

# Six new species of *Drosophila* (Diptera, Drosophilidae) from Parque Nacional Henri Pittier, Venezuela

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Objektyp: **Article**

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

Band (Jahr): **75 (2002)**

Heft 3-4

PDF erstellt am: **22.07.2024**

Persistenter Link: <https://doi.org/10.5169/seals-402830>

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## Six new species of *Drosophila* (Diptera, Drosophilidae) from Parque Nacional Henri Pittier, Venezuela

GERHARD BÄCHLI<sup>1</sup> & CARLOS R. VILELA<sup>2</sup>

The following species of *Drosophila* belonging in the subgenera *Drosophila* and *Sophophora* are described from Parque Nacional Henri Pittier, Cordillera de la Costa, States of Aragua and Carabobo, Venezuela: *D. guacamaya* sp. nov. (type locality: Pico Guacamaya), *D. periquito* sp. nov. (type locality: Pico Periquito), *D. ranchograndensis* sp. nov. (type locality: Estación Biológica Fernández Yépez, Rancho Grande), *D. tschirnhausi* sp. nov. (type locality: Estación Biológica Fernández Yépez, Rancho Grande), *D. papei* sp. nov. (type locality: Estación Biológica Fernández Yépez, Rancho Grande), and *D. pittieri* sp. nov. (type locality: Estación Biológica Fernández Yépez, Rancho Grande).

Keywords: *Drosophila*, *fasciola* subgroup, *willistoni* group, new species, terminalia, Venezuela.

### INTRODUCTION

The fauna of *Drosophila* species of Venezuela is incompletely known. There are only two comprehensive publications: In the first one, COVA GARCIA & SUAREZ (1962) give a list of 17 species which were collected in the area of Maracay, with details of collection sites and attractive media. References for 21 species are listed which have been recorded earlier in Venezuela (GONZALEZ RINCONES 1938; HEED & WHEELER 1957; WASSERMAN & WILSON 1957; WHEELER 1957; MAGALHÃES 1962; THROCKMORTON 1962; WASSERMAN 1962; WHEELER & MAGALHÃES 1962). COVA GARCIA & SUAREZ (1962) give also drawings of male terminalia of 30 species, including 11 unnamed species. Unfortunately, we were unable to localize any extant specimens or preparations to verify some relevant open questions. In a second publication (HUNTER 1970), 19 additional species are recorded from Venezuela, summing up the total number to 53 species. Various additional publications (e.g. MILLER 1958; MOURÃO & BICUDO 1967; WHEELER 1970; SPASSKY *et al.* 1971; BENADO *et al.* 1979; VILELA 1983; VILELA & DO VAL 1983, 1985; ESCALANTE & BENADO 1992; VILELA 1992; DURANDO *et al.* 2000; VILELA & BÄCHLI 2000a, 2000b) give further records. At present, the number of named *Drosophila* species known from Venezuela is 72, and some 15 unnamed species have been recorded yet.

Through the kind offices of Michael VON TSCHIRNHAUS, we have got access to a series of drosophilids collected with Malaise traps by Thomas PAPE in the Parque Nacional Henri Pittier, Venezuela. This National Park, well known for its eminent biological diversity, is named in honor of the Swiss botanist Henri PITTIER (1857–1950). Besides several already known *Drosophila* species, we have found some specimens which belong to six species new to science.

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## MATERIAL AND METHODS

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 details on the preparations of microscope slides, illustrations, measurements, and indices, as well as morphological terminology, see VILELA & BÄCHLI (2000a). Whenever in the same plate, all figures were drawn to the same scale and all photomicrographs were taken and enlarged to the same magnification.

All specimens are deposited in collection of the Zoologisches Museum, Universität Zürich, Zürich, Switzerland.

## RESULTS

Genus *Drosophila* FALLÉNSubgenus *Drosophila* FALLÉN

## ungrouped species

According to the structure and shape of the aedeagus and paraphyses, the following species seem to be closely related: *D. guacamaya* sp. nov., *D. ranchograndensis* sp. nov., and *D. tschirnhausi* sp. nov. Thus, they may represent members of a yet unnamed species group. However, virtually all shared features of their external morphology, which could be used in the diagnosis of a putative group of species, are also shared with some other Neotropical groups. We believe that the analysis of the oviscapt valves and spermathecae as well as of additional features of the tentatively associated females are needed before a grouping decision is taken.

*Drosophila (Drosophila) guacamaya* sp. nov.

(Figs 1, 2, 13A)

Material examined. Holotype ♂ (dissected), labelled "Venezuela, Pittier N. P. [National Park], Pico Guacamaya 1830 [meters], Th. [Thomas] PAPE leg. X1323 [= Malaise trap, 15.–30.11.1997] / Holotype". The specimen is badly damaged, having lost most of its setae and the distal region of the left wing. Additional specimens, see note below.

Type locality. Pico Guacamaya [67°40'01"W, 10°21'54"N], Parque Nacional Henri Pittier, State of Aragua, Venezuela.

*Diagnosis.* Generally yellowish flies; carina noselike, narrow, sulcate; tergite 2 with a medially interrupted marginal band, tergites 3 and 4 with a broad, medially faintly fading, laterally narrowed marginal band, tergites 5 and 6 with a faint median triangular spot; wing diffuse brownish; aedeagus as in Figs 2E, 13A.

*Description.* Head. Frons generally brownish-yellow, dull, frontal length 0.34–0.38 mm; frontal index = 1.00–1.05, top to bottom width ratio = 1.32–1.43. Frontal triangle paler greyish, about 75–90% of frontal length; ocellar triangle slightly prominent, about 38–45% of frontal length. Orbital plates pale greyish, about 75–77% of frontal length. Orbital setae black, or2 close to and outside of or1, distance of or3 to or1 = 44–67% of or3 to vtm, or1 / or3 ratio = 0.80–0.93, or2 / or1 ratio = 0.33–0.50, postvertical setae = 50–57%, ocellar setae = 68–81% of frontal length; vibrissal index = 0.46–0.62. Face yellowish. Carina noselike, yellowish-brown, slightly diverging downwards, sulcate. Cheek index about 6–9. Eye index = 1.06–1.13. Occiput yellowish, diffuse brownish above foramen. Antennae slightly brownish, length to width ratio of flagellomere 1 = 1.25–1.57. Arista with 3 dorsal,

2 ventral and about 3–5 small inner branches, plus terminal fork. Proboscis yellowish. Palpi with 2 stronger, black setae and a few pale shorter ones.

Thorax length 1.17–1.33 mm. Scutum yellowish, subshiny, diffuse brownish towards scutellum. (6–)8 rows of acrostichal setae. h index = 1.18–1.40. Transverse distance of dorsocentral setae 200–267% of longitudinal distance; dc index = 0.56–0.63. Distance between apical scutellar setae about 58–77% of that of the apical to the basal one; basal ones slightly convergent; scut index = 0.82–1.00. Pleura yellowish, subshiny, sterno index = 0.64–0.80, mid katepisternal seta about 35–59% of the anterior one. Halteres whitish-yellow. Legs pale yellow, preapical setae on all tibiae, ventral apical seta on mid tibia.

Wing diffuse brownish, more so in costal half, both crossveins may also be slightly shaded, length 2.31–2.56 mm, length to width ratio = 2.21–2.28. Indices: C = 2.65–3.63, ac = 2.29–2.67, hb = 0.43–0.53, 4C = 0.78–0.89, 4v = 1.60–1.74, 5x = 1.43–1.80, M = 0.50–0.53, prox. x = 0.63–0.74.

Abdomen generally yellowish, tergite 2 with large but diffuse, triangular, paramedian spots, tergites 3 and 4 each with a large, roundish-triangular, dark brown median spot which is basal-medially slightly fading and laterally narrowing, not reaching ventral margins, tergites 5 and 6 each with a pale brownish, more or less triangular median spot.

♂ *Terminalia* (Figs 1, 2, 13A). Epandrium dorsally microtrichose with about 21 lower setae, and no upper setae; ventral lobe triangular, scarcely microtrichose. Cerci fused to hypandrium on its lower half, dorsally microtrichose. Surstylus not microtrichose, with 12 cone-shaped prenisetae whose tips gradually change from

*Drosophila guacamaya*

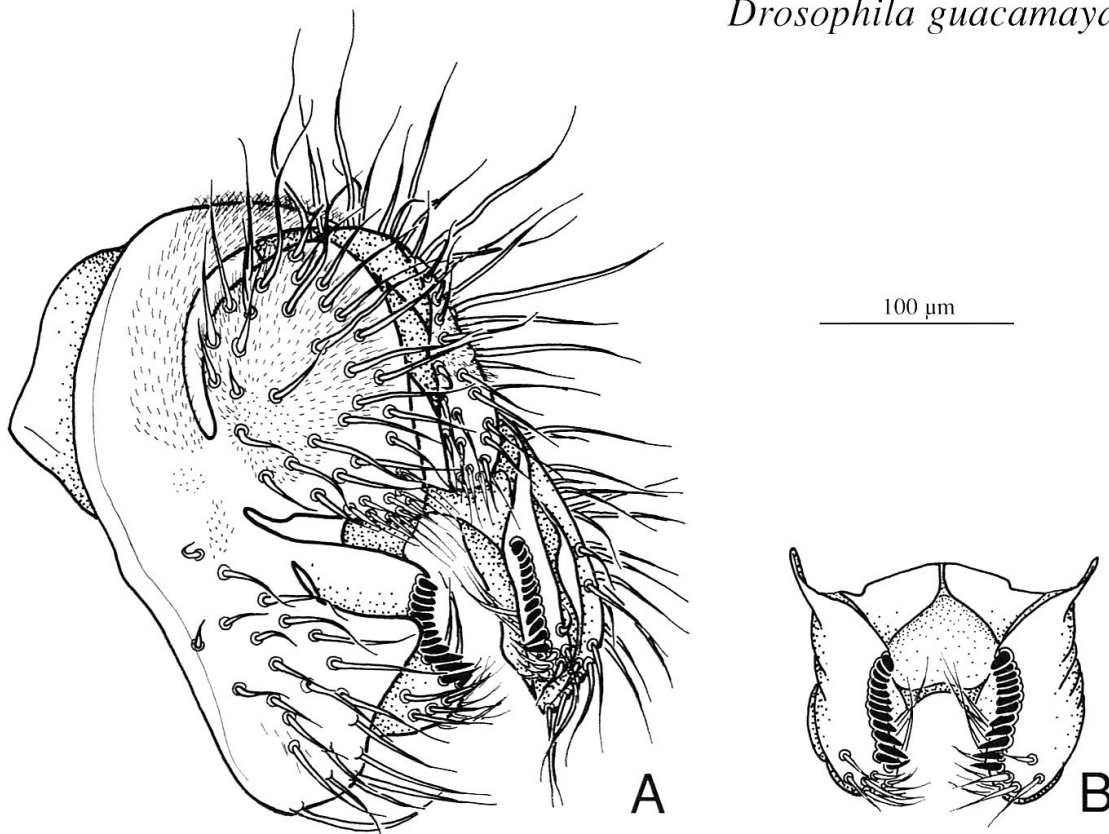


Fig. 1. *Drosophila (Drosophila) guacamaya* sp. nov., holotype ♂. A, epandrium, cerci, surstyli and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view.



