



Towards the systematics and diversity of Neotropical *Tanytarsus* van der Wulp (Diptera: Chironomidae): news from Colombia

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Abstract

Our study pertains to the systematics and diversity of non-biting midges of the genus *Tanytarsus* van der Wulp, 1874 from the Neotropical region and in particular, Colombia, a country scarcely studied for these dipterans to date. Adult male specimens collected from the Colombian Llanos and Andes biomes belong to five species described as new in the present paper: *Tanytarsus colombiensis* **sp. nov.** (placed in the *caipira* species group, here defined), *T. germani* **sp. nov.** and *T. gnomon* **sp. nov.** (both placed in the *curvicristatus* group, here defined), *T. lulu* **sp. nov.** (in the *ligulatus* group, here defined) and *T. meta* **sp. nov.** (the *riopreto* group). Also an illustrated brief redescription of the adult male of *T. hastatus* Sublette *et Sasa*, 1994 is provided. After reclassification of *Caladomyia* Sæwedal, 1981, the name accepted as a junior synonym of *Tanytarsus*, several species names became homonyms, thus they are here proposed to be replaced with substitute names, as follows: *Tanytarsus reiffi* **nom. nov. pro Tanytarsus reissi** (Reiff, 2000); *Tanytarsus sanseverinoi* **nom. nov. pro Tanytarsus angelae** Trivinho-Strixino *et Shimabukuro*, 2017; *Tanytarsus trivinhostrixinoi* **nom. nov. pro Tanytarsus fittkawi** Sanseverino *et Trivinho-Strixino*, 2010. *Rheotanytarsus breda* (Roback, 1960) **comb. nov.** is excluded from *Tanytarsus*. An annotated checklist of Neotropical *Tanytarsus*, with 89 species, is also presented.

Key words: Andes, Llanos, aquatic insects, non-biting midges, *Tanytarsus*, new species, new names, checklist, Neotropics

Introduction

The Colombian fauna is considered megadiverse, with one of the largest number of species per unit area and endemic species in the world (Arbelaez-Cortes 2013). The family Chironomidae (non-biting midges), one of the most abundant and diverse family of Diptera, has only 33 species in 18 genera and three chironomid subfamilies recorded thus far from Colombia (Contreras-Lichtenberg 1988, Mendes & Pinho 2014; Ospina-Torres *et al.* 2018; Dantas *et al.* 2019). However, Colombia, with its great environmental heterogeneity, probably is home to a rich and diverse fauna of non-biting midges, most of which remain unknown.

Tanytarsus van der Wulp, 1874 is currently the second most diverse genus of Chironomidae, comprising nearly 400 species distributed worldwide (Lin *et al.* 2018, Roskov *et al.* 2019, present authors' inventory). It is well represented in the Neotropical region with over 80 species described and named prior to the present paper (see Table 6 and references therein). Despite the great diversity of the genus, only *Tanytarsus curvicristatus* has been recorded for Colombia so far (Contreras-Lichtenberg 1988, Mendes & Pinho 2014).

The immature stages of *Tanytarsus* develop in almost all aquatic environments, and many species are strongly associated with certain habitat types. Representatives of this diverse genus are thus excellent indicators in the biomonitoring of freshwater ecosystems, and the high diversity of such habitats allows expectation of significant species richness.

During our studies on Chironomidae diversity in South America, specimens of five unknown species of *Tanytarsus* were collected in the ecologically diverse Llanos and Andes biomes in Colombia. They are here described and illustrated based on adult males sampled from just a couple of sites. Two of them are placed in the *curvicristatus* species group, and further two species—in the *caipira* and *ligulatus* groups—all groups here proposed as new and defined; the fifth new species is a member of the *riopreto* group. We also provide a set of diagnostic characters of adult male of *T. hastatus* Sublette *et* Sasa, 1994, the species recorded for the first time in Colombia. As a summary, we have compiled data on all species of the genus *Tanytarsus* recorded from the Neotropical region, presented as an annotated tabulation below.

Material and methods

The specimens were sampled at several sites in the Llanos (Fig. 1) and Andes biomes, using a Malaise trap or at light. The material was preserved in 80% ethanol. Microscope slides were prepared using Euparal® as the mounting medium according to the procedure outlined by Sæther (1969). Measurements were made using the Cell D program and a digital camera attached to an optic microscope Olympus BX 51; the photographs were adjusted using the Helicon Focus® 6 image stacking software; some of them were made before mounting the specimens on permanent slides. The morphological terminology follows Sæther (1980). The 89 Neotropical *Tanytarsus* species, with data on their known stage/sex, geographical distribution and most important references to each species are presented in Table 6 (see also for their authorship, which is not included at first mention in the text). The type specimens are deposited in the Colección Entomológica del Tecnológico de Antioquia (CETdeA), Medellín, Colombia.

Results

Systematics

Family: Chironomidae Newman, 1834

Subfamily: Chironominae Newman, 1834

Tribe: Tanytarsini Zavřel, 1917

Subtribe: Tanytarsina Zavřel, 1917

Genus: Tanytarsus van der Wulp, 1874

***Tanytarsus caipira* species group**

Members: *Tanytarsus caipira* Trivinho-Strixino *et* Strixino, 2007, *Tanytarsus colombiensis* **sp. nov.**

Diagnosis. Hypopygial anal point deeply forked, with bifurcation beginning near its base. Superior volsella bare (without field of microtrichia on its dorsal surface) pyriform, with apex hook-like and anteromedially directed. Digitus short, not extending beyond median margin of superior volsella, apically rounded. Stem of median volsella as short as digitus.



FIGURE 1. Sites of sampling the material in Colombia (Meta Department, Puerto Lopez).

***Tanytarsus colombiensis* sp. nov.**

LSID: urn:lsid:zoobank.org:act:160B07E4-B418-4690-8F64-A21DC8D90AD7

(Fig. 2A–G)

Type material. Holotype, adult male: COLOMBIA, Meta Department, Puerto Lopez, 04°08'11"N 72°52'53"W, 206 m a.s.l., 01–03 January 2021, Malaise trap, G.P.S. Dantas, S.M.R. Hernández (CETdeA).

Derivatio nominis. In reference to the country—*terra typica* of the species.

Diagnosis. Frontal tubercles small. Anal tergite bands T-shaped. Anal point deeply forked and strongly curved downwards, apex of each branch notched and slightly curved outwards. Median volsella with setiform and branched lamellae.

Description. Adult male (n = 1).

Body size and proportions. Total length 2.08 mm. Wing length 1.15 mm. Total length/wing length ratio 1.81. Wing length/length of profemur ratio 1.97.

Colouration. Eyes black. Antenna brown, head capsule and palp light brown. Scutal vittae and postnotum light brown. Ground colour of thorax, scutellum, and haltere yellowish. Foreleg: all segments light brown. Mid and hind legs: femora yellowish, tibiae and tarsomeres light brown. Wing membrane with pale brownish undertone. Abdomen light yellowish, hypopygium slightly darker.

Head. Eyes bare, with well-developed dorsomedian extensions. Antenna with 13 flagellomeres; ultimate flagellomere 331 µm long; AR 0.85. Frontal tubercles small, 8 µm long. Tentorium 110 µm long. Temporal setae 7 on each side. Clypeus with 10 setae. Lengths of palpomeres 1–5 (in µm): 28, 32, 80, 90, 175; sensilla clavata not observed on third palpomere.

Thorax. Ac 16, restricted to anterior region of scutum; Dc 7 on each side, uniserial; Pa 1 on each side; Sets 4. Scutum projected and rounded anteriorly, overreaching antepronotum.

Wing. Typical of the genus. Almost all veins (except subcosta) and entire membrane posterior to radial veins area (except base of m cell) covered with macrotrichia. Brachiolum with 1 seta. VRCu 1.26. WW 0.27.

Legs. Foreleg tibia with straight lanceolate spur 13 µm long. Tibial combs of mid and hind legs separated; spurs of mid leg unequal: one bent, 15 µm long, second straight and shorter, 11 µm long; spurs of hind leg unequal: one bent 24 µm long, second straight and shorter, 18 µm long. Basitarsus of mid leg with 4 sensilla chaetica. Lengths and proportions of legs as in Table 1.

TABLE 1. Lengths (in µm) and proportions of legs of *Tanytarsus colombiensis* sp. nov., male (n = 1).

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV
p ₁	585	260	854	378	322	252	110	3.28	1.60	0.99
p ₂	518	448	269	120	78	40	36	0.60	4.52	3.59
p ₃	564	562	395	238	212	126	63	0.70	2.38	2.85

Hypopygium. Tergite IX covered with dense short microtrichia, except for small median field free of microtrichia at base, dorsal/median setae absent, 4 long setae on each side of anal point; lateral teeth not observed; anal tergite bands T-shaped, ending well anterior to anal point base (Fig. 2A, C). Anal point 70 µm long, deeply forked and strongly curved downwards, apex of each branch notched and slightly curved outwards (Fig. 2A–E). Superior volsella 32 µm long, with posteromedian corner pointed; 4 setae on dorsal surface and 2 ventral setae placed close to median margin; digitus 15 µm long, finger-like, with basal part slightly extending beyond posterior margin of superior volsella but with apex not reaching its median margin (Fig. 2A–C). Stem of median volsella 14 µm long, medially directed, with setiform and branched lamellae, as shown in Fig. 2F, G. Inferior volsella ~65 µm long, covered with microtrichia, evenly curved, posteriorly directed. Phallapodeme slightly sinuous, ~95 µm long; transverse sternapodeme ~40 µm long; oral projections slight. Gonocoxite 100 µm long. Gonostylus 75 µm long, straight, parallel-sided, with apex round. HR 1.33. HV 2.77.

Distribution and ecological notes. The species is known only from the type locality in central Colombia, where the vegetation corresponds to mosaics of savannas, mainland forests and flooded forests (Fig. 1A–C). The holotype specimen was collected over a small stream about 1 meter wide and with negligible current, which is bordered by a relatively well-preserved gallery forest (Fig. 1B). It is worth noting that the point where the trap was placed, was located about 10 meters upstream of a dammed area, which formed a small pond (Fig. 1C).

