

A contribution to the knowledge of *Trichomyia* Haliday in Curtis, 1839 (Diptera, Psychodidae): supplementary characters of five Quate's species

Maira Xavier Araújo^{1,2} & Freddy Bravo^{1,3}

¹ Universidade Estadual de Feira de Santana (UEFS), Departamento de Ciências Biológicas (DCBIO), Laboratório de Sistemática de Insetos (LASIS). Feira de Santana, BA, Brasil.

² ORCID: <https://orcid.org/0000-0003-2447-9901>. E-mail: mah.biology@gmail.com

³ ORCID: <https://orcid.org/0000-0003-0959-0767>. E-mail: fbravo@uefs.br

Abstract. The type material of five species of the genus *Trichomyia* described by Quate were analyzed and new characters, not described in the original descriptions, are described and figured. All specimens analyzed were males. Were studied four Neotropical specimens, *T. biloba* Quate, 1999, *T. dolickakis* Quate, 1996, *T. intricate* Quate, 1996, and *T. xaniostylis* Quate, 1996, and *T. trukensis* Quate, 1959 from Micronesian region.

Keywords. Neotropical Region; Central America; Micronesia; Taxonomy; Moth-flies.

INTRODUCTION

Trichomyia Haliday in Curtis, 1839 is a genus of Trichomyiinae (Psychodidae) with 203 known species distributed worldwide (Araújo & Bravo, 2018; Araújo *et al.*, 2018a, b). The diversity of *Trichomyia* was underestimated in the Neotropical Region for a long time (Duckhouse, 1978), but recently Araújo & Bravo (2016) increased the number of known species by 36%. The increased records of *Trichomyia* species highlighted the need for reviews of original descriptions and complementary descriptions of some species due to their diminutive size, unique characteristics, and little-studied morphology among other psychodids, mainly Phlebotominae (Galati, 2018). This work presents a supplementary description of characters not presents on the original descriptions of five Quate's species of *Trichomyia* (Quate, 1959, 1996, 1999): four Neotropical species, *Trichomyia biloba* Quate, 1999; *Trichomyia dolickakis* Quate, 1996; *Trichomyia intricata* Quate, 1996; and *Trichomyia xaniostylis* Quate, 1996 and one Micronesian species, *Trichomyia trukensis*. Additionally, a new record of *T. xaniostylis* Quate, 1996 for Brazil is presented.

MATERIAL AND METHODS

The type material of five species of *Trichomyia* were studied. Specimens were loaned from the

following institutions: Natural History Museum, London, England (BMNH); United States National Museum, Smithsonian Institution, Washington, USA (USNM) and California Academy of Sciences, São Francisco, California, USA (CAS). The photographs were taken using a stereomicroscope Leica S8 APO with camera MC170 HD attached to it and an optical microscope with an AmScope M120-2 L-PB10 (5mpx) camera. The illustrations were made using Inkscape.

General morphological terminology follows that of Cumming & Wood (2017), for the specific terminology for the antennae of Psychodidae we used Ibáñez-Bernal (2004) and for terminalia, Araújo & Bravo (2016).

TAXONOMY

Trichomyia biloba Quate, 1999 (Figs. 1A-G)

Trichomyia biloba Quate, 1999: 413, figs. 1A-D.

