Zeitschrift: Mitteilungen der Schweizerischen Entomologischen Gesellschaft = Bulletin de la Société Entomologique Suisse = Journal of the Swiss Entomological Society

Herausgeber: Schweizerische Entomologische Gesellschaft

Band: 78 (2005)

Heft: 1-2

Artikel: Three new species of Neotropical Drosophilidae (Diptera)

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DOI: https://doi.org/10.5169/seals-402887

MITTEILUNGEN DER SCHWEIZERISCHEN ENTOMOLOGISCHEN GESELLSCHAFT
BULLETIN DE LA SOCIÉTÉ ENTOMOLOGIQUE SUISSE
78: 143–163, 2005

Three new species of Neotropical Drosophilidae (Diptera)

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One new species of *Drosophila* from the southernmost Mexican state of Chiapas and from Guatemala (*Drosophila batmani* n. sp.), belonging to the *uninubes* subgroup of the *rubrifrons* species group, and two new species of *Hirtodrosophila*, both from the state of Rio de Janeiro, Brazil (*Hirtodrosophila gavea* n. sp. and *Hirtodrosophila minuscula* n. sp.) and extremely similar to *Hirtodrosophila gilva* (Burla, 1956), are described. Additionally, *Hirtodrosophila ramulosa* (Burla, 1956) is redescribed based on its type material. Illustrations (line drawings and photomicrographs) of the male terminalia of the four species concerned are also included.

Keywords: Brazil, Rio de Janeiro, Mexico, Chiapas, Guatemala, *Drosophila*, *Hirtodrosophila*, male terminalia, redescription.

INTRODUCTION

In two recently published papers (Vilela & Bächli 2004a, 2004b) we have made comments on some misidentified specimens of drosophilids we have either received as a loan from the American Museum of Natural History (AMNH) or analyzed in Burla's collection housed in the Zoologisches Museum der Universität Zürich (ZMUZ).

Among the specimens from the AMNH, previously identified as *Drosophila uninubes* Patterson and Mainland, we have found some flies which proved to belong to one undescribed species of the *Drosophila rubrifrons* group. Additionally, in Burla's collection (ZMUZ), two male specimens belonging to two undescribed species of *Hirtodrosophila* were found among some ordinary flies previously identified by Dr. Hans Burla as *Drosophila gilva* Burla.

The purpose of the present paper is to describe those three Neotropical species and to redescribe *Hirtodrosophila ramulosa* (Burla, 1956), based on its type material.

MATERIAL AND METHODS

Eight specimens (5 ♂♂, 3 ♀♀) belonging to the genus *Drosophila*, housed in the American Museum of Natural History (New York), and five male specimens belonging to the genus *Hirtodrosophila*, deposited in the Zoologisches Museum der Universität Zürich, were used in the present study. They are detailed under each description or redescription.

Label data attached to each type specimen are cited in full with a slash indicating a label change. Our own notes or interpretations are included in brackets.

For morphological terminology, measurements, indices, preparations of microscope slides as well as illustrations see Vilela & Bächli (2000) and Bächli *et al.* (2004). Whenever on the same plate, all line drawings were drawn to the same scale. Similarly, unless two scales are included on a given plate, all photomicrographs were taken and enlarged to the same magnification.

Genus *Drosophila* Fallén

Drosophila batmani n. sp.

(Figs 1A, 2, 4, 5)

Material examined (5 ♂♂, dissected, 3 ♀♀, deposited in AMNH). Holotype male (dissected, right wing removed) labelled: «San Cristobal Chiapas, Mex. [Mexico] / MWasserman / [right wing mounted in microslide] / ♂ / Drosophila batmani Vilela & Bächli, 2004 / HOLOTYPE / [microvial with terminalia].» — 4 ♂♂, 3 ♀♀ paratypes: 4 ♂♂, 1 ♀, same data as holotype [1 ♂ illustrated, body missing except for terminalia and remains of two legs]; 2 ♀♀, «Guatemala April 1959 / Drosophila batmani Vilela & Bächli, 2004 / ♂ [or ♀] / PARATYPE [one female has an additional label " 376.9"].»

Type locality. San Cristobal, state of Chiapas, Mexico.

Diagnosis. Generally yellowish flies; frons brownish, paler yellowish towards anterior margin; wing with both main crossveins slightly clouded, apex of R_{2+3} with a dark, roundish spot; abdominal tergites with a dark marginal band which is medially narrowed or interrupted; aedeagus conspicuously bearing three relatively long, straight, sharply pointed, apical processes, as seen in dorsal view, and laterodorsally with a pair of short, backwards directed, subapical processes.

Description. ♂. Head. Frons generally reddish-brown, dull, frontal length 0.29 (0.28–0.31) mm; frontal index = 0.85 (0.81–0.90), top to bottom width ratio = 1.31 (1.24–1.35). Frontal triangle blackish-brown, about 59 % of frontal length; ocellar triangle prominent, about 47 % of frontal length. Orbital plates narrow, greyish-black, diverging from eye margin, about 76 % of frontal length. Orbital setae black, almost in a line, distance of or3 to or1 = 45 % of or3 to vtm, or1 / or3 ratio = 0.74 (0.73–0.75), or2 / or1 ratio = 0.36 (0.33–0.40), postocellar setae = 66 %, ocellar setae = 90 % of frontal length; vibrissal index = 0.84 (0.73–0.91). Face brownish. Carina noselike, broad. Cheek index about 7–10. Eye index = 1.15. Arista with 4–5 dorsal, 2 ventral and about 6 inner branches, plus terminal fork.

Thorax length 1.11 (1.10–1.12) mm. Scutum brownish-yellow, shiny, 6–8 rows of acrostichal setulae. h index = 0.86 (0.80–0.93). Transverse distance of dorsocentral setae 170 % of longitudinal distance; dc index = 0.71 (0.68–0.73). Distance between apical scutellar setae about 110 % of that between apical and basal one, basal setae divergent; scut index = 1.02 (1.00–1.04). Pleura brownish-yellow, sterno index = 0.62 (0.58–0.67), median katepisternal seta about 68–73 % of the anterior one.

Wing (Fig. 1A) with slightly shadowed main crossveins and a more-or-less roundish spot around tip of R_{2+3}, length 2.61 (2.55–2.63) mm, length to width ratio = 2.27. Indices: C = 3.67 (3.47–3.79), ac = 2.29 (2.00–2.50), hb = 0.28 (0.27–0.29), 4C = 0.65 (0.64–0.68), 4v = 1.54 (1.50–1.55), 5x = 1.13, M = 0.41, prox. x = 0.51 (0.50–0.55).

Abdomen generally yellowish, tergites 2–6 with a broad, brownish marginal band which is medially more-or-less narrowed or even interrupted and laterally narrowed.

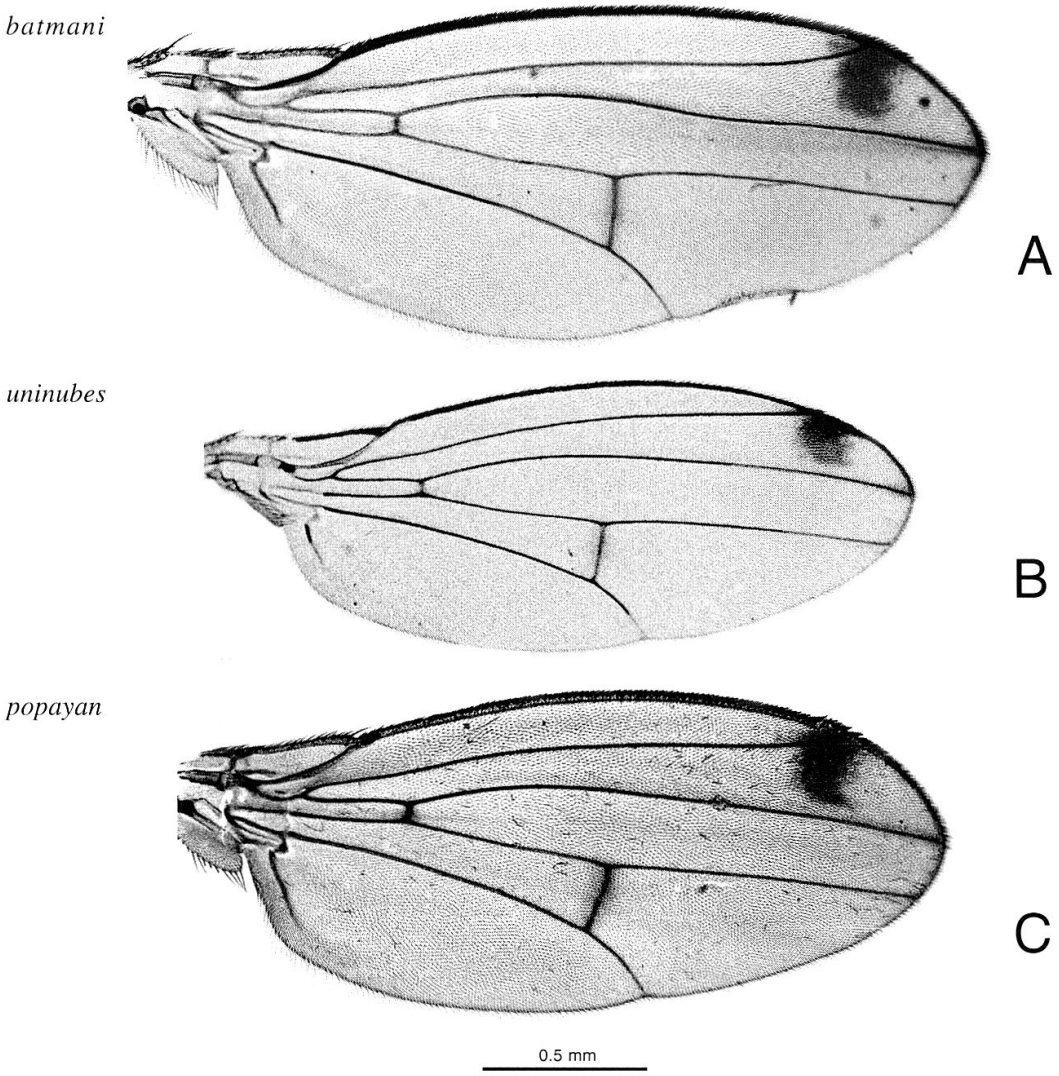

Fig. 1. Right wings, dorsal view, of: A, *Drosophila batmani* n. sp., holotype (1241HT); B, *Drosophila uninubes* (1242), ordinary specimen, 19 miles East of Morelia, Michoacan, Mexico, IX.1947 (same specimen illustrated in Fig. 3C, D); C, *Drosophila popayan* (1237), paratype (same specimen illustrated in Fig. 3E, F).