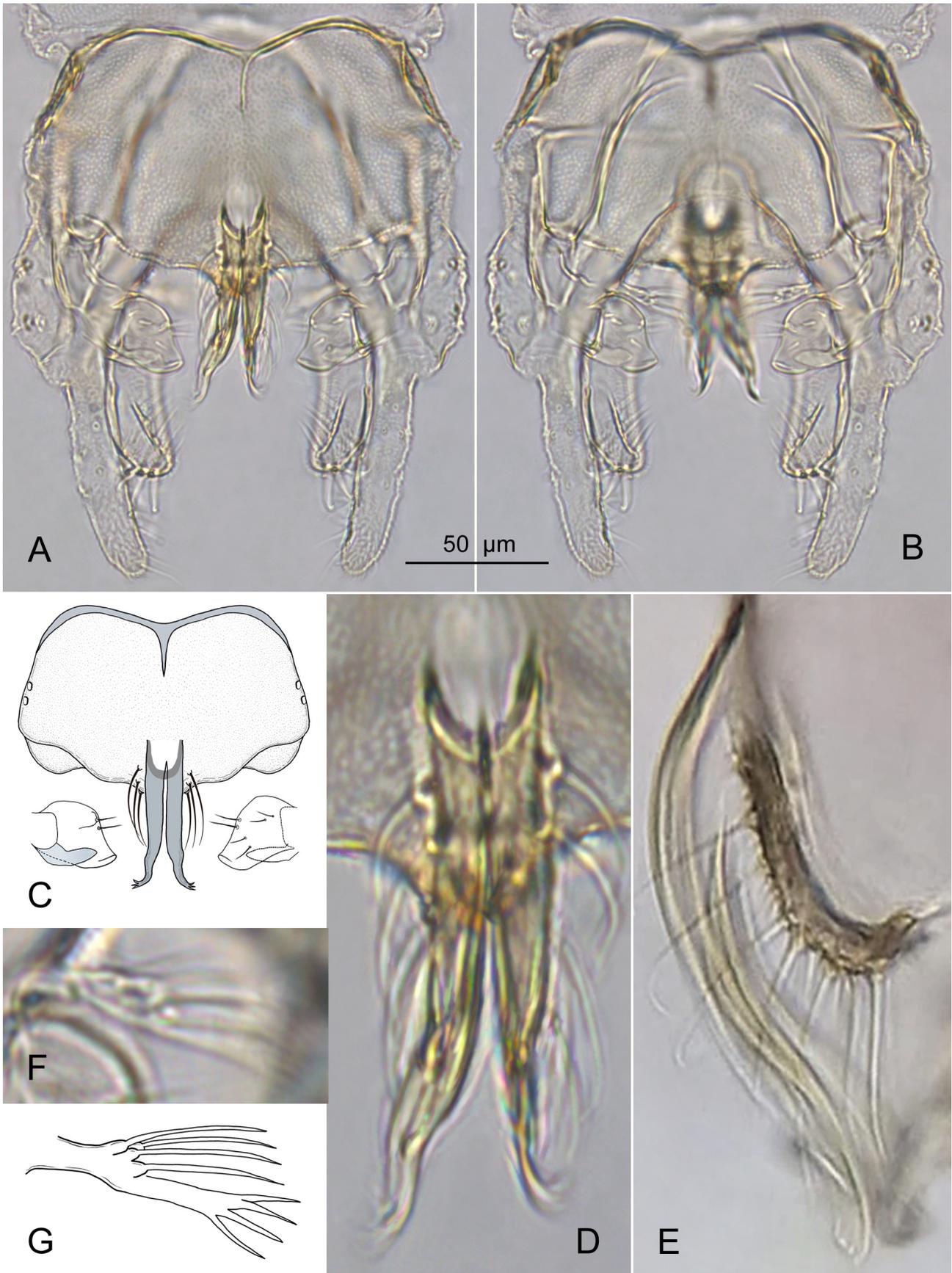


FIGURE 2. *Tanytarsus colombiensis* sp. nov., male. **A, B:** hypopygium in dorsal (**A**) and ventral aspect (**B**); **C:** arrangement of anal tergite, anal point, superior volsella and digitus; **D, E:** anal point in dorsal (**D**) and lateral view (**E**); **F, G:** median volsella photographed (**F**) and drawn (**G**); (**D–G** magnified *ca.* 3 times relative to **A** and **B**).

Discussion. A tendency to split, *i.e.* forming a bi- or trifid hypopygial anal point is a rare character within *Tanytarsus*. In some species the anal point is divided into lobes, with the split restricted to apical part, usually with median protrusion or extension between. The anal point can be also deeply forked, with a distinct bifurcation beginning near its base. We treat these two character states or structure types as clearly different. The first one is typical mainly of species originally included in *Caladomyia* [= *Tanytarsus ortonii* species group in the current definition (Lin *et al.* 2018)], while the second is known from males of only one species—*Tanytarsus caipira* described from Brazil (Trivinho-Strixino & Strixino 2007). Yet another shape of a split anal point is shown in *Tanytarsus richardsi* Glover, 1973 from Australia, in which the bifurcation is restricted to distal portion, and the anal point is Y-shaped or slingshot-shaped (Glover 1973). We define this structure as unique, and presume a need of inclusion of *T. richardsi* in a separate species group that is not, however, an aim of this study.

To a group of species displaying the first aforementioned structure type, apart from the species known as members of the *ortonii* group, we preliminarily include also *Tanytarsus bifurcus* Freeman, 1958 described from West Africa (Burkina Faso) and *Tanytarsus biwatrifurcus* Sasa *et* Kawai, 1987 from Japan (Freeman 1958, Sasa & Kawai 1987). The two species were placed in *Tanytarsus*, and have not been previously considered the members of *Caladomyia* or the *ortonii* group, probably due to their great distance from region of the highest diversity (Neotropics). In fact, a set of hypopygium structures, including the anal point in the two species, fits the concept of the *ortonii* group. If so, the group has a much wider range than that known to date, covering the South and Central America, the tropical/subtropical ecozone of North America, Africa and East Asia. Such the distribution pattern, including the Palearctic region, support a concept by Zakrzewska and Giłka (2013) based on the fossil record and indicating a broad distribution of the *ortonii* group in the past (Eocene Baltic amber, ~40 Mya).

Tanytarsus colombiensis is here defined as a closest known relative of *T. caipira*. In males of the two species the anal point is deeply forked, the superior volsella is bare, without a field of microtrichia on its dorsal surface, pyriform, with a hook-like apex directed anteromedially, the digitus is short, with apex round, hidden under the superior volsella, and the stem of the median volsella is more or less as short as the digitus. Consequently, we here propose the *caipira* group for the two species. The character set best delimiting the males of both species includes the anal point branches notched apically and the T-shaped anal tergite bands in *T. colombiensis* (Fig. 2) vs. the branches pointed and the anal tergite bands of V-type broadly separated in *T. caipira* (Trivinho-Strixino & Strixino 2007; figs 1, 2).

***Tanytarsus curvicristatus* species group**

Members: *Tanytarsus curvicristatus* Contreras-Lichtenberg, 1988, *Tanytarsus pseudocurvicristatus* Trivinho-Strixino, Wiedenbrug *et* da Silva, 2015, *Tanytarsus germani* **sp. nov.**, *Tanytarsus gnomon* **sp. nov.**

Diagnosis. Hypopygial anal point with crests short but broad, rounded, crescent (curved) or flake-shaped. Two bars present on anal point: anterior bar smaller, posteriorly directed, simple, cone-shaped or in a form of bunch of spines; posterior bar larger, anteriorly directed, apically enlarged and/or split into projections turned up dorsally or dorsolaterally; spinulae absent. Superior volsella extensive at base, with distinctly narrower posteromedian corner resulting in concave median margin. Digitus short, not extending beyond median margin of superior volsella, or vestigial.

***Tanytarsus germani* sp. nov.**

LSID: urn:lsid:zoobank.org:act:EA7DEF24-FFB4-44E8-9A46-B11916895012

(Fig. 3A–F)

Type material. Holotype, adult male: COLOMBIA, Meta Department, Puerto Lopez, 04°08'11"N 72°52'53"W, 206 m a.s.l., 01–03 January 2021, Malaise trap, G.P.S. Dantas, S.M.R. Hernández (CETdeA). Paratypes: 2 males, same data as for holotype.

Derivatio nominis. The specific name is a patronym commemorating the eminent Colombian entomologist, German Amat (1960–2021).

Diagnosis. Frontal tubercles absent. Tergite IX with 3–4 strong median setae and extensive microtrichia-free

area near base of anal point. Anal tergite bands V-shaped, broadly separated. Anal point with a round pit—anteriorly enclosed with darkly pigmented horseshoe-like margin overlapping the crests; anterior bar cone-shaped, covered with scale-like thorny structures, darkly pigmented; posterior bar split into two flake-shaped projections turned up dorsolaterally. Superior volsella extensive, anterior margin straight, median margin strongly concave, posteromedian corner distinctly narrower but relatively strong. Digitus straight, pointed. Median volsella with single foliate and several setiform lamellae.

Description. Adult male (n = 3).

Body size and proportions. Total length 1.96–2.08 mm. Wing length 1.05–1.06 mm. Total length/wing length ratio 1.87–1.96. Wing length/length of profemur ratio 1.59–1.62.

Colouration. Eyes black. Antenna brown. Scutal vittae and postnotum light brown. Head capsule, ground colour of thorax, scutellum, sternum, and haltere yellow to light brown. Legs yellowish to light brown. Wing veins yellow, membrane pale. Abdomen yellow.

Head. Eyes bare, with well-developed dorsomedian extensions. Antenna with 13 flagellomeres; ultimate flagellomere 350–357 μm long; AR 0.83. Frontal tubercles absent. Tentorium 90–100 μm long. Temporal setae 6–7 on each side. Clypeus with 10–13 setae. Lengths of palpomeres 1–5 (in μm): 25–26, 25–28, 67–72, 80–90, 122–132; third palpomere with 5 sensilla clavata subapically, 10–12 μm long.

Thorax. Ac 14–16, restricted to anterior region of scutum; Dc 5–7 on each side, uniserial; Pa 1 on each side; Scts 5. Scutum projected and rounded anteriorly, overreaching antepnotum.

Wing. Obovate, with anal lobe strongly reduced. Almost all veins and entire membrane below radial veins covered with macrotrichia. Brachiolum with 1 seta. VRCu 1.25–1.33.

Legs. Foreleg tibia with short lanceolate spur 13–14 μm long. Tibial combs of mid and hind legs separated; spurs of mid leg unequal: one apically curved, 28–30 μm long, second straight, 12–15 μm long; spurs of hind leg unequal: one apically curved, 33–35 μm long, second straight, 30–33 μm long. Basitarsus of mid leg without sensilla chaetica. Lengths and proportions of legs as in Table 2.

TABLE 2. Lengths (in μm) and proportions of legs of *Tanytarsus germani* sp. nov., male (n = 3).

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV
p ₁	652–660	295–298	795–806	375–397	306–317	218–224	108–115	2.69–2.70	1.65–1.75	1.19–1.20
p ₂	597–612	449–452	255–275	120–122	80–82	53–55	45–48	0.57–0.61	4.29–4.40	3.81–4.16
p ₃	596–602	520–526	374–395	212–217	170–180	97–110	67–70	0.72–0.75	2.59–2.78	2.84–3.00

Hypopygium. Tergite IX covered with dense short microtrichia except for extensive bare fields near base of anal point, with 3–4 median setae between anal tergite bands; lateral teeth minute; anal tergite bands V-shaped, medially separated, almost reaching the base of anal point (Fig. 3A, C). Anal point 40–45 μm long, lanceolate, apically rounded, bearing a round pit—anteriorly enclosed with dark pigmented, horseshoe-like margin overlapping the crests; anterior bar in shape of spruce cone, covered with scale-like thorny structures, darkly pigmented, posterior bar placed subapically on anal point, split into two flake-shaped projections turned up dorsolaterally (Fig. 3A, C, D). Superior volsella with anterior margin straight and median margin strongly concave, posteromedian corner or distal half distinctly narrower but relatively strong; 6 setae on dorsal surface, 2 setae on median margin (1 close to anterior margin) and 1 seta on ventral tubercle close to anterior margin, field of microtrichia on dorsal surface absent; digitus 10–12 μm long, straight, pointed, reaching but not extending beyond median margin of superior volsella (Fig. 3A, B, E). Stem of median volsella 17–20 μm long, slightly swollen distally, with several setiform lamellae placed subapically and single foliate lamella on apex (Fig. 3B, F). Inferior volsella 55–60 μm long, nearly straight, posteriorly directed, with distal half slightly swollen, apex round. Phallapodeme ~70–80 μm long; transverse sternapodeme ~40 μm long, with small oral projections. Gonocoxite 90–95 μm long. Gonostylus 80–85 μm long, straight, tapering towards blunt apex. HR 1.10–1.12, HV 2.42–2.45.

Distribution and ecological notes. The adult male specimens examined were collected together with those of three other species described in the present paper. For details on ecology and bionomics see notes under *Tanytarsus colombiensis*.

