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Three new species of Stactobiinae (Trichoptera: Hydroptilidae) with the first record of *Orinocotrichia* Harris, Flint & Holzenthal from Brazil

WAGNER RAFAEL M. DE SOUZA[1,2], ALLAN PAULO MOREIRA SANTOS[1] & DANIELA MAEDA TAKIYA[1]

[1]*Laboratório de Entomologia, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro. Caixa Postal 68044, 21941-971 Rio de Janeiro, RJ, Brazil.*

[2]*Corresponding author E-mail: faelwagner@gmail.com*

Abstract

Approximately 300 species are assigned to Stactobiinae, most of them occurring in the Old World. Seven species have been recorded from Brazil, six of *Flintiella* and one of *Bredinia.* Herein, three new species are described and illustrated based on specimens collected in Maranhão and Piauí states from Northeastern Region of Brazil: *Orinocotrichia angelus* **sp. nov.** (Holotype male deposited in CZMA: Maranhão State) can be distinguished by the subgenital plate conspicuous, mesally divided; *Flintiella pallida* **sp. nov.** (Holotype male deposited in CZMA: Maranhão State), differs from its cogeners by the process of the subgenital plate; and *F. harrisi* **sp. nov.** (Holotype male deposited in CZMA: Piauí State), recognized by the short process of the phallus. The new species of *Orinocotrichia* is the third species described in this genus and represents the first record of *Orinocotrichia* from Brazil. *Orinocotrichia angelus* **sp. nov.** and *F. pallida* **sp. nov.** are the first microcaddisflies species described from Maranhão State, Brazil.

Key words: *Flintiella*, microcaddisfly, Northeastern Brazil, taxonomy

Introduction

Stactobiinae includes 12 genera and over 300 species mostly occurring in the Old World. Four genera are known from the Neotropics: *Bredinia* Flint, 1968, *Flintiella* Angrisano, 1995, *Orinocotrichia* Harris, Flint & Holzenthal, 2002, and *Tizatetrichia* Harris, Flint & Holzenthal, 2002. Currently, two stactobiine genera are recorded in Brazil, and only two species have been recorded from Northeastern Brazil. In this region, Maranhão and Piauí are among the states with the fewest records of caddisfly species, currently, with 1 and 2 caddisfly species reported *Macrostemum arcuatum* (Erichson, 1848) in Maranhão (Flint 1978) and *Nectopsyche splendida* (Navás, 1917) and *Oecetis connata* Flint, 1974 in Piauí (Quintero *et al.* 2014; Henriques-Oliveira *et al.* 2013).

Flintiella was erected by Angrisano (1995) for a single species from Uruguay and Argentina. The genus was revised by Harris *et al*. (2002b) and currently contains 12 species distributed throughout Central and South America. Six *Flintiella* species have been recorded from Brazil: *F. andreae* Angrisano, 1995, *F. astilla* Harris, Flint & Holzenthal, 2002, *F. boraceia* Harris, Flint & Holzenthal, 2002, *F. carajas* Santos, Jardim & Nessimian, 2011, *F. manauara* Santos & Nessimian, 2009, and *F. pizotensis* Harris, Flint & Holzenthal, 2002.

Orinocotrichia comprises only two species: *O. calcariga* Harris, Flint & Holzenthal, 2002, described from Venezuela, and *O. tagola* Oláh & Johanson, 2011, from French Guiana. According to Harris *et al*. (2002a), *Orinocotrichia* is closely related to *Flintiella*, but it can be distinguished from the latter by the reduced inferior appendages, unmodified subgenital plate, and more complex phallus apex in the male genitalia. Moreover, the posterior positioning of the vaginal sclerite can be used to identify the females.

Herein, three new microcaddisfly species are described; one based on material collected in Piauí and two other from Maranhão states. The latter represent the first species described from the State of Maranhão.

