Zootaxa 3742 (1): 001–078
www.mapress.com/zootaxa/

Monograph

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3742.1.1
http://zoobank.org/urn:lsid:zoobank.org:pub:78959DF2-CFF7-442A-B7B3-0B1A053A4D73

ZOOTAXA

3742

Revision of *Beardius* Reiss *et* Sublette, 1985 (Diptera: Chironomidae), with the description of twenty new species

LUIZ CARLOS PINHO[1], HUMBERTO FONSECA MENDES[2] & TROND ANDERSEN[3,4]

[1]*Universidade Federal de Santa Catarina, Centro de Ciências Biológicas, Depto. de Ecologia e Zoologia, 88040–901, Florianópolis - SC, Brazil. E-mail: luiz.pinho@ufsc.br*

[2]*Universidade Federal do ABC, Centro de Ciências Naturais e Humanas, Bloco A, Sala 501–3, Rua Santa Adélia 166, Bairro Bangu, 09210–170, Santo André - SP, Brazil. E-mail: humberto.mendes@ufabc.edu.br*

[3]*Department of Natural History, University Museum of Bergen, University of Bergen, P.O. Box 7800, N-5020 Bergen, Norway.*

[4]*Corresponding author: E-mail: trond.andersen@um.uib.no*

Magnolia Press
Auckland, New Zealand

Accepted by B. Rossaro: 13 Aug. 2013; published: 2 Dec. 2013

LUIZ CARLOS PINHO, HUMBERTO FONSECA MENDES & TROND ANDERSEN
Revision of *Beardius* Reiss *et* Sublette, 1985 (Diptera: Chironomidae), with the description of twenty new species
(*Zootaxa* 3742)

78 pp.; 30 cm.

2 Dec. 2013

ISBN 978-1-77557-304-3 (paperback)

ISBN 978-1-77557-305-0 (Online edition)

FIRST PUBLISHED IN 2013 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of content

Abstract

The genus *Beardius* Reiss *et* Sublette, 1985 is revised and twenty new species, *Beardius abbadi* **sp. n.**, *B. arawak* **sp. n.**, *B. bizzoi* **sp. n.**, *B. bucephalus* **sp. n.**, *B. curticaudatus* **sp. n.**, *B. dioi* **sp. n.**, *B. hirtidorsum* **sp. n.**, *B. krenak* **sp. n.**, *B. kumadueni* **sp. n.**, *B. longicaudatus* **sp. n.**, *B. mileneae* **sp. n.**, *B. nebularius* **sp. n.**, *B. neusae* **sp. n.**, *B. novoairensis* **sp. n.**, *B. phoenix* **sp. n.**, *B. sapiranga* **sp. n.**, *B. tupinamba* **sp. n.**, *B. vanessae* **sp. n.**, and *B. yperoig* **sp. n.** from Brazil and *Beardius chapala* **sp. n.** from Mexico are described and figured. Further, the female, pupa and larva of *B. urupeatan* Pinho, Mendes *et* Andersen and the female and larva of *B. cristhinae* Trivinho-Strixino *et* Siqueira are described, and new records of Brazilian species are provided. Emended diagnoses for all stages and sexes are given. The phylogeny of the genus is outlined and seven tentative species groups, the *parcus* group, the *truncatus* group, the *tupinamba* group, the *triangulatus* group, the *bucephalus* group, the *xylophilus* group, and the *roquei* group, are proposed. Keys to males, females, pupae and larvae are provided.

Key words: Diptera, Chironomidae, *Beardius*, systematics, new species, Brazil

Introduction

The genus *Beardius* was erected by Reiss & Sublette (1985) based on three new species, *B. parcus* from Venezuela and Brazil, *B. breviculus* from Panama, and *B. truncatus* from Texas, U.S.A. Andersen & Sæther (1996) described *B. aciculatus* from Costa Rica and Mexico, and *B. lingulatus* and *B. triangulatus* from Costa Rica. Jacobsen & Perry (2000) revised the genus, and described *B. reissi* from Florida, U.S.A. Later, six new Brazilian species have been added. Trivinho-Strixino & Strixino (2000) described *B. phytophilus* and *B. xylophilus*; Trivinho-Strixino & Siqueira (2007) described *B. cristhinae* and *B. roquei*; and finally Pinho *et al.* (2009) described *B. fittkaui* and *B. urupeatan.* The larvae are associated with macrophytes or submerged wood in both standing and flowing waters (Jacobsen & Perry 2000; Trivinho-Strixino & Strixino 2000).

During the last few years, by combination of sorting through unidentified museum material and fieldwork in Brazil, we have encountered twenty new Neotropical *Beardius* species, all described below. The genus thus comprises 33 species, distributed in the Neotropical and southern Nearctic regions. Emended diagnoses for all stages and sexes are given, the phylogeny of the genus is outlined and seven tentative species groups are proposed. Keys to the males, females, pupae and larvae are provided.

Material and methods

The specimens were mounted on slides in Euparal following the procedure outlined by Sæther (1969). The general terminology and abbreviations follow Sæther (1980). Measurements are given as ranges, followed by the mean when more than three specimens were measured, followed by the number of specimens measured in parenthesis. Types will be housed in the following collections, as stated in each description:

INPA—Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil.
MZSP—Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.
MZUFBA—Museu de Zoologia da Universidade Federal da Bahia, Salvador, Brazil.
ZMBN—Department of Natural History, University Museum of Bergen, Norway.
ZSM—Zoologische Staatssammlung München, Munich, Germany.

Beardius Reiss *et* Sublette

Beardius Reiss *et* Sublette, 1985: 175.
Beardius Reiss *et* Sublette; Andersen & Sæther (1996: 34), Jacobsen & Perry (2000: 130).

Type species: *Beardius parcus* Reiss *et* Sublette, 1985: 183, by original designation.

Other included species: *Beardius abbadi* **sp. n.**; *B. aciculatus* Andersen *et* Sæther, 1996; *B. arawak* **sp. n.**; *B. bizzoi* **sp. n.**; *B. breviculus* Reiss *et* Sublette, 1985; *B. bucephalus* **sp. n.**; *B. chapala* **sp. n.**; *B. cristhinae* Trivinho-

Strixino *et* Siqueira, 2007; *B. curticaudatus* **sp. n.**; *B. dioi* **sp. n.**; *B. fittkaui* Pinho, Mendes *et* Andersen, 2009; *B. hirtidorsum* **sp. n.**; *B. krenak* **sp. n.**; *B. kumadueni* **sp. n.**; *B. lingulatus* Andersen *et* Sæther, 1996; *B. longicaudatus* **sp. n.**; *B. mileneae* **sp. n.**; *B. nebularius* **sp. n.**; *B. neusae* **sp. n.**; *B. novoairensis* **sp. n.**; *B. phoenix* **sp. n.**; *B. phytophilus* Trivinho-Strixino *et* Strixino, 2000; *B. reissi* Jacobsen, 2000; *B. roquei* Trivinho-Strixino *et* Siqueira, 2007; *B. sapiranga* **sp. n.**; *B. triangulatus* Andersen *et* Sæther, 1996; *B. truncatus* Reiss *et* Sublette, 1985; *B. tupinamba* **sp. n.**; *B. urupeatan* Pinho, Mendes *et* Andersen, 2009; *B. vanessae* **sp. n.**; *B. xylophilus* Trivinho-Strixino *et* Strixino, 2000; *B. yperoig* **sp. n.**

The diagnosis of the adults is emended based on Andersen & Sæther (1996) and Jacobsen & Perry (2000). When describing the new species it became evident that the structure previously regarded as the median volsella in fact is two different structures. Previously the median volsella in *Beardius* has been regarded as a very plastic structure, varying from a low wart-like tubercle bearing long setae as in *B. phytophilus* (Fig. 1), to a long, triangular to rounded microtrichiose projection as in *B. lingulatus* (Fig. 3) and *B. urupeatan* (Fig. 6), sometimes bearing long lamellae as in *B. xylophilus* (Fig. 151). However, in the hypopygium of for instance *B. phoenix* sp. n. or *B. dioi* sp. n. two structures which can be interpreted as the median volsella are evident, both a proximal wart-like tubercle and a distal microtrichiose projection (Figs 2, 7, 8). The median volsellae in other Chironomini genera are usually either wart-like, as in *Microtendipes* Kieffer and *Oukuriella* Epler, or somewhat longer and cylindrical, as in *Nilothauma* Kieffer and *Paratendipes* Kieffer, both types bearing one to several apical setae. Thus, the median volsella in *Beardius* is most likely to be the proximal wart-like tubercle with strong apical setae, as described for *B. phytophilus*, *B. cristhinae*, *B. roquei*, *B. parcus* and *B. reissi*.

The distal microtrichiose "median volsella" is to a varying degree attached to the inferior volsella (Figs 8–10) and in some of the new species, like in *B. phoenix* sp. n. (Fig. 2), *B. arawak* sp. n. (Fig. 4), and *B. novoairensis* sp. n. (Fig. 5) arises from the very base of the inferior volsella. This structure is thus regarded as part of the inferior volsella and is called the basal lobe or basal projection of the inferior volsella below.

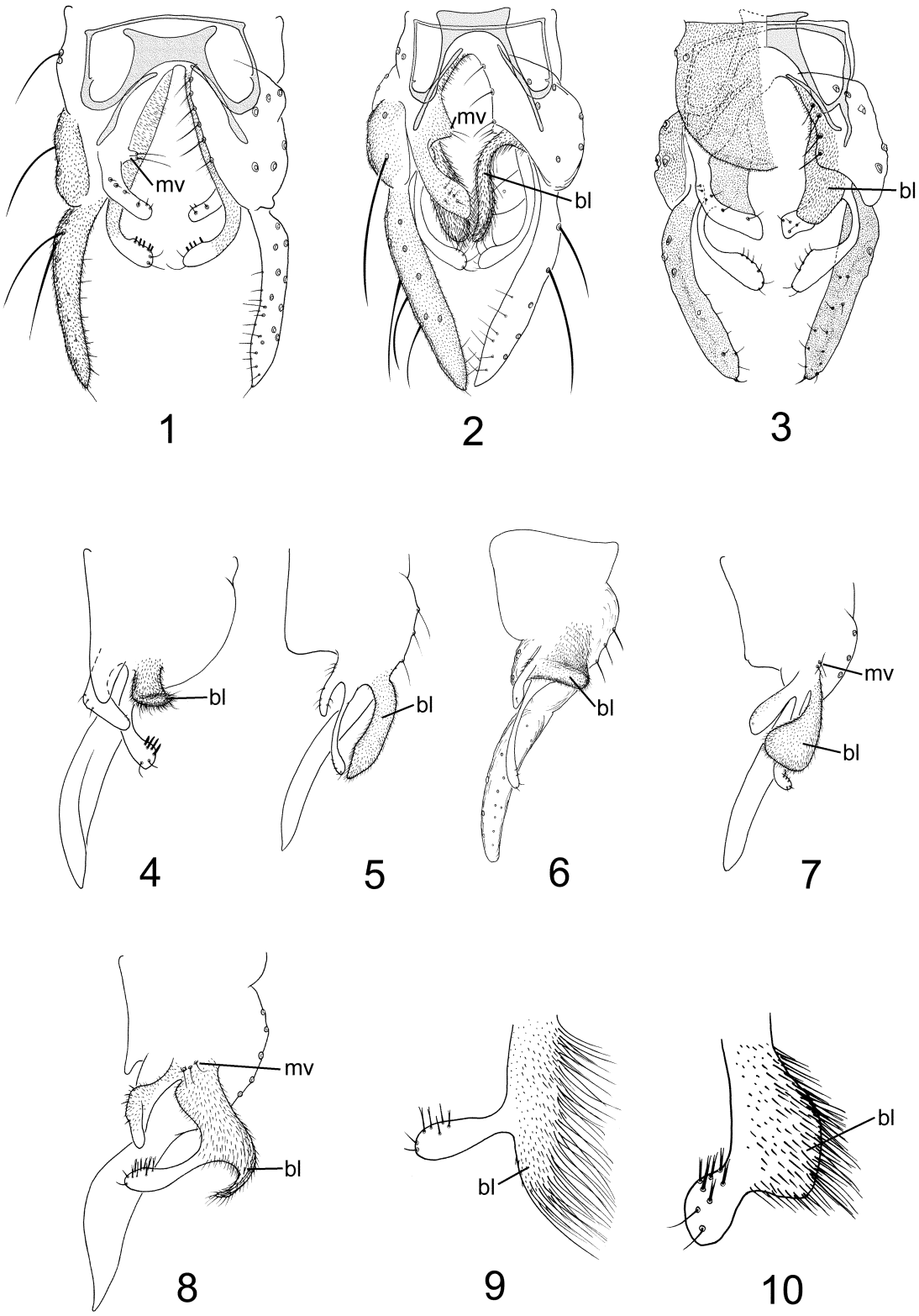
Both structures, the median volsella and the microtrichiose projection of the inferior volsella may be present or absent and the description of some of the previous named species is emended below accordingly. However, when only one structure is present, our interpretation might be questionable for a few species. We have for instance interpreted the structure in *B. curticaudatus* sp. n. and *B. xylophilus* sp. n. as being a projection of the inferior volsella rather than a median volsella, even though it might resemble the median volsella in many Tanytarsini species.

Diagnosis

The males can be separated from other Chironomini genera based on the following combination of characters: squama bare; fore tibia with reduced scale and well developed spur; superior volsella simple; presence of median volsella and / or basal projection of inferior volsella; transverse sternapodeme with oral projections; two (rarely three) thin simple setae at apex of inferior volsella; and AR > 0.5, in most species > 0.8.

The pupae can be separated from other Chironomini genera based on the following combination of characters: thoracic horn with few branches, often with a stronger anterior branch with spinules; tergites III–VI with anterior transverse band of shagreen; tergites VII and VIII often bare, sometimes with anterolateral patches of shagreen; paratergite VIII often with long, curved spines anterior to anal spur; and abdominal segment V with 3 pairs of taeniate L setae.

The larvae can be separated from other Chironomini genera based on the following combination of characters: antenna with 5–7 segments; Lauterborn organ opposite on apex of segments 2 and 3; clypeus separated or fused with frontal apotome to form a frontoclypeal apotome; dorsal tooth of mandible pale; mentum with median tooth simple, contrasting pale, lower than first lateral tooth; and pecten epipharyngis composed of three distinct plates, each with 3–4 teeth.



FIGURES 1–10. Variation in the median volsella (mv) and the basal lobe of the inferior volsella (bl) in male *Beardius.* **1–3**—hypopygium, dorso-ventral view; **4–8**—hypopygium, lateral view, **9–10**—inferior volsella with basal lobe. — **1**—*B. phytophilus* Trivinho-Strixino *et* Strixino; **2**—*B. phoenix* **sp. n.**; **3**—*B. lingulatus* Andersen *et* Sæther; **4**—*B. arawak* **sp. n.**; **5**—*B. novoairensis* **sp. n.**; **6**—*B. urupeatan* Pinho, Mendes *et* Andersen; **7**—*B. phoenix* **sp. n.**; **8**—*B. dioi* **sp. n.**; **9**—*B. bizzoi* **sp. n.**; **10**—*B. mileneae* **sp. n.** — (**3**—redrawn after Andersen & Sæther (1996); **6**—redrawn after Pinho *et al.* (2009)).

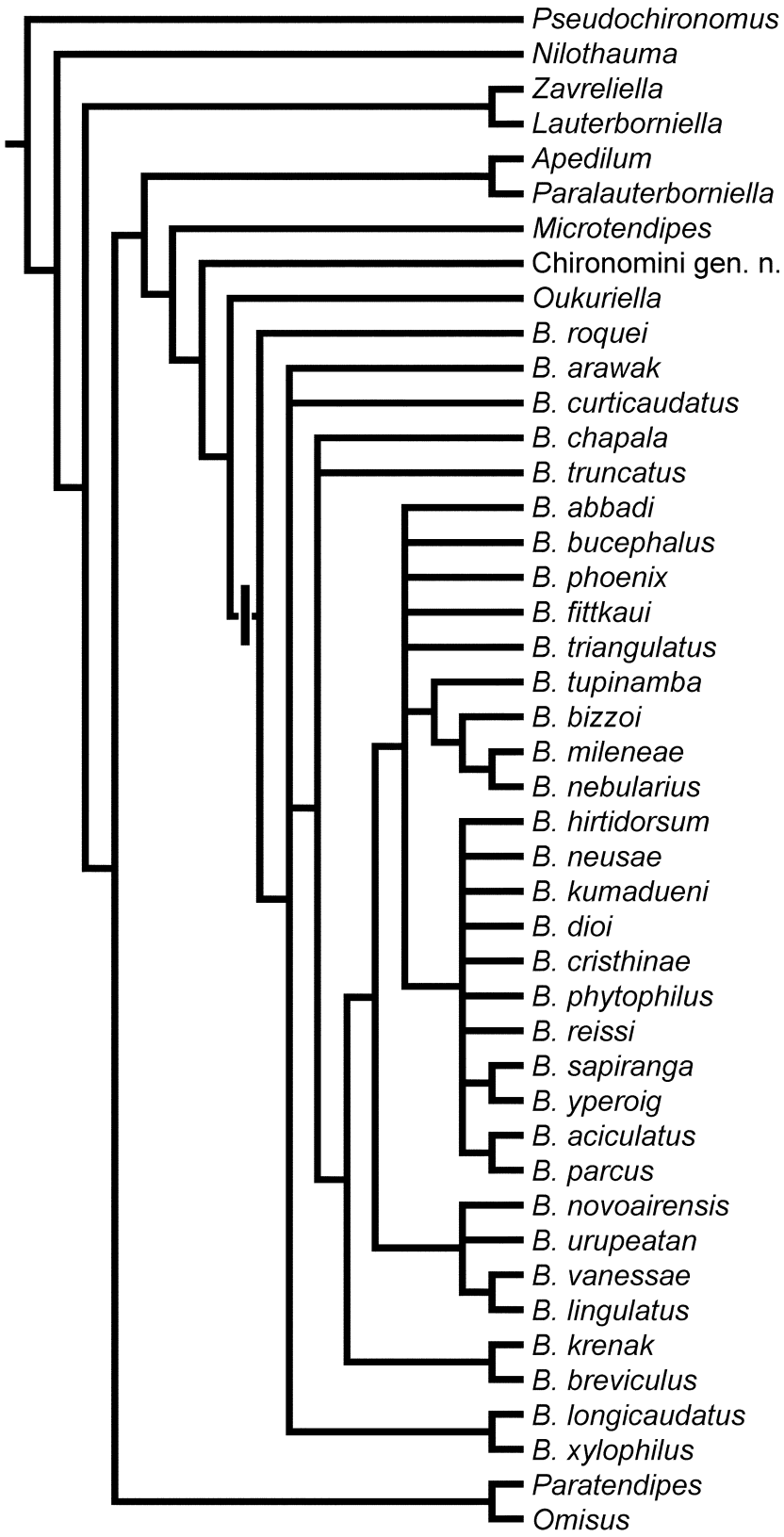


FIGURE 11. Strict consensus tree of parsimony analysis after equal weighting of the characters. Bar indicates the genus *Beardius.*

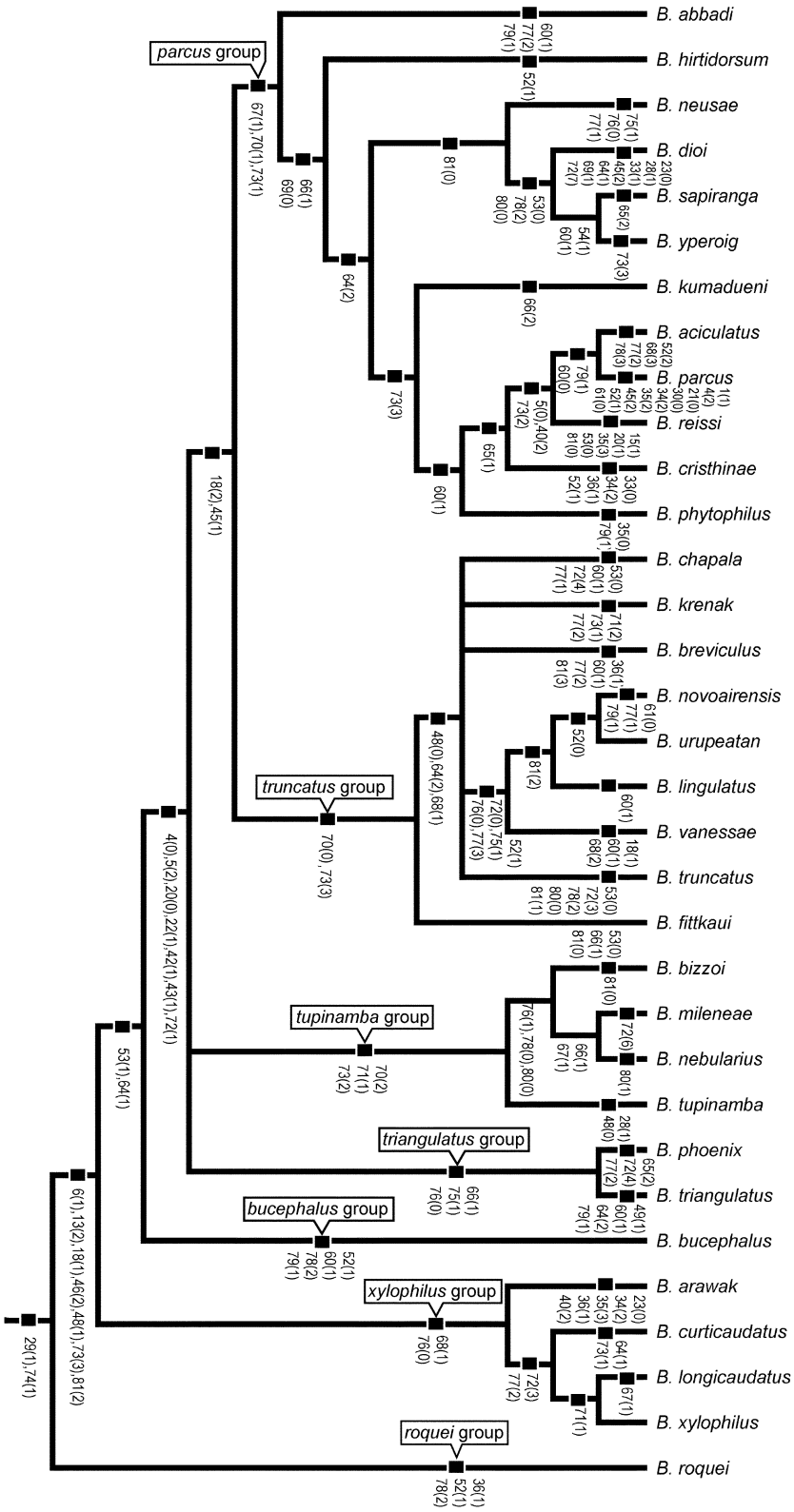


FIGURE 12. Strict consensus tree of parsimony analysis of the relationships within *Beardius* after successive weighting of the characters.

Description

Adults. Small to medium sized species, wing length 1.2–2.7 mm.

Coloration. Body pale to brown, sometimes with anterior brown band on pale tergites; legs pale to pale brown; wing membrane translucent without dark spots or bands.

Antenna. Male with 13 flagellomeres; AR 0.5–1.5. Female with 5 flagellomeres; AR 0.3–0.4.

Head. Eyes bare, iridescent or not, with moderate dorsomedial extension. Temporals about 10. Frontal tubercles absent. Palp with five segments, not shortened; segment 3 with about 4 sensillae subapically.

Thorax. Antepronotal lobes fused dorsally, strongly constricted. Scutum slightly overhanging antepronotum; scutal tubercle present or absent. Acrostichals of normal length, reduced, or lacking. With 5–10 dorsocentrals, sometimes 1–3 of them close to antepronotum; 0–3 prealars. Scutellum with 4–6 setae.

Wing. Membrane bare. Anal lobe absent. Costa not extended, ending distal to M_{1+2}; R_{2+3} ending at 1/3 to 1/2 the distance between R_1 and R_{4+5}; Fcu slightly distal to RM. Wing frequently with seta on R and apex of R_{4+5}, sometimes R without setae; R_1 and basal 2/3 of R_{4+5} always without setae. Squama bare.

Legs. Apex of fore tibia with long, narrow spur on reduced scale. Mid and hind tibia with 1 short, high, comb-bearing long spur, narrowly separated from smooth, unspurred comb. Pseudospurs absent. Sensillae chaetica mostly present on tarsomere 1 of mid leg and sometimes on tarsomere 1 of hind leg. Pulvilli simple, shorter than claw.

Abdomen. Tergites weakly setose, with tendency to anterior and posterior transverse bands, or with two central tufts on each tergite (*B. dioi* sp. n.). Segment VIII rectangular, sometimes slightly constricted anteriorly, but not triangular.

Male hypopygium. Tergal bands absent, weak and following anterior margin of tergite, or well developed. Tergite IX rarely with median setae and without apical setae. Anal point absent or present, short to moderately long, fully covered with microtrichia or comparatively long, with bare apex. Posterior margin of anal tergite square to rounded, sometimes slightly concave medially. Superior volsella digitiform, leaf-shaped or pediform, with or without microtrichia, with about 6–20 dorsal, 2 apical and 4 ventral setae. Median volsella absent to weakly developed, reduced to 1–6 short tubercles with long apical setae. Inferior volsella narrow to wide, straight to strongly curved, frequently clavate, bearing 2, rarely 3, thin simple setae at apex; microtrichia covering at most 2/3 of the volsella, or completely bare; projection of inferior volsella often present, arising at base or along basal 1/2 of the volsella, with lamellae, setae or macrotrichia. Gonostylus generally slender, nearly parallel-sided, apically blunt and with few apical and median short setae. Transverse sternapodeme small to broadly plate-like, with distinct oral projections.

Female genitalia. Gonocoxapodeme VIII straigth, ending on base of dorsomesal lobe of gonapophysis VIII. Gonocoxite IX small, with 0–2 setae. Tergite IX undivided, with numerous setae. Segment X with 0–2 setae. Postgenital plate subtriangular to triangular, comparatively large. Cercus of moderate size. Gonapophysis VIII divided into large dorsomesal lobe and small to moderately sized, brush-like ventrolateral lobe. Apodeme lobe indistinct, with straight or slightly curved apodeme. Coxosternapodeme evenly curved. Seminal capsules small, spherical to ovoid, with or without microtrichia and indistinct to distinct neck. Spermathecal ducts narrow to wide, straight or slightly curved, bare or with thorn-like secretory cells along proximal 1/2. Labium apparently bare.

Pupa. Small to medium sized pupae.

Coloration. Exuvia pale to light brown.

Cephalothorax. Cephalic tubercles short and triangular, or absent; frontal setae slender. Frontal warts absent. Thoracic horn with about 6 strong, smooth branches, or with anterior branch notably larger and covered with fine spinules. Basal ring of thoracic horn rounded to elliptical, with rounded tracheal branch. Thorax frequently with fine dorsal granulation. Prealar tubercle absent. With 4 dorsocentrals; 1–2 precorneals; 0–1 antepronotal; and 0–1 prealar.

Abdomen. Tergite I bare (except in *B. arawak* sp. n.); tergites II–VI each with conspicuous anterior band of strong shagreen contiguous with median field of finer shagreen, uniform or stronger anteriorly, or tergite II with uniform strong shagreen and tergites III–VI with anterior shagreen only slightly stronger than posterior shagreen. Tergites VII and VIII bare, or with shagreen in two anterolateral patches (as in *B. roquei* and *B. arawak* sp. n.). Row of hooklets on tergite II continuous, extending for 1/3 to 2/3 the width of the tergite. Pedes spurii A present on sternite IV. Pedes spurii B on segment II weak. Anterolateral and anteromedial tubercles absent on sternite I. Conjunctive I/II bare (except for *B. truncatus*, with few spinules); conjunctive III/IV bare; conjuntive IV/V with spinules arranged in a single or two separate patches. Spur on tergite VIII wide, short, with one or two teeth and frequently with some minute accessory teeth basally; often with several small to large, straight to posteriorly curved spines or clusters of spinules anterior to spur. Segment I without L seta; segments II–IV each with 3 pairs of short L setae; segment V with 3 pairs of taeniate L setae; segments VI–VII each with 4 pairs; and segment VIII

with 3–4 pairs of longer taeniate L setae. Each segment with pair of ventral and dorsal O setae. Anal lobe with few (< 30) uniserial fringe taeniae. Dorsal setae absent. Genital sac overreaching anal lobe by 1/3 to 1/2 of its length.

TABLE 1. Character states for characters 1–81. Polymorphisms: A = 0&1; B = 1&2; C = 0&2; D = 0&1&2; E = 0&–; F = 1&3; G = 0&3; H = 0&1&2&3.

Taxon / Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Pseudochironomus	1	0	0	0	0	1	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	G	0	1	0	2	0	0
Zavreliella	0	0	1	1	0	0	1	0	1	0	1	1	2	0	1	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0	2	0	0	0	A	0	1	0	0
Apedilum	0	0	1	1	0	0	1	1	1	0	1	1	1	0	0	0	1	0	1	0	0	1	0	1	1	0	1	0	2	0	0	1	2	0	0	0	0	1	A	1	0
Paratendipes	0	0	1	1	1	0	1	0	A	0	1	0	1	0	0	0	3	0	1	1	0	0	0	1	1	0	1	0	2	0	0	0	A	0	3	0	A	0	1	0	0
Paralauterborniella	0	0	1	1	0	0	1	2	1	0	0	-	1	0	0	0	0	0	1	0	0	0	0	1	1	0	1	1	2	0	0	0	2	C	0	0	A	0	A	0	0
Oukuriella	0	1	1	A	0	0	A	0	A	0	A	E	B	0	0	A	D	A	1	1	0	0	1	1	1	0	1	0	2	0	0	0	0	B	0	0	0	0	1	1	2
Omisus	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	0	3	0	1	0	0	0	0	1	1	1	1	0	3	0	0	0	2	2	1	0	1	0	2	1	2
Microtendipes	1	0	1	1	A	0	1	1	1	A	1	0	1	0	0	0	2	0	A	1	0	0	0	0	1	0	1	0	3	1	0	0	1	0	0	0	0	0	B	0	0
Lauterborniella	1	0	1	1	2	0	1	0	1	1	1	0	2	1	1	0	1	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0	2	1	1	1	0	0	1	0	2
Nilothauma	1	0	A	0	1	0	?	0	0	1	0	B	0	0	1	B	0	A	A	0	0	0	1	1	0	0	0	2	1	0	0	0	0	0	0	0	1	1	0	0
Chironomini gen n	0	0	1	1	C	0	1	1	1	0	1	1	1	0	0	0	3	0	1	1	0	0	0	1	1	0	1	0	2	1	0	0	2	0	0	0	0	0	1	0	2
B. abbadi	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. bizzoi	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. bucephalus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. arawak	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	1	1	0	1	0	1	?	0	0	2	2	3	1	0	0	1	2	2
B. chapala	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. krenak	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. curticaudatus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. hirtidorsum	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. neusae	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. longicaudatus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. mileneae	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. novoairensis	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. kumadueni	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. dioi	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	1	1	0	1	1	1	?	0	0	1	0	1	0	0	0	A	1	2
B. phoenix	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	1	1	0	1	A	1	1	0	0	2	0	1	0	0	0	1	1	2
B. sapiranga	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. tupinamba	0	1	1	0	2	1	1	0	1	0	1	0	2	0	0	0	1	1	0	1	1	1	1	1	1	0	1	1	1	1	0	0	2	0	1	0	0	0	A	1	2
B. vanessae	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. nebularius	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. yperoig	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. aciculatus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. breviculus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	1	1	0	1	0	1	1	0	0	2	0	1	1	0	0	1	1	2
B. cristhinae	0	1	1	0	2	1	1	0	1	0	1	0	2	0	0	0	0	2	1	0	1	1	1	1	1	0	1	0	1	1	0	0	0	2	1	1	0	0	1	1	2
B. fittkaui	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	1	1	0	1	0	1	1	0	0	2	0	1	0	0	0	1	1	2
B. lingulatus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. parcus	1	1	1	2	0	1	1	0	1	0	1	0	2	0	0	0	0	2	1	0	0	1	1	1	1	0	1	0	1	0	0	0	2	2	2	0	0	0	1	2	2
B. phytophilus	0	1	1	0	2	1	1	0	1	0	1	0	2	0	0	0	0	2	1	0	1	1	1	1	1	0	1	0	1	1	0	0	?	0	0	0	0	0	1	1	2
B. reissi	0	1	1	?	0	1	1	0	1	0	1	0	2	0	1	0	0	2	1	1	1	1	1	1	1	0	1	0	1	1	0	0	2	0	3	0	0	0	1	2	2
B. roquei	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	1	1	0	1	?	1	?	0	0	2	0	1	1	0	0	1	1	2
B. triangulatus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
B. truncatus	0	1	1	0	2	1	1	0	1	0	1	0	2	0	0	0	0	2	1	1	1	1	1	1	1	0	1	0	1	1	0	0	2	0	1	?	0	0	1	1	2
B. urupeatan	0	1	1	0	2	1	1	0	1	0	1	0	2	0	0	0	0	2	1	0	1	1	1	1	1	0	1	0	1	1	0	0	2	0	1	0	0	0	1	1	2
B. xylophilus	0	1	1	1	0	1	1	0	1	0	1	0	2	0	0	0	0	1	1	1	1	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

TABLE 1. Continued.