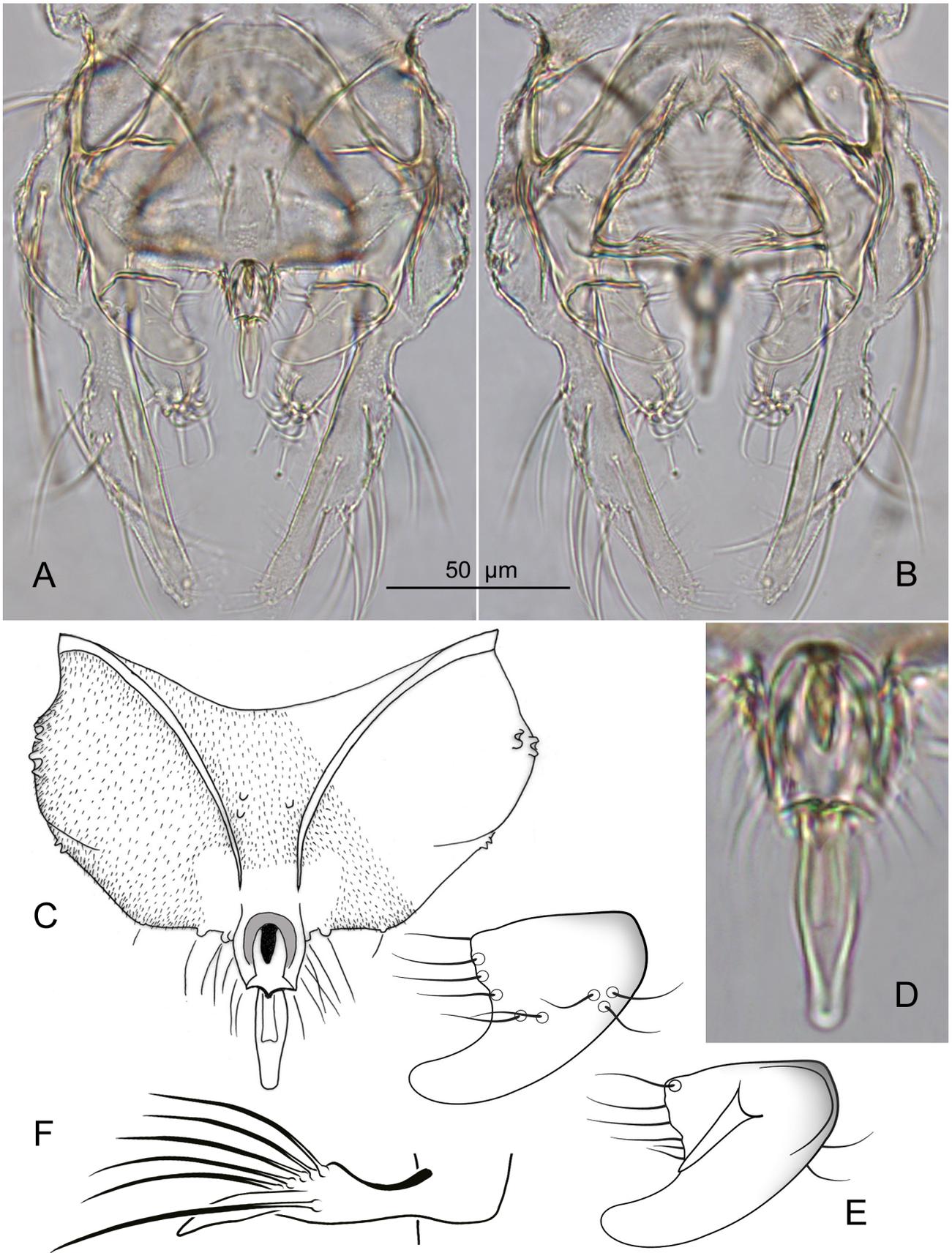


FIGURE 3. *Tanytarsus germani* sp. nov., male. **A, B:** hypopygium in dorsal (**A**) and ventral aspect (**B**); **C:** anal tergite and anal point; **D:** anal point in dorsal view; **E:** superior volsella and digitus; **F:** median volsella; (**D–F** magnified *ca.* 2–3 times relative to **A** and **B**).

***Tanytarsus gnomon* sp. nov.**

LSID: urn:lsid:zoobank.org:act:8FF8DF78-6BA1-4661-B38C-560195B62C38

(Fig. 4A–F)

Type material. Holotype: male, COLOMBIA, Huila Departament, Yaguará, Condominio Santa Helena, 2°39'40.86"N 75°31'0.03"W, 570 m a.s.l., 06 March 2018, sweep net, G.P.S. Dantas, S.M.R. Hernández, E.C.G. Amat (CETdeA).

Derivatio nominis. In reference to the shape of the anal point with its posterior bar, resembling a sundial clock hand (Lat. *gnomon*). Noun in apposition.

Diagnosis. Frontal tubercles small. Tergite IX covered with dense short microtrichia except for two bare fields lateral to anal point base. Anal point with well-developed anal crests extending towards tergite IX and flanking a small cone-shaped anterior bar, posterior bar slender, evenly curved upwards, with apex slightly enlarged and split. Superior volsella with posteromedian corner strongly narrowed, in shape of finger-like projection, with apex swollen and medially directed. Digitus subtriangular, pointed, reaching half length of superior volsella. Median volsella with 1 foliate and 3 setiform lamellae.

Description. Adult male (n = 1).

Body size and proportions. Total length 2.39 mm. Wing length 1.25 mm. Total length/wing length ratio 1.90. Wing length/length of profemur ratio 1.71.

Coloration. Eyes black. Antenna light brown. Head capsule and thorax yellow to light brown. Legs yellowish to light brown. Wing veins yellow, membrane pale. Abdomen yellow.

Head. Eyes bare, with well-developed dorsomedian extensions. Antenna with 13 flagellomeres; ultimate flagellomere 446 µm long; AR 1.01. Frontal tubercles small, 4 µm long. Tentorium 105 µm long. Temporal setae 9 on each side. Clypeus with 11 setae. Lengths of palpomeres 1–5 (in µm): 24, 28, 78, 90, 160; third palpomere with 2 sensilla clavata subapically, 12 µm long.

Thorax. Ac 16, restricted to anterior region of scutum; Dc 5 on each side, uniserial; Pa 1 on each side; Scts 4. Scutum projected and rounded anteriorly, overreaching antepronotum.

Wing. Typical of the genus. Almost all veins (except subcosta) and entire membrane posterior to radial veins area (except base of m and an cells) covered with macrotrichia. Brachiolum with 1 seta. VRCu 1.15. WW 0.28.

Legs. Foreleg tibia with straight lanceolate spur 15 µm long. Tibial combs of mid and hind legs separated; spurs of mid leg unequal: one bent, 24 µm long, second straight, 12 µm long; spurs of hind leg unequal: one bent 28 µm long, second straight 27 µm long. Basitarsus of mid leg without sensilla chaetica. Lengths and proportions of legs as in Table 3.

TABLE 3. Lengths (in µm) and proportions of legs of *Tanytarsus gnomon* sp. nov., male (n = 1).

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV
p ₁	734	299	–	–	–	–	–	–	–	–
p ₂	668	525	308	136	100	63	55	0.59	4.24	3.86
p ₃	727	610	449	242	215	125	86	0.74	2.67	2.98

Hypopygium. Tergite IX covered with dense short microtrichia except for two bare fields lateral to anal point base, with 5 median setae placed between anal tergite bands and 4 setae on each side of anal point; lateral teeth present, minute; anal tergite bands V-shaped, widely separated, ending anterior to anal point base (Fig. 4A). Anal point 55 µm long, somewhat lanceolate, with elongated and rounded tip, bearing well-developed, 22 µm long anal crests extending towards tergite IX and flanking a small, 8 µm long, cone-shaped anterior bar, posterior bar slender, evenly curved upwards, with apex slightly enlarged and split (Fig. 4A, C). Superior volsella 44 µm long, with posteromedian corner strongly narrowed, in shape of finger-like projection swollen apically and directed medially; with 5 setae on dorsal surface and 3 ventral setae close to median margin (at least 2 setae placed on prominent tubercles), field of microtrichia on dorsal surface absent; digitus 11 µm long, subtriangular, pointed, reaching half length of superior volsella (Fig. 4A–D). Stem of median volsella 11 µm long, with 1 foliate and 3 setiform lamellae (Fig. 4B, E, F). Inferior volsella ~60 µm long, covered with microtrichia, with distal half slightly curved, swollen and posteromedially directed. Phallapodeme sinuous, ~65 µm long; transverse sternapodeme ~50 µm long, with strong oral projections. Gonocoxite 95 µm long. Gonostylus 85 µm long, almost straight, evenly tapering towards pointed apex. HR 1.14. HV 2.81.

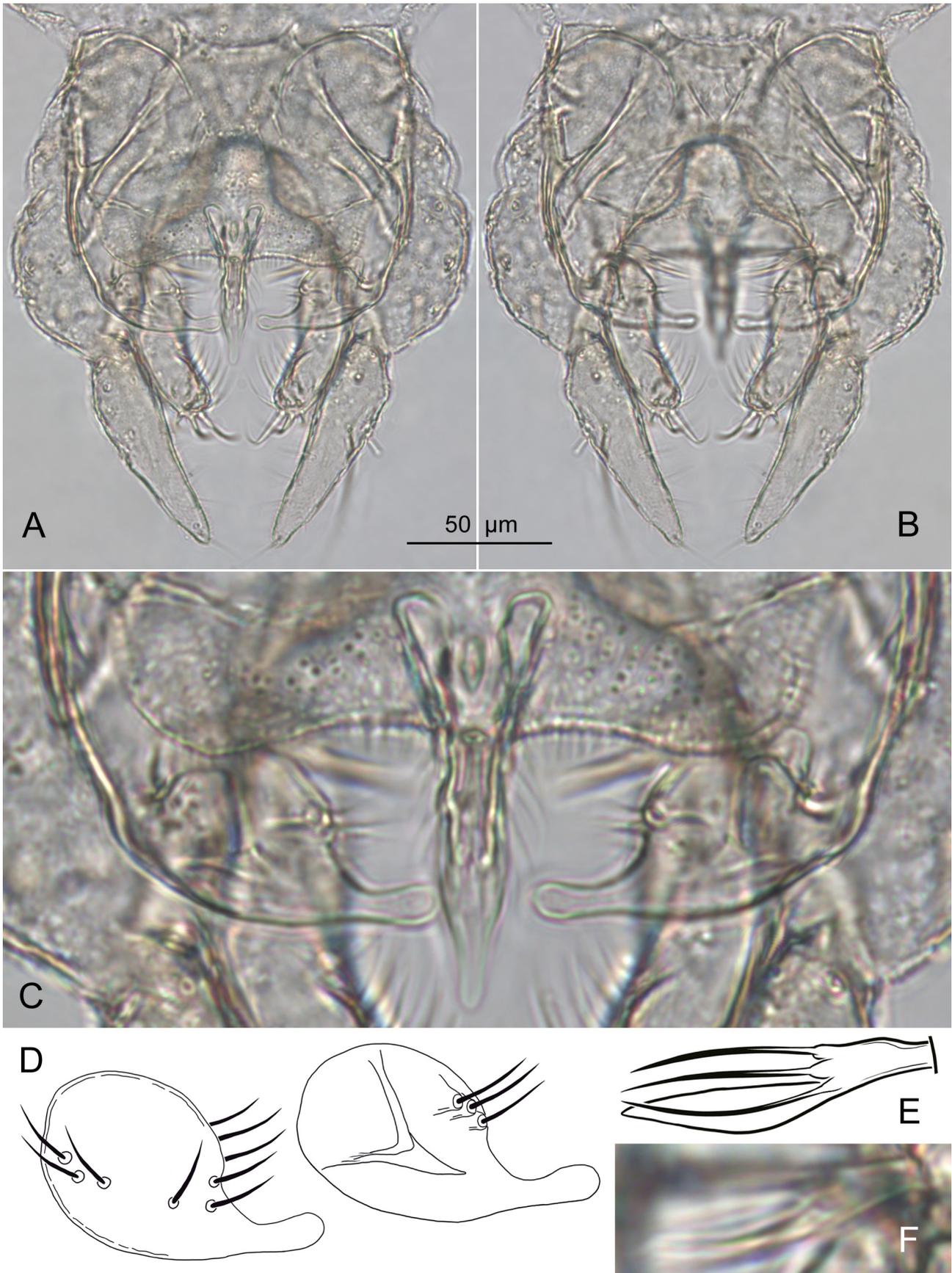


FIGURE 4. *Tanytarsus gnomon* sp. nov., male. **A, B:** hypopygium in dorsal (**A**) and ventral aspect (**B**); **C:** arrangement of anal point, superior volsella and digitus; **D:** superior volsella and digitus; **E, F:** median volsella drawn (**E**) and photographed (**F**); (C–F magnified ca. 2–3 times relative to A and B).

Distribution and ecological notes. This species is known only from the type locality in the Huila department, at the inter-Andean valley of Magdalena River basin, reaching the 570 m elevation. Next to the type locality are some small artificial lakes and a first-order stream. However, attempts to collect the immature stages of the new species in these environments were unsuccessful.