*Drosophila guacamaya*

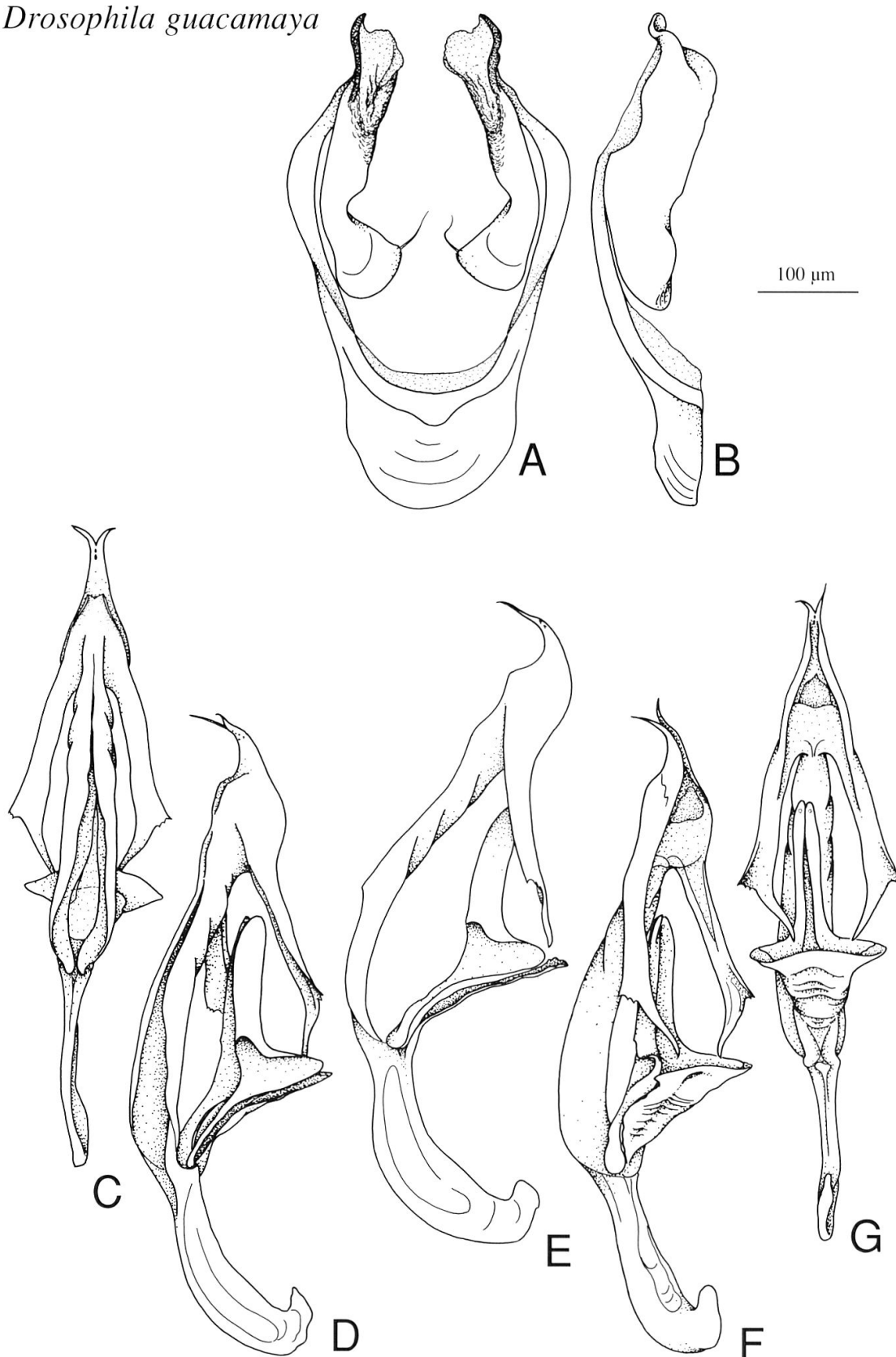


Fig. 2. *Drosophila (Drosophila) guacamaya* sp. nov., holotype ♂. A, hypandrium and gonopods, posterior view. B, idem, left lateral view. C–G, aedeagus, aedeagal apodeme, and paraphyses, several views from dorsal through ventral.

the more roundish dorsal ones to the longer and sharply pointed ventral ones, about 5 outer long setae and ca. 6 long inner setae. Decasternum as in Fig. 1B. Hypandrium longer than epandrium, dorsal arch (= bow) absent, gonopod linked to paraphysis by membranous tissue, bearing one thin seta on the anterior inner margin. Aedeagus long, bifid and bent dorsally at distal end; ventrally bearing a pair of long, projected ventrad spurs, which almost reach the ventral rod. Aedeagal apodeme shorter than aedeagus, laterally flattened. Ventral rod as long as paraphysis, dorsoventrally flattened, slightly pleated, triangular. Paraphysis anteriorly very narrow, linked to distal margin of aedeagal apodeme by membranous tissue, distally expanded and projected posteriad, distally concave, bearing one setula at very distal end.

*Etymology.* Noun. Named in allusion to the type locality.

*Relationship.* Probably related to two of the new species described in the present paper: *D. ranchograndensis* sp. nov and *D. tschirnhausi* sp. nov., but differs in the characters of the aedeagus.

*Note.* Based on some common external characters, four females with the same collection data could, on basis of further analysis, be associated with this species. Their oviscapt valves are very long and narrow.

***Drosophila (Drosophila) periquito* sp. nov.**

(Figs 3, 4, 13C)

Material examined. Holotype ♂ (dissected), labelled "Venezuela, Pittier N. P. [National Park], Pico Periquito [=Periquito] 1680 [meters], Th. [Thomas] PAPE leg. X1322 [= Malaise trap, 15.-30.11.1997] / Holotype". Additional female specimen: see note below.

Type locality. Pico Periquito [67°42'11"W, 10°20'11"N], Parque Nacional Henri Pittier, State of Aragua, Venezuela.

*Diagnosis.* Generally yellowish flies; carina noselike, narrow, sulcate; frontal vittae brownish; tergites 2–5 with a narrow, medially almost interrupted, laterally narrowed marginal band, wing diffuse brownish; aedeagus asymmetrical as in Fig. 4E, 13C.

*Description.* Head. Frons generally brownish-yellow, frontal length 0.37–0.41 mm; frontal index = 1.09–1.10, top to bottom width ratio = 1.20–1.27. Frontal triangle apically narrowing, pale greyish, about 59–79% of frontal length; ocellar triangle prominent, prolonged, about 41–42% of frontal length. Orbital plates greyish, apically slightly diverging from eye margin, about 77–79% of frontal length. Orbital setae black, or2 more close to or1 than to or3 and more close to the eye margin than or3, distance of or3 to or1 = 70–75% of or3 to vtm, or1 / or3 ratio = 0.87–1.00, or2 / or1 ratio = 0.62, postvertical setae = 54–59%, ocellar setae = 64–71% of frontal length; vibrissal index = 0.33–0.38, following oral setae short. Face brownish. Carina narrow, noselike. Cheek index about 6–8. Eye index = 1.11–1.16. Antennae brownish, length to width ratio of flagellomere 1 = 1.50. Arista with 3 dorsal, 2 ventral and about 4–5 small inner branches, plus terminal fork. Proboscis yellow. Palpi with 2–3 prominent setae.

Thorax length 1.08–1.19 mm. Scutum yellowish, subshiny. 6–8 rows of acrostichal setae. h index = 1.30–1.33. Transverse distance of dorsocentral setae 200–211% of longitudinal distance; dc index = 0.62–0.73. Scutellum brownish-yellow, distance between apical scutellar setae about 67–77% of that of the apical to the basal one; scut index = 0.79–0.87. Pleura diffuse brownish, at least in upper half,

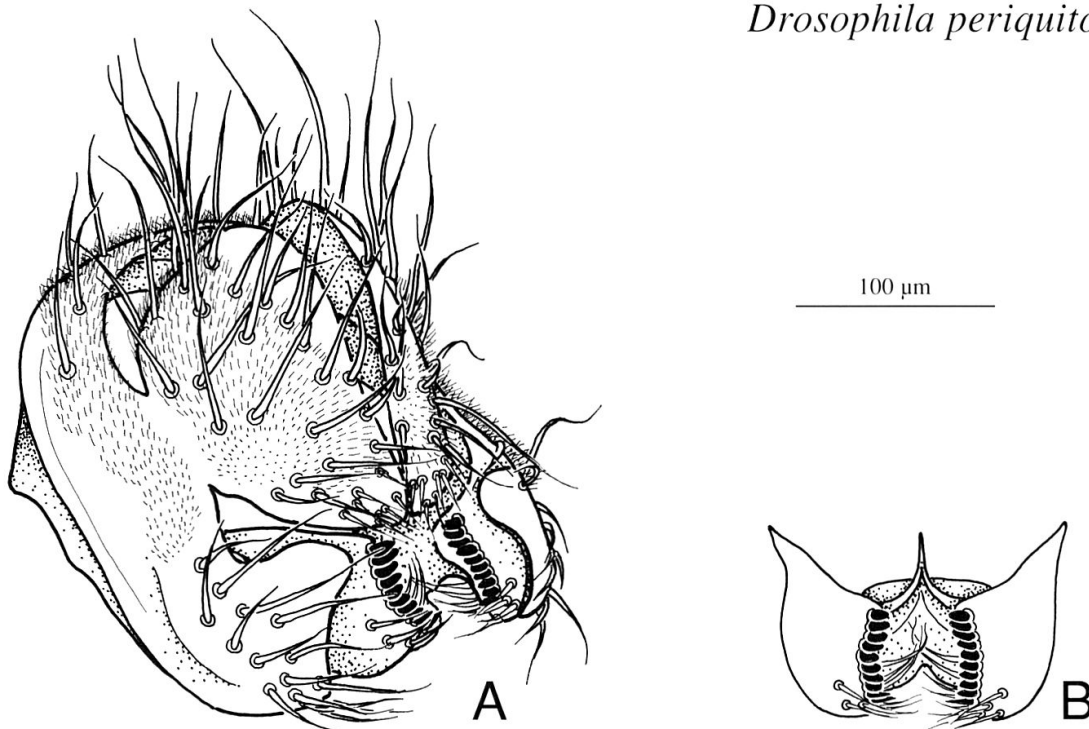
*Drosophila periquito*

Fig. 3. *Drosophila (Drosophila) periquito* sp. nov., holotype ♂. A, epandrium, cerci, surstyli and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view.

sterno index = 0.78–0.83, mid katepisternal seta about 22–30% of the anterior one. Halteres yellow, stem brownish above. Legs yellow, preapical setae on all tibiae, ventral apical seta on mid tibia.

