); ibidem, ?.i.1971, 1 female (MZSP); ibidem, 11.i.1971, 1 female (MZSP); ibidem, 14.i.1971, 1 male and 3 females (MZSP); ibidem, 06.ii.1971, 1 male and 2 females (MZSP); ibidem, 07.ii.1971, 1 male and 2 females (MZSP); ibidem, 14.ii.1972, 2 females (MZSP); ibidem, 15.ii.1972, 3 females (MZSP); ibidem, 11.vi.1972, 1 female (MZSP) and 7 females (MZSP). Santa Catarina: Florianópolis, vii.1960, Casemiro *leg.*, 1 female (MZSP); Joinville, 27.i.1972, H. S. Lopes *leg.*, 1 female (MZSP); Seara [=Nova Teutônia] (27.1833 S, 52.3833 W), 24.x.1936, Fritz Plaumann *leg.*, Brit. Mus. 1936–256, A. E. Whittington (2004), 1 male (NHMUK 010862540); ibidem, 29.xi.1937, Brit. Mus. 1938–40, 2 females (NHMUK 010862538, NHMUK 010862539); ibidem, 28.iii.1938, Brit. Mus. 1938–312, 1 female (NHMUK 010862537); ibidem, ii.1967, 1 female (MZSP); ibidem, ii.1969, 1 female (MZSP); ibidem, x.1969, 2 females (MZSP); ibidem, xi.1970, 1 female (MZSP); ibidem, vii.1971, 1 female (MZSP). São Paulo: Andes, 1955, M. Carrera *leg.*, 1 male and 2 females (MZSP); Barueri, ?.ii.1966, K. Lenko *leg.*, 1 female (MZSP); Butantan, 02.vii.1979, H. S. Lopes *leg.*, 1 female (MZSP); ibidem, 12.vii.1979, 1 female (MZSP); idem, Horta O. Cruz, 06.viii.1969, L.T.F. *leg.*, 1 male (MZSP); ibidem, 08.viii.1979, 1 male (MZSP); ibidem, 11.viii.1971, 2 males and 3 females (MZSP); Cantareira, Chapadão (23.4142 S, 46.6000 W), viii.1946, Barreto *leg.*, 1 female (MZSP); Rio Paraná, Porto Cabral, 01–25.iv.1944, Trav. Fo., Carrera & E. Dente *leg.*, 1 male (MZSP); São José dos Campos, 15–22.viii.1997, Eurico R. de Paulo *leg.*, 1 female (LACM); ibidem, 07–14.ix.1997, 1 female (LACM).

Distribution. Brazil (Ceará*, Pernambuco*, Goiás, Mato Grosso do Sul, Rio de Janeiro, São Paulo, Paraná* and Santa Catarina), Paraguay and Argentina (Fig. 6).

Comments. Blanchard (1938a, 1938b) deposited the holotypes of *Paragoniaeola tanycephala* and *Eupterocerina conjuncta* in his personal collection, and only the material of *P. tanycephala* could be tracked down (INTA).

***Plagiocephalus latifrons*(Hendel, 1909a)**

(Figs. 1D–F, 2D–F, 3C, D, 4C, D, 5B, D)

Plagiocephalus latifrons (Hendel, 1909a): Aczél, 1951: 421; Steyskal, 1963: 512; 1964: 400; 1968: 54.21; Kameneva, 2004b: 18; Kameneva et al., 2017: 127.

Terpnomyia latifrons (Hendel, 1909a): 18 (Syntypes: 3 females, MTD; 1 female, NHMW; Type localities: Bolivia: Mapiri; and Peru: Urubambaflufs) (examined by photographs); Hendel, 1909b: 31.

Stylophthalmyia fascipennis Frey, 1926: 46 (Holotype male, MZH; Type locality: Guatemala: Barbereau) (synonymized by Steyskal, 1963: 511) (examined by photographs).

Ophryoterpnomyia latifrons: Hendel, 1936: 76 (synonymized by Carrera, 1950: 260).

Willineria orfilai Blanchard, 1951: 32 (Holotype male, Museo de Ciencias Naturales de Salta; Type locality: Bolivia: Chapare, Yungas) (synonymized by Steyskal, 1964: 490).