Discussion. Sanseverino (2006) discussed relationships between *Tanytarsus curvicristatus* and species of the *Tanytarsus signatus* group, as well as those of former *Caladomyia* and *Virgatanytarsus*—the names evidenced as synonyms of *Tanytarsus* (Lin *et al.* 2018), thus validating a previously postulated concept of Cranston (2000) for *Virgatanytarsus*. The Sanseverino's analysis was based on morphology of male hypopygium, mainly the anal point and its bars—the structures present in all the taxa analysed. In the dissertation, relations between *T. curvicristatus*, *T. signatus* (Holarctic) and *T. liepae* (Australia) were defined as close and possibly closer to each other than to species of the former *Caladomyia* and *Virgatanytarsus*. Due to a peculiar structure of the anal point in *T. curvicristatus*, a new species group for this species was also suggested. A close species described later, *T. pseudocurvicristatus*, supported this concept (Trivinho-Strixino *et al.* 2015). Further, molecular analyses indicated *T. signatus* as a lineage genetically divergent from that of *T. curvicristatus*, while the latter species and its morphologically close relatives, including *T. pseudocurvicristatus*, again were suggested to be placed in a separate species group (Lin *et al.* 2018). Another two species, presented here as new, made it possible to formulate a diagnosis based on characters found in all four species, and to establish the previously expected *Tanytarsus curvicristatus* species group. These characters are the shape and arrangement of the anal point crests, bars, the lack of the spinulae typical of most *Tanytarsus*, as well as the shape of the superior volsella and digitus (see the group diagnosis). The anal point bar(s) shape/arrangement seems to be crucial in phylogeny analyses based on morphology of *Tanytarsus*. These structures have recently been studied in both extant and fossil species (Trivinho-Strixino 2012, Zakrzewska & Gilka 2013, Dantas & Gilka 2017), although they are found in only a few species groups of the genus.

Tanytarsus ligulatus species group

Members: *Tanytarsus ligulatus* Reiss, 1972, *Tanytarsus paraligulatus* Reiss, 1972, *Tanytarsus lulu* sp. nov.

Diagnosis. Hypopygial anal point with spoon-shaped apex—round with margin smooth or flattened with margin toothed. Superior volsella more or less heart-shaped, with median margin concave slightly at least. Digitus well-developed, extending beyond median margin of superior volsella. Frontal tubercles long, length/width ratio ~2–4.

Tanytarsus lulu sp. nov.

LSID: urn:lsid:zoobank.org:act:0FFBC66B-AF75-4301-ACA1-96195E22440C

(Fig. 5A–E)

Type material. Holotype, adult male: COLOMBIA, Meta Department, Puerto Lopez, 04°08'11"N 72°52'53"W, 206 m a.s.l., 01–03 January 2021, Malaise trap, G.P.S. Dantas, S.M.R. Hernández (CETdeA). Paratypes: 1 male, same data as for holotype.

Derivatio nominis. The name is a tribute to the couple, Luz Helena Rangel and Luiz M. Hernández, for their invaluable help during fieldwork in Puerto Lopez, and especially for all the support and warm welcome given during the first author's stay in Colombia. The specific epithet is formed by the junction of the first syllable of Luz and Luiz (*lulu*) and should be considered a noun in apposition.

Diagnosis. AR > 1. Frontal tubercles well-developed, over two times as long as wide. Mid leg with apical row of 4–7 sensilla chaetica. Tergite IX with lateral teeth. Orolateral spines of laterosternite IX in shape of small processes. Anal point with apex spoon-shaped, smooth, lacking serrations. Superior volsella oval, with posteromedian corner slightly projecting rounded, median margin slightly concave. Digitus pointed, extending slightly beyond median margin of superior volsella. Median volsella with 2–3 setiform and 3 pectinate lamellae. Inferior volsella with angular dorsal protrusion.

Description. Adult male (n = 2).

Body size and proportions. Total length 2.34–2.86 mm. Wing length 1.22–1.46 mm. Total length/wing length ratio 1.92–1.96. Wing length/length of profemur ratio 2.14–2.26.

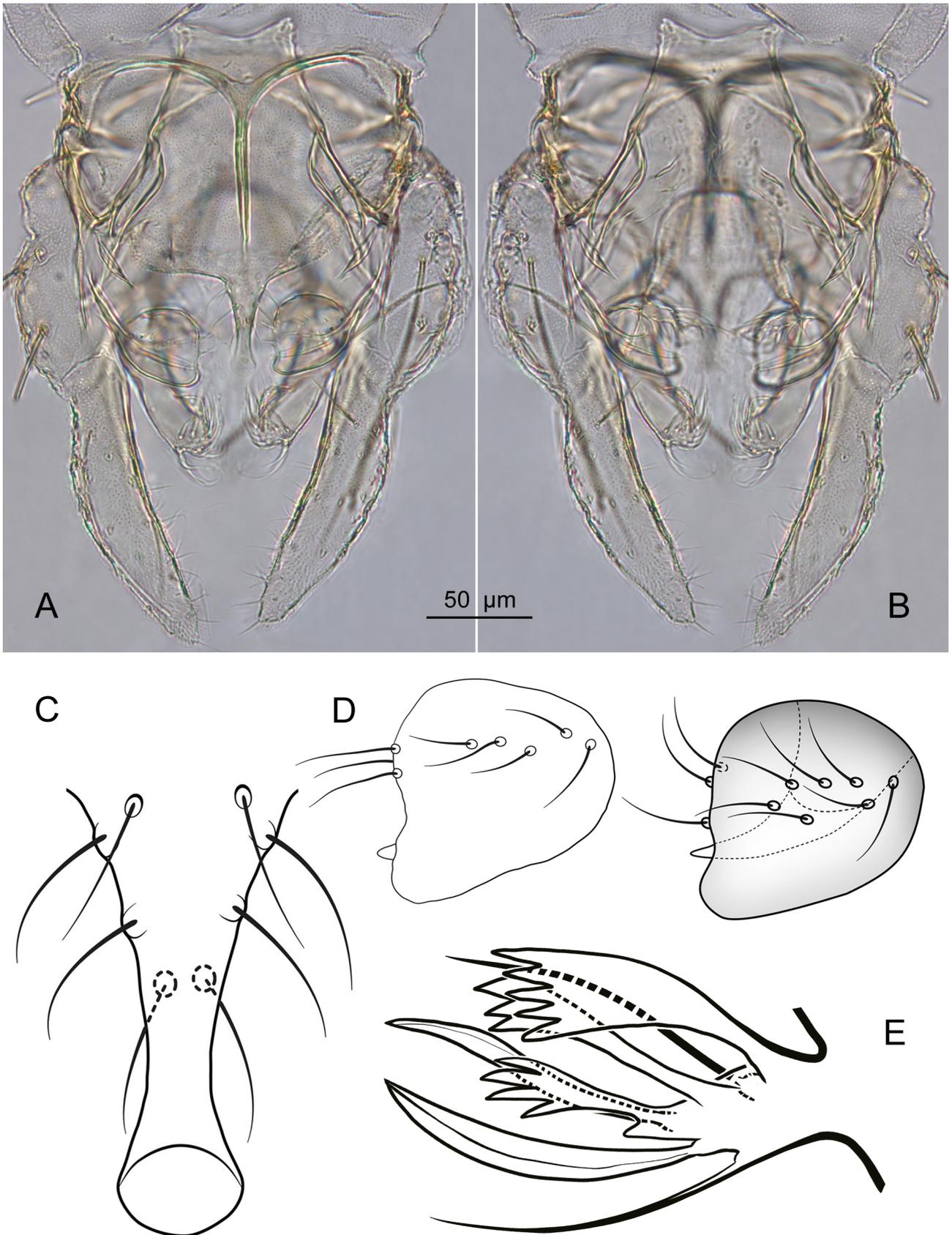


FIGURE 5. *Tanytarsus lulu* sp. nov., male. **A, B:** hypopygium in dorsal (**A**) and ventral aspect (**B**); **C:** anal point; **D:** superior volsella and digitus; **E:** median volsella; (C–E magnified *ca.* 3–4 times relative to A and B).

Colouration. Eyes black. Antenna brown. Head capsule and thorax yellow to light brown. Legs: proximal half of femora pale, distal half of femora plus tibiae and tarsi light brown. Wing veins yellowish brown, membrane pale. Abdomen yellowish.

Head. Eyes bare, with moderately developed dorsomedian extensions. Antenna with 13 flagellomeres; ultimate flagellomere 425 μm long; AR 1.04. Frontal tubercles well-developed, 27–29 μm long, 12–15 μm wide, ca. 2.2 times as long as wide. Tentorium 140 μm long. Temporal setae 8–9 on each side. Clypeus with 17–18 setae. Lengths of palpomeres 1–5 (in μm): 26–27, 26–27, 67–80, 84–106, 153–169; third palpomere with 1 subapical sensillum clavatum 14 μm long.

Thorax. Ac 12, restricted to anterior region of scutum; Dc 6–7 on each side, uniserial; Pa 1 on each side; Scts 4. Scutum projected and rounded anteriorly, overreaching anteprepronotum. Halteres with at least 4 setae.

Wing. Somewhat oblong, with anal lobe reduced. Brachiolum with 1 seta, Sc bare, R with 16–18 setae, R_1 with 13–20 setae, R_{4+5} with 11–18 setae, M bare, M_{1+2} with 35–40 setae, M_{3+4} with 30 setae, Cu with 4 setae, Cu_1 with 7–12 setae, postcubitus with 3–4 setae, An with 13–20 setae. Cell m bare (false vein bare), r_{4+5} with 75–80 setae, m_{1+2} with 70–80 setae (+48 setae on false vein), m_{3+4} with 20–28 setae, cu and an bare. VRCu 1.20–1.23.

Legs. Foreleg tibia with short lanceolate spur 15–20 μm long. Lengths of combs of mid tibia 8–9 μm (with 11–12 μm long spur) and 13–17 μm (with 15–21 μm long spur); lengths of combs of hind tibia 14–15 μm (with 17–18 μm spur) and 17–19 μm (with 22–25 μm long spur). Basitarsus of mid leg with apical row of 4–7 sensilla chaetica. Lengths and proportions of legs as in Table 4.

TABLE 4. Lengths (in μm) and proportions of legs of *Tanytarsus lulu* sp. nov., male (n = 2).

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV
p ₁	543–681	265–330	758	392	323	230	81	2.86	1.53	1.07
p ₂	580–721	446–558	287–347	135–166	100–121	70–77	51–57	0.62–0.64	3.69–3.86	3.57–3.69
p ₃	600–732	597–732	420–500	255–294	223–266	147–169	76–92	0.68–0.70	2.31–2.39	2.85–2.93

Hypopygium. Tergite IX covered with microtrichia except for small bare area at base of anal point; lateral teeth present; orolateral spines of laterosternite IX in shape of small processes; anal tergite bands T-type, fused on median part of tergite, ending close to anal point base (Fig. 5A, B). Anal point 35–40 μm long, elongate, with spoon-shaped apex with margin smooth (without serrations), pair of dorsal setae at base, two lateral setae on each side and pair of ventral setae subapically; microtrichia and spinulae absent (Fig. 5A, C). Superior volsella 32–35 μm long, oval, posteromedian corner slightly projecting and rounded, median margin slightly concave; 6–7 setae on dorsal surface, 2 setae on median margin, and 1 ventral seta; field of microtrichia on dorsal surface absent; digitus 21–23 μm long, pointed, slightly extending beyond median margin of superior volsella (Fig. 5A, B, D). Stem of median volsella 13–15 μm long, with 2–3 setiform and 3 pectinate lamellae (Fig. 5B, E). Inferior volsella 75 μm long, covered with microtrichia, slightly curved and posteromedially directed, apex with angular dorsal protrusion. Phallapodeme ~100–105 μm long, strongly sinuous; transverse sternapodeme ~35–50 μm long, with well-developed oral projections. Gonocoxite 85–100 μm long. Gonostylus 125 μm long, narrow, slightly curved, tapering towards pointed apex. HR 0.80. HV 2.29.

Distribution and ecological notes. The adult male specimens examined were collected together with those of three other species described in the present paper. For details on ecology and bionomics see notes under *Tanytarsus colombiensis*.

