



New species and new records of the predaceous midge genus *Parabezzia* Malloch (Diptera: Ceratopogonidae) from Brazil

MARIA LUIZA FELIPPE-BAUER¹ & GUSTAVO R. SPINELLI²

¹Laboratório de Diptera, Instituto Oswaldo Cruz-Fiocruz, Av. Brasil 4365, 21040-900 Rio de Janeiro, RJ.

E-mail: mlfbauer@ioc.fiocruz.br

²División Entomología, Museo de La Plata, CCT CONICET- La Plata, Paseo del Bosque s/n, 1900 La Plata, Argentina.

E-mail: spinelli@fcnym.unlp.edu.ar

Abstract

Four new species of predaceous midges of the genus *Parabezzia* Malloch are described and illustrated based on female specimens from southeastern Brazil. Two species are recorded for the first time from Brazil, *Parabezzia costalis* Wirth from Rio de Janeiro State and *P. balseiroi* Spinelli & Grogan from Rio Grande do Sul State.

Key words: predaceous midges, Neotropical Region, Rio de Janeiro, Rio Grande do Sul, new species, new records

Resumo

Quatro novas espécies de ceratopogonídeos predadores do gênero *Parabezzia* Malloch são descritas e ilustradas baseadas em espécimes fêmeas provenientes da região sudeste do Brasil. Duas espécies são reportadas pela primeira vez para o Brasil, *Parabezzia costalis* Wirth para o estado do Rio de Janeiro e *P. balseiroi* Spinelli & Grogan para o estado do Rio Grande do Sul.

Palavras-chave: ceratopogonídeos predadores, região neotropical, Rio de Janeiro, Rio Grande do Sul, espécies novas, novos registros

Introduction

The predaceous genus *Parabezzia* Malloch includes 40 species distributed worldwide (Borkent, 2014). Of these, Borkent & Spinelli (2007) mentioned 24 species that inhabit the Neotropical region, and subsequently Grogan et al. (2013) described *P. florentinae* from the island of Guadeloupe. In their revision of the neotropical species of *Parabezzia*, Spinelli & Grogan (1987) recognized four species groups, the *alexanderi* group, the *brunnea* group, the *uncinata* group and the *unguis* group, earlier proposed by Grogan & Wirth (1977) for the Nearctic region. From Brazil, only *P. brasiliensis* Spinelli & Grogan and *P. inaequalis* Spinelli & Grogan are known from the States of Mato Grosso and Amazonas, respectively.

The study of female specimens from the Atlantic forests of southeastern Brazil and additional material from Rio Grande do Sul, revealed the presence of four undescribed and two previously known species. In this paper, we describe and illustrate the new species, comparing them with related species of *Parabezzia*, which now includes 44 species, 29 of them inhabiting the Neotropical region. The first records of *P. costalis* Wirth and *P. balseiroi* Spinelli & Grogan from Brazil are also provided.

Material and methods

The majority of specimens studied were collected in Union Biological Reserve (22° 25' 35" S, 42° 2' 4" W), Casimiro de Abreu, Rio de Janeiro State, Brazil. Two specimens of *Parabrezza balseiroi* Spinelli & Grogan were collected in Pólvora island (32°02'01"S 52°10'45"W), Rio Grande, Rio Grande do Sul, Brazil. The specimens are slide-mounted in phenol-balsam in the manner described by Wirth & Marston (1968). Diagnostic characters were microphotographed using a Nikon Eclipse E 200 and the plates were prepared using GIMP Portable 2.6. The general terminology used is that employed in Spinelli & Grogan (1987). Additional measures, as LC/T ratio, was obtained by dividing the length of the longest talon of the fore, mid and hind leg claws, by the length of their respective tarsomeres 5. Meristic information is given as range, followed by the mean and number of specimens examined. The new species and new records are deposited in the Ceratopogonidae Collection of Instituto Oswaldo Cruz (CCER), Rio de Janeiro, Brazil and in the Entomological Collection of Museo de La Plata (MLP), La Plata, Argentina. The data of the specimens studied are available on line in: <http://ccer.fiocruz.br/catalogue>.

Parabrezza unica Felipe-Bauer & Spinelli, sp. nov.

Figs. 1–7

Diagnosis. The only Neotropical species of *Parabrezza* in which the females lack the costal section III, scutellum with 4–6 setae, fore and hind tarsomeres 5 with ventral swelling, tarsal claws unequal, the longest talon nearly 2X longer than shorter talon, spermathecae very unequal, the larger ovoid and the smaller round. Male Unknown.

Female. Head brown. Eyes separated by V-shaped space equal to diameter of 2.4–3.0 (n= 6) ommatidia at level of interocular setae (Fig. 3). Antennal flagellum pale brown (Fig. 2); pedicel brown; antennal ratio 1.00–1.14 (1.10, n=6). Clypeus with 10–13 slender setae. Palpus pale brown (Fig. 4); segment 3 with few capitate hyaline sensilla on inner mesal surface; palpal ratio 3.2–4.0 (3.7, n=6). Mandible with 8 teeth.

Thorax dark brown. Scutum with two (rarely one) presutural, 4–5 posterolateral setae; scutellum with 4–6 (4 stout, 1–2 delicate) setae. Wing (Fig. 1) length 0.93–0.98 (0.95, n=6) mm; breadth 0.41–0.43 (0.43, n=6) mm; membrane slightly infuscated; Sc, M, r-m, R₁ and R₃ brown; wing sections length 550–430 µ, two setae on costa proximad of basal arculus; costal fringe long in the margin and center of costa, uniformly distributed along margin of vein and sparsely distributed on center of vein in distal ½ of section I; R₃ ending at wing apex. Halter pale brown. Legs brown, hind leg darker (Fig. 6), base and apex of tibiae and apex of fore and mid femora, slightly paler; hind tibial comb with 5–7 spines, commonly 6 spines (n=6); tarsi paler (Figs. 6–7), palisade setae in single row on hind tarsomere 1; fore and hind tarsomere 5 with ventral swelling; mid tarsal claws slightly smaller than fore and mid ones, that are similar in length, lengths of larger and smaller talons of fore, mid and hind claws: 75/37.5–62.5/30–75/35 µ (n=6); longest talon of fore, mid and hind leg claws smaller than length of their respective tarsomeres 5, LC/T ratios of fore, mid and hind legs 0.84–0.78–0.80 (n=6); hind tarsal ratio 2.7–2.9 (2.8, n=6).

Abdomen brown. Two very unequal spermathecae (Fig. 5) with very short necks, the larger ovoid and the smaller slightly rounded, measuring 70 X 58 µ and 48 X 45 µ (n=6).

Male. Unknown.

Distribution. Brazil (Rio de Janeiro).

Types. Holotype ♀, BRAZIL, Rio de Janeiro, Casimiro de Abreu, Union Biological Reserve (22° 25' 35" S, 42° 2' 4" W), 28.XII.2012–31.I.2013, "Biota Diptera Fluminense" team col., Malaise trap (CCER). Paratypes, 5 ♀: 4 ♀, same data as holotype (2CCER; 2 MLP); 1 ♀, same data as holotype except 28.IV–17.V.2013 (CCER).