Taxon / Character	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
Pseudochironomus	0	0	0	A	0	A	0	0	0	0	1	0	0	0	0	0	0	A	0	0	1	2	B	A	?	0	0	-	-	-	0	0	0	0	0	A	0	A	H
Zavreliella	2	2	1	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	A	0	0	0	A	A	?	1	0	-	-	-	0	0	0	0	C	A	0	0	0
Apedilum	2	2	1	0	0	0	1	A	1	A	0	0	0	1	1	0	2	1	1	1	0	1	B	1	2	2	1	0	-	-	-	0	0	0	0	1	0	0	0	C
Paratendipes	2	2	1	0	0	0	0	A	0	0	0	0	0	0	1	A	B	A	0	A	0	A	0	0	1	0	0	0	-	-	-	0	0	0	0	1	0	0	A	G
Paralauterborniella	2	2	1	0	0	0	0	A	1	0	0	0	0	1	1	0	2	1	0	1	0	0	0	0	0	0	1	0	-	-	-	0	0	0	0	1	0	0	0	0
Oukuriella	A	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	2	1	A	A	0	0	2	A	A	?	2	0	-	-	-	F	A	0	A	C	A	0	0	0
Omisus	2	2	0	0	0	0	0	0	0	A	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	-	-	-	0	0	0	0	?	0	0	0	0
Microtendipes	B	A	A	0	A	1	A	0	0	A	0	A	0	1	1	0	A	0	0	0	0	0	0	0	1	0	2	0	-	-	-	0	0	0	0	1	A	0	0	1
Lauterborniella	2	2	1	0	0	1	0	A	0	0	0	0	0	0	1	0	2	1	0	0	0	1	0	0	1	1	1	0	-	-	-	0	0	0	0	1	0	0	0	0
Nilothauma	0	0	1	0	0	0	A	A	A	1	0	0	0	0	1	1	2	1	A	A	A	0	C	D	C	C	D	0	-	-	-	0	A	A	A	0	D	0	A	A
Chironomini gen n	2	2	1	0	0	1	0	A	0	0	0	0	1	1	1	0	2	1	0	1	0	1	0	0	0	0	0	2	0	-	-	-	0	0	0	1	1	1	0	0	0
B. abbadi	?	?	?	?	?	?	?	0	0	0	0	1	0	0	1	0	2	1	1	1	1	1	1	0	0	1	2	1	1	0	1	1	1	0	2	2	1	1	2
B. bizzoi	?	?	?	?	?	?	?	0	0	0	0	1	0	0	1	0	2	1	A	1	1	1	B	0	0	0	2	1	2	1	1	2	1	0	1	0	0	0	0	0
B. bucephalus	?	?	?	?	?	?	?	0	0	0	1	1	0	0	1	0	2	1	1	1	1	1	1	0	0	0	2	1	0	0	0	3	1	0	2	0	2	1	1	2
B. arawak	2	2	1	0	2	1	1	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1	0	0	0	0	1	1	0	0	0	3	1	0	0	C	1	0	1	2
B. chapala	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	0	?	?	1	1	1	1	2	0	0	0	1	1	0	0	4	3	1	0	2	1	1	?	?	?
B. krenak	?	?	?	?	?	?	?	0	0	0	0	1	0	0	1	0	2	1	0	1	1	1	2	0	0	0	1	1	0	2	1	1	1	0	2	2	1	0	A	C
B. curticaudatus	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1	1	0	0	0	1	1	0	0	3	1	1	0	0	2	1	0	1	2
B. hirtidorsum	?	?	?	?	?	?	?	0	0	0	1	1	0	0	1	0	2	1	0	1	1	1	1	0	1	1	2	0	-	-	-	1	1	0	2	0	1	A	1	2
B. neusae	?	?	?	?	?	?	?	0	0	0	0	1	0	0	1	0	2	1	0	1	1	1	2	0	1	1	2	0	-	-	-	1	1	1	0	1	1	A	A	0
B. longicaudatus	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1	0	0	0	1	1	1	0	1	?	3	1	0	0	2	1	0	1	2
B. mileneae	?	?	?	?	?	?	?	?	0	0	0	1	0	0	1	0	2	1	A	1	1	1	1	0	1	1	2	1	2	1	6	2	1	0	1	A	0	0	0	C
B. novoairensis	?	?	?	?	?	?	?	0	0	0	0	1	0	0	1	0	2	1	0	0	1	1	2	0	0	0	1	1	0	0	5	3	1	1	0	1	1	1	1	2
B. kumadueni	?	?	?	?	?	?	?	0	0	0	0	1	0	0	1	0	2	1	0	1	1	1	2	0	2	1	2	0	-	-	-	3	1	0	2	0	1	0	1	2
B. dioi	1	1	1	2	2	1	1	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1	1	0	1	1	2	1	1	0	7	1	1	0	2	0	2	0	0	0
B. phoenix	1	1	1	0	2	1	1	0	0	0	0	1	0	0	1	0	2	1	0	1	1	1	1	2	1	0	2	1	0	0	4	3	1	1	0	2	1	0	1	2
B. sapiranga	?	?	?	?	?	?	?	0	0	0	0	1	0	1	0	2	1	1	1	1	1	2	2	1	1	2	0	-	-	-	1	1	0	2	0	2	0	0	0
B. tupinamba	1	1	1	0	2	1	0	0	0	0	0	1	0	0	1	0	2	1	0	1	1	1	1	0	0	0	2	1	2	1	1	2	1	0	2	0	1	0	1	C
B. vanessae	?	?	?	?	?	?	?	0	0	0	1	1	0	0	1	0	2	1	1	1	1	1	2	0	0	1	2	1	0	0	0	3	1	1	0	3	1	A	1	0
B. nebularius	?	?	?	?	?	?	?	0	0	0	0	1	0	0	1	0	2	1	A	1	1	1	1	0	1	1	2	1	2	1	1	2	1	0	1	0	0	0	1	2
B. yperoig	?	?	?	?	?	?	?	0	0	0	0	0	1	0	1	0	2	1	1	1	1	1	2	0	1	1	2	0	-	-	-	3	1	0	2	0	2	0	0	C
B. aciculatus	?	?	?	?	?	?	?	0	0	0	2	1	0	0	1	0	2	1	0	1	1	1	2	1	1	1	3	0	-	-	-	2	1	0	2	2	3	1	1	2
B. breviculus	1	1	1	A	2	1	0	0	0	0	A	1	0	0	1	0	2	1	1	1	1	1	2	0	0	0	1	1	0	0	1	3	1	0	2	2	1	0	1	3
B. cristhinae	1	1	1	1	2	1	1	0	0	0	1	A	0	0	1	0	2	1	1	1	1	1	2	1	0	1	2	0	-	-	-	3	1	0	2	0	1	0	1	2
B. fittkaui	1	1	1	1	2	1	1	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1	1	0	1	0	2	1	0	0	1	3	1	0	2	0	1	0	1	0
B. lingulatus	?	?	?	?	?	?	?	0	0	0	1	1	0	0	1	0	2	1	1	1	1	1	2	0	0	0	1	1	0	0	2	3	1	1	0	3	1	0	1	2
B. parcus	1	1	1	2	2	1	1	0	0	0	1	1	0	0	1	0	2	1	0	0	1	1	2	1	1	1	2	0	-	-	-	2	1	0	2	0	1	1	1	2
B. phytophilus	1	1	1	1	2	1	1	0	0	0	0	1	0	0	1	0	2	1	1	1	1	B	0	?	?	2	0	-	-	-	3	1	0	2	0	1	1	1	2
B. reissi	1	1	1	1	2	1	1	0	0	0	0	0	0	0	1	0	2	1	1	1	1	1	2	1	1	1	2	0	-	-	-	2	1	0	2	0	1	0	A	0
B. roquei	2	2	1	1	0	1	0	0	0	0	1	0	0	0	1	0	2	1	0	1	1	1	0	0	0	0	2	0	-	-	-	0	1	0	2	0	2	0	1	0
B. triangulatus	?	?	?	?	?	?	?	1	0	0	0	1	0	0	1	0	2	1	1	1	1	1	2	0	1	0	2	1	0	0	1	3	1	1	0	0	1	1	1	2
B. truncatus	1	1	1	?	2	1	0	0	0	0	A	0	0	0	1	0	2	1	0	1	1	1	2	0	0	0	1	1	0	0	3	3	1	0	2	3	2	0	0	1
B. urupeatan	1	1	1	1	2	1	0	0	0	0	0	1	0	0	1	0	2	1	0	1	1	1	2	0	0	0	1	1	0	0	0	3	1	1	0	3	1	0	1	2
B. xylophilus	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1	0	0	0	0	1	1	0	1	3	1	1	0	0	2	1	0	1	2

Larva. Small to medium sized larva.

Coloration. Orange to red.

Head dorsum. Sclerite 2 present; clypeus separate or fused with frontal apotome to form a frontoclypeal apotome.

Antenna. With 5, 6 or 7 segments; basal segment somewhat shorter to slightly longer than flagellum; ring organ in basal 1/4 of basal segment. Antennal seta lacking. Antennal blade slightly shorter than flagellum or of equal length. Accessory blade short. Segment 3 with apical peg sensillum. Large lauterborn organs alternating on segments 2 and 3.

Mandible. With short, pale, erect dorsal tooth contiguous at base with smaller, flat tooth on inner surface of mandible. Apical tooth short, dark, as are the 2 inner teeth. Seta subdentalis straight, long, wide, bluntly rounded apically, reaching level of apical inner tooth. Seta interna with 3–4 major plumose branches. Pecten mandibularis indistinct / absent to conspicuous, with 6–15 setae. Mola with 0–2 spines.

Mentum. With simple, pale, low median tooth and 5 pairs of darker lateral teeth. First lateral tooth notched, higher than median tooth, with remaining lateral teeth progressively diminishing in size. Last two pairs of lateral teeth often fused at base. Ventromental plates separated by 1–2 times the width of median tooth, each about 2/3 to full width of mentum; medial apex pointed medially to slightly curved anteriorly or curved posteriorly. Seta submenti long, simple, bifid or weakly fimbriate, not extending past margin of mentum.

Labrum. SI slender, fimbriate only on medial side; alveolus of SI occurring on common base. SII slender, fimbriate only at apex; sitting on low tubercle. SIII simple. SIV normal. Seta premandibularis simple. Labral lamella normal. Pecten epipharyngis with 3 separate, apically toothed plates, each with 3–4 teeth. Premandible with 2–3 apical, rounded teeth.

Abdomen. Tubuli ventrales and lateralis absent. Four short tubuli anales present. Seta on base of the procercus as long as the anal setae. About 8 anal setae, equal or longer than the supraanal setae.

Systematics

To assess the phylogenetic relationship of the involved species a data matrix for 81 characters in 44 taxa was compiled (Table 1). All species of *Beardius* Reiss *et* Sublette were entered separately. Outgroups were selected after running preliminary analyses with Cranston's (2006) matrix, including *Beardius*, *Oukuriella* Epler and "Chironomini gen. n." (a new neotropical genus closely related to *Paratendipes*). Eleven genera were picked from eight different hierarchic levels, they are: (1) *Oukuriella* Epler, (2) Chironomini gen. n., (3) *Paratendipes* Kieffer, *Omisus* Townes, *Zavreliella* Kieffer and *Lauterborniella* Thienemann *et* Bause, (4) *Microtendipes* Kieffer, (5) *Apedilum* Townes, (6) *Paralauterborniella* Lenz, (7) *Nilothauma* Kieffer and (8) *Pseudochironomus* Malloch.
The following characters were used in the parsimony analysis:

Larva

1. Dorsal surface of head capsule: (0) S3 on same plate as S4 and S5 (clypeus fused to frons); (1) S3 on anterior plate to S4 and S5 (separate clypeus).
2. Clypeus/anterior frontoclypeus: (0) smooth; (1) granular.
3. Labral sclerite: (0) 0–1 & 2 present; (1) single.
4. Antennal segments: (0) five; (1) six; (2) seven.
5. Length of antennal blade: (0) extending to apex of antenna; (1) not extending to apex of antenna; (2) extending well beyond apex of antenna.
6. Accessory blade: (0) short; (1) subequal to segment 2.
7. Lauterborn organs: (0) opposite; (1) alternate on segments 2 and 3; (2) absent.
8. Pecten epypharyngis: (0) 3 separate scales; (1) 1 fused plate; (2) 2 separate scales.
9. Pecten epypharyngis: (0) smooth; (1) toothed in one plane; (2) toothed in multiple planes.
10. Premandible: (0) with 1–3 teeth; (1) with more than 3 teeth.
11. Mandibular dorsal tooth: (0) absent; (1) present.
12. Mandibular dorsal tooth (*absence scored as "–"*): (0) pale; (1) light to dark brown.
13. Mandibular inner teeth: (0) four; (1) three; (2) two.
14. Mandibular inner teeth: (0) light to dark brown; (1) pale.
15. Spines on mola: (0) absent; (1) present.
16. Seta interna: (0) present; (1) absent.
17. Median tooth of mentum: (0) simple; (1) bifid; (2) trifid; (3) divided in four.
18. Median tooth of mentum: (0) subequal or longer than first lateral tooth; (1) very short; (2) about 1/2 length of first lateral tooth.
19. Mentum: (0) dark; (1) dark, with median tooth pale; (2) pale.
20. Distance between ventromental plates: (0) about 1/2 the width of median tooth of mentum; (1) longer than the width of median tooth of mentum.
21. Postmentum: (0) smooth; (1) granular.
22. Medial ends of ventromental plates: (0) pointed medially to slightly curved anteriorly; (1) curved posteriorly.

Pupa

23. Cephalic tubercles: (0) absent; (1) present.
24. Frontal setae: (0) absent; (1) present.
25. Thoracic horn: (0) with 2–3 branches; (1) with 4–12 branches.
26. Basal ring of thoracic horn: (0) rounded to elliptical; (1) kidney-shaped.
27. Prealar tubercle: (0) present; (1) absent.
28. Scutum: (0) rugose; (1) smooth.
29. Number of precorneal setae: (0) absent; (1) one; (2) two; (3) three.
30. Thoracic horn: (0) with anterior stout branch; (1) without anterior stout branch.
31. Number of dorsocentral setae: (0) four; (1) two.
32. Row of hooklets on tergite II: (0) continuous; (1) interrupted.
33. Length of row of hooklets on tergite II: (0) longer than 1/2 the width of tergite; (1) 1/2 the width of tergite; (2) shorter than 1/2 the width of tergite.
34. Conjunctive IV/V: (0) with spinule in a single patch; (1) bare; (2) with spinule in two patches.
35. Spinules on paratergite V: (0) absent; (1) restricted to distal 1/4; (2) restricted to distal 1/2; (3) absent only in basal 1/4.
36. Spinules on paratergite VI: (0) absent; (1) present.
37. Tergite VIII spur: (0) with one dominant tooth; (1) with multiple, subequal teeth (comb).
38. Taeniate setae on segment IV: (0) absent; (1) present.
39. Taeniate setae on segment VIII: (0) three; (1) four; (2) five.
40. Tergite VI: (0) shagreen covering the whole tergite; (1) shagreen occupying 1/2 to 2/3 of the tergite; (2) shagreen restricted to distal 1/4 of the tergite.
41. Conjunctive III/IV: (0) with spinules in a single patch; (1) with spinules in two patches; (2) bare.
42. Tergite VII: (0) with shagreen in a single patch; (1) bare; (2) with shagreen in two patches.
43. Tergite VIII: (0) with shagreen in a single patch; (1) bare; (2) with shagreen in two patches.
44. Anal lobe: (0) with shagreen; (1) without.
45. Spines on paratergite VIII: (0) absent; (1) long; (2) short.
46. Anal lobe fringe: (0) one layer, complete (with more than 20 taeniate setae); (1) multilayered; (2) one layer, sparse (with less than 20 taeniate setae).
47. Dorsal setae on anal lobe: (0) present; (1) absent.
48. Shagreen on tergite II: (0) uniform; (1) stronger in basal 1/2.

Imagines

49. Antennal ratio: (0) >1.0; (1) <1.0.
50. Frontal tubercle: (0) absent; (1) present.
51. Dorsomedial extension of eye: (0) moderate to weak; (1) strong, eyes almost touching.
52. Scutal tubercle: (0) absent; (1) reduced; (2) well developed.
53. Acrostichals: (0) present; (1) absent.
54. Anterior dorsocentrals, (*close to antepronotum*): (0) absent; (1) present.
55. Spur/spine on fore tibial scale: (0) present; (1) absent.
56. Fore tibial comb: (0) present; (1) absent.
57. Hind tibial comb: (0) with one spur; (1) with two spurs.
58. Anal lobe of wing: (0) strong; (1) weak; (2) absent.
59. Squama: (0) with setae; (1) bare.
60. Tergal bands: (0) present; (1) absent.
61. Median setae of tergite IX: (0) present; (1) absent.
62. Apical setae of tergite IX: (0) present; (1) absent.
63. Transverse sternapodeme: (0) rounded or triangular; (1) with oral projections.
64. Anal point: (0) long; (1) short; (2) absent.
65. Superior volsella: (0) digitiform; (1) pediform; (2) leaf-shaped.
66. Microtrichia on dorsal surface of superior volsella: (0) absent; (1) absent at apex; (2) fully covering the surface.
67. Microtrichia on ventral surface of superior volsella: (0) absent; (1) absent at apex; (2) fully covering the surface.
68. Median volsella: (0) digitiform, with long apical setae; (1) absent; (2) wart-like, bearing long setae; (3) needle-shaped, with one basal seta.
69. Inferior volsella projection: (0) absent; (1) present.
70. Inferior volsella projection (*absence of projection scored as "–"*): (0) attached to base of the volsella; (1) attached from the base until mid-length of volsella; (2) attached from the base until 2/3 the length of volsella.
71. Inferior volsella projection (*absence of projection scored as "–"*): (0) with microtrichia only; (1) with microtrichia and lamellae; (2) with long setae.
72. Shape of inferior volsella projection (*absence of projection scored as "–"*): (0) rounded to quadrate, horizontal; (1) triangular, vertical; (2) tongue-shaped, vertical; (3) digitiform; (4) long, narrowed at base (spoon-shaped); (5) long, not narrowed at base, with triangular tip; (6) rounded to trapezoid, vertical; (7) tongue-shaped, curved, vertical.

73. Microtrichia on inferior volsella: (0) fully covering the volsella; (1) present only at base; (2) absent only at apex; (3) absent.
74. Apical thin setae of inferior volsella: (0) absent; (1) present.
75. Subapical setae of inferior volsella: (0) stout; (1) thin.
76. Subapical setae of inferior volsella: (0) simple, not branched; (1) bifid or trifid; (2) apically dissected.
77. Inferior volsella: (0) slightly curved; (1) straight; (2) strongly curved; (3) curved at base, straight at apex.
78. Tergite coloration: (0) uniformly brown to black; (1) uniformly pale; (2) at least tergites VI–VIII pale with brown oral bands; (3) tergite I brown, tergites II–VI brown and pale, tergites VII–IX pale.
79. Setae on R: (0) present; (1) absent.
80. Setae on R_1: (0) present; (1) absent.
81. Setae on R_{4+5}: (0) present in basal 1/3–2/3; (1) present along the whole vein; (2) restricted to apex; (3) absent.

The data matrix was edited in NDE (*Nexus Data Editor*), version 5.0 (Page 2001) and Mesquite (Maddison & Maddison 2009) and analyses were performed in PAUP* 4.0b10 (Swofford 2002). Distributions of characters and tree edition were done using Mesquite. All characters were treated as unordered.

Equal-weighting of characters resulted in 333 topologies, 288 steps long (CI = 0.43; RI = 0.66; RC = 0.28), the strict consensus tree is shown in Figure 11. The genus *Oukuriella* is shown to be the sister genus of *Beardius*. When applying successive weighting of characters (Farris 1969), six equally parsimonious cladograms were obtained from data matrix, the strict consensus tree is shown in Figure 12. The monophyly of the genus is supported by the combination of one precorneal seta on pupa (character 29, state 1) and presence of thin apical setae on inferior volsella (character 74, state 1).

Tentative species groups

Seven species groups of *Beardius* are apparent in the strict consensus tree after successive weighting of the characters (Fig. 12). However, so far the larvae of only 8 species and the pupae of only 13 species are known. When more immatures are described and added to the matrix the number and composition of the species groups might change and the groups outlined below must be regarded as tentative.

The *parcus* group

The group includes *B. abbadi* **sp. n.**, *B. hirtidorsum* **sp. n.**, *B. neusae* **sp. n.**, *B. dioi* **sp. n.**, *B. sapiranga* **sp. n.**, *B. yperoig* **sp. n.**, *B. kumadueni* **sp. n.**, *B. aciculatus* Andersen *et* Sæther, *B. parcus* Reiss *et* Sublette, *B. reissi* Jacobsen, *B. cristhinae* Trivinho-Strixino *et* Siqueira, and *B. phytophilu*s Trivinho-Strixino *et* Strixino.

The *parcus* group *sensu* Jacobsen & Perry (2000)—(*B. reissi* (*B. parcus*, *B. aciculatus*))—is evidenced in the obtained cladograms.

The larvae and pupae are known for *B. parcus*, *B. reissi*, *B. cristhinae* and *B. phytophilu*s. The group is supported by the following characters: ventral microtrichia on superior volsella (character 67, state 1); inferior volsella with projection attached from base to mid-length of volsella (character 70, state 1); and microtrichia on inferior volsella present only at base (character 73, state 1).

The *truncatus* group

The group includes *B. chapala* **sp. n.**, *B. krenak* **sp. n.**, *B. breviculus* Reiss *et* Sublette, *B. novoairensis* **sp. n.**, *B. urupeatan* Pinho, Mendes *et* Andersen, *B. lingulatus* Andersen *et* Sæther, *B. vanessae* **sp. n.**, *B. truncatus* Reiss *et* Sublette, and *B. fittkaui* Pinho, Mendes *et* Andersen.

The *truncatus* group *sensu* Andersen & Sæther (1996)—*B. truncatus, B. lingulatus, B. breviculus* and *B. triangulatus*,—is not evidenced in the obtained cladograms; only *B. truncatus, B. lingulatus,* and *B. breviculus* are included in the group, while *B. triangulatus* groups with *B. phoenix* in the *triangulatus* group. However, their phylogeny was based on 6 species only and at that time the immatures were only known for *B. parcus.* Today many more species are known, and the larvae are known for *B. truncatus* and *B. urupeatan*, and the pupae are known for *B. breviculus, B. truncatus*, *B. fittkaui* and *B. urupeatan*.

The group is supported by the following characters: inferior volsella with projection attached to base of the volsella (character 70, state 0); absence of microtrichia on inferior volsella (character 73, state 3, except for present at base in *B. krenak*); and anal point absent (except for a very short anal point in *B. fittkaui*).

The *tupinamba* group

The group includes *B. bizzoi* **sp. n.**, *B. mileneae* **sp. n.**, *B. nebularius* **sp. n.**, and *B. tupinamba* **sp. n.**

The larvae and pupae are known for *B. tupinamba* only. This new and easily recognizable group is supported by the following characters: inferior volsella with projection attached from base to 2/3 the length of volsella (character 70, state 2), bearing microtrichia and lamellae (character 71, state 1); and inferior volsella bare only at apex (character 73, state 2).

The *triangulatus* group

The group includes *B. triangulatus* Andersen *et* Sæther and *B. phoenix* **sp. n.**

The larvae are unknown and the pupa is known for *B. phoenix* only. The group is supported by the following characters: apicodorsal surface of superior volsella without microtrichia (character 66, state 1); subapical setae of inferior volsella thin (character 75, state 1) and not branched (character 76, state 0).

The *bucephalus* group

The group includes *B. bucephalus* **sp. n.** only.

The immatures are unknown. This monotypic group is supported by the following characters: scutal tubercle reduced (character 52, state 1); tergal bands absent (character 60, state 1); tergites VI–VIII pale with brown oral bands (character 78, state 2); and R without setae (character 79, state 1).

The *xylophilus* group

The group includes *B. arawak* **sp. n.**, *B. curticaudatus* **sp. n.**, *B. longicaudatus* **sp. n.**, and *B. xylophilus* Trivinho-Strixino *et* Strixino.

The larvae are known for *B. xylophilus* and the pupae are known for *B. xylophilus* and *B. arawak*. The group is supported by the following characters: median volsella absent (character 68, state 1); and subapical setae of inferior volsella simple, not branched (character 76, state 0).

The *roquei* group

The group includes *B. roquei* Trivinho-Strixino *et* Siqueira only.

The larvae are unknown. This monotypic group is supported by the following characters: spinules present on paratergite VI (character 36, state 1); scutal tubercle reduced (character 52, state 1); and at least tergites VI–VIII pale with brown oral bands (character 78, state 2).

Key to the males of *Beardius* Reiss *et* Sublette

1. Superior volsella fused with inferior volsella (Figs 37–38). Brazil . . . . . *Beardius cristhinae* Trivinho-Strixino *et* Siqueira
– Superior and inferior volsella not fused 2
2. Acrostichals present. 3
– Acrostichals absent.. 14
3. Tergal bands absent. 4
– Tergal bands present 7
4. Median volsella short, bearing long setae; basal projection of inferior volsella absent 5
– Median volsella absent, basal projection of inferior volsella as long as superior volsella (Fig. 36). Mexico. . . *B. chapala* **sp. n.**
5. Median volsella composed of 2–3 short tubercles, each bearing long, single seta. 6
– Median volsella composed of a single, comparatively long tubercle, bearing about 5 setae (Jacobsen & Perry 2000, fig. 1A–C, E). Southern U.S.A . . . . . *B. reissi* Jacobsen
6. Superior volsella digitiform; anal point present (Figs 153–154). Brazil. . . . . *B. yperoig* **sp. n.**
– Superior volsella leaf-shaped; anal point absent (Figs 113–114). Brazil . . . . . *B. sapiranga* **sp. n.**
7. Projection of inferior volsella lingulate, arising from basal 1/2 of the volsella (Figs 56–58). Clypeus with about 40 setae. Brazil . . . . . *B. dioi* **sp. n.**
– Projection of inferior volsella, if present, arising from base of inferior volsella. Clypeus with about 15 setae. 8
8. Median volsella composed of 2–4 short tubercles, each bearing single seta; projection of inferior volsella absent.. 9
– Median volsella absent; basal projection of inferior volsella digitiform to subquadrate, bearing numerous macrotrichia or lamellae 10
9. Anal point short, sitting high on tergite IX, all covered with microtrichia; median volsella at apex of strong, bluntly triangular projection of inferior volsella (Pinho *et al.* 2009, figs 1–5). Brazil.. . . . . *B. fittkaui* Pinho, Mendes *et* Andersen

– Anal point comparatively long, arising from posterior margin of tergite IX, with apical 2/3 bare; median volsella at apex of low, rounded projection of inferior volsella (Trivinho-Strixino & Siqueira 2007, figs 6, 7). Brazil. . . . . *B. roquei* Trivinho-Strixino *et* Siqueira

10. Anal point well developed. 11

– Anal point absent or very short 13

11. Anal point as along as inferior volsella, narrowly spatulate, without microtrichia in apical 1/3 (Figs 82–84). Brazil. . . . . *B. longicaudatus* **sp. n.**

– Anal point no longer than 2/3 the length of inferior volsella, triangular, fully covered with microtrichia. 12

12. Projection of inferior volsella subquadrate, transverse, with microtrichia (Figs 19–21). Brazil. . . . . *B. arawak* **sp. n.**

– Projection of inferior volsella digitiform, projecting caudad, bearing long lamellae reaching apex of inferior volsella (Figs 150–151). Brazil . . . . . *B. xylophilus* Trivinho-Strixino *et* Strixino

13. Anal point absent; inferior volsella with short, comparatively thin, apically dissected subapical setae (Reiss & Sublette 1985, fig. 27). Southern U.S.A . . . . . *B. truncatus* Reiss *et* Sublette

– Anal point short, triangular, arising from bluntly rounded protrusion of posterior margin of tergite IX; inferior volsella with short, stout, nearly lanceolate subapical setae (Figs 51–53). Brazil. . . . . *B. curticaudatus* **sp. n.**

14. Projection of inferior volsella absent; median volsella short, bearing one to several setae or needle-like projection. 15

– Projection of inferior volsella present, always microtrichiose, but variable in shape; median volsella as above, or absent. . . 20

15. Superior volsella pediform; inferior volsella stout 16

– Superior volsella digitiform; inferior volsella narrow, with at most enlarged apex 17

16. Tergite IX with median setae; median volsella short, with numerous setae (Reiss & Sublette 1985, fig. 13). Brazil, Mexico, Venezuela. . . . . *B. parcus* Reiss *et* Sublette

– Tergite IX without setae; median volsella needle-shaped, with at most one basal seta (Andersen & Sæther 1996, fig. 3). Costa Rica, Mexico . . . . . *B. aciculatus* Andersen *et* Sæther

17. Inferior volsella with microtrichia in basal 1/2; subapical setae short, stout 18

– Inferior volsella mostly bare, with microtrichia at most in basal 1/4; subapical setae comparatively long, thin. 19

18. Posterior part of scutum with dense, long microtrichia; tergal bands present; superior volsella tapering towards apex (Figs 68–70). Brazil . . . . . *B. hirtidorsum* **sp. n.**

– Posterior part of scutum without conspicuously dense, long microtrichia; tergal bands absent; superior volsella not tapered (Figs 110–111). Brazil. . . . . *B. phytophilus* Trivinho-Strixino *et* Strixino

19. Gonocoxite with dorsomedial projection; dorsal microtrichia covering about 3/4 of superior volsella; inferior volsella curved, with setae in distal 1/3 only (Figs 78–79). Brazil. . . . . *B. kumadueni* **sp. n.**

– Gonocoxite without dorsomedial projection; dorsal microtrichia present at base of superior volsella only; inferior volsella nearly straight, with setae in distal 2/3 (Figs 93–94). Brazil. . . . . *B. neusae* **sp. n.**

20. Inferior volsella with well developed projection arising from basal 2/3 of the volsella, long, projecting medially, with macrotrichia and lamellae. 21

– Inferior volsella with projection arising from the base, if arising from basal 2/3 of the volsella, then triangular, short, projecting caudad 24

21. Superior volsella with microtrichia; coloration brown. 22

– Superior volsella without microtrichia; coloration brown or pale 23

22. AR 1.15–1.27; R_1 bare; projection of inferior volsella well developed, with acuminate apex, overreaching apex of inferior volsella (Figs 89–91). Brazil . . . . . *B. nebularius* **sp. n.**

– AR 0.84–0.92; R_1 with setae; projection of inferior volsella shorter, with rounded apex in dorsal view, not overreaching inferior volsella (Figs 85–88). Brazil. . . . . *B. mileneae* **sp. n.**

23. Total length 3.8–4.9 mm; R_1 with setae; coloration light brown (Figs 26–29). Brazil . . . . . *B. bizzoi* **sp. n.**

– Total length 2.3–2.9 mm; R_1 bare; coloration pale (Figs 115–117). Brazil. . . . . *B. tupinamba* **sp. n.**

24. Anal point present, small, broadly triangular, sitting on the posterior margin of tergite IX. 25

– Anal point absent. 27

25. Anal point on rounded posterior protrusion of tergite IX; projection of inferior volsella subquadrate; scutal tubercle present (Figs 31–34). Brazil. . . . . *B. bucephalus* **sp. n.**

– Anal point on posterior margin of tergite IX; projection of inferior volsella not as above; scutal tubercle absent. 26

26. Superior volsella broadly clavate; projection of inferior volsella arising from base of volsella, long, racquet-shaped (Figs 103–105). Brazil . . . . . *B. phoenix* **sp. n.**

– Superior volsella digitform; projection of inferior volsella arising from mid-length of volsella, triangular, pointed (Figs 14–15). Brazil. . . . . *B. abbadi* **sp. n.**

27. Scutal tubercle present 28

– Scutal tubercle absent. 29

28. Projection of inferior volsella rounded, fused with ventral surface of superior volsella (Figs 148–149). Brazil. . . . . *B. vanessae* **sp. n.**

– Projection of inferior volsella lingulate, not fused with ventral surface of superior volsella (Andersen & Sæther 1996, fig. 5[1]). Costa Rica . . . . . *B. lingulatus* Andersen *et* Sæther

29. Anal tergite with 2 median setae; projection of inferior volsella very long, overreaching inferior volsella, parallel-sided, tapering towards apex (Figs 97–99). Brazil. . . . . *B. novoairensis* **sp. n.**

– Anal tergite without median setae; projection of inferior volsella shorter. 30

30. Inferior volsella narrow, nearly straight; projection of inferior volsella transverse, subquadrangular with rounded apex (Pinho

et al. 2009, figs 12–19). Brazil. . . . . *B. urupeatan* Pinho, Mendes *et* Andersen.
– Inferior volsella comparatively stout; projection of inferior volsella subtriangular to triangular, never transverse. 31
31. Projection of inferior volsella subtriangular, with rounded apex, bearing long, strong setae overreaching the apex of inferior volsella; inferior volsella with subapical stout, apically dissected setae; tergal bands present (Figs 75–76). Brazil. . . . . *B. krenak* **sp. n.**
– Projection of inferior volsella triangular, with macrotrichia only; inferior volsella with subapical thin, simple setae; tergal bands absent 32
32. AR about 0.5; median volsella present, composed of single, short tubercle with single, apical seta (Andersen & Sæther 1996, fig. 4[1]). Costa Rica. . . . . *B. triangulatus* Andersen *et* Sæther
– AR about 1.3; median volsella absent (Reiss & Sublette 1985, fig. 28). Panama, southern U.S.A. . . . . *B. breviculus* Reiss *et* Sublette

[1]The figure texts for *B. triangulatus* and *B. lingulatus* in Andersen & Sæther (1996) has changed place, fig. 4 is *B. triangulatus* and fig. 5 is *B. lingulatus.*

Key to the females of *Beardius* Reiss *et* Sublette

Jacobsen & Perry (2000) provided a tentative key to known and unknown females of the genus. For the females of *B. breviculus, B. lingulatus, B. triangulatus* and *B. truncatus* characters, like presence or absence of acrostichals, setae on wing veins and presence or absence of scutal tubercle were extrapolated from the males, However, these characters differs between males and females in some species. The females of *B. cristhinae*, *B. tupinamba* and *B. urupeatan* have, for instance, setae on R_1, although setae are absent in the males, and in *B. urupeatan* acrostichals are present in the females but not in the males.

