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A contribution to the systematics of Neotropical *Tanytarsus* van der Wulp: first descriptions from Ecuador (Diptera: Chironomidae: Tanytarsini)

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Abstract

First specific records of *Tanytarsus* van der Wulp from the Ecuadorian mainland based on detailed descriptions are presented. *Tanytarsus cayambe* **sp. nov.** shows an interesting set of characters known from several Neotropical *Tanytarsus* as well as from species of the *recurvatus* group of the northern distribution. *Tanytarsus cotopaxi* **sp. nov.** is placed in the *riopreto* species group; as a result an emended diagnosis for adult males of the group is proposed. The diagnostic description of *Tanytarsus curvicristatus* Contreras-Lichtenberg is also complemented.

Key words: Diptera, Chironomidae, *Tanytarsus*, systematics, new species, Ecuador

Introduction

Tanytarsus van der Wulp is the most species-rich genus in the large tribe Tanytarsini of the family Chironomidae—a worldwide distributed and the most abundant group of water dipterans. Systematic groups of species in *Tanytarsus* are typical for different aquatic habitat types, and the representatives of this diverse genus are thus excellent biological indicators in biomonitoring of freshwater ecosystems. However, among a number of records on chironomids published from the Neotropical region, only scarce information on *Tanytarsus*, including one specific record from Galapagos (Sanseverino 2006), were so far presented from Ecuador. In the recent key to larvae by Prat and Rieradevall (2011) three tanytarsine genera are mentioned from Ecuador (*Tanytarsus*, *Rheotanytarsus* and *Paratanytarsus*), but no specific data/descriptions are reported from this country. In our paper we present first detailed descriptions and discussions on systematics of *Tanytarsus* from the Ecuadorian mainland, including two new species.

Material and methods

The material is a part of a collection of nematocerous flies taken in the commune Mindo in Ecuador (0°03'S 78°46'W), at sites in the mountain area of the cloud forest at an altitude of c. 1400 m. Specimens were sampled with a sweep net, preserved in 70% ethanol, dissected and slide-mounted in a mixture of phenol and Canada balsam using the method by Wirth and Marston (1968). Morphological terminology and abbreviations follow Sæther (1980), wherever possible. Length measurements were rounded off to the nearest full μm (palp) or to the nearest 5 μm (legs); antennal and leg ratios (AR, LR) were calculated to the second digit after the decimal point. Illustrations were prepared using the technique of Gilka (2008); photographs were taken using the Nomarski DIC. The material examined is deposited in the Department of Invertebrate Zoology and Parasitology, University of Gdańsk, Poland.

Systematics

Tanytarsus cayambe sp. nov.

Type material. Holotype, adult male: ECUADOR, Pichincha province, San Miguel de Los Bancos (canton), Mindo, c. 1400 m a.s.l., 25–31 August 1999, netting, leg. Dawid Graczyk. Paratype, adult male: same data as holotype.

Derivation of the name. The specific name is referred to the Cayambe, the second biggest volcano in the Pichincha province where the specimens were collected. The name should be treated as a noun in apposition.

Diagnosis. AR low, 0.35–0.40. Sc with numerous macrotrichia. Anal tergite with several median setae. Anal tergite bands of V-type, short, broadly separated. Anal point long, with distinct club-shaped prolongation and single strong spine placed between crests. Superior volsella circular, with slightly concave apex. Digitus subtriangular, extending beyond superior volsella, apically pointed. Median volsella with several slender pectinate and two long setiform lamellae.

Description. Adult male (n = 1 or 2)

Wing length 1.53–1.64 mm.

Colouration. Eyes black; antennal pedicel, head capsule, ground colour of thorax, scutellum, haltere, proximal parts of legs and abdomen greenish yellow; wing membrane with greenish undertone; remaining body parts slightly darker, pale brown.

Head. Antenna with 13 flagellomeres; AR 0.35–0.40. Frontal tubercles conical, 8 µm long. Length of palpomeres II–V (µm): 36–44, 96–109, 101–117, 193 (n = 1). Clypeus with 11–16 setae.

Thorax chaetotaxy. Ac 11–13, Dc 8–9 on each side, Pa 1 on each side, Scts 4–5.