Wing faintly brownish, particularly in costal half, length 2.06–2.35 mm, length to width ratio = 2.09–2.11. Indices: C = 2.25–2.53, ac = 2.67–2.83, hb = 0.47–0.50, 4C = 0.94–1.00, 4v = 1.63–1.72, 5x = 1.17–1.43, M = 0.44–0.56, prox. x = 0.67–0.69.

Abdomen generally yellowish, tergites 2–5 with a more or less diffuse brownish marginal band which is laterally narrowed, medially broadened but in the mid-line almost triangularly interrupted.

♂ *Terminalia* (Figs 3, 4, 13C). Epandrium mostly microtrichose with about 14 lower setae and 3 upper setae; ventral lobe as in Fig. 3A, not microtrichose. Cerci mostly microtrichose, fused to hypandrium on its lower half. Surstylus not microtrichose, with 10 cone-shaped prenisetae which are roundish at tip, the most ventral one is longer and sharply pointed, about 4 long outer setae and ca. 6 long inner setae. Decasternum as in Fig. 3B. Hypandrium as long as epandrium; dorsal arch absent, gonopod linked to paraphysis by membranous tissue, bearing no setae, posteriorly slightly rugose. Aedeagus very short, asymmetric. Aedeagal apodeme twice as long as aedeagus, laterally flattened. Ventral rod as long as paraphysis, dorsoventrally flattened. Paraphysis somewhat square-shaped, linked to distal margin of aedeagal apodeme by membranous tissue, bearing one long seta and one setula.

*Etymology.* Noun. Named in allusion to the type locality.

*Relationship.* We were unable to recognize the relationships between *D. periquito* sp. nov. and any species of *Drosophila* ever described from the Neotropical region.

*Drosophila periquito*

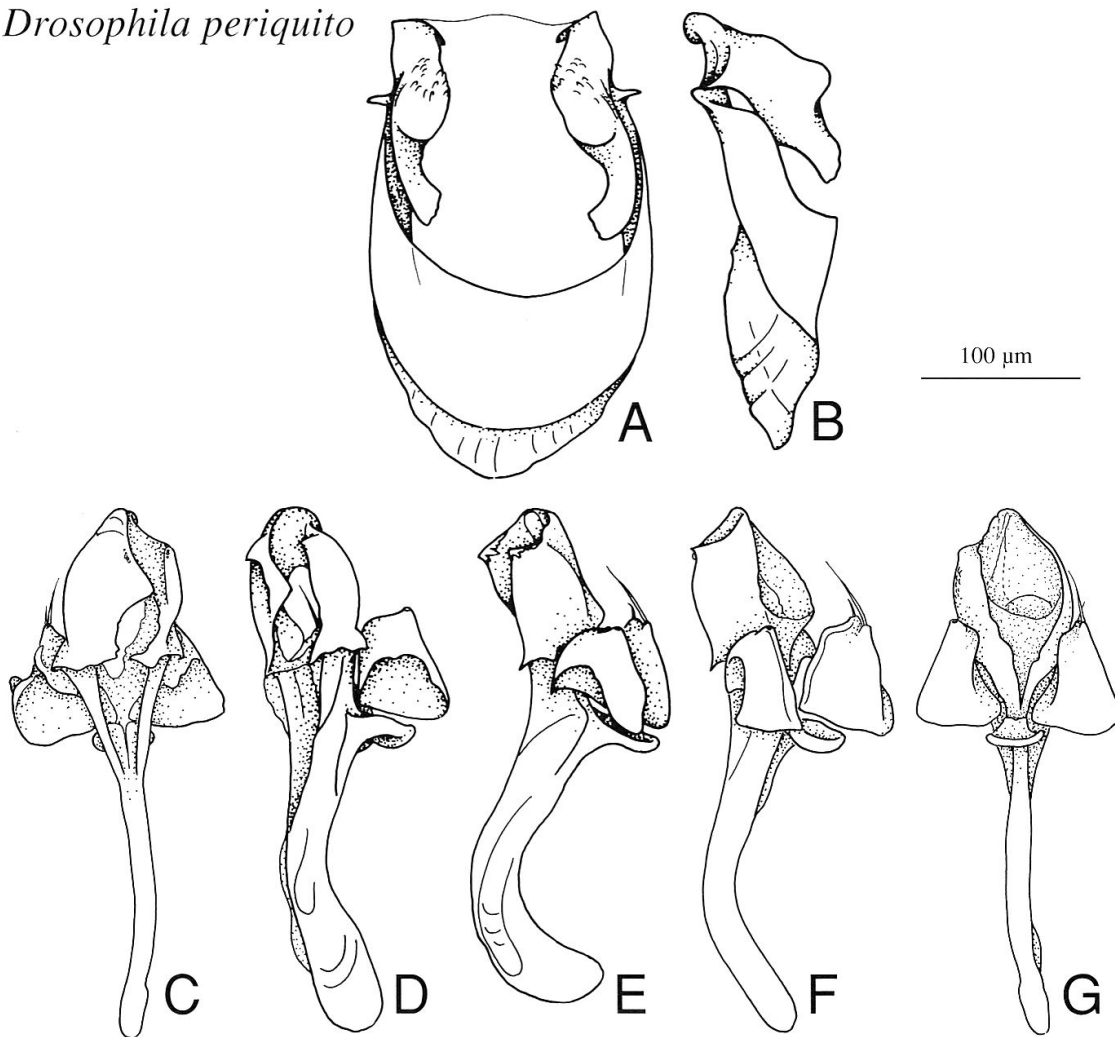


Fig. 4. *Drosophila (Drosophila) periquito* sp. nov., holotype ♂. A, hypandrium and gonopods, posterior view. B, idem, left lateral view. C–G, aedeagus, aedeagal apodeme, and paraphyses, several views from dorsal through ventral.

*Note.* One female with the same collection data may, according to the external morphology, also belong to this species, but is not being considered a paratype. The oviscapt valve is broader than that of the females mentioned in the description of *D. guacamaya* sp. nov.

***Drosophila (Drosophila) ranchograndensis* sp. nov.**

(Figs 5, 6, 13E)

Material examined. Holotype ♂ (dissected), labelled “Venezuela, Pittier N. P. [National Park], Rancho Grande 1150 [m], Th. [Thomas] PAPE leg. X1321 [= Malaise trap, 15.–30.11.1997] / Holotype”. 8 ♂ paratypes, same collection data as holotype. For female: see note below.

Type locality. Estación Biológica Fernández Yépez, Rancho Grande [67°41'08"W, 10°20'58"N], Parque Nacional Henri Pittier, State of Aragua, Venezuela.

*Diagnosis.* Generally yellowish-brown flies; frontal vittae dark brown, forming a V-shaped area; carina noselike, slightly diverging downwards, sulcate; pleura brown; tergites 2–6 with a broad, medially interrupted, paramedially somewhat

narrowed marginal band, wing diffuse brownish; tip of C-I brown, both crossveins more or less shadowed; aedeagus as in Figs 6E, 13E.

*Description.* Head. Frons generally reddish-brown, dull, with a yellowish median stripe and two downwards convergent stripes at the orbital plates, continued to the upper margin of the face, frontal length 0.35–0.44 mm; frontal index = 1.09–1.30, top to bottom width ratio = 1.36–1.50. Frontal triangle not very distinct, yellowish, about 50–73% of frontal length; ocellar triangle black, prominent, prolonged, about 28–45% of frontal length. Frontal vittae forming 2 convergent dark stripes. Orbital plates narrow, apically diverging from eye margin, about 68–76% of frontal length. Orbital setae black, almost in a row, or2 almost equally distant from or1 and or3, distance of or3 to or1 = 56–86% of or3 to vtm, or1 / or3 ratio = 1.00–1.15, or2 / or1 ratio = 0.43–0.58, postvertical setae = 48–63%, ocellar setae = 68–77% of frontal length; vibrissal index = 0.38–0.73. Face yellow. Carina distinctly broadened downwards, noselike, dorsally sulcate, Cheek index about 6–9. Eye index = 1.14–1.21. Occiput brownish. Antennae brownish, length to width ratio of flagellomere 1 = 1.29–1.71. Arista with 3–4 dorsal, 2 ventral and about 5–7 small inner branches, plus terminal fork. Proboscis brown. Clypeus blackish-brown. Palpi brownish, apically pale yellow, with a row of about 5 ventral setae.

Thorax length 1.08–1.34 mm. Scutum brownish-yellow, subshiny, with 4 diffuse brownish stripes in paramedian and lateral positions. 6–8 rows of acrostichal setae. h index = 1.00–1.15. Transverse distance of dorsocentral setae 164–220% of longitudinal distance; dc index = 0.69–0.81. Scutellum prolonged, distance between apical scutellar setae about 67–82% of that of the apical to the basal one; basal ones convergent; scut index = 0.81–0.93. Pleura brownish, with 2 diffuse darker stripes in upper and lower half, sterno index = 0.75–0.85, mid katepisternal seta about 27–50% of the anterior one. Halteres whitish, stem basal-dorsally brown. Legs pale yellowish-brown, knees paler, tip of tibiae with a diffuse brown ring, tarsomeres of foreleg with a row of slightly prolonged, erected dorsal setae, preapical setae on all tibiae, ventral apical seta on mid tibia.