Type material. Syntypes of *Terpnomyia latifrons* (4 females): "Bolivia – Mapiri / 21.I.03 / S. Carlos 800 m", "Terpnomyia latifrons / det. F. Hendel", "Cotypus"; "Bolivia – Mapiri / 5.III.03 / Sarampioni 700 m", "Terpnomyia latifrons / det. F. Hendel", "Cotypus"; "Peru – Urubambafl. / 10.IX.03 / Umahuankilia"; "Terpnomyia latifrons / det. F. Hendel", "Cotypus", "Staatl. Museum für / Tierkunde Dresden/Coll. W. Schnuse, 1911″ (MTD); "Peru – Urubambafl./13.IX.03/Umahuankilia", "Terpnomyia latifrons/det. F. Hendel", "Paratype", "Coll. Hendel" (NHMW).

Diagnosis. *Plagiocephalus latifrons* can be differentiated from *P. lobularis* and *P. intermedius* by the longest eyestalks (5.08–18.08 mm) (Fig. 1D, E); female parafacialia black (Fig. 2D); radial-medial band with base almost as narrow as the apex, at most barely touching the discal band (Fig. 3C, D). The species can also be distinguished by male frons with gold spot on anterior portion of ocellar triangle (Fig. 1E); male face yellowish white, with region close to antennae yellower (Fig. 1D); male scape, pedicel and first flagellomere entirely yellow (Fig. 1D), and female scape, pedicel and first flagellomere gold with apex sometimes darker (Fig. 2D); palpus yellow; male proboscis yellow, with yellow setulae, and female proboscis reddish yellow, with brown and yellow setulae. Male wing of normal outline, without posterior lobes (Fig. 3C); crossvein r-m almost at the level of apex of vein R_1 (Fig. 3C, D). Male fore and mid legs entirely yellow, and hind leg yellow to gold (Fig. 1F); female legs brown, with tarsi lighter, and fore femur yellowish on the apex (Fig. 2F).

Measurements: Male: Body: 2.55–3.75 mm; Wing: 4.05–6.8 mm. Female: Body: 2.85–4.00 mm; Wing: 4.75–6.48 mm; Oviscape: 1.05–1.5 mm.

