A new species of *Riethia* Kieffer, 1917 from Zurqui, Costa Rica (Chironomidae, Chironominae, Pseudochironomini)

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The male of *Riethia epleri* **sp. n.** is described and figured based on material from Zurqui in Costa Rica. The species is the first species of *Riethia* Kieffer, 1917 to be described from Central America and can be distinguished from all other Neotropical species of *Riethia* by having a superior volsella that is bent nearly 90° medially, apically straight, parallel-sided with bluntly rounded to triangular apex projecting mesad, basally with microtrichia, apically without microtrichia and with row of dorsal setae and two strong ventral setae; a bluntly subtriangular inferior volsella, with microtrichia, weak setae, and about 10 broad scales in double row along inner margin; and a median volsella consisting of two bluntly triangular tubercles, each with single seta.

Key words: Diptera, Chironomidae, Chironominae, Pseudochironomini, *Riethia epleri*, new species, Costa Rica, Neotropical region.

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Introduction

The tribe Pseudochironomini within the subfamily Chironominae was established by Sæther (1977: 154). The tribe is characterized by having a black comb on fore tibia, similar to the combs on mid- and hind tibiae, and in the male the median volsella is generally present. Originally the genera *Aedokritus* Roback, 1958, *Manoa* Fittkau, 1963, *Megacentron* Freeman, 1961, *Pseudochironomus* Malloch, 1915, *Psilochironomus* Sublette, 1966, and *Riethia* Kieffer, 1917 were included in the tribe (Sæther 1977). However, *Psilochironomus* is now considered to be a *nomen dubium* (Spies & Reiss 1996). Later, Andersen (2016) added the genus *Madachironomus* Andersen, 2016 based on two species from Madagascar to the tribe. However, according to Cranston (2003) the tribe Pseudochironomini might not be monophyletic.

The genus *Riethia* was erected by Kieffer (1917) based on the adults of two species from Australia; with *Riethia stictoptera* Kieffer, 1917 accepted as the type (Ashe 1983). The Austro-Pacific species was recently revised by Cranston (2019), recognizing 14 species. From South America Edwards (1931) described two species from Patagonia, *Pseudochironomus melanoides* Edwards, 1931 from Argentina and *P. truncatocaudatus* Edwards, 1931 from Chile, that are now placed in *Riethia.* Trivinho-Strixino *et al.* (2009) redescribed *R. truncatocaudatus* and placed *R. melanoides* as a junior synonym. Later, Neubern *et al.* (2011) described *Riethia manauara* Neubern, Trivhino-Strixino & Silva, 2011 from the Amazon in Brazil and Trivhino-Strixino & Shimabukuro (2018) recently described four more species from Brazil: *R. boraceia* Strixino & Shimabukuro, 2018, *R. cuame* Strixino & Shimabukuro, 2018, *R. fazzari* Strixino & Shimabukuro, 2018, and *R. galilei* Strixino &

Shimabukuro, 2018.

Based on morphological characters, adult males of *Manoa* and *Riethia* cannot be separated with certainty, only females and pupa may be separated at the generic level (Jacobsen & Perry 2002, Trivhino-Strixino *et al.* 2009). However, below we describe a new species as *Riethia epleri* sp. n. based on males only, as it closely resembles other Neotropical species of *Riethia* described from South America. The males were collected at a four-hectare site of mostly tropical cloud forest at Zurqui in Costa Rica (Epler 2017). The new species is the first *Riethia* species to be described from Central America and can be separated from other Neotropical *Riethia* species by having a superior volsella that is bent nearly 90° medially, apically straight, parallel-sided with bluntly rounded to triangular apex projecting mesad, basally with microtrichia, apically without microtrichia and with row of dorsal setae and two strong ventral setae; a bluntly subtriangular inferior volsella, with microtrichia, weak setae, and about 10 broad scales in double row along inner margin; and a median volsella consisting of two bluntly triangular tubercles, each with single seta.

Material and methods

Prior to examination the specimens were mounted in Euparal following the procedure outlined by Sæther (1969). Morphological terminology follows Sæther (1980). Measurements are given as ranges, followed by the mean. Coloration is based on slide mounted specimens.

The holotype is deposited in the collection at the Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica (INBIO), now housed at Departamento de Historia Natural, Museo Nacional de Costa Rica, San José. Most paratypes are deposited in the Natural History Museum of Los Angeles County, Los Angeles, USA (LACM); three paratypes are in the Department of Natural History, University Museum of Bergen, Norway (ZMBN).