Discussion. *Tanytarsus lulu* and several Neotropical species, i.e. *T. ligulatus*, *T. paraligulatus* as well as “*Tanytarsus* cf. *ligulatus*” [pre-named and described by Sanseverino (2006), but finally not delimited as new species nor yet validated] are distinct by the anal point crests forming an extraordinary structure—the round, spoon-shaped apex (cf. Reiss 1972, Sanseverino 2006). This character state prompted us to treat it as a main apomorphy for the *ligulatus* species group, proposed here. Several other diagnostic characters in common among the species mentioned above support this concept. All species analysed have well-developed, long frontal tubercles. They are 3.5 times as long as wide in *T. ligulatus* and *T. cf. ligulatus*, the ratio is 4 in *T. paraligulatus*, while 2.2 in *T. lulu*. In the *ligulatus* group, the superior volsella is more or less heart-shaped, with the median margin concave slightly at least (strongly concave in *T. ligulatus* and *T. cf. ligulatus*, nearly straight in *T. paraligulatus*, slightly concave in *T. lulu*). The key character within the *ligulatus* group is also the size of the digitus, well-developed in all the species. However, *T. lulu* has the digitus pointed, extending slightly beyond the median margin of the superior volsella, while the digitus is

finger-like, rounded apically, extending well beyond the superior volsella in *T. ligulatus* and *T. paraligulatus*. In this character *T. lulu* is similar to *T. cf. ligulatus*. These two, possibly the closest species share also some other features that differentiate them from both *T. ligulatus* and *T. paraligulatus*: the spoon-shaped anal point apex is round and have no serrations (teeth) on margin in *T. lulu* and *T. cf. ligulatus*, while the apex is flattened, with margin toothed in *T. ligulatus* and *T. paraligulatus*. Despite the aforementioned similarities, *T. lulu* and *T. cf. ligulatus* display several differences: the AR is greater than 1 (1.04) in *T. lulu*, while less than 1 (0.84) in *T. cf. ligulatus*; other differentiate characters pertain to the frontal tubercle length/width ratio, the shape of the superior volsella (see above) and the wing chaetotaxy and macrotrichia—numerous in *T. lulu* relative to *T. cf. ligulatus* (cf. Sanseverino 2006). The structure of an auxiliary importance in the male Tanytarsini diagnostics are the hypopygial anterolateral teeth or orolateral spines of laterosternite IX, however, they usually are minute thus weakly observable. The spines are in shape of small processes in *Tanytarsus lulu* but not confirmed in other species of the *ligulatus* group. Another character that needs re-examination is the presence of sensilla chaetica on the mid leg basitarsus which form a distinct row (comb) in *T. lulu*, but have not been mentioned in descriptions of *T. ligulatus*, *T. paraligulatus* nor *T. cf. ligulatus* (Sanseverino 2006). All species of the *ligulatus* group are close morphologically, thus their delimitation has to be based on detailed descriptions (given in the extended form for *T. lulu*).

***Tanytarsus riopreto* species group**

Members: *Tanytarsus branquini* Fittkau et Reiss, 1973, *Tanytarsus cuieirensis* Fittkau et Reiss, 1973, *Tanytarsus cururui* Fittkau et Reiss, 1973, *Tanytarsus riopreto* Fittkau et Reiss, 1973, *Tanytarsus meta* **sp. nov.**

***Tanytarsus meta* sp. nov.**

LSID: urn:lsid:zoobank.org:act:770BE4EB-7B0F-4D80-9E7D-6BD6D04AF2AA

(Fig. 6A–F)

Type material. Holotype, adult male: COLOMBIA, Meta Department, Puerto Lopez, 04°08'11"N 72°52'53"W, 206 m a.s.l., 01–03 January 2021, Malaise trap, G.P.S. Dantas, S.M.R. Hernández, E.C.G. Amat (CETdeA).

Derivatio nominis. The specific epithet derived from the Meta Department in central Colombia, where the specimen was collected. Noun in apposition.

Diagnosis. Frontal tubercles well-developed, nearly 4 times as long as wide. Tergite IX covered with dense microtrichia on entire surface, with 7 median setae. Anal tergite bands V-shaped separated. Anal point broad at base, distinctly narrowed at mid length, with parallel-sided apical elongation, bearing slender crests and long trifid spinulae directed anteriorly. Superior volsella heart-shaped with median margin strongly concave and posteromedian corner well-developed. Digitus finger-like, pointed, not extending beyond median margin of superior volsella. Stem of median volsella bulbous, bearing several setiform and 3 foliate lamellae.

Description. Adult male (n = 1).

Body size and proportions. Total length 2.63 mm. Wing length 1.16 mm. Total length/wing length ratio 2.27. Wing length/length of profemur ratio 1.63.

Colouration. Eyes black. Antenna, scutal vittae and postnotum light brown. Head capsule, ground colour of thorax, scutellum, sternum and haltere yellow to light brown. Legs yellowish to light brown. Wing veins yellow, membrane pale. Abdomen yellow.

Head. Eyes bare, with well-developed dorsomedian extensions. Antenna with 13 flagellomeres; ultimate flagellomere 416 µm long; AR 0.90. Frontal tubercles well-developed, 18 µm long, 5 µm wide, 3.6 times as long as wide. Tentorium 115 µm long. Temporal setae 10 on each side. Clypeus with 17 setae. Lengths of palpomeres 1–5 (in µm): 30, 33, 90, 95, 150; third palpomere with 2 subapical sensilla clavata 16 µm long.

Thorax. Ac 14, restricted to anterior region of scutum; Dc 7 on each side, uniserial; Pa 3 on each side; Sets 4. Scutum projected and rounded anteriorly, overreaching antepronotum.

Wing. Typical of the genus. Almost all veins (except subcosta) and entire membrane posterior to radial veins area (except base of m and an cells) covered with macrotrichia. Brachiolium with 1 seta. VRCu 1.21. WW 0.29.

Legs. Foreleg tibia with straight lanceolate spur 16 µm long. Tibial combs of mid and hind legs separated; spurs of mid leg unequal: one bent, 32 µm long, second straight, 20 µm long; spurs of hind leg similar, both long and

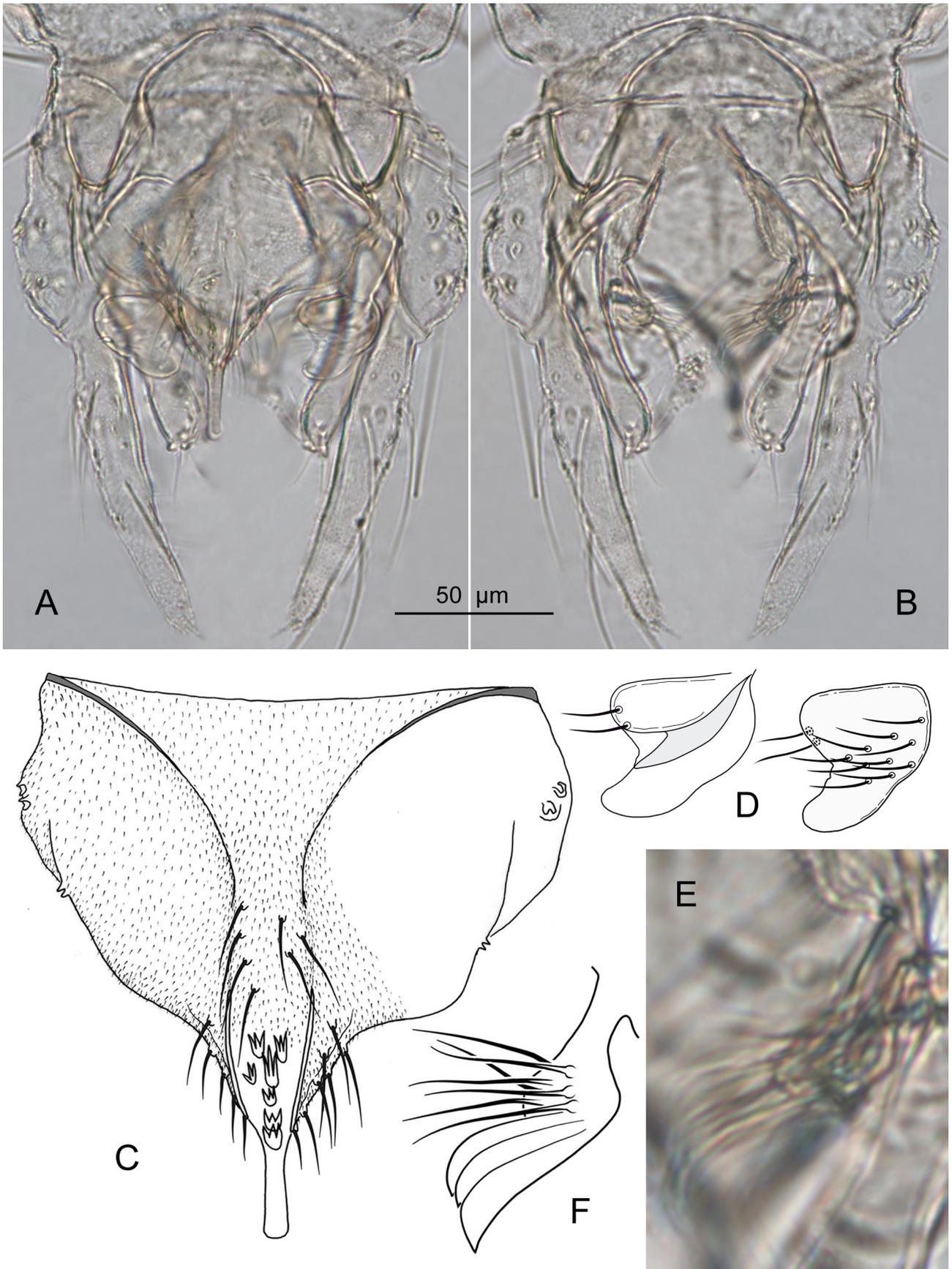


FIGURE 6. *Tanytarsus meta* sp. nov., male. **A, B:** hypopygium in dorsal (**A**) and ventral aspect (**B**); **C:** anal tergite and anal point; **D:** superior volsella and digitus; **E, F:** median volsella photographed (**E**) and drawn (**F**); (**C–F** magnified *ca.* 2–3 times relative to **A** and **B**).

slightly sinuous: one 55 μm long, second 48 μm long. Basitarsus of mid leg without sensilla chaetica. Lengths and proportions of legs as in Table 5.

TABLE 5. Lengths (in μm) and proportions of legs of *Tanytarsus meta* sp. nov., male (n = 1).

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV
p ₁	710	285	932	443	368	295	142	3.27	1.54	1.07
p ₂	627	492	297	141	100	58	48	0.60	4.08	3.77
p ₃	670	542	485	275	243	160	75	0.89	2.25	2.50

Hypopygium. Tergite IX covered with dense short microtrichia on entire surface, 7 median setae (placed between anal tergite bands and anal point crests) and 7 lateral setae on each side of anal point; lateral teeth present, minute; anal tergite bands V-type, widely separated, ending well anterior to anal point base (Fig. 6A, C). Anal point 45 μm long, broad at base, with distinctly narrowed parallel-sided apical elongation, rounded apically, bearing slender crests flanking 7 long trifold spinulae placed irregularly and anteriorly directed (Fig. 6A, C). Superior volsella heart-shaped with median margin strongly concave and posteromedian corner well-developed, 10 setae on dorsal surface, 1 seta on median margin and 1 ventral seta close to median margin, field of microtrichia on dorsal surface absent; digitus 12 μm long, finger-like, pointed, not extending beyond median margin of superior volsella (Fig. 6A, B, D). Stem of median volsella bulbous, 22 μm long, with several setiform and 3 foliate lamellae (Fig. 6B, E, F). Inferior volsella 67 μm long, covered with microtrichia, straight and posteriorly directed, with apex slightly swollen. Phallapodeme S-shaped, ~85 μm long; transverse sternapodeme ~50 μm long, without oral projections. Gonocoxite ~90 μm long. Gonostylus 100 μm long, narrow, nearly straight, tapering towards blunt apex. HR 0.88. HV 2.63.

Distribution and ecological notes. The adult male specimen examined was collected together with those of *Tanytarsus colombiensis*, *T. germani* and *T. lulu*. For details on ecology and bionomics see notes under *T. colombiensis*.

Discussion. The *Tanytarsus riopreto* species group was proposed by Fittkau and Reiss (1973) for four species: *T. branquini*, *T. cuieirensis*, *T. cururui* and *T. riopreto*. Later on, several further species (*T. clivosus*, *T. hamatus*, *T. hastatus*, *T. limneticus* and *T. pandus*) were proposed to be included (Sublette & Sasa 1994), although when their diagnostic characters were comprehensively reanalyzed, their membership in the *riopreto* group was considered questionable (Sanseverino 2006). The group definition by Sublette and Sasa (1994) was refuted also on the basis of molecular analyses by Lin *et al.* (2018); consequently a more strict group definition and species composition were postulated. Following the concepts of Fittkau and Reiss (1973), Sanseverino (2006) and Lin *et al.* (2018), we accept the *riopreto* group with the original species composition, extended with *T. meta* described here. The adult male of *T. meta* fits well the group diagnosis, except for the structure of lamellae of the median volsella—with apices split into minute pectinations in the *riopreto* group vs. foliate lamellae, with simple apices in *T. meta*. However, if this subtle difference is not considered (the structure is often overlooked due to its size), the new species falls in the couplet 33 of the key to adult males of Neotropical *Tanytarsus* by Sanseverino (2006), leading to the *riopreto* group. The set of character best separating the male of *T. meta* and other species of the group are slight difference in the shape of the anal point, volsellae and a relatively short digitus in the new species [cf. the diagnosis given above and those of Fittkau & Reiss (1973) and Sanseverino (2006)].