Wing slightly brownish, more so in costal half, both crossveins narrowly shadowed, tip of C-I brown, length 2.13–2.66 mm, length to width ratio = 2.06–2.21. Indices: C = 2.31–2.76, ac = 2.13–2.83, hb = 0.53–0.60, 4C = 0.83–0.95, 4v = 1.45–1.67, 5x = 1.14–1.67, M = 0.44–0.53, prox. x = 0.58–0.78.

Abdomen with yellow ground color, tergites 2–6 with a more or less distinct, dark brown marginal band of variable width which is medially interrupted, laterally narrowed but ventrally covering the whole area.

♂ *Terminalia* (Figs 5, 6, 13E). Epandrium mostly microtrichose, with about 12 lower setae, and no upper setae, ventral lobe straight, not microtrichose. Cerci dorsally microtrichose, fused to hypandrium on its lower half. Surstylus not microtrichose, with ca. 11 cone-shaped prenisetae whose tips gradually change from the more roundish dorsal ones to the longer and sharply pointed ventral ones, about 1 outer long seta and ca. 5 long inner setae. Decasternum as in Fig. 5B. Hypandrium as long as epandrium; dorsal arch absent, gonopod linked to paraphysis by membranous tissue, bearing one thin seta on the anterior inner margin. Aedeagus anteriorly conspicuously roundish, widely expanded, sharply pointed at distal end; ventro-submedially bearing a pair of short, projected frontwards spurs. Aedeagal apodeme as long as aedeagus, rod-shaped. Ventral rod half the length of paraphysis. Paraphysis linked to distal margin of aedeagal apodeme by membranous tissue, distally expanded and projected posteriad, distally slightly concave, bearing one setula at very distal end.

*Etymology.* Named in allusion to the type locality.

*Relationship.* Probably related to two of the new species described in the present paper: *D. guacamaya* sp. nov. and *D. tschirnhausi* sp. nov.; but differing in the characters of the aedeagus.

*Note.* According to the external morphology, five females with the same collection data could be associated with this species, but are not being considered paratypes. The oviscapt valve is very long and narrow, as mentioned for the females tentatively associated with *D. guacamaya* sp. nov.

*Drosophila ranchograndensis*

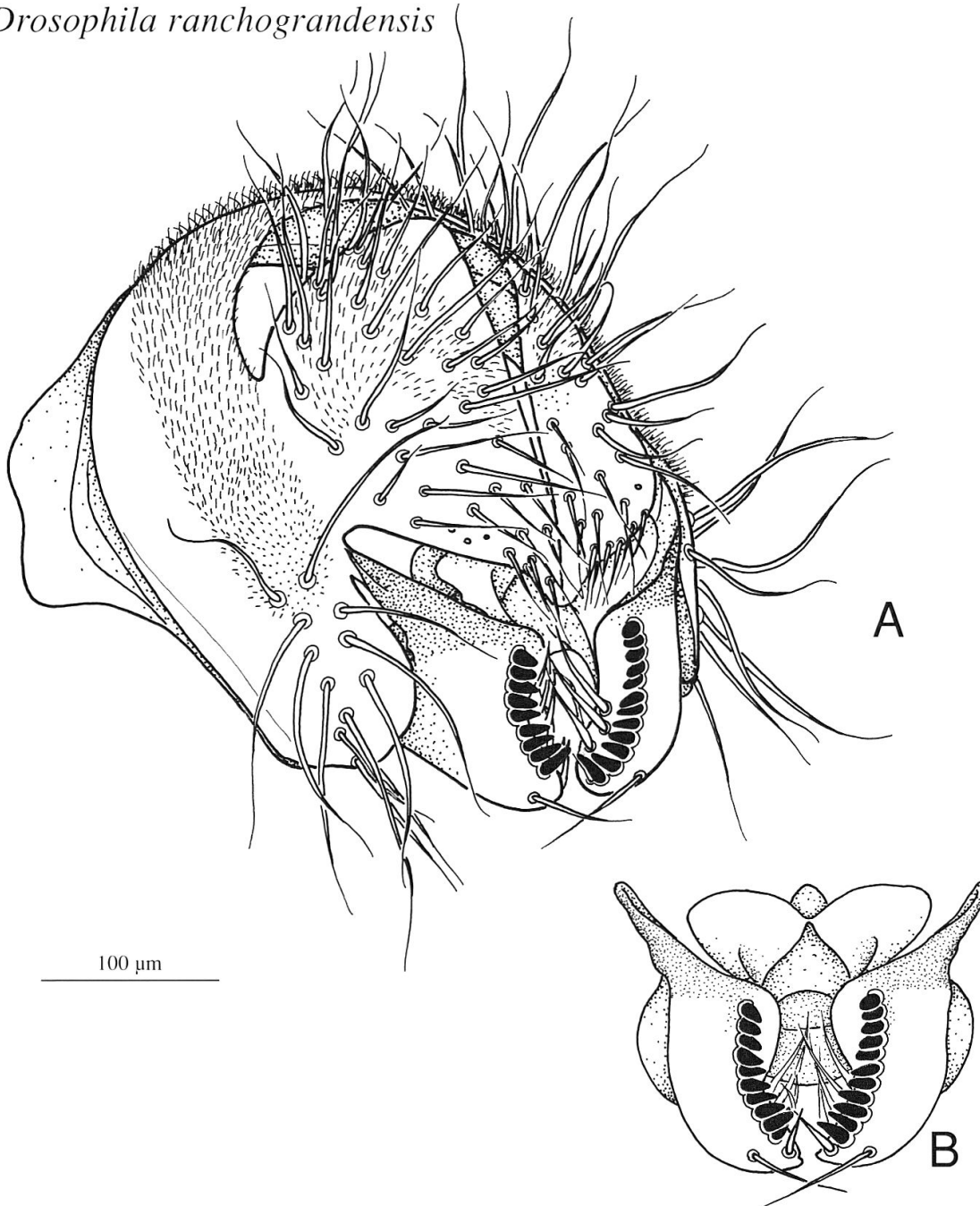


Fig. 5. *Drosophila (Drosophila) ranchograndensis* sp. nov., holotype ♂. A, epandrium, cerci, surstyli and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view.



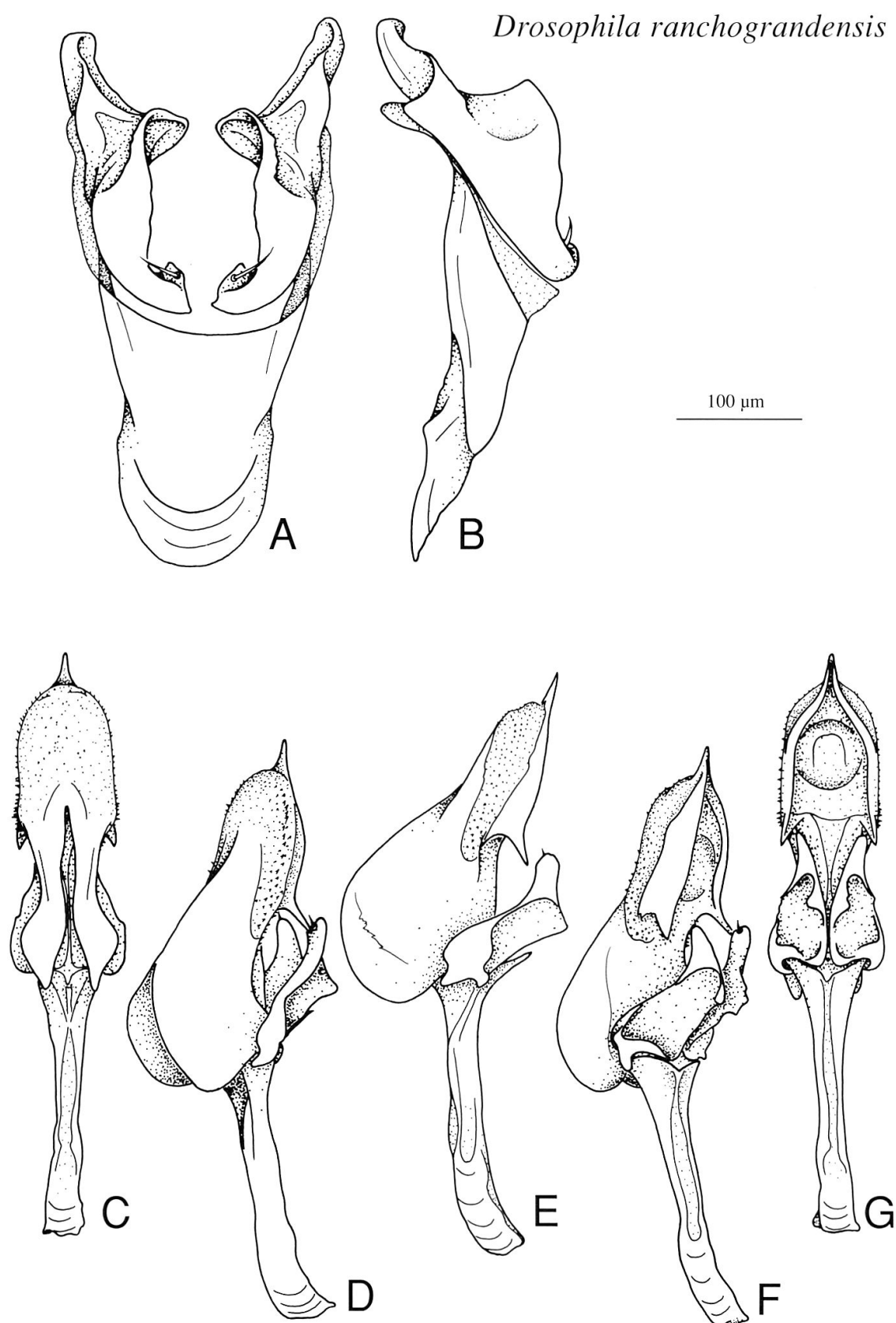


Fig. 6. *Drosophila (Drosophila) ranchograndensis* sp. nov., holotype ♂. A, hypandrium and gonopods, posterior view. B, idem, left lateral view. C–G, aedeagus, aedeagal apodeme, and paraphyses, several views from dorsal through ventral.

*Drosophila (Drosophila) tschirnhausi* sp. nov.

(Figs 7, 8, 13B)

Material examined. Holotype ♂ (dissected), labelled "Venezuela, Pittier N. P. [National Park], Rancho Grande 1150 [m], Th. [Thomas] PAPE leg. X1321 [= Malaise trap, 15.–30.11.1997] / Holotype". 3 ♂ paratypes, same collection data as holotype. For female: see note below.