Material examined. BELIZE: Stann Creek Valley, 06.iv.1979, B. Bowers *leg*., 4 males (USNM). BRAZIL: Acre: Cruzeiro do Sul, Rio Moa (7.6172 S, 72.7708 W), 19–28.xi.1996, J. A. Rafael, J. Vidal & R. L. Menezes *leg*., 1 female wing (INPA). Amapá: Serra do Navio, 13.x.1957, J. Lane *leg*., 1 female (MZSP). Amazonas: Barcelos, Rio Demeni Pirico (0.325 S, 62.7892 W), viii.2008, A. Silva & R. Machado *leg*., 1 female (INPA); Ipixuna, Rio Gregório, Com. Lago Grande (7.1699 S, 70.8195 W), 18–23.v.2011, J. A. Rafael, J. T. Câmara, R. F. Silva, A. Somavilla, C. Gonçalves *leg*., 1 female (INPA); idem, Rio Liberdade, Estirão da Preta (7.363 S, 71.8686 W), 11–15.v.2011, J. A. Rafael, J. T. Câmara, R. F. Silva, A. Somavilla, C. Gonçalves & A. Agudelo *leg*., 1 female (INPA); ibidem, J. A. Rafael, J. T. Câmara, R. F. Silva, A. Somavilla & C. Gonçalves *leg*., 2 females (INPA); Manaus, Campus Universitário, 23.vi.1979, J. A. Rafael *leg*., 1 female (INPA); idem, Reserva Ducke (2.9166 S, 59.9833 W), 20 m, 07–21.xii.1994, J. A. Rafael & J. Vidal *leg*., 1 female (INPA); idem, 09.viii.2000, J. Vidal & A. F. Oliveira *leg*., 1 male (INPA); ibidem, 12.ix.2000, 1 male (INPA); ibidem, 26.x.2000, 2 males (INPA); ibidem, 27.x.2000, 1 female (INPA); ibidem, 28.xi.2000, 1 male (INPA); ibidem, 24.v.2001, 1 male (INPA); idem, ix.2001, J. Vidal *leg*., 1 female (INPA); idem, ZF2 km-14 Torre (2.5892 S, 60.1153 W), 19–22.iii.2004, J. A. Rafael, C. S. Motta, F. F. Xavier F, A. Silva F & J. T. Câmara *leg*., 1 female (INPA); idem, 18–21.v.2004, J. A. Rafael, F. B. Baccaro, F. F. Xavier & A. Silva *leg*., 1 female (INPA); idem, 12–15.x.2004, J. A. Rafael, C. S. Motta, F. F. Xavier, A. Silva F & S. Trovisco *leg*., 1 female (INPA); idem, 17–21.viii.2017, J. A. Rafael, A. C. Vasconcelos, F. F. Xavier, T. Mahlmann, S. Lima & B. Oliveira *leg*., 1 male (INPA); Novo Aripuanã, Reserva Soka (5.2647 S, 60.1188 W), 28.iv–06.v.1999, R. L. Ferreira, R. A Rocha, J. Vidal & R. S. Leite *leg*., 2 females (INPA); idem, 17–25.viii.1999, J. Vidal & A. L. Henriques *leg*., 1 male and 4 females (INPA); Pq. N. Jau, Ig. Miracutu, Ig. do Gerlei (1.9500 S, 61.8167 W), 23–28.vii.1995, J. A. Rafael & J. Vidal *leg*., 1 female (INPA); Rio Javari, Retirão do Equador, x.1979, Alvarenga *leg*., 2 females (MZSP); São Gabriel da Cachoeira, Morro dos Seis Lagos, 800 m, 28.ix–6.x.1990, J. Vidal & J. A. Rafael *leg*., 1 male (INPA). Maranhão: Bom Jardim, REBIO-Res. Biol. Gorupi, 02–11.ix.2010, D. W. A. Marques, E. A. S. Barbosa, J. A. Silva & M. M. Abreu *leg*., 1 female (CZMA). Pará: Belém, APEG Forest, x.1969, T. H. G. Aitken *leg*., 1 female (USNM); Óbidos, Colônia São Tomé (1.8461 S, 55.0397 W), 01–11.ix.2001, J. A. Rafael & J. Vidal *leg*., 1 female (INPA); idem, Faz. Parujá (1.6225 S, 55.3872 W), 05–11.ix.2000, J. A. Rafael & J. F. Vidal *leg*., 1 male (INPA); idem, Sítio Curuó (1.7842 S, 55.1181 W), 29.viii–08.ix.2001, J. A. Rafael & J. Vidal *leg*., 1 female (INPA). Rondônia: 62 Km SE Ariquemes (10.2418 S, 62.5492 W), 17–24.iii.1989, W. J. Hanson *leg*., 4 females (LACM); idem, 15–22.iii.1991, W. Hanson & G. Bohart *leg*., 1 female (LACM); idem, 13–25.iv.1992, W. J. Hanson *leg*., 1 female (LACM); ibidem, 8–20.xi.1994, 5 females (LACM); ibidem, 7–18.xi.1995, 1 female (LACM); ibidem, 22–31.x.1997, 1 female (LACM); ibidem, 1–14.xi.1997, 1 female (LACM); Monte Negro, Fazenda Amorim (10.6683 S, 63.4833 W), 03–15.xii.2011, Amorim, Ament & Riccardi *leg*., 1 female (MZSP); Porto Velho, AHE Jirau, Rio Madeira (9.5981 S, 65.3667 W), 28.iii–08.iv.2011, R. R. Silva, E. Z. Albuquerque & eq. *leg*., 1 female (MZSP). Roraima: Ilha de Maracá, Rio Uraricoera, 19–24.vii.1987, J. A. Rafael & L. S. Aquino *leg*., 1 female (Det.: A. Norrbom, 1990) (INPA); Pacaraima, 5–8.iii.1988, Eq. J. A. Rafael *leg*., 1 female (INPA). BOLIVIA: Sta Cruz, Buena Vista, 21.ii.1999, F. D. Parker *leg*., 1 female (LACM). COLOMBIA: Antioquia: Mpio la Pintada, Farailon La Paz, 16.ii.2007, N. Uribe *leg*., 1 male (CEUA); idem, Sán Jerónimo, Parque los Tamarindos, 425 m, 24–27.iv.2006, A. Velez *leg*., 1 male (CEUA 38267); idem, San Roque vrd, El Topacio, VSR Rez Bosque F1, v.2013, 1 male (CEUA); Ma, Santa Marta, Puerto Mosquito Rva La Iguana Verde, bosque VSR (11.1852 N, 74.1769 W), 09.xi.2012, C. Valverde *leg*., 1 male (CEUA); ibidem, 10.xi.2012, 1 male (CEUA). Santander: Cimitarra, Ciénaga de Cachimberos, Hacienda San Miguel, 05–8.x.2001, M. Castaño & M. Velez *leg*., 2 males (CEUA 38268); idem, Hacienda El Bosque, Campamento Ecuador, Bosque Ecuador, 09–12.x.2001, 1 male (CEUA 38133); idem, Vd. Primavera, 05–8.v.2001, M. Castaño & M. Velez *leg*., 3 males (CEUA 38269); idem, Vereda Primavera Km 4, Hacienda El Bosque, Campamento Santa Isabel, 01–4.x.2001, 1 male (CEUA 38270); San J. Girón, Prof. Sogamoso Denso Tierra, 603 m, 10–11.v.2015, Y. Correa *leg*., 1 male (CEUA). COSTA RICA: Alajuela: 2 Km S Pital, 05–28.ix.1988, F. D. Parker *leg*., 1 female (LACM); 20 Km S Upala, 14–17.viii.1990, F. D. Parker *leg*., 1 female (EMUS); ibidem, 21–23.viii.1990, 1 female (EMUS); ibidem, 28–30.viii.1990, 2 females (EMUS); ibidem, 01–10.v.1990, 1 female (LACM); ibidem, vi.1990, 2 females (LACM); ibidem, 15.vii.1990, 1 female (LACM); ibidem, 29.vii.1990, 1 female (LACM); ibidem, 01.viii.1990, 1 male (LACM); ibidem, 07–09.viii.1990, 1 female (LACM); ibidem, 21–23.viii.1990, 2 females (LACM); ibidem, 28–30.viii.1990, 1 female (LACM); ibidem, 10–13.ix.1990, 1 female (LACM); ibidem, 16–25.ix.1990, 1 female (LACM); ibidem, 27.ix–18.x.1990, 1 male and 2 females (LACM); ibidem, 1–5.x.1990, 1 female (LACM); ibidem, 16.x.1990, 3 females (LACM); ibidem, 23.x.1990, 4 females (LACM); ibidem, 26–30.x.1990, 2 females (LACM); ibidem, 28.x.1990, 4 females (LACM); ibidem, 30.x.1990, 3 females (LACM); ibidem, 01.xi.1990, 7 females (LACM); ibidem, 01–20.xi.1990, 2 females (LACM); ibidem, 06.xi.1990, 5 females (LACM); ibidem, 8.xi.1990, 11 females (LACM); ibidem, 13.xi.1990, 7 females (LACM); ibidem, 20.xi.1990, 3 females (LACM); ibidem, 29.xi.1990, 3 females (LACM); ibidem, 06.xii.1990, 4 females (LACM); ibidem, 11.xii.1990, 3 females (LACM); ibidem, 13.xii.1990, 1 female (LACM); ibidem, 13.xii.1990–09.i.1991, 2 males (LACM); ibidem, 06.i.1991, 1 male (LACM); ibidem, 20.i–12.ii.1991, 1 male (LACM); ibidem, 29.i.1991, 2 females (LACM); ibidem, 05.ii.1991, 2 females (LACM); ibidem, 07.ii.1991, 1 female (LACM); ibidem, 12.ii–05.iii.1991, 1 female (LACM); ibidem, 3–9.iii.1991, 1 male and 1 female (LACM); ibidem, 05–18.viii.1991, 1 male (LACM);