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Material and methods

Specimens were collected with Pennsylvania light (Frost 1957) and Malaise traps (Gressit & Gressit 1962) in Maranhão and Piauí states, Northeastern Brazil, and preserved in 96% ethanol. To observe and draw genital structures, the abdomen was removed, cleared in a heated solution of 10% KOH, and temporarily mounted on slides. Terminology follows that given by Harris *et al.* 2002b. Vector-based illustrations were made in Illustrator CS5 (Adobe Inc.) using pencil sketches as templates. Species descriptions were made using DELTA software (DEscriptive Language for TAxonomy) (Dallwitz *et al*. 1999) and lists of material examined were made using AUTOMATEX macro in Microsoft Excel (Brown 2013).

Type specimens are deposited in Coleção Zoológica do Maranhão, Universidade Estadual do Maranhão, Caxias (CZMA), Coleção Entomológica Professor José Alfredo Pinheiro Dutra, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro (DZRJ), and in Coleção de Invertebrados, Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA) as indicated in the species descriptions.

Results and discussion

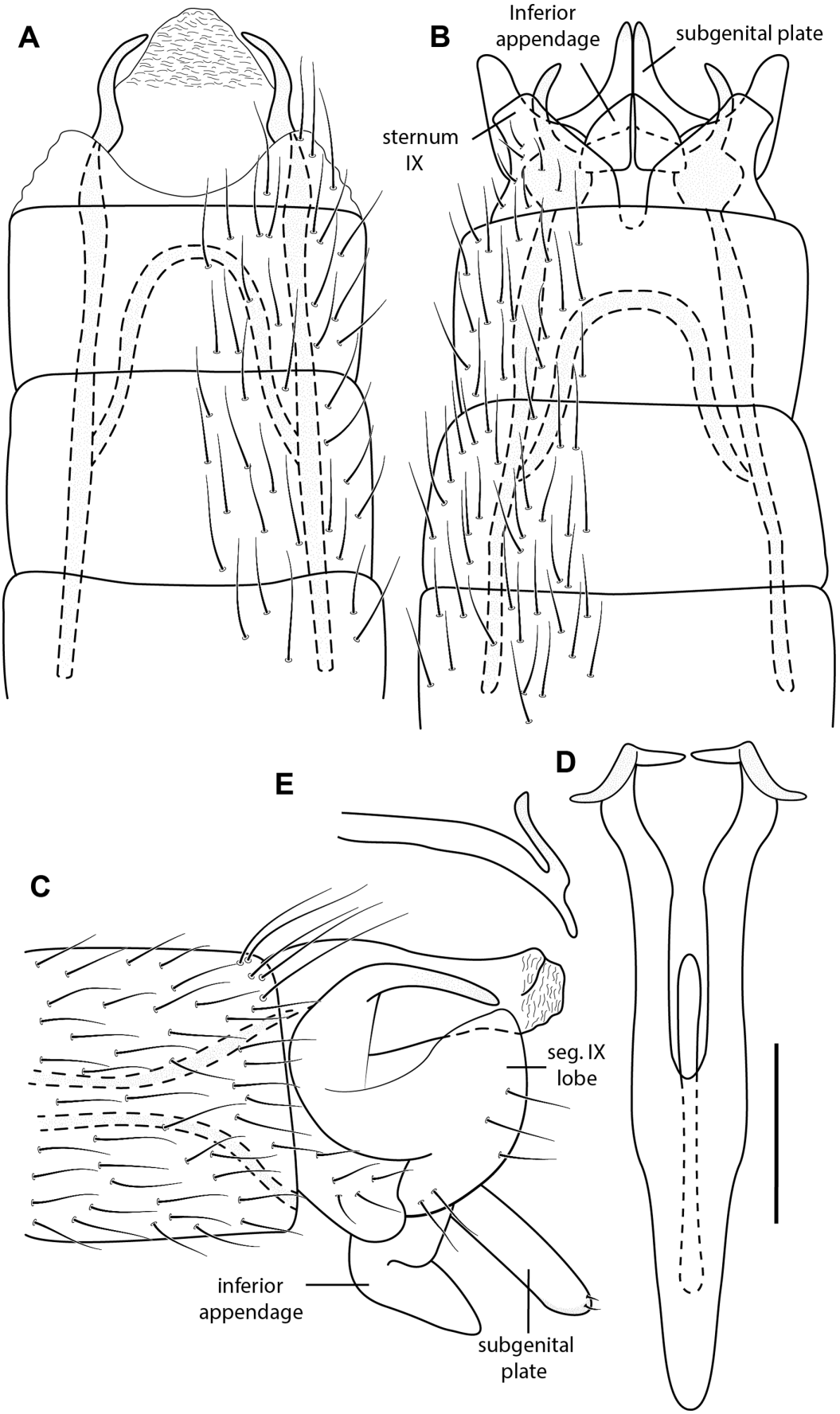
***Orinocotrichia angelus* sp. nov.**
(Figures 1A–E)