Etymology. The specific epithet is from Latin: *unica* = unique, referring the only species of the genus *Parabrezza* lacking costal section III.

Taxonomic discussion. *Parabrezza unica* can be distinguished from the other species of *Parabrezza* by the absence of the costal section III, a character typical of all species of this genus (Wirth, 1965; Grogan & Wirth, 1977; Clastrier & Raccurt, 1979; Spinelli & Grogan, 1987; Wirth & Grogan, 1988). Although this new species lacks what is likely the clear generic synapomorphy, the combination of all other morphological characters is coincident with that present in *Parabrezza*, and therefore we provisionally place it within *Parabrezza*. Due to the pattern of distribution of setae on costal vein, *P. unica* is placed in the *brunnea* species group. The females of the new species differ from Neotropical species of the *brunnea* species group by the presence of ventral swelling on fore and hind tarsomere 5 (ventral swelling absent in hind leg in *P. arenosa* and in *P. caribbeana*, in all legs in *P.*

brunnea), by the very unequal spermathecae (slightly unequal in *P. caribbeana* and *P. indistincta* **sp. nov.**, subequal in *P. arenosa*, *P. brunnea* and *P. casimirensis* **sp.nov.**, not described in *P. fuscipennis*) and by the hind tarsal ratio 2.7–2.9 (2.4 in *P. arenosa*, 2.5 in *P. caribbeana* and *P. indistincta* **sp. nov.**, 3.6 in *P. fuscipennis*).

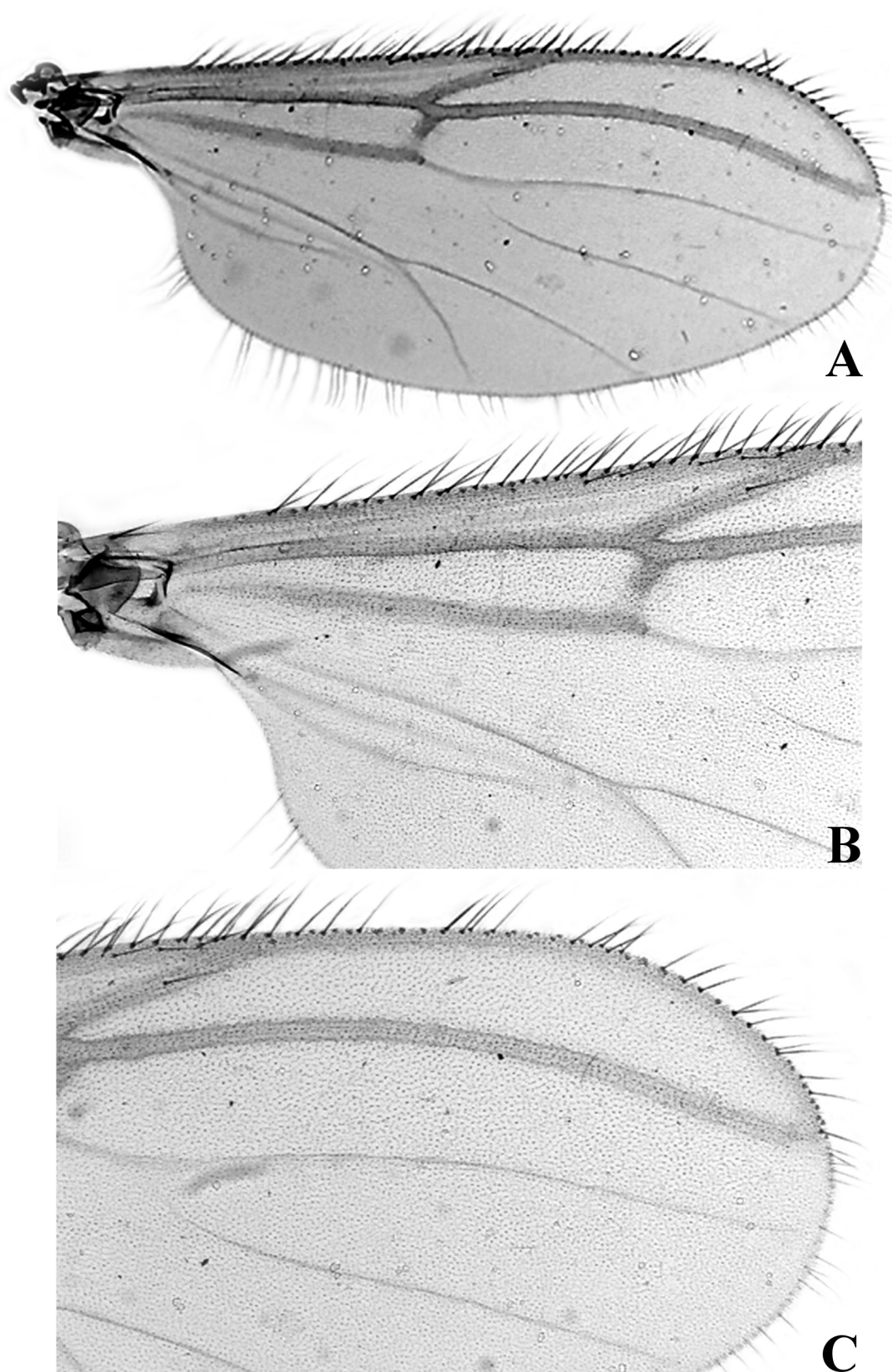
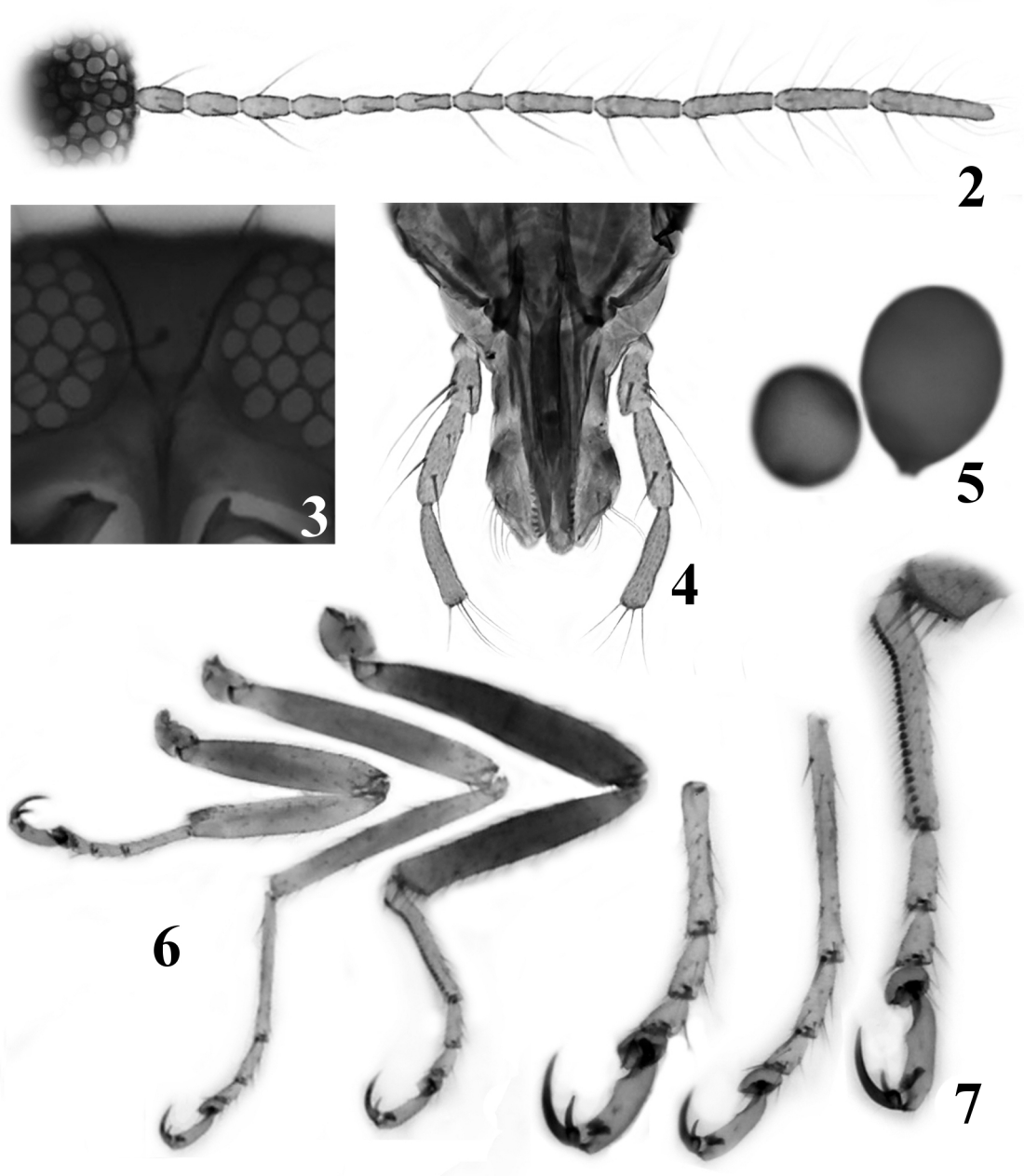