Tanytarsus hastatus Sublette et Sasa, 1994

(Fig. 7A–D)

Material examined. COLOMBIA, Cundinamarca department, Fusagasugá, 04°19'50"N 74°21'49"W, 1,800 m a.s.l., 07 March 2021, at light, 2 adult males, G.P.S. Dantas (CETdeA).

Diagnostic characters. Adult male. AR 1.12. Frontal tubercles large. Tergite IX entirely covered with microtrichia, with double lateral teeth; anal tergite bands V-type, separated, ending well anterior to anal point base (Fig. 7A, B). Anal point robust, lanceolate, pointed, with pair of well-developed crests, area between crests with numerous small spinulae; superior volsella more or less circular at base, with concave median margin and well projecting posteromedian corner, field of microtrichia on dorsal surface absent; digitus long and pointed, finger-like, extending well beyond margin of superior volsella (Fig. 7C). Median volsella with foliate lamellae (Fig. 7D). Inferior volsella slightly curved, with swollen round apex directed posteromedially.

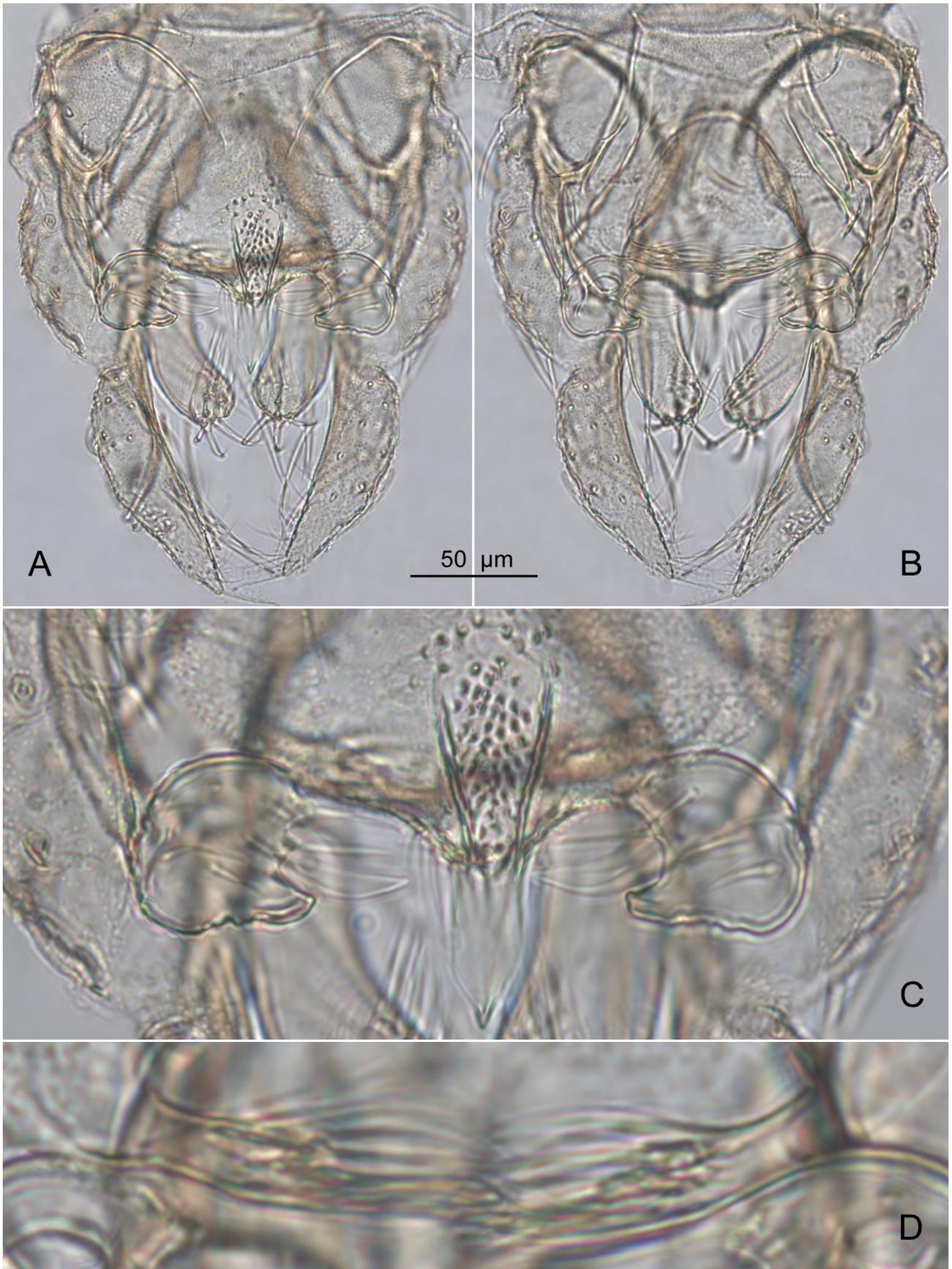


FIGURE 7. *Tanytarsus hastatus* Sublette *et* Sasa, 1994, male. **A, B:** hypopygium in dorsal (**A**) and ventral aspect (**B**); **C:** arrangement of anal point, superior volsella and digitus; **D:** median volsellae; (C–D magnified *ca.* 2–3 times relative to A and B).

Distribution and ecological notes. The present record of *Tanytarsus hastatus* in Colombia is the first in the Andean region and its highest known location above sea level. As a result, the vertical distribution gradient known for *T. hastatus* ranges from 0 to an altitude of 1800 meters. The specimens were collected in an urban area, on the seventh floor of an apartment.

Annotated checklist of *Tanytarsus* recorded from the Neotropical region

The checklist includes data on known sex and stage, geographical distribution and most important references to each species listed (Table 6). Among 89 species, all are known from adult males, 13 from females, 42 from pupae and 24 from larvae, while all stages (larva, pupa and adults of both sexes) have so far been described for 10 species. The majority of *Tanytarsus* have been recorded from Brazil (65 species), among which 62 species have *locus typicus* here, and 61 species are known exclusively from this country. The numbers of species recorded in other countries of South and Central America are as follows: Argentina, Chile (7), Guatemala (6), Costa Rica (5), Ecuador (4), Belize, Panama, Peru (2), French Guyana, Nicaragua, Puerto Rico, Venezuela (1), and Colombia, from where 7 species are recorded, including these presented here. Several species known from the Neotropical region are distributed also in the tropical ecozone of North America reaching Mexico (3 species) and the southern USA (California, Florida; 2 species). Additionally, names for two species coming from Argentina and Bolivia need validation, and one name from Brazil is considered doubtful (*nomen dubium*). From the checklist we exclude one species originally ascribed to *Calopsectra* Kieffer, 1921 “Group *Rheotanytarsus*”, subsequently moved to *Tanytarsus* (considered the senior synonym of *Calopsectra*), and here treated in a new systematic combination as *Rheotanytarsus breda* (Roback, 1960). The species is known from the adult male that shows a set of characters typical of the genus *Rheotanytarsus* Thienemann *et* Bause, 1913, i.e. the shape of the gonostylus (distal portion distinctly narrowed), superior volsella (directed posteriorly), median volsella (with long sinuous lamellae fused basally) and the lack of a digitus (cf. Roback 1960, figs 57–62).

After recent reclassification of *Caladomyia* Säwedal, 1981 (Lin *et al.* 2018), this generic name is accepted as a junior synonym of *Tanytarsus*. As a result, several specific names became homonyms for which we propose new substitute names (ICZN, Art. 60.3), as follows:

Tanytarsus reiffi Dantas, Amat, Hamada *et* Gilka, 2022

LSID: urn:lsid:zoobank.org:act:53143FCD-B509-4AC2-94FA-F29BD663EEC9

pro Tanytarsus reissi (Reiff, 2000) preoccupied by *Tanytarsus reissi* Paggi, 1992

Tanytarsus sanseverinoi Dantas, Amat, Hamada *et* Gilka, 2022

LSID: urn:lsid:zoobank.org:act:F3DE2AE8-8907-4C0F-B670-D4E87745AFBF

pro Tanytarsus angelae Trivinho-Strixino *et* Shimabukuro, 2017 preoccupied by *Tanytarsus angelae* (Trivinho-Strixino, 2012)

Tanytarsus trivinhostrixinoi Dantas, Amat, Hamada *et* Gilka, 2022

LSID: urn:lsid:zoobank.org:act:DC6D905F-A51F-4CDD-A1CD-4CF9E749B612

pro Tanytarsus fittkai Sanseverino *et* Trivinho-Strixino, 2010 preoccupied by *Tanytarsus fittkai* (Reiff, 2000)

Acknowledgments

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TABLE 6. The 89 extant species of *Tanytarsus* recorded from the Neotropical region, known from male (m), female (f), pupa (p) and/or larva (l); yellow: Brazil, green: Brazil + other countries, blue: outside Brazil; **boldface:** *terra typica*; * gender of species epithet adjusted to the genus name in the current combination (ICZN, Art. 34.2); ** new name (nom. nov.) for homonym (ICZN, Art. 60.3) after reclassification of *Caladomyia* (=junior synonym of *Tanytarsus*).

No	species	sex/stage	distribution/country	reference
1	<i>T. adalberti</i> (Säwedal, 1981)	m	Brazil	Säwedal (1981)
2	<i>T. alatae</i> Trivinho-Strixino et Shimabukuro, 2017	m	Brazil	Trivinho-Strixino & Shimabukuro (2017)
3	<i>T. alatus</i> Paggi, 1992	m	Argentina	Paggi (1992), Sanseverino (2006), Sanseverino & Fittkau (2007)
4	<i>T. alfredoi</i> Sanseverino et Trivinho-Strixino, 2010	m p l	Brazil	Sanseverino & Trivinho-Strixino (2010)
5	<i>T. alienus</i> Trivinho-Strixino et Shimabukuro, 2017	m f	Brazil	Trivinho-Strixino & Shimabukuro (2017)
6	<i>T. amazonicus</i> Sanseverino et Fittkau, 2006	m p	Brazil	Sanseverino & Fittkau (2006)
7	<i>T. angelae</i> (Trivinho-Strixino, 2012)	m	Brazil	Trivinho-Strixino (2012)
8	<i>T. branquini</i> Fittkau et Reiss, 1973	m	Brazil	Fittkau & Reiss (1973), Sanseverino (2006)
9	<i>T. briani</i> Reis, Gil-Azevedo et Ferreira-Kepler, 2021	m	Costa Rica	Reis et al. (2021)
10	<i>T. bromelicola</i> Cranston, 2007	m f p l	Puerto Rico, USA (FL)	Cranston (2007)
11	<i>T. bruneolus</i> (Trivinho-Strixino, 2012) *	m f p l	Brazil	Trivinho-Strixino (2012)
12	<i>T. caipira</i> Trivinho-Strixino et Strixino, 2007	m f p l	Brazil	Trivinho-Strixino & Strixino (2007)
13	<i>T. canine</i> (Trivinho-Strixino, 2012)	m p	Brazil	Trivinho-Strixino (2012)
14	<i>T. capaopreto</i> (Trivinho-Strixino, 2012)	m p l	Brazil	Trivinho-Strixino (2012)
15	<i>T. capitatus</i> Sublette et Sasa, 1994	m	Costa Rica, Guatemala	Sublette & Sasa (1994), Sanseverino (2006)
16	<i>T. carolae</i> (Trivinho-Strixino, 2012)	m	Brazil	Trivinho-Strixino (2012)
17	<i>T. carolensis</i> (Trivinho-Strixino, 2012)	m f p l	Brazil	Trivinho-Strixino (2012)
18	<i>T. castelnau</i> (Säwedal, 1981)	m	Brazil	Säwedal (1981)
19	<i>T. cayambe</i> Gilka et Zakrzewska, 2013	m	Ecuador	Gilka & Zakrzewska (2013)
20	<i>T. chivosus</i> Reiss, 1972	m p	Argentina, Chile	Reiss (1972), Sanseverino (2006)
21	<i>T. colombiensis</i> sp. nov.	m	Colombia	present data
22	<i>T. comunis</i> (Trivinho-Strixino, 2012)	m p l	Brazil	Trivinho-Strixino (2012)
23	<i>T. corumba</i> Trivinho-Strixino, Wiedenbrug et da Silva, 2015	m	Brazil	Trivinho-Strixino et al. (2015)
24	<i>T. costarica</i> Reis, Gil-Azevedo et Ferreira-Kepler, 2021	m	Costa Rica	Reis et al. (2021)
25	<i>T. cotopaxi</i> Gilka et Zakrzewska, 2013	m	Ecuador	Gilka & Zakrzewska (2013)