Type locality. Estación Biológica Fernández Yépez, Rancho Grande [67°41'08"W, 10°20'58"N], Parque Nacional Henri Pittier, State of Aragua, Venezuela.

*Diagnosis.* General characters as in *D. ranchograndensis* sp. nov., but the tergite bands are narrower, laterally fading, medially also interrupted but paramedially triangularly expanded, aedeagus as in Figs 8E, 13B.

*Description.* Head. Frons generally dull brownish, with a yellowish, triangular midline and narrow, yellowish stripes along both orbital plates, frontal length 0.35–0.41 mm; frontal index = 1.10–1.20, top to bottom width ratio = 1.33–1.45. Frontal triangle about 57–83% of frontal length; ocellar triangle blackish-brown, prominent, somewhat prolonged, about 38–43% of frontal length. Orbital plates apically diverging from eye margin, about 71–76% of frontal length. Orbital setae black, or2 close to and outside of or1, distance of or3 to or1 = 50–67% of or3 to vtm, or1 / or3 ratio = 0.91–1.09, or2 / or1 ratio = 0.42–0.50, postvertical setae = 48–58%, ocellar setae = 62–70% of frontal length; vibrissal index = 0.36–0.54. Face yellowish. Carina broadened downwards, prominent, noselike, slightly sulcate

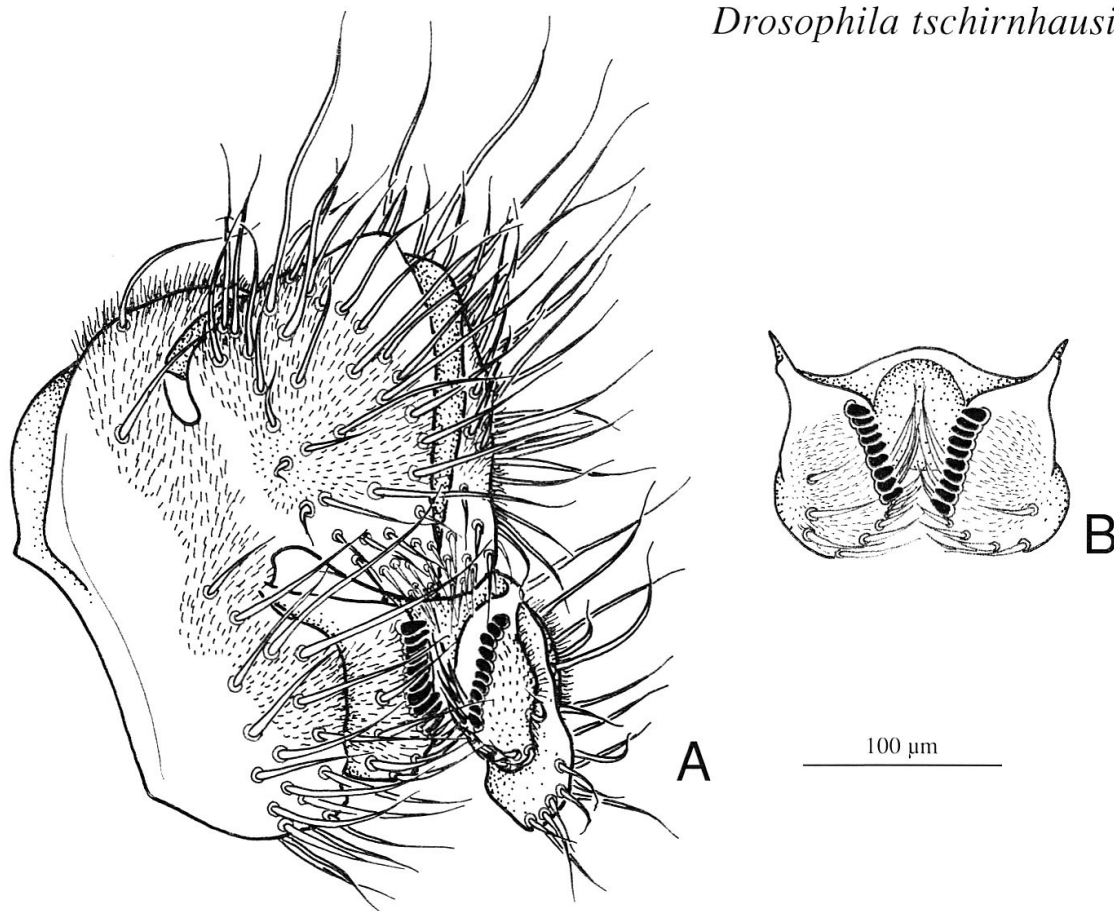
*Drosophila tschirnhausi*

Fig. 7. *Drosophila (Drosophila) tschirnhausi* sp. nov., holotype ♂. A, epandrium, cerci, surstyli and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view.

dorsally. Cheek index about 7–13. Eye index = 1.11–1.19. Occiput brown. Antennae brownish, length to width ratio of flagellomere 1 = 1.50–1.70. Arista with 3–4 dorsal, 2 ventral and about 5–7 inner branches which are shorter towards base, plus terminal fork. Proboscis yellow. Palpi yellow, with distinct setae along the lower margin.

Thorax length 1.05–1.30 mm. Scutum brownish-yellow, subshiny, with more or less diffuse stripes in the midline, along the rows of dorsocentral setae and laterally, and in the midline a narrow, silvery stripe, if seen from front. 6–8 rows of acrostichal setae. h index = 1.07–1.18. Transverse distance of dorsocentral setae 200–

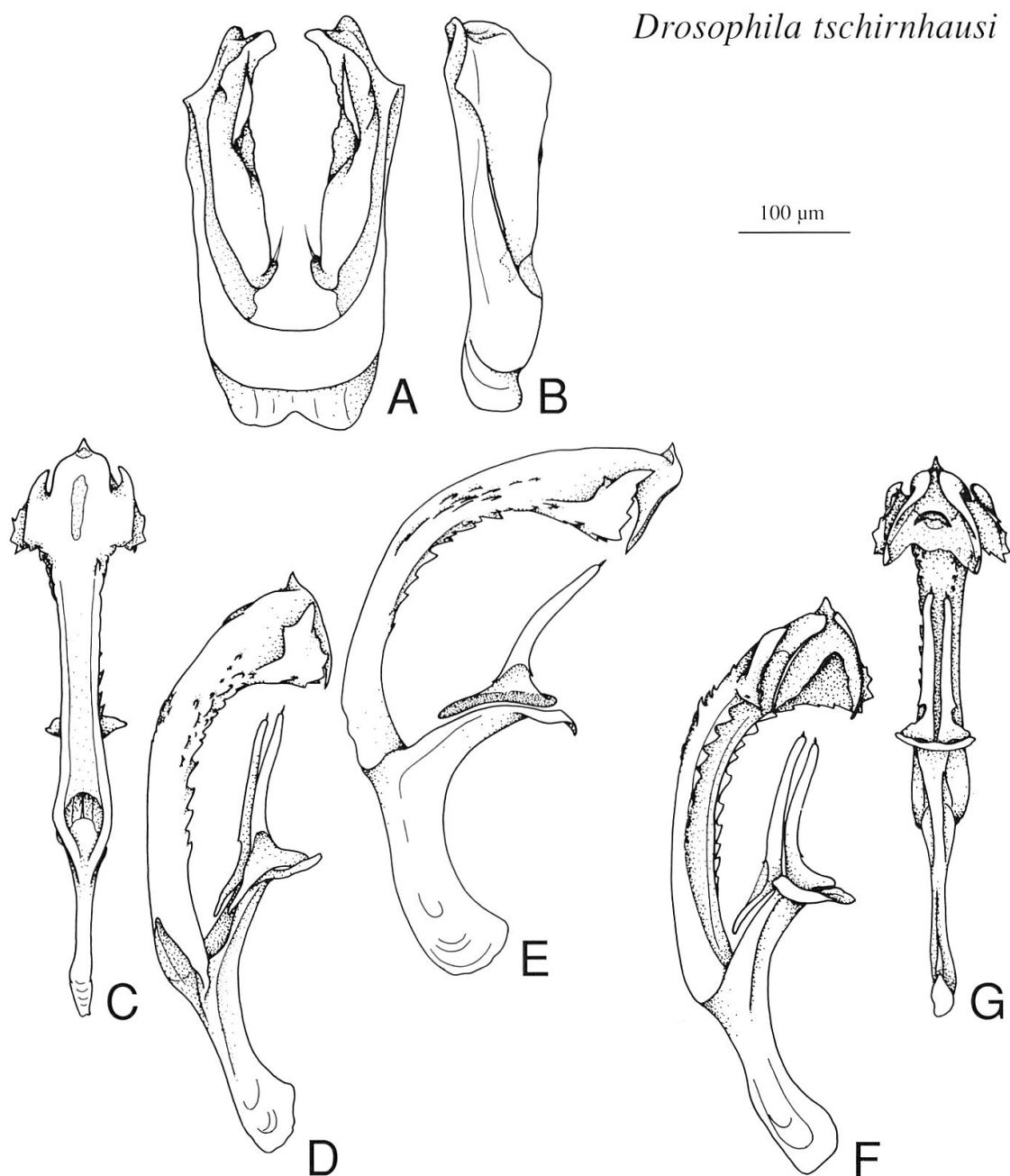


Fig. 8. *Drosophila (Drosophila) tschirnhausi* sp. nov., holotype ♂. A, hypandrium and gonopods, posterior view. B, idem, left lateral view. C–G, aedeagus, aedeagal apodeme, and paraphyses, several views from dorsal through ventral.

222% of longitudinal distance; dc index = 0.68–0.76. Scutellum yellowish, basally slightly brownish and with a large brown spot at the bases of the basal scutellar setae, distance between apical scutellar setae about 55–79% of that of the apical to the basal one; basal ones convergent; scut index = 0.76–0.81. Pleura predominantly yellowish, with diffuse brownish stripes along the upper margin and above the kat-episternum, sterno index = 0.72–0.76, mid kat-episternal seta about 35–39% of the anterior one. Halteres yellow, stem basal-dorsally with a blackish spot. Legs yellowish, tarsomeres of foreleg dorsally with short, erected setae, preapical setae on all tibiae, ventral apical seta on midleg.

Wing diffuse brownish, particularly in costal half, tip of C-I blackish, both crossveins faintly shadowed, veins brown but costa yellowish, length 2.24–2.63 mm, length to width ratio = 2.24–2.37. Indices: C = 2.67–3.00, ac = 2.00–2.67, hb = 0.53–0.63, 4C = 0.78–0.83, 4v = 1.48–1.65, 5x = 1.00–1.60, M = 0.33–0.50, prox. x = 0.56–0.62.