1. Acrostichals present. 2
– Acrostichals absent 4
2. Seminal capsule with indistinct or very short neck; spermathecal duct wide (Fig. 61). Clypeus with about 50 setae. . . . . *B. dioi* **sp. n.**
– Seminal capsule with distinct neck; spermathecal duct comparatively narrow; clypeus with about 10 setae. 3
3. Gonocoxite IX with 2 setae; with 2–3 acrostichals; VR 1.44–1.47 (Figs 132–135). . . *B. urupeatan* Pinho, Mendes *et* Andersen
– Gonocoxite IX bare; with 4–8 acrostichals; VR 1.22–1.34 (Jacobsen & Perry 2000, fig. 1D). . . . . *B. reissi* Jacobsen
4. Ventrolateral lobe with long microtrichia. 5
– Ventrolateral lobe with short microtrichia. 6
5. Gonocoxite IX with 1 seta; scutal tubercle vestigial; abdomen all pale (Figs 118–121). . . . . *B. tupinamba* **sp. n.**
– Gonocoxite IX bare; scutal tubercle prominent; abdomen with tergites I–V brown with median pale area and tergites VI–VIII brown (Jacobsen & Perry 2000, fig. 4) . . . . . *B. aciculatus* Andersen *et* Sæther
6. R with 12–13 setae, R_1 with 8–11 setae (Fig. 39). . . . . *B. cristhinae* Trivinho-Strixino *et* Siqueira
– R and R_1 without setae (Andersen & Sæther 1996, fig. 2). . . . . *B. parcus* Reiss *et* Sublette

Key to the pupae of *Beardius* Reiss *et* Sublette

1. Tergites VII and VIII with two anterolateral patches of shagreen 2
– Tergites VII and VIII bare 3
2. Paratergite VIII smooth, without lateral spines; paratergite II with anterior area of fine spinules; paratergite V with distal spinules at the base of LS 1–2 (Figs 24–25). . . . . *B. arawak* **sp. n.**
– Paratergite VIII with numerous long and thin spines; paratergite II without spinules; paratergite V with spinules restricted to apex (Trivinho-Strixino & Siqueira 2007, figs 8–12). . . . . *B. roquei* Trivinho-Strixino *et* Siqueira
3. Tergite II with strong and uniform shagreen 4
– Tergite II with stronger anterior shagreen. 6
4. Segment V with 4 taeniate L setae; conjunctive I/II with spinules (Jacobsen & Perry 2000, fig. 3A, C, E, G). . . . . *B. truncatus* Reiss *et* Sublette
– Segment V with 3 taeniate L setae; conjunctive I/II bare. 5
5. Paratergite VI without distal spinules; paratergite VIII always with long, curved spines (Figs 139–140). . . . . *B. urupeatan* Pinho, Mendes *et* Andersen
– Paratergite VI with distal spinules; paratergite VIII with or without long, curved spines (Jacobsen & Perry 2000, fig. 3B, D, F). . . . . *B. breviculus* Reiss *et* Sublette
6. Paratergite VIII with long spines. 7
– Paratergite VIII with very short spines mainly close to spur, if present. 10
7. Tergite VI with shagreen restricted to transverse band in anterior 1/3 (Jacobsen & Perry 2000, fig. 2A–D). . *B. reissi* Jacobsen

– Tergite VI with shagreen in anterior 1/2, sometimes extending to 2/3 of the tergite. 8
8. Anal spur of tergite VIII with dominant tooth and 1–3 comparatively large accessory teeth (Trivinho-Strixino & Strixino 2000, fig. 1). . . . . *B. phytophilus* Trivinho-Strixino *et* Strixino
– Anal spur of tergite VIII with dominant tooth and minute accessory teeth, if present. 9
9. Conjunctive IV/V with spinules in two patches; row of hooklets on tergite II extending for about 1/2 the width of tergite (Trivinho-Strixino & Siqueira 2007, figs 2–5) . . . . . *B. cristhinae* Trivinho-Strixino *et* Siqueira
– Conjunctive IV/V with spinules in single patch; row of hooklets on tergite II extending for about 1/3 the width of tergite (Pinho *et al.* 2009, figs 6–9) . . . . . *B. fittkaui* Pinho, Mendes *et* Andersen
10. Anal spur of tergite VIII with single tooth, without accessory teeth. 11
– Anal spur of tergite VIII with a dominant tooth and minute accessory teeth 12
11. Thoracic horn with single spine on strong, anterior branch (Fig. 123). . . . . *B. tupinamba* **sp. n.**
– Thoracic horn with many spines in distal 1/2 of strong, anterior branch (Fig. 107). . . . . *B. phoenix* **sp. n.**
12. Tergite VI with shagreen restricted to transverse band in anterior 1/3 (Reiss & Sublette 1985, figs 15–20). . . . . *B. parcus* Reiss *et* Sublette
– Tergite VI with shagreen in anterior 2/3 and with two posterolateral patches of shagreen (Fig. 66). . . . . *B. dioi* **sp. n.**

Key to the larvae of *Beardius* Reiss *et* Sublette

1. Antenna with 7 segments (segments 2–4 may only be partially separated). 2
– Antenna with 5 or 6 segments. 3
2. Clypeus separated from frontal apotome; distance between ventromental plates about the width of median mental tooth; AR 0.87–1.05 (Reiss & Sublette 1985, fig. 21–25). . . . . *B. parcus* Reiss *et* Sublette
– Clypeus and frontal apotome fused into frontoclypeal apotome; distance between ventromental plates about twice the width of median mental tooth; AR 0.70–0.79 (Jacobsen & Perry 2000, figs 5, 6D). . . . . *B.* sp. C. Jacobsen
3. Antenna with 5 segments. 4
– Antenna with 6 segments. 8
4. Pecten mandibularis absent or indistinct. 5
– Pecten mandibularis distinct, with about 7 setae. 6
5. Mentum with median tooth very small, much lower than first lateral tooth (Fig. 127). . . . . *B. tupinamba* **sp. n.**
– Mentum with median tooth larger, about 1/2 the length of first lateral tooth (Fig. 141). . . . . *B. urupeatan* Pinho, Mendes *et* Andersen
6. Distance between ventromental plates 2 times the width of median mental tooth (Epler 2001, 8.36). . . . . *B. truncatus* Reiss *et* Sublette
– Distance between ventromental plates 1.5 times the width of median mental tooth. 7
7. Mentum with last two lateral teeth fused at base only, last lateral tooth much lower than penultimate; ornamentation on lateral margin of mandible indistinct or absent (Trivinho-Strixino & Strixino 2000, figs 6–12) . . . . . *B. phytophilus* Trivinho-Strixino *et* Strixino
– Mentum with last two lateral teeth with slight apical separation only (in worn specimens separation might be difficult to discern), last lateral tooth almost at same level as penultimate; ornamentation on lateral margin of mandible distinct (Figs 43–45). . . . . *B. cristhinae* Trivinho-Strixino *et* Siqueira
8. Antennal blade as long as flagellum; ventromental plates with median ends pointing posteriorly (Jacobsen & Perry 2000, figs 2E–H, 6B) . . . . . *B. reissi* Jacobsen
– Antennal blade longer than flagellum; ventromental plates with median ends pointing medially (Trivinho-Strixino & Strixino 2000, figs 17–23). . . . . *B. xylophilus* Trivinho-Strixino *et* Strixino

The species

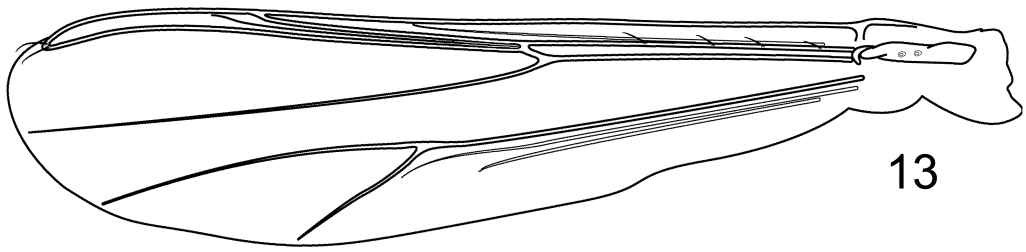
Beardius abbadi sp. n.

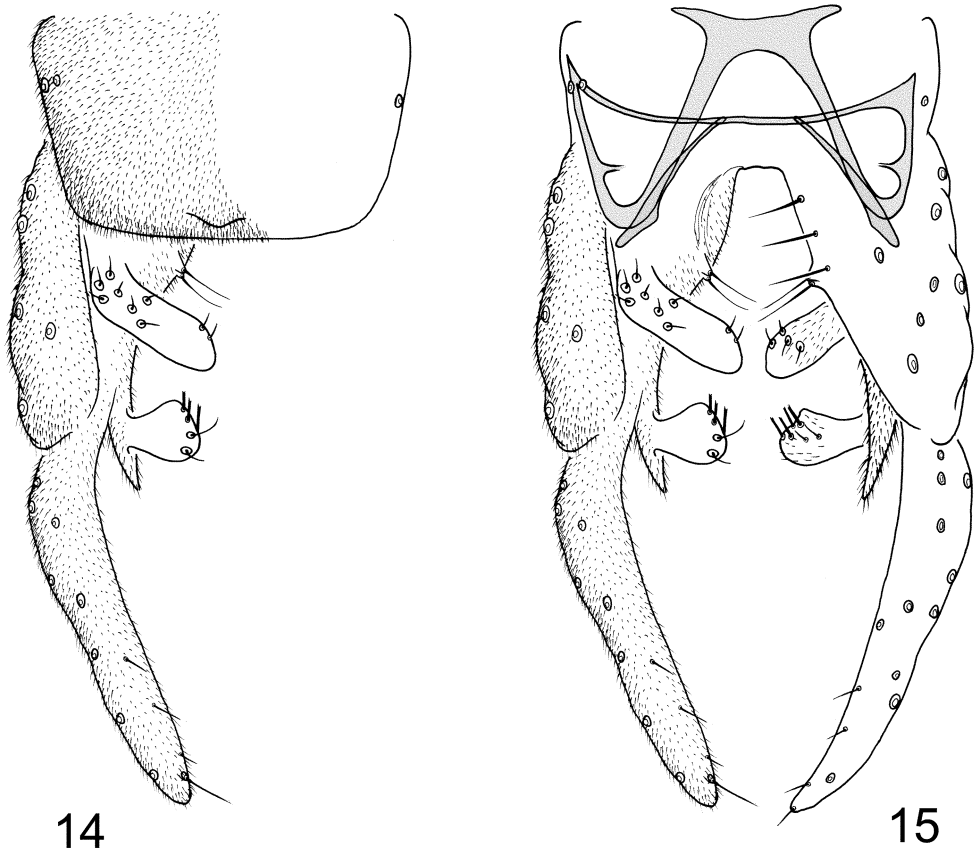
(Figs 13–15)

Type material. Holotype: male, **BRAZIL, Amazonas State:** Novo Airão, AM 352 Km 9, 123 m a.s.l., "Igarapé no Sítio do Sr. Valdenor", #6, S02°42'04.5" W06°55'23.4", 11–14.viii.2008, Malaise trap suspended 3 m above the ground, A.M.O. Pes *et al.* (MZSP). Paratypes: 2 males, as holotype (INPA). 1 male, Manaus, AM 010 Km 26, 43 m a.s.l., Adolfo Ducke Forest Reserve, #66, Afluente Igarapé Acará (Ig. 23), S02°57'07.4" W59°57'27.6", 04–07.xi.2008, Malaise trap suspended 3 m above the ground, U.G. Neiss *et al.* (ZMBN). 1 male, Rio Preto da Eva, Ramal baixo do Rio, ponte Km 10, 14.iv.2008, at light, N. Hamada *et al.* (ZSM).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the ventral, narrowly triangular projection of the inferior volsella projecting caudad.

Etymology. Named after MSc. Guilherme Abbad Silveira for all help and encouragement.





FIGURES 13–15. *Beardius abbadi* **sp. n.**, male. **13**—wing; **14**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **15**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Description

Male (n = 4–5, except when otherwise stated). Total length 2.00–2.30, 2.16 mm. Wing length 0.98–1.07, 1.03 mm. Total length / wing length 1.98–2.20, 2.11. Wing length / length of profemur 1.94–2.12, 2.04.

Coloration. Head, thorax and abdomen pale. Legs pale.

Head. AR 1.04–1.17 (3), ultimate flagellomere 449–487 (3) μm long. Inner verticals 0–1, 0; outer verticals 4–6, 5; postorbitals 2–5, 4. Clypeus with 11–15, 13 setae. Tentorium 63–94, 78 μm long; 20–23, 22 μm wide. Stipes 111 (1) long. Palpomere lengths (in μm): 28–40, 33; 23–28, 25; 73–99, 83; 71–104, 96; 119–149, 139. Third palpomere with 2 sensillae subapically, longest 13–18, 15 μm long.

Thorax. Scutal tubercle absent. Antepronotum without setae. Dorsocentrals 5–6, 5; acrostichals absent; prealars 2. Scutellum with 4 setae.

Wing (Fig. 13). VR 1.34–1.47, 1.39. R with 2–6, 5 setae; R_{4+5} with 1–2, 2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 37–48, 43 µm long; spur of mid tibia (including comb) 54–75, 70 µm long; spur of hind tibia (including comb) 64–80, 70 µm long. Width at apex of fore tibia 37–48, 43 µm; of mid tibia 37–43, 40 µm; of hind tibia 37–48, 43 µm. Lengths and proportions of legs in Table 2.

TABLE 2. Lengths (in µm) and proportions of legs of *Beardius abbadi* **sp. n.**, male (n = 3–5).

	fe	ti	ta_1	ta_2
p_1	486–505, 496	299–327, 318	701–767, 739	318–365, 346
p_2	421–561, 505	383–421, 402	318–365, 337	159–168, 164
p_3	533–589, 561	411–449, 430	449–496, 468	224–243
	ta_3	ta_4	ta_5	LR
p_1	252–290, 276	187–224, 200	65–75, 70	2.14–2.66, 2.41
p_2	112–131, 122	56–65, 60	27–29, 28	0.81–0.87, 0.85
p_3	168–187	84–93	37–47, 42	1.07–1.11, 1.10
	BV	SV	BR	
p_1	1.68–1.94, 1.77	1.09–1.17, 1.12	2.6–3.0, 2.8	
p_2	3.18–3.45, 3.34	2.46–2.74, 2.61	4.5–7.3, 5.8	
p_3	2.69–2.80	2.08–2.14, 2.10	3.8–6.8, 5.0	

Hypopygium (Figs 14–15). Anal point bluntly triangular, 4–8, 6 µm long, not reaching posterior margin of tergite IX. Tergite IX without setae, tergal bands absent. Laterosternite IX with 2 setae. Phallapodeme 40–48, 46 µm long. Transverse sternapodeme 28–33, 30 µm long. Gonocoxite 91–114, 104 µm long. Superior volsella digitiform, 30–43, 38 µm long, with 7–8, 7 dorsal and 4 ventral setae, with microtrichia on ventral surface. Median volsella 2–4, 3 µm long, with 2–3, 3 apical setae, longest 18–25, 23 µm long. Inferior volsella clavate, 40–51, 46 µm long, with 2 apical setae and 4–5, 4 stout and 2 thin setae subapically; projection narrowly triangular, arising from base of volsella, 8–15, 11 µm long, covered with microtrichia. Gonostylus 111–127, 119 µm long. HR 0.72–1.00, 0.88. HV 1.74–2.18, 2.00.

Female and immatures. Unknown.

Distribution. The species is collected in the Amazonas State in Brazil.

Beardius aciculatus Andersen *et* Sæther

Beardius aciculatus Andersen *et* Sæther, 1996: 40.
Beardius aciculatus Andersen *et* Sæther; Jacobsen & Perry (2000: 139).

Material examined. Type material, as in Andersen & Sæther (1996).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the needle shaped median volsella with basal seta.

Description. The species was described in detail by Andersen & Sæther (1996).

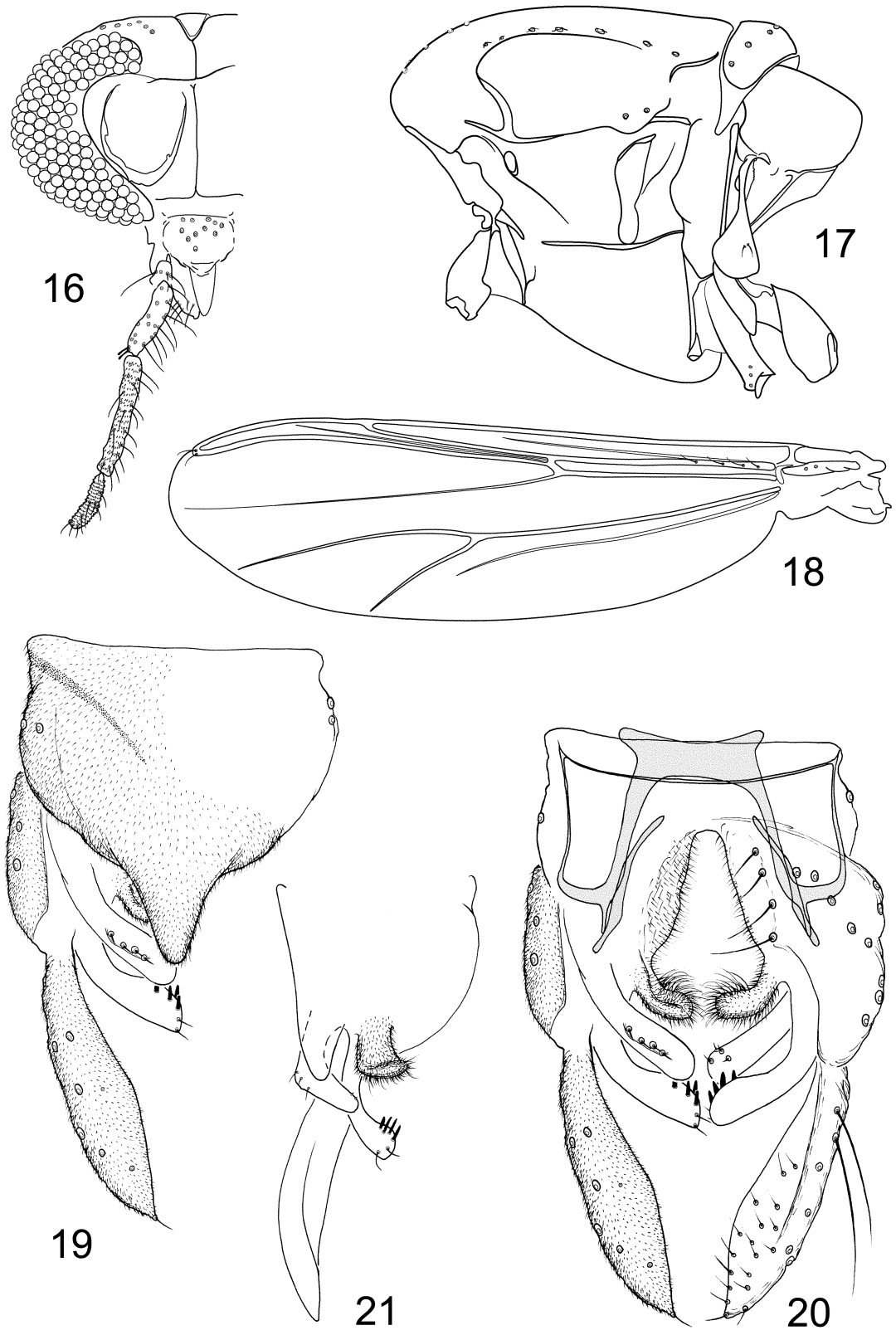
Distribution. The species is recorded from Costa Rica and Mexico (Andersen & Sæther 1996).

Beardius arawak sp. n.

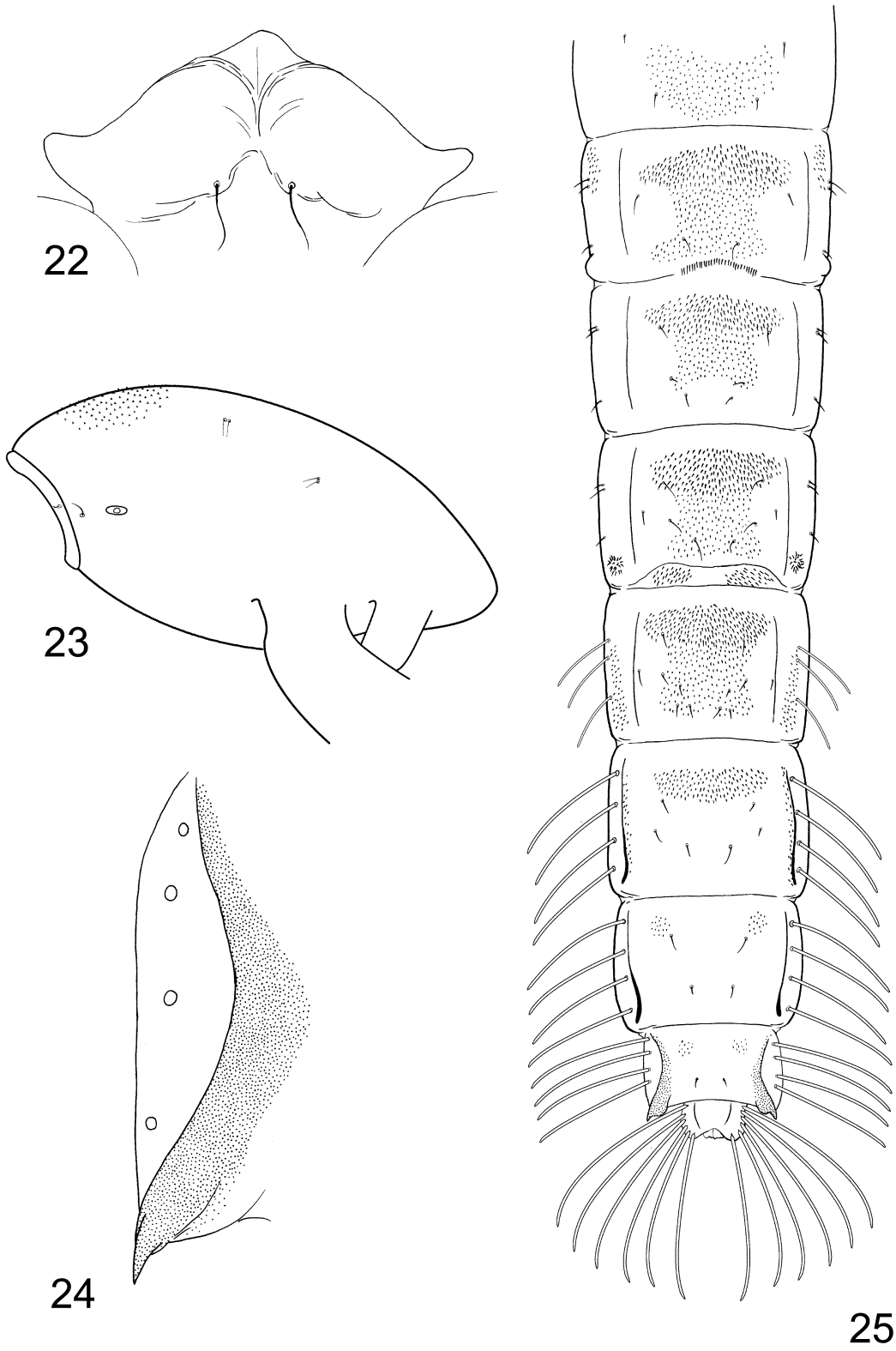
(Figs 16–25)

Type material. Holotype male, **BRAZIL, Acre State:** Mâncio Lima, Serra do Divisor National Park, Igarapé Ar Condicionado, 17.iii.2006, light trap, A.R. Calor (MZSP). Paratypes: 2 males, as holotype except Igarapé Amor, 18.iii.2006 (MZSP). 1 pupa with pharate male, **Amazonas State:** Rio Cuieiras, na foz do Rio Branquinho, 21.xii.1961, Brundin net, A308, E.J. Fittkau (ZSM). 1 pupa with pharate male, Igarapé Cachoeira, 12.iv.1961, A150–1, E.J. Fittkau (MZSP). 1 pupa, Lago Cabaliana, Baixo Rio Solimões, Brundin net, F. Reiss (MZSP). 1 pupa, Lago do Calado, Baixo Rio Solimões, 10.v.1971, Brundin net, F. Reiss (ZSM); 1 pupa, as previous except 30.xi.1971 (ZMBN). 1 male, **Pará State:** Rurópolis, Cachoeira do Grin, S04°05', W55°00', 24.x.2007,

Pennsylvania trap, N. Hamada *et al.* (INPA). 1 male, as previous except 09.x.2008, L.M. Fusari & N. Hamada (INPA).



FIGURES 16–21. *Beardius arawak* **sp. n.**, male. **16**—head; **17**—thorax; **18**—wing; **19**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **20**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect; **21**—hypopygium, lateral view.



FIGURES 22–25. *Beardius arawak* **sp. n.**, pupa. **22**—frontal apotome; **23**—thorax; **24**—paratergite VIII; **25**—abdominal segments I–IX and anal lobe, dorsal view.

Diagnostic characters. The species belongs in the *xylophilus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; anal point broadly triangular, moderately long, covered with microtrichia; and basal projection of inferior volsella subquadrate and transverse. The pupa differs from that of other known species by the combination of the following characters: tergites VII–VIII with anterolateral patches of shagreen; and paratergite VIII lacking lateral spines.

Etymology. The name refers to the Arawak Indians, an ethnic group from Central and South America. The name is to be regarded as a noun in apposition.

TABLE 3. Lengths (in µm) and proportions of legs of *Beardius arawak* **sp. n.**, male (n = 3).

	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	533–598	355–430	739–888	318–374	262–327	206–252
p_2	533–645	393–458	318–411	131–168	94–131	64–66
p_3	580–683	421–514	449–542	215–252	159–196	84–112

	ta_5	LR	BV	SV	BR
p_1	84–94	2.04–2.08	1.76–1.85	1.16–1.20	2.3–2.9
p_2	28–37	0.81–0.90	3.77–3.95	2.68–2.91	2.7–3.6
p_3	37–47	1.05–1.07	2.86–3.00	2.21–2.23	3.0–4.9

Description

Male (n = 3, except when otherwise stated). Total length 2.37–2.66 mm. Wing length 1.04–1.27 mm. Total length / wing length 2.09–2.28. Wing length / length of profemur 1.95–2.13.

Coloration. Head, thorax and abdomen pale. Legs pale.

Head (Fig. 16). AR 0.87–1.30, ultimate flagellomere 449–552 µm long. Inner verticals 3, outer verticals 3–4, postorbitals 3–4. Clypeus with 10–15 setae. Tentorium 127–139 µm long, 24–30 µm wide. Stipes 100–106, 103 µm long. Palpomere lengths (in µm): 25–40, 20–30, 96–124, 134–159, 134–233 (2). Third palpomere with 2–3 sensillae subapically, longest 10–15 µm long.

Thorax (Fig. 17). Scutal tubercle absent. Antepronotum without setae. Dorsocentrals 7; acrostichals 5–8, prealars 2–3. Scutellum with 4–6 setae.

Wing (Fig. 18). VR 1.48–1.54. R with 4 setae; R_{4+5} with 2–4 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 43–54 µm long, spur of mid tibia (including comb) 51–70 µm long, spur of hind tibia (including comb) 59–75 µm long. Width at apex of fore tibia 43–48 µm, of mid tibia 45–51 µm, of hind tibia 48–54 µm. Lengths and proportions of legs as in Table 3.

Hypopygium (Figs 19–21). Anal point strong, bluntly triangular, 30–46 µm long. Tergite IX without setae, tergal bands present. Laterosternite IX with 2–3 setae. Phallapodeme 48–63 µm long. Transverse sternapodeme 38–53 µm long. Gonocoxite 83–101 µm long. Superior volsella digitiform, weakly curved, 48–51 µm long, with 5–7 dorsal, 2 apical, and 2 ventral setae, without microtrichia. Median volsella absent. Inferior volsella clavate, 46–58 µm long, with 2 apical thin setae and 4–8 short, lanceolate setae subapically; projection subquadrate, transverse, sometimes digitiform in dorsal aspect, arising from base of volsella, 23–28 µm long. Gonostylus 91–116 µm long. HR 0.85–0.92. HV 2.47–2.81.

Pupa (n = 5, except when otherwise stated). Total length 2.71–3.36 (4) mm.

Coloration. Cephalothorax and abdomen pale.

Cephalothorax (Fig. 23). Frontal apotome conical (Fig. 22), frontal setae 31–72, 49 µm long. Thorax with fine dorsal granulation. Thoracic horn with about 3 branches; anterior stout branch with spinules in distal 2/3. Distance between Dc1 and Dc2 4–6, 5 µm; between Dc2 and Dc3 144–167, 156 µm; between Dc3 and Dc4 4–6, 5 µm. Median antepronotal 1, precorneal 1, prealars absent.

Abdomen (Fig. 25). Tergite I with or without shagreen. Tergites II–V with anterior transverse band of shagreen slightly stronger than contiguous posterior shagreen. Tergite VI with anterior transverse band of shagreen only. Tergites VII and VIII with shagreen in two anterolateral patches. Row of hooklets on tergite II about 1/3 of tergite width. Conjunctive IV/V with spinules in two patches. Paratergite V with row of spinules in posterior 1/2; paratergite VI with or without spinules. Pedes spurii A and pedes spurii B present. Segment I without L setae;

segments II–IV with 3 L setae; segment V with 3 taeniate L setae; segments VI–VIII with 4 taeniate L setae. Segment VIII without lateral spines, spur simple (Fig. 24). Anal lobe 143–164 (3) µm long, with 6–12, 10 taeniate setae.

Female and larva. Unknown.

Distribution. The species is collected in the Acre, Amazonas, and Pará states in Brazil.

***Beardius bizzoi* sp. n.**
(Figs 26–29)

Type material. Holotype: male, **BRAZIL, Santa Catarina State:** Urubici, São Joaquim National Park, Morro da Igreja, Rio Pelotas, 1670 m a.s.l., S28°07'37" W49°28'47", 18.viii–05.xii.2004, Malaise trap, L.C. Pinho & L.E.M. Bizzo (MZSP). Paratypes: 8 males, as holotype (MZSP, MZUFBA, INPA, ZSM, ZMBN).

Diagnostic characters. The species belongs in the *tupinamba* group. The male can be separated from other species of the *tupinamba* group by the combination of the following characters: large body size (3.8–4.9 mm); coloration brown; R_1 with setae; and superior volsella without microtrichia.

Etymology. Named after Dr. Luís Eduardo Maestrelli Bizzo for collecting some of the material.

Description

Male (n = 8–9, except when otherwise stated). Total length 3.81–4.90, 4.43 mm. Wing length 2.26–2.68, 2.51 mm. Total length / wing length 1.68–1.88, 1.77. Wing length / length of profemur 2.24–2.54, 2.40.

Coloration. Head and abdomen light brown. Thorax pale with scutum, vittae, postnotum and preepisternum stramineous. Legs stramineous.

Head. AR 1.04–1.28, 1.16; ultimate flagellomere 594–749, 696 µm long. Temporal setae 10–13, 11; not well separated in inner and outer verticals and postorbitals. Clypeus with 15–18, 16 setae. Tentorium 134–195, 152 µm long; 30–51, 40 µm wide. Stipes 159–202, 182 (6) µm long. Palpomere lengths (in µm): 35–48, 43; 43–51, 48; 172–202, 190; 175–202, 190; 240–311, 276. Third palpomere with 5–6, 5 sensillae subapically, longest 20–28, 23 µm long.

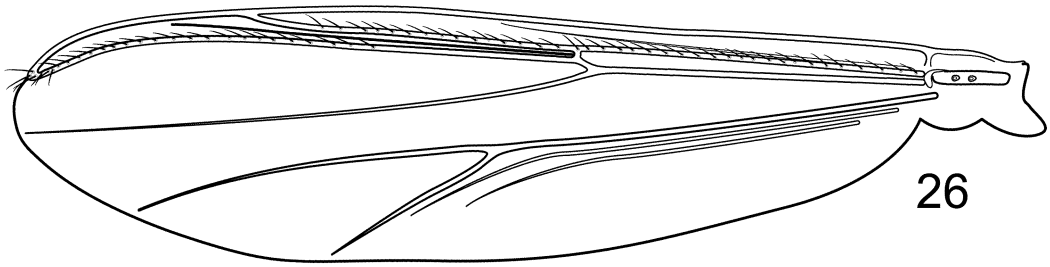
Thorax. Scutal tubercle absent. Antepronotum without setae. Dorsocentrals 7–10, 9; acrostichals absent; prealars 2. Scutellum with 4–6, 5 setae.

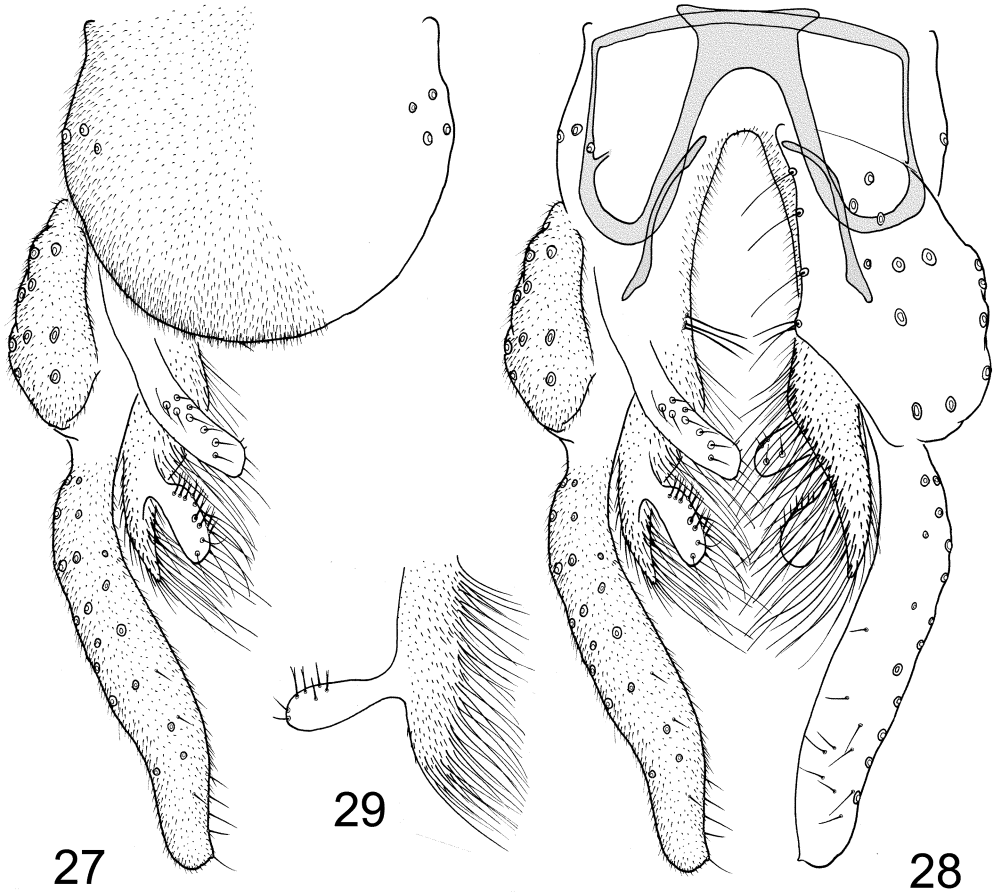
Wing (Fig. 26). VR 1.24–1.35, 1.32. R with 16–23, 20 setae; R_1 with 10–17, 14 setae; R_{4+5} with 20–33, 27 setae. Brachiolum with 2–3, 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 94–131, 112 µm long; spur of mid tibia (including comb) 131–178, 159 µm long; spur of hind tibia (including comb) 140–178, 159 µm long. Width at apex of fore tibia 103–140, 122 µm; of mid tibia 122–178, 140 µm; of hind tibia 140–168, 159 µm. Lengths and proportions of legs as in Table 4.

TABLE 4. Lengths (in µm) and proportions of legs of *Beardius bizzoi* **sp. n.**, male (n = 7–9).

	fe	ti	ta_1	ta_2
p_1	935–1113, 1038	673–860, 795	1216–1403, 1309	561–664, 617
p_2	991–1141, 1085	823–944, 907	505–561, 533	281–318, 299
p_3	1057–1318, 1234	963–1150, 1066	701–823, 776	421–477, 458
	ta_3	ta_4	ta_5	LR
p_1	514–598, 552	346–421, 383	131–159, 140	1.57–1.69, 1.63
p_2	215–243, 224	122–150, 131	56–84, 75	0.59–0.61, 0.60
p_3	309–355, 337	159–187, 178	75–94, 84	0.69–0.77, 0.74
	BV	SV	BR	
p_1	1.46–2.03, 1.81	1.36–1.47, 1.41	2.0–3.3, 2.6	
p_2	3.35–3.55, 3.47	3.57–3.75, 3.66	3.9–7.3, 5.0	
p_3	2.79–3.07, 2.91	2.77–3.09, 2.93	4.2–6.4, 5.6	





FIGURES 26–29. *Beardius bizzoi* **sp. n.**, male. **26**—wing; **27**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **28**—hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect; **29**—inferior volsella, lateral view.

Hypopygium (Figs 27–28). Anal point absent to weakly projected, at most 4 μm long. Tergite IX without setae, tergal bands weak to absent. Laterosternite IX with 2–4, 3 setae. Phallapodeme 81–109, 94 μm long. Transverse sternapodeme 51–86, 63 μm long. Gonocoxite 157–187, 175 μm long. Superior volsella digitiform, weakly curved, 71–81, 76 μm long, with 7–9, 8 dorsal and 4–5, 4 ventral setae, without microtrichia. Median volsella 3–5, 4 μm long, with 3–5, 4 apical setae, longest 28–33, 30 μm long. Inferior volsella clavate, 76–106, 94 μm long, with 2–3, 2 apical thin setae and 8–10, 9 stout, bifid or trifid setae subapically; projection narrowly triangular in dorsal view, arising from basal 2/3 of volsella, bearing fringe of long lamellae (Fig. 29). Gonostylus 192–218, 207 μm long. HR 0.73–0.93, 0.85. HV 2.06–2.47, 2.31.

Female and immatures. Unknown.

Distribution. The species is collected in the Santa Catarina State in Brazil.

Beardius breviculus Reiss *et* Sublette

Beardius breviculus Reiss *et* Sublette, 1985: 189.
Beardius breviculus Reiss *et* Sublette; Epler (2001: 8.36), Jacobsen (2008: 98).
Beardius sp. B Jacobsen & Perry (2000: 138).

Material examined. Paratypes deposited in ZMBN.

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the combination of the following characters: median volsella absent; basal projection of inferior volsella triangular with comparatively short macrotrichia; and AR about 1.3. The pupa by the combination of: tergite II with strong, uniform shagreen; tergites VII–VIII bare; conjunctive III/IV bare; and paratergite VI with distal spinules.

Description. The species was described in detail by Reiss & Sublette (1985). The triangular structure considered as "median volsella" by Reiss & Sublette (1985) must be regarded as a basal lobe of the inferior volsella; median volsella is absent.

Distribution. The species is recorded from Panama and southern U.S.A (Epler 2001; Reiss & Sublette 1985).

Beardius bucephalus sp. n.

(Figs 30–34)

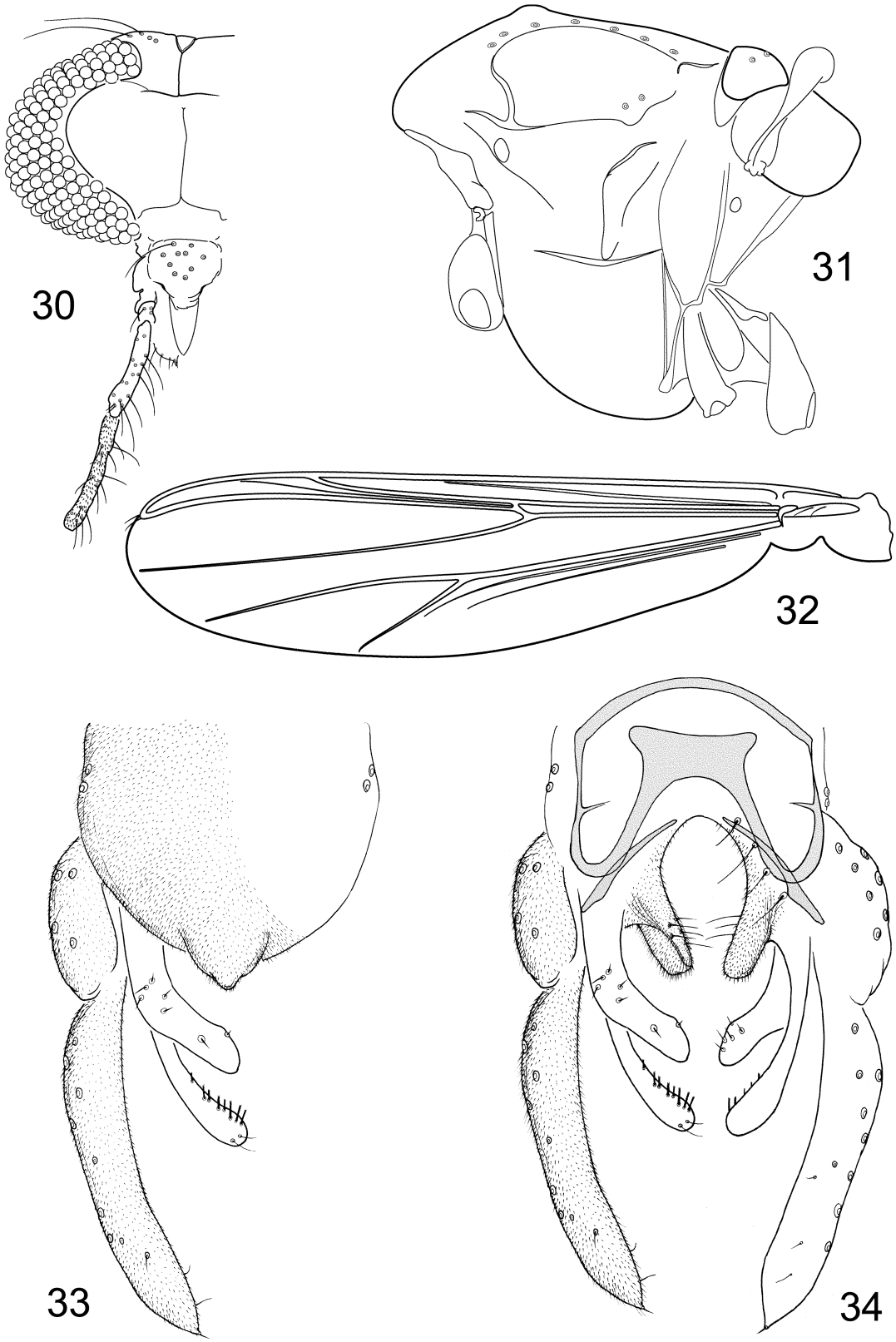
Type material. Holotype: male, **BRAZIL, Paraíba State:** Mamanguape, Guaribas Biological Reserve, Rio Cabeça de Boi, 29.vii.2009, at light, A.R. Calor & L.S. Lecci (MZSP). Paratypes: 2 males, as holotype (MZUFBA, ZMBN). 1 male, **Acre State:** Mâncio Lima, Serra do Divisor National Park, Igarapé Amor, 18.iii.2006, at light, A.R. Calor (INPA).

Diagnostic characters. The species belongs in the monotypic *bucephalus* group. The male can be separated from all other members of the genus by the following combination of characters: basal projection of inferior volsella subquadrate, transverse; median volsella wart-like; and anal point very short, arising from rounded, posterior protrusion of tergite IX.

Etymology. From Greek *bucephalus*, meaning the head of the ox, referring to the type locality Rio Cabeça de Boi ("Ox Head River").

TABLE 5. Lengths (in µm) and proportions of legs of *Beardius bucephalus* **sp. n.**, male (n = 1–4).

	fe	ti	ta_1	ta_2
p_1	795–870, 842	439–496, 477	1103	468
p_2	757–842, 804	552–617, 589	458–514	215–252
p_3	823–916, 879	608–673, 645	655–711	327–374
	ta_3	ta_4	ta_5	LR
p_1	449	327	112	2.51
p_2	168–178	94–112	37–47	0.82–0.84
p_3	224–234	122–140	37–47	1.06–1.07
	BV	SV		BR
p_1	1.77	1.12		2.8
p_2	3.35–3.49	2.84–2.86		3.8–4.8
p_3	2.86–2.93	2.19–2.24		3.4–5.0



FIGURES 30–34. *Beardius bucephalus* **sp. n.**, male. **30**—head; **31**—thorax; **32**—wing; **33**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **34**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Description

Male (n = 4, except when otherwise stated). Total length 2.85–2.98, 2.91 mm. Wing length 1.38–1.47, 1.43 mm. Total length / wing length 2.03–2.07, 2.04. Wing length / length of profemur 1.67–1.73, 1.71.

Coloration. Head and thorax stramineous; abdomen pale, with narrow, brown anterior transverse bands on tergites II–VIII. Legs stramineous.

Head (Fig. 30). AR 1.36–1.47 (2), ultimate flagellomere 561–589 (2) μm long. Temporal setae 9–12, 11; not well separated in inner and outer verticals and postorbitals. Clypeus with 10–14, 12 setae. Tentorium 114–127, 121 μm long; 30–33, 31 μm wide. Stipes 121–139, 134 μm long. Palpomere lengths (in μm): 30–43, 35; 30–35, 33; 124–137, 129; 149–159, 156; 230–248 (3). Third palpomere with 2–3, 3 sensillae subapically, longest 13–20, 15 μm long.

Thorax (Fig. 31). Scutal tubercle present. Antepronotum without setae. Dorsocentrals 6–7, 7; acrostichals absent; prealars 2. Scutellum with 4 setae.

Wing (Fig. 32). VR 1.24–1.35, 1.30. R_{4+5} with 1–2, 2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 43–48, 45 μm long; spur of mid tibia (including comb) 70–80, 75 μm long; spur of hind tibia (including comb) 75–86, 80 μm long. Width at apex of fore tibia 48–59, 54 μm; of mid tibia 51–56, 54 μm; of hind tibia 54–59, 56 μm. Lengths and proportions of legs as in Table 5.

Hypopygium (Figs 33–34). Anal point bluntly triangular, 8–18, 13 μm long; sitting on rounded, posterior protrusion of tergite IX. Tergite IX without setae, tergal bands absent. Laterosternite IX with 2 setae. Phallapodeme 51–68, 58 μm long. Transverse sternapodeme 40–46, 43 μm long. Gonocoxite 91–114, 106 μm long. Superior volsella digitiform, curved, 61–68, 66 μm long, with 5–9, 7 dorsal, and 4–5, 4 ventral setae, without microtrichia. Median volsella with 1–4, 3 setae, longest 15–25, 20 μm long. Inferior volsella clavate, slightly curved, 89–101, 94 μm long, with 2 apical thin setae and 6–9, 8 stout setae subapically; projection subrectangular, 38–43, 40 μm long, arising from base of volsella. Gonostylus 139–154, 147 μm long. HR 0.65–0.75, 0.72. HV 2.09–2.22, 2.15.

Female and immatures. Unknown.

Distribution. The species is collected in the Acre and Paraíba States in Brazil.

TABLE 6. Lengths (in μm) and proportions of legs of *Beardius chapala* **sp. n.**, male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	–	–	–	–	–	–	–	–	–	–	–
p_2	766	636	–	–	–	–	–	–	–	–	–
p_3	831	676	–	–	–	–	–	–	–	–	–

***Beardius chapala* sp. n.**
(Figs 35–36)

Type material. Holotype male, **MEXICO**, **Jalisco State:** Lake Chapala, El Chante, 26.xi.1981, MF1, H.W. Fittkau (ZSM).

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; median volsella absent; and basal projection of the inferior volsella long, digitiform.

Etymology. The name refers to the type locality, Lake Chapala. The name is to be regarded as a noun in apposition.

Description

Male (n = 1). Total length 2.75 mm.

Coloration. All pale.

Head and wings. Lost.

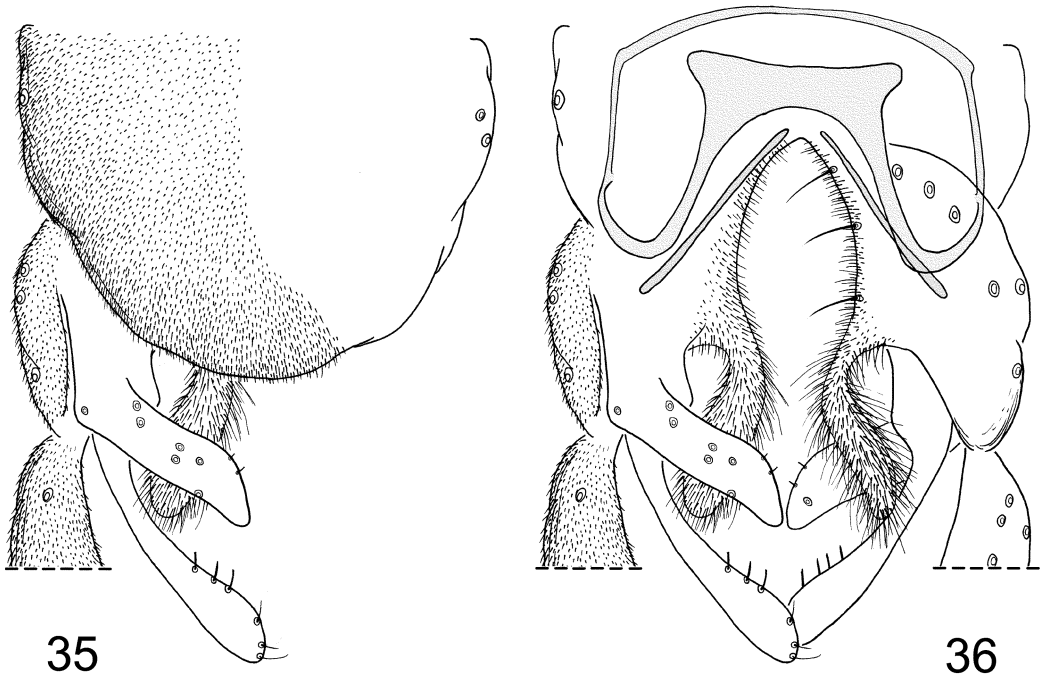
Thorax. Scutal tubercle absent. Antepronotum without setae. Dorsocentrals 8, acrostichals 4, prealars 2. Scutellum with 6 setae.

Legs. Fore leg, mid and hind tarsi lost. Spur of mid tibia (including comb) 36 µm long, spur of hind tibia (including comb) 40 µm long. Width at apex of mid tibia 48 µm, of hind tibia 52 µm. Lengths and proportions of legs as in Table 6.

Hypopygium (Figs 35–36). Anal point absent. Tergite IX without setae, tergal bands absent. Laterosternite IX with 2 setae. Phallapodeme 75 µm long. Transverse sternapodeme 67 µm long. Gonocoxite 152 µm long. Superior volsella digitiform, 93 µm long, with 7 dorsal, 2 apical, and 1 ventral setae, without microtrichia. Median volsella absent. Inferior volsella slightly clavate, 132 µm long, with 2 apical thin and 4 short, stout, subapical setae; projection arising from base of volsella, digitiform, curved, with narrow base, 91 µm long, densely covered with long microtrichia. Gonostylus not measurable.

Female and immatures. Unknown.

Distribution. The species is collected in the Jalisco State in Mexico.



FIGURES 35–36. *Beardius chapala* **sp. n.**, male. **35**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **36**—hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect.

Beardius cristhinae Trivinho-Strixino *et* Siqueira
(Figs 37–48)

Beardius cristhinae Trivinho-Strixino *et* Siqueira, 2007: 281.
Beardius cristhinae Trivinho-Strixino *et* Siqueira; Pinho *et al.* (2009: 262).
Beardius sp. 4 Sonoda & Trivinho-Strixino (2000: 746).

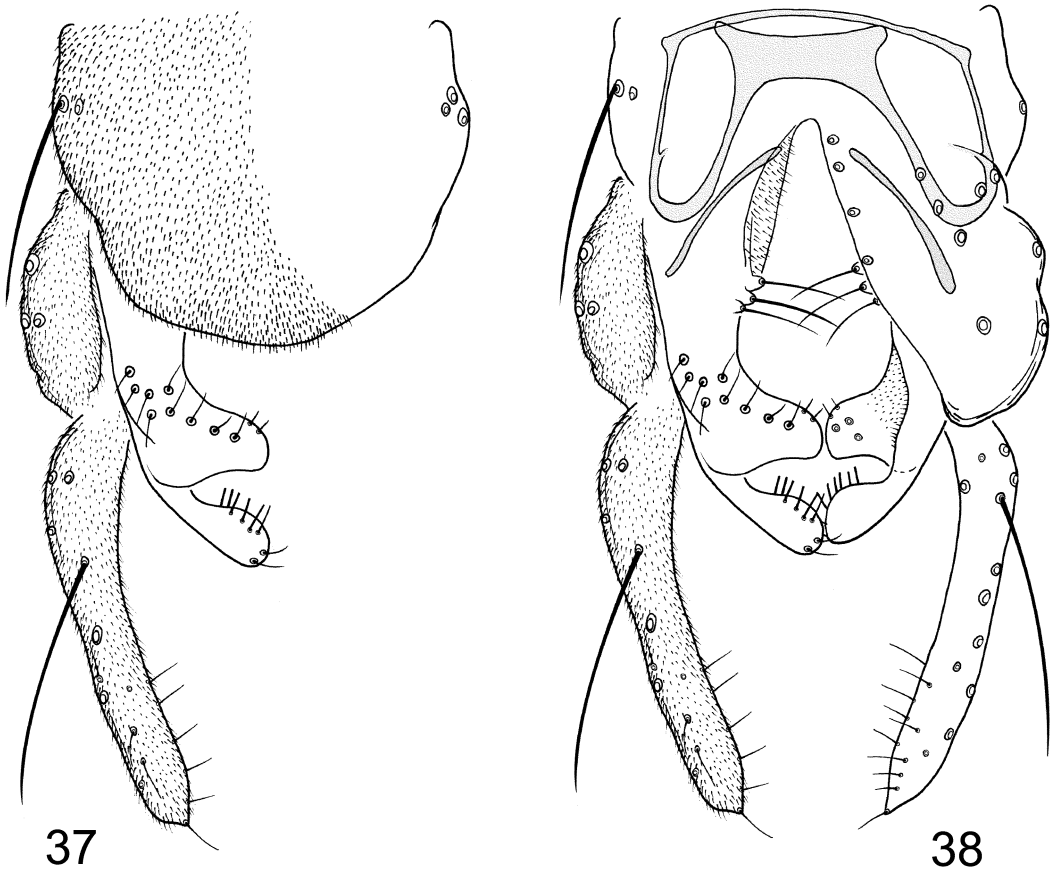
Material examined. Type material as in Trivinho-Strixino & Siqueira (2007). Additional material: **BRAZIL, Amazonas State:** Manaus, Adolfo Ducke Forest Reserve, Poça, S02°55'21" W59°58'44", in pool, 2 females with larva and pupa, 1 pharate female with larva, 2 males with pupa, 05.ii.2010, L.C. Pinho & H.F. Mendes.

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by having superior volsella fused with inferior volsella. The female by the combination of the following characters: acrostichals absent; R and R_1 with setae; and ventrolateral lobe with short microtrichia. The pupa by: tergite II with stronger shagreen orally; tergites VII and VIII without shagreen; paratergite VIII with long spines; and conjunctive IV/V with spinules arranged in two patches. The larva by: antenna with 5 segments; pecten mandibularis conspicuous; distance between ventromental plates of about the same width as median tooth of mentum; mandible with outer margin wrinkled; and mentum with last lateral tooth at about the same level as penultimate tooth.

Description

Male. The male was described in detail by Trivinho-Strixino & Siqueira (2007). Below we give new illustrations of the hypopygium (Figs 37–38). The tergal bands must be regarded as absent. The type series was not enough cleared and shadows of muscles was erroneously interpreted as tergal bands by Trivinho-Strixino & Siqueira (2007). This was evidenced by examination of the type series, coupled with additional cleared material. Further, the superior volsella has ventral microtrichia only.

Female (n = 2–3, except when otherwise stated). Total length 2.09–2.40 mm. Wing length 1.41–1.45 mm. Total length / wing length 1.44–1.70. Wing length / length of profemur 1.82–1.91.



FIGURES 37–38. *Beardius cristhinae* Trivinho-Strixino *et* Siqueira, male. **37**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **38**—hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect.

Coloration. Head, thorax and abdomen pale. Legs pale.

Head. AR 0.28–0.30, ultimate flagellomere 106–109 µm long. Temporal setae 8–10, not well separated in inner and outer verticals and postorbitals. Clypeus with 10–15 setae. Tentorium 137–177 µm long, 15–20 µm wide. Stipes 129 (1) µm long. Palpomere lengths (in µm): 25–38, 30–35, 83–104, 109–134, 152–200. Third palpomere with 3–4 sensillae subapically, longest 15–18 µm long.

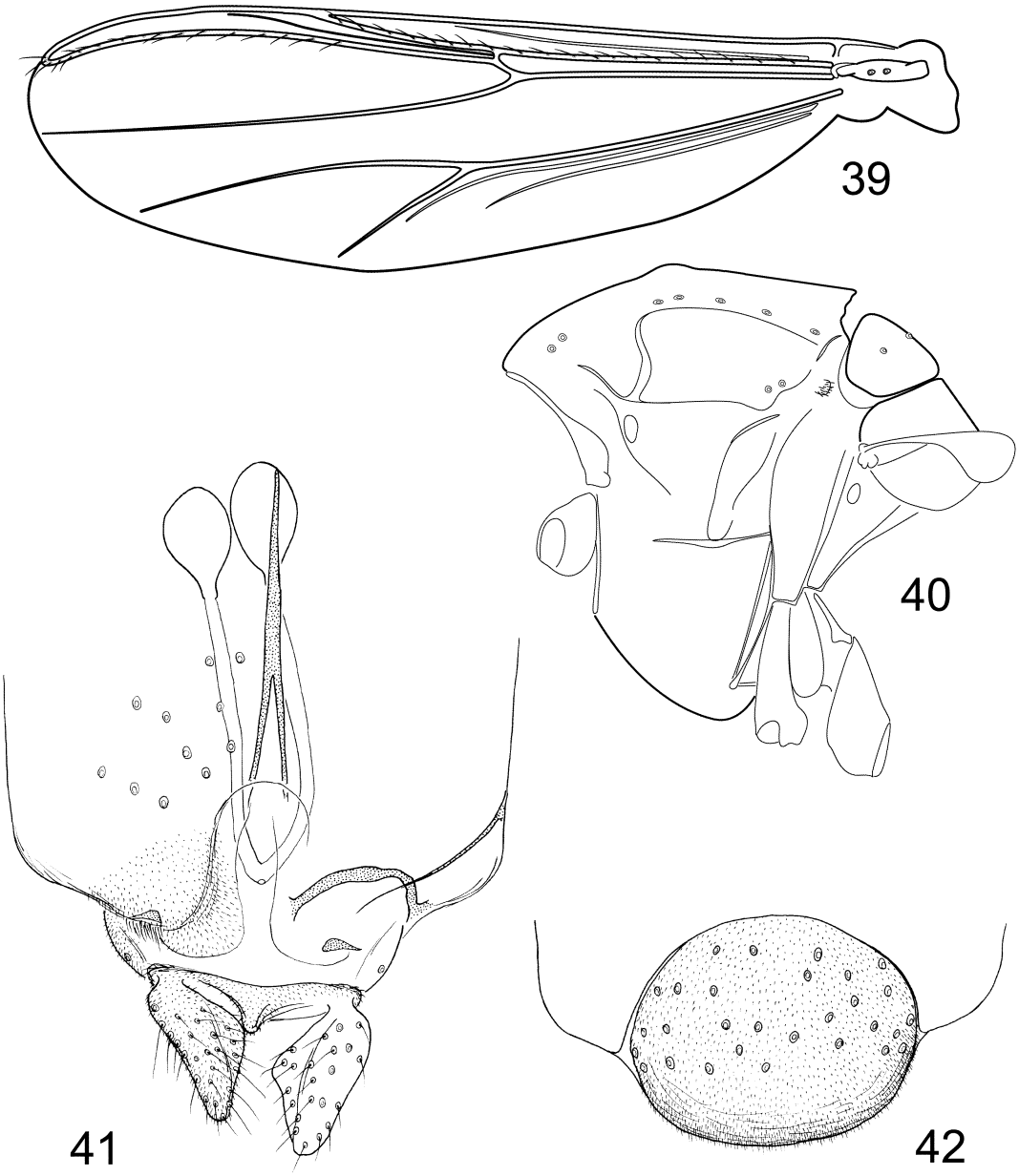
Thorax (Fig. 40). Scutal tubercle present. Dorsocentrals 6–9, including 1–2 near antepronotum; acrostichals absent; prealars 2. Scutellum with 4 setae.

Wing (Fig. 39). VR 1.19–1.32. R with 12–13 setae, R_1 with 8–11 setae, R_{4+5} with 17–19 setae. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 48–54 µm long, spur of mid tibia (including comb) 80–86 µm long, spur of hind tibia (including comb) 75–80 µm long. Width at apex of fore tibia 51–56 µm, of mid tibia 54–59 µm, of hind tibia 59–64 µm. Lengths and proportions of legs as in Table 7.

TABLE 7. Lengths (in μm) and proportions of legs of *Beardius cristhinae* Trivinho-Strixino *et* Siqueira, female (n = 1–3).

	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	739–795	374–411	1047	486	430	327
p_2	729–776	552–570	439–477	224–243	159–178	75–94
p_3	804–832	589–608	655	346	252	131
	ta_5	LR	BV	SV	BR	
p_1	122	2.80	1.98	1.06	2.6	
p_2	28–47	0.78–0.85	3.25–3.53	2.80–2.93	4.0–6.3	
p_3	47	1.08	2.66	2.16	3.6	



FIGURES 39–42. *Beardius cristhinae* Trivinho-Strixino *et* Siqueira, female. **39**—wing; **40**—thorax; **41**—genitalia, ventral view; **42**—tergite IX.

Genitalia (Figs 41–42). Tergite IX with 17–29 setae. Cercus 66–76 µm long, 33–43 µm wide. Notum 89–127 µm long. Gonocoxite IX with 1–2 setae. Seminal capsule 40–68 µm long, excluding 10–15 µm long neck.

Pupa. The pupa was described in detail by Trivinho-Strixino & Siqueira (2007).

Larva (n = 6, except when otherwise stated). Total length 3.08–3.62 (3) mm. Head capsule 329–372, 347 µm long.

Coloration. Light red.

Head dorsum (Fig. 48). Frontoclypeal apotome and labral sclerite 2 present. Frontoclypeal apotome with anterior granulation, extending to S4.

Antenna (Fig. 47). With 5 segments. AR 1.00–1.24, 1.10. Length of segments (in µm): 53–66, 58; 19–21, 20; 13–18, 15; 10–13, 12; 5–8, 6. Blade 58–99, 81 µm long, 1,5 times longer than flagellum. Lauterborn organs 13–15, 14 µm long, alternating on segments 2 and 3.

Labrum. Pecten epipharyngis (Fig. 46) with 3 plates, mid with 3 teeth, laterals with 3–4, 3 teeth each. Premandible 78–96, 86 µm long.

Mentum (Figs 43–44). Pale median tooth about 1/2 length of first lateral tooth. Ventromental plate 83–101, 91 µm wide, distance between plates 9–14, 12 µm. Postmentum 154–170, 164 µm long, with granulose area between ventromental plates.

Mandible (Fig. 45). 127–147, 137 µm long. Seta subdentalis 33–46, 38 µm long. Seta interna with 3 major branches. Pecten mandibularis distinct. Mola without spines. Outer margin granulose.

Abdomen. Procercus about 25 µm long, with 8 anal setae, longest about 450 µm long. Seta supraanalis about 330 µm long. Posterior prolegs about 75 µm long.

Biology. The larvae were collected in tubes constructed of leaf debris between decaying leaves in a temporary pool in the Adolfo Ducke Forest Reserve near Manaus, Brazil. The larvae of other *Beardius* species have been found in superficial mines in wood or are associated with macrophytes, so the habit of this species expands the range of substrate types for *Beardius* larvae.

Distribution. The species is collected in the São Paulo, Mato Grosso, and Amazonas states in Brazil.

***Beardius curticaudatus* sp. n.**
(Figs 49–53)

Type material. Holotype: male, **BRAZIL, Amazonas State:** Manaus, AM 010 Km 26, 55 m a.s.l., Adolfo Ducke Forest Reserve, #64, Igarapé Bolívia (Ig. 23), S02°59'14.8" W59°56'47.1", 09–12.xi.2008, Malaise trap suspended 3 m above the ground, U.G. Neiss *et al.* (MZSP). Paratypes: 2 males, as holotype (MZSP, INPA). 2 males, Novo Airão, AM 352 Km 9, 123 m a.s.l., Igarapé no Sítio do Sr. Valdenor, #6, S02°42'04.5" W06°55'23.4", 11–14.viii.2008, Malaise trap suspended 3 m above the ground, A.M.O. Pes *et al.* (MZUFBA, ZMBN).

TABLE 8. Lengths (in µm) and proportions of legs of *Beardius curticaudatus* **sp. n.**, male (n = 4–5).

	fe	ti	ta_1	ta_2
p_1	524–580, 542	327–383, 355	729–795, 757	318–358, 337
p_2	524–608, 561	374–430, 402	337–374, 355	140–168, 159
p_3	570–636, 608	430–486, 458	477–533, 505	224–252, 234
	ta_3	ta_4	ta_5	LR
p_1	262–299, 281	196–234, 215	75–94, 84	2.00–2.23, 2.12
p_2	103–122, 112	65–75, 70	28–37, 31	0.85–0.90, 0.87
p_3	168–187, 178	84–103, 94	37–47, 40	1.09–1.15, 1.11
	BV	SV		BR
p_1	1.76–1.88, 1.81	1.17–1.26, 1.21		2.0–3.7, 3.1
p_2	3.54–3.75, 3.66	2.63–2.94, 2.77		3.3–5.8, 4.4
p_3	2.76–3.01, 2.88	2.11–2.13, 2.12		4.2–5.0, 4.6

Diagnostic characters. The species belongs in the *xylophilus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; anal point short; and basal projection of inferior volsella long, digitiform, bearing long lamellae reaching the apex of the inferior volsella.

Etymology. From Latin *curticaudatus*, meaning short tailed, referring to the size of the anal point.

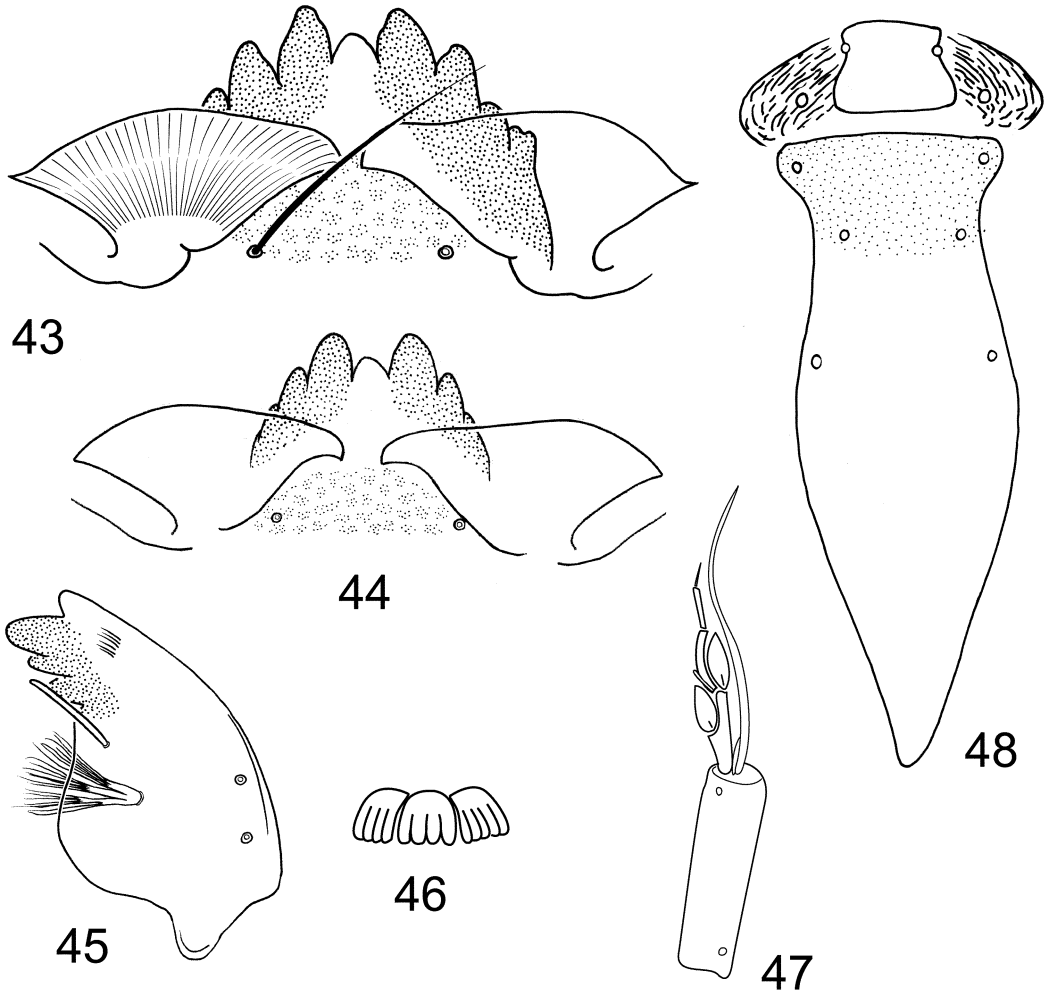
Description

Male (n = 4–5). Total length 2.18–2.71, 2.52 mm. Wing length 1.06–1.12, 1.09 mm. Total length / wing length 2.07–2.61, 2.32. Wing length / length of profemur 1.93–2.15, 2.00.

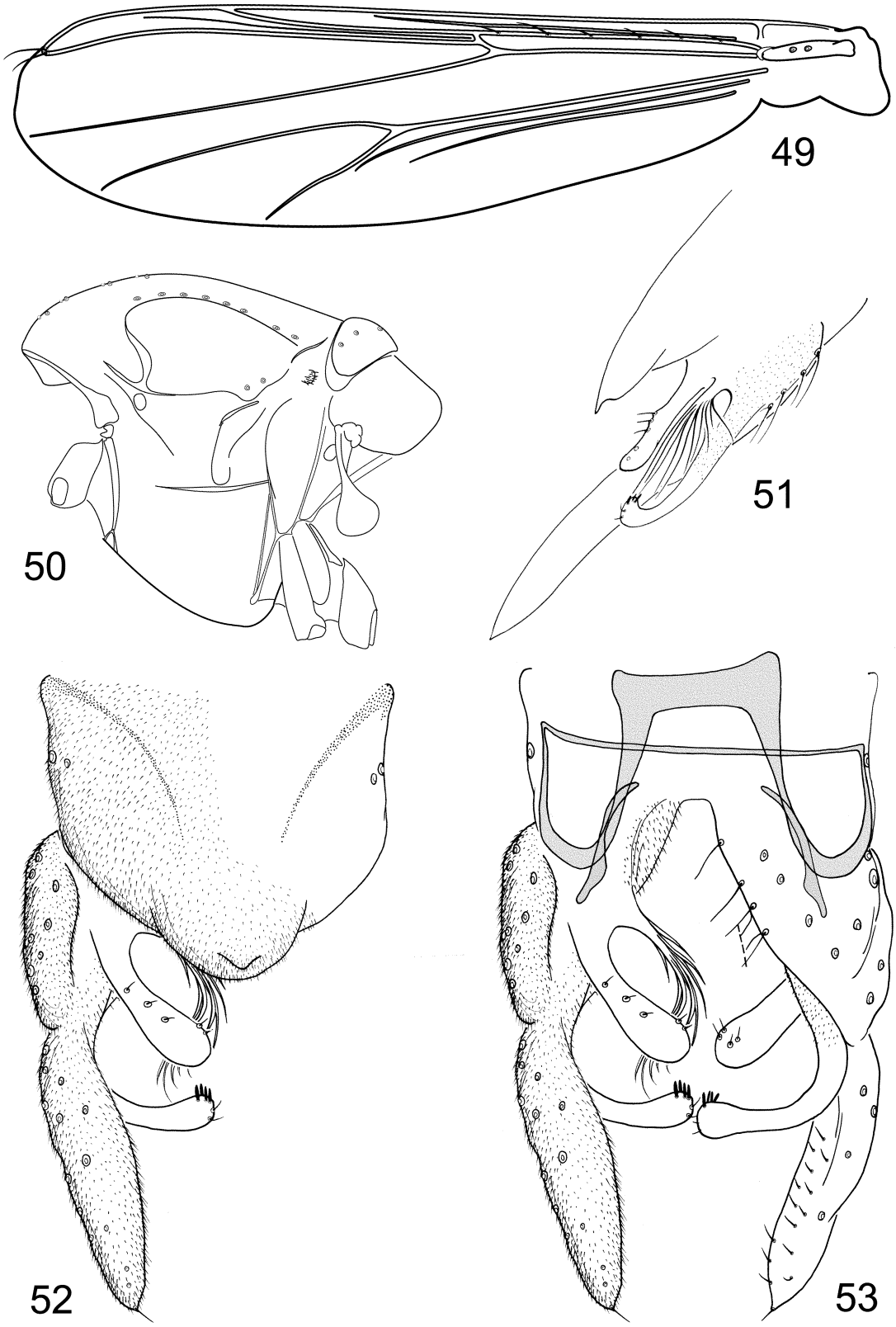
Coloration. Head and abdomen pale; thorax pale, with vittae and scutum stramineous. Legs pale.

Head. AR 1.00–1.32, 1.25; ultimate flagellomere 460–519, 508 µm long. Inner vertical 1; outer verticals 3–4, 4; postorbitals 3–4, 4. Clypeus with 10–13, 11 setae. Tentorium 71–116, 96 µm long; 23–35, 30 µm wide. Stipes 121–129 (3) µm long. Palpomere lengths (in µm): 25–46, 35; 28–46, 35; 99–129, 114; 124–167, 149; 182–233, 202. Third palpomere with 3–4, 4 sensillae subapically, longest 13–15, 14 µm long.

Thorax (Fig. 50). Scutal tubercle absent. Dorsocentrals 7–9, 8; acrostichals 7–8, 8; prealars 2. Scutellum with 6 setae.



FIGURES 43–48. *Beardius cristhinae* Trivinho-Strixino *et* Siqueira, larva. **43**—mentum and ventromental plates; **44**—mentum and ventromental plates, variation; **45**—mandible; **46**—pecten epipharyngis; **47**—antenna; **48**—dorsal sclerites of head capsule.



FIGURES 49–53. *Beardius curticaudatus* **sp. n.**, male. **49**—wing; **50**—thorax; **51**—hypopygium, lateral view; **52**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **53**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Wing (Fig. 49). VR 1.36–1.50, 1.43. R with 4–8, 6 setae; R_{4+5} with 2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 37–48, 43 µm long; spur of mid tibia (including comb) 54–64, 59 µm long; spur of hind tibia (including comb) 64–70, 67 µm long. Width at apex of fore tibia 43–48, 46 µm; of mid tibia 43–54, 48 µm; of hind tibia 48–54, 51 µm. Lengths and proportions of legs as in Table 8.

Hypopygium (Figs 51–53). Anal point small, bluntly triangular, 5–7, 6 µm long, arising from broadly rounded posterior protrusion of tergite IX. Tergite IX without setae, tergal bands present. Laterosternite IX with 2–3, 2 setae. Phallapodeme 56–58, 57 µm long. Transverse sternapodeme 46–56, 51 µm long. Gonocoxite 101–104, 102 µm long. Superior volsella digitiform, 48–68, 56 µm long, with 3–5, 4 dorsal, 2 apical, and 2 ventral setae, without microtrichia. Median volsella absent. Inferior volsella strongly curved, clavate, 73–89, 83 µm long, with 2 apical thin and 4–5, 4 subapical stout setae, with microtrichia in basal 1/3; projection arising from base of volsella, 66–73, 71 µm long, with about 12 long, curved lamellae. Gonostylus 99–116, 109 µm long. HR 0.89–1.02, 0.97. HV 2.11–2.40, 2.30.

Female and immatures. Unknown.

Distribution. The species is collected in the Amazonas State in Brazil.

TABLE 9. Lengths (in µm) and proportions of legs of *Beardius dioi* **sp. n.**, male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	1168	699	1191	710	618	504	160	1.70	1.53	1.57	4.3
p_2	1008	802	538	240	195	114	69	0.67	3.80	3.36	4.9
p_3	1107	870	779	412	275	172	80	0.89	2.94	2.54	5.4

***Beardius dioi* sp. n.**
(Figs 54–66)

Type material. Holotype male, **BRAZIL, Amazonas State:** Rio Branquinho, Acampamento Tapiri, 22.vii.1961, light trap, A213–1, E.J. Fittkau (ZSM). Paratype: 1 male with associated pupa, "Zucht, A176–1, Benthos from Zone I (part of Zone II, quiet spots); from leaves, moderate flow-through, with coarse detritus, 29.v.1961, E.J. Fittkau" (MZSP). 1 male, 1 female, Novo Airão, AM 352 Km 9, 123 m a.s.l., Igarapé no Sítio do Sr. Valdenor, #6, S02°42'04.5" W06°55'23.4", 11–14.viii.2008, Malaise trap suspended 3 m above the ground, A.M.O. Pes *et al.* (INPA). 1 male, 1 female, Manaus, AM 010 Km 26, 55 m a.s.l., Adolfo Ducke Forest Reserve, #64, Igarapé Bolívia (Ig.23), S02°59'14.8" W59°56'47.1", 09–12.xi.2008, Malaise trap suspended 3 m above the ground, U.G. Neiss *et al.* (MZSP). 1 male, Novo Aripuanã, Soka Gakkai Reserve, 07–09.vii.2008, Pennsylvania trap, N. Hamada *et al.* (MZUFBA).

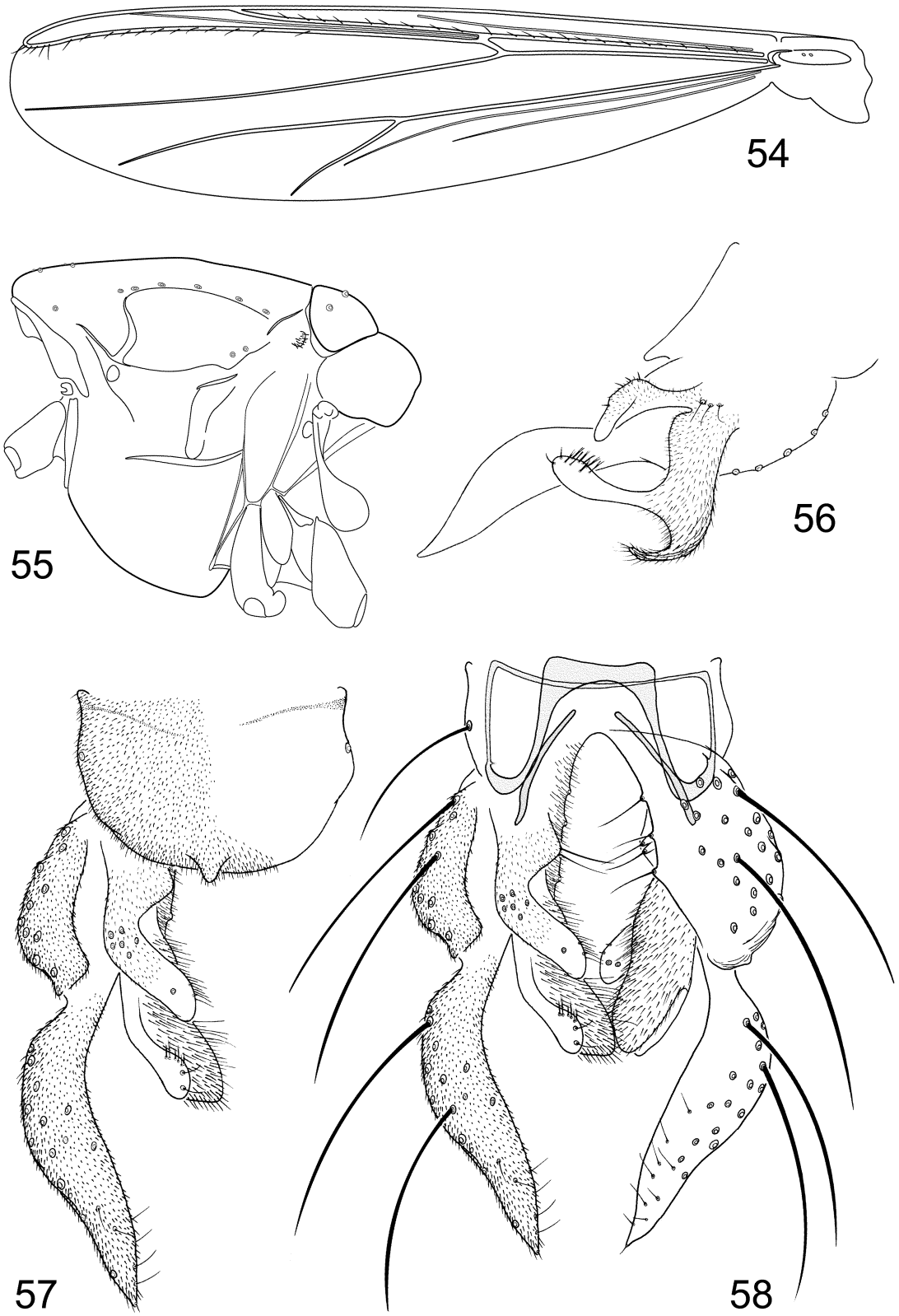
Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; tergal bands present; and inferior volsella with conspicuous, lingulate basal projection. The female by: acrostichals present; and clypeus with about 50 setae. The pupa by: tergite VI with shagreen in anterior 2/3 and in two posterolateral patches; anal spur of tergite VIII with a dominant tooth and minute accessory teeth; and paratergite VIII with very short spines.

Etymology. Named after the late Ronnie James Dio, according to the senior author the greatest rock singer of all times.

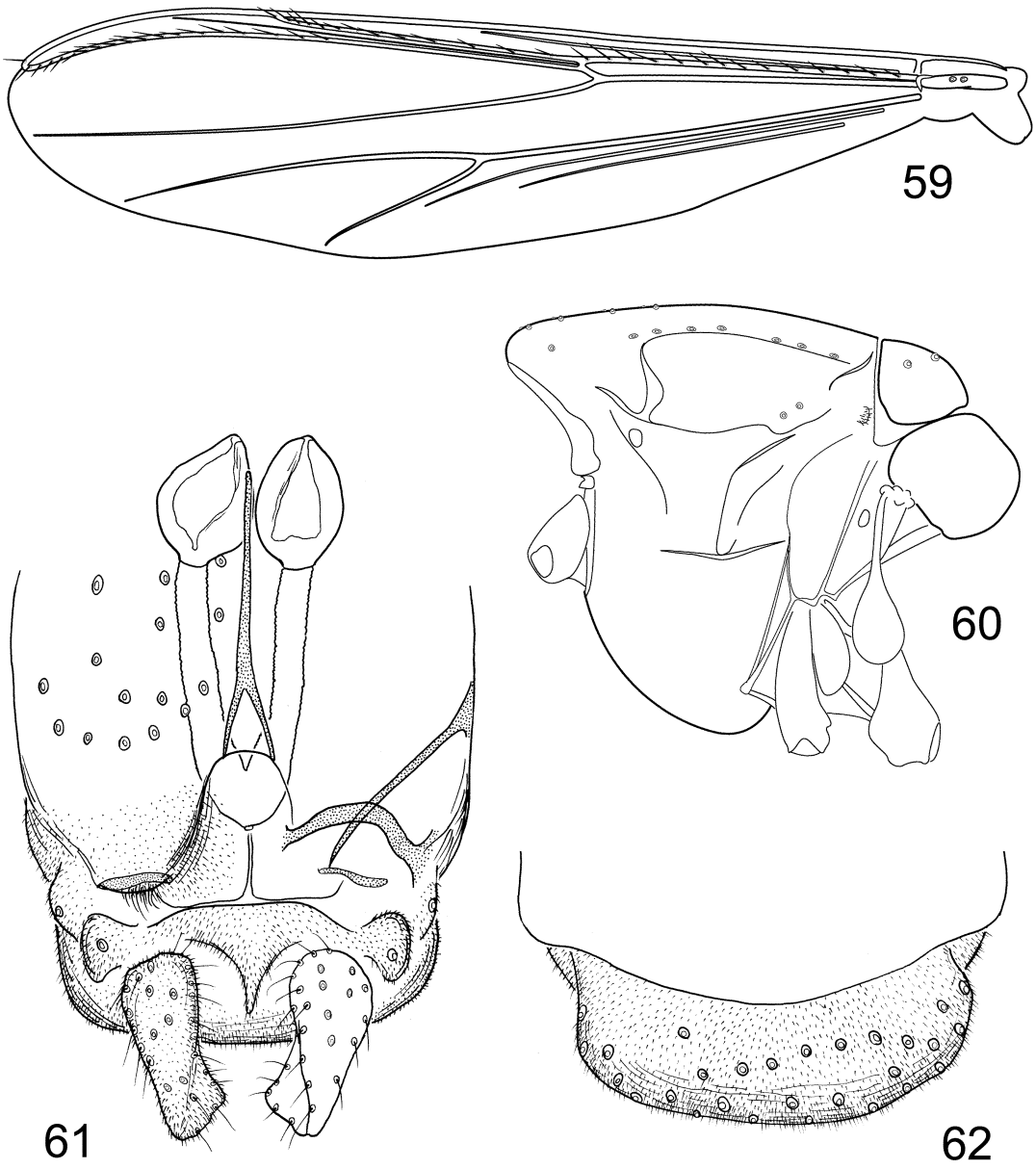
Description

Male (n = 1–2). Total length 3.60–3.99 mm. Wing length 1.47–1.74 mm. Total length / wing length 2.07–2.70. Wing length / length of profemur 1.48.

Coloration. Head pale to stramineous. Thorax pale with vittae, antepronotum and postnotum brown. Abdomen pale, tergites I–VIII each with transverse, anterior brown band and lighter brown lateral bands. Legs pale.



FIGURES 54–58. *Beardius dioi* **sp. n.**, male. **54**—wing; **55**—thorax; **56**—hypopygium, lateral view; **57**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **58**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.



FIGURES 59–62. *Beardius dioi* **sp. n.**, female. **59**—wing; **60**—thorax; **61**—genitalia, ventral view; **62**—tergite IX.

Head. AR 1.37–1.63, ultimate flagellomere 755–903 μm long. Temporal setae 9–12, not well separated in inner and outer verticals and postorbitals. Clypeus with 47 setae. Tentorium 132–161 μm long, 34–36 μm wide. Stipes not measurable. Palpomere lengths (in μm): 25, 29–32, 79–86, 120–129, 193–209. Third palpomere with 5 sensillae subapically, longest 23 μm long.

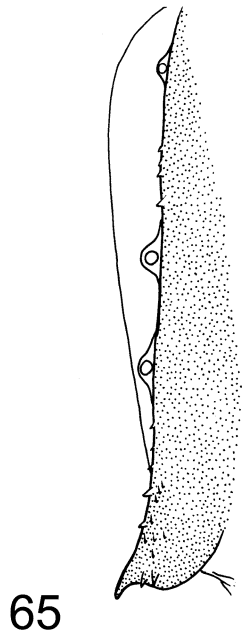
Thorax (Fig. 55). Scutal tubercle absent. Dorsocentrals 7, 1 of them near antepronotum; acrostichals 4; prealars 2–3. Scutellum with 4 setae.

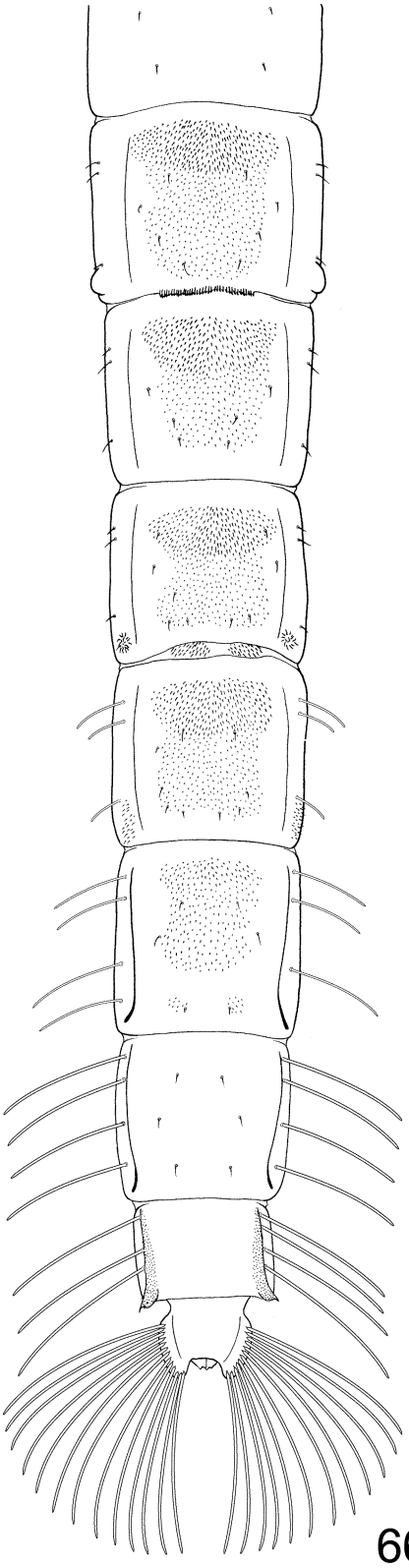
Wing (Fig. 54). VR 1.43. R with 10–12 setae, R_1 with 10–13 setae, R_{4+5} with 14–17 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 73 μm long, spur of mid tibia (including comb) 93 μm long, spur of hind tibia (including comb) 98 μm long. Width at apex of fore tibia 50 μm, of mid tibia 52 μm, of hind tibia 59 μm. Lengths and proportions of legs as in Table 9.

Hypopygium (Figs 56–58). Anal point bluntly triangular, 14–18 μm long. Tergite IX without setae, tergal bands present. Laterosternite IX with 1 seta. Phallapodeme 73–82 μm long. Transverse sternapodeme 54 μm long. Gonocoxite 145–163 μm long. Superior volsella digitiform, curved, 73–79 μm long, with 7–8 dorsal, 2 apical, and

2 ventral setae, with dorsal microtrichia in basal 2/3. Median volsella 4 µm long, with 2–3 apical setae, longest 30 µm long. Inferior volsella clavate, curved, 100–102 µm long, with 2 apical thin setae and 5 subapical stout, bifid setae; projection arising from basal 1/2 of volsella lingulate, broad, 95–107 µm long, densely covered with microtrichia. Gonostylus 152–168 µm long. HR 0.95–0.97. HV 2.37–2.38.





FIGURES 63–66. *Beardius dioi* **sp. n.**, pupa. **63**—frontal apotome; **64**—thorax; **65**—paratergite VIII; **66**—abdominal segments I–VIII and anal lobe, dorsal view.

TABLE 10. Lengths (in μm) and proportions of legs of *Beardius dioi* **sp. n.**, female (n = 1–2).

	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	1010–1160	598–664	1244–1496	711–720	589–645	514–542
p_2	898–982	767–814	533	262	187	103
p_3	1019–1094	814–860	739	439	318	168
	ta_5	LR	BV	SV	BR	
p_1	150–159	2.08–2.25	1.45–1.61	1.22–1.29	–	
p_2	56	0.70	3.62	3.12	4,0	
p_3	65	0.91	2.59	2.48	–	

Female (n = 1–2). Total length 3.13–3.64 mm. Wing length 1.70–1.77 mm. Total length / wing length 1.77–2.14. Wing length / length of profemur 1.52–1.69.

Coloration. Head pale to stramineous. Thorax pale with vittae, antepronotum and postnotum brown. Abdomen pale, tergites I–VIII each with transverse, anterior brown band and lighter brown lateral bands. Legs pale.

Head. AR 0.34, ultimate flagellomere 152 μm long. Inner vertical 1, outer verticals 5, postorbitals 4. Clypeus with 51–54 setae. Tentorium 139 μm long, 23 μm wide. Stipes 139 μm long. Palpomere lengths (in μm): 30–33, 35–38, 94–104, 139–147, 230–240. Third palpomere with 3 sensillae subapically, longest 18–28 μm long.

Thorax (Fig. 60). Scutal tubercle absent. Dorsocentrals 7–9, 1–3 of them close to antepronotum; acrostichals 8; prealars 2. Scutellum with 4 setae.

Wing (Fig. 59). VR 1.26. R with 5 setae, R_1 with 1 seta, R_{4+5} with 2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 31–33 μm long, spur of mid tibia (including comb) 48–63 μm long, spur of hind tibia (including comb) 53–56 μm long. Width at apex of fore tibia 26–30 μm, of mid tibia 29–31 μm, of hind tibia 30–33 μm. Lengths and proportions of legs as in Table 10.

Genitalia (Figs 61–62). Tergite IX with 19–28 setae. Cercus 81 μm long, 35 μm wide. Notum 89–101 μm long. Gonocoxite IX with 1 seta. Seminal capsule 46–56 μm long, neck absent.

Pupa (n = 1). Total length 3.83 mm.

Coloration. Cephalothorax and abdomen pale.

Cephalothorax (Fig. 64). Frontal apotome conical (Fig. 63), frontal setae 41 μm long. Thorax without dorsal granulation. Thoracic horn with 6 branches; anterior branch stout, with spinules in apical 2/3. Distance between Dc1 and Dc2 22 μm, between Dc2 and Dc3 144 μm, between Dc3 and Dc4 12 μm. Precorneal 1, antepronotals and prealars absent.

Abdomen (Fig. 66). Tergites I, VII and VIII without shagreen. Tergites II–V with transverse anterior band of shagreen a little stronger than contiguous posterior shagreen. Tergite VI with uniformly thin shagreen. Row of hooklets on tergite II about 2/3 of tergite width. Conjuntive IV/V with spinules in two patches. Paratergite V with few posterior spinules. Pedes spurii A and pedes spurii B present. Segment I without L setae; segments II–IV with 3 L setae; segment V with 3 taeniate L setae; segments VI–VII with 4 taeniate L; segment VIII with 3–4 taeniate L setae. Segment VIII with short, thin lateral spines, anal spur simple, with short accessory spines (Fig. 65). Anal lobe 163 μm long, with 12 taeniate setae.

Larva. Unknown.

Distribution. The species is collected in the Amazonas State in Brazil.

Beardius fittkaui Pinho, Mendes *et* Andersen

Beardius fittkaui Pinho, Mendes *et* Andersen, 2009: 258.

Material examined. Type material as in Pinho *et al.* (2009).

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; and median volsella at apex of subtriangular projection of inferior volsella. The pupa by: tergite II with stronger shagreen orally; tergite VI with shagreen in anterior 2/3; tergites VII and VIII without shagreen; paratergite VIII with long spines; anal spur of tergite VIII with minute accessory teeth; and conjunctive IV/V with spinules in a single patch.

Description. The male was described in detail by Pinho *et al.* (2009). The structure considered to be the "median volsella" by Pinho *et al.* (2009) must be regarded as a basal subtriangular lobe of the inferior volsella while the 2–3 setae situated on the apex of this projection the wart-like median volsella.

Distribution. The species is recorded from the Amazonas State in Brazil (Pinho *et al.* 2009).

TABLE 11. Lengths (in μm) and proportions of legs of *Beardius hirtidorsum* **sp. n.**, male (n = 5–7).

	fe	ti	ta_1	ta_2
p_1	546–595, 571	302–367, 326	709–782, 750	310–350, 326
p_2	546–652, 587	391–465, 432	302–342, 318	147–163, 155
p_3	587–693, 644	440–505, 473	431–497, 465	212–245, 228
	ta_3	ta_4	ta_5	LR
p_1	245–277, 261	179–196, 187	65–73, 69	2.13–2.51, 2.30
p_2	106–115, 110	57–65, 61	32–34, 33	0.72–0.77, 0.74
p_3	171–196, 187	82–90, 87	33–49, 40	0.95–1.00, 0.97
	BV	SV	BR	
p_1	1.41–1.96, 1.82	1.13–1.23, 1.19	2.4–3.3, 2.7	
p_2	3.62–3.96, 3.76	3.11–3.34, 3.21	2.8–4.3, 3.3	
p_3	2.84–3.08, 2.96	2.38–2.45, 2.42	2.0–4.4, 3.5	

***Beardius hirtidorsum* sp. n.**
(Figs 67–70)

Type material. Holotype male, **BRAZIL, Roraima State:** Boa Vista, Lago Magalhães, 10.xii.1971, F. Reiss (ZSM). Paratypes: 3 males, as holotype (MZSP). 3 males, **Mato Grosso State:** Ribeirão Cascalheira, Afluente Ribeirão Bonito, S12°55'36" W51°53'28", 08.x.2007, light trap, L.C. Pinho *et al.* (ZMBN, MZUFBA).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the tapering apex of the superior volsella; and the conspicuous, long macrotrichia in posterior part of scutum.

Etymology. From Latin *hirtidorsum*, meaning hairy back, referring to the diagnostic macrotrichia on scutum.
Description

Male (n = 5–7, except when otherwise stated). Total length 2.24–3.06, 2.57 mm. Wing length 1.14–1.23, 1.17 mm. Total length / wing length 1.95–2.48, 2.18. Wing length / length of profemur 2.02–2.09, 2.06.

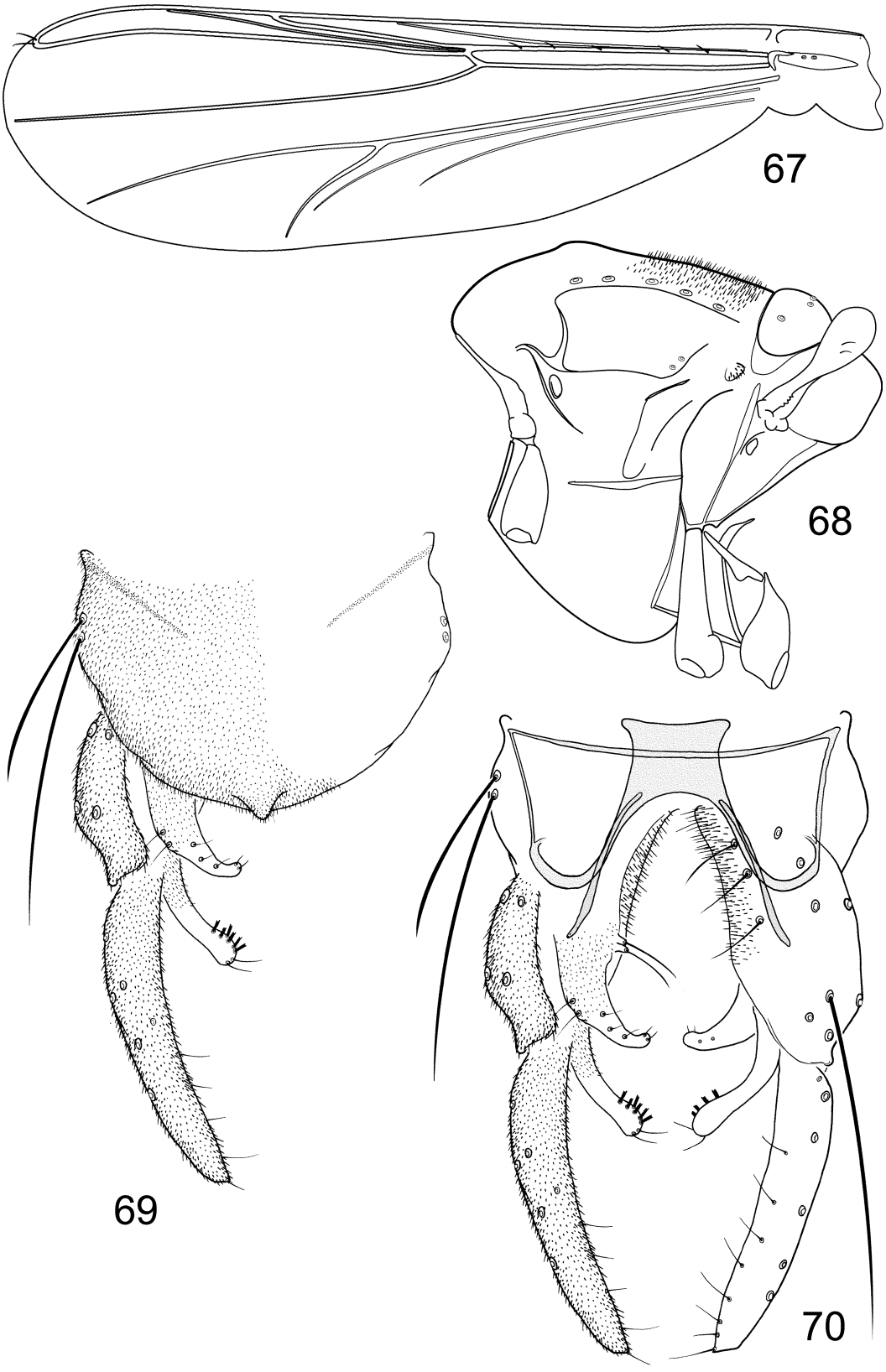
Coloration. Head, thorax and abdomen pale. Legs pale.

Head. AR 1.04–1.18, 1.11; ultimate flagellomere 399–440, 416 μm long. Inner verticals 2; outer verticals 4; postorbitals 2–3, 2. Clypeus with 9–13, 11 setae. Tentorium 81–124, 103 (4) μm long; 26–30, 28 (4) μm wide. Stipes 103–116, 112 μm long. Palpomere lengths (in μm): 26–30, 28; 26–30, 28; 67–95, 75; 102–118, 112; 164–185, 175 (4). Third palpomere with 2–4, 3 sensillae subapically; longest 12–16, 14 μm long.

Thorax (Fig. 68). Scutal tubercle present; scutum with distinct, long macrotrichia in posterior 1/2. Dorsocentrals 5–7, 6; acrostichals absent; prealars 2. Scutellum with 4–5, 4 setae.

Wing (Fig. 67). VR 1.36–1.46, 1.41. R with 0–4, 1 seta; R_{4+5} with 2–4, 3 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 36–40, 38 μm long; spur of mid tibia (including comb) 40–56, 48 μm long; spur of hind tibia (including comb) 48–60, 56 μm long. Width at apex of fore tibia 36–40, 38 μm; of mid tibia 36–40, 37 μm; of hind tibia 40–48, 46 μm. Lengths and proportions of legs as in Table 11.



FIGURES 67–70. *Beardius hirtidorsum* **sp. n.**, male. **67**—wing; **68**—thorax; **69**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **70**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Hypopygium (Figs 69–70). Anal point bluntly triangular, 4–8, 6 µm long, barely overreaching posterior margin of tergite IX. Tergite IX without setae, tergal bands present. Laterosternite IX with 2–3, 2 setae. Phallapodeme 43–60, 53 µm long. Transverse sternapodeme 26–39, 33 µm long. Gonocoxite 93–102, 98 µm long. Superior volsella with narrow, curved apex, 28–35, 32 µm long, with 6–9, 7 dorsal and 1–2, 2 ventral setae, with microtrichia dorsally. Median volsella 2–3, 2 µm long, with 2 apical setae, longest 18–24, 22 µm long. Inferior volsella slightly curved, 32–51, 43 µm long, with 2 apical thin and 5–7, 6 stout bifid subapical setae, with microtrichia dorsally in basal 1/2; projection absent. Gonostylus 93–112, 102 µm long. HR 0.91–1.04, 0.98. HV 2.22–2.73, 2.49.

Female and immatures. Unknown.

Distribution. The species is collected in the Mato Grosso and Roraima states in Brazil.

***Beardius krenak* sp. n.**
(Figs 71–76)

Type material. Holotype: male, **BRAZIL, Minas Gerais State:** Serra do Cipó National Park, Km 130, 23.vii.1972, at temporary pool, hand net, C.G. Froehlich (MZSP). Paratypes: 9 males, as holotype (MZSP, ZMBN, INPA, MZUFBA).

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the unique basal projection of the inferior volsella bearing very long setae.

Etymology. The name refers to the Krenak Indians, an ethnic group from the Minas Gerais State, Brazil. The name is to be regarded as a noun in apposition.

TABLE 12. Lengths (in µm) and proportions of legs of *Beardius krenak* **sp. n.**, male (n = 6–11).

	fe	ti	ta_1	ta_2
p_1	842–963, 916	655–720, 692	916–1075, 1001	374–458, 421
p_2	795–907, 870	655–720, 692	402–468, 430	187–234–215
p_3	982–1057, 1019	767–860, 814	664–748, 701	355–411, 383
	ta_3	ta_4	ta_5	LR
p_1	355–403, 383	234–309, 271	103–131, 112	1.36–1.48, 1.42
p_2	140–168, 155	94–112, 103	47–65, 56	0.60–0.75, 0.65
p_3	271–346, 318	140–159, 150	65–84, 75	0.82–0.92, 0.85
	BV	SV		BR
p_1	2.09–2.28, 2.17	1.57–1.67, 1.63		2.4–3.0, 2.6
p_2	3.47–3.94, 3.69	3.40–3.80, 3.57		3.0–5.5, 4.0
p_3	2.56–3.01, 2.77	2.55–2.68, 2.62		2.5–5.4, 4.0

Description

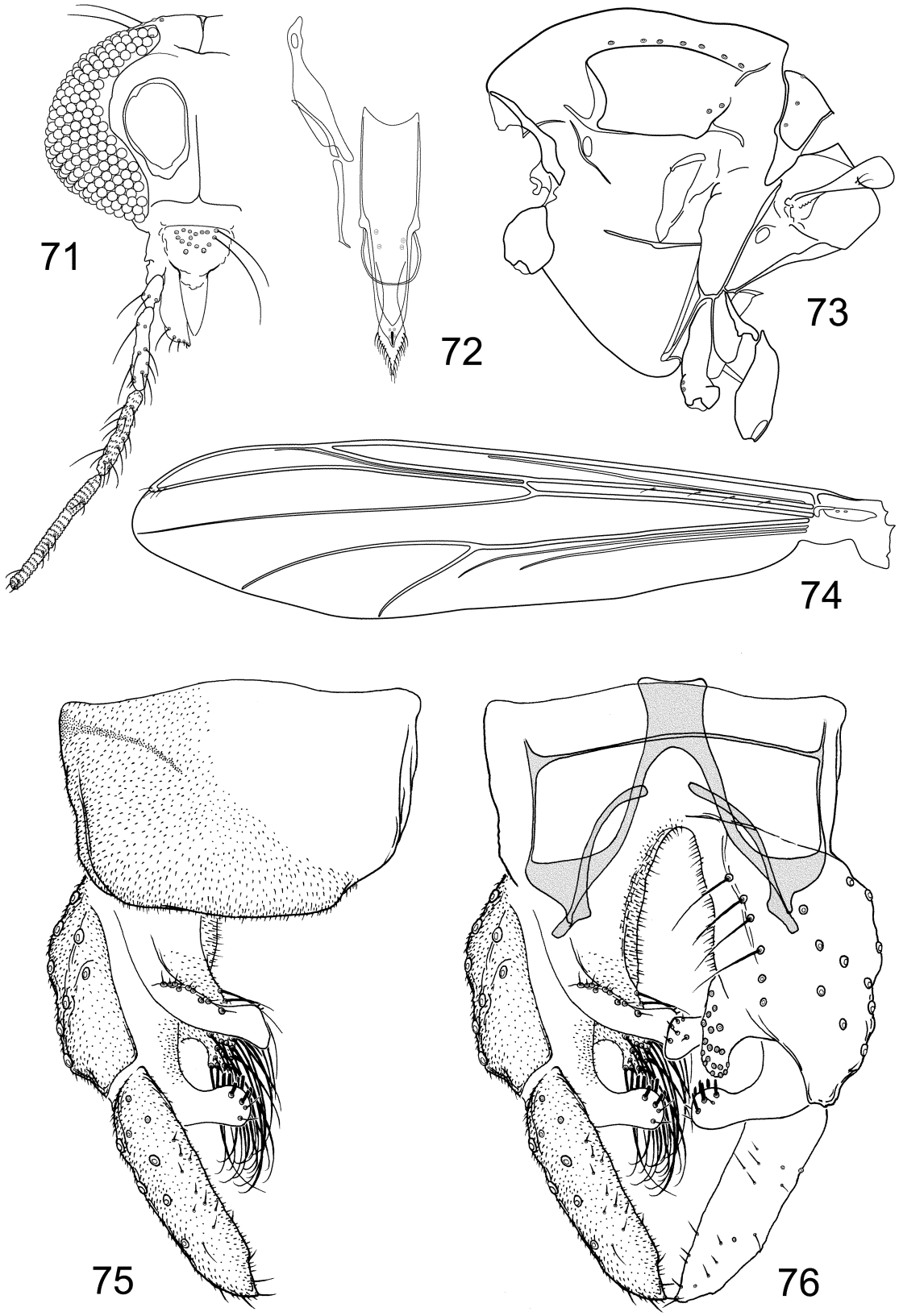
Male (n = 9–11, except when otherwise stated). Total length 3.03–3.63, 3.39 mm. Wing length 1.74–1.94, 1.83 mm. Total length / wing length 1.57–1.97, 1.85. Wing length / length of profemur 1.93–2.19, 2.02.

Coloration. Head, thorax and abdomen pale to stramineous. Legs pale to stramineous.

Head (Fig. 71). AR 1.21–1.46, 1.34; ultimate flagellomere 608–673, 645 µm long. Inner verticals 1–2, 2 (6); outer verticals 3–5, 4 (6); postorbitals 3–5, 4 (6). Clypeus with 8–11, 10 (8) setae. Tentorium, stipes and cibarial pump as in Figure 72. Tentorium 119–132, 124 µm long; 23–33, 28 µm wide. Stipes 127–159, 147 (6) µm long. Palpomere lengths (in µm): 33–38, 35 (8); 38–51, 46 (8); 94–139, 124 (8); 111–159, 134 (7); 142–223, 180 (5). Third palpomere with 2–3, 3 (8) sensillae subapically, longest 18–25, 23 (8) µm long.

Thorax (Fig. 73). Scutal tubercle absent. Dorsocentrals 5–8, 7; acrostichals absent; prealars 2. Scutellum with 2–4, 3 setae.

Wing (Fig. 74). VR 1.17–1.37, 1.25. R with 4–8, 7 setae; R_1 with 0–1, 0 seta; R_{4+5} with 2–7, 4 setae. Brachiolum with 1–2, 2 setae. Remaining veins bare.



FIGURES 71–76. *Beardius krenak* **sp. n.**, male. **71**—head; **72**—tentorium, stipes and cibarial pump; **73**—thorax; **74**—wing; **75**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **76**—hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect.

Legs. Spur of fore tibia (including scale) 48–64, 59 µm long; spur of mid tibia (including comb) 70–80, 75 µm long; spur of hind tibia (including comb) 75–96, 86 µm long. Width at apex of fore tibia 54–75, 64 µm; of mid tibia 54–64, 59 µm; of hind tibia 59–75, 64 µm. Lengths and proportions of legs as in Table 12.

Hypopygium (Figs 75–76). Anal point absent. Tergite IX without setae, tergal bands present. Laterosternite IX without setae. Phallapodeme 63–89, 76 µm long. Transverse sternapodeme 25–51, 38 µm long. Gonocoxite 139–157, 149 µm long. Superior volsella digitiform, curved, 51–63, 56 µm long, with 7–9, 8 dorsal, 2 apical, and 4–6, 5 ventral setae, without microtrichia. Median volsella absent. Inferior volsella clavate, curved, 46–63, 56 µm long, with 2 apical thin and 6–8, 7 subapical stout setae, with microtrichia dorsally in basal 1/2; projection arising from base of volsella, subtriangular with rounded apex, 20–30, 25 µm long, with numerous, strong setae, longest 71–101, 86 µm long. Gonostylus 101–137, 119 µm long. HR 1.11–1.51, 1.29. HV 2.83–3.42, 3.14.

Female and immatures. Unknown.

Distribution. The species is collected in the Minas Gerais State in Brazil.

***Beardius kumadueni* sp. n.**
(Figs 77–79)

Type material. Holotype male, **BRAZIL, Pará State:** Igarapé Kumadueni, 19.iv.1962, light trap, A377, E.J. Fittkau (ZSM).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the presence of an unique dorsomedial extension of the gonocoxite.

Etymology. The name refers to the type locality, Igarapé Kumadueni. The name is to be regarded as a noun in apposition.

TABLE 13. Lengths (in µm) and proportions of legs of *Beardius kumadueni* **sp. n.**, male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	701	383	978	424	352	269	90	2.55	1.82	1.11	2.4
p_2	709	530	432	187	139	73	49	0.82	0.53	2.87	3.6
p_3	750	554	–	–	–	–	–	–	–	–	–

Description

Male (n = 1). Total length 2.58 mm. Wing length 1.35 mm. Total length / wing length 1.91. Wing length / length of profemur 1.92.

Coloration. Head, thorax and abdomen light brown. Legs pale.

Head. AR 1.02, ultimate flagellomere 505 µm long. Inner verticals 2, outer verticals 3, postorbitals 3. Clypeus with 8 setae. Tentorium 93 µm long, 20 µm wide. Stipes 106 µm long. Palpomere lengths (in µm): 28, 30, 81, 112, 171. Third palpomere with 4 sensillae subapically, longest 10 µm long.

Thorax. Scutal tubercle absent. Dorsocentrals 5, acrostichals absent, prealars 2. Scutellum with 4 setae.

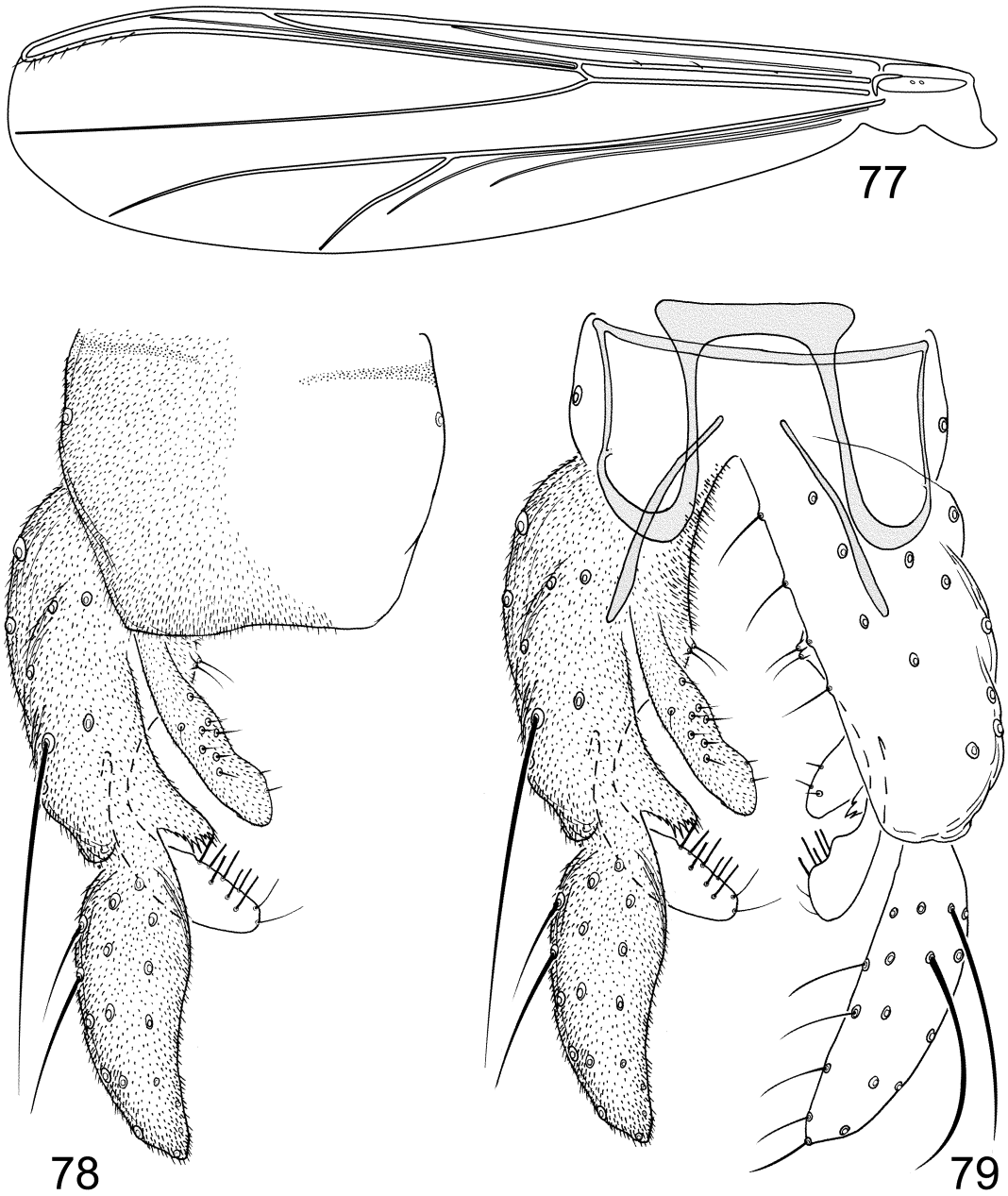
Wing (Fig. 77). VR 1.48. R with 3 setae, R_{4+5} with 9 setae. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 48 µm long, spur of mid tibia (including comb) 68 µm long, spur of hind tibia (including comb) 68 µm long. Width at apex of fore tibia 40 µm, of mid tibia 40 µm, of hind tibia 44 µm. Lengths and proportions of legs as in Table 13.

Hypopygium (Figs 78–79). Anal point absent. Tergite IX without setae, tergal bands present. Laterosternite IX with 1 seta. Phallapodeme 61 µm long. Transverse sternapodeme 41 µm long. Gonocoxite 118 µm long, with bluntly triangular dorsomedial extension. Superior volsella digitiform, 55 µm long, with 8 dorsal and 3 ventral setae, densely covered with microtrichia. Median volsella 3 µm long, with 2–3 apical setae, longest 22 µm long. Inferior volsella clavate, curved, 61 µm long, with 2 apical thin and 7 subapical stout setae; projection absent. Gonostylus 89 µm long. HR 1.32. HV 2.89.

Female and immatures. Unknown.

Distribution. The species is collected in the Pará State in Brazil.



FIGURES 77–79. *Beardius kumadueni* **sp. n.**, male. **77**—wing; **78**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **79**—hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect.

Beardius lingulatus Andersen *et* Sæther

Beardius lingulatus Andersen *et* Sæther, 1996: 41.

Material examined. Type material, as in Andersen & Sæther (1996).

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the combination of the following characters: median volsella absent; and inferior volsella strongly curved with tongue-shaped basal projection, not fused to the superior volsella.

Description. The male was described in detail by Andersen & Sæther (1996). The structure considered to be the "median volsella" by Andersen & Sæther (1996) must be regarded as a basal tongue-shaped lobe of the inferior volsella; median volsella is absent.

Distribution. The species is recorded from Costa Rica (Andersen & Sæther 1996).

TABLE 14. Lengths (in μm) and proportions of legs of *Beardius longicaudatus* **sp. n.**, male (n = 5–6).

	fe	ti	ta_1	ta_2
p_1	458–542, 505	327–346, 337	701–739, 720	299–365, 318
p_2	505–542, 524	365–393, 383	290–337, 318	131–140, 137
p_3	542–570, 552	411–430, 421	439–468, 458	206–262, 243
	ta_3	ta_4	ta_5	LR
p_1	252–262, 257	178–196, 187	75–84, 80	2.03–2.19, 2.14
p_2	103–112, 108	47–56, 53	28–37, 32	0.74–0.88, 0.85
p_3	150–168, 159	75–94, 85	37–47, 41	1.04–1.09, 1.07
	BV	SV	BR	
p_1	1.81–1.97, 1.89	1.12–1.23, 1.19	1.8–2.7, 2.2	
p_2	3.61–4.47, 4.00	2.69–3.19, 2.82	3.0–4.8, 3.7	
p_3	2.59–2.94, 2.79	2.12–2.21, 2.17	2.8–5.3, 4.1	

***Beardius longicaudatus* sp. n.**
(Figs 80–84)

Type material. Holotype: male, **BRAZIL, Amazonas State:** Rio Preto da Eva, AM 010 Km 113, 24 m a.s.l., Ramal do Procópio Km 15, #41, Igarapé no Sítio Dois Irmãos, S02°40'36.6" W59°23'19.8", 28.ix.2008, Malaise trap suspended 3 m above the ground, J.O. Silva *et al.* (MZSP). Paratypes: 5 males, as holotype (INPA, ZMBN, MZUFBA).

Diagnostic characters. The species belongs in the *xylophilus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; anal point long, narrowly spatulate without microtrichia in apical 1/3; and basal projection of the inferior volsella long, digitiform, bearing long lamellae reaching the apex of inferior volsella.

Etymology. From Latin *longicaudatus*, meaning long tailed, referring to the shape of the anal point.

Description

Male (n = 5–6, except when otherwise stated). Total length 2.12–2.39, 2.29 mm. Wing length 0.99–1.05, 1.02 mm. Total length / wing length 2.05–2.34, 2.23. Wing length / length of profemur 1.90–2.20, 2.02.

Coloration. Head and abdomen pale, thorax pale with vittae and scutum stramineous. Legs pale.

Head. AR 1.11–1.19, 1.15; ultimate flagellomere 423–471, 444 μm long. Temporal setae 8–10, 9; not well separated in inner and outer verticals and postorbitals. Clypeus with 9–11, 10 setae. Tentorium 89–106, 96 μm long; 23–33, 25 μm wide. Stipes 111–129, 119 μm long. Palpomere lengths (in μm): 25–30, 28; 23–30, 28; 86–99, 94; 121–139, 132; 182–200, 192. Third palpomere with 2 sensillae subapically, longest 10–13, 11 μm long.

Thorax (Fig. 81). Scutal tubercle absent. Dorsocentrals 5–7, 6; acrostichals 4–6, 5; prealars 2. Scutellum with 4–6, 5 setae.

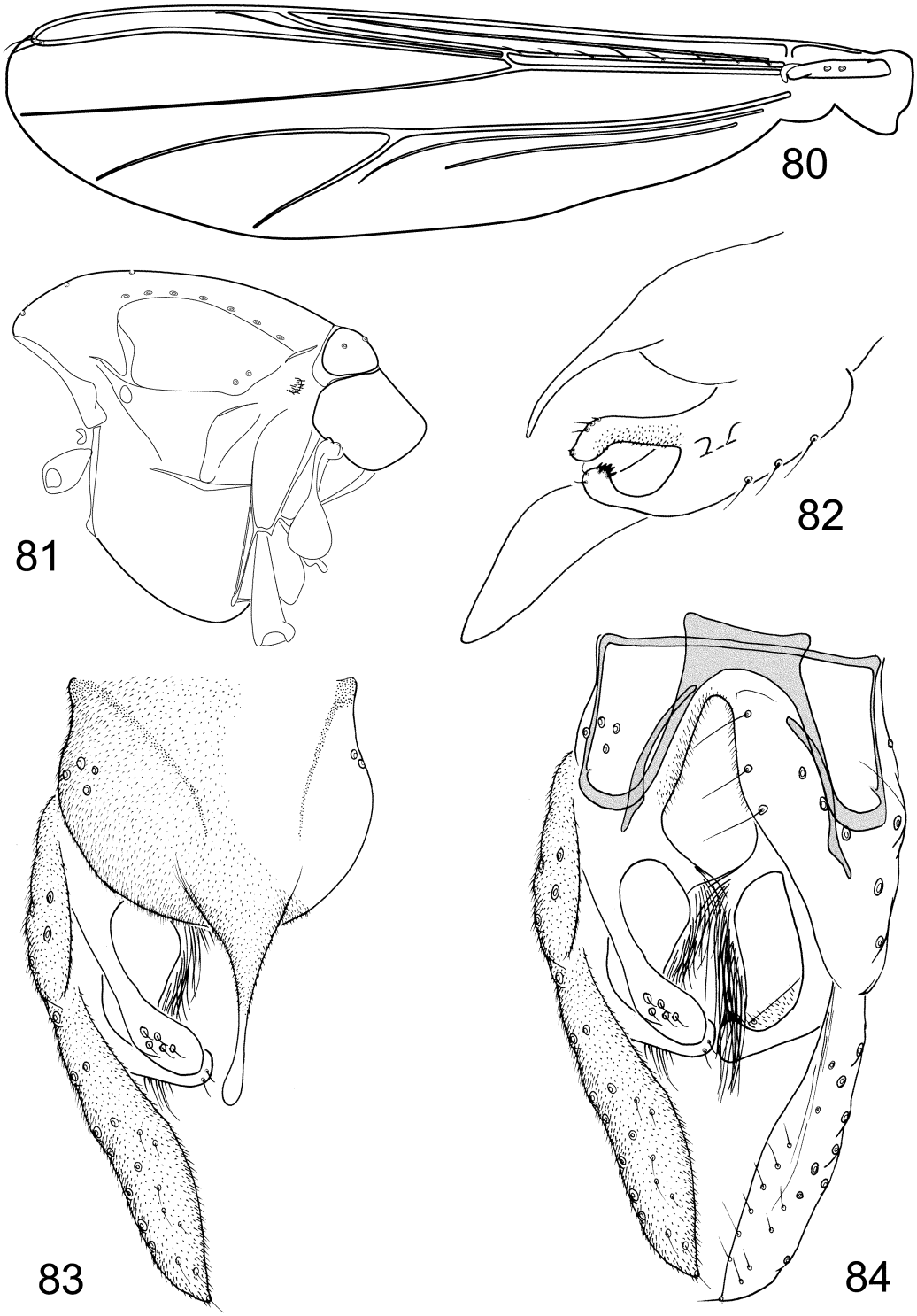
Wing (Fig. 80). VR 1.39–1.46, 1.43. R with 5–8, 6 setae; R_{4+5} with 2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 32–37, 34 μm long; spur of mid tibia (including comb) 54–59, 56 μm long; spur of hind tibia (including comb) 59–70, 64 μm long. Width at apex of fore tibia 37–48, 43 μm; of mid tibia 37–43, 41 μm; of hind tibia 43–48, 46 μm. Lengths and proportions of legs as in Table 14.

Hypopygium (Figs 82–84). Anal point narrowly spatulate, 43–63, 56 μm long, with microtrichia restricted to basal 2/3. Tergite IX without setae, tergal bands present. Laterosternite IX with 2–4, 3 setae. Phallapodeme 63–73, 68 μm long. Transverse sternapodeme 33–43, 38 μm long. Gonocoxite 94–106, 101 μm long. Superior volsella clavate, 46–56, 51 (4) μm long, with 4–5, 4 (4) dorsal and 4 (4) ventral setae, with microtrichia on ventral surface. Median volsella absent. Inferior volsella curved, clavate, 43–66, 56 (4) μm long, with 2 apical thin and 4–5, 4 subapical stout setae; projection arising from base of volsella, 78–96, 86 (4) μm long, with numerous, long lamellae. Gonostylus 96–114, 104 μm long. HR 0.90–1.08, 0.97. HV 2.00–2.42, 2.22.

Female and immatures. Unknown.

Distribution. The species is collected in the Amazonas State in Brazil.



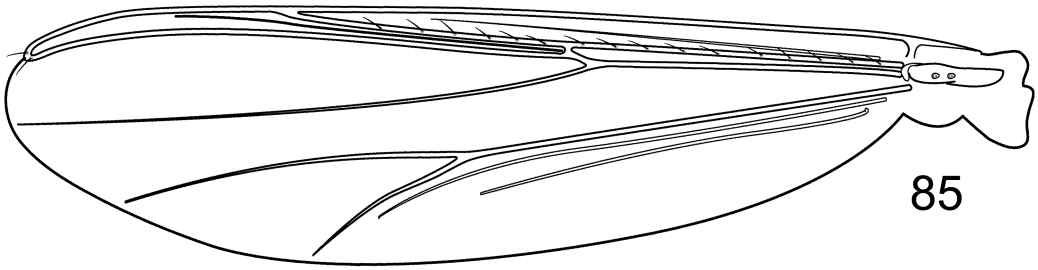
FIGURES 80–84. *Beardius longicaudatus* **sp. n.**, male. **80**—wing; **81**—thorax; **82**—hypopygium, lateral view; **83**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **84**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

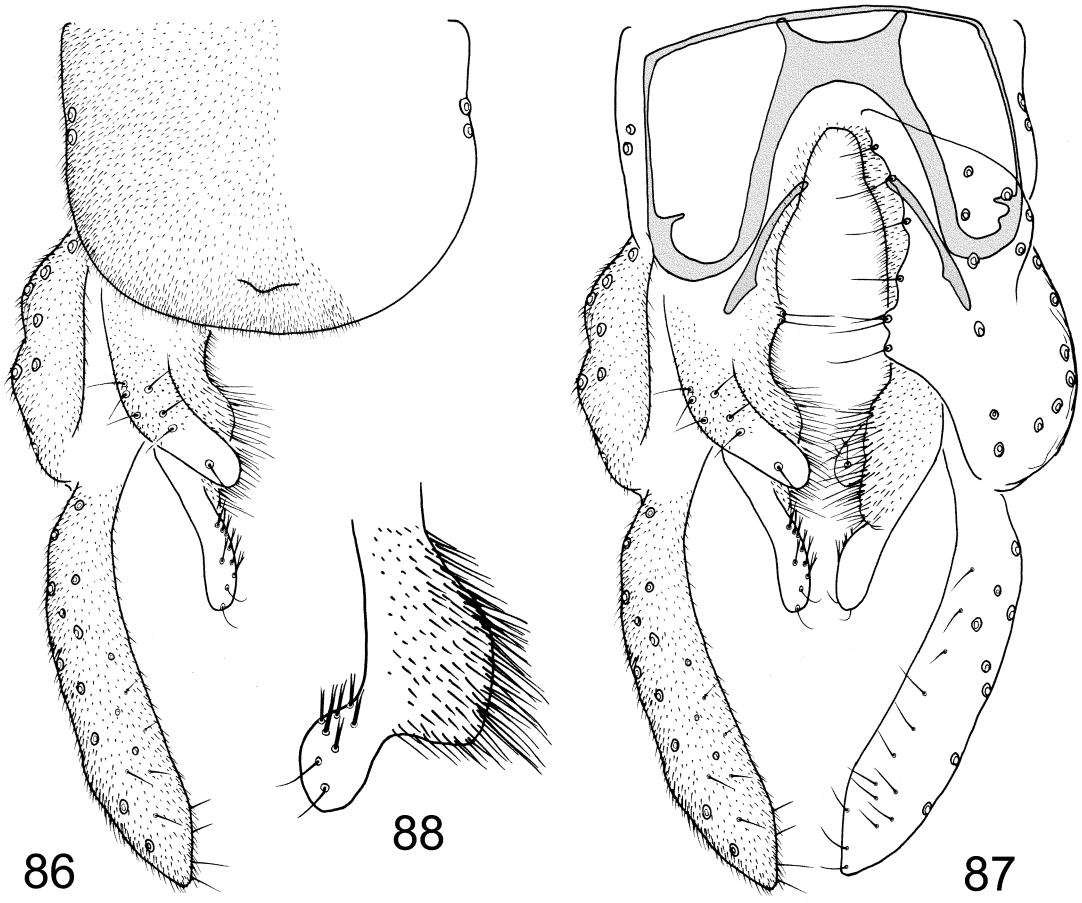
Beardius mileneae **sp. n.**
(Figs 85–88)

Type material. Holotype: male, **BRAZIL, Santa Catarina State:** Urubici, São Joaquim National Park, Morro da Igreja, Rio Pelotas, 1670 m a.s.l., S28°07'37" W49°28'47", 18.viii–05.xii.2004, Malaise trap, L.C. Pinho & L.E.M. Bizzo (MZSP). Paratypes: 27 males, as holotype (MZSP, INPA, ZMBN, MZUFBA, ZSM).

Diagnostic characters. The species belongs in the *tupinamba* group. The male can be separated from all other members of the genus by the combination of the following characters: coloration brown; R_1 with setae; superior volsella with microtrichia; and basal projection of inferior volsella attached to basal 2/3 of the volsella, not overreaching the volsella, with fringe of lamellae.

Etymology. Named after Dr. Milene Hoehr de Moraes, the senior author's beloved wife.





FIGURES 85–88. *Beardius mileneae* **sp. n.**, male. **85**—wing; **86**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **87**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect; **88**—inferior volsella, lateral view.

Description

Male (n = 9–10, except when otherwise stated). Total length 3.08–3.49, 3.28 mm. Wing length 1.72–2.10, 1.93 mm. Total length / wing length 1.59–1.84, 1.72. Wing length / length of profemur 2.24–2.46, 2.35.

Coloration. Head and abdomen light brown. Thorax stramineous with scutum, vittae, postnotum and preepisternum light to dark brown. Legs light brown.

TABLE 15. Lengths (in μm) and proportions of legs of *Beardius mileneae* **sp. n.**, male (n = 7–10).

	fe	ti	ta_1	ta_2
p_1	739–907, 823	570–701, 645	720–907, 823	393–486, 449
p_2	729–888, 823	608–776, 711	318–430, 383	206–252, 224
p_3	851–1029, 944	739–907, 814	458–570, 524	299–374, 327
	ta_3	ta_4	ta_5	LR
p_1	346–430, 402	224–271, 243	84–112, 103	1.29–1.48, 1.34
p_2	168–196, 187	94–112, 103	56–75, 65	0.49–0.61, 0.56
p_3	234–281, 252	112–140, 131	56–75, 70	0.63–0.74, 0.68
	BV	SV		BR
p_1	1.90–2.09, 1.98	1.66–1.76, 1.73		2.7–3.3, 3.1
p_2	3.11–3.44, 3.24	3.61–4.31, 4.18		2.8–6.0, 3.9
p_3	2.72–3.01, 2.90	3.18–3.46, 3.35		3.8–6.5, 5.0

Head. AR 0.84–0.92, 0.88; ultimate flagellomere 421–477, 439 μm long. Temporal setae 11–13, 12; not well separated in inner and outer verticals and postorbitals. Clypeus with 9–13, 11 setae. Tentorium 99–157, 121 μm long; 25–33, 29 μm wide. Stipes 124–142, 134 μm long. Palpomere lengths (in μm): 33–38, 35; 33–48, 43; 119–154, 139; 106–149, 124; 121–159, 139. Third palpomere with 2–4, 3 sensillae subapically, longest 13–20, 15 μm long.

Thorax. Scutal tubercle absent. Dorsocentrals 6–9, 7; acrostichals absent; prealars 2–3, 2. Scutellum with 4–8, 6 setae.

Wing (Fig. 85). VR 1.32–1.59, 1.42. R with 8–14, 11 setae; R_1 with 5–9, 8 setae; R_{4+5} with 2–27, 18 setae. Brachiolum with 2–3, 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 48–59, 54 μm long; spur of mid tibia (including comb) 64–86, 75 μm long; spur of hind tibia (including comb) 64–80, 75 μm long. Width at apex of fore tibia 48–59, 54 μm; of mid tibia 48–59, 54 μm; of hind tibia 59–70, 64 μm. Lengths and proportions of legs as in Table 15.

Hypopygium (Figs 86–87). Anal point bluntly triangular, 3–8, 5 μm long, not reaching posterior margin of tergite IX. Tergite IX without setae, tergal bands weak to absent. Laterosternite IX with 2–4, 3 setae. Phallapodeme 56–68, 63 μm long. Transverse sternapodeme 43–66, 58 μm long. Gonocoxite 124–152, 137 μm long. Superior volsella digitiform, curved, 48–58, 53 μm long, with 7–10, 8 dorsal, 2 apical, and 2–3, 2 ventral setae, with microtrichia on both dorsal and ventral surfaces. Median volsella 3–5, 4 μm long, with 2–3, 2 apical setae, longest 23–28, 25 μm long. Inferior volsella clavate, 66–83, 73 μm long, with 2 apical thin and 5–7, 6 subapical stout bifid to trifid setae; projection arising from basal 2/3 of the volsella, with microtrichia and fringe of lamellae (Fig. 88). Gonostylus 134–159, 142 μm long. HR 0.92–1.02, 0.96. HV 2.33–2.71, 2.50.

Female and immatures. Unknown.

Distribution. The species is collected in the Santa Catarina State in Brazil.

***Beardius nebularius* sp. n.**

(Figs 89–91)

Type material. Holotype: male, **BRAZIL, Santa Catarina State:** Urubici, São Joaquim National Park, Morro da Igreja, Rio Pelotas, 1670 m a.s.l., S28°07'37" W49°28'47", 18.viii.2004, CDC trap, L.C. Pinho & L.E.M. Bizzo (MZSP). Paratypes: 1 male, as holotype (MZSP); 1 male, as holotype except 18.viii–05.xii.2004, Malaise trap (ZMBN). 3 males, Urubici, Pousada Nossa Senhora das Graças, 900 m a.s.l., S27°59'46" W49°34'02", at light, L.C. Pinho & L.E.M. Bizzo (MZUFBA, INPA, ZMBN).

Diagnostic characters. The species belongs in the *tupinamba* group. The male can be separated from all other members of the genus by the combination of the following characters: coloration brown; R_1 bare; superior volsella with microtrichia; and projection of inferior volsella arising along basal 2/3 of the volsella, overreaching the volsella, with microtrichia and fringe of long lamellae.

Etymology. From Latin *nebularius*, meaning cloudy, referring to the cloud forest surrounding the type locality. Description

Male (n = 5–6, except when otherwise stated). Total length 2.93–3.28, 3.20 mm. Wing length 1.77–1.95, 1.85 mm. Total length / wing length 1.66–1.80, 1.73. Wing length / length of profemur 2.48–2.63, 2.56.

Coloration. Head and abdomen light brown. Thorax stramineous with scutum, vittae, postnotum and preepisternum light brown. Legs stramineous.

Head. AR 1.15–1.27, 1.22; ultimate flagellomere 533–642, 580 µm long. Temporal setae 10–14, 12; not well separated in inner and outer verticals and postorbitals. Clypeus with 9–13, 11 setae. Tentorium 88–139, 121 µm long; 25–35, 30 µm wide. Stipes 116–127, 121 µm long. Palpomere lengths (in µm): 30–48, 38; 38–45, 41; 96–121, 110; 126–147, 135; 157–195, 180. Third palpomere with 2 sensillae subapically, longest 10–13, 11 µm long.

Thorax. Scutal tubercle absent. Dorsocentrals 6–7, 7; acrostichals absent; prealars 2. Scutellum with 4 setae.

Wing (Fig. 89). VR 1.44–1.58, 1.51. R with 3–7, 5 setae; R_{4+5} with 1–2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 35–50, 45 µm long; spur of mid tibia (including comb) 51–68, 59 µm long; spur of hind tibia (including comb) 53–73, 60 µm long. Width at apex of fore tibia 43–58, 53 µm; of mid tibia 45–54, 50 µm; of hind tibia 48–59, 55 µm. Lengths and proportions of legs as in Table 16.

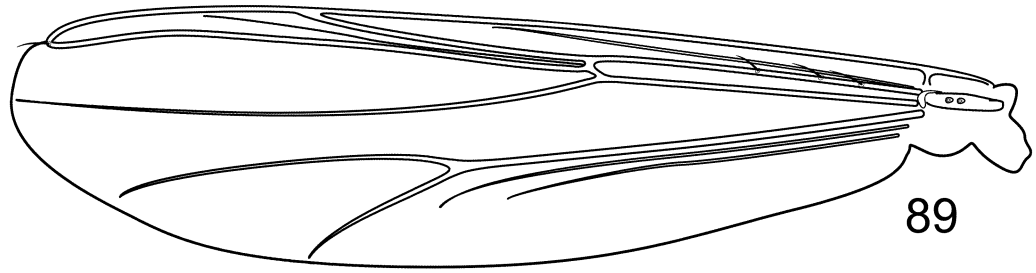
Hypopygium (Figs 90–91). Anal point bluntly triangular, 3–7, 5 µm long, not reaching posterior margin of tergite IX. Tergite IX without setae, tergal bands weak to absent. Laterosternite IX with 2–3, 2 setae. Phallapodeme 53–63, 59 µm long. Transverse sternapodeme 45–58, 52 µm long. Gonocoxite 116–154, 131 µm long. Superior volsella digitiform, 48–58, 53 µm long, with 6–8, 7 dorsal and 3–5, 4 ventral setae, with microtrichia in basal 2/3 of both dorsal and ventral surfaces. Median volsella 4–5, 4 µm long, with 2–4, 3 apical setae, longest 20–25, 23 µm long. Inferior volsella clavate, 53–66, 59 µm long, with 2 apical thin and 4–7, 5 subapical stout, bifid or trifid setae; projection arising along basal 2/3 of the volsella, with microtrichia and fringe of long lamellae. Gonostylus 126–144, 137 µm long. HR 0.85–0.98, 0.96. HV 2.14–2.49, 2.33.

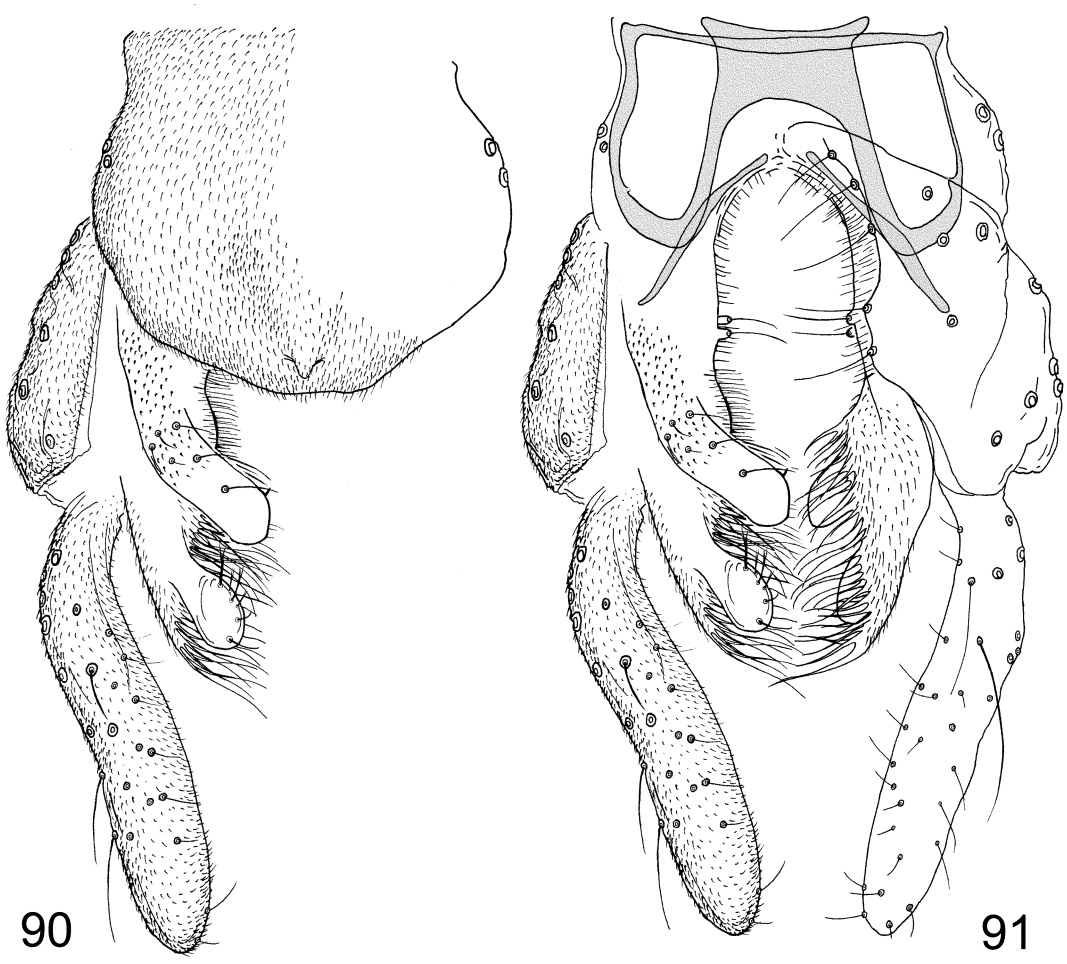
Female and immatures. Unknown.

Distribution. The species is collected in the Santa Catarina State in Brazil.

TABLE 16. Lengths (in µm) and proportions of legs of *Beardius nebularius* **sp. n.**, male (n = 5–6).

	fe	ti	ta_1	ta_2
p_1	664–767, 711	496–598, 549	738–870, 809	365–440, 400
p_2	673–785, 723	552–626, 589	299–365, 330	168–215, 193
p_3	767–879, 826	636–729, 686	411–514, 472	252–299, 277
	ta_3	ta_4	ta_5	LR
p_1	318–365, 339	187–234, 213	75–94, 88	1.45–1.49, 1.47
p_2	131–159, 145	75–94, 80	47–65, 58	0.54–0.60, 0.56
p_3	196–233, 214	94–112, 101	56–75, 65	0.65–0.72, 0.69
	BV	SV		BR
p_1	1.96–2.05, 2.00	1.53–1.58, 1.57		2.2–3.1, 2.7
p_2	3.30–3.64, 3.45	3.74–4.07, 3.97		3.4–5.4, 4.5
p_3	2.92–3.06, 3.02	3.06–3.41, 3.21		6.0–8.9, 7.1





FIGURES 89–91. *Beardius nebularius* **sp. n.**, male. **89**—wing; **90**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **91**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

TABLE 17. Lengths (in µm) and proportions of legs of *Beardius neusae* **sp. n.**, male (n = 2).

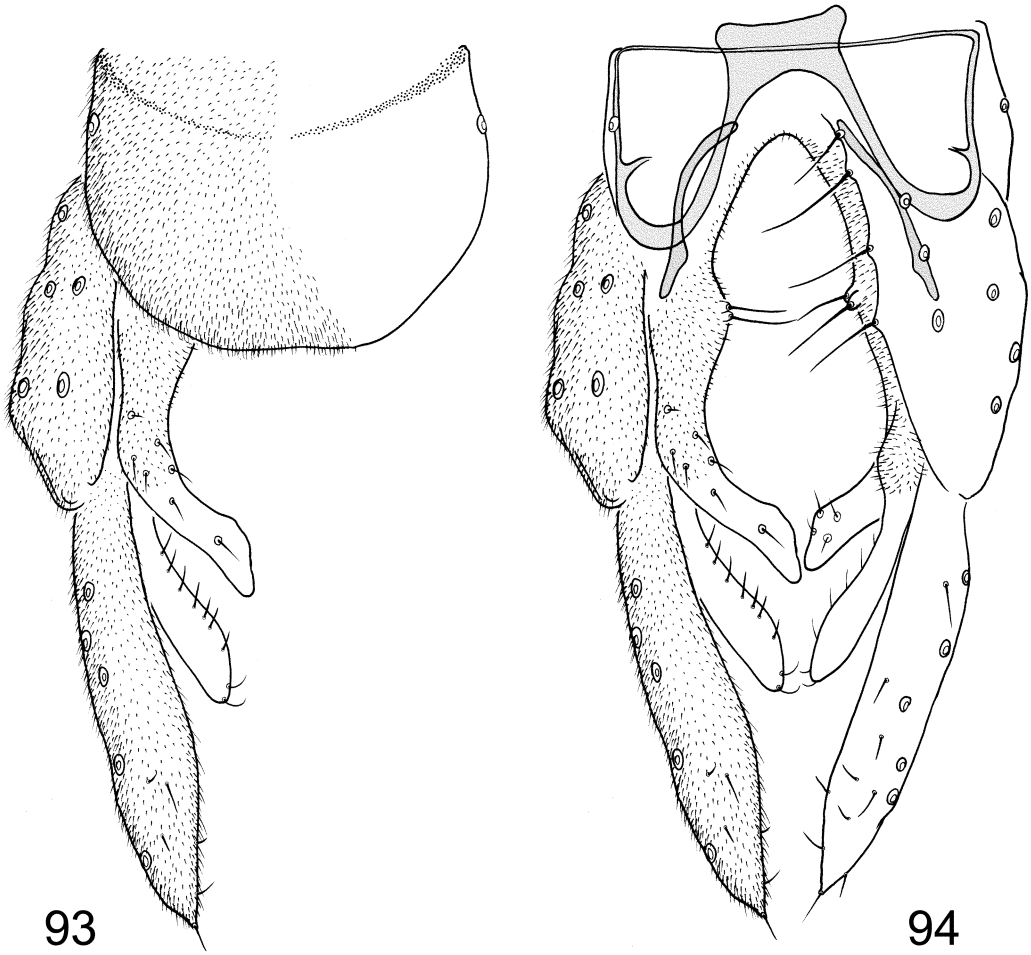
	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	496–505	290–309	655–748	299–309	252–262	178–187
p_2	505–514	374–393	262–281	130–132	84–94	46–48
p_3	541–543	421–430	401–403	187–196	140–168	74–76
	ta_5	LR	BV	SV	BR	
p_1	56–65	2.26–2.42	1.81–1.92	1.09–1.20	2.0–3.7	
p_2	27–29	0.70–0.71	3.81–4.10	3.23–3.36	4.3–5.0	
p_3	36–38	0.93–0.96	2.86–3.13	2.40–2.42	3.4–4.0	

***Beardius neusae* sp. n.**
(Figs 92–94)

Type material. Holotype: male, **BRAZIL, Amazonas State:** Novo Aripuanã, Soka Gakkai Reserve, 07–09.vii.2008, Pennsylvania trap, N. Hamada *et al.* (MZSP). Paratype: 1 male, as holotype (ZMBN).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals absent; median volsella wart-like; and inferior volsella without basal projection, with thin subapical setae.

Etymology. Named after Dr. Neusa Hamada for all her help and enthusiasm and for collecting the material of this species.



FIGURES 92–94. *Beardius neusae* **sp. n.**, male. **92**—wing; **93**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **94**—hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect.

Description

Male (n = 1–2). Total length 1.96–2.13 mm. Wing length 1.02–1.07 mm. Total length / wing length 1.93–2.00. Wing length / length of profemur 2.06–2.11.

Coloration. Head, thorax and abdomen pale. Legs pale.

Head. AR 0.86–0.91, ultimate flagellomere 401–439 µm long. Inner vertical 1, outer verticals 4–5, postorbitals 2–3. Clypeus with 11 setae. Tentorium 81–86 µm long, 15–20 µm wide. Stipes 96 µm long. Palpomere lengths (in µm): 22–24, 25–30, 56–63, 81–89, 124. Third palpomere with 1–3 sensillae subapically, longest 13–15 µm long.

Thorax. Scutal tubercle absent. Dorsocentrals 4–6, acrostichals absent, prealars 2. Scutellum with 4 setae.

Wing (Fig. 92). VR 1.38–1.42. R with 0–4 setae, R_1 with 0–4 setae, R_{4+5} with 16–55 setae. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 37 µm long, spur of mid tibia (including comb) 59 µm long, spur of hind tibia (including comb) 59 µm long. Width at apex of fore tibia 37 µm, of mid tibia 37 µm, of hind tibia 43 µm. Lengths and proportions of legs as in Table 17.

Hypopygium (Figs 93–94). Anal point absent. Tergite IX without setae, tergal bands present. Laterosternite IX with 1–2 setae. Phallapodeme 48–51 µm long. Transverse sternapodeme 27–29 µm long. Gonocoxite 86–89 µm long. Superior volsella digitiform, curved, 48–51 µm long, with 7–8 dorsal, 2 apical, and 2 ventral setae, with microtrichia dorsally in basal 1/3. Median volsella 3 µm long, with 2–3 apical setae, longest 15–23 µm long. Inferior volsella weakly clavate, 57–59 µm long, with 2 apical thin and 7–8 subapical, stout setae; without projection. Gonostylus 94–96 µm long. HR 0.91–0.93. HV 2.10–2.22.

Female and immatures. Unknown.

Distribution. The species is collected in the Amazonas State in Brazil.

TABLE 18. Lengths (in µm) and proportions of legs of *Beardius novoairensis* s**p. n.**, male (n = 3–4).

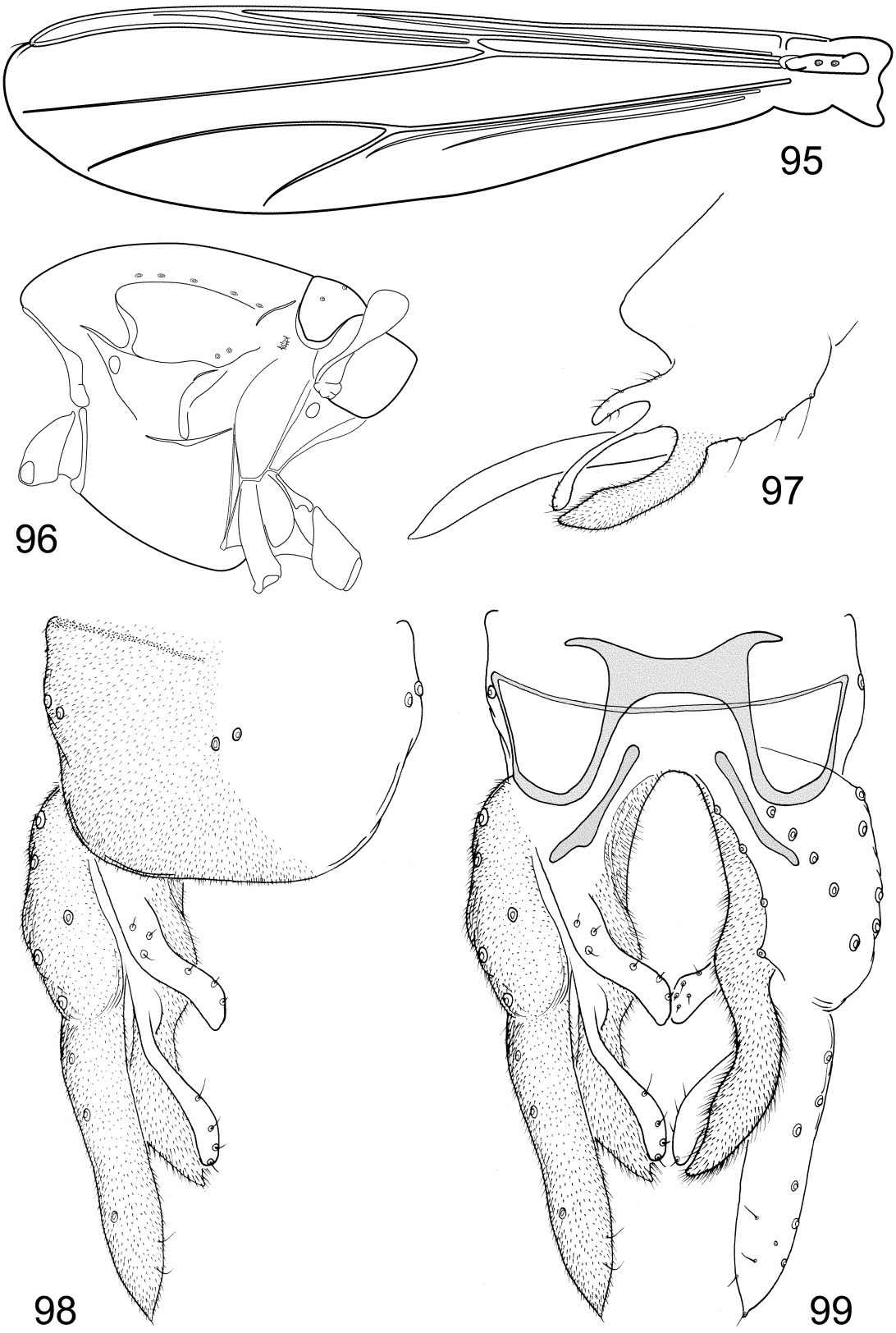
	fe	ti	ta_1	ta_2
p_1	542–608, 570	346–374, 365	748–870, 814	365–421, 393
p_2	542–636, 598	430–486, 458	355–393, 365	168–178, 174
p_3	645–683, 664	496, 533, 514	496–570, 542	262–281, 271
	ta_3	ta_4	ta_5	LR
p_1	290–365, 327	234–281, 252	84–94, 87	2.13–2.33–2.21
p_2	122–140, 131	65–84, 75	35–39, 37	0.74–0.91, 0.82
p_3	196–215, 206	103–112, 108	45–49, 47	1.00–1.09, 1.06
	BV	SV		BR
p_1	1.55–1.65, 1.62	1.11–1.31, 1.20		2.8–3.5, 3.2
p_2	3.38–3.53, 3.47	2.62–2.86, 2.77		2.8–4.3
p_3	2.65–2.78, 2.72	2.12–2.30, 2.17		3.6–5.0, 4.3

***Beardius novoairensis* sp. n.**
(Figs 95–99)

Type material. Holotype: male, **BRAZIL, Amazonas State:** Novo Airão, AM 352 Km 9, 59 m a.s.l., Igarapé no Sítio do Sr. Valdenor, #5, S02°42'00.4" W06°55'34.2", 11–14.viii.2008, Malaise trap suspended 3 m above the ground, A.M.O. Pes *et al.* (MZSP). Paratypes: 3 males, as holotype (INPA, ZMBN, MZUFBA).

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the combination of the following characters: tergite IX with median setae; and basal projection of the inferior volsella, parallel-sided, tapering towards apex, as long as the volsella.

Etymology. The specific epithet refers to the city of Novo Airão, where the specimens were collected.



FIGURES 95–99. *Beardius novoairensis* **sp. n.**, male. **95**—wing; **96**—thorax; **97**—hypopygium, lateral view; **98**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **99**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Description

Male (n = 4, except when otherwise stated). Total length 2.26–2.67, 2.48 mm. Wing length 1.18–1.24, 1.21 mm. Total length / wing length 1.82–2.15, 2.04. Wing length / length of profemur 2.00–2.17, 2.08.

Coloration. Head, thorax and abdomen pale. Legs pale.

Head. AR 1.43–1.45 (2), ultimate flagellomere 589–637 (2) µm long. Temporal setae 9–11, 10; not well separated in inner and outer verticals and postorbitals. Clypeus with 1–14, 13 setae. Tentorium 96–109, 101 µm long; 20–28, 23 µm wide. Stipes 119–127, 121 µm long. Palpomere lengths (in µm): 33–40, 35; 33–38, 35; 89–101, 96; 96–134, 114; 164–167 (2). Third palpomere with 2 sensillae subapically; longest 6–8, 7 µm long.

Thorax (Fig. 96). Scutal tubercle absent. Dorsocentrals 5–6, 6; acrostichals absent; prealars 2. Scutellum with 4–6, 5 setae.

Wing (Fig. 95). VR 1.35–1.42, 1.38. R_{4+5} with 1–2, 2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 43–54, 48 µm long; spur of mid tibia (including comb) 86–91, 88 µm long; spur of hind tibia (including comb) 75–91, 86 µm long. Width at apex of fore tibia 37–48, 43 µm; of mid tibia 37–59, 48 µm; of hind tibia 43–48, 45 µm. Lengths and proportions of legs as in Table 18.

Hypopygium (Figs 97–99). Anal point absent. Tergite IX with 2 setae, tergal bands present. Laterosternite IX with 2–3, 2 setae. Phallapodeme 40–61, 53 µm long. Transverse sternapodeme 40–46 (3) µm long. Gonocoxite 91–106, 99 µm long. Superior volsella digitiform, curved, 38–46 (3) µm long, with 4–6 (3) dorsal, 2 (3) apical and 3 (3) ventral setae, without microtrichia. Median volsella absent. Inferior volsella slightly clavate, narrow, weakly sigmoid, 63–73, 68 µm long, with 2 apical and 2–3, 2 subapical thin setae; projection arising from base of volsella, 58–66, 63 µm long, parallel-sided, tapering towards apex, densely covered with microtrichia. Gonostylus 96–116, 109 µm long. HR 0.78–0.97, 0.90. HV 2.10–3.01, 2.50.

Female and immatures. Unknown.

Distribution. The species is collected in the Amazonas State in Brazil.

Beardius parcus Reiss *et* Sublette

Beardius parcus Reiss *et* Sublette, 1985: 183.
Beardius parcus Reiss *et* Sublette; Andersen & Sæther (1996: 36), Jacobsen & Perry (2000: 141).
Chironomini gen. A6 (Reiss 1976: 130, 1977: 70).

Material examined. Paratypes deposited in ZMBN. Additional material: **Brazil, Mato Grosso State:** Nova Mutum, Fazenda Buriti, 3 males, 04–14.ii.2002, light trap, H.F. Mendes; as previous except 1 male, 12.vi.2003; as previous except 2 males, 13.vii.2003. Ribeirão Cascalheira, Estrada para Fazenda Manaus, Represa 1 km após 2º afluente do Ribeirão Bonito, S12°55.599' W51°53.474', 5 males, 08.x.2007, light trap, L.C. Pinho *et al.* Ribeirão Cascalheira, Ribeirão Bonito, S12°52.590' W51°53.096', 1 male, 12.x.2007, light trap, L.C. Pinho *et al.* **São Paulo State:** Luiz Antônio, Jataí Ecological Station, 2 males, 09.iii.2006, light trap, L.C. Pinho; as previous except 1 male, 19.ii.2003, A.R. Calor & C. Santos.

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals absent; superior volsella pediform; and median volsella comparatively large, wart-like, with several setae. The female by: acrostichals absent; R and R_1 bare; and ventrolateral lobe with short microtrichia. The pupa by: tergite II with stronger shagreen orally; tergite VI without posterolateral patches of shagreen; tergites VII and VIII without shagreen; paratergite VIII with short spines; and spur on tergite VIII with dominant tooth and minute accessory teeth. The larva by: antenna with 7 segments; and clypeus separated from frontal apotome.

Description. Male and immatures were described in detail by Reiss & Sublette (1985). Andersen & Sæther (1996) provided a detailed description of the female.

Distribution. The species is recorded from Brazil, Mexico, and Venezuela (Reiss & Sublette 1985; Andersen & Sæther 1996).

***Beardius phoenix* sp. n.**
(Figs 100–109)

Type material. Holotype male with pupa, **BRAZIL, Amazonas State:** Rio Branquinho, above waterfall, 22.vii.1961, Brundin net, A211, E.J. Fittkau (ZSM). Paratypes: 5 males, Uatumã Biological Reserve, Acampamento Cachoeira, 31.i.–02.ii.2008, light trap, N. Hamada *et al.* (INPA). 2 males, **Acre State:** Mâncio Lima, Serra do Divisor National Park, Pé da Serra, Igarapé Ar-condicionado, 17.iii.2006, light trap, A.R. Calor (ZMBN). 1 male, Mâncio Lima, Serra do Divisor National Park, Pé da Serra, Rio Moa, 16.iii.2006, light trap, A.R. Calor (MZUFBA). 2 males, **Pará State:** Igarapé Kumadueni, 19.iv.1962, light trap, A377, E.J. Fittkau (ZMBN). 4 males, Rio Parú do Oeste, Malloca Apicó, 400 m a.s.l., 20.iv.1962, light trap, A366–1, E.J. Fittkau (MZSP). 1 male, Serra Tumucumaque, Igarapé Okueima, Acampamento II, 18.iv.1962, light trap, E.J. Fittkau (ZMBN). 1 pupa, Rio Paru, Missão Tiriyos, 22–23.iii.1962, Brundin net, A356–1, E.J. Fittkau (MZSP).

Diagnostic characters. The species belongs in the *triangulatus* group. The male can be separated from all other members of the genus by the combination of the following characters: median volsella wart-like; and inferior volsella with developed projection, narrowed at base and reaching apex of volsella. The pupa by: tergite II with stronger shagreen orally; tergites VII and VIII without shagreen; paratergite VIII without spines; and stout anterior branch of thoracic horn with spinules in distal 1/2.

TABLE 19. Lengths (in µm) and proportions of legs of *Beardius phoenix* **sp. n.**, male (n = 6–10).

	fe	ti	ta_1	ta_2
p_1	489–571, 522	293–350, 326	636–750, 693	334–371, 350
p_2	440–595, 538	350–473, 399	269–416, 314	130–236, 155
p_3	505–611, 571	399–473, 440	318–432, 383	155–228, 187
	ta_3	ta_4	ta_5	LR
p_1	261–350, 285	179–212, 196	65–82, 73	1.95–2.15, 2.06
p_2	90–171, 130	49–90, 65	33–49, 42	0.63–0.88, 0.77
p_3	114–212, 163	57–90, 73	33–49, 42	0.76–0.95, 0.88
	BV	SV		BR
p_1	1.61–1.88, 1.76	1.22–1.27, 1.25		1.7–3.8, 2.8
p_2	2.76–4.17, 3.53	2.57–3.14, 3.04		3.0–4.4, 3.6
p_3	1.61–1.88, 1.76	1.22–1.27, 1.25		1.7–3.8, 2.8

Etymology. The name *phoenix* refers to the mythological bird which rises from the ashes, because during the present study the only three known specimens of this new species were accidentally burnt while drying slides in an incubator. However, after two years of searching for the species in museum collections and at the collection sites, more specimens were found.

Description

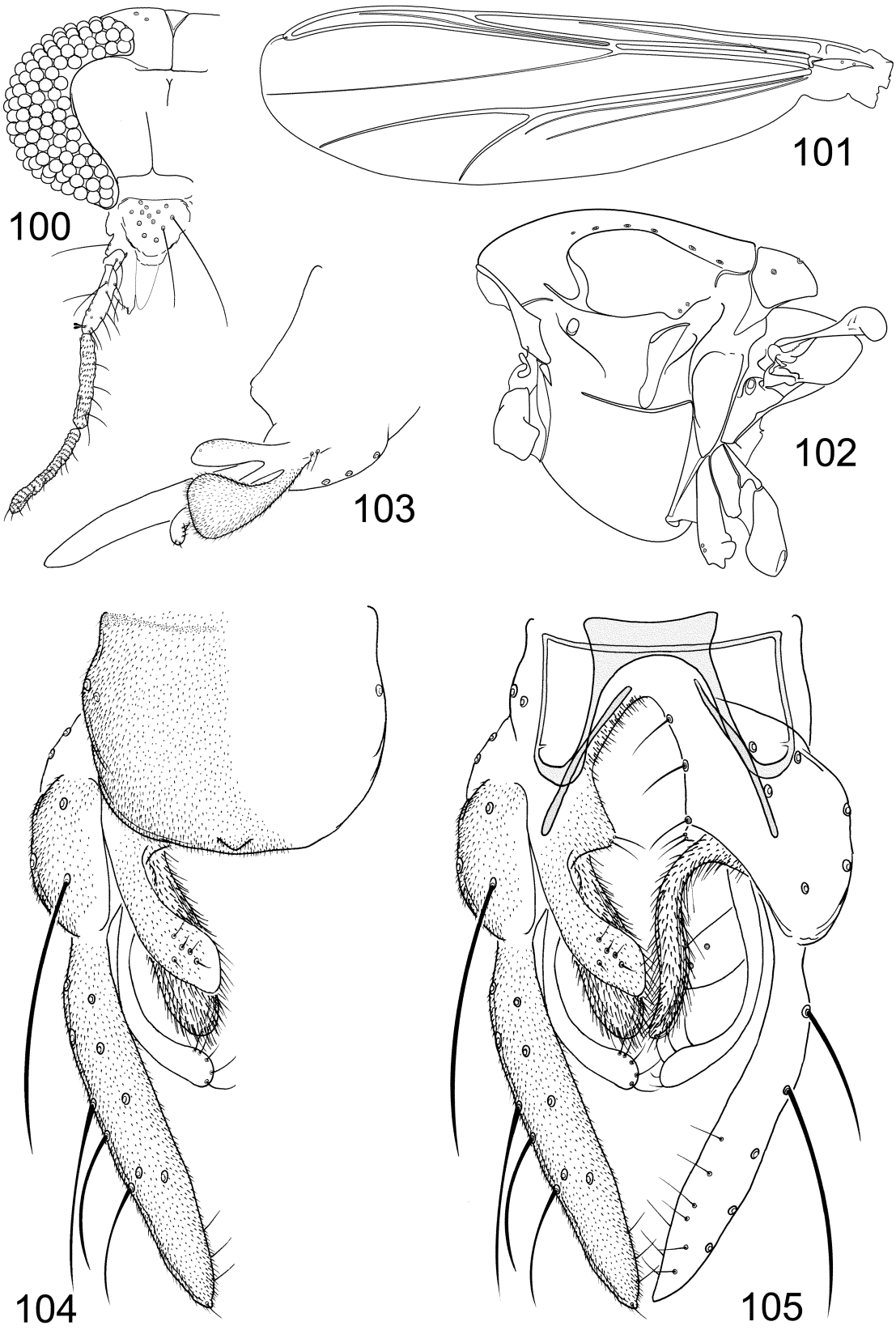
Male (n = 8–10, except when otherwise stated). Total length 1.83–2.41, 2.18 mm. Wing length 1.03–1.18, 1.09 mm. Total length / wing length 1.55–2.35, 1.99. Wing length / length of profemur 2.03–2.26, 2.09.

Coloration. Head, thorax and abdomen pale. Legs pale.

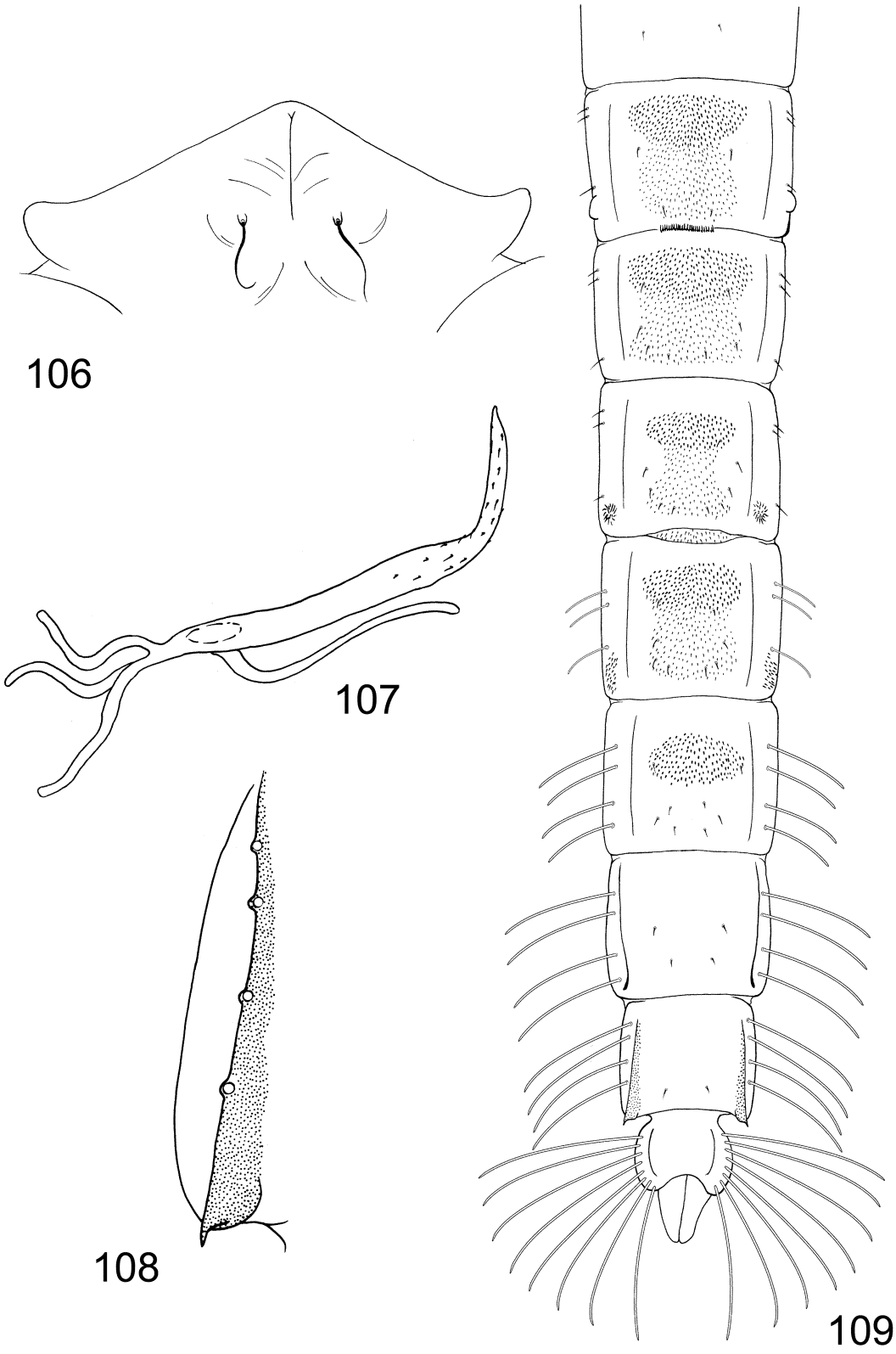
Head (Fig. 100). AR 0.88–1.08, 1.01; ultimate flagellomere 87–102, 95 µm long. Inner verticals 1–2, 1; outer verticals 3–4, 4; postorbitals 3–5, 4. Clypeus with 10–12, 11 setae. Tentorium 77–107, 93 µm long; 16–24, 20 µm wide. Stipes 89–138, 103 µm long. Palpomere lengths (in µm): 22–30, 26; 22–37, 28; 66–102, 83; 103–126, 111; 144–168, 160. Third palpomere with 2–4, 2 sensillae subapically; longest 12–16, 14 µm long.

Thorax (Fig. 102). Scutal tubercle absent. Dorsocentrals 4–6, 5; acrostichals absent; prealars 2–3, 2. Scutellum with 4 setae.

Wing (Fig. 101). VR 1.39–1.51, 1.43. R with 1–4, 2 setae; R_{4+5} with 1–2, 2 setae at apex. Brachiolum with 1–3, 2 setae. Remaining veins bare.



FIGURES 100–105. *Beardius phoenix* **sp. n.**, male. **100**—head; **101**—wing; **102**—thorax; **103**—hypopygium, lateral view; **104**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **105**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.



FIGURES 106–109. *Beardius phoenix* **sp. n.**, pupa. **106**—frontal apotome; **107**—thoracic horn; **108**—paratergite VIII; **109**—abdominal segments I–IX and anal lobe, dorsal view.

Legs. Spur of fore tibia (including scale) 28–36, 32 µm long; spur of mid tibia (including comb) 28–44, 36 µm long; spur of hind tibia (including comb) 41–48, 44 µm long. Width at apex of fore tibia 36–44, 41 µm; of mid tibia 32–41, 36 µm; of hind tibia 32–44, 41 µm. Lengths and proportions of legs as in Table 19.

Hypopygium (Figs 103–105). Anal point broadly triangular; 2–5, 3 µm long; not reaching posterior margin of

tergite IX. Tergite IX without setae, tergal bands present. Laterosternite IX with 1–2, 2 setae. Phallapodeme 56–68, 61 μm long. Transverse sternapodeme 35–48, 40 μm long. Gonocoxite 104–114, 109 μm long. Superior volsella broadly clavate, 30–43, 39 μm long, with 4–8, 6 dorsal and 1–2, 2 ventral setae, fully covered with microtrichia. Median volsella 5–6, 5 μm long; with 2 apical setae; longest 10–16, 13 μm long. Inferior volsella clavate, curved, 51–61, 57 μm long; with 2 apical and 3–4, 3 subapical thin setae; projection racquet-shaped, arising from base of volsella, 55–65, 61 μm long; densely covered with long microtrichia. Gonostylus 97–112, 104 μm long. HR 0.78–0.92, 0.85. HV 1.66–2.37, 2.11 (7).

Pupa (n = 1–2). Total length 2.73 mm.

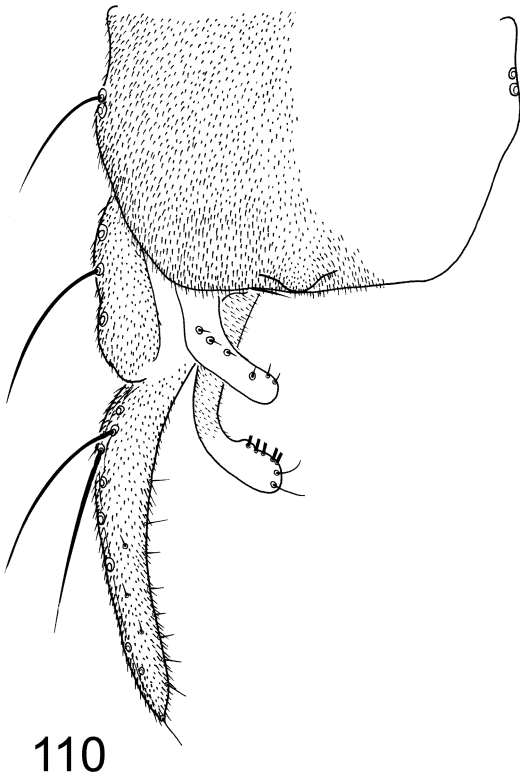
Coloration. Cephalothorax and abdomen pale.

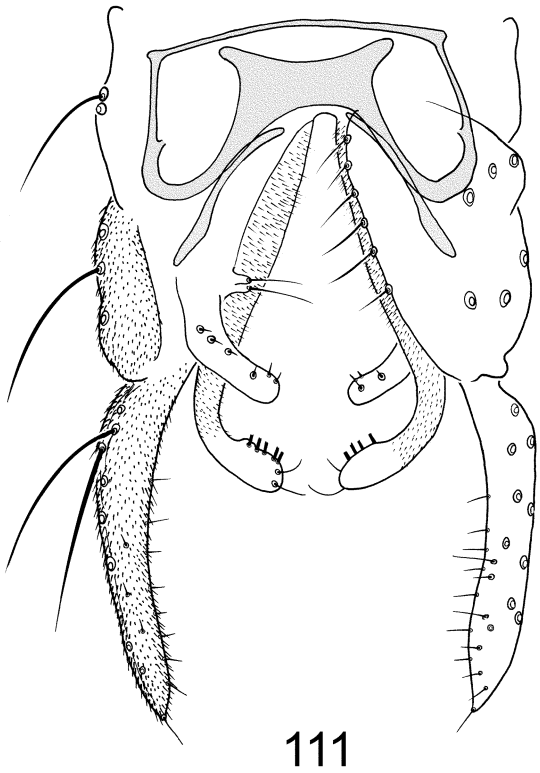
Cephalothorax. Frontal apotome conical (Fig. 106), frontal setae 33–55 μm long. Thoracic horn with 5 branches (Fig. 107); anterior branch with spinules along distal 1/2. Distance between Dc1 and Dc2 8 μm; between Dc2 and Dc3 138 μm; between Dc3 and Dc4 8 μm. Prealars absent.

Abdomen (Fig. 109). Tergites I, VII and VIII without shagreen. Tergites II–V with anterior transverse band of shagreen a little stronger than contiguous posterior shagreen. Tergite VI with anterior transverse band of shagreen only. Row of hooklets on tergite II about 1/3 of tergite width. Conjunctive IV/V with spinules in a single patch. Paratergite V with few spinules, restricted to posterior margin. Pedes spurii A and pedes spurii B present. Segment I without L setae; segments II–IV with 3 setae L; segment V with 3 taeniate L setae; segments VI–VIII with 4 taeniate L setae. Segment VIII without lateral spines, spur simple (Fig. 108). Anal lobe 106 μm long, with 8 taeniate setae.

Female and larva. Unknown.

Distribution. The species is collected in the Acre, Amazonas, and Pará states in Brazil.





FIGURES 110–111. *Beardius phytophilus* Trivinho-Strixino *et* Strixino, male. **110**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **111**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Beardius phytophilus Trivinho-Strixino *et* Strixino
(Figs 110–111)

Beardius phytophilus Trivinho-Strixino *et* Strixino, 2000: 245.
Beardius sp. 1 Trivinho-Strixino & Strixino (1995: 77).

Material examined. Type material, as in Trivinho-Strixino & Strixino (2000).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals absent; median volsella wart-like; and inferior volsella with stout, subapical setae and lacking basal projection. The pupa by: tergite II with stronger shagreen orally; tergite VI with shagreen reaching 1/2 the length of the tergite; tergites VII and VIII bare; paratergite VIII with long pointed spines; and spur on tergite VIII with dominant tooth and 1–3 comparatively large accessory teeth. The larva by: antenna with 5 segments; pecten mandibularis distinct; distance between ventromental plates 1,5 times the width of median tooth of mentum; and rugosity on outer margin of mandible indistinct or absent.

Description. The species was described in detail by Trivinho-Strixino & Strixino (2000). After reexamining the type series, a very short anal point was found in some specimens (Fig. 110) and microtrichia were present or absent on superior volsella (Fig. 111).

Remarks. Many unassociated adult specimens from Mato Grosso and Amazonas clearly have microtrichia on the superior volsella, but none of these have an anal point. Although not assigned to this species in the present paper, these specimens may represent *B. phytophilus.* However, more associations between adults and immatures, especially from São Paulo State, are necessary for a better understanding of the variation within this species.

Distribution. The species is collected in the São Paulo State in Brazil.

Beardius reissi Jacobsen

Beardius reissi Jacobsen *in* Jacobsen & Perry, 2000: 132.
Beardius reissi Jacobsen; Jacobsen (2008: 97).
Beardius sp. A Epler (1992: 7.27, 1995: 7.27).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; superior volsella pediform; median volsella consisting of a single tubercle bearing about 5 setae; and inferior volsella lacking basal projection. The female by: acrostichals present; clypeus with about 10 setae; and gonocoxite IX bare. The pupa by: tergite II with stronger shagreen orally; tergite VI with shagreen restricted to a transverse band in anterior 1/3; tergites VII and VIII bare; and paratergite VIII with long spines. The larva by: antenna with 6 segments; antennal blade as long as flagellum; and median ends of ventromental plates pointing posteriorly.

Description. The male, female, larva, and pupa were described in detail by Jacobsen & Perry (2000).

Distribution. The species is recorded from southern U.S.A. (Jacobsen & Perry 2000).

Beardius roquei Trivinho-Strixino *et* Siqueira

Beardius roquei Trivinho-Strixino *et* Siqueira, 2007: 282.
Beardius sp. Roque *et al.* (2003: 322).

Material examined. Type material, as in Trivinho-Strixino & Siqueira (2007). Additional material: **BRAZIL, Amazonas State:** Igarapé do Bajaon, 1 male, 11.xii.1961, A277, E.J. Fittkau. Coari, Base Operacional Geólogo Pedro de Moura (BOGPM) Urucu, Igarapé Martha, 1 male, S04°51'50" W65°04'45", 05–06.xi.2007, Pennsylvania trap, S.R.M. Couceiro. Rio Branquinho, 1 male, 20.iv.1961, light trap, A163, E.J. Fittkau. Uatumã Biological Reserve, Acampamento Cachoeira, 1 male, 31.i–02.ii.2008, light trap, N. Hamada *et al.* **Pará State:** Igarapé

Aepuku Äku, 1 male, 15–16.iv.1962, light trap, A368, E.J. Fittkau. Missão Cururu, 2 males, 12.i.1961, light trap, A88–5, E.J. Fittkau; as previous except 1 male, 16.i.1961, A88–1; as previous except 2 males, 19.i.1961, A88–1. Serra Tumucumaque, Igarapé Okueima, Acampamento II, 1 male, 18.iv.1962, light trap, A371–1, E.J. Fittkau.

Diagnostic characters. The species belongs in the monotypic *roquei* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; anal point comparatively long, with microtrichia in basal 1/3 only; and inferior volsella lacking basal projection. The pupa by: tergites VII and VIII having two anterolateral patches of shagreen; and paratergite VIII with numerous long, thin spines.

Description. The male and pupa were described in detail by Trivinho-Strixino & Siqueira (2007).

Distribution. The species is collected in the Amazonas, Pará, and São Paulo states in Brazil.

TABLE 20. Lengths (in μm) and proportions of legs of *Beardius sapiranga* **sp. n.**, male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	608	393	–	–	–	–	–	–	–	–	–
p_2	598	430	318	140	103	70	48	0.74	3.69	3.24	4.6
p_3	664	505	458	215	150	96	54	0.91	3.22	2.55	4.8

***Beardius sapiranga* sp. n.**
(Figs 112–114)

Type material. Holotype male, **BRAZIL, Bahia State:** Mata de São João, Sapiranga Reserve, 22–25.vii.2001, Malaise trap Ponto B5, M.T. Tavares *et al.* (MZSP).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; superior volsella leaf-shaped; and inferior volsella lacking projection.

Etymology. The name refers to the type locality, Sapiranga Reserve, Bahia. The name is to be regarded as a noun in apposition.

Description

Male (n = 1). Total length 2.16 mm. Wing length 1.15 mm. Total length / wing length 2.15. Wing length / length of profemur 1.89.

Coloration. Head and thorax pale; abdomen pale with large, anterior brown band on tergites II–VIII. Legs pale.

Head. AR 1.14, ultimate flagellomere 487 μm long. Inner verticals 3, outer verticals 2, postorbitals 4. Clypeus with 10 setae. Tentorium 71 μm long, 30 μm wide. Stipes 106 μm long. Palpomere lengths (in μm): 25, 20, 71, 83, 104. Third palpomere with 3 sensillae subapically, longest 15 μm long.

Thorax. Scutal tubercle absent. Dorsocentrals 9, 2 of them close to antepronotum; acrostichals 8; prealars 3. Scutellum with 6 setae.

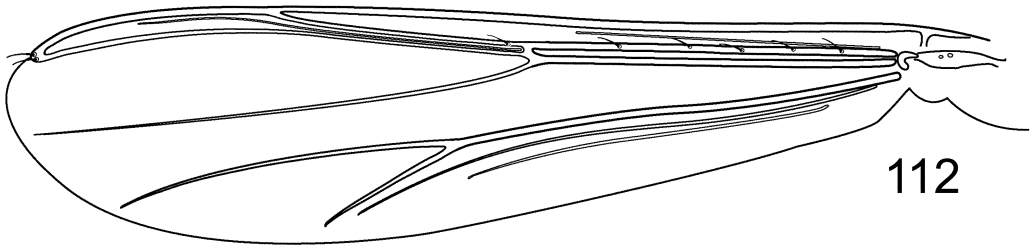
Wing (Fig. 112). VR 1.26. R with 5 setae, R_1 with 1 seta, R_{4+5} with 2 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

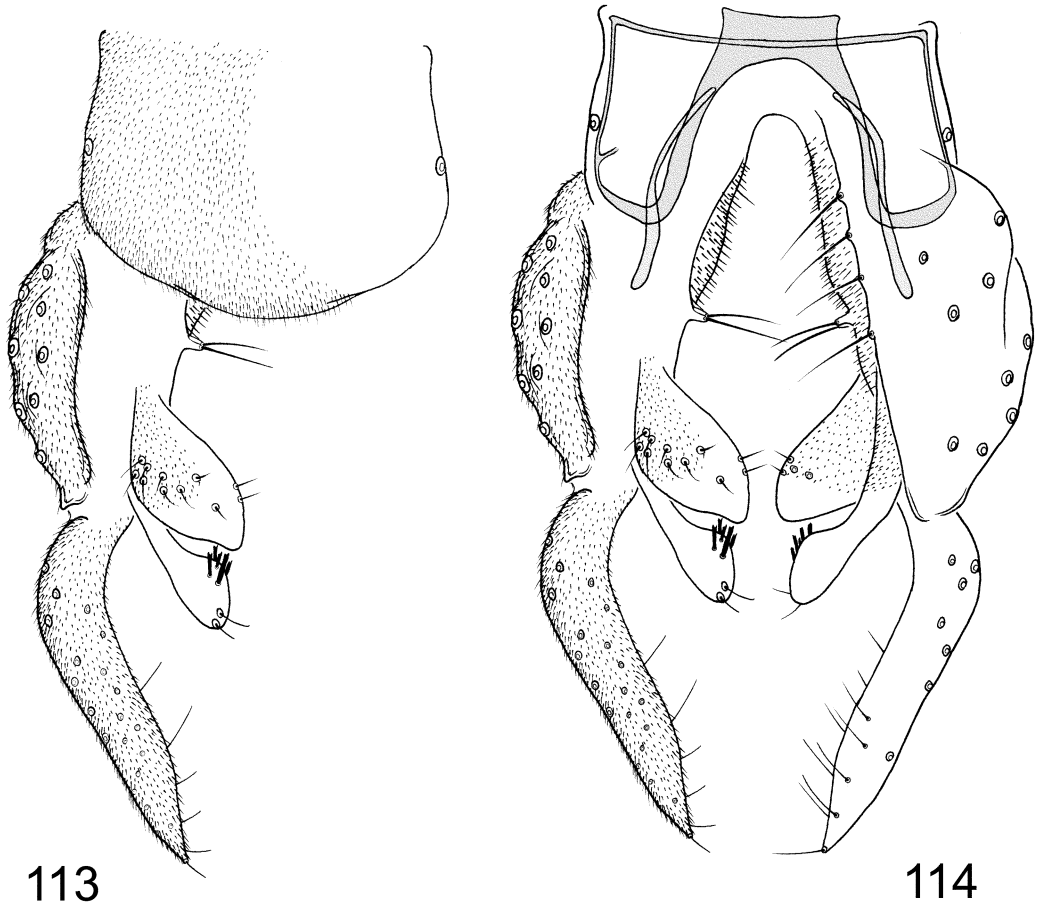
Legs. Spur of fore tibia (including scale) 46 μm long, spur of mid tibia (including comb) 58 μm long, spur of hind tibia (including comb) 66 μm long. Width at apex of fore tibia 38 μm, of mid tibia 38 μm, of hind tibia 43 μm. Lengths and proportions of legs as in Table 20.

Hypopygium (Figs 113–114). Anal point absent. Tergite IX without setae, tergal bands absent. Laterosternite IX with 1 seta. Phallapodeme 63 μm long. Transverse sternapodeme 33 μm long. Gonocoxite 127 μm long. Superior volsella leaf-shaped, 61 μm long, with 9 dorsal, 2 apical, and 2 ventral setae, covered with microtrichia in basal 2/3. Median volsella 5 μm long, with 2 apical setae, longest 20 μm long. Inferior volsella clavate, curved, 63 μm long, with 2 apical thin and 5 subapical stout, bifid setae; projection absent. Gonostylus 106 μm long. HR 1.19. HV 2.52.

Female and immatures. Unknown.

Distribution. The species is collected in the Bahia State in Brazil.





FIGURES 112–114. *Beardius sapiranga* **sp. n.**, male. **112**—wing; **113**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **114**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Beardius triangulatus Andersen *et* Sæther

Beardius triangulatus Andersen *et* Sæther, 1996: 43.

Material examined. Type material, as in Andersen & Sæther (1996).

Diagnostic characters. The species belongs in the *triangulatus* group. The male can be separated from all other members of the genus by the combination of the following characters: median volsella wart-like; inferior volsella with basal, triangular projection with comparatively long macrotrichia; and AR about 0.5.

Description. The male was described in detail by Andersen & Sæther (1996); the structure considered to be the "median volsella" is here regarded as a basal, triangular projection of the inferior volsella. The wart-like tubercle at the base of this projection must be regarded as the median volsella.

Distribution. The species is recorded from Costa Rica (Andersen & Sæther 1996).

Beardius truncatus Reiss *et* Sublette

Beardius truncatus Reiss *et* Sublette, 1985: 188.
Beardius truncatus Reiss *et* Sublette; Epler (1992: 7.27, 1995: 7.27, 2001: 8.36), Jacobsen (2008: 99).

Material examined. Paratypes deposited in ZMBN.

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; inferior volsella with digitiform projection bearing long macrotrichia; and anal point lacking. The pupae by: tergite II with strong, uniform shagreen; tergites VII and VIII bare; and conjunctive I/II with spinules. The larvae by: antenna with 5 segments; pecten mandibularis conspicuous; and distance between ventromental plates about 2 times the width of median tooth of mentum.

Description. The male was described in detail by Reiss & Sublette (1985). The structure considered as "median volsella" must be regarded as a basal, digitiform projection of the inferior volsella; the median volsella is absent. The larva was described by Epler (2001) and the pupa by Jacobsen (2008).

Distribution. The species is recorded from southern USA (Reiss & Sublette 1985).

TABLE 21. Lengths (in μm) and proportions of legs of *Beardius tupinamba* **sp. n.**, male (n = 7–10)

	fe	ti	ta_1	ta_2
p_1	561–701, 636	411–477, 449	683–926, 832	309–430, 393
p_2	533–711, 645	449–561, 514	271–374, 337	150–187, 173
p_3	655–823, 739	505–673, 598	411–561, 477	234–299, 271
	ta_3	ta_4	ta_5	LR
p_1	281–374, 337	187–271, 234	75–112, 94	1.49–2.06, 1.84
p_2	112–140, 131	56–75, 65	37–47, 42	0.57–0.71, 0.65
p_3	168–234, 206	84–131, 112	47–65, 56	0.80–0.85, 0.82
	BV	SV	BR	
p_1	1.52–1.98, 1.77	1.21–1.52, 1.30	2.0–3.2, 2.7	
p_2	3.46–3.82, 3.60	3.26–4.07, 3.42	2.0–6.3, 3.3	
p_3	2.60–3.15, 2.92	2.63–2.80, 2.69	2.6–5.2, 4.4	

Beardius tupinamba **sp. n.**

(Figs 115–131)

Type material. Holotype male with larva and pupa, **BRAZIL, São Paulo State:** Salesópolis, Boraceia Biological Station, Rio Coruja, 08.xii.2005, in submersed wood, C.G. Froehlich *et al.* (MZSP). Paratypes: 1 female with pupa, as holotype (MZSP); 6 males, as holotype (ZMBN); 1 male, as holotype except 11.xii.2001, at light, H.F. Mendes (MZSP); 1 male, as holotype except 27.xii.1967, at light (MZUSP). 1 male, Campos do Jordão State Park, Córrego Campo do Meio, 06.vi.2005, light trap, A.R. Calor *et al.* (INPA); 1 male, as previous except 22.vi.2006, M.R. Spies & A.E. Siegloch (INPA). 7 males, Ubatuba, Maranduba, Pousada, 13.ix.2006, light trap, A.R. Calor *et al.* (MZSP); 1 male, as previous except Sítio Santa Cruz, 14.ix.2006 (MZSP). 1 male, Pindamonhangaba, Fazenda São Sebastião, 3° afluente Rio Cedro, 18.ix.2006, light trap, M.R. Spies & A.E. Siegloch (MZSP). 2 males, Cananeia, Restinga, 18.vii.2001, light trap, F.O. Roque (MZUFBA). 1 male, **Bahia State:** Camacan, Fazenda do Waldemar da Farmácia, escoadouro da represa de abastecimento, S15°25'17" W39°34'01", 306 m a.s.l., 05.xi.2009, drift net, A.R. Calor *et al.* (MZUFBA). 1 male, **Minas Gerais State:** Ipoema, Serra do Cipó, Fazenda Cachoeira alta, córrego abaixo da cachoeira, S19°34'46" W43°29'34", 838 m a.s.l., light trap, A.R Calor *et al.* (MZUFBA). 1 male with pupa, **Rio de Janeiro State:** Bacia de Sepetiba, 13.vii.1989, B. Göltner (ZSM). 1 male, Teresópolis, Vale da Revolta, Rio Paquequer, 07.vii.1996 (ZSM).

Diagnostic characters. The species belongs in the *tupinamba* group. The male can be separated from other members of the *tupinamba* group by the combination of the following characters: comparatively small body size (2.3–3.0 mm); coloration pale; R_1 without setae; and superior volsella without microtrichia. The female by: coloration pale; acrostichals absent; and ventrolateral lobe with long microtrichia. The pupa by: tergite II with slightly stronger shagreen orally; tergites VII and VIII without shagreen; paratergite VIII without spines; tergite VIII with simple spur; and stout anterior branch of thoracic horn with single spine. The larva by: antenna with 5 segments; pecten mandibularis absent or indistinct; and mentum with median tooth less than 1/2 the length of first lateral tooth.

Etymology. The name refers to the Tupinambá Indians, an ethnic group who used to live along the Brazilian coast. The name is to be regarded as a noun in apposition.

Description

Male (n = 8–10, except when otherwise stated). Total length 2.34–2.96, 2.66 mm. Wing length 1.26–1.69, 1.43 mm. Total length / wing length 1.70–2.02, 1.86. Wing length / length of profemur 2.02–2.51, 2.20.

Coloration. Head and abdomen pale. Thorax pale, with vittae, scutum, postnotum and preepisternum pale to stramineous. Legs pale.

Head. AR 0.84–1.13, 1.00; ultimate flagellomere 96–132, 114 µm long. Inner verticals 1–3, 2; outer verticals 3–5, 4; postorbitals 3–5, 4. Clypeus with 8–12, 10 setae. Tentorium 71–119, 96 µm long; 20–30, 25 µm wide. Stipes 119–159, 132 (5) µm long. Palpomere lengths (in µm): 30–46, 35 (7); 28–46, 35 (7); 106–127, 114 (7); 124–139, 132 (6); 152–210, 180 (5). Third palpomere with 2–3, 2 (7) sensillae subapically, longest 13–18, 15 (7) µm long.

Thorax. Scutal tubercle absent. Dorsocentrals 6–7, 6; acrostichals absent; prealars 2. Scutellum with 4 setae.

Wing (Fig. 115). VR 1.34–1.54, 1.42. R with 6–11, 8 setae; R_{4+5} with 2–16, 4 setae. Brachiolum with 2–3, 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 32–54, 39 µm long; spur of mid tibia (including comb) 43–54, 48 µm long; spur of hind tibia (including comb) 37–64, 59 µm long. Width at apex of fore tibia 37–54, 45 µm; of mid tibia 43–54, 48 µm; of hind tibia 48–59, 54 µm. Lengths and proportions of legs as in Table 21.

Hypopygium (Figs 116–117). Anal point broadly triangular, 0–5 µm long, barely reaching posterior margin of tergite IX in some specimens. Tergite IX without setae, tergal bands present. Laterosternite IX with 1–2, 2 setae. Phallapodeme 56–68, 63 µm long. Transverse sternapodeme 35–53, 46 µm long. Gonocoxite 99–119, 111 µm long. Superior volsella digitiform, curved, 38–56, 46 µm long, with 5–8, 7 dorsal and 2 ventral setae, without microtrichia. Median volsella 3–4, 4 µm long, with 1–2, 2 apical setae, longest 15–23, 20 µm long. Inferior volsella clavate, 40–58, 51 µm long, with 2 apical thin and 3–6, 3 subapical stout setae; projection arising from basal 2/3 of volsella, subtriangular, with microtrichia and fringe of long lamellae. Gonostylus 91–134, 119 µm long. HR 0.83–1.08, 0.94. HV 1.66–2.37, 2.11 (7).

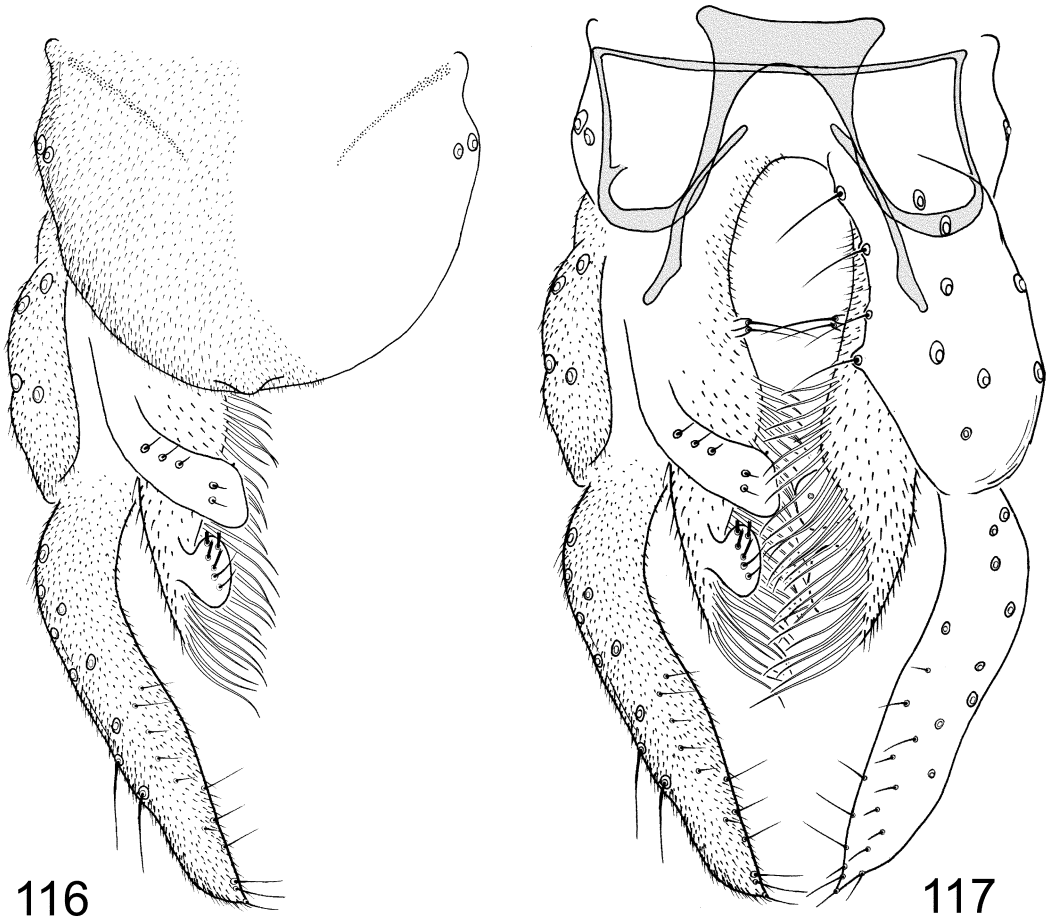
Female (n = 1). Total length 1.95 mm. Wing length 1.29 mm. Total length / wing length 1.51. Wing length / length of profemur 2.42.

Coloration. Head and abdomen pale. Thorax pale with scutum, vittae, postnotum and preepisternum stramineous. Legs pale.

Head. AR 0.41; ultimate flagellomere 94 µm long. Temporals 7, not well separated in inner and outer verticals and postorbitals. Clypeus with 10 setae. Tentorium 75 µm long, 15 µm wide. Stipes 78 µm long. Palpomere lengths (in µm): 28, 25, 91, 114, 144. Third palpomere with 2 sensillae subapically, longest 18 µm long.

Thorax (Fig. 119). Scutal tubercle absent. Dorsocentrals 7, 2 of them close to antepronotum; acrostichals absents; prealars 2. Scutellum with 4 setae.

Wing (Fig. 118). VR 1.41. R with 12 setae, R_1 with 9 setae, R_{4+5} with 23 setae. Brachiolum with 2 setae. Remaining veins bare.



FIGURES 115–117. *Beardius tupinamba* **sp. n.**, male. **115**—wing; **116**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **117**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

TABLE 