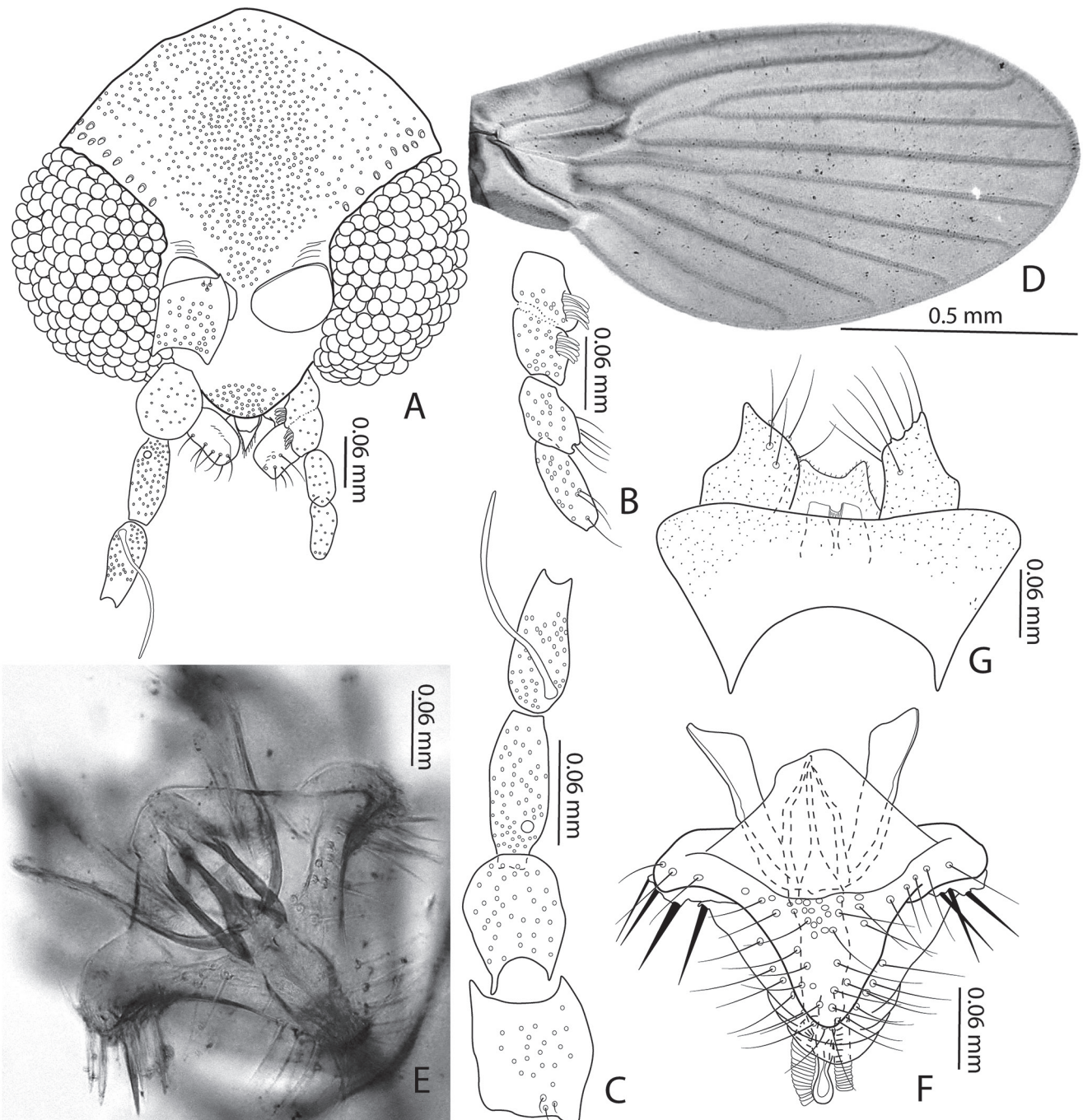
Material examined: 1 paratype ♂ (BMNH) Panama, San Blas Nusagandi Reserve, 09°20'N, 79°00'W, 19-26.III.1994, J. Pickering leg.

Diagnosis: Palpus with four segments, first two partially fused. Male terminalia present hypantrium fused with gonocoxites, gonostylus little sclerotized, and aedeagus bifurcated with a mem-

branous sheath. Cercus cuneiform and hypoproct with bilobed apex.

Supplementary description: Male: Head subcircular in frontal view, rounded eyes. Supraocular bristles in a single row. Antennal socket subtriangular, with a short distance between them, less than $\frac{1}{3}$ the length of the antennal socket (Fig. 1A). Occipital bristles present in almost the entire occipital plate. Palpus with four segments, the first two partially fused, first and second segments with sensilla grouped in a pit, on the basal portion in the first and on the apical portion in the second; palpus formula