Abdomen predominantly yellow, shiny, tergites 2–6 each with two relatively large, paramedian, almost triangular, brown spots, continued in a lateral marginal band which is narrowed downwards.

♂ *Terminalia* (Figs 7, 8, 13B). Epandrium posteriorly microtrichose, with about 19 lower setae, and 3 upper setae; ventral lobe roundish, dorsodistally microtrichose. Cerci mostly microtrichose, fused to hypandrium on its lower 3/4. Surstylus mostly microtrichose, with 10 cone-shaped prenisetae roundish at tip, about 6 outer long setae and ca. 6 long inner setae. Decasternum as in Fig. 7B. Hypandrium as long as epandrium; dorsal arch absent, gonopod linked to paraphysis by membranous tissue, bearing one thin seta on the anterior inner margin. Aedeagus long, bow-shaped, laterally conspicuously serrated at ventral margin, sharply pointed at distal end; ventrodistally bearing a pair of short, projected ventrad spurs. Aedeagal apodeme shorter than aedeagus, laterally flattened. Ventral rod longer than paraphysis, distally expanded laterally. Paraphysis anteriorly very narrow, linked remotely to distal margin of ventral rod by membranous tissue, distally concave, slightly expanded, and projected posteriad, bearing one setula at very distal end.

*Etymology.* Named in honor of Michael VON TSCHIRNHAUS who is an important dipterist and collector of many acalyptrate Diptera.

*Relationship.* Probably related to two of the new species described in the present paper: *D. guacamaya* sp. nov. and *D. ranchograndensis* sp. nov., but differs in the characters of the aedeagus.

*Note.* One female with the same collection data might be associated with this species, but is not being considered a paratype.

*repleta* species group

***Drosophila (Drosophila) papei* sp. nov.**

(Figs 9, 10, 13F)

Material examined. Holotype ♂ (dissected, wings missing), labelled “Venezuela, Pittier N. P. [National Park], Rancho Grande 1150 [m], Th. [Thomas] PAPE leg. X1321 [= Malaise trap, 15.–30.11.1997] / Holotype”. 2 ♂ paratypes (dissected), same collection data as holotype.

Type locality. Estación Biológica Fernández Yépez, Rancho Grande [67°41'08"W, 10°20'58"N], Parque Nacional Henri Pittier, State of Aragua, Venezuela.

*Diagnosis.* Brownish-yellow flies; frons brown, a yellowish stripe along the orbital plates, reaching the anterior margin; mesonotum mainly brownish, with yellowish

low anterior corners, diffuse darker stripes and roundish spots; tergites 2–6 with broad marginal bands which are medially interrupted and latero-ventrally with large yellow areas; wing diffuse brownish, tip of C-I black; aedeagus as in Figs 10E, 13F.

*Description.* ♂. Head. Frons predominantly brown, dull, with a yellowish median stripe and two downwards convergent stripes at the orbital plates, continued to the upper margin of the face, frontal length 0.37–0.39 mm; frontal index = 1.00–1.28, top to bottom width ratio = 1.39–1.67. Frontal triangle slightly silvery, about 52–64% of frontal length; ocellar triangle prominent, black, slightly prolonged, about 43–45% of frontal length. Orbital plates pale yellow, about 73–74% of frontal length. Orbital setae black, or2 slightly closer to or1 and to the eye margin than to or3, distance of or3 to or1 = 67–86% of or3 to vtm, or1 / or3 ratio = 0.92–1.08, or2 / or1 ratio = 0.43–0.67, postvertical setae = 50–57%, ocellar setae = 59–65% of frontal length; vibrissal index = 0.46–0.58. Face pale yellow. Carina prominent, noselike, distinctly broadened downwards. Cheek index about 6–8. Eye index = 1.23–1.26. Length to width ratio of flagellomere 1 = 1.43–1.57. Arista with 3–4 long dorsal, 2 ventral and about 6 small inner branches, plus terminal fork. Proboscis brown. Clypeus blackish-brown. Palpi brownish, apically pale yellowish.

Thorax length 1.07–1.29 mm. Scutum generally brownish-yellow, with a diffuse pattern of roundish spots and brown paramedian and lateral stripes, interrupted by slightly silvery stripes, if seen from front. 6 rows of acrostichal setae. h index = 1.00–1.18. Transverse distance of dorsocentral setae 183–200% of longitudinal distance; dc index = 0.68–0.73; 2–3 prolonged acrostichal setae in front of the dorsocentral setae, all these setae arising from blackish spots. Scutellum yellowish with two diffuse brown stripes and two blackish-brown lateral spots, distance between apical scutellar setae about 80–83% of that of the apical to the basal one; basal ones divergent; scut index = 0.81–0.83. Pleura brown, with a diffuse pattern of stripes, sterno index = 0.77–0.87, mid katepisternal seta about 25–35% of the anterior one. Halteres white, stem basal-dorsally black. Legs brown, knees and tips of tibia yellowish, tibiae with brown bands below knees and before the yellow tips, preapical setae on all tibiae, ventral apical seta on mid tibia.

Wing brownish, particularly on costal half, tip of C-I black, both crossveins slightly and narrowly shadowed, length 2.27–2.49 mm, length to width ratio = 2.15–2.32. Indices: C = 2.21–2.47, ac = 2.43–2.71, hb = 0.44–0.63, 4C = 0.89–1.00, 4v = 1.47–1.59, 5x = 1.00–1.25, M = 0.42–0.59, prox. x = 0.63–0.68.

Abdomen with yellow ground color, tergites 2–6 each with a broad, blackish-brown, medially interrupted marginal band which is laterally narrowed and ventrally reaching the anterior margin; the dark ventral area is interrupted by a large, roundish yellow spot.

♂ *Terminalia* (Figs 9, 10, 13F). Epandrium mostly microtrichose, with about 11 lower setae, and 3 upper setae; ventral lobe projected ventrad, dorsally microtrichose. Cerci mostly microtrichose, fused to hypandrium on its lower half. Surstylus not microtrichose, with 11 cone-shaped prensisetae roundish at tip, about 6 outer long setae and ca. 7 long inner setae. Decasternum as in Fig. 10B. Hypandrium longer than epandrium; dorsal arch absent, gonopod linked to paraphysis by membranous tissue, bearing one thin seta on the anterior inner margin. Aedeagus slightly bent, rounded at tip, ventrally bearing a pair of long, projected frontwards spurs, which reach the ventrodistal corner of paraphysis. Aedeagal apodeme shorter than aedeagus, laterally flattened. Ventral rod absent. Paraphysis linked to distal margin of aedeagal apodeme by membranous tissue, distally convex and expanded, bearing one setula at very distal end.

*Drosophila papei*

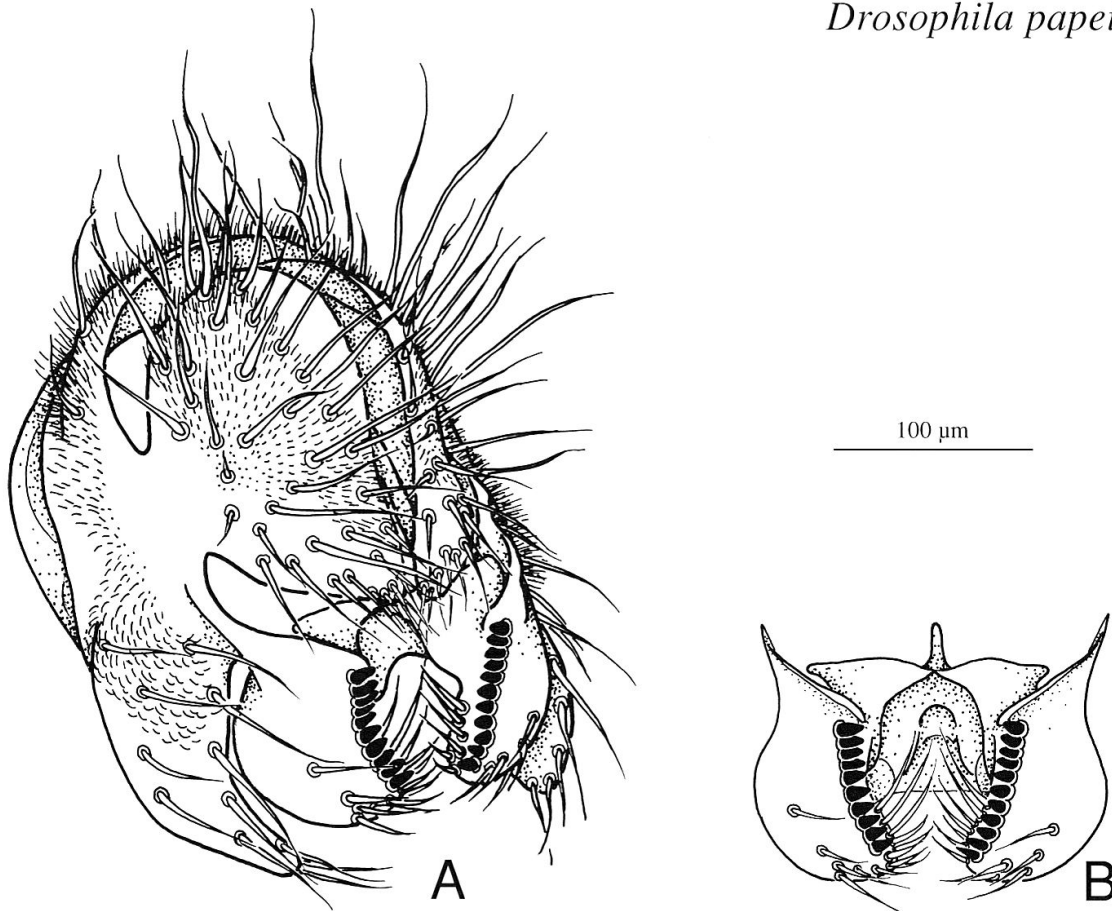


Fig. 9. *Drosophila (Drosophila) papei* sp. nov., holotype ♂. A, epandrium, cerci, surstyli and decasternum, oblique posterior view. B, surstyli and decasternum, posterior view.

*Etymology.* Named in honor of the collector, Thomas PAPE, Stockholm.