FIGURE 1. *Parabezzia unica* **sp. nov.**, female. A. Wing; B. Wing base, showing costa; C. wing apex, showing r_3 .



FIGURES 2–7. *Parabazzia unica* sp. nov., female. 2. Antenna; 3. Eyes separation, anterior view; 4. Palpus, lateral view; 5. Spermathecae; 6. Legs (left to right) of fore, mid- and hindlegs, lateral view; 7. Tarsi (left to right) fore, mid- and hind tarsomeres, lateral view.

***Parabazzia indistincta* Felipe-Bauer & Spinelli, sp.nov.**

Figs. 8–13

Diagnosis. The only Neotropical species of the *Parabazzia brunnea* group in which the females have an evidente, but pale costal section III, the clypeus has 20 setae, the scutellum 13 setae, the fore and hind tarsomere 5 have prominent ventral swellings, and the longest talon of the hind leg claws is longer than the length of their respective tarsomeres 5.

Female. Head brown. Eyes separated by V-shaped space equal to diameter of 2.5 ommatidia at level of interocular setae (Fig. 11). Antennal flagellum pale brown (Fig. 9); pedicel brown; antennal ratio 1.11. Clypeus with 20 slender setae. Palpus pale brown (Fig. 10); segment 3 with few capitate hyaline sensilla on inner mesal surface; palpal ratio 3.5. Mandible with 9 teeth.