Wing. Fig. 1A. Entire membrane below radial veins covered with dense macrotrichia; Sc with numerous macrotrichia.

Legs. Fore tibia with straight slender spur. Tibial combs of mid and hind leg separated; spurs of mid and hind leg similar in shape, both slightly curved, one spur twice as long as the second. Basitarsus of mid leg bearing 4 hook-shaped sensilla chaetica (n = 1). Length of leg segments and leg ratios in Table 1.

TABLE 1. Lengths (µm) of leg segments and leg ratios of male *Tanytarsus cayambe* sp. nov.

| | fe | ti | ta ₁ | ta ₂ | ta ₃ | ta ₄ | ta ₅ | LR |
|----------------|---------|---------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------|
| P ₁ | 720 | 365–385 | 1030–1095 | 460–495 | 395 | 300–310 | 135–145 | 2.82–2.83 |
| P ₂ | 760–805 | 565–620 | 385 | 200 | 140 | 95 | 70 | 0.68 |
| P ₃ | 790–855 | 685–760 | 520 | 300 | 270 | 170 | 95 | 0.76 |

Hypopygium (Fig. 1B–D). Gonostylus 105–115 µm long, slightly swollen in proximal part, tapering to slender tip. Anal tergite with 5–10 median setae. Anal tergite bands of V-type, short, broadly separated. Anal point long, slightly constricted in mid length with distinct club-shaped prolongation, tip broadly rounded with 3 lateral setae on each side and single strong spine placed between short crests; entire area surrounding base of anal point covered with microtrichia (Fig. 1B, C). Superior volsella circular, with slightly concave apex, 6 dorsal and 3 anteromedian setae, microtrichia absent. Digitus subtriangular, distorted at mid length, extending slightly beyond superior volsella, apically pointed. Inferior volsella with distinctly broadened head-like apex, and wide darkly coloured dorsomedian ridge (Fig. 1B). Stem of median volsella 12 µm long, club-shaped, slightly curved, bearing 4 slender pectinate and 2 long setiform lamellae (Fig. 1D).

Discussion. A group membership of *Tanytarsus cayambe* is not certain. The new species shows several characters typical for the *recurvatus* group (Holarctic and Oriental regions), i.e. the short anal tergite bands of V-type, the anal point elongate with the distinct lanceolate or club-shaped prolongation and the superior volsella roundish with concave apex. However, the new species has the strong hypopygial median setae and the anal point is armed with the single spine, whereas the median setae and spines/spinulae are absent in the *recurvatus* group. The single spine or short seta instead typical spinulae are known from several Neotropical *Tanytarsus*: *T. monospinosus* Ekrem et Reiss, *T. jacaretingensis* Sanseverino et Fittkau and *T. rinihuensis* Reiss (Reiss 1972, Ekrem & Reiss 1999, Sanseverino & Fittkau 2006). The latter species and *T. cayambe* are also distinct in having