1.0:1.0:1.5:1.3 (Fig. 1B). Antenna incomplete in examined specimen, scape subcylindrical and subspherical pedicel, first flagellomere of the same length as the second flagellomere; first flagellomere subcylindrical, other flagellomeres piriform, asymmetrical; ascoids approximately twice the length of flagellomere, filiform, and sinuous (Fig. 1C). **Wing:** Sc ending in C, sclerotized and without microtrichia; r-m present, radial fork and medial fork closer to the base of wing than the apex of the CuA_2 ; R_{4+5} complete at base (Fig. 1D). **Male terminalia:** hypandrium fused with gonocoxites forming a wide plate that covers the genitalia, with lateroposterior pilose arms di-



Figures 1. *Trichomyia biloba* Quate, 1999. (A) Head, ventral view; (B) Palpus (C) Scape, pedicel and first flagellomeres; (D) Right wing; (E) Aedeagus, gonostylus and parameres; (F) Aedeagus, gonostylus and parameres; (G) Cercus, epandrium and hypoproct.

rected to the external lateral and with three spinous setae. Gonostylus little sclerotized, with acuminate apex, basally fused and divergent apically. Aedeagus bifurcated and convergent with a membranous sheath, ejaculatory apodeme short, 0.5 times the length of parameres (Figs. 1E, 1F). Cercus cuneiform in ventral view with bristles randomly distributed throughout its length. Hypoproct with micropilosity and bilobed apex. Epandrium rectangular with apical micropilosity and without alveoli (Fig. 1G).

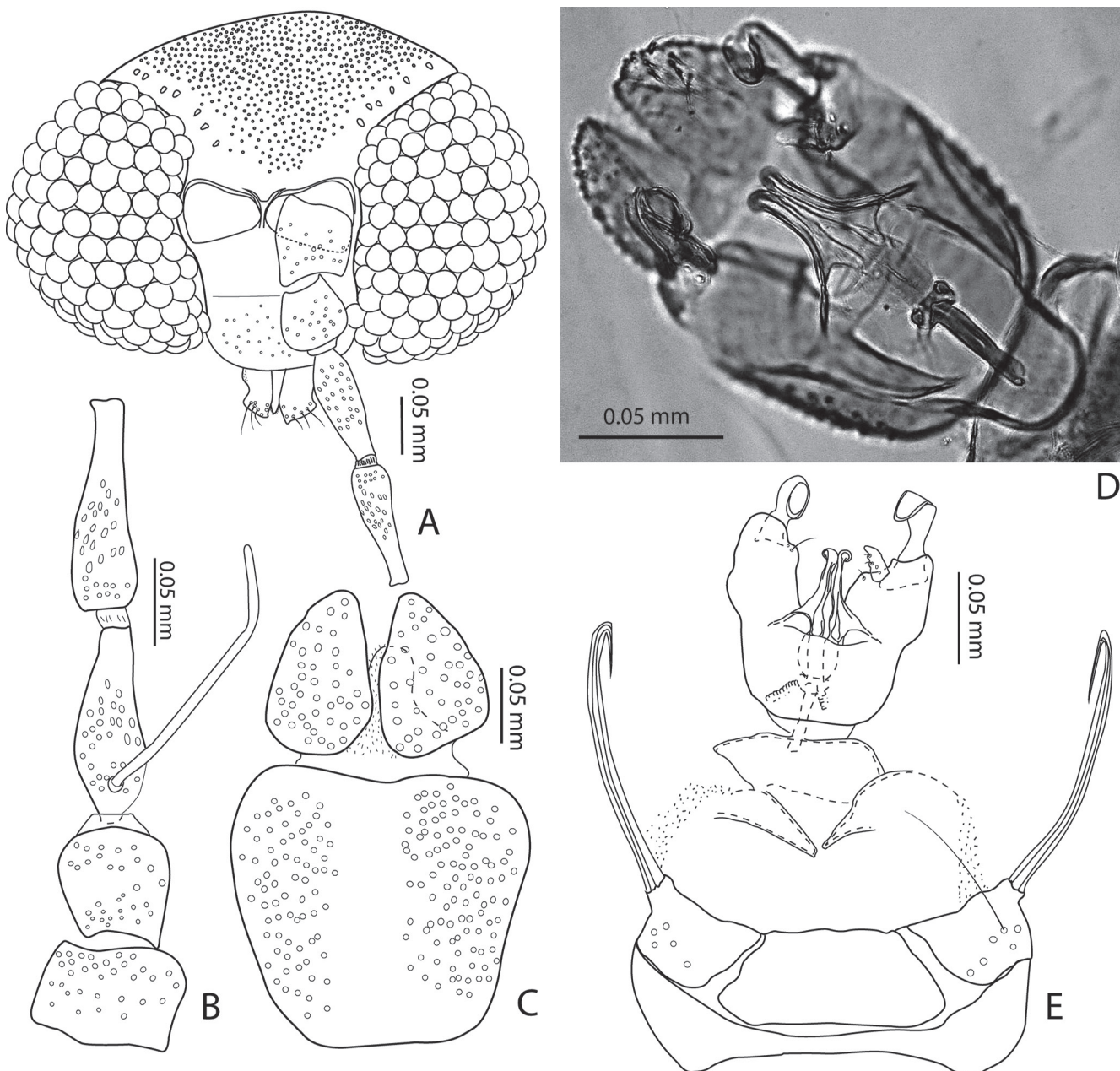
***Trichomyia dolichakis* Quate, 1996
(Figs. 2A-E)**