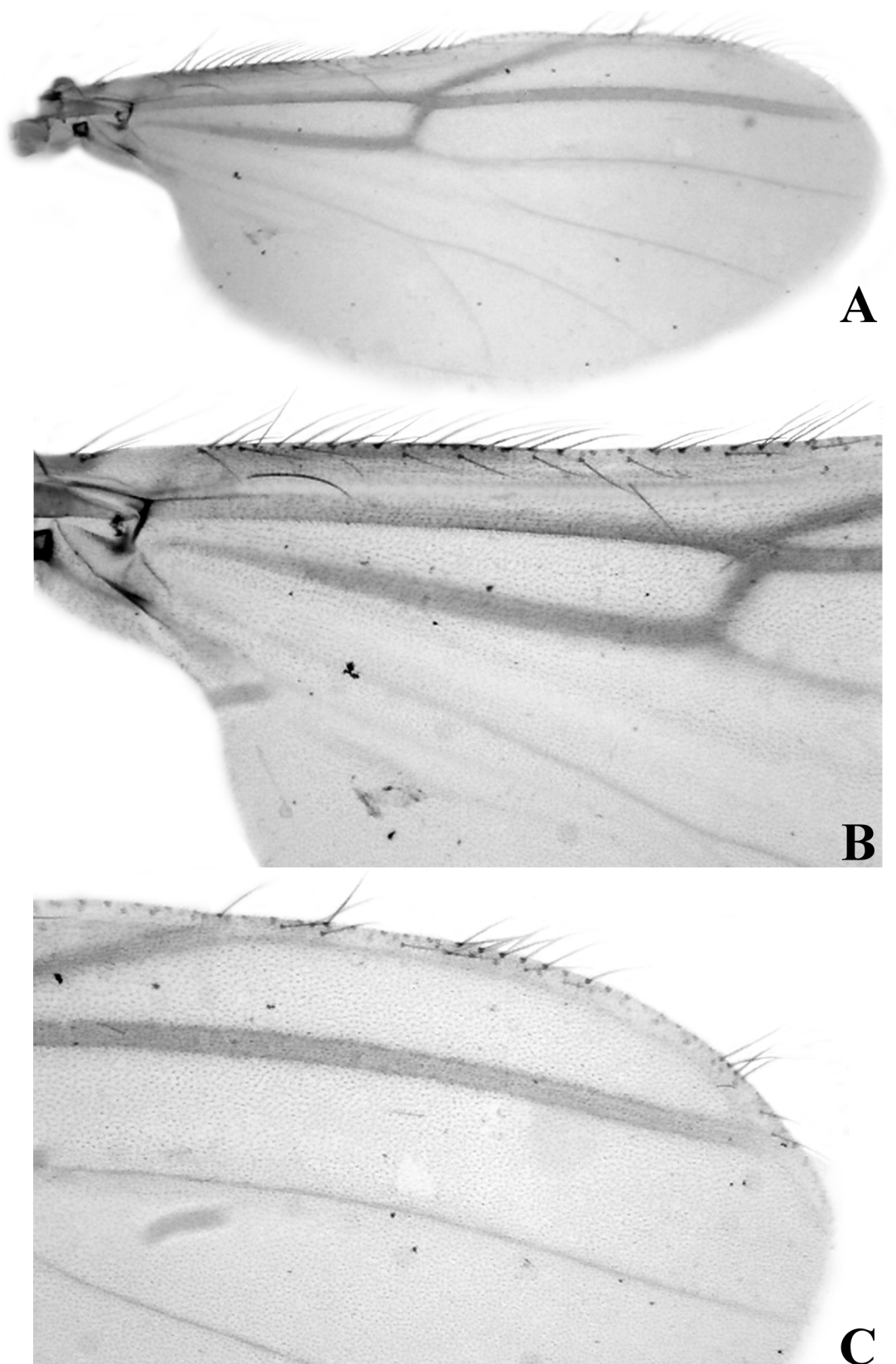
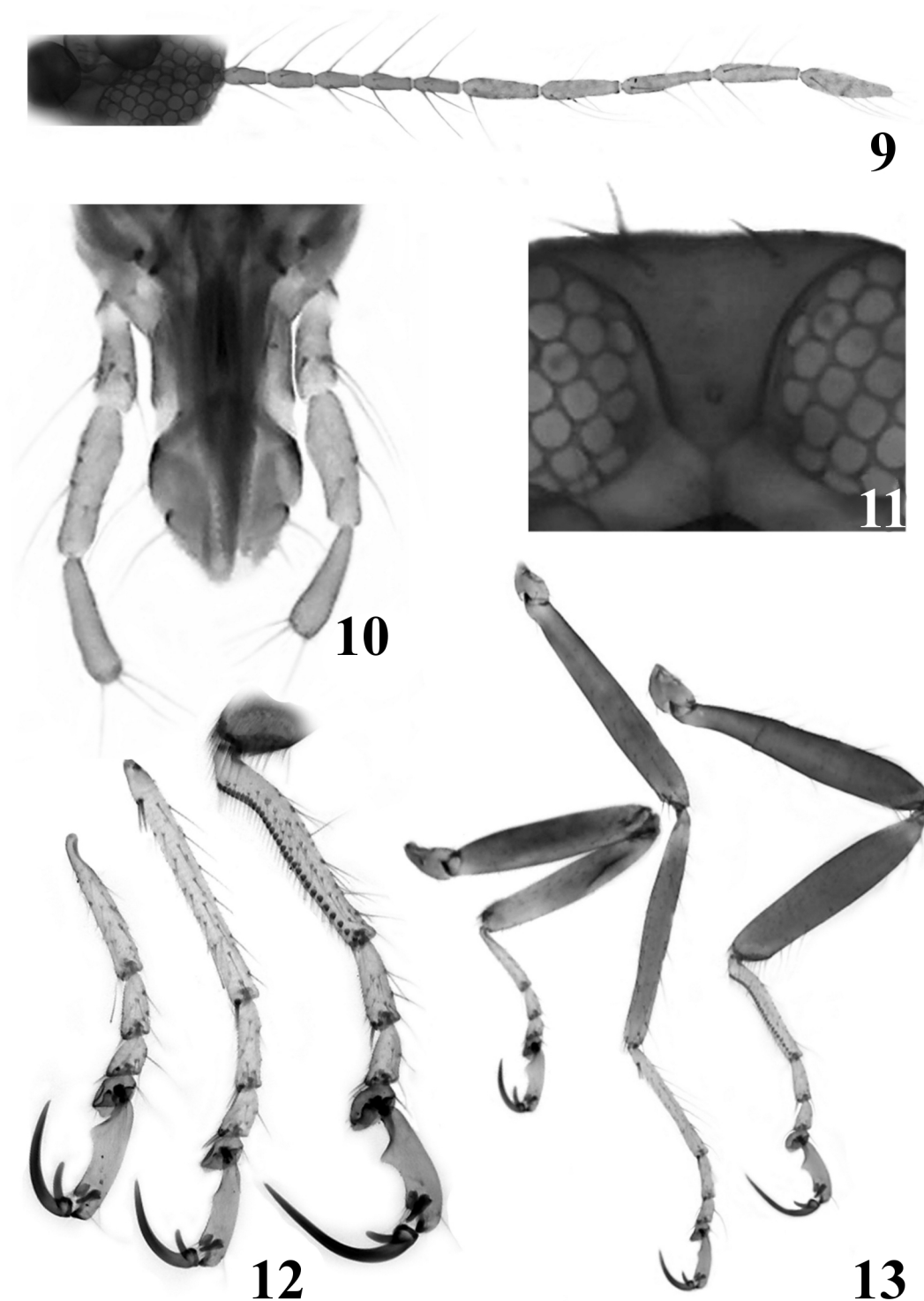


FIGURE 8. *Parabezzia indistincta* **sp. nov.**, female. A. Wing; B. Wing base, showing costa; C. Wing apex, showing r_3 .



FIGURES 9–13. *Parabezzia indistincta* sp. nov., female. 9. Antenna; 10. Palpus, lateral view; 11. Eyes separation, anterior view; 12. Tarsi (left to right) fore, mid- and hind tarsomeres, lateral view; 13. Legs (left to right) of fore, mid- and hindlegs, lateral view.

Thorax dark brown. Scutum with 2 presutural, 3 posterolateral setae; scutellum with 13 (8 stout, 5 delicate) setae. Wing (Fig. 8) length 1.23 mm; breadth 0.55 mm; membrane slightly infuscated; Sc, M, r-m, R_1 and R_2 slightly darker than membrane; wing sections length 770–430–90 μ , four setae on costa proximad of basal arculus; costal fringe long in the margin and center of costa, uniformly distributed along margin of vein, sparsely distributed

on center of vein in distal ½ of section I and in section II of costa; section III and costal extension beyond apex of second radial cell pale; R_3 ending at 0.98 of wing length; costal extension reaching 0.47 the length from tip of R_3 to tip of M_1 . Halter pale brown. Legs brown (Fig. 13), hind leg darker; hind tibial comb with 10 spines; tarsi paler (Figs. 12–13), palisade setae in single row on hind tarsomere 1; fore and hind tarsomere 5 with prominent ventral swelling, inconspicuous on mid tarsomere 5; hind tarsal claws longer than fore and mid tarsal claws, being the mid claws the smallest, lengths of larger and smaller talons of fore, mid and hind claws: 125/50 – 113/37.5 – 150/50 μ ; longest talon of hind leg claws longer than length of their respective tarsomeres 5, LC/T ratios of fore, mid and hind legs 0.91–0.96–1.01; hind tarsal ratio 2.5.

Abdomen brown. Two slightly unequal ovoid spermathecae, with very short necks, measuring 75 X 63 and 65 X 58 μ , collapsed, not illustrated.

Male. Unknown.

Distribution. Brazil (Rio de Janeiro).

Types. Holotype ♀, BRAZIL, Rio de Janeiro, Casimiro de Abreu, Union Biological Reserve (22° 25' 35" S, 42° 2' 4" W), 28.IV–17.V.2013, “Biota Diptera Fluminense” team col., Malaise trap (CCER).