Material examined. Holotype male. BRAZIL: Maranhão: Carolina, Parque Nacional da Chapada das Mesas, Riacho Cancela, Malaise trap, 07°06'43.4"S 47°17'16.6"W, 186 m a.s.l., 18–21.IX.2014, W.R.M. Souza & T.T. Andrade leg. (CZMA). **Paratypes.** Same data as holotype, 3 males (DZRJ), 1 male (INPA).

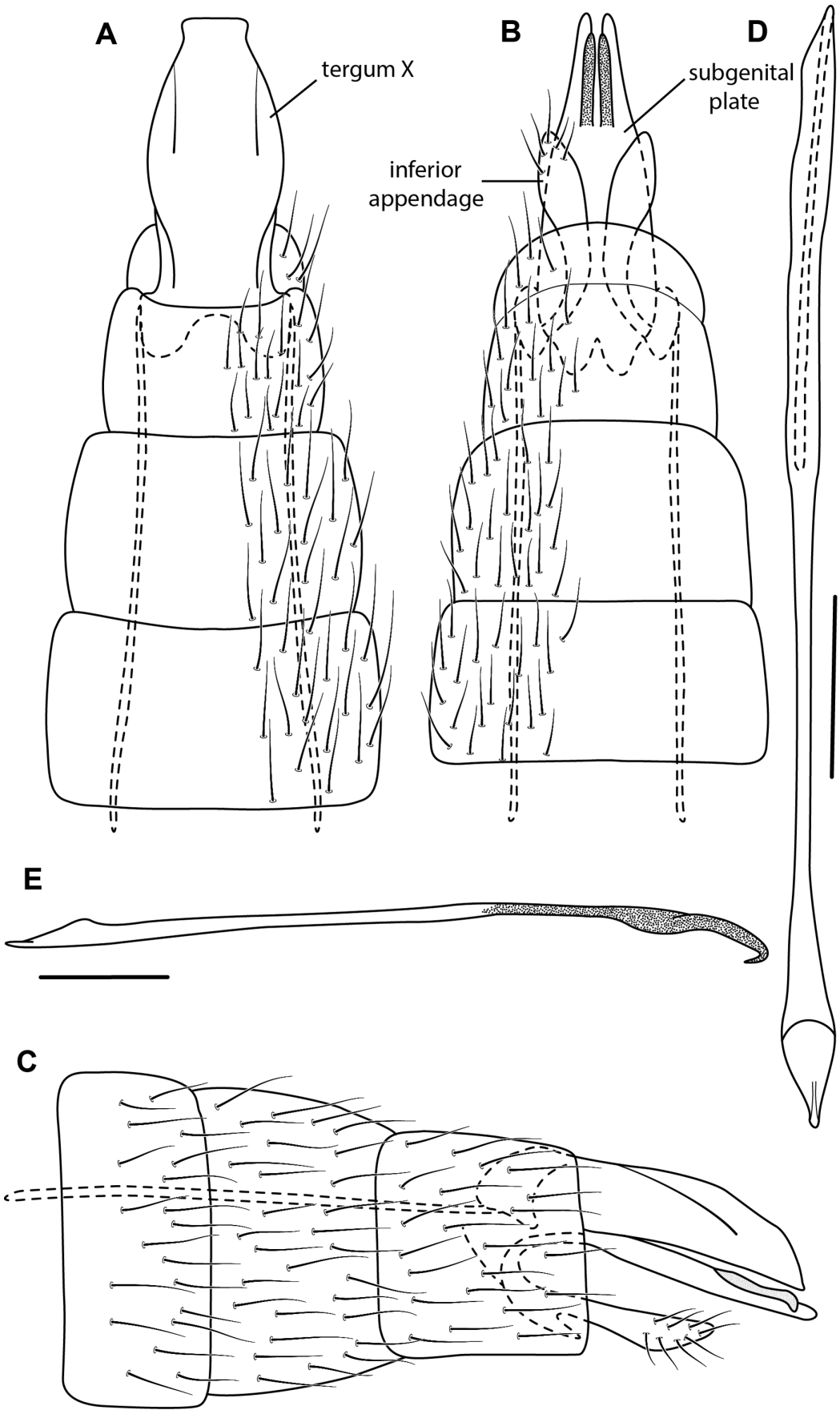
Description. **Holotype**. **Adult male**. Length (from tip of the head to wing apex) 1.9 mm. General color pale yellow (in alcohol). Head without modification. Antennae simple; 18-articulated. Ocelli absent. Tibial spur formula 0-2-3. Fore- and hind wing venation reduced to basal veins. Mesoscutellum with transverse suture. Metascutellum rectangular, short, and wide. Abdomen without visible modifications. Segment VII without a mesoventral process. *Male genitalia*. Segment VIII annular. Segment IX reduced dorsally (Fig. 1A); sternum divided into 2 truncate lobes, curved laterad (Fig. 1B); posterolateral margin produced as a large rounded lobe and a sclerotized, elongate process (Fig 1C), curved inwardly in dorsal view (Fig. 1A); elongate apodemes originating from the anterolateral margin of segment, extending into segment VI (Figs 1A–B). Inferior appendages, in ventral view, short and rounded apically (Fig. 1B); in lateral view, subtriangular (Fig. 1C). Subgenital plate conspicuous and elongate; in ventral view completely divided into lateral arms, apex slightly darkened (Fig. 1C); in lateral view, digitiform (Fig. 1B). Tergum X membranous, subrectangular, elongate, and rounded apically in dorsal and lateral views (Fig. 1C). Phallus divided into 2 long branches, parallel basally, and strongly curved distally, with apices almost touching each other in ventral view (Fig. 1D); each arm bearing a dorsal curved retrorse spine-like process at apex (Figs 1D–E); ejaculatory duct protruding from the mesal incision of the phallus (Fig. 1D).