Trichomyia dolichakis Quate, 1996: 12-13, figs. 4c-f.

Material examined: 1 paratype ♂ (USNM) and 1 paratype ♂ (BMNH): Costa Rica, Limon, Puerto Viejo de Talamanca, 20-22.VII.1993, L.W. Quate, leg.

Diagnosis: Wing with Sc sclerotized without microtrichia and r-m. Tergite VII with acuminate lateroapical lobes and a set of joined bristles. Male terminalia with triangular arm of gonocoxite with few bristles, cylindrical gonostylus, bifurcated aedeagus, and a short ejaculatory apodeme.

Supplementary description: Male: Head oval, wider than long in frontal view, rounded eyes. Supraocular bristles in a single row. Antennal socket subtriangular, with a short distance between them, almost together (Fig. 2A). Occipital bristles in a row restricted to the



Figures 2. *Trichomyia dolichakis* Quate, 1996. (A) Head, ventral view; (B) Scape, pedicel and first flagellomeres; (C) Cercus, epandrium and hypoproct; (D) Aedeagus, gonostylus and parameres; (E) Aedeagus, gonostylus, parameres and tergite VII.

posterior margin of the eye. Palpus lost in the both studied specimens. Antenna incomplete in the studied specimens, scape subcylindrical; pedicel subspherical; flagellomeres piriform and asymmetrical; first flagellomere of the same length as the second flagellomere; ascoids filiform, 1.4 times the length of the flagellomere (Fig. 2B). **Wing:** Sc sclerotized without microtrichia; r-m present, radial fork closer to the apex than the apex of the CuA_2 and the medial fork lined with the apex of the CuA_2 ; R_{4+5} complete at the base. Tergite VII with a pair of acuminate lateroapical lobes and a set of joined bristles with curved tip (Fig. 2E). **Male terminalia:** hypandrium fused with gonocoxites. Arm of gonocoxite, triangular, with few bristles randomly distributed and directed to the inner region of the genitalia. Gonostylus cylindrical, little sclerotized, without bristles and with curved apex, articulated with the ventral region of the gonocoxite. Aedeagus bifurcated, one pair of parameres connected by a sheath, ejaculatory apodeme short, 0.6 times the length