ibidem, 10–19.iii.1991, 3 females (LACM); ibidem, 12.iii.1991, 2 females (LACM); ibidem, 18–26.iii.1991, 1 female (LACM); ibidem, 20–26.iii.1991, 2 females (LACM); ibidem, 27–31.iii.1991, 5 females (LACM); ibidem, 1–10.iv.1991, 6 females (LACM); ibidem, 11–20.iv.1991, 2 females (LACM); ibidem, 12–30.iv.1991, 1 female (LACM); ibidem, 1–9.v.1991, 1 female (LACM); ibidem, 10–21.v.1991, 2 females (LACM); ibidem, 1–11.vi.1991, 1 female (LACM); ibidem, 03.vi.1991, 1 female (LACM); ibidem, 07.vi.1991, 1 female (LACM); ibidem, 21.vi.1991, 1 female (LACM); ibidem, 1–15.vii.1991, 1 female (LACM); ibidem, 16–24.vii.1991, 4 females (LACM); ibidem, 21–31.vii.1991, 2 females (LACM); ibidem, 1–10.x.1991, 1 female (LACM); ibidem, 11–21.x.1991, 1 female (LACM); ibidem, 22–31.x.1991, 1 female (LACM); Golfito: 22.vii.1957, Truxal & Menke *leg.*, 2 females (Det.: Korneyev & Kameneva, 2001, Det.: Kameneva, 2001) (LACM); ibidem, 24.vii.1957, 1 male (LACM). Guanacaste: S Cañas, 11–15.iii.1989, F. D. Parker *leg.*, 1 male (LACM); 14 Km S Cañas, 14–16.x.1989, F. D. Parker *leg.*, 1 male (LACM); ibidem, 15–25.vii.1990, 1 female (LACM); ibidem, 24–31.viii.1990, 2 females (LACM); ibidem, 16–19.xi.1990, 1 female (LACM); ibidem, 1–22.vi.1991, 1 female (LACM); 3 Km SE R. Naranjo (10.7911 N, 85.6689 W), 15–22.x.1991, F. D. Parker *leg.*, 1 female (LACM); ibidem, 20.xi.1991, 1 male (LACM); ibidem, 1–5.xii.1991, 1 female (LACM); ibidem, 10–23.i.1992, 1 female (LACM); ibidem, 20–31.i.1992, 1 female (LACM); ibidem, 10–19.ii.1992, 1 female (LACM); ibidem, 23–31.viii.1992, 1 female (LACM); ibidem, iv.1992, 1 female (LACM); ibidem, v.1992, 1 female (LACM); ibidem, 13.vii.1992, 1 female (LACM); ibidem, 10–20.ix.1992, 1 male (LACM); ibidem, 11–20.ix.1992, 1 male (EMUS); ibidem, 1–9.x.1992, 1 female (LACM); ibidem, 22.x.1992, 1 female (LACM); ibidem, xii.1992, 1 female (LACM); ibidem, 4–8.i.1993, 1 female (LACM); ibidem, 15–19.iii.1993, 1 male (LACM); ibidem, 15–30.iv.1993, 1 female (LACM); ibidem, 1–9.vii.1993, 1 female (LACM); ibidem, 14–16.vii.1993, 1 female (LACM); ibidem, 1–3.vii.1993, 1 female (LACM); ibidem, 25.vii.1993, 1 female (LACM); ibidem, 23.viii.1993, 1 female (LACM). Heredia: La Selva (10.4333 N, 84.0167 W), 06.ix.1999, INBio-OET, 1 female (LACM); ibidem, 10.ix–03.x.1999, 1 female (LACM); ibidem, 20.ix.1999, 3 females (LACM); La Selva Res. Sta., 24–30.viii.1988, W. J. Hanson *leg.*, 1 female (LACM). Higuito: San Mateo CR, Pablo Schild *leg.*, 1 male (USNM). Limon: 7 mi N Guacimo, 22.ii–3.iii.1988, F. D. Parker *leg.*, 1 female (LACM); Prov. Guapiles, 25.vi.1965, R. J. Hamton *leg.*, 1 male (LACM). Puntarenas: Piedras Blancas 24 Km W (8.7833 N, 83.2500 W), 200 m, xi.1990, P. Hanson *leg.*, 1 female (Det.: Kameneva, 2001) (USNM). San Jose: Escazu, 19–24.iv.1988, F. D. Parker *leg.*, 1 female (LACM); ibidem, 15–22.vii.1989, 1 female (LACM); ibidem, 23–24.ix.1989, 1 female (LACM); San Isidro 9 mi S (9.331 N, 83.6993 W), 31.xii.1988, F. D. Parker *leg.*, 1 female (EMUS). Turrialba: Catie/IICA Research Station, 24–30.vii.1981, W. R. Dolling B. M. 1981–411, 1 male (NHMUK 010862541). ECUADOR: Napo: Lago Agrio 8 Km W, 28.viii.1975, Langley & Cohen *leg.