***Riethia epleri* sp. n.** (Figures 1–6)

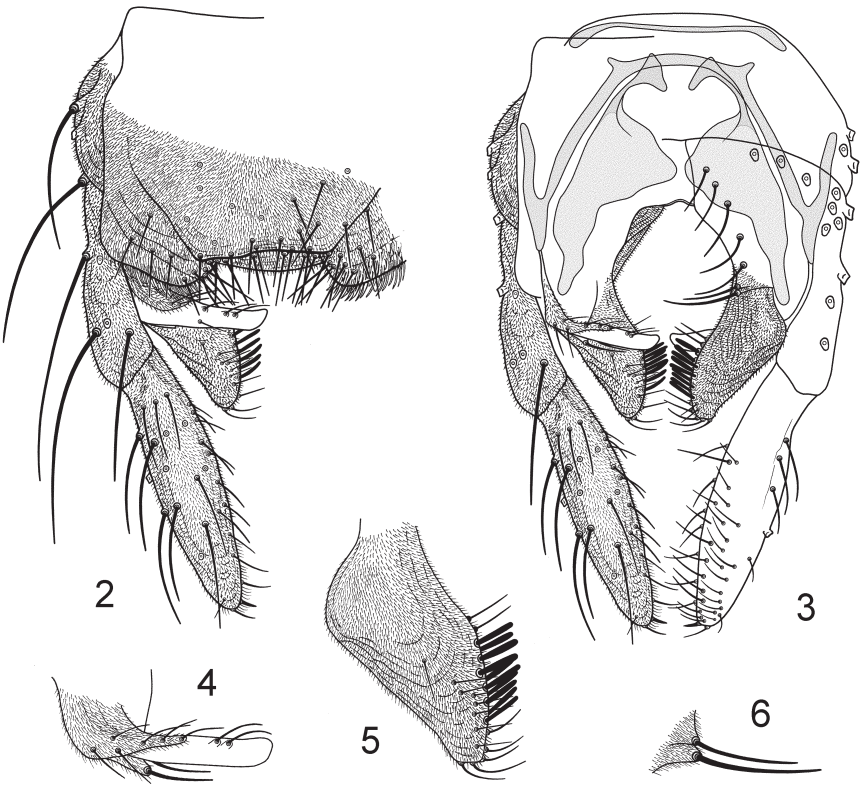
Type material. Holotype ♂ adult (slide mounted), COSTA RICA: San José Province, Moravia, Zurqui de Moravia, creek river, 1600 m asl., 24 September 2012, light trap, project ZADBI, (slide no: ZADBI-39, -84:00:57 10:02:58 #105053; INBIO). **Paratypes.** 4♂♂ as holotype (slides no: ZADBI-43, -84:00:57 10:02:58 #105056, 1♂ LACM; ZADBI-39, -84:00:57 10:02:58 #105053, 1♂ LACM, 2♂♂ ZMBN); 2♂♂ as holotype except 21 September 2012 (slides no: ZADBI-33, -84:00:57 10:02:58 #105048, LACM); 4♂♂ as holotype except 22 September 2012 (slides no: ZADBI-46, -84:00:57 10:02:58 #105059, 3♂♂ LACM; ZADBI-41, -84:00:57 10:02:58 #105054, 1♂ LACM); 1♂ as holotype except Aquatic emergence trap (slide no: ZADBI-58, -84:00:57 10:02:58 #105071, LACM); 2♂♂ as holotype except 24 September–2 October 2012, Aquatic emergence trap (slides no: ZADBI-68, -84:00:57 10:02:58 #105158, 1♂ LACM; ZADBI-99, -84:00:57 10:02:58 #105153, 1♂ LACM); 1♂ as holotype except 19–26 April 2013, Malaise trap (slides no: ZADBI-673, -84:00:57 10:02:58 #106619, ZMBN).

Diagnostic characters. The new species can be distinguished from other Neotropical *Riethia* species by having a superior volsella that is bent nearly 90° medially, apically straight, parallel-sided with bluntly rounded to triangular apex projecting mesad, basally with microtrichia, apically without microtrichia, with row of dorsal setae and 2 strong ventral setae; a bluntly subtriangular inferior volsella, with microtrichia, weak setae, and 9–11, 10 broad scales in double row along inner margin; and a median volsella consisting of two bluntly triangular tubercles, each with single seta.

Etymology. Named after John H. Epler, Florida, for his many contributions to chironomid taxonomy and for having sorted out the material of the new species.

Description. **Adult male** (n = 5–7). Total length 4.84–5.99, 4.95 mm. Wing length 2.20–2.25, 2.22 mm. Total length / wing length 2.18–2.29, 2.23. Wing length / length of profemur 2.38–2.68, 2.52.

FIGURE 1. *Riethia epleri* sp. n., male. Wing.