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TABLE 6. (Continued)

No	species	sex/stage	distribution/country	reference
26	<i>T. cuteirensis</i> Fittkau et Reiss, 1973	m p	Brazil	Fittkau & Reiss (1973), Sanseverino & Wiedenbrug (2000), Sanseverino (2006)
27	<i>T. curumim</i> (Trivinho-Strixino, 2012)	m p l	Brazil	Trivinho-Strixino (2012)
28	<i>T. cururui</i> Fittkau et Reiss, 1973	m	Brazil	Fittkau & Reiss (1973), Sanseverino (2006)
29	<i>T. curviceristatus</i> Contreras-Lichtenberg, 1988	m	Colombia, Ecuador, Peru	Contreras-Lichtenberg (1988), Sanseverino (2006), Gilka & Zakrzewska (2013)
30	<i>T. digitatus</i> Sanseverino et Fittkau, 2006	m	Brazil	Sanseverino & Fittkau (2006)
31	<i>T. erikae</i> (Reiff, 2000)	m	Brazil	Reiff (2000)
32	<i>T. fastigatus</i> Reiss, 1972	m p	Argentina, Brazil, Chile	Reiss (1972), Sanseverino (2006), Mendes & Pinho (2014)
33	<i>T. fitkaui</i> (Reiff, 2000)	m	Brazil	Reiff (2000)
34	<i>T. friburgensis</i> Sanseverino et Fittkau, 2006	m	Brazil	Sanseverino & Fittkau (2006)
35	<i>T. friederi</i> (Trivinho-Strixino et Strixino, 2000)	m f p l	Brazil	Trivinho-Strixino & Strixino (2000)
36	<i>T. germani</i> sp. nov.	m	Colombia	present data
37	<i>T. giovannii</i> Sanseverino et Trivinho-Strixino, 2010	m p l	Brazil	Sanseverino & Trivinho-Strixino (2010), Trivinho-Strixino et al. (2015)
38	<i>T. gnomon</i> sp. nov.	m	Colombia	present data
39	<i>T. guatemalensis</i> Sublette et Sasa, 1994	m	Guatemala	Sublette & Sasa (1994), Sanseverino (2006)
40	<i>T. hamatus</i> Reiss, 1972	m p	Argentina, Chile	Reiss (1972), Sanseverino (2006)
41	<i>T. hastatus</i> Sublette et Sasa, 1994	m f p	Colombia, Brazil, Ecuador, Guatemala, Mexico, Panama, Peru, Venezuela, USA (CA)	Sublette & Sasa (1994), Spies & Reiss (1996), Sanseverino (2006), present data
42	<i>T. hero</i> (Reiff, 2000)	m	Brazil	Reiff (2000)
43	<i>T. hirsutus</i> Trivinho-Strixino, Wiedenbrug et da Silva, 2015	m p	Brazil	Trivinho-Strixino et al. (2015), Dantas & Gilka (2017)
44	<i>T. hoefleri</i> (Reiff, 2000)	m	Brazil	Reiff (2000)
45	<i>T. humboldti</i> (Säwedal, 1981)	m f p l	Brazil	Säwedal (1981), Trivinho-Strixino (2012)
46	<i>T. illustris</i> Dantas et Gilka, 2017	m	Brazil	Dantas & Gilka (2017)
47	<i>T. impar</i> Trivinho-Strixino et Strixino, 2004	m f p l	Brazil	Trivinho-Strixino & Strixino (2004), Dantas & Gilka (2017)
48	<i>T. insignis</i> Dantas et Gilka, 2017	m	Brazil	Dantas & Gilka (2017)

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TABLE 6. (Continued)

No	species		sex/stage	distribution/country	reference
49	<i>T. insolens</i> Dantas et Gilka, 2017		m	Brazil	Dantas & Gilka (2017)
50	<i>T. jacaretingensis</i> Sanseverino et Fittkau, 2006		m	Brazil, French Guyana	Sanseverino & Fittkau (2006)
51	<i>T. jaragua</i> (Trivinho-Strixino, 2012)		m p l	Brazil	Trivinho-Strixino (2012)
52	<i>T. jatai</i> Trivinho-Strixino, Wiedenbrug et da Silva, 2015		m	Brazil	Trivinho-Strixino et al. (2015)
53	<i>T. kapilei</i> (Trivinho-Strixino, 2012)		m p l	Brazil	Trivinho-Strixino (2012)
54	<i>T. kiche</i> Vinogradova, Riss et Spies, 2009		m	Belize, Costa Rica, Guatemala, Mexico , Nicaragua, Panama	Vinogradova et al. (2009), Dantas & Gilka (2017)
55	<i>T. kraussi</i> (Säwedal, 1981)		m	Brazil	Säwedal (1981)
56	<i>T. lenyae</i> Sanseverino et Trivinho-Strixino, 2010		m p	Brazil	Sanseverino & Trivinho-Strixino (2010)
57	<i>T. ligulatus</i> Reiss, 1972		m p	Brazil	Reiss (1972), Sanseverino (2006), Trivinho-Strixino et al. (2015)
58	<i>T. longitubuli</i> Trivinho-Strixino, Wiedenbrug et da Silva, 2015		m p l	Brazil	Trivinho-Strixino et al. (2015)
59	<i>T. lulu</i> sp. nov.		m	Colombia	present data
60	<i>T. magnus</i> Trivinho-Strixino et Strixino, 2004		m f p l	Brazil	Trivinho-Strixino & Strixino (2004)
61	<i>T. marauia</i> Sanseverino, Wiedenbrug et Fittkau 2003		m p	Brazil	Sanseverino et al. (2003), Sanseverino (2006)
62	<i>T. meta</i> sp. nov.		m	Colombia	present data
63	<i>T. monospinosus</i> Ekrem et Reiss, 1999		m	Brazil	Ekrem & Reiss (1999)
64	<i>T. mulleri</i> (Säwedal, 1981)		m	Brazil	Säwedal (1981)
65	<i>T. obiriciae</i> Trivinho-Strixino et Sonoda, 2006		m f p l	Brazil	Trivinho-Strixino & Sonoda (2006), Trivinho-Strixino et al. (2015)
66	<i>T. orellanai</i> (Reiff, 2000)		m	Brazil	Reiff (2000)
67	<i>T. ortoni</i> (Säwedal, 1981)		m p l	Brazil	Säwedal (1981), Trivinho-Strixino & Strixino (1991, 2003)
68	<i>T. pandus</i> Sublette et Sasa, 1994		m f p	Guatemala, Costa Rica	Sublette & Sasa (1994), Spies & Reiss (1996), Sanseverino (2006)
69	<i>T. paraligulatus</i> Reiss, 1972		m	Chile	Reiss (1972), Sanseverino (2006)
70	<i>T. patagonicus</i> (Reiss, 1972)		m p l	Argentina, Chile	Reiss (1972), Sanseverino et al. (2010)
71	<i>T. pistra</i> (Sublette et Sasa, 1994)		m	Guatemala	Sublette & Sasa (1994), Reiff (2000)
72	<i>T. poppigi</i> (Säwedal, 1981)		m	Brazil	Säwedal (1981)
73	<i>T. poqomchi</i> Vinogradova, Riss et Spies, 2009		m	Belize, Mexico	Vinogradova et al. (2009)

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TABLE 6. (Continued)

No	species	sex/stage	distribution/country	reference
74	<i>T. pseudocurvicristatus</i> Trivinho-Strixino, Wiedenbrug <i>et da</i> Silva, 2015	m p l	Brazil	Trivinho-Strixino <i>et al.</i> (2015)
75	<i>T. reiffi</i> Dantas, Amat, Hamada <i>et</i> Gilka, 2022**	m	Brazil	Reiff (2000)
76	<i>T. reissi</i> Paggi, 1992	m	Argentina	Paggi (1992), Sanseverino (2006)
77	<i>T. revolta</i> Sanseverino, Wiedenbrug <i>et</i> Fittkau, 2003	m p	Brazil	Sanseverino <i>et al.</i> (2003), Sanseverino (2006)
78	<i>T. rhabdomantis</i> (Trivinho-Strixino <i>et</i> Strixino, 1991)	m p l	Brazil	Trivinho-Strixino & Strixino (1991), Trivinho-Strixino & Sanseverino (2003), Sanseverino (2006)
79	<i>T. rinihuensis</i> Reiss, 1972	m p	Chile	Reiss (1972), Sanseverino (2006)
80	<i>T. riopreto</i> Fittkau <i>et</i> Reiss, 1973	m	Brazil	Fittkau & Reiss (1973), Sanseverino (2006)
81	<i>T. riotarumensis</i> (Reiff, 2000)	m p l	Brazil	Reiff (2000), Trivinho-Strixino & Strixino (2003)
82	<i>T. sanseverinoi</i> Dantas, Amat, Hamada <i>et</i> Gilka, 2022**	m	Brazil	Trivinho-Strixino & Shimabukuro (2017)
83	<i>T. spixi</i> (Säwedal, 1981)	m p	Brazil	Säwedal (1981)
84	<i>T. trivinhostrixinoi</i> Dantas, Amat, Hamada <i>et</i> Gilka, 2022**	m p l	Brazil	Sanseverino & Trivinho-Strixino (2010)
85	<i>T. tuberculatus</i> Reiss, 1972	m p	Argentina, Brazil, Chile	Reiss (1972), Sanseverino (2006), Sanseverino & Fittkau (2007)
86	<i>T. tumultuarius</i> Ekrem <i>et</i> Reiss, 1999	m	Brazil	Ekrem & Reiss (1999)
87	<i>T. waika</i> Sanseverino, Wiedenbrug <i>et</i> Fittkau, 2003	m p	Brazil	Sanseverino <i>et al.</i> (2003), Sanseverino (2006)
88	<i>T. xingu</i> Sanseverino, Wiedenbrug <i>et</i> Fittkau, 2003	m p	Brazil	Sanseverino <i>et al.</i> (2003), Sanseverino (2006)
89	<i>T. yara</i> (Trivinho-Strixino, 2012)	m f p l	Brazil	Trivinho-Strixino (2012)
	<i>T. pararinihuensis sensu</i> Sanseverino (2006), not yet valid (ICZN)	m	Bolivia	Sanseverino (2006)
	<i>T. pseudorinihuensis sensu</i> Sanseverino (2006), not yet valid (ICZN)	m	Argentina, Bolivia	Sanseverino (2006)
	<i>T. oligotrochus</i> Rempel, 1939, <i>nomen dubium</i>	m	Brazil	Rempel (1939), Spies & Reiss (1996)