*, 1 female (USNM); Limoncocha, 15.vi.1977, P. J. Spangler & D. R. Givens *leg.*, 3 females (USNM); Misahualli nr. Tena, 6–19.x.2001, C. Brammer *leg.*, 1 male (LACM); Res. Ethnica Waorani 1 Km S, Onkone Gare Camp (0.6527 S, 76.4333 W), 03.vii.1995, T. L. Erwin et al. *leg.*, 1 female (USNM); ibidem, 26.vi.1996, 1 male (USNM); ibidem, 08.ii.1996, 1 male (Det.: V. Korneyev, 2008) (USNM); Yasuni Res. Sta. (0.6667 S, 76.3833 W), 250 m, 19–30.x.1998, W. J. Hanson *leg.*, 8 females (LACM). Sucumbios: Sacha Lodge (0.5000 S, 76.4833 W), 270 m, 20–30.ix.1994, P. Hibbs *leg.*, 1 female (LACM). EL SALVADOR: El Impossible, 04.vii.1977, Jarger *leg.*, 1 female (USNM). La Unión (13.3351 N, 87.8470 W), 25.i.1957, P.A.B *leg.*, 1 male (USNM); idem, 25.i.1957, G.R.S. *leg.*, 2 females (USNM). Santa Tecla, 23.ii.1935, P.A.B. *leg.*, 1 male (USNM). GUATEMALA: Escuintla: Palín, 1992, J. Lopez *leg.*, 1 male and 1 female (Det.: A. Norrbom, 1992) (USNM). Rodriguez, 1 male (Det.: E. E. Austen, 8.ix.1926: *Stylophthalmyia fascipennis* Frey) (NHMUK 010862536). Sta. Lucia Cotz., 02–11.v.1988, F. D. Parker *leg.*, 1 female (LACM). HONDURAS: Atlántida, La Ceiba, 07.ix.1916, F. J. Dyer *leg.*, 1 female (USNM). MEXICO: Chiapas: Cacahoatan, 30.viii.1967, H. Sanchez R. *leg.*, 2 females (USNM); Tuxtla Chico, 02.viii.1967, H. Sanchez R. *leg.*, 1 male (USNM). Sinaloa, 68 mi SE Culiacan, 23.iv.1977, Hanson & Davis *leg.*, 1 female (LACM). NICARAGUA: Masaya: La Concha, Estrada 62–2376, 02.vii.1961, Sequeira & Leal *leg.*, 2 males (USNM). PANAMA: Barro Colorado: CZ, iv–v.1937, J. Zetek *leg.*, 1 female (USNM); ibidem, vii.1937, 3 females (USNM); ibidem, x–xi.1941, 1 female (USNM); ibidem, i–iii.1944, 2 males and 2 females (USNM); Canal Zone, 09.vii.1978, N. E. Woodley *leg.*, 1 female (Det.: *Terpnomyia* sp. G. Steyskal, 1982) (USNM); ibidem, 14.vii.1978, 1 female (USNM); Is, xi.1937, J. Zetek *leg.*, 2 females (USNM); idem, 10–17.v.1964, W. D. & S. S. Duckworth *leg.*, 1 male (USNM); idem, 25–28.iii.1965, S. S. & W. D. Duckworth *leg.*, 1 female (USNM). Cerro Campana, 11–14.vii.1967, O. S. Flint, Jr. *leg.*, 1 female (USNM). El Cermeño, iv–v.1939, 1 female (USNM); idem, xii.1939–i.1940, J. Zetek *leg.*, 2 males and 1 female (USNM). La Campana, i–iii.1938, J. Zetek *leg.*, 1 male and 3 females (USNM). PERU: Dp. Junin: Chanchamayo, 11.viii.1918, J. M. Schunke *leg.*, 1 female (USNM). Huanuco: Cochicote, 08.ix.1965, J. C. Hitchcock, Jr. *leg.*, 1 female (Det.: G. Steyskal, 1965) (USNM); vic. Tingo Maria, 1–5.vi.1999, W. Hanson & S. Keller *leg.*, 2 females (LACM). Iquitos, iii–iv.1932, R. C. Shannon *leg.*, 1 female (Det.: Greene: *Terpnomyia latifrons* Hendel) (USNM). TRINIDAD: Simla, Arima-Blanchisseuse Rd., 20.vii.1975, J. Price *leg.*, 1 male (USNM); Simla Res. Sta., I., 2–15.vi.1981, Hanson & Clemons *leg.*, 1 male and 6 females (LACM). VENEZUELA: Lara, 4 Km NW de La Pastora, 2–3.iii.1978, J. B. Heppner *leg.*, 1 male (USNM). T. F. Amaz., Cerro de La Neblina Basecamp (0.8333 N, 66.1622 W), 140 m, 4–12.ii.1984, D. Davis & T. McCabe *leg.*, 2 females (USNM); ibidem, 1–10.iii.1984, 1 female (USNM).