FIGURES 2–6. *Riethia epleri* sp. n., male. **2**. Hypopygium, dorsal view. **3**. Hypopygium with tergite IX removed, dorsal aspect to the left, ventral aspect to the right. **4**. Superior volsella. **5**. Inferior volsella. **6**. Median volsella.

Coloration. Head and legs light brown, thorax brown with posterior part of scutum and postnotum dark brown, abdomen brown. Wing hyaline.

Antenna. Antennal Ratio (AR) = 1.02–1.21, 1.11. Terminal flagellomere 498–556, 519 µm long.

Head. Temporal setae 19–25, 22, bi- to triserial. Clypeus with 11–16, 14 setae. Tentorium 178–191, 185 µm long, 41–43, 42 µm wide. Stipes 158–189, 173 µm long, 8–14, 11 µm wide. Palpomere lengths (in µm): 51–57, 54; 70–78, 75; 170–178, 174; 133–164, 148; 219–262, 248. Third palpomere with 3–5 sensilla clavata subapically, longest about 20 µm long.

Thorax. Antepronotum with 2–4, 3 ventrolateral setae. Acrostichals 18–21, 19 in double row; dorsocentrals 8–11, 10 in single row; prealars 3–4, 4. Scutellum with 16–19, 18 setae in two rows.

Wing (Figure 1). Wing Ratio (VR) 1.11–1.15, 1.13. Brachiolum with 1–2, 2 setae; R with 15–17, 16; R_{2+3} with 12–16, 13; R_{4+5} with 5–13, 9 setae; other veins and membrane bare. Squama with 9–14, 11 setae.

Legs. Spur of fore tibia 55–66, 59 µm long; spurs of mid tibia 76–83, 79 µm and 80–94, 84 µm long; spurs of hind tibia 90–95, 92 µm and 97–102, 99 µm long. Width at apex of fore tibia 54–62, 59 µm; of mid tibia 62–69, 66 µm; of hind tibia 66–73, 69 µm. Lengths and proportions of legs as in Table 1.

Hypopygium (Figures 2–6). Tergite IX medially with straight to weakly concave posterior margin, with posteriolateral, rounded lobes fringed with long microtrichia; with 41–45, 43 setae. Laterosternite IX with 5–7, 6 setae. Phallapodeme 154–170, 162 µm long; including 35–47, 41 µm long, narrow, curved oral projection. Transverse sternapodeme arched, 80–96, 90 µm long. Gonocoxite 170–185, 176 µm long. Superior volsella bent nearly 90° medially, basal part with microtrichia; apical part 72–80, 77 µm long, 11–14, 13 µm wide, straight, parallel-sided with bluntly rounded to triangular apex projecting mesad, apically without microtrichia and with row of dorsal setae and with 2 strong ventral setae. Inferior volsella bluntly subtriangular, 79–90, 86 µm long, 52–63, 58 µm wide medially, with microtrichia, weak setae, and 9–11, 10 broad scales in double row along inner margin. Median volsella consisting of two bluntly triangular tubercles, each with single seta, longest setae 43–49, 46 µm long. Gonostylus 144–154, 149 µm long. Hypopygium Ratio (HR) 1.13–1.23, 1.18. Hypopygium Value (HV) 3.34–3.52, 3.41.

Immatures and female. Larva, pupa, and female are unknown.

Distribution. The species is known only from a tropical cloud forest at Zurqui in Costa

TABLE 1. Lengths (in µm) and proportions of legs of *Riethia epleri* sp. n., male (n = 4–6). Abbreviations: LR = Legg Ratio, BV = "Bein-Verhältnisse", SV = "Schenkel-Schiene-Verhältnisse", BR = Bristle Ratio.

	P_1	P_2	P_3
Fe	833–891, 858	980–1103, 1034	964–1046, 1007
Ti	948–1046, 989	923–997, 959	1046–1160, 1113
ta_1	1038–1095, 1062	637–662, 647	792–833, 807
ta_2	539–588, 556	335–368, 350	466–490, 479
ta_3	425–466, 445	261–278, 273	351–376, 363
ta_4	368–384, 374	172–188, 178	221–229, 224
ta_5	163–188, 174	82–98, 90	98–114, 106
LR	1.047–1.112, 1.075	0.645–0.693, 0.675	0.698–0.773, 0.726
BV	1.846–1.904, 1.877	2.898–3.093, 2.971	2.362–2.514, 2.458
SV	1.690–1.769, 1.733	2.962–3.282, 3.081	2.525–2.722, 2.626
BR	2.64–2.73, 2.69	3.13–3.63, 3.39	3.70–4.63, 4.18

Rica, where it was collected at a creek at 1600 m altitude.

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