*Relationship.* It belongs to the forest-dwelling *fasciola* subgroup of the *repleta* group. Its male terminalia are very similar to those of *D. pictilis* WASSERMAN, 1962 from El Salvador and Panama (see VILELA 1983: 22, fig. 15C), from which it differs mainly by having paraphysis of a different shape and a more straight aedeagus, bearing a much longer ventral spur.

Subgenus *Sophophora* STURTEVANT

*willistoni* species group

***Drosophila (Sophophora) pittieri* sp. nov.**

(Figs 11, 12, 13D)

Material examined. Holotype ♂ (dissected), labelled "Venezuela, Pittier N. P. [National Park], Rancho Grande 1150 [meters], Th. [Thomas] PAPE leg. X1321 [= Malaise trap, 15.–30.11.1997] / Holotype".

Type locality. Estación Biológica Fernández Yépez, Rancho Grande, [67°41'08"W, 10°20'58"N], Parque Nacional Henri Pittier, State of Aragua, Venezuela.

*Diagnosis.* Pale yellowish flies; carina very narrow, sharp; tergites with a diffuse, medially not interrupted marginal band, lateroventrally dark brown; aedeagus as in Figs 12E, 13D.



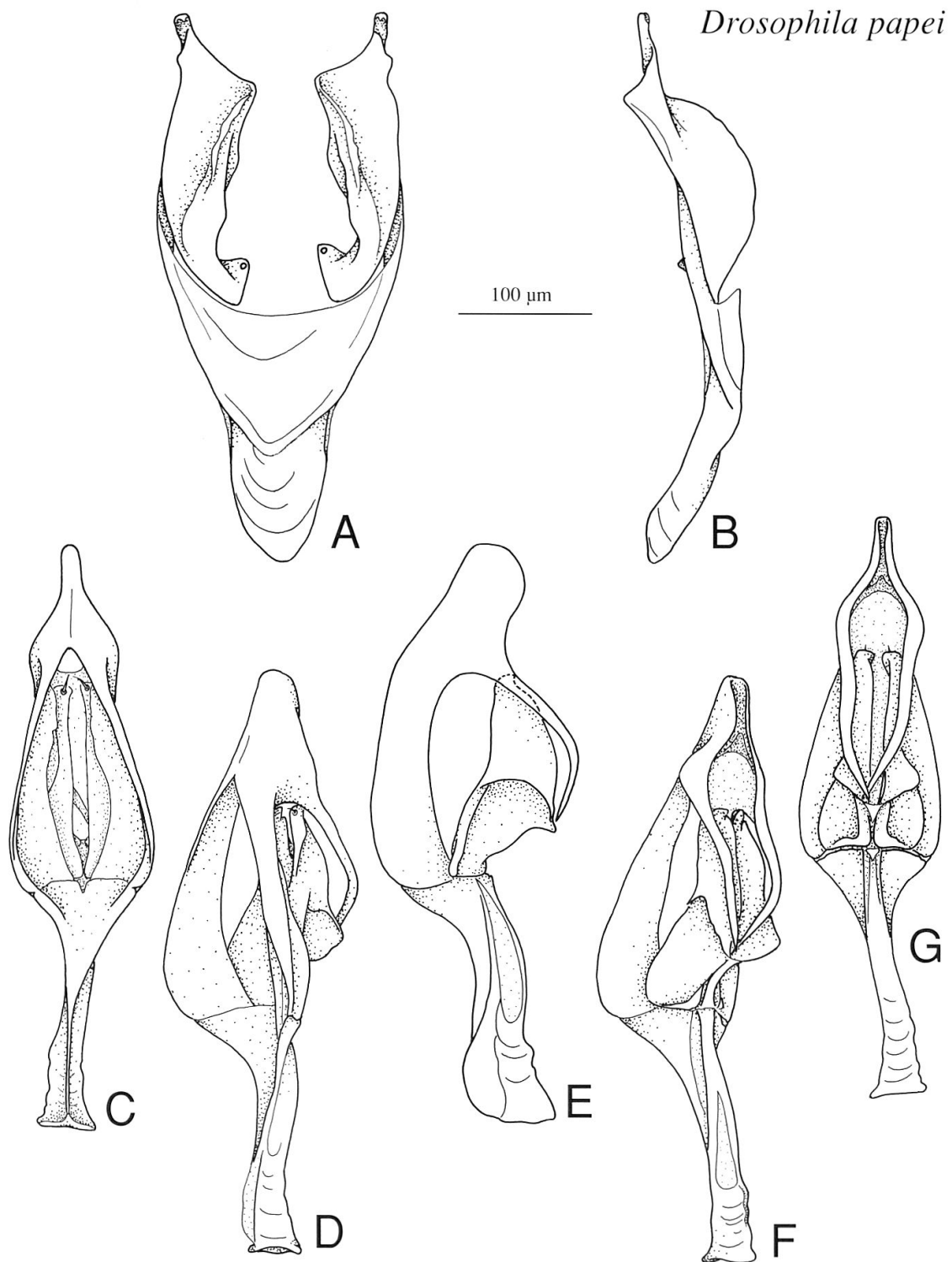


Fig. 10. *Drosophila (Drosophila) papei* sp. nov., holotype ♂. A, hypandrium and gonopods, posterior view. B, idem, left lateral view. C–G, aedeagus, aedeagal apodeme, and paraphyses, several views from dorsal through ventral.

*Description.* ♂. Head. Frons generally yellow to brownish, almost dull, frontal length 0.26 mm; frontal index = 0.88, top to bottom width ratio = 1.29. Frontal triangle about 67% of frontal length; ocellar triangle prominent, shiny, brownish, with dark shadows on the inner side of the ocelli, about 47% of frontal

length. Orbital plates apically slightly diverging from eye margin, shiny, about 87% of frontal length. Orbital setae black, or2 closer to or1 and to the eye margin than to or3, distance of or3 to or1 = 57% of or3 to vtm, or1 / or3 ratio = 0.82, or2 / or1 ratio = 0.44, postvertical setae = 67%, ocellar setae = 93% of frontal length; Vibrissa relatively short, vibrissal index = 1.00. Face yellow. Carina narrow, dorsally ridged, prominent and convex but not noselike. Cheek index about 13–15. Eye index = 1.23. Occiput yellow, brownish above foramen. Flagellomere 1 brownish, marginal setulae slightly prolonged, length to width ratio = 1.60. Arista with 5 long dorsal, 3 long ventral and about 7–8 short inner branches, plus terminal fork. Proboscis yellow. Palpi with a distinct apical seta and a few short ones along the lower margin.

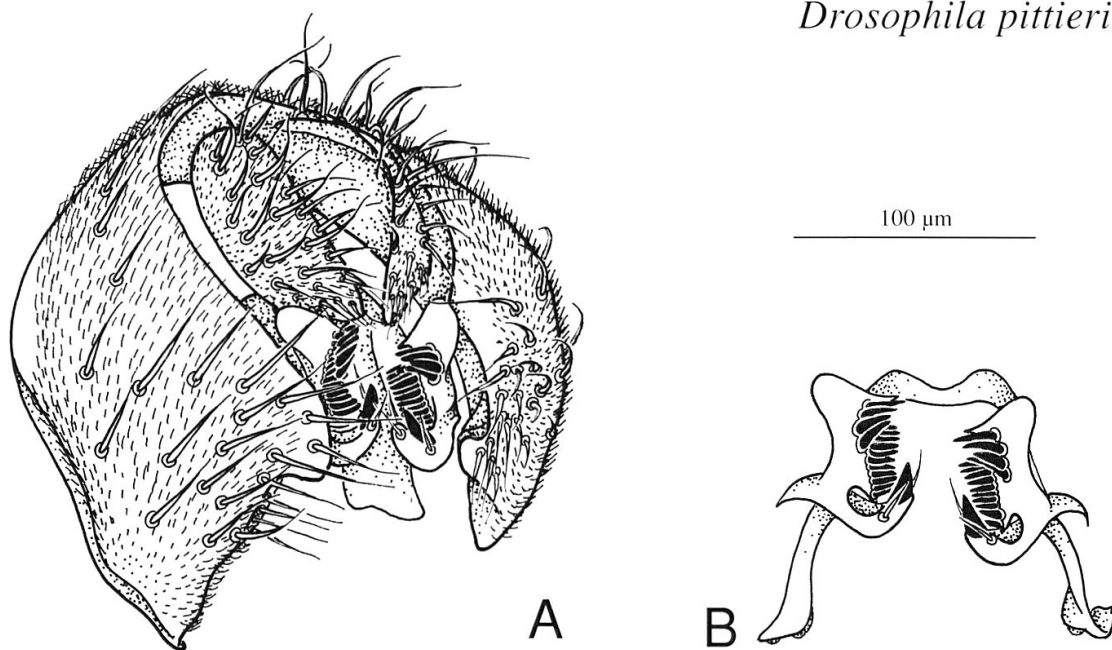


Fig. 11. *Drosophila (Sophophora) pittieri* sp. nov., holotype ♂. A, epandrium, cerci, surstyli and deca-sternum, oblique posterior view. B, surstyli and deca-sternum, posterior view.

Thorax length 0.92 mm. Scutum yellow, subshiny, darker brownish towards scutellum. 8 rows of acrostichal setae. h index = 0.77. Transverse distance of dorso-central setae 170% of longitudinal distance; dc index = 0.58. Scutellum yellowish-brown, scutellar setae nearly equidistant; scut index = 1.09. Pleura yellowish, with a diffuse, broad, brownish horizontal stripe, sterno index = 0.23, mid katapisternal seta about 220% of the anterior one, i.e., the anterior katapisternal seta is minute and may be overlooked. Halteres white. Legs yellowish, preapical setae on all tibiae, ventral apical seta on mid tibia.

Wing diffuse brownish, more distinct in costal half, crossvein DM-Cu diffusely shadowed, length 1.92 mm, length to width ratio = 2.29. Indices: C = 2.27, ac = 2.50, hb = 0.67, 4C = 0.88, 4v = 1.47, 5x = 1.33, M = 0.47, prox. x = 0.41.

Abdomen generally yellowish, shiny, tergites 2–6 each with a diffuse, brownish, medially triangularly extended marginal band; in addition, the lateral part of these tergites is dark brownish, with a concave delimitation.