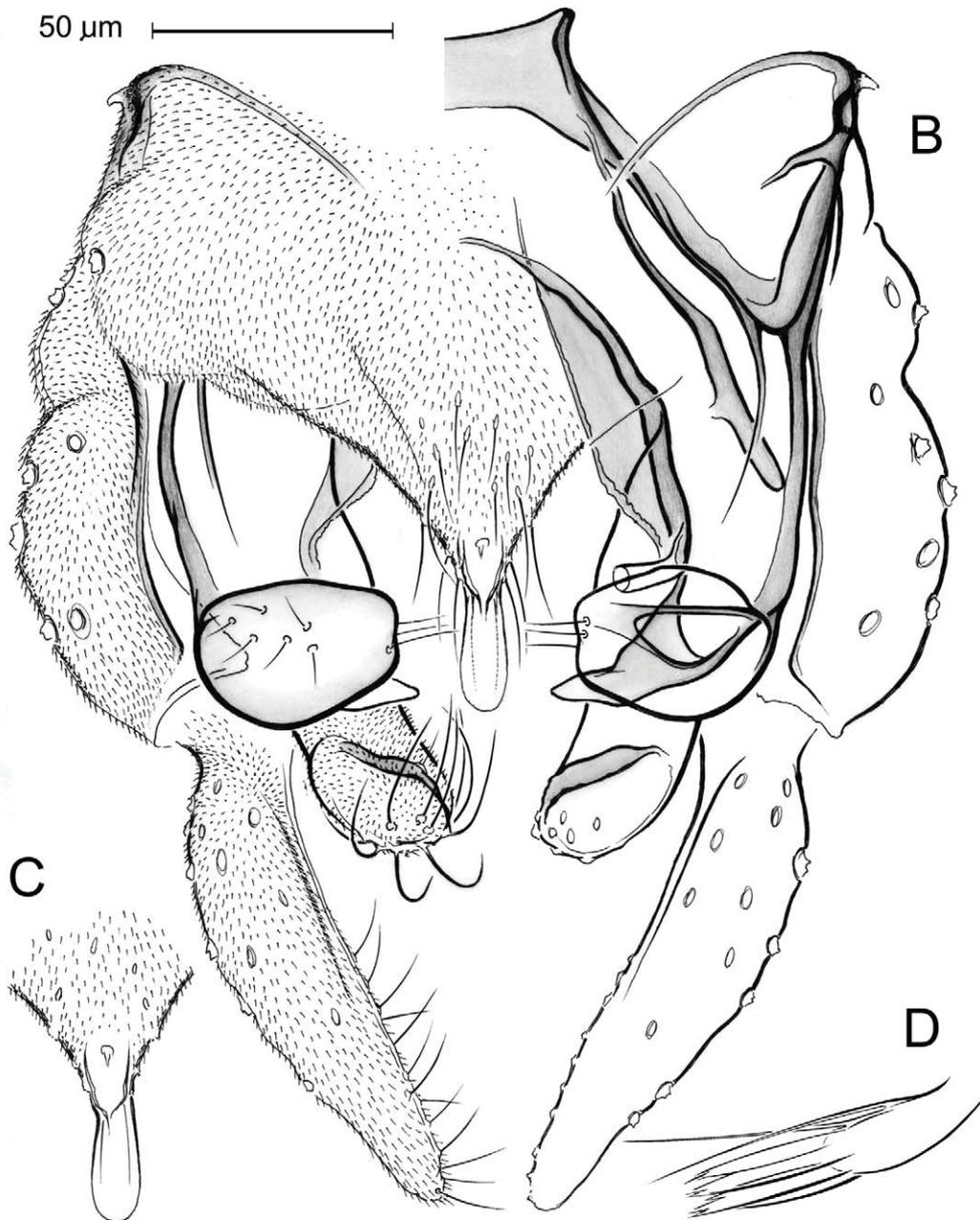


FIGURE 1. *Tanytarsus cayambe* sp. nov., adult male. A—wing, B—hypopygium, C—anal point (variability), D—median volsella (magnified x 2 relative to hypopygium).

subcostal wing vein covered with macrotrichia. This character is discussed by Sanseverino (2006) and mentioned as not common among Neotropical *Tanytarsus*. Interestingly, two other Brazilian species, i.e. *Tanytarsus impar* Trivinho-Strixino *et* Strixino and *Tanytarsus magnus* Trivinho-Strixino *et* Strixino, which show setae on Sc, have the anal point spinulae also not developed (Trivinho-Strixino & Strixino 2004). All the above species seem to be closely related, however, their group membership needs further studies in the course of exploring the Neotropical *Tanytarsus*.

***Tanytarsus cotopaxi* sp. nov.**

Type material. Holotype, adult male: ECUADOR, Pichincha province, San Miguel de Los Bancos (canton), Mindo, c. 1400 m a.s.l., 16 September 1999, netting, leg. Dawid Graczyk.

Derivation of the name. The specific name is referred to the Cotopaxi, the biggest volcano in the Pichincha province where the specimen was collected. The name should be treated as a noun in apposition.

Diagnosis. AR low, 0.48. Hypopygium with bristle-shaped median setae; lateral teeth absent; anal point expanded in proximal part, with spinulae arranged in regular row; microtrichia between crests absent; superior volsella ellipse-shaped, deeply excavated at apex, with small field of microtrichia at base; digitus long, with swollen roundish apex; inferior volsella parallel-sided, tapering to round apex; median volsella with setiform and pectinate lamellae.