♂ Terminalia (Figs 2, 4, 5). Epandrium dorsodistally microtrichose, with 5 lower and 2 upper setae; ventral lobe finger-shaped, curved, neither microtrichose nor covering surstylus. Cerci anteriorly connected to epandrium by membranous tissue, not microtrichose and devoid of ventral lobe, although ventromedially each plate is slightly projected downwards. Surstylus not microtrichose, bearing a slightly wavy row of 13 peglike prensisetae, ca. 6 thin inner and 6 thicker outer setae. Decasternum as in Fig. 4B. Hypandrium longer than epandrium, in lateral view remarkably bent anterad, anterior margin narrow; posterior hypandrial process absent; dorsal arch present, well developed, W-shaped, mediodistally membranous; gonopod weakly fused to paraphysis, bearing one seta near the median inner margin. Aedeagus fused to aedeagal apodeme, tube-shaped; apically bearing three relatively long, straight, sharply pointed, backwards directed processes (better seen in

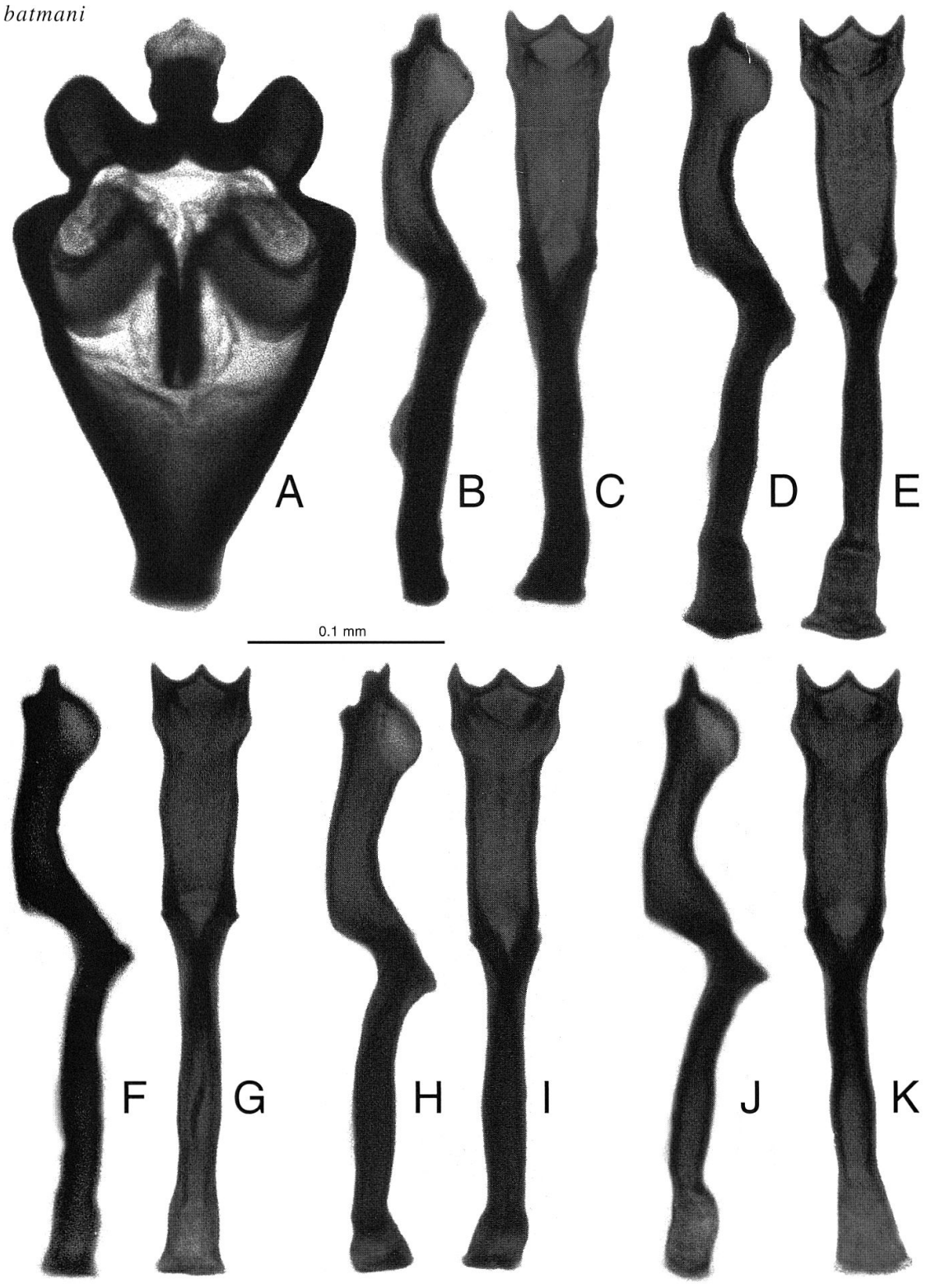

Fig. 2. *Drosophila batmani* n. sp. A, hypandrium, ventral view, paratype, Guatemala (1232). B–K, aedeagus+aedeagal apodeme, left lateral (left) and ventral (right) views; B, C, (1232) paratype, Guatemala; D, E, (1240) paratype, San Cristobal; F, G, (1241) holotype; H, I, (1243) paratype, San Cristobal; J, K, (1245) paratype, San Cristobal.

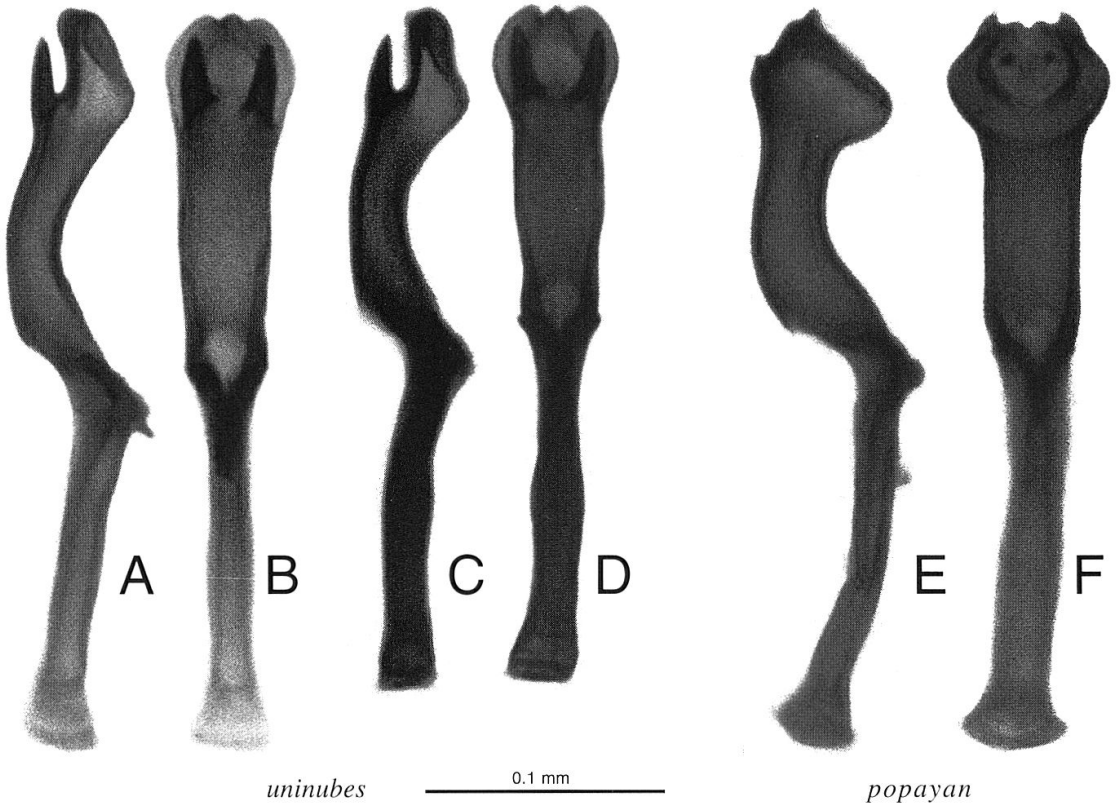

Fig. 3. Aedeagus+aedeagal apodeme, left lateral (left) and ventral (right) view. A–D, *Drosophila uninubes*, A, B, (1231), ordinary specimen, 20 miles NE of Pachuca, Hidalgo, Mexico, VI.1952; C, D, (1242) ordinary specimen, 19 miles East of Morelia, Michoacan, Mexico, IX.1947 (same specimen illustrated in Fig. 1B). E–F, *Drosophila popayan* (1237). paratype (same specimen illustrated in Fig. 1C).

dorsal view) and laterodorsally with a pair of short, backwards directed, subapical processes; lateroventrally membranous in distal region, which is covered with a collar of tiny scales; dorsal cleft reduced to an opening adjacent to the fusion line aedeagus+aedeagal apodeme. Aedeagal apodeme sligthly longer than aedeagus, rod-shaped. Ventral rod shorter than aedeagal apodeme width. Paraphysis fused to gonopod, anteriorly bearing 1 setula on dorsal margin, connected to distal margin of aedeagal apodeme by membranous tissue.