Distribution. Mexico, Belize*, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Trinidad, Venezuela, Colombia, Brazil (Maranhão*, Amapá*, Pará, Roraima*, Amazonas, Rondônia* and Acre*), Ecuador, Peru and Bolivia (Fig. 6).

Comments. A female specimen with the label "Paraguay: Depto Alto Paraguay, 14–16.04.1986, Pague, Solis *leg.* (USNM)" was analyzed and identified by Kameneva (2004b)as *P. latifrons*. However, from the analysis of this specimen, it was concluded that it belongs to the genus *Pterocerina* Hendel.

Plagiocephalus intermedius Kameneva 2004b

(Figs. 2G–I, 3E, F)

Plagiocephalus intermedius Kameneva, 2004b: 19 (Holotype: 1 male, INBio; Paratypes: 3 males and 17 females, INBio; Type locality: Costa Rica: Puntarenas, Monteverde) (examined by photographs).

Type material. Holotype (male): Costa Rica: Puntarenas: Monteverde, San Luis, Buen Amigo, 1000–1350 m, ix.1994, 3224, Fuentes *leg.*. Paratypes (3 males, 17 females): Costa Rica: Cartago: A. C. Amistad, P. N. Tapanti, 1150 m, i.1994, Mora *leg.*, 1 male; Guanacaste: Rio San Lorenzo, Tierras Morenas, Z. P. Tenorio, 1050 m, i.1993, Rodriguez *leg.*, 1 female; P. N. Guanacaste: Est. Cacao, vii.1989, GNP Biod. Sur. *leg.*, 1 female; idem, SW side Volcan Cacao, 1000–1400 m, xi–xii.1989, Blanco, Chaves *leg.*, 1 female; idem, Lado SO Volcan Cacao, 800–1600 m, 12–17.vii.1993, Fuentes *leg.*, 1 female; Puntarenas: Monteverde, San Luis, Buen Amigo, 100–1350 m, ix.1994, 1 female; ibidem, xi.1994, 1 male; ibidem, 25.xi–10.xii.1996, Fuentes *leg.*, 1 male; Est. Pittier, Sendero Pittier, 1670 m, 26.vi.1995, Angulo *leg.*, 1 female; ibidem, 21.vi–4.vii.1995, Moraga *leg.*, 2 females; ibidem, 25.vi–4.vii.1995, Zumbado *leg.*, 3 females; ibidem, 1700 m, 3.vii.1995, Zumbado *leg.*, 2 females;

Buenos Aires, Est. Altamira, Sendero Los Gigantes, 1450 m, 4.i–3.ii.2000, Rubi *leg*., 4 females (INBio).

Diagnosis. *Plagiocephalus intermedius* can be differentiated by the eyestalks of male longer than in *P. lobularis* and shorter than in *P. latifrons* (3.00–7.00 mm); female parafacialia yellow (Fig. 2G); radial-medial band with base wider than apex, at most barely touching the discal band (Fig. 3E, F). The species can also be distinguished by male face yellowish white; male scape, pedicel and first flagellomere entirely yellow, and female scape, pedicel and first flagellomere gold with apex darker (Fig. 2G); palpus yellow; proboscis reddish yellow, with brown and yellow setulae. Male wing of normal outline, without posterior lobes (Fig. 3E); crossvein r-m located distinctly before the apex of vein R_1 (Fig. 3E, F); male subapical band curved and narrower when touching the apical band (Fig. 3E); male apical band wider than in *P. lobularis* and *P. latifrons* (Fig. 3E). Male fore and mid legs entirely yellow, and hind leg yellow to gold; female legs brown with tarsi lighter, and fore femur yellowish on the apex (Fig. 2I).

Measurements: Male: Body: 4.50–5.80 mm; Wing: 4.70–6.10 mm. Female: Body:

2.88–3.35 mm; Wing: 4.62–5.7 mm; Oviscape: 1.29–1.50 mm.

Material examined. COSTA RICA: La Suiza, 1961, P. Schild *leg*., 1 female (USNM); idem, 24.xi.1961, PablShild *leg*., 1 female (USNM).

Distribution. Costa Rica (Fig. 6).

Comments. Part of the INBio collection, including the type material of *P. intermedius*, was aggregated to the Museo Nacional de Costa Rica. The material of *P. intermedius* from the USNM examined in this work had been previously misidentified as *P. latifrons* by Kameneva (2004b).