Etymology. The new species is named after Angelo B. M. Machado on the occasion of his 80th birthday (noun in apposition, nominative singular from classical form).

Remarks. This new species is the third species assigned to *Orinocotrichia*. Male genitalia structure of *O. angelus* **sp. nov.** is very similar to that of *O. calcariga*, particularly the posterolateral margin of segment IX produced into a large lobe and a sclerotized process, reduced inferior appendages, and phallus divided into 2 arms, each with an apical retrorse spine-like process. However, whereas *O. calcariga* and *O. tagola* have a reduced undivided subgenital plate, this structure in *O. angelus* **sp. nov.** is conspicuous, completely divided mesally, and more similar to that described for *Flintiella* species. Besides the subgenital plate, the new species can also be distinguished from its congeners by the truncate projections of sternum IX in ventral view, the broader lobe of the posterolateral margin of the same segment, and the phallus apical branches narrowing apically and almost touching each other in ventral view. Thus, males of *Orinocotrichia* can be distinguished from males of *Flintiella* based on the reduced inferior appendages and the more complex phallus apex. In fact, it is possible that *Flintiella* and *Orinocotrichia* are synonyms, but only a better knowledge of the diversity of Neotropical microcaddisflies and a formal phylogenetic analysis can help resolve this question.



FIGURES 1A–E. Male genitalia of *Orinocotrichia angelus* **sp. nov.**: A. dorsal; B. ventral; C. left lateral; D. phallus, dorsal; E. phallus, lateral. Scale bar = 0.1 mm.