References

- Arbelaez-Cortes, E. (2013) Knowledge of Colombian Biodiversity: Published and Indexed. *Biodiversity and Conservation*, 22, 2875–2906.
<https://doi.org/10.1007/s10531-013-0560-y>
- Contreras-Lichtenberg, R. (1988) *Tanytarsus curvicristatus* spec. nov. eine neue Chironomidenart aus Kolumbien (Diptera: Chironomidae). *Spixiana*, Supplement 14, 101–104. [<https://biostor.org/reference/86112>]
- Cranston, P.S. (2000) Monsoonal tropical *Tanytarsus* van der Wulp (Diptera: Chironomidae) reviewed: new species, life histories and significance as aquatic environmental indicators. *Australian Journal of Entomology*, 39, 138–159.
<https://doi.org/10.1046/J.1440-6055.2000.00170.X>
- Cranston, P.S. (2007) A new species for a bromeliad phytotelm-dwelling *Tanytarsus* (Diptera: Chironomidae). *Annales of the Entomologica Society of America*, 100, 617–622.
[https://doi.org/10.1603/0013-8746\(2007\)100\[617:ANSFAB\]2.0.CO;2](https://doi.org/10.1603/0013-8746(2007)100[617:ANSFAB]2.0.CO;2)
- Dantas, G.P.S., Amat, G. & Hernández-Rangel, S.M. (2019) A new Andean species of *Ablabesmyia* Johannsen from Colombia (Diptera: Chironomidae) with an updated taxonomic key for Neotropical species. *Studies on Neotropical Fauna and Environment*, 55 (2), 96–102.
<https://doi.org/10.1080/01650521.2019.1697162>
- Dantas, G.P.S. & Gilka, W. (2017) New *Tanytarsus* van der Wulp from the Brazilian Amazonia indicate clues to intrageneric relations (Diptera: Chironomidae). *Zootaxa*, 4294 (2), 281–291.
<https://doi.org/10.11646/zootaxa.4294.2.10>
- Ekrem, T. & Reiss, F. (1999) Two new *Tanytarsus* species (Diptera: Chironomidae) from Brazil, with reduced median volsella. *Aquatic Insects*, 21, 205–213.
<https://doi.org/10.1076/aqin.21.3.205.4525>
- Fittkau, E.J. & Reiss, F. (1973) Amazonische Tanytarsini (Chironomidae, Diptera) I. Die *riopreto*-Gruppe der Gattung *Tanytarsus*. *Studies on Neotropical Fauna*, 8, 1–16.
<https://doi.org/10.1080/01650527309360451>
- Freeman, P. (1958) A study of the Chironomidae (Diptera) of Africa South of the Sahara. Part IV. *Bulletin of the British Museum (Natural History) Entomology*, 6, 263–363.
<https://doi.org/10.5962/bhl.part.17110>
- Gilka, W. & Zakrzewska, M. (2013) A contribution to the systematics of Neotropical *Tanytarsus* van der Wulp: first descriptions from Ecuador (Diptera: Chironomidae: Tanytarsini). *Zootaxa*, 3619 (4), 453–459.
<https://doi.org/10.11646/zootaxa.3619.4.3>
- Glover, B. (1973) The Tanytarsini (Diptera: Chironomidae) of Australia. *Australian Journal of Zoology*, Supplementary Series, 23, 403–478.
<https://doi.org/10.1071/AJZS023>
- ICZN [International Commission on Zoological Nomenclature] (1999) *International Code of Zoological Nomenclature. 4th Edition*. International Trust for Zoological Nomenclature, London. Available from: <https://www.iczn.org/the-code/the-code-online/> (accessed 30 September 2021)
- Lin, X.-L., Stur, E. & Ekrem, T. (2018) Molecular phylogeny and temporal diversification of *Tanytarsus* van der Wulp (Diptera: Chironomidae) support generic synonymies, a new classification and centre of origin. *Systematic Entomology*, 43 (4), 659–677.
<https://doi.org/10.1111/syen.12292>
- Mendes, H.F. & Pinho, L.C. (2014) Checklist of the Brazilian Chironomidae species. Available from: <https://sites.google.com/site/brazilianchironomids/list> (accessed 30 April 2022)
- Ospina-Torres, R., Mey, W. & Jaime-Murcia, P. (2018) Two New orthoclad species from Colombian Andes (Diptera: Chironomidae). *Zootaxa*, 4472 (2), 385–392.
<https://doi.org/10.11646/zootaxa.4472.2.11>
- Paggi, A.C. (1992) Two new species of genus *Tanytarsus* from Argentina (Diptera, Chironomidae). *Fragmenta Entomologica*, 23, 299–306.
- Reiff, N. (2000) Review of the mainly Neotropical genus *Caladomyia* Sæwedal, 1981, with descriptions of seven new species (Insecta, Diptera, Chironomidae, Tanytarsini). *Spixiana*, 23, 175–198.
- Reis, P.R., Gil-Azevedo, L.H. & Ferreira-Keppler, R.L. (2021) Two new species of *Tanytarsus* van der Wulp (Diptera: Chironomidae) from Costa Rica. *Zootaxa*, 4966 (1), 84–90.
<https://doi.org/10.11646/zootaxa.4966.1.9>
- Reiss, F. (1972) Die Tanytarsini (Chironomidae, Diptera) Südchiles und Westpatagoniens. Mit Hinweisen auf die Tanytarsini-Fauna der Neotropis. *Studies on Neotropical Fauna*, 7, 49–94.
<https://doi.org/10.1080/01650527209360434>
- Rempel, J.G. (1939) Neue Chironomiden aus Nordostbrasilien. *Zoologischer Anzeiger*, 127, 209–216.
- Roback, S. (1960) Results of the Catherwood Foundation Peruvian Amazon Expedition. New species of Tendipedidae (Diptera). *Transactions of American Entomological Society*, 86, 87–107. [<https://www.jstor.org/stable/25077799>]

- Roskov, Y., Abucay, L., Orrell, T., Nicolson, D., Bailly, N., Kirk, P.M., Bourgoin, T., DeWalt, R.E., Decock, W., De Wever, A., Nieukerken, E. van, Zarucchi, J. & Penev, L. (2019) Species 2000 & ITIS Catalogue of Life. Available from: <http://www.catalogueoflife.org/annual-checklist/2019/> (accessed 15 May 2021)
- Sæther, O.A. (1969) Some Nearctic Podonominae, Diamesinae and Orthoclaadiinae (Diptera: Chironomidae). *Bulletin of the Fisheries Research Board of Canada*, 107, 1–154. [<https://waves-vagues.dfo-mpo.gc.ca/Library/1505.pdf>]
- Sæther, O.A. (1980) Glossary of chironomid morphology terminology (Diptera, Chironomidae). *Entomologica Scandinavica*, Supplement 14, 1–51. [<https://www.nhbs.com/glossary-of-chironomid-morphology-terminology-diptera-chironomidae-book>]
- Sanseverino, A.M. (2006) *A review of the genus Tanytarsus van der Wulp, 1874 (Insecta, Diptera, Chironomidae) from the Neotropical Region*. Dissertation, Fakultät für Biologie, Ludwig-Maximilians-Universität, München, 312 pp. Available from: <http://edoc.ub.uni-muenchen.de/4975> (accessed 30 September 2020)
- Sanseverino, A.M. & Fittkau, E.J. (2006) Four new species of *Tanytarsus* van der Wulp, 1874 (Diptera: Chironomidae) from South America. *Zootaxa*, 1162 (1), 1–18. <https://doi.org/10.11646/zootaxa.1162.1.1>
- Sanseverino, A.M. & Fittkau, E.J. (2007) Taxonomy of *Caladomyia alata* (Paggi, 1992) and *Caladomyia tuberculata* (Reiss, 1972), new combinations (Diptera: Chironomidae). In: Andersen, T. (Ed.), *Contributions to the Systematics and Ecology of Aquatic Diptera—A Tribute to Ole A. Sæther*. The Caddis Press, Columbus, Ohio, pp. 265–273.
- Sanseverino, A.M. & Trivinho-Strixino, S. (2010) New Species of *Tanytarsus* van der Wulp (Diptera: Chironomidae) from São Paulo State, Brazil. *Neotropical Entomology*, 39 (1), 67–82. <https://doi.org/10.1590/S1519-566X2010000100010>
- Sanseverino, A.M., Trivinho-Strixino, S. & Nessimian, J.L. (2010) Taxonomic status of *Nimbocera* Reiss, 1972, a junior synonym of *Tanytarsus* van der Wulp, 1874 (Diptera: Chironomidae). *Zootaxa*, 2359 (1), 43–57. <https://doi.org/10.11646/zootaxa.2359.1.3>
- Sanseverino, A.M. & Wiedenbrug, S. (2000) Description of the pupa of *Tanytarsus cuieirensis* Fittkau & Reiss (Insecta, Diptera, Chironomidae). *Spixiana*, 23, 207–210.
- Sanseverino, A.M., Wiedenbrug, S. & Fittkau, E.J. (2003) *Marauia* group: a new species group in the genus *Tanytarsus* van der Wulp, 1874, from the Neotropics (Diptera, Chironomidae). *Studia Dipterologica*, 9, 453–468.
- Sasa, M. & Kawai, K. (1987) Studies on the chironomid midges of Lake Biwa (Diptera, Chironomidae). *Lake Biwa Study Monographs*, 3, 1–120.
- Säwedel, L. (1981) Amazonian Tanytarsini II. Description of *Caladomyia* n. gen. and eight new species (Diptera: Chironomidae). *Entomologica Scandinavica*, 12, 123–143. <https://doi.org/10.1163/187631281794709890>
- Spies, M. & Reiss, F. (1996) Catalog and bibliography of Neotropical and Mexican Chironomidae (Insecta, Diptera). *Spixiana*, Supplement 22, 61–119. [<https://biostor.org/reference/86122>]
- Sublette, J.E. & Sasa, M. (1994) Chironomidae collected in onchocerciasis endemic areas of Guatemala (Insecta, Diptera). *Spixiana*, Supplement 20, 1–60. [<https://biostor.org/reference/86107>]
- Trivinho-Strixino, S. (2012) A systematic review of Neotropical *Caladomyia* Säwedel (Diptera: Chironomidae). *Zootaxa*, 3495 (1), 1–41. <https://doi.org/10.11646/zootaxa.3495.1.1>
- Trivinho-Strixino, S. & Sanseverino, A.M. (2003) *Tanytarsus rhabdomantis*: New combination for *Nimbocera rhabdomantis* Trivinho-Strixino & Strixino, 1991 (Diptera: Chironomidae). *Zootaxa*, 389 (1), 1–10. <https://doi.org/10.11646/zootaxa.389.1.1>
- Trivinho-Strixino, S. & Shimabukuro, E.M. (2017) Tanytarsini (Diptera: Chironomidae) from macicolous habitat in Southeast Brazil: new species and new records. *Zootaxa*, 4269 (3), 427–437. <https://doi.org/10.11646/zootaxa.4269.3.6>
- Trivinho-Strixino, S. & Sonoda, K.C. (2006) A new *Tanytarsus* species (Insecta, Diptera, Chironomidae) from São Paulo State, Brazil. *Biota Neotropica*, 6 (2), 1–9. <https://doi.org/10.1590/S1676-06032006000200020>
- Trivinho-Strixino, S. & Strixino, G. (1991) Duas novas espécies de *Nimbocera* Reiss (Diptera, Chironomidae) do Estado de São Paulo, Brasil. *Revista Brasileira de Entomologia*, 35, 173–178.
- Trivinho-Strixino, S. & Strixino, G. (2000) A new species of *Caladomyia* Säwedel, 1981, with description of the female and immature stages (Insecta, Diptera, Chironomidae). In: Baehr M., Spies M. (eds). Contributions to chironomid research in memory of Dr. Friedrich Reiss. *Spixiana*, 23, 167–173.
- Trivinho-Strixino, S. & Strixino, G. (2003) The immature stages of two *Caladomyia* Säwedel, 1981 species, from São Paulo State, Brazil (Chironomidae, Chironominae, Tanytarsini). *Revista Brasileira de Entomologia*, 47, 597–602.
- Trivinho-Strixino, S. & Strixino, G. (2004) Two new species of *Tanytarsus* from southeast of Brazil (Insecta, Diptera, Chironomidae). *Spixiana*, 27, 155–164.
- Trivinho-Strixino, S. & Strixino, G. (2007) A new Neotropical species of *Tanytarsus* van der Wulp, 1874 (Diptera: Chironomidae), with an unusual anal process. *Zootaxa*, 1654 (1), 61–67. <https://doi.org/10.11646/zootaxa.1654.1.5>

- Trivinho-Strixino, S., Wiedenbrug, S. & da Silva, F.L. (2015) New species of *Tanytarsus* van der Wulp (Diptera: Chironomidae: Tanytarsini) from Brazil. *European Journal of Environmental Sciences*, 5 (1), 92–100.
<https://doi.org/10.14712/23361964.2015.82>
- Vinogradova, E.M, Riss, H.W. & Spies, M. (2009) New species of *Tanytarsus* van der Wulp, 1874 (Diptera: Chironomidae) from Central America. *Aquatic Insects*, 31, 11–17.
<https://doi.org/10.1080/01650420802502477>
- Zakrzewska, M. & Giłka, W. (2013) In the Eocene, the extant genus *Caladomyia* occurred in the Palaeartic (Diptera: Chironomidae: Tanytarsini). *Polish Journal of Entomology*, 82, 397–403.
<https://doi.org/10.2478/pjen-2013-0003>