Etymology. The specific epithet is from Latin: *indistincta* = indistinct, referring the pale costal section III of this species, difficult to see at the first sight.

Taxonomic discussion. *Parabezzia indistincta* can be distinguished from the other species of *Parabezzia* by the pale, indistinct costal section III. Due to the pattern of distribution of setae on costal vein, *Parabezzia indistincta* is placed in the *brunnea* species group. The females of the new species differ from the Neotropical species of the *brunnea* species group by the presence of 4 setae on costa proximad of basal arcus (2 setae in *P. arenosa*, *P. casimirensis* **sp. nov.**, *P. caribbeana* and *P. unica* **sp. nov.**, not described in *P. fuscipennis*), by the presence of ventral swelling on fore and hind tarsomere 5, inconspicuous on mid tarsomere 5 (ventral swelling absent on hind tarsomere 5 in *P. arenosa* and *P. caribbeana*, on mid tarsomere 5 in *P. unica* **sp. nov.**, on all tarsomeres in *P. brunnea*), by the presence of 20 setae on clypeus (12–14 in *P. casimirensis* **sp. nov.**, 10–13 in *P. unica* **sp. nov.**, not described in the remaining species), by the presence of 13 setae on scutellum (9–11 in *P. casimirensis* **sp. nov.**, 4–6 in *P. unica* **sp. nov.**, not described in the remaining species), and by hind tarsal ratio 2.5 (3.6 in *P. fuscipennis*).

***Parabezzia casimirensis* Felipe-Bauer & Spinelli, sp. nov.**

Figs. 14–20

Diagnosis. The only Neotropical species of the *Parabezzia brunnea* group in which the females are large (wing length 1.2–1.4 mm), the fore and hind tarsomeres 5 have prominent ventral swelling, and the hind tarsal claws are slightly longer than the fore and mid ones, with the mid claws smaller.

Female. Head brown. Eyes separated by V-shaped space equal to diameter of 2.5 (n=4) ommatidia at level of interocular setae (Fig. 18). Antennal flagellum pale brown (Fig. 15); pedicel brown; antennal ratio 1.07–1.12 (1.08, n=4). Clypeus with 12–14 slender setae. Palpus pale brown (Fig. 16); segment 3 with few capitate hyaline sensilla on inner mesal surface; palpal ratio 3.6–3.8 (3.7, n=4). Mandible with 7–9 teeth.

Thorax dark brown. Scutum with 4 presutural, 4–5 posterolateral setae; scutellum with 9–11 (4–6 stout, 5–6 delicate) setae. Wing (Fig. 14) length 1.2–1.4 (1.3, n=4) mm; breadth 0.54–0.63 (n=0.58, n=4) mm; membrane slightly infuscated; Sc, M, r-m, R_1 and R_3 brown; wing sections length 770–530–65 μ , two setae on costa proximad of basal arcus; costal fringe long in margin and center of costa, uniformly distributed along margin of vein and sparsely distributed on center of vein in the distal ½ of section I and in sections II and III; R_3 ending at 0.98 of wing length; costal extension reaching 0.37–0.48 (0.42, n=4) the length from tip of R_3 to tip of M_1 . Halter pale brown. Legs brown (Fig. 20), hind legs darker; hind tibial comb with 7–10, commonly 10 spines (n=4); tarsi paler (Fig. 19), palisade setae in single row on hind tarsomere 1; fore and hind tarsomere 5 with prominent ventral swelling, inconspicuous on mid tarsomere 5; hind tarsal claws slightly longer than fore and mid tarsal claws, being the mid claws the smallest, lengths of larger and smaller talons of fore, mid and hind claws: 115/45 – 98/33 – 135/50 μ (n=4); longest talon of fore, mid and hind leg claws smaller than length of their respective tarsomeres 5, LC/T ratios of fore, mid and hind legs 0.85–0.85–0.94 (n=4); hind tarsal ratio 2.6–2.8 (2.7, n=4).