FIGURES 2A–E. Male genitalia of *Flintiella pallida* **sp. nov.**. A. dorsal; B. ventral; C. left lateral; D. phallus, dorsal; E. phallus, lateral. Scale bar = 0.1 mm.

***Flintiella pallida* sp. nov.**
(Figures 2A–E)

Material examined. Holotype male. BRAZIL: Maranhão: Carolina, Parque Nacional da Chapada das Mesas, Riacho Cancela, Malaise trap, 07°06'43.4"S 47°17'16.6"W, 186 m a.s.l., 18-21.IX.2014, W.R.M. Souza & T.T. Andrade leg. (CZMA). **Paratypes.** Same data as holotype, 2 males (CZMA), 2 males (INPA), 2 males (DZRJ); same data but Mirador, Parque Estadual do Mirador, Pennsylvania trap, 06°43'50.8"S 44°59'01.6"W, 264 m a.s.l., 22.IX.2014, W.R.M. Souza & T.T. Andrade leg., 2 males (DZRJ).

Description. **Holotype**. **Adult male**. Length (from tip of head to the wing apex) 1.8 mm. General color pale yellow (in alcohol). Head without modification. Antennae simple; 18-articulated. Ocelli absent. Tibial spur formula 0-2-3. Fore- and hind wing venation reduced to basal veins. Mesoscutellum with transverse suture. Metascutellum rectangular, short, and wide. Abdomen without visible modifications. Segment VII without a mesoventral process. *Male genitalia*. Segment VIII annular, ventrally with posterior margin membranous. Segment IX reduced; elongate apodemes originating from the anterolateral margin of segment, extending into segment V (Figs 2A, C). Inferior appendages, in ventral view, elongate and curved laterad (Fig. 2B); in lateral view narrowing posteriorly with short setae (Fig. 2C). Subgenital plate conspicuous and elongate; in ventral view excised at apex and bearing 2 sclerites originating at midlength (Fig. 2B); in lateral view with apex digitiform (Fig. 2C). Tergum X elongate, with lateral margins rounded, truncate apically (Fig. 2A); in lateral view subrectangular, dorsal margin rounded (Fig. 2C). Phallus tubular, long, and slender, slightly broad basally narrowing at midlength (Fig. 2D); in lateral view with acute, darkened, and curved ventrally apex (Fig. 2E); ejaculatory duct protruding apically.

Etymology. The specific name is an allusion to the general color of *Flintiella* species.

Remarks. The new species shares some features with *Flintiella pizotensis* Harris, Flint & Holzenthal, 2002, such as the inferior appendages narrowing posteriorly, subgenital plate with processes, and undivided phallus apex. However, *F. pallida* **sp. nov.** can be easily distinguished from *F. pizotensis* and other congeners by the digitiform processes of the subgenital plate, tergum X elongate with posterior margin truncate, and acute and ventrally-turned phallus apex.

***Flintiella harrisi* sp. nov.**
(Figures 3A–E)

Material examined. Holotype male. BRAZIL: Piauí: Piracuruca, Parque Nacional de Sete Cidades; Riacho Piedade, Pennsylvania trap, 04°06'34"S, 41°4'39"W, 169 m a.s.l., 19.IV.2012, D.M. Takiya leg. (CZMA).