♀. Measurements: Frontal length 0.29 (0.23–0.34) mm; frontal index = 0.85 (0.77–0.95), top to bottom width ratio = 1.33 (1.27–1.38), Frontal triangle about 60 % of frontal length; ocellar triangle about 45 % of frontal length. Orbital plates about 80 % of frontal length. Distance of or3 to or1 = 50 % of or3 to vtm, or1 / or3 ratio = 0.71 (0.69–0.73), or2 / or1 ratio = 0.42 (0.36–0.45), postocellar setae = 73 (70–76) %, ocellar setae = 87 (80–94) % of frontal length; vibrissal index = 0.69 (0.56–0.77). Cheek index about 6–8. Eye index = 1.19. Thorax length 1.12 (0.93–1.22) mm. h index = 0.93. Transverse distance of dorsocentral setae 180 % of longitudinal distance; dc index = 0.70. Distance between apical scutellar setae about 110 % of that between apical and basal one; scut index = 0.99 (0.97–1.00), sterno index = 0.56 (0.54–0.58), median katepisternal seta about 57–77 % of anterior one. Wing length 2.57 (2.20–2.80) mm, length to width ratio = 2.20. Indices: C = 3.80 (3.75–3.86),

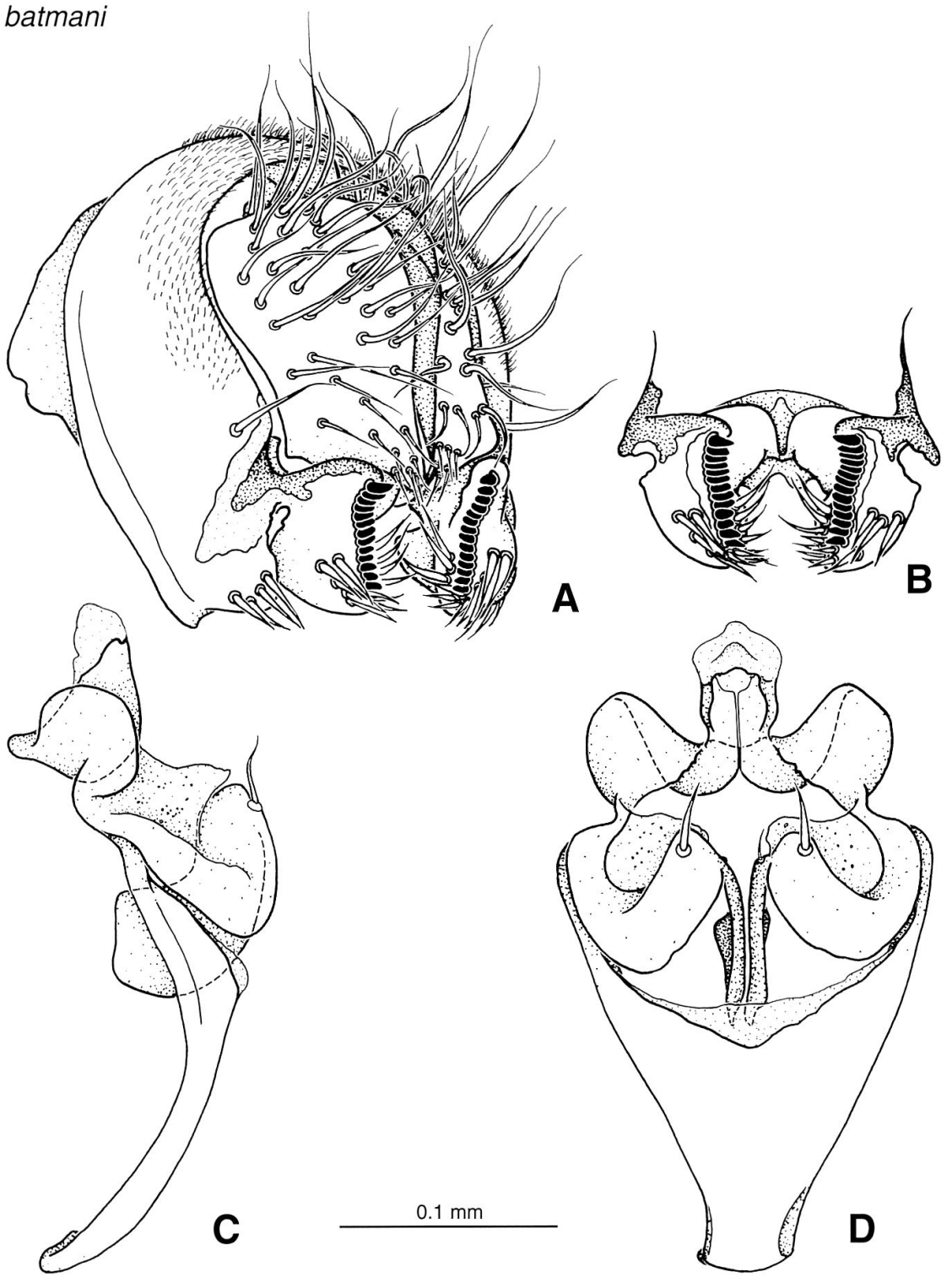

Fig. 4. *Drosophila batmani* n. sp., paratype, Guatemala. A, epandrium, cerci, surstyli, and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view. C, hypandrium and gonopods, left lateral view. D, idem, posterior view.

batmani

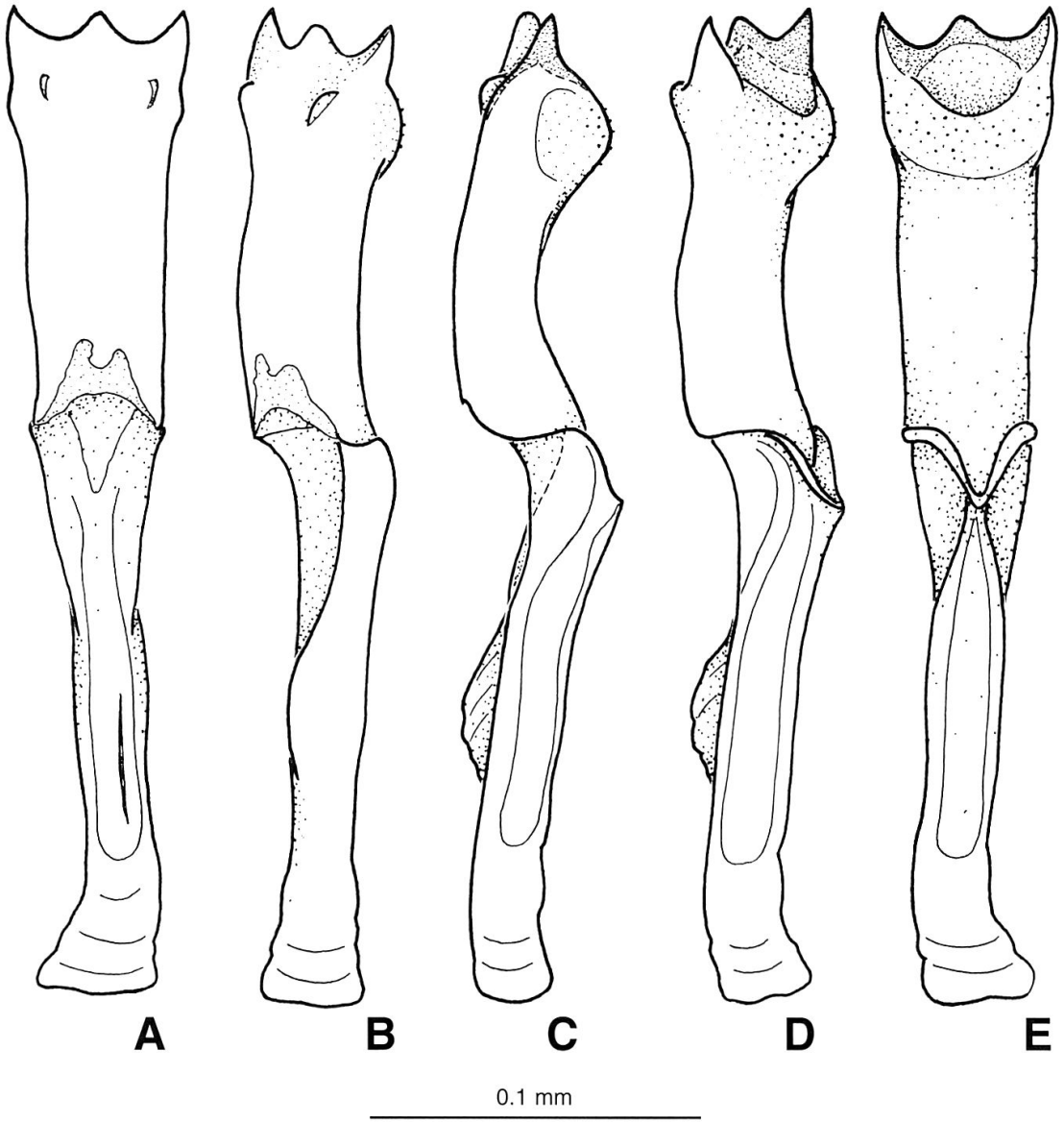

Fig. 5. *Drosophila batmani* n. sp., paratype, Guatemala. A–E, aedeagus+aedeagal apodeme, several aspects from dorsal through ventral.

ac = 2.24 (2.14–2.33), hb = 0.30 (0.27–0.33), 4C = 0.66 (0.64–0.68), 4v = 1.68 (1.59–1.77), 5x = 1.12 (1.00–1.25), M = 0.43 (0.41–0.45), prox. x = 0.55.

Etymology. The epithet «*batmani*» is a noun in the genitive case, referring to the comics superhero Batman, as the aedeagus tip of this new species, when seen in dorsal view, at first sight roughly resembles the superhero created by Bob Kane in 1939.

Distribution. Southern Mexico (Chiapas) and Guatemala.

Biology. Unknown.

Relationship. *Drosophila batmani* n. sp. belongs to the *uninubes* subgroup of the *Drosophila rubrifrons* species group and constitutes together with *D. uninubes*

Patterson & Mainland, 1943 and *Drosophila popayan* Vilela & Bächli, 2004 a set of three sibling species.

Comments. The wing pattern of *D. batmani* n. sp. (Fig. 1A) is virtually identical to those of its two sibling species, *D. uninubes* Patterson & Mainland, 1943 (Fig. 1B) and *D. popayan* Vilela & Bächli, 2004 (Fig. 1C). However, *D. batmani* mostly differs from *D. uninubes* in having an aedeagus laterodorsally bearing a much shorter subapical process (Figs 1B–K) which is remarkably long in the latter species (Figs. 2A–D). In lateral view, the aedeagus of *D. batmani* (Figs 2B, D, F, H, J) somewhat resembles that of *D. popayan* (Fig. 3E) from which it differs by bearing a noticeably longer apical process and presenting a smaller ventrodistal, membranous expansion; their aedeagi mostly differ when seen in dorsal view, because of the three relatively long, straight, apical processes present in *D. batmani* (Figs 2C, E, G, I, K) and the two short, curved, lateroapical processes present in *D. popayan* (Fig. 3F).