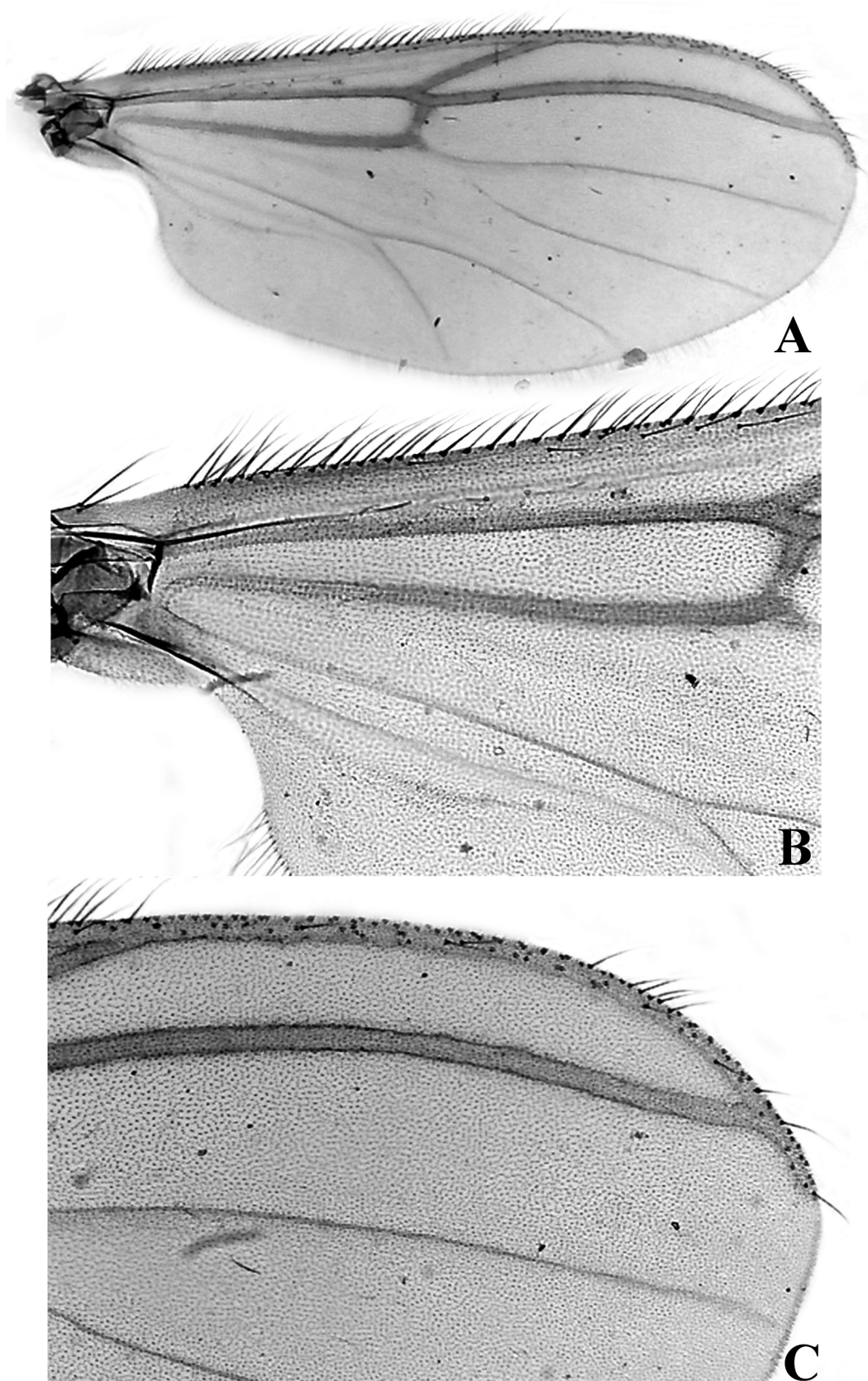
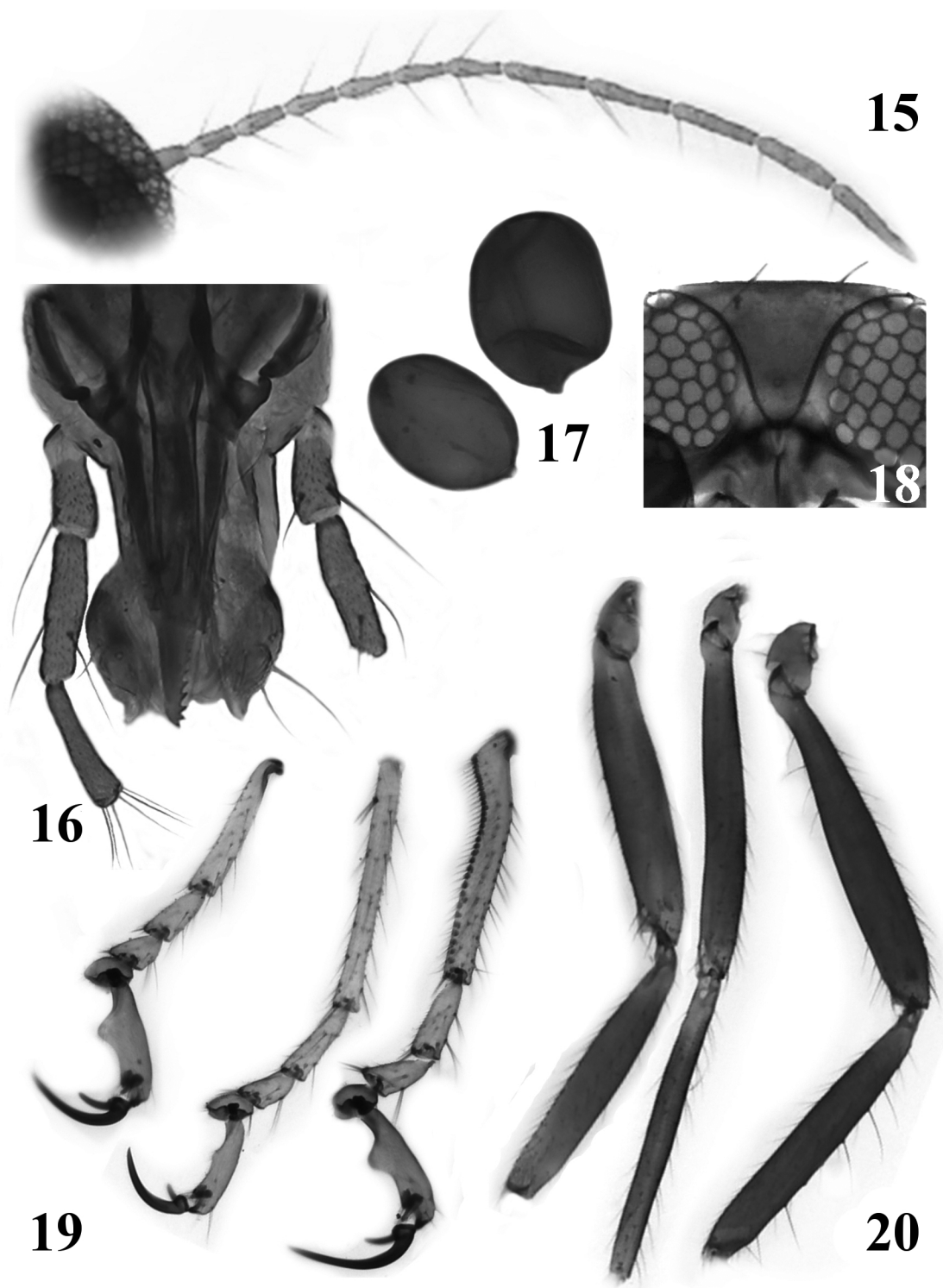


FIGURE 14. *Parabezzia casimirensis* **sp. nov.**, female. A. Wing; B. Wing base, showing costa; C. Wing apex, showing r_3 .



FIGURES 15–20. *Parabezzia casimirensis* sp. nov., female. 15. Antenna; 16. Palpus, lateral view; 17. Spermathecae; 18. Eyes separation, anterior view; 19. Tarsi (left to right) fore, mid- and hind tarsomeres, lateral view; 20. Legs (left to right) of fore, mid- and hindlegs, lateral view.

Abdomen brown. Two subequal ovoid spermathecae (Fig. 17) with very short necks, when present, measuring $77.5 \times 60 \mu$ and $70 \times 55 \mu$ ($n=4$).

Male. Unknown.

Distribution. Brazil (Rio de Janeiro).

Types. Holotype ♀, BRAZIL, Rio de Janeiro, Casimiro de Abreu, Union Biological Reserve ($22^{\circ} 25' 35''$ S,

42° 2' 4" W), 28.XII.2012–31.I.2013, “Biota Diptera Fluminense” team col., Malaise trap (CCER). Paratypes, 3 ♀: 1 ♀, same data as holotype (CCER), 2 ♀, same data as holotype except 16.III–25.IV.2013 (CCER; MLP).

Etymology. This species is named after the originaries of Casimiro de Abreu, municipality of Rio de Janeiro State, where the specimens were collected.

Taxonomic discussion. *Parabezzia casimirensis* differs from the other Neotropical species of the *brunnea* species group by its wing length 1.2–1.4 mm (1.03 mm in *P. caribbeana*, 1.00 mm in *P. arenosa*, 0.93–0.98 mm in *P. unica* **sp. nov.**), by the fore and hind tarsomere 5 with prominent ventral swelling, inconspicuous on mid tarsomere 5 (ventral swelling absent on hind tarsomere 5 in *P. arenosa* and *P. caribbeana*, on mid tarsomere 5 in *P. unica* **sp. nov.**, on all tarsomeres in *P. brunnea*), and by the hind tarsal ratio 2.6–2.8 (2.4 in *P. arenosa*, 2.5 in *P. caribbeana* and *P. indistincta* **sp. nov.**, 3.6 in *P. fuscipennis*).