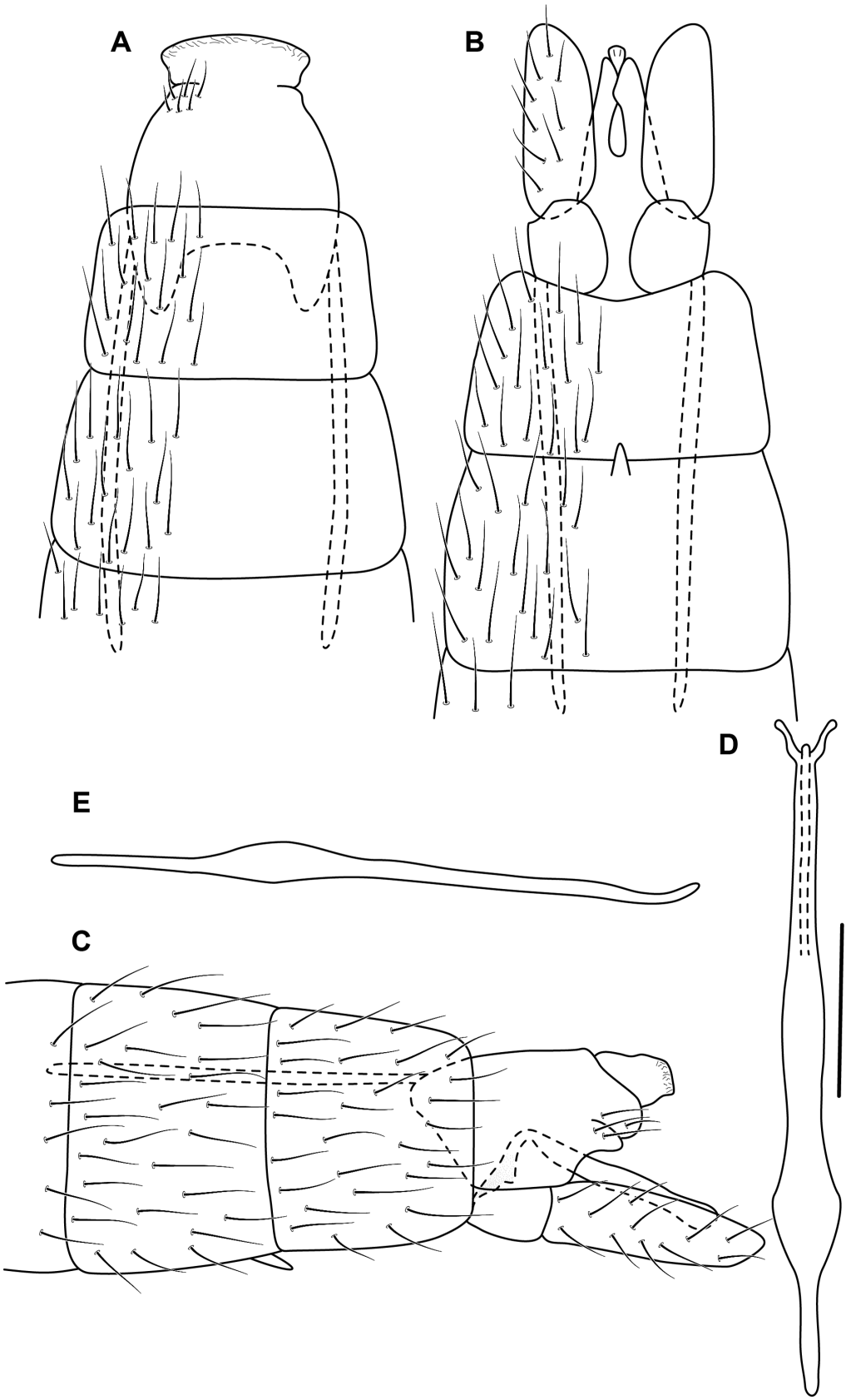
Description. **Holotype**. **Adult male**. Length (from tip of the head to wing apex) 1.8 mm. General color pale yellow (in alcohol). Head without modification. Antennae simple; 18-articulated. Ocelli absent. Tibial spur formula 0-2-3. Fore- and hind wing venation reduced to basal veins. Mesoscutellum with transverse suture. Metascutellum rectangular, short and wide. Abdomen without visible modifications. Segment VII with a mesoventral process.

Male genitalia. Segment VIII annular. Segment IX broad with anterior margin concave, with small setae distally in dorsal view (Fig. 3A); sternum divided into 2 lobes (Fig. 3B); elongate apodemes originating from the anterolateral margin of segment, extending into segment VI (Figs 3A–B). Inferior appendages, in ventral and lateral views, elongate, subrectangular with short setae (Figs 3B–C). Subgenital plate conspicuous and elongate; in ventral view triangular, divided mesally into 2 arms obliquely truncate at apex, nearly as long as inferior appendages (Fig. 3B); in lateral view with digitiform apex (Fig. 3C). Tergum X short, partially fused to segment IX (Fig. 3A); in lateral view lobate (Fig. 3C). Phallus tubular; apex divided into 2 lateral, digitiform processes (Fig. 3D); in lateral view with the apical processes slightly dorsally turned (Fig. 3E); ejaculatory duct protruding from mesal incision (Fig. 3D).