Genus *Hirtodrosophila* Duda

Hirtodrosophila gavea n. sp.

(Figs 6A, B, G, 7, 8)

Material examined. Holotype male (dissected and deposited in ZMUZ) labelled: «Brasilia [Brazil] Rio de Janeiro VI.1953 H. Burla leg. / ♂ / gilva [misidentification] / Hirtodrosophila gavea Vilela & Bächli 2004 / HOLOTYPE.»

Type locality. Parque da Cidade, Rio de Janeiro city, state of Rio de Janeiro, Brazil.

Diagnosis. Generally yellowish flies, pleura with a diffuse brown stripe from below postpronotum to below wing base; abdominal tergites with diffuse brown marginal bands; very similar to *Hirtodrosophila gilva* (Burla, 1956) and to *Hirtodrosophila minuscula* n. sp. It differs from the first mostly by having a remarkably huge ventralmost prensiseta on the surstylus, which is of normal size in *H. gilva*. It differs from the latter by having a quite distinct aedeagus, which is mostly covered with scales anterolaterally and just subtly serrate medially in lateral view; in *H. minuscula* the aedeagus is just slightly scaled laterally and remarkably serrate along the dorsal margin in lateral view.

Description. ♂. Head. Frons brownish, frontal length 0.25 mm; frontal index = 0.94, top to bottom width ratio = 1.13. Frontal triangle indistinct, may be greyish-yellow, ocellar triangle slightly prominent, microtrichose, about 35 % of frontal length. Orbital plates narrow, not diverging from eye margin, about 75 % of frontal length. Orbital setae brown, equidistant, almost in a line, distance of or3 to or1 = 70 % of or3 to vtm, or1 / or3 ratio = 1.14, or2 / or1 ratio = 0.25, postocellar setae = 47 %, ocellar setae = 67 % of frontal length; vibrissal index = 0.27. Carina short, narrow, not very distinct. Cheek index about 3–4. Eye roundish. Antennae yellow. Flagellomere 1 apically brownish, densely covered with elongated setulae, length to width ratio = 1.50. Arista with 6 dorsal, 1 ventral and about 5 long inner branches, plus terminal fork. Proboscis yellow.

Thorax length 0.81 mm. Scutum brown with diffuse darker stripes. 6 rows of acrostichal setulae. h index = 1.13. dc index = 0.60. Distance between apical scutellar setae about 130 % of that between apical and basal one; scut index = 0.73.

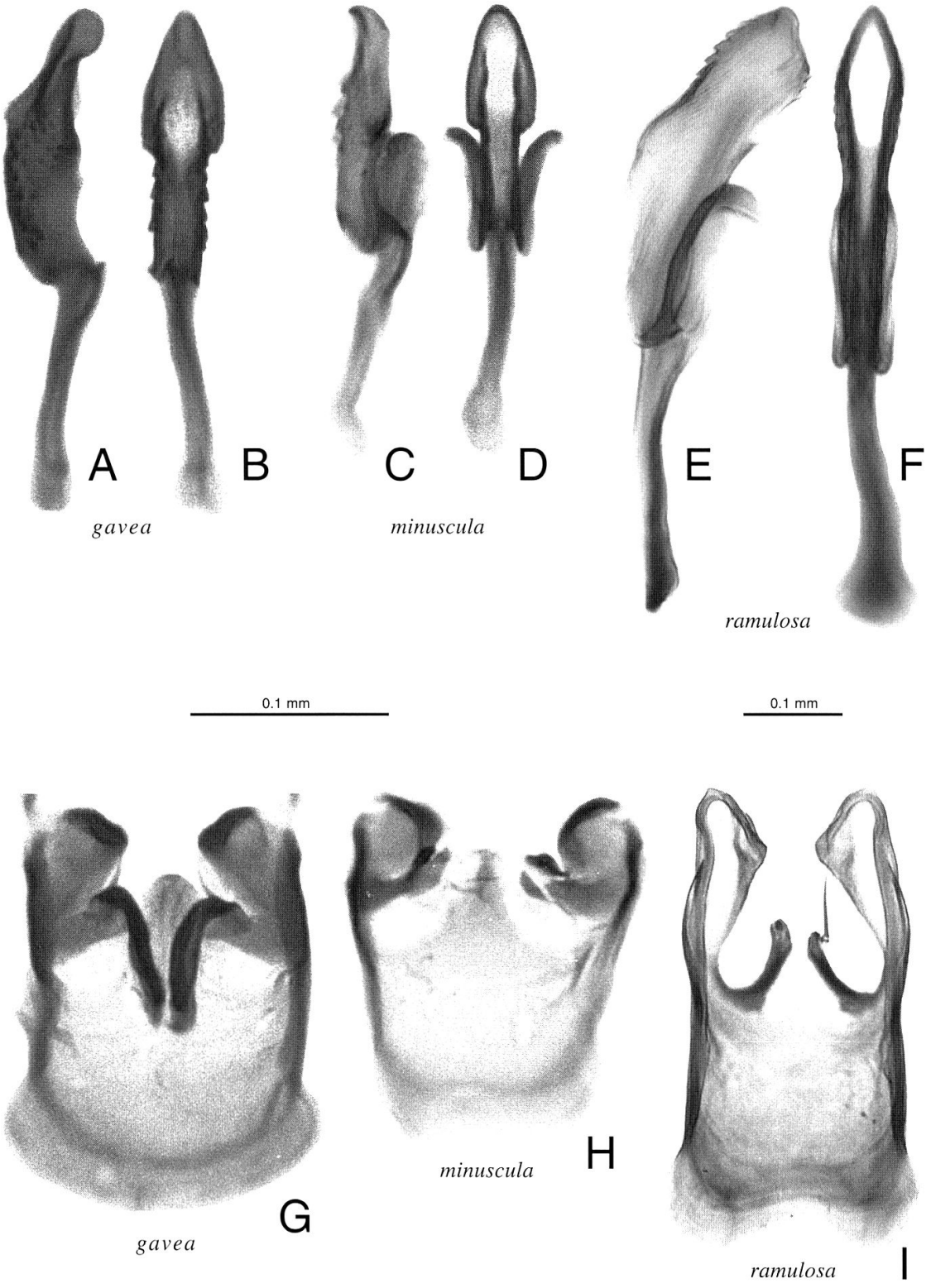

Fig. 6. Aedeagi+aedeagal apodemes and paraphyses (above), left lateral (left) and ventral (right) view, and hypandria, ventral view (below) of holotypes of: *Hirtodrosophila gavea* n. sp., A, B, G (1194); *Hirtodrosophila minuscula* n. sp., C, D, H (1193); *Hirtodrosophila ramulosa* (Burla), E, F, I (B458). Paraphyses of first species are fused to gonopods (Fig. G).

gavea

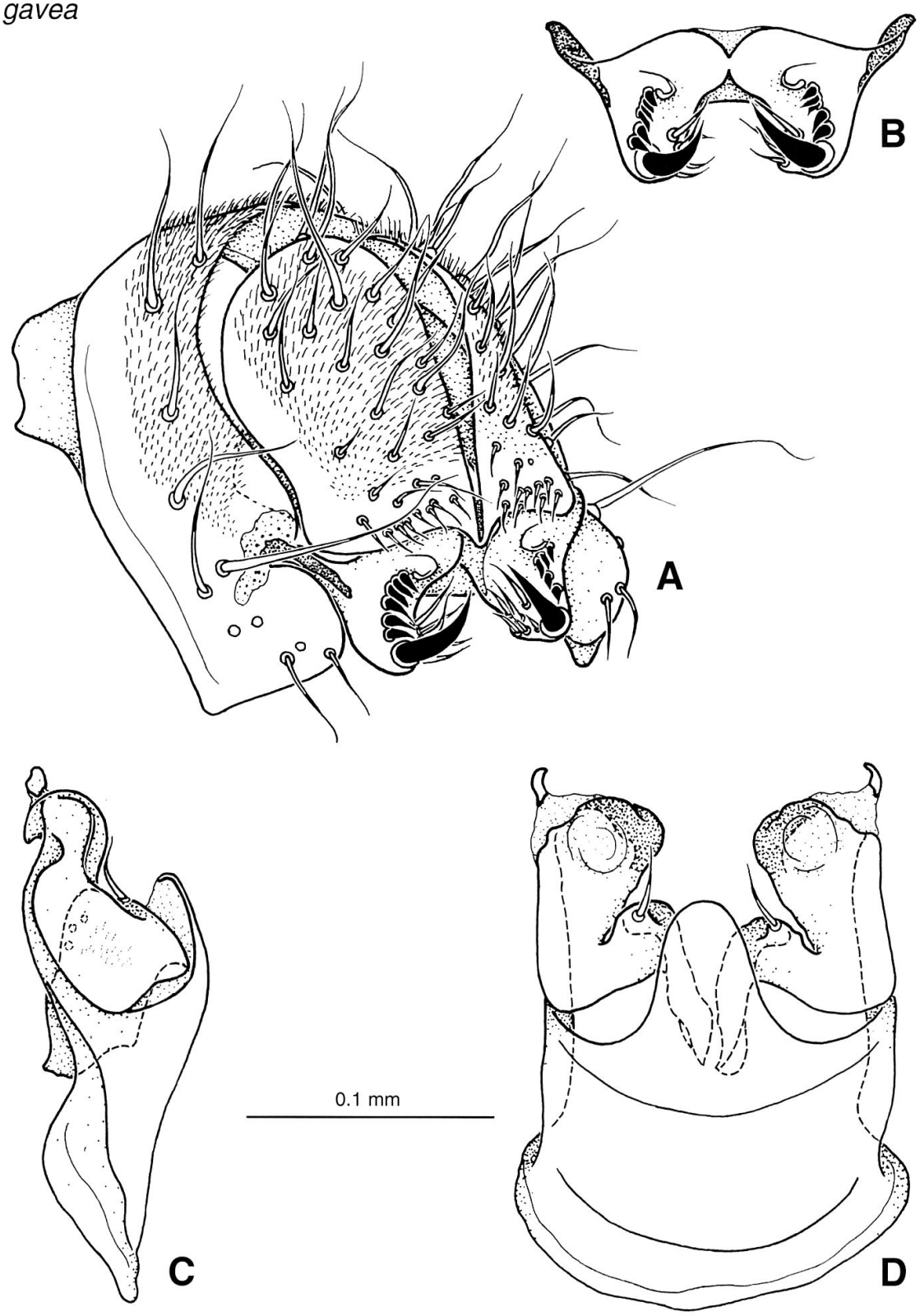

Fig. 7. *Hirtodrosophila gavea* n. sp., holotype. A, epandrium, cerci, surstyli, and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view. C, hypandrium and gonopods+paraphyses, left lateral view. D, idem, posterior view.