♂ *Terminalia* (Figs 11, 12, 13D). Epandrium mostly microtrichose, with about 21 lower setae, and 6 upper setae. Cerci completely microtrichose, linked to hypand-

rium by membranous tissue. Surstylus hook-shaped below, not microtrichose, with 15 cone-shaped, sharply pointed prenisetae positioned in a sinuate row, in addition to one very strong, inwards directed preniseta on the tip of the lower expansion, 1 long outer seta and 1 inner seta. Decasternum as in Fig. 11B. Hypandrium longer than epandrium, dorsoventrally bearing two paramedian setae and dorsodistally

*Drosophila pittieri*

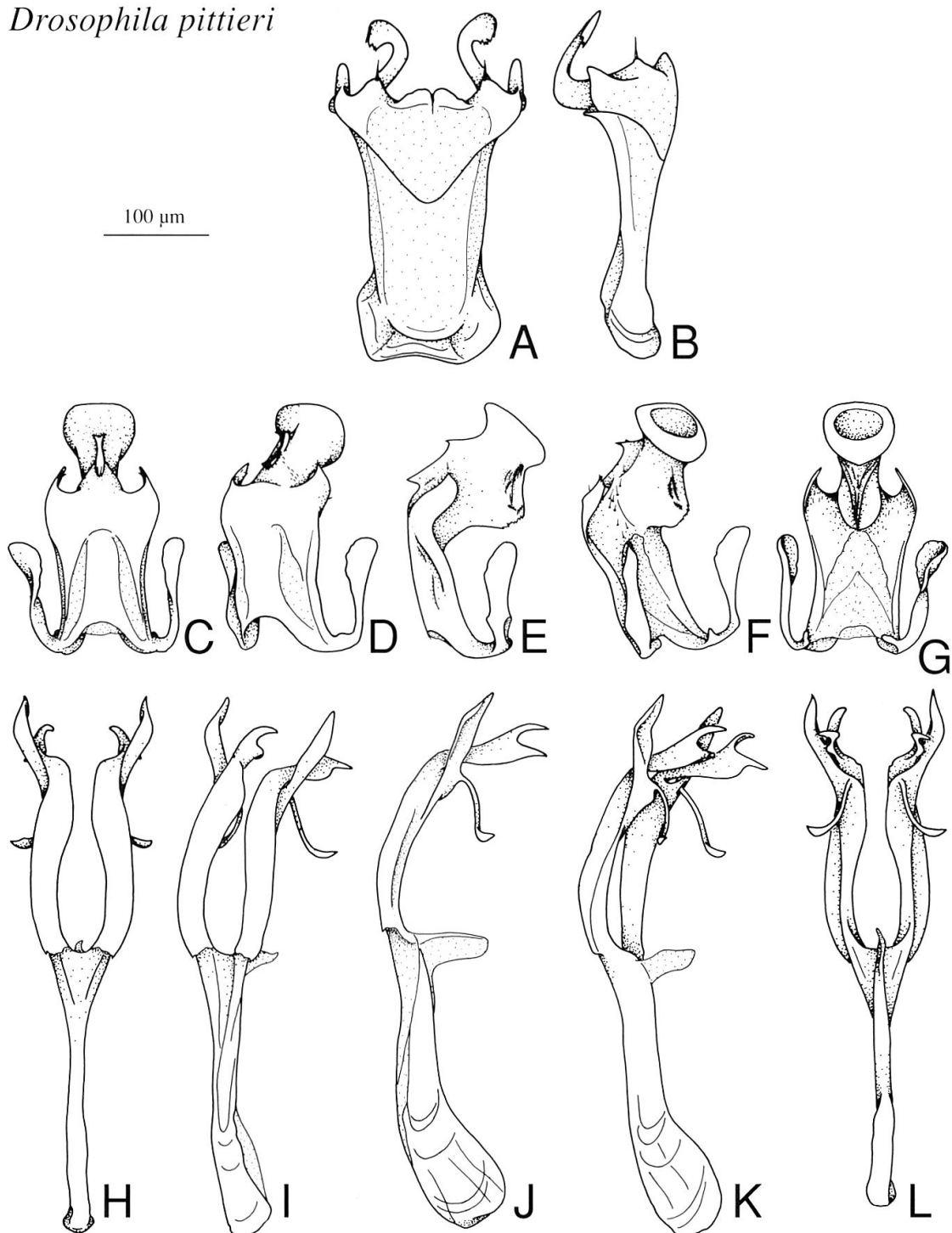


Fig. 12. *Drosophila (Sophophora) pittieri* sp. nov., holotype ♂. A, hypandrium and gonopods, posterior view. B, idem, left lateral view. C–G aedeagus, several views from dorsal through ventral. H–L, aedeagal apodeme and paraphyses, several views from dorsal through ventral.

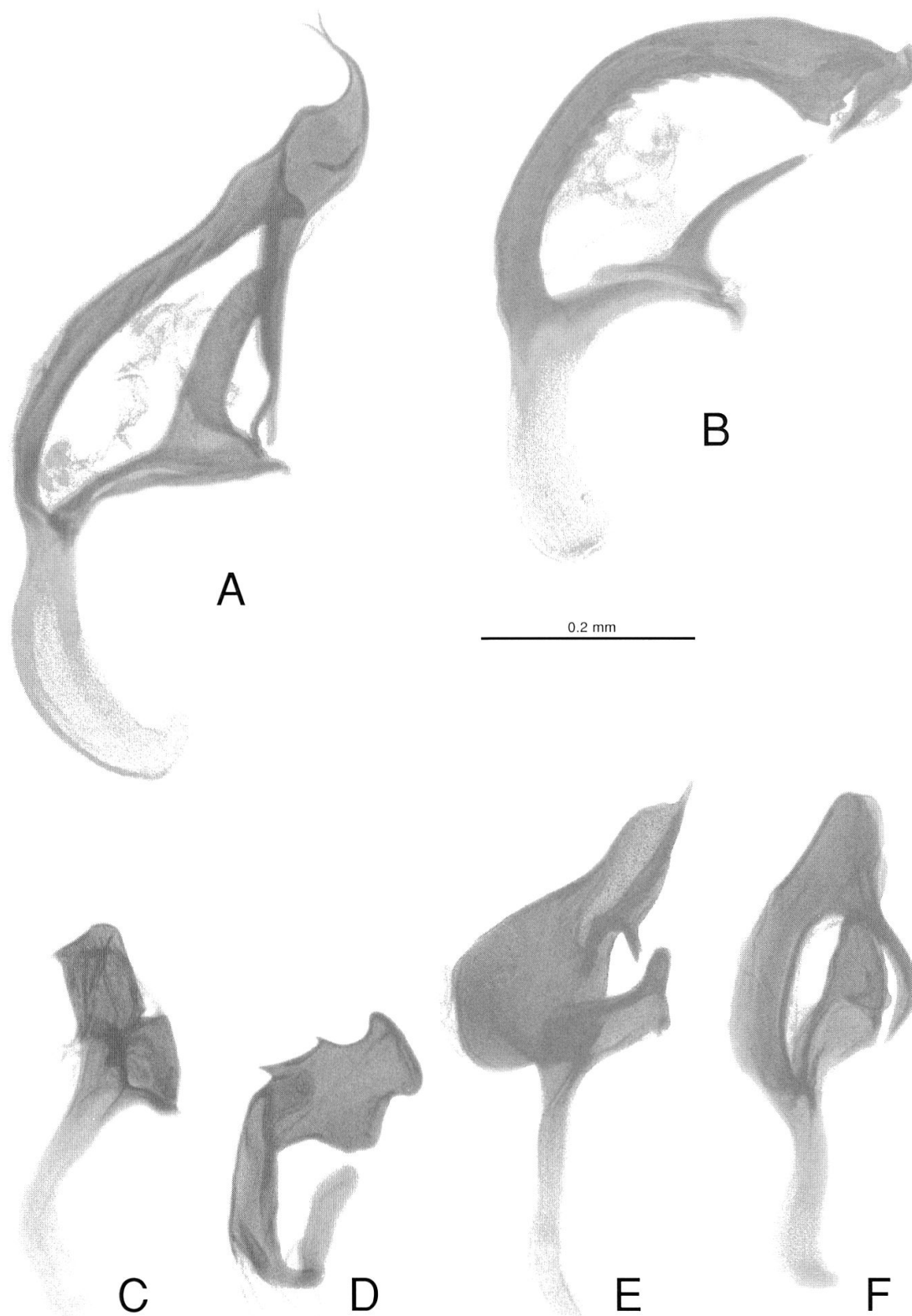


Fig. 13. Aedeagus, aedeagal apodeme, and paraphysis (except for D), left lateral view, of the holotypes (except for F = paratype) of: A, *Drosophila (Drosophila) guacamaya* sp. nov. B, *Drosophila (Drosophila) tschirnhausi* sp. nov. C, *Drosophila (Drosophila) periquito* sp. nov. D, *Drosophila (Sophophora) pittieri* sp. nov. E, *Drosophila (Drosophila) ranchograndensis* sp. nov. F, *Drosophila (Drosophila) papei* sp. nov.

bearing two bent appendages, subapically serrated at outer margin; dorsal arch absent; gonopod fused both to each other and to hypandrium, bearing two paramedian setae. Aedeagus roundish at tip, weakly linked both to aedeagal apodeme and to hypandrium by membranous tissue, with two long, projected posteriad, laterodorsal expansions in addition to 1 dorsal, large, slightly serrated prominence and 1 smaller, slightly serrated ventral prominence on median line, lateral surfaces medially covered with tiny spines; anteroventral region anteriorly bearing 2 prolongations projected posteriad. Aedeagal apodeme longer than aedeagus, rod-shaped, anteriorly expanded. Ventral rod membranous, as in Figs 12J-K. Paraphysis fused to aedeagal apodeme, submedially bifid, distally sinuate. The outer main branch bears a slender, curved expansion at medioventral surface and the inner branch is in turn bifid at tip.

*Etymology.* Named in honor of the late Swiss botanist Henri PITTIER, after whom the Pittier National Park is also named.

*Relationship.* It belongs to the *alagitans-bocainensis* complex (WHEELER & MAGALHÃES 1962) of the *willistoni* group, but differs from the remaining species in the shape of the aedeagus.

#### ACKNOWLEDGMENTS

We are indebted to J. LECLERC, K. HUTTER, P. BRAUCHLI and D. RÖTHLISBERGER for helping with digital image processing and to Dr. Michael VON TSCHIRNHAUS of the Fakultät Biologie, Universität Bielefeld, Germany, for kindly donating the specimens included in the present paper. Information on the collection area was provided by Prof. Dr. Jürg DEMARMELS, Universidad Central de Venezuela, Maracay, Venezuela.

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(received April 8, 2002, accepted September 10, 2002)