***Parabezzia fluminensis* Felipe-Bauer & Spinelli, sp. nov.**

Figs. 21–27

Diagnosis. The only Neotropical species of the *Parabezzia alexanderi* group in which the females present small wing length (0.98 mm), basal swelling not prominent, beginning at the level of basal arculus, fore and mid tarsomere 5 with delicate ventral swelling, tarsal claws long and slightly unequal on fore and mid legs, small and nearly equal on hind leg, spermathecae ovoid, slightly unequal to subequal.

Female. Head brown. Eyes separated by V-shaped space equal to diameter of 2.4 (n=2) ommatidia at level of interocular setae (Fig. 25). Antennal flagellum pale brown (Fig. 22); pedicel brown; antennal ratio 1.12 (n=2). Clypeus with 9–12 (n=2) slender setae. Palpus pale brown (Fig. 23); segment 3 with few capitate hyaline sensilla on inner mesal surface; palpal ratio 3.0–3.3 (3.2, n=2). Mandible with 9 teeth.

Thorax brown. Scutum with 4–5 presutural, 5 posterolateral setae; scutellum with 8–10 (4 stout, 4–6 delicate) setae. Wing (Fig. 21) length 0.98 (n=2) mm; breadth 0.40–0.43 (0.41, n=2) mm; membrane slightly infuscated; Sc, M, r-m, R₁ and R₃ brown; wing sections length 480–390–140μ, one seta on costa proximad of basal arculus; costal fringe moderately long in the entire margin of costa; R₃ ending at 0.90 of wing length; costal extension reaching 0.70 the length from tip of R₃ to tip of M₁. Halter pale brown. Legs yellowish brown (Fig. 26), hind femur darker; trochanters, apical portion of femora and entire tibiae paler; mid femur slightly swollen basally, hind femur slightly swollen distally; hind tibial comb with 9 spines; tarsi paler (Fig. 27), palisade setae in single row on hind tarsomere 1; fore and mid tarsomere 5 with delicate ventral swelling; tarsal claws long and slightly unequal on fore and mid legs, small and nearly equal on hind leg, lengths of larger and smaller talons of fore, mid and hind claws: 179/134 – 168/131 – 49/41μ (n=2); longest talon of fore and mid leg claws longer than length of their respective tarsomeres 5, LC/T ratios of fore, mid and hind legs 1.32–1.32–0.70 (n=2); hind tarsal ratio 2.7 (n=2).

Abdomen brown. Two slightly unequal to subequal ovoid spermathecae (Fig. 24) with very short necks, measuring 75 X 60μ and 63 X 51μ (n=2).

Male. Unknown.

Distribution. Brazil (Rio de Janeiro).

Types. Holotype ♀, BRAZIL, Rio de Janeiro, Casimiro de Abreu, Union Biological Reserve (22° 25' 35" S, 42° 2' 4" W), 28.XII.2012–31.I.2013, “Biota Diptera Fluminense” team col., malaise trap (CCER). Paratype 1 ♀, same data as holotype (CCER).

Etymology. This species is named after the originaries of the state of Rio de Janeiro, where the specimens were collected.

Taxonomic discussion. *Parabezzia fluminensis* differs from the other New World species of the *alexanderi* species group by its smaller wing length (0.98 mm) (1.04 mm in *P. blantoni*, 1.30 mm in *P. costalis* and *P. spangleri*, 1.23–1.34 mm in *P. balseiroi* and 1.02–1.32 mm in *P. alexanderi*), by the presence of wing basal swelling beginning at the level of basal arculus (wing basal swelling beginning before the level of basal arculus in the remaining species), by the fore and mid tarsomere 5 with delicate ventral swelling (prominent ventral swelling on fore and mid tarsomere 5 in *P. costalis*, ventral swelling absent on fore tarsomere 5 in *P. alexanderi* and *P. balseiroi*, on all tarsomeres 5 in *P. spangleri*, ventral swelling on tarsomeres 5 not described in *P. blantoni*).