Discussion on the terminalia of *Plagiocephalus*

One of the characters shared by the species of Pterocallini is the distiphallus bare or microsetulose. In other tribes of Ulidiidae, mainly from the subfamily Otitinae, the distiphallus is found spinulose, setulose, or both (Kameneva and Korneyev, 2006). In both *P. lobularis* and *P. latifrons*, the distiphallus is microsetulose on the two thirds apical. Other genera of Pterocallini, such as *Cymatosus* Enderlein, *Paragorgopis* Giglio-Tos and some species of *Neoacanthoneura* Hendel, have the distiphallus bare (Kameneva, 2004a, 2009). The epandrium of *Plagiocephalus* is elongate oval, similarly to the group of species *apicalis* of the genus *Neoacanthoneura* (Kameneva, 2012). Other genera of the tribe, such as *Cymatosus*, *Megalaemyia* Hendel and *Aciuroides* Hendel (Kameneva, 2009, 2012), have the epandrium short oval shaped. *Plagiocephalus* male terminalia can also be differentiated from other genera of the tribe by the prensisetae with small denticles on the inner surface.

We did not find any significant morphological difference between the male terminalia of *P. lobularis* and *P. latifrons*, and among the female terminalia of the species. A low variation in the morphology of the male terminalia among closely related species was also observed in other sexually dimorphic species with an ornamented head, for instance, species of *Teleopsis* Rondani (Diopsidae) (Földvári et al., 2007) and *Richardia* Robineau-Desvoidy (Richardiidae) (Wendt and Ale-Rocha, 2015). A likely explanation for the low variation of the terminalia among ornamented species is the access of the female to the male quality before copulation. The size of ornamented traits, such the eyestalks or gena processes, indicates genetic quality for the females, thus sexual selection acts primarily on these traits (Badyaev, 2004; Kelly, 2014), preventing the terminalia to be highly variable, as usually do in several dipteran taxa.

The presence of three spherical spermathecae with a smooth surface in the female of the species of *Plagiocephalus* is also shared by the other species of Pterocallini. The *Plagiocephalus* species have the female terminalia with a narrow segment 8 and cerci with an oval shape, differently from *Aciuroides* Hendel, *Apterocerina* Hendel, *Coscinum* Hendel, *Cyrtomostoma* Hendel, *Elapata* Hendel, *Lathrostigma* Enderlein, *Micropterocerus* Hendel, *Pterocerina*, and *Tetrapleura* Schiner, which have the segment 8 and cerci flattened and rigid (Kameneva, 2012). Based on the female terminalia and in other characters, Kameneva (2012) proposed that these last genera form a monophyletic group, excluding *Plagiocephalus* of the clade. Together with the lack of phylogenies for the Neotropical groups of ulidiids, only a minority of the Pterocallini species had their male and female terminalia described or illustrated, precluding the positioning of *Plagiocephalus* in a possible clade within the tribe.

Remarks on the geographical distribution of *Plagiocephalus*

Plagiocephalus is a widely distributed genus in the Neotropical region (Fig. 6). Among the species of *Plagiocephalus*, *P. latifrons* has the largest area of distribution. The distribution pattern of *P. latifrons* and *P. lobularis* seems well delimited. The distribution range of *P. latifrons* goes from Northwest of the Neotropical region until the diagonal line from Northern Brazil to South of Bolivia, while the range of distribution of *P. lobularis* remains in the Atlantic side of South America, going from Northeastern Brazil to South Brazil, and North of Paraguay and Argentina. *Plagiocephalus intermedius* is known only from Costa Rica. This species probably is distributed across the highest parts of Central America and do not occur in sympatry with *P. latifrons*, which is mostly distributed in areas of low altitude of the Neotropics (Fig. 6). However, the patterns of distribution found may have been influenced by the deficiency of appropriate collecting in the Neotropical region.

Xanthacrona Wulp, another genus of Pterocallini, has a similar area of distribution, occurring from North of the Neotropical region to South of Brazil, Paraguay and North of Argentina (Soares et al., 2018). However, the pattern of distribution of any of the five described species of *Xanthacrona* overlap with the distribution pattern of the *Plagiocephalus* species. Considering the number of species, Ulidiidae are among the most unexplored families in the Neotropical region (Amorim, 2009). Before making robust statements on distribution and diversification patterns of the ulidiids in the Neotropical region, there are still much to be done, including more collecting of specimens, taxonomic revisions and phylogenetic analyses of this still unstudied group of flies.

Conflicts of interest

The authors declare no conflicts of interest.

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