Description. Adult male (n = 1)

Wing length 1.47 mm.

Colouration. Eyes black; antennal pedicel, head capsule, ground colour of thorax, scutellum, haltere, proximal parts of legs and abdomen greenish yellow; wing membrane with pale greenish undertone; remaining body parts slightly darker, brownish.

Head. Antenna with 13 flagellomeres; AR 0.48. Frontal tubercles absent. Length of palpomeres II–V (μm): 38, 94, 101, 179. Clypeus with 15 setae.

Thorax chaetotaxy. Ac 15; Dc 8 on each side; Pa 1 on each side; Scts 4, outermost pair minute.

Wing. Fig. 2A. Membrane below R and An with sparse macrotrichia only in distal part, cells r_{4+5} , m_{1+2} and distal half of m_{3+4} covered with dense macrotrichia.

Legs. Fore tibia with straight slender spur. Tibial combs of mid and hind leg separated; spurs of mid leg unequal: one long and straight and the second short, tooth-like; spurs of hind leg equal, long and slightly bent. Basitarsus of mid leg bearing 4 hook-shaped sensilla chaetica. Length of leg segments and leg ratios in Table 2.

TABLE 2. Lengths (μm) of leg segments and leg ratios of male *Tanytarsus cotopaxi* sp. nov.

| | fe | ti | ta ₁ | ta ₂ | ta ₃ | ta ₄ | ta ₅ | LR |
|----------------|-----|-----|-----------------|-----------------|-----------------|-----------------|-----------------|------|
| P ₁ | 840 | 380 | 1270 | 565 | 445 | 355 | 150 | 3.34 |
| P ₂ | 795 | 605 | 435 | 195 | 140 | 80 | 55 | 0.72 |
| P ₃ | 820 | 745 | – | – | – | – | – | – |

Hypopygium (Fig. 2B, C). Gonostylus 100 μm long, slightly swollen in proximal part, tapering to slender tip. Anal tergite with 4 bristle-shaped median setae arranged in transversal row. Anal tergite bands of V-type, separated, with distal sections bent and parallelly tapering to the centre of anal tergite; lateral teeth absent. Anal point stout and long, slightly expanded in proximal part, roundish, with abruptly narrowed tip, apically blunt with 3–4 lateral setae on each side and 4 spinulae arranged in regular row and placed in pit framed by semicircular anal crests; entire area surrounding base of anal point covered with microtrichia, microtrichia between crests absent. Superior volsella ellipse-shaped, deeply excavated at apex, with small field of microtrichia at base, bearing 2 dorsal setae, 2 anteromedian setae and small tubercle (seta apparently broken) at base of digitus. Digitus straight and long, extending far beyond superior volsella, with swollen roundish apex. Inferior volsella parallel-sided, tapering to round apex, with slight dorsomedian ridge (Fig. 2B). Stem of median volsella 12 μm long, slightly curved, bearing 1 short setiform and 3 slender pectinate lamellae (Fig. 2C).