gavea

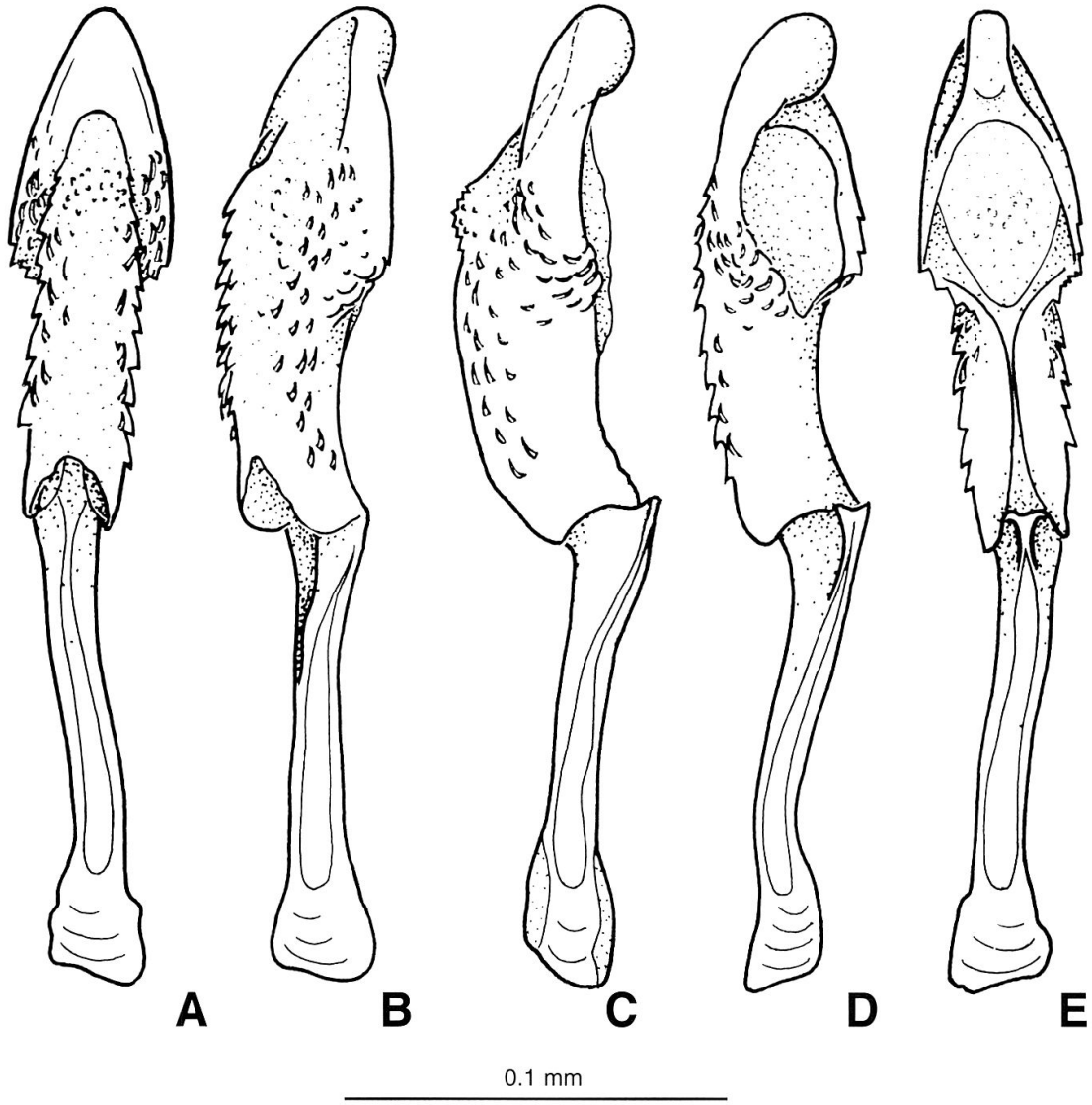

Fig. 8. *Hirtodrosophila gavea* n. sp., holotype. A–E, aedeagus+aedeagal apodeme, several aspects from dorsal through ventral.

Pleura yellowish-brown, with a more or less distinct brown stripe below postpronotum, sterno index = 0.44, median katepisternal seta about 43 % of anterior one. Halter pale. Legs yellowish, preapical seta on hind tibia, apical seta on mid tibia.

Wing hyaline, length 1.68 mm, length to width ratio = 2.18. Indices: C = 1.39, ac = 4.50, hb = 0.61, 4C = 1.64, 4v = 2.45, 5x = 2.25, M = 0.82, prox. x = 0.55.

Abdomen predominantly yellow, tergites 2–5 with a diffuse brownish marginal band which is medially broadened.

♂ Terminalia (Figs 6A, B, G, 7, 8). Epandrium dorsoposteriorly microtrichose with about 5 lower, and 6 upper (posterior lowermost one remarkably long) setae; ventral lobe neither microtrichose nor covering surstylus. Cercus well-developed, anteriorly connected to epandrium by membranous tissue, mostly microtrichose,

devoid of ventral lobe, ventrally with a row of short setae; anterior margin medially expanded beneath posterior margin of epandrium. Surstylus not microtrichose, bearing ca. 7 curved, sharply pointed, peglike prensisetae (ventralmost one remarkably huge) arranged in a slightly concave row, ca. 5 inner setae, and no outer seta; dorsalmost prensisetae preceded by a tiny crescent-shaped process (Figs 7A, B). Decasternum as in Fig. 7B. Hypandrium as long as epandrium, roughly square in posterior view; posterior hypandrial process present, membranous; dorsal arch absent; gonopod fused to paraphysis, bearing one seta near median inner margin, posteriorly strongly sclerotized and preceded by a slightly membranous area. Aedeagus fused to aedeagal apodeme, apically roundish in dorsal and ventral view, anterolaterally conspicuously bearing tiny scales, submedially with a pair of tiny, anteriorly directed lobes in the ventral region, and dorsally bearing a tiny pair of scaled processes on median surface; dorsal cleft (Fig. 8B) reduced to an anterior opening, adjacent to fusion line (Fig. 8C) between aedeagus and aedeagal apodeme. Aedeagal apodeme as long as aedeagus, rod-shaped. Ventral rod absent. Paraphysis slightly microtrichose, connected to distal margin of aedeagal apodeme by membranous tissue and bearing ca. three tiny setulae near dorsal margin.

Distribution. Known only from the type locality.

Biology. Unknown.

Etymology. The epithet «*gavea*» is a noun in apposition, in allusion to the district of Gavea, south of Rio de Janeiro city, where the collection site (Parque da Cidade) of the holotype is located.

Comments. The aedeagus of *H. gavea* is at first sight very similar to that of *Hirtodrosophila morgani* (Mourão *et al.*, 1967). However, they have a quite distinct surstylus and can be readily identified by the presence of a remarkably huge ventralmost prensiseta in *H. gavea* (Figs. 7A, B), which is absent in *H. morgani*. Additionally, in dorsal view, the aedeagus of *H. gavea* is apically roundish (Figs 6B, 7A) while in *H. morgani* it is deeply bifid (for illustrations of the male terminalia of the latter species, refer to Vilela & Bächli 2004b, figs 5, 6, 13A–D).

Hirtodrosophila minuscula n. sp.

(Figs 6C, D, H, 9, 10)

Material examined. Holotype male (dissected and deposited in ZMUZ) labelled: «Brasilia [Brazil] Rio de Janeiro V.1953 H. Burla leg. / ♂ / gilva [misidentification] / Hirtodrosophila minuscula Vilela & Bächli, 2004 / HOLOTYPE.»

Type locality. Parque da Cidade, Rio de Janeiro city, state of Rio de Janeiro, Brazil.

Diagnosis. Externally very similar to *H. gavea* n. sp. and to *Hirtodrosophila gilva* (Burla, 1956). It differs from the first by having a quite distinct aedeagus, which is just slightly scaled laterally and remarkably serrate along dorsal margin in lateral view; in *H. gavea* the aedeagus is mostly covered with scales anterolaterally and just subtly serrate medially in lateral view. It differs from the latter mostly by having a remarkably huge ventralmost prensiseta on the surstylus, which is of normal size in *H. gilva*.

Description. ♂. Head. Frons brownish, microtrichose, frontal length 0.20 mm; frontal index = 0.92, top to bottom width ratio = 1.23. Frontal triangle usually indistinct, may be greyish-yellow, ocellar triangle slightly prominent, microtrichose,

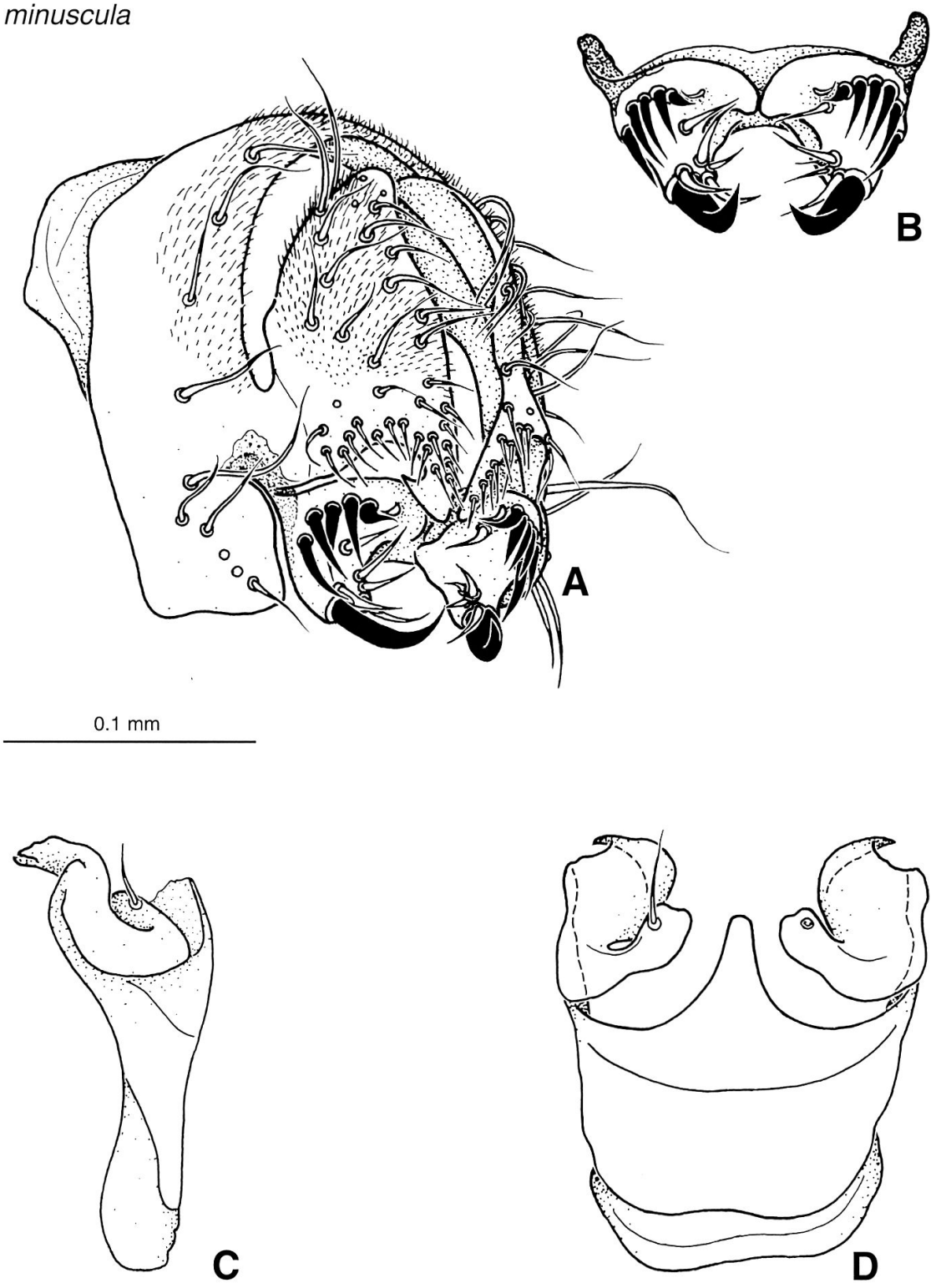

Fig. 9. *Hirtodrosophila minuscula* n. sp., holotype. A, epandrium, cerci, surstyli, and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view. C, hypandrium and gonopods, left lateral view. D, idem, posterior view.

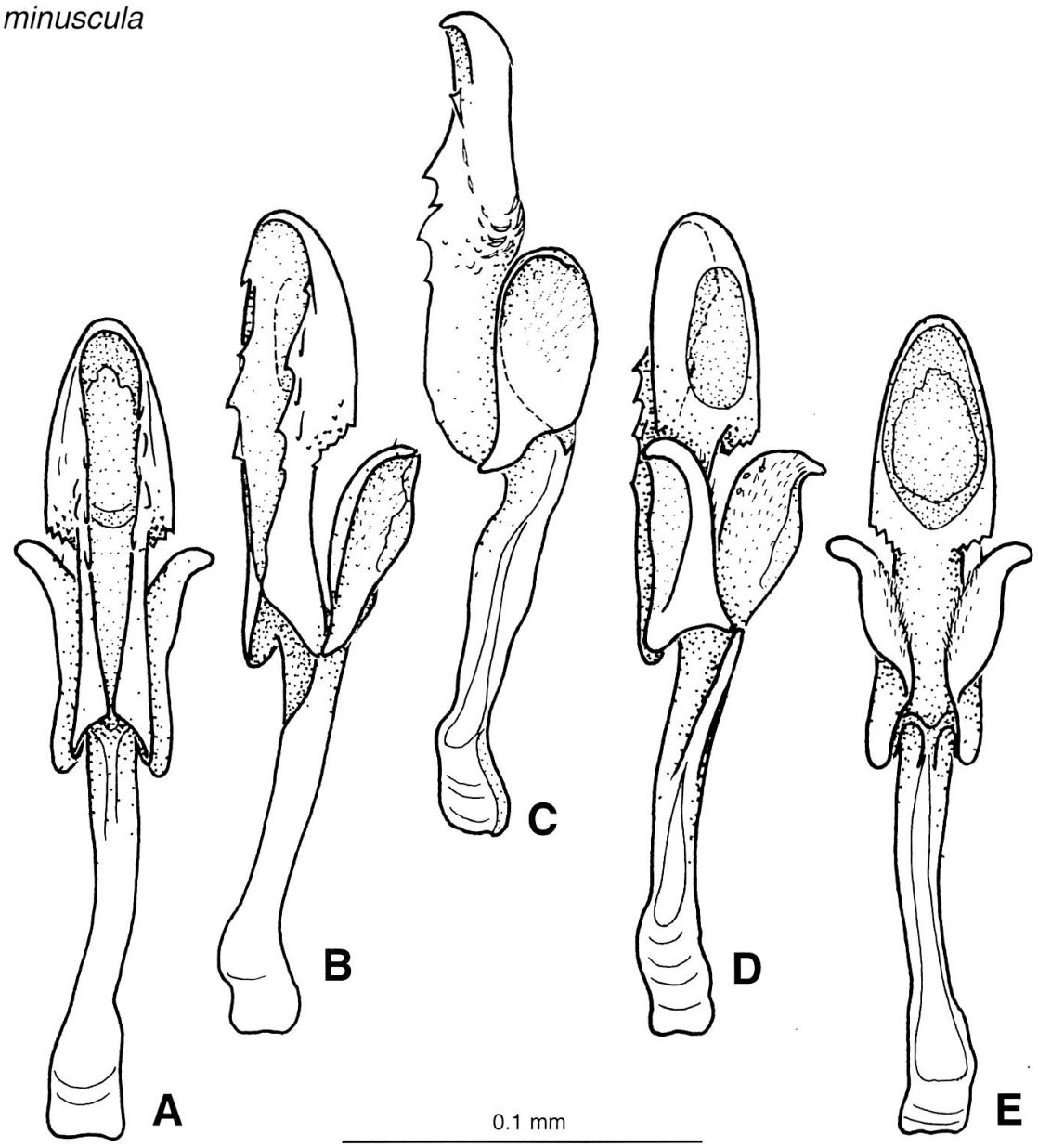

Fig. 10. *Hirtodrosophila minuscula* n. sp., holotype. A–E, aedeagus+aedeagal apodeme and paraphyses, several aspects from dorsal through ventral.

about 35 % of frontal length. Orbital plates narrow, not diverging from eye margin, about 75 % of frontal length. Orbital setae brown, equidistant, almost in a line, distance of or3 to or1 = 70 % of or3 to vtm, or1 / or3 ratio = 1.00, or2 / or1 ratio = 0.29, postocellar setae = 42 %, ocellar setae = 67 % of frontal length. Cheek index about 5. Eye roundish, index = 1.11. Antennae yellow. Flagellomere 1 apically brownish, densely covered with elongated setulae. Arista with 4 dorsal, 1 ventral and about 4 short inner branches, plus terminal fork.

Thorax brownish, microtrichose, length 0.71 mm. h index = 1.00. dc index = 0.38. Distance between apical scutellar setae about 130 % of that between apical and basal one; scut index = 0.53. Pleura brownish. Halter pale. Legs yellowish,

preapical seta on metatibia, apical seta on mesotibia.

Wing damaged but seems to be hyaline.

Abdomen predominantly yellow, tergites 2–5 with a diffuse brownish marginal band which is medially broadened.

♂ Terminalia (Figs 6C, D, H, 9, 10). Epandrium dorsoposteriorly microtrichose with about 5 lower, and 5 upper setae; ventral lobe neither microtrichose nor covering surstylus. Cercus fused to epandrium on its lower 1/3, dorsally microtrichose, devoid of ventral lobe, ventrally with a curved row of short setae. Surstylus not microtrichose, bearing ca. 7 long, curved, sharply pointed, peglike prensisetae (ventralmost one remarkably huge) arranged in a strongly concave row, ca. 5 inner setae, and no outer seta; dorsalmost prensiseta is preceded by a tiny crescent-shaped process (Figs 9A, B). Decasternum as in Fig. 9B. Hypandrium shorter than epandrium, roughly square in posterior view; posterior hypandrial process present, membranous; dorsal arch absent; gonopod linked to paraphysis by membranous tissue, bearing one seta near the anterior inner margin, posteriorly strongly sclerotized. Aedeagus fused to aedeagal apodeme, apically roundish in dorsal and ventral view, dorsally mostly membranous and marginally serrate in median region, mediolaterally bearing tiny scales, submedially with a pair of tiny, anteriorly directed lobes in the ventral region, apically slightly turned dorsad in lateral view; dorsal cleft (Fig. 10B) reduced to an anterior opening, adjacent to fusion line between aedeagus and aedeagal apodeme. Aedeagal apodeme as long as aedeagus, rod-shaped. Ventral rod absent. Paraphysis slightly microtrichose, anteriorly expanded dorsad and embracing aedeagus, connected to distal margin of aedeagal apodeme by membranous tissue and bearing ca. three tiny setulae near dorsal margin.

Distribution. Brazil (state of Rio de Janeiro).

Biology. Unknown.

Etymology. The epithet «*minuscula*» is a Latin adjective meaning minute, in allusion to the tiny size of the holotype.

Comments. Although the surstylus of *H. minuscula* n. sp. is at first sight very similar to that of *H. gavea* sp. nov., because both bear a huge ventralmost prensiseta, their male terminalia are rather distinct regarding the connection cercus-epandrium, the relative size and position of the remaining prensisetae and the general structure of the aedeagus.

Hirtodrosophila ramulosa (Burla, 1956)

(Figs 6E, F, I, 11, 12, 13)

Drosophila (Hirtodrosophila) ramulosa Burla, 1956:266; Wheeler (1959, 1970, 1981); Val *et al.* (1981).

Material examined. Four microscope slide mounts bearing disarticulated specimens: Burla's numbers 458 [holotype male, in two slides] and 459 [paratype ♂] and 460 [paratype ♀] as stated in Burla, 1956: 266. The slides are respectively labelled as follows: «H. italongala [manuscript name] ♂ 414» [dismounted by us, terminalia now kept in a microvial filled with glycerin and pinned together with original label; red label with number 458, probably unglued from the slide, is missing]; «458 / H. italongala ♂ 396» [with all body parts except terminalia]; «459 / H. italongala N 524 P775» [male, all body parts present]; «460 / H. italongala / 397» [only the abdomen transversely separated into two parts]. To all of them the following labels are added: «♂ [or ♀] / HOLOTYPE [or PARATYPE] / Hirtodrosophila ramulosa (Burla) Vilela & Bächli det.» Refer to Vilela & Bächli (2004a) for details about Burla's specimens numbering.

Type locality. Parque Nacional do Itatiaia, State of Rio de Janeiro, Brazil.

ramulosa

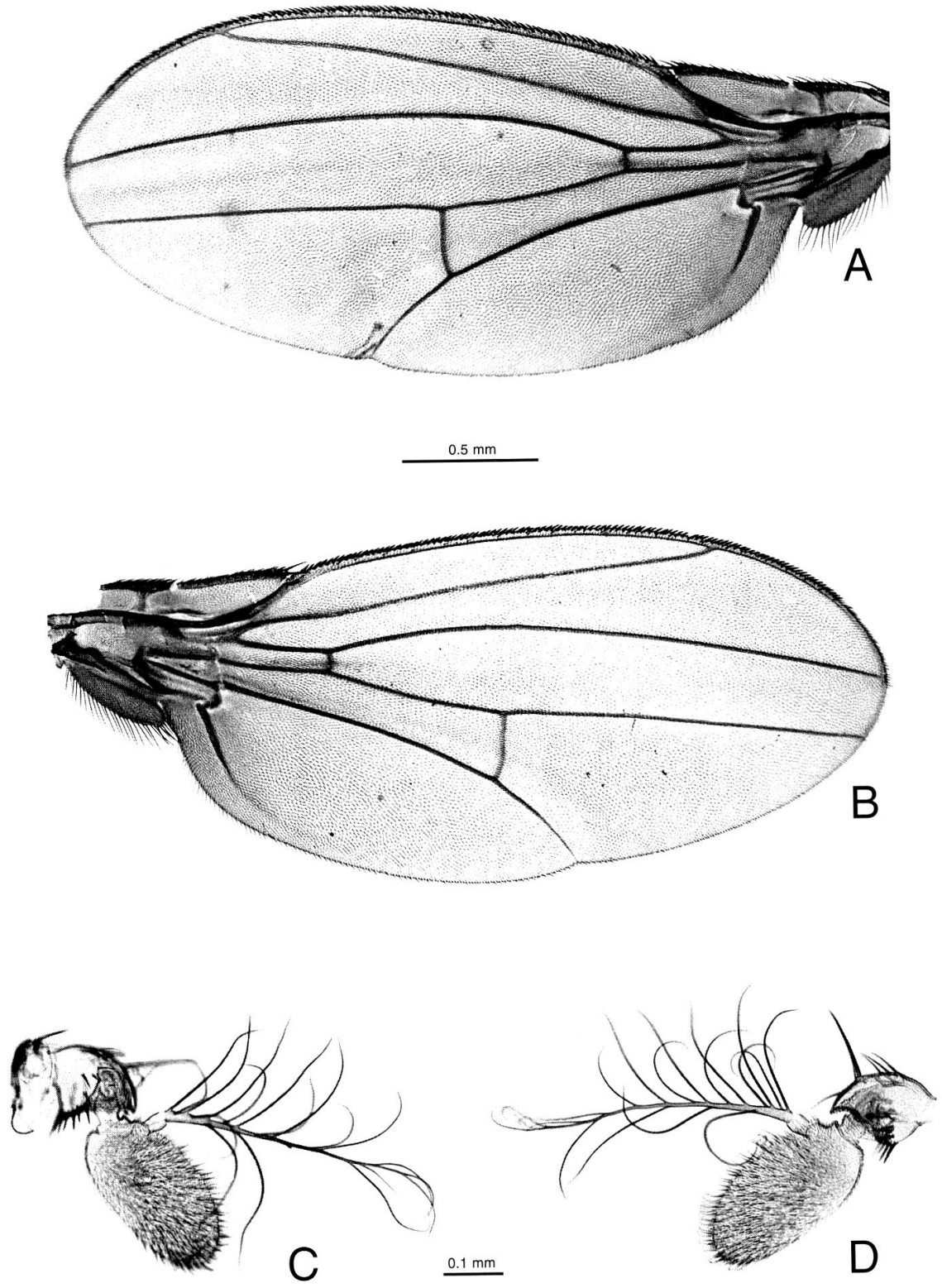

Fig. 11. *Hirtodrosophila ramulosa* (Burla), holotype. Left (A) and right (B) wings, dorsal view. Left (C) and right (D) antenna, inner view.

Diagnosis. Generally yellowish-brown flies; scutum with 4 darker brown stripes; arista with 7 dorsal, 4–5 ventral and about 5 inner branches, which are curved and as long as dorsal and ventral ones, plus terminal fork; wings hyaline; tergites brown with basal, paramedian, yellowish spots; aedeagus apically narrow in dorsal and ventral view, and blunt in lateral view, dorsally entirely membranous and marginally serrate on distal $^1/_3$, conspicuously wrinkled dorsolaterally, subapically slightly serrate ventrally.

Redescription (mainly based on Burla, 1956). ♂. Head. Frons smoky greyish-brown, darker along vertex, greyish-yellow above ptilinum, frontal index = 0.7; orbital plates narrow, pale brown, distance of or3 to or1 = 100 % of or3 to vtm, or1 / or3 ratio = 0.9; or2 / or1 ratio = 0.6; face whitish; cheek index about 8; eye index = 1.3; antennae whitish-yellow, flagellomere 1 brownish-yellow, marginal setulae about $^1/_4$ of flagellomere width, length to width ratio = 1.9; arista (Figs 11C, D) with 7 dorsal, 4–5 ventral and about 5 inner branches which are unusually curved and as long as dorsal and ventral ones, plus terminal fork; palpus greyish-yellow.

Scutum brown, with 4 diffuse, dark greyish-brown stripes; 8 rows of acrostichal setulae; dc index = 0.7; scutellum dark greyish-brown, basal scutellar setae divergent; scut index = 0.9; pleura dark brown, yellowish along sutures, sterno index = 0.9; halter knob dark blackish-brown; legs yellowish, but procoxa blackish-brown, other coxae somewhat paler, profemur blackish-brown, apically greyish-yellow, mesofemur greyish-yellow, basally darker, metafemur greyish-yellow, basal half darker.

Wing (Figs 11A, B) pale brownish, veins brown, length 3.5 mm, length to width ratio = 2.02. Indices: C = 1.93, ac = 3.28, hb = 0.67, 4C = 1.17, 4v = 1.96, 5x = 1.75, M = 0.61. prox. x = 0.52.

Abdomen greyish-brown, tergites with a pair of basal, paramedian, yellow spots, largest one reaching to hind margin on T2, smaller and crescent-shaped on T3–T6.

♂ Terminalia (Figs 6E, F, I, 12, 13). Epandrium dorsoposteriorly microtrichose with about 13 lower, and 12 upper setae; ventral lobe neither microtrichose nor covering surstylus. Cercus well-developed, anteriorly connected to epandrium by membranous tissue, medially microtrichose, devoid of ventral lobe; ventrally with a tuft of thin, tiny setae on inner corner; anterior margin medially expanded beneath posterior margin of epandrium. Surstylus not microtrichose, bearing ca. 11 long, roundish at tip, peglike prensisetae arranged in a straight row, ca. 14 inner setae, and two outer setae. Decasternum as in Fig. 12B. Hypandrium longer than epandrium, roughly rectangular in posterior view; posterior hypandrial process and dorsal arch absent; gonopod linked to paraphysis by membranous tissue, bearing 1 seta on tip of one finger-shaped expansion of anterior inner margin; gonopods anteriorly fused to each other. Aedeagus fused to aedeagal apodeme, apically narrow in dorsal and ventral view, and blunt in lateral view, dorsally entirely membranous and marginally serrate on distal $^1/_3$, conspicuously wrinkled dorsolaterally, subapically slightly serrate ventrally; dorsal cleft (Fig. 11B) reduced to an anterior opening, adjacent to fusion line between aedeagus and aedeagal apodeme. Aedeagal apodeme shorter than aedeagus, rod-shaped, anteriorly expanded laterally. Ventral rod vestigial. Paraphysis ventrally membranous, slightly microtrichose distally on inner side, anteriorly expanded dorsad and embracing aedeagus, connected to distal margin of aedeagal apodeme by membranous tissue and bearing ca. four tiny setulae near dorsoapical margin.

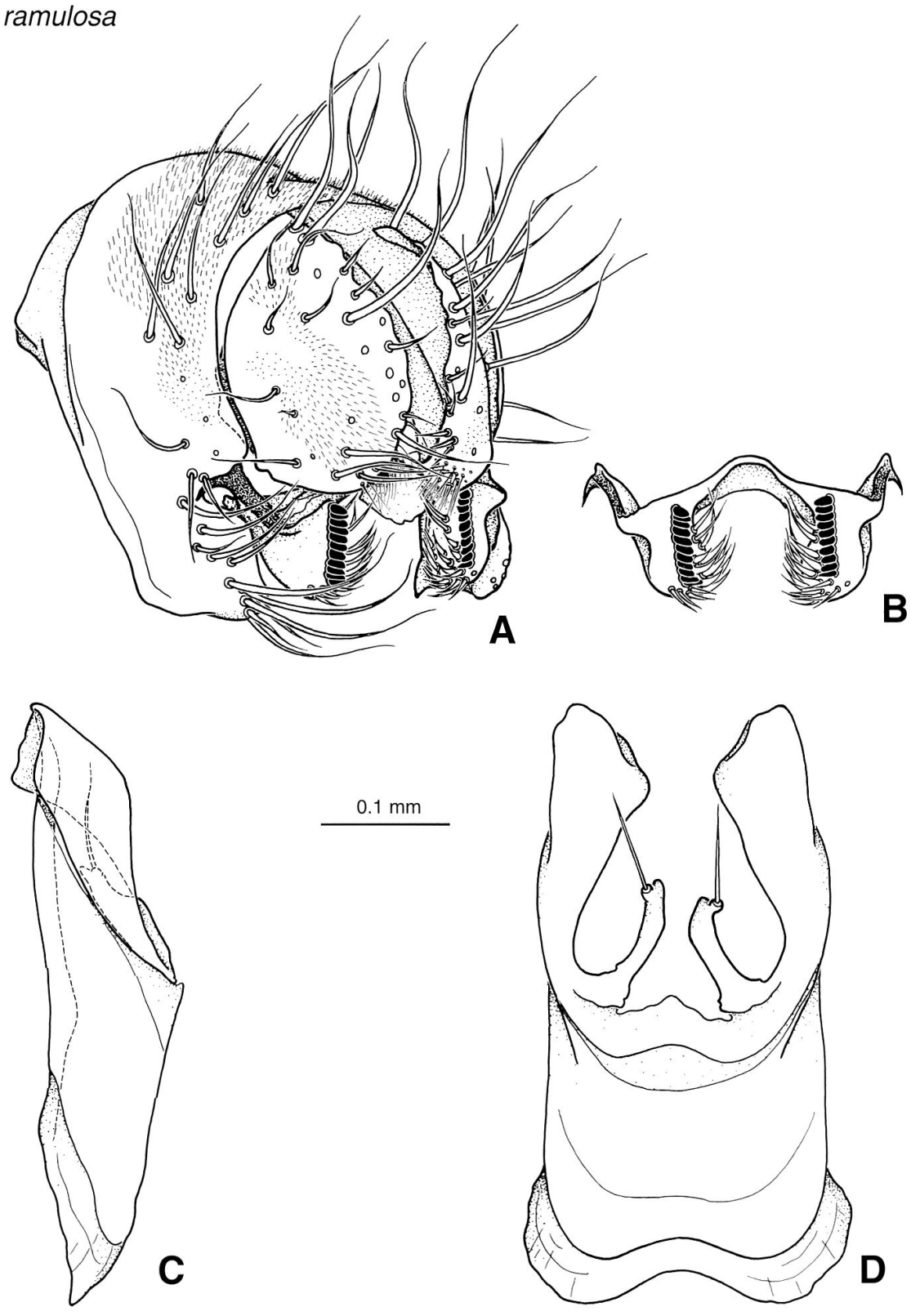

Fig. 12. *Hirtodrosophila ramulosa* (Burla), holotype. A, epandrium, cerci, surstyli, and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view. C, hypandrium and gonopods, left lateral view. D, idem, posterior view.

ramulosa

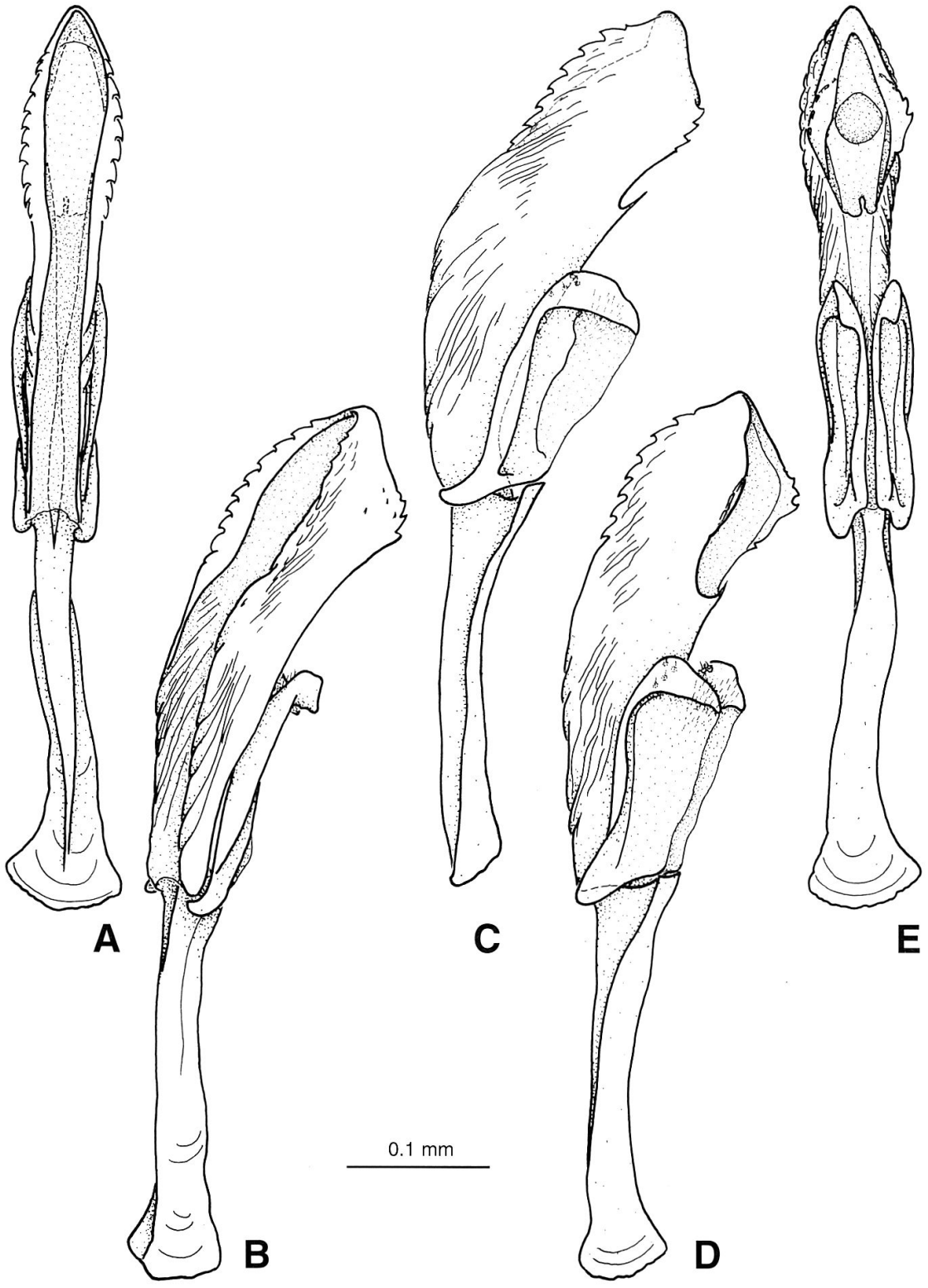

Fig. 13. *Hirtodrosophila ramulosa* (Burla), holotype. A–E, aedeagus+aedeagal apodeme and paraphyses, several aspects from dorsal through ventral.

♀. Oviscapt valve generally of the *Hirtodrosophila* type (Burla, 1956: 317).

Etymology. Not stated in the original description, but the epithet «*ramulosa*» is most probably an allusion to the inner branches of the arista which are remarkably curved and as long as dorsal and ventral branches.

Distribution. Brazil (state of Rio de Janeiro).

Biology. Unknown.

Comments. The arista is aberrant from any known *Hirtodrosophila* species (inner branches not mentioned in the original description). Regarding the holotype of *H. ramulosa* it is worthwhile to make the following considerations. As detailed in Vilela & Bächli (2004a), each of Burla's microscope slides cited in his publication on *Zygothrica* and *Hirtodrosophila* (then a subgenus of *Drosophila*) usually bears two numbers: one identification number originally given and cited by Burla (1956) and one slide mounting number added later on by the second author of the present paper. Sometimes, a third number usually cited in Burla's lab notes is also included. In the original description of *H. ramulosa* (Burla, 1956: 266) it is stated that the holotype (cited as typus) is one male preserved in two slides bearing the number Nr. 458. Additionally, two paratypes (one male and one female) are included (Nr. 459 and Nr. 460, respectively). In the collection of the ZMUZ there are indeed 4 slide mountings that match those cited by Burla, although just one of them bears the red label Nr. 458. However, the slide mounting missing the identification label and detailed above under «material examined» contains the male terminalia of *H. ramulosa* and undoubtedly belongs to its holotype as was deduced by comparing both the position and details of the structures on the slide with the original drawings of the male terminalia of the holotype (Burla, 1956: 317, figs 337, 338) and the numbers cited on the labels with those included in Burla's lab notes. So, we assume that the original red label Nr. 458 probably became unglued from one of the two original slides bearing the disarticulated holotype. This slide was dismounted and the terminalia used for preparing the line drawings depicted in Figs 12 and 13.

ACKNOWLEDGMENTS

We are indebted to Dr. David A. Grimaldi (AMNH) for loaning the specimens we have used in the description of *Drosophila batmani* n. sp.

ZUSAMMENFASSUNG

Folgende neue Arten werden beschrieben: *Drosophila batmani* n. sp., (*rubrifrons*-Gruppe, *uninubes*-Untergruppe) aus Mexico und Guatemala; *Hirtodrosophila gavea* n. sp.. und *Hirtodrosophila minuscula* n. sp., beide aus Brasilien und nahe verwandt mit *Hirtodrosophila gilva* (Burla, 1956). Ausserdem wird *Hirtodrosophila ramulosa* (Burla, 1956) anhand des Typenmaterials neu beschrieben. Alle vier Arten werden illustriert.

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(received January 3, 2005; accepted May 12, 2005)