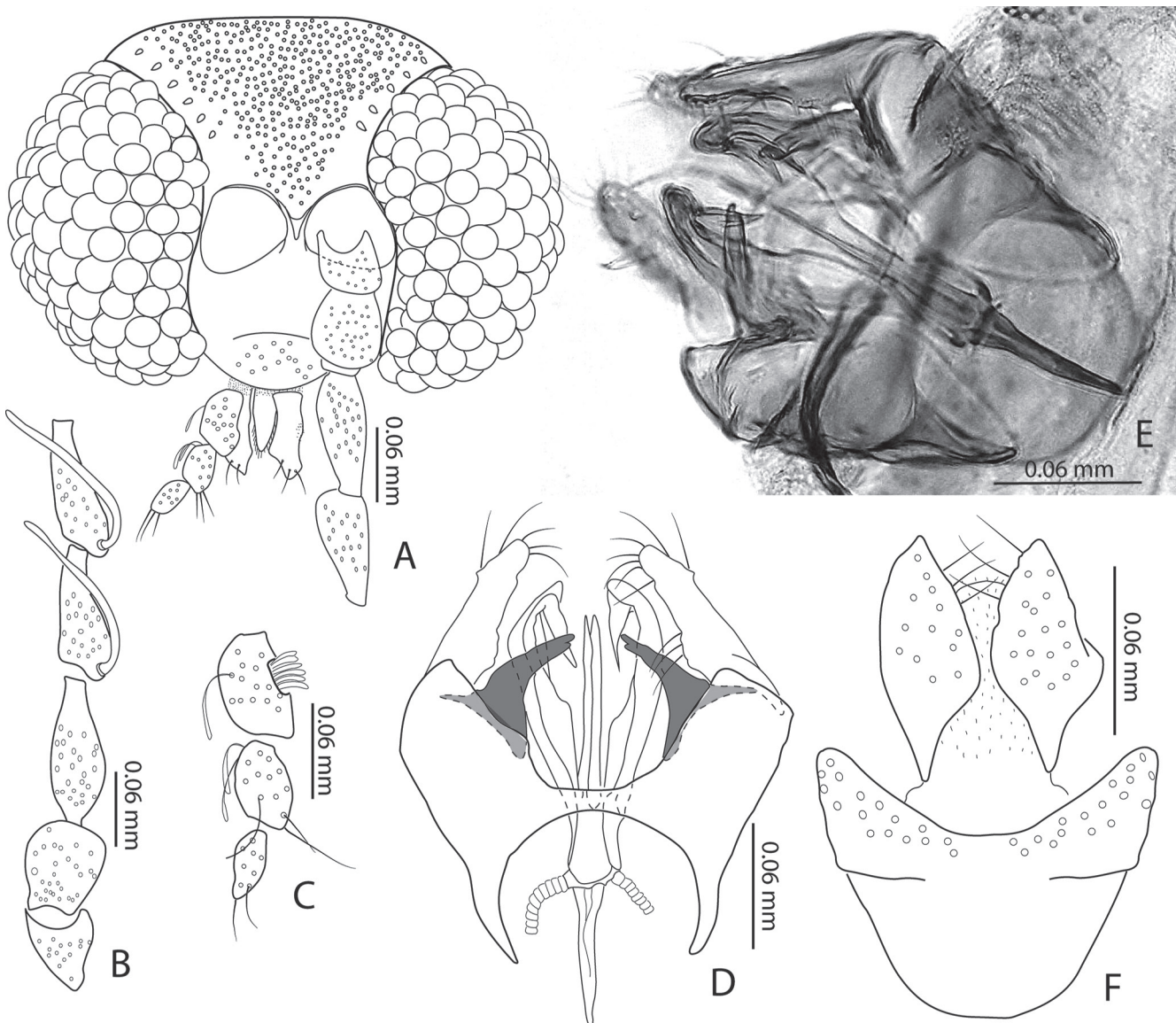
of parameres (Figs. 2D, 2E). Cercus triangular in ventral view with bristles randomly distributed throughout its length. Hypoproct with micropilosity and rounded apex. Epandrium trapezoidal and pilose, with alveoli concentrated on both lateral (Fig. 2C).

***Trichomyia intricata* Quate, 1996
(Figs. 3A-F)**

Trichomyia intricata Quate, 1996: 10-11, fig. a.

Material examined: 1 paratype ♂ (USNM) Costa Rica, Limon, Puerto Viejo de Talamanca, 20-23.VII.1993, sea level. L.W. Quate, leg.

Diagnosis: Palpus with three segments. Ascoids are digitiform and C-shaped. Male terminalia with gonocoxites, cylindrical arm of gonocoxite, strongly sclerotized

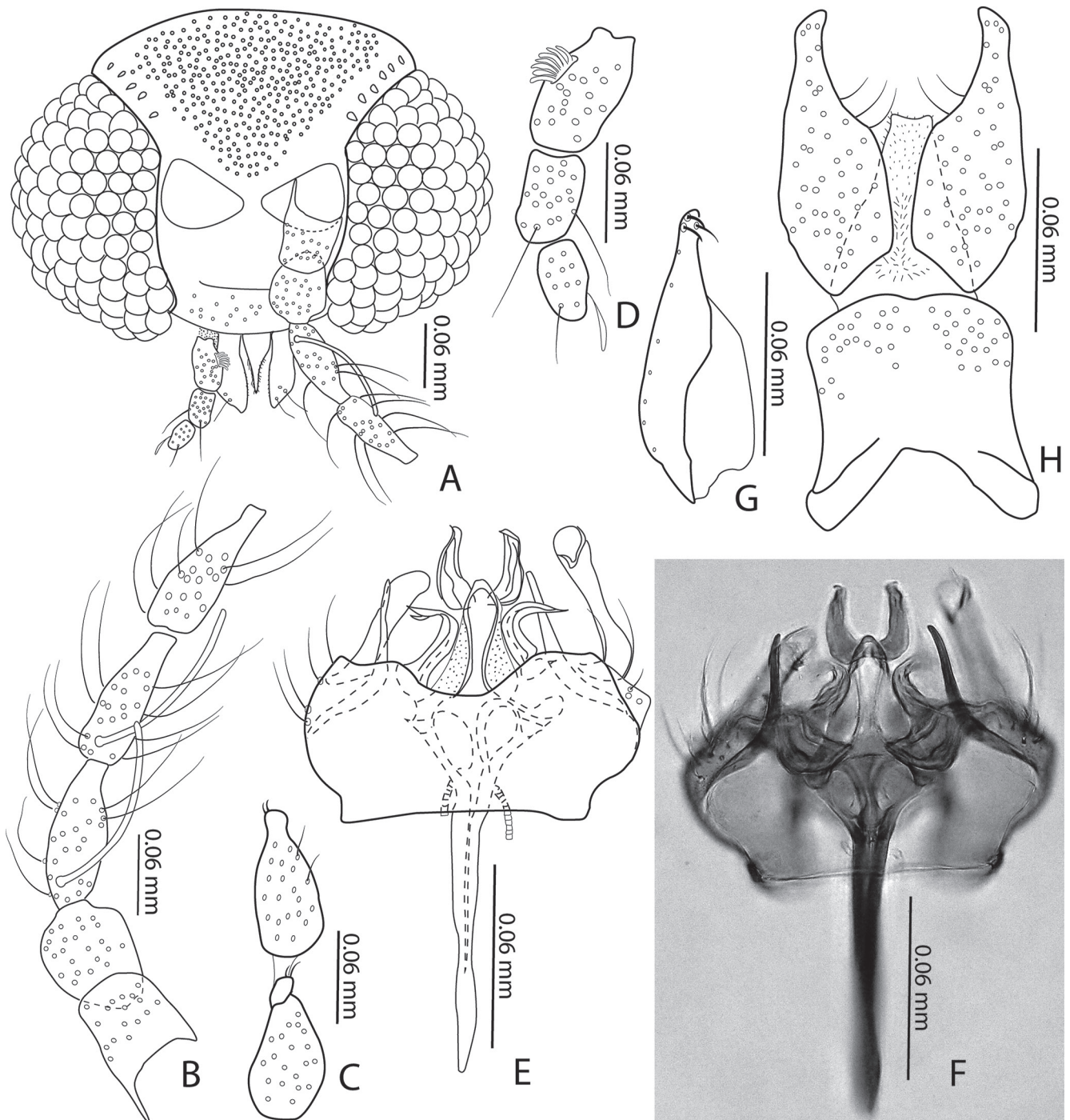


Figures 3. *Trichomyia intricata* Quate, 1996. (A) Head, ventral view; (B) Scape, pedicel and first flagellomeres; (C) Palpus; (D) Male genitalia, dorsal view; (E) Male genitalia, dorsal view; (F) Cercus, epandrium and hypoproct.

gonostylus, and bifurcated aedeagus. Cercus cuneiform, epandrium trapezoidal and pilose with concentrated alveoli at the apex of the lateral regions.

Supplementary description: Male: Head oval, wider than long in frontal view, rounded eyes. Supraocular bristles in a single row. Antennal socket subtriangular, with a short distance between them, almost together (Fig. 3A). Occipital bristles in a row restricted to the posterior margin of the eye. Palpus with three segments, first segment with sensilla grouped in a pit, palpus formula 1.0:1.0:0.6 (Fig. 3C). Antenna incomplete, scape subcylindrical and

subspherical pedicel, flagellomeres piriform and asymmetrical, first flagellomere of the same length as the second flagellomere. Ascoids digitiform and almost C-shaped, with 1.4 times the length of the flagellomere (Fig. 3B). **Male terminalia:** hypandrium fused with gonocoxites. Arm of gonocoxite cylindrical, projected diagonally, at an angle of 45°, pilose, with a row of setae on the inner margin. Gonostylus strongly sclerotized and digitiform, with a short subapical indentation at the apex, articulated with the ventral region of gonocoxite. Aedeagus bifurcated, one pair of subtriangular parameres with slightly curved apices, ejaculatory apodeme short, 0.6



Figures 4. *Trichomyia trukensis* Quate, 1959. (A) Head, ventral view; (B) Scape, pedicel and first flagellomeres; (C) Last flagellomeres and apiculus; (D) Palpus; (E) Male genitalia, dorsal view; (F) Male genitalia, dorsal view; (G) Cercus; (H) Cercus, epandrium and hypoproct.

times the length of parameres (Figs. 3D, 3E). Cercus cuneiform in ventral view with bristles randomly distributed throughout its length. Hypoproct with micropilosity and rounded apex. Epandrium pilose and with a concave posterior margin, with alveoli distributed and concentrated at the apex of the two lateral (Fig. 3F).

***Trichomyia trukensis* Quate, 1959
(Figs. 4A-H)**

Trichomyia trukensis Quate, 1959: 441-442, figs. 3a-g.

Material examined: holotype ♂ (USNM) Federated States of Micronesia, Truk, Moen I, Mt. Teroken, 80 m, 28.XII.1952, J.L. Gressitt leg. 213.

Diagnosis: Palpus with three segments. Male terminalia with a strongly sclerotized arm of gonocoxite, cylindrical gonostylus, and a bifurcated aedeagus with long ejaculatory apodeme. Cercus piriform with three setae at the apex, and hypoproct with a truncated apex with micropilosity and a cluster of setulae at the base.

Supplementary description: Male: Head oval, wider than long in frontal view, rounded eyes. Supraocular bristles in a single row. Antennal socket subtriangular, with a short distance between them, less than $\frac{1}{2}$ the length of the antennal socket (Fig. 4A). Occipital bristles in a row restricted to the posterior margin of the eye. Antenna with 13 flagellomeres, scape subcylindrical and subspherical pedicel, flagellomeres piriform and asymmetrical, first flagellomere the same length as the sec-



Figures 5. *Trichomyia xaniostylis* Quate, 1996. (A) Scape, pedicel and first flagellomeres; (B) Flagellomeres with long ascoid; (C) Palpus; (D) Last flagellomere and apiculus; (E) Right wing; (F) Aedeagus and parameres; (G) Cercus, epandrium and hypoproct; (H) Male genitalia, lateral view; (I) Male genitalia, dorsal view.

ond flagellomere. Ascoids digitiform, with 1.1 times the length of flagellomere (Fig. 4B). Flagellomeres 12 and 13 globose, the last with an apiculus subcircular with two setae in the apex (Fig. 4C). Palpus with three segments, first segment with sensilla grouped in a pit, palpus formula 1.0:1.5:1.4 (Fig. 4D). **Male terminalia:** hypandrium fused with gonocoxites. Arm of gonocoxite with filiform hook shape, without bristles, projected diagonally, at an angle of 60° and strongly sclerotized. Gonostylus cylindrical, little sclerotized, without bristles and with a truncated apex, articulated with the ventral region of the gonocoxite. Aedeagus bifurcated, a pair of parameres bifurcated apically, long ejaculatory apodeme, 2.6 times the length of parameres (Figs. 4E, 4F). Cercus piriform in ventral view with three setae in the apex and bristles randomly distributed throughout its length (Fig. 4G). Hypoproct with truncated apex, apical micropilosity and a cluster of setulae concentrated in the basal region. Epanandrium quadrangular with the bifurcated base and alveoli concentrated in the apex of the two lateral. (Fig. 4H).

***Trichomyia xaniostylis* Quate, 1996
(Figs. 5A-I)**

Trichomyia xaniostylis Quate, 1996: 9-10, figs. 2h-m.

Material examined: 2 paratypes ♂ (USNM, CAS) Costa Rica, Limon, Puerto Viejo de Talaman, 20.VII.1993, L.W. Quate, leg.; 4 ♂ (MZFS) Brazil, Roraima, km 4, S.J. Baliza, 30.IV.2005, without name of collector; 1 ♂ (MZFS) Brazil, Amazonas, Purupuru, Est. Nunes de Melo, km 4, 24.XI.1998, without name of collector; 2 ♂ (MZFS) Brazil, Roraima, km 3, Sl. Do Anaua, 24.X.2003, M. Rocha leg.; 1 ♂ (MZFS) Brazil, Pará, Novo Repartimento, Vic. Bandeirante, Sítio Pedro Roqueta, 19.VIII.1998, without name of collector; 1 ♂ (MZFS) Brazil, Roraima, km 4, São Luiz do Anauá, Faz. Zulmira, 04.II.2004, M. Rocha leg; new record: 3 ♂ (MZFS) Brazil, Rondônia, Caucalândia, 200 km SSE de Porto Velho, 10°18.00'S, 61°52.01'O, 25.V-06.VI.1998, L.W. Quate leg.

Distribution: Costa Rica and Brazil, states of Roraima, Amazonas, Pará and Rondônia (new record).

Diagnosis: Palpus with three segments; Sc sclerotized without microtrichia, r-m present, and R4+5 complete at the base. Male terminalia with a rectangular arm of gonocoxite with modified setae, and a short, triangular gonostylus. The aedeagus is bifurcated, with strongly sclerotized parameres, and a short ejaculatory apodeme.

Supplementary description: Male: Head oval in frontal view, rounded eyes. Supraocular bristles in a single row. Antennal socket subtriangular, with a short distance between them, less than 1/3 the length of the antennal socket. Occipital bristles in a row restricted to the posterior margin of the eye. Scape subcylindrical and subspherical pedicel, flagellomeres piriform, with a pair of mediobas-

al ascoids, first flagellomere of the same length as the second flagellomere (Fig. 5A). Ascoids with variations, filiform and parallel to flagellomeres, with the same size of the flagellomeres in one of the paratypes, or digitiform and slightly S-shaped, with 1.6 times the length of the flagellomeres in the other specimens. (Figs. 5A, 5B). Antenna with 13 flagellomeres, flagellomere 13 more globous than the others and with a terminal apiculus separated by a suture. Apiculus subcircular with two setae in the apex (Fig. 5D). Palpus with three segments, first segment with sensilla grouped in a pit, palpus formula 1.0:0.5:0.7 (Fig. 5C). Wing. Sc sclerotized without microtrichia, r-m present, radial fork closer to the apex than the apex of the CuA₂ and the medial fork at the same height as the apex of the CuA₂; R₄₊₅ complete at the base (Fig. 5E) (Fig. 46.2). **Male terminalia:** hypandrium fused with gonocoxites. Arm of gonocoxite rectangular, longer than wide, with modified rod-shaped setae in a row at the apex and small spinous bristles randomly distributed in the dorsal region, directed for the apical region, at an angle of 90°. Gonostylus short, triangular in lateral view, little sclerotized, without bristles and articulated basally in the ventral region of the gonocoxite (Figs. 5H, 5I). Aedeagus bifurcated, a pair of bifurcated and strongly sclerotized parameters, ejaculatory apodeme short, 0.5 times the length of parameres (Fig. 5F). Cercus piriform in ventral view with four modified spiniform bristles at the apex and thinner bristles randomly distributed throughout its length (Figs. 5H, 5G). Hypoproct acuminate with micropilosity. Epanandrium quadrangular and pilose, with alveoli concentrated in the apex of the two lateral (Fig. 5G).

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