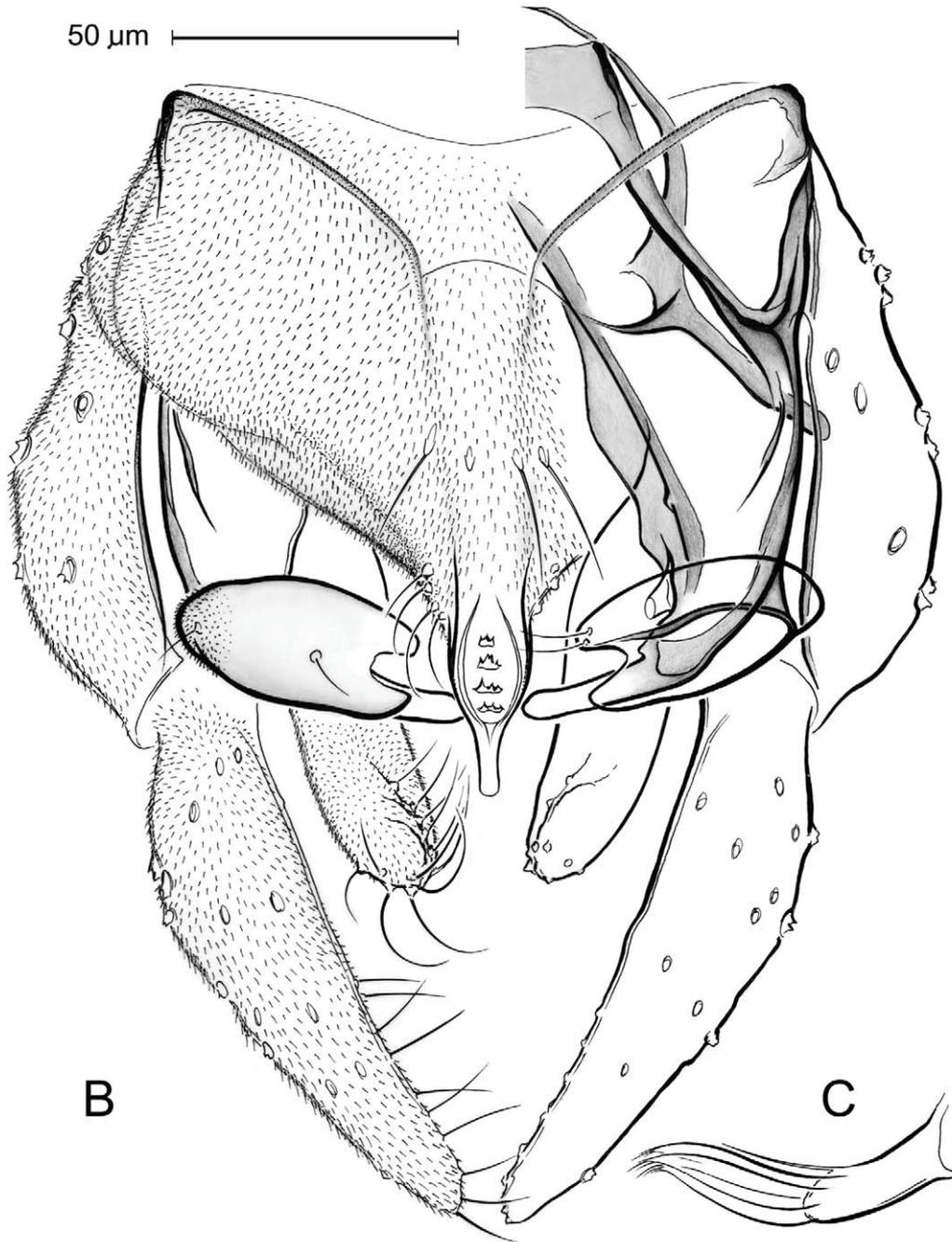
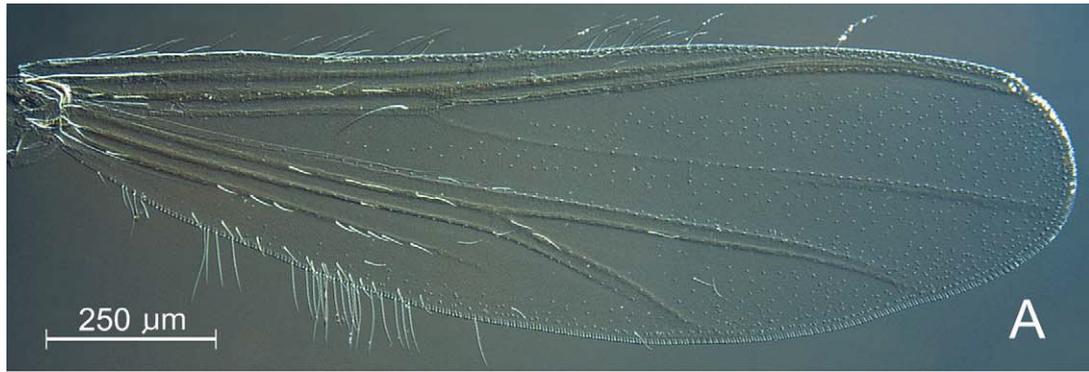


FIGURE 2. *Tanytarsus cotopaxi* sp. nov., adult male. A—wing, B—hypopygium, C—median volsella (magnified x 2 relative to hypopygium).

Discussion. We recognized *Tanytarsus cotopaxi* as a member of the *riopreto* species group that was so far known from four species (Fittkau & Reiss 1973, Sanseverino 2006). Following the inclusion of *T. cotopaxi* into the group, we propose to delimit the recently emended group diagnosis (Sanseverino 2006) to several principal characters as follows: LR_1 relatively high (c. 2.9–3.9); anal tergite bands parallelly tapering to the centre of anal tergite, ending close to anal point base; median setae strong or bristle-shaped; anal point elongate, with crests and spinulae well developed; superior volsella heart-shaped, ellipse-shaped or somewhat T-like, distinctly concave or excavated; two setae on median margin of superior volsella and single seta-bearing tubercle at base of digitus; digitus extending beyond superior volsella; median volsella with setiform and pectinate lamellae; stem of median volsella and digitus more or less of the same length. The *riopreto* group appears to be closely related to the Holarctic *chinyensis* group, as suggested by Gilka and Paasivirta (2009). The median volsella / digitus proportions and the size of median setae are the best diagnostic characters for separation of the two groups.

The adult male of *Tanytarsus cotopaxi* is easily determinable by the low AR (0.48 vs. 0.6–1.0 known in the *riopreto* group so far), the bristle-shaped median setae arranged in transversal row, the anal point distinctly expanded in proximal part, bearing large spinulae placed in row, the superior volsella ellipse-shaped, deeply excavated at apex, the digitus long, with swollen apex, and the median volsella with single setiform and three pectinate lamellae. The field of microtrichia on the superior volsella found in *T. cotopaxi* is known in the group only from *T. cururui* Fittkau *et* Reiss.

Tanytarsus curvicristatus Contreras-Lichtenberg, 1988

Tanytarsus curvicristatus Contreras-Lichtenberg, 1988: 101 (adult male; figs 1, 2; Colombia); Sanseverino 2006: 198 (adult male, fig. 62, Peru); Sanseverino & Trivinho-Strixino 2010: 74.

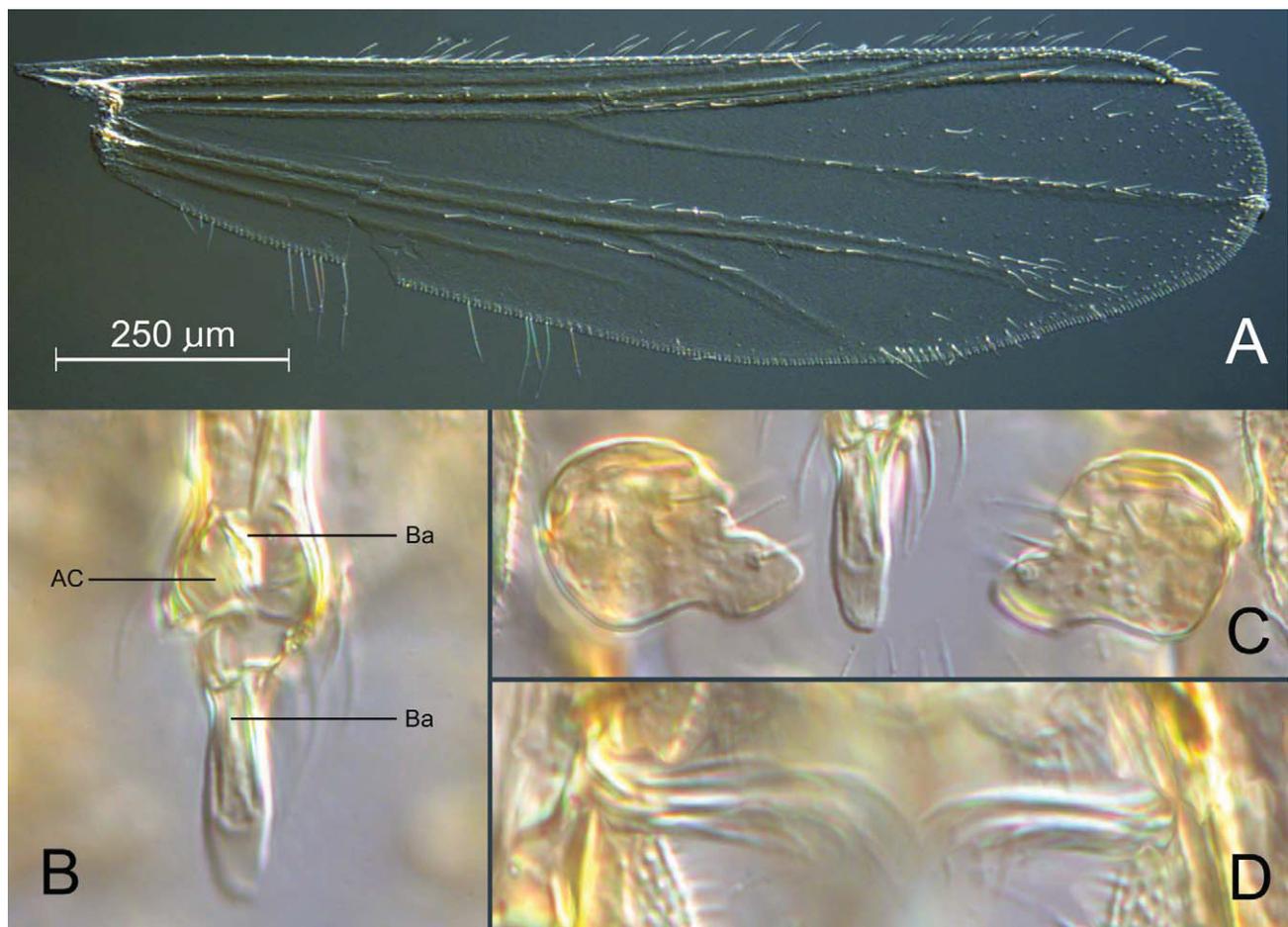


FIGURE 3. *Tanytarsus curvicristatus* Contreras-Lichtenberg, 1988, adult male. A—wing, B—hypopygial anal point, C—superior volsellae, D—median volsellae. AC—anal crests, Ba—anal point bar.

Material examined. ECUADOR, Pichincha province, San Miguel de Los Bancos (canton), Mindo, c. 1400 m a.s.l., 25–31 August 1999, netting, 1 male, leg. Dawid Graczyk.

Discussion. Most of diagnostic characters found in the examined specimen of *Tanytarsus curvicristatus* are consistent with those originally described and recently complemented (Contreras-Lichtenberg 1988, Sanseverino 2006). The adult male of the species can be identified by the following feature combination: wing covered with macrotrichia only in distal part: sparse macrotrichia in 2/3 distal area of r_{4+5} , m_{1+2} and along wing margin in cubital and anal cells (Fig. 3A); hypopygial anal point with pair of short and broad oval crests above round pit, and with two bars (Fig. 3B); superior volsella round at base, with protruding posteromedian corner (Fig. 3C); digitus vestigial, pointed; median volsella short, with setiform, slender spindle-shaped and several ramose lamellae (Fig. 3D). Other metric and meristic diagnostic characters presently complemented: frontal tubercles absent, AR 0.56, 12 clypeals, 7–8 dorsocentrals, 4–5 scutellars and 1 prealar seta; tibial spur of fore leg 24 μm long, combs of mid and hind legs 12–20 μm long, spurs 24 and 40 μm long (mid leg), 32 and 44 μm long (hind leg); LR2 0.61, LR3 0.64; gonostylus c. 95 μm long, stem of median volsella 8 μm long. In proportion to the smaller size, the individual examined shows a distinctly shorter wing (1.25 mm vs. 1.33–2.30 mm), antennal and palp segments and a slightly higher LR_1 (2.5 vs. 2.4) (*cf.* l.c.).

The systematic position of several *Tanytarsus* species having the characteristic structure of the anal point (Fig. 3B) is discussed in detail by Sanseverino and Trivinho-Strixino (2010).

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