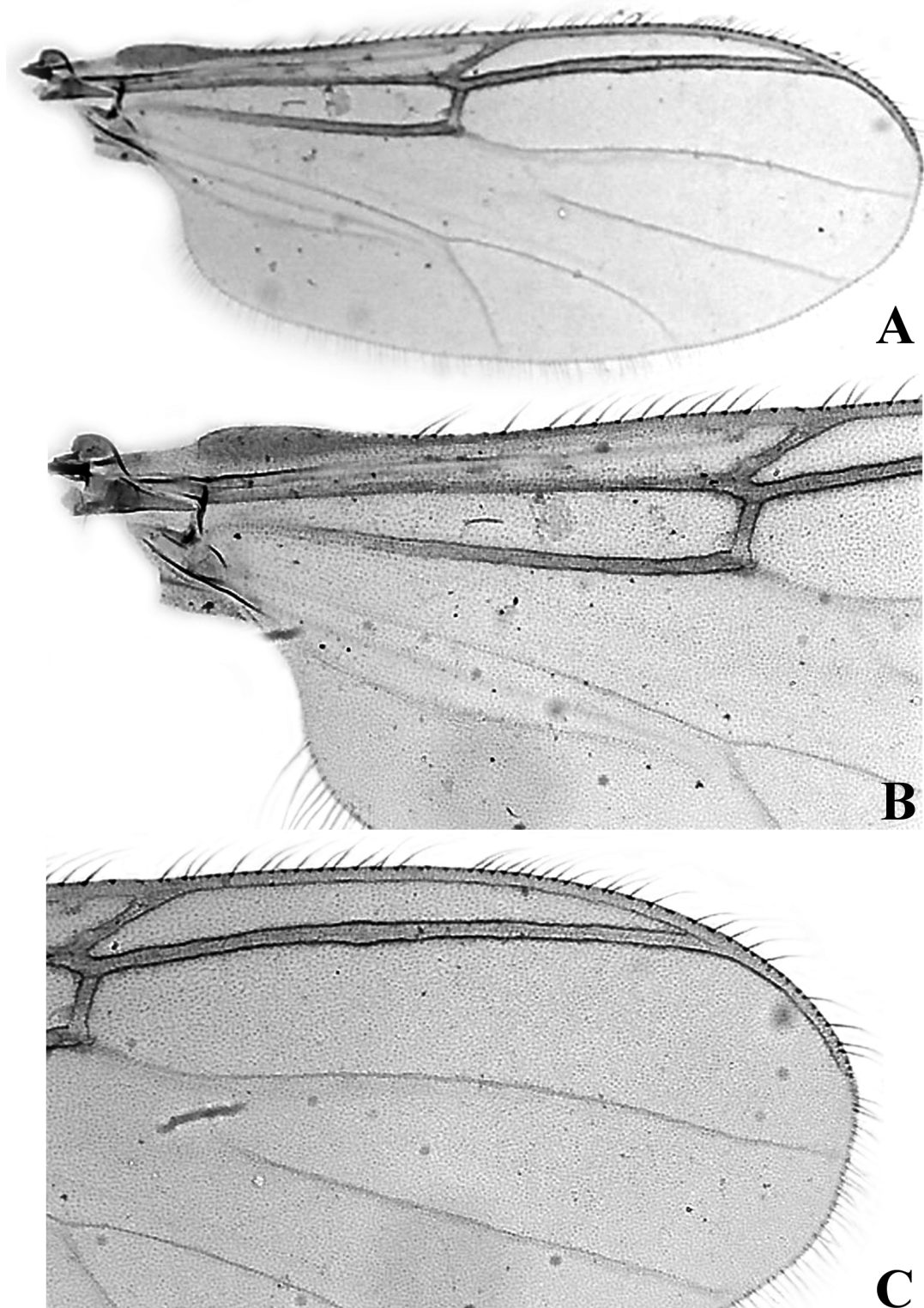
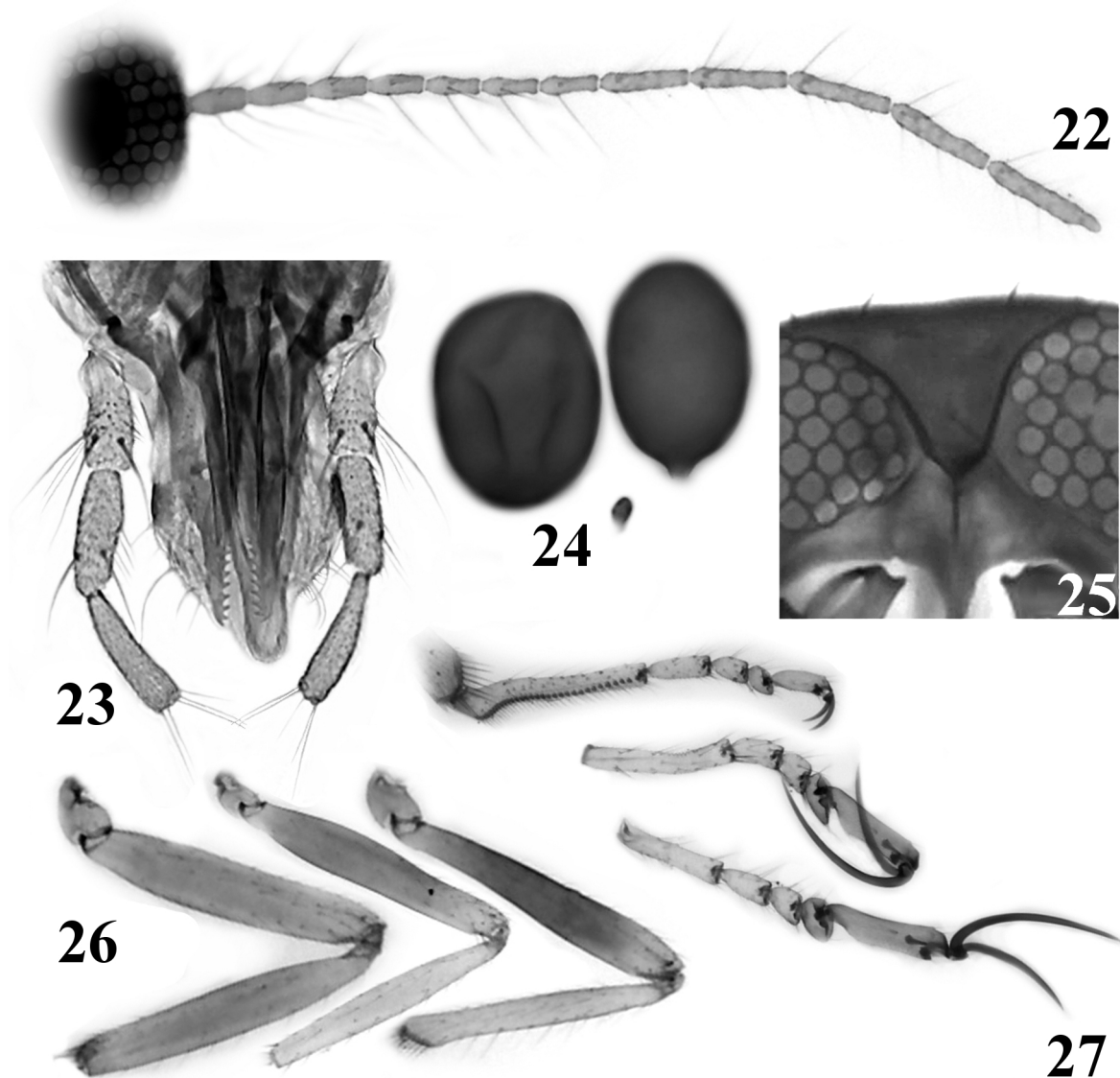


FIGURE 21. *Parabezzia fluminensis* sp. nov., female. A. Wing; B. Wing base, showing costa; C. Wing apex, showing r_3 .



FIGURES 22–27. *Parabezzia fluminensis* sp. nov., female. 22. Antenna; 25. Eyes separation, anterior view; 23. Palpus, lateral view; 24. Spermathecae; 26. Legs (left to right) of fore, mid- and hindlegs, lateral view; 27. Tarsi (top to bottom) hind, mid- and fore tarsomeres, lateral view.

New records from Brazil

Parabezzia balseiroi Spinelli & Grogan

Parabezzia balseiroi Spinelli & Grogan, 1987: 13 (male, female, pupa; Entre Ríos, Argentina; figs.); Borkent & Wirth, 1997: 104 (in World catalog); Spinelli, 2000: 70 (distrib.); Borkent & Spinelli, 2007: 84 (in Neotropical catalog; distrib.); Spinelli et al., 2012: 164 (redescr. pupa); Borkent, 2014: 129 (in World catalog).

Distribution: Argentina (Mendoza, Corrientes, Entre Ríos, Buenos Aires), Brazil (Rio Grande do Sul).

New record: BRAZIL, Rio Grande do Sul, Rio Grande, Pólvora island (32°02'01"S 52°10'45"W), 22.X–03.XI.2009, Carrasco, D. col., 2 ♀, Malaise trap (CCER).

Parabezzia costalis Wirth

Parabezzia costalis Wirth, 1965: 221 (female, male; Panama; figs.); Wirth, 1974: 42 (in catalog south of USA); Spinelli & Grogan, 1987:17 (redescr., distrib.; figs.); Wirth & Grogan, 1988: 74 (in list of World species of *Parabezzia*); Borkent & Wirth, 1997:104 (in World catalog); Borkent & Spinelli, 2007: 84 (in Neotropical catalog; distrib.); Borkent, 2014: 129 (in catalog).

Distribution: Panama, Brazil (Rio de Janeiro)

New record: BRAZIL, Rio de Janeiro, Casimiro de Abreu, Union Biological Reserve (22° 25' 35" S, 42° 2' 4" W), 28.XII.2012–31.I.2013, “Biota Diptera Fluminense” team col., 9 ♀, Malaise trap (CCER).

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