Etymology. This species is named after Dr. Steven C. Harris who described many Trichoptera species, especially Neotropical microcaddisflies.

Remarks. Based on the subgenital plate divided into 2 arms nearly as long as inferior appendages, subrectangular inferior appendages, and presence of the mesoventral process on segment VII, this new species is similar to *Flintiella carajas* and *F. heredia* Harris, Flint and Holzenthal, 2002. *Flintiella harrisi* **sp. nov.** can be recognized by the short and digitiform processes at the phallus apex, segment IX elongate dorsally with its anterior margin concave. The phallus with 2 apical processes is also present in *F. andreae*. However, *F. pallida* **sp. nov.** is

easily separated from other *Flintiella* by the presence of the mesoventral process of segment VII and by the divided subgenital plate with arms obliquely truncate apically.



FIGURES 3A–E. Male genitalia of *Flintiella harrisi* **sp. nov.**. A. dorsal; B. ventral; C. left lateral; D. phallus, dorsal; E. phallus, lateral. Scale bar = 0.1 mm.

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References

Angrisano, E.B. (1995) Contribucion al conocimiento de los Trichoptera del Uruguay II. Familia Hydroptilidae. *Revista Brasileira de Entomologia*, 39, 501–516.

Brown, V.B. (2013) Automating the “Material Examined” section of taxonomy papers to speed up species descriptions. *Zootaxa*, 3683 (3), 297–299. http://dx.doi.org/10.11646/zootaxa.3683.3.8

Dallwitz, M.L., Paine, T.A. & Zucher, E.J. (1999) User’s guide to DELTA Editor. Available from: https://www.delta-intkey.com/ (accessed 20 November 2014)

Flint, O.S., Jr. (1978) Studies of Neotropical Caddisflies, XXII: Hydropsychidae of the Amazon Basin (Trichoptera). *Amazoniana*, 5 (3), 373–421.

Frost, S.W. (1957) The Pennsylvania insect light trap. *Journal of Economic Entomology*, 9, 52–172.

Gressit, J.L. & Gressit, M.K. (1962) An improved Malaise trap. *Pacifc Insects*, 4 (1), 87–90.

Harris, S.C., Flint, O.S. Jr. & Holzenthal, R.W. (2002a) Two new genera of Hydroptilidae from the Neotropics (Trichoptera: Hydroptilidae: Stactobiini). *Journal of the New York Entomological Society*, 110, 49–64. http://dx.doi.org/10.1664/0028-7199(2002)110[0049:TNGOHF]2.0.CO;2

Harris, S.C., Flint, O.S. Jr. & Holzenthal, R.W. (2002b) Review of the Neotropical genus *Flintiella* (Trichoptera: Hydroptilidae: Stactobiini). *Journal of the New York Entomological Society*, 110, 65–90. http://dx.doi.org/10.1664/0028-7199(2002)110[0065:ROTNGF]2.0.CO;2

Henriques-Oliveira, A.L., Dumas, L.L. & Nessimian, J.L. (2014) Three new species and new distributional records of *Oecetis* McLachlan 1877 (Trichoptera: Leptoceridae: Leptocerinae) from Brazil. *Zootaxa*, 3753 (3), 273–282. http://dx.doi.org/10.11646/zootaxa.3753.3.6

Quintero, F.B., Costa, A.M. & Calor, A.R. (2014) Trichoptera do Semiárido I: Annulipalpia. *In*: Bravo, F. & Calor, A.R. (Eds.), *Artrópodes do Semiárido: biodiversidade e conservação*. Printmídia, Feira de Santana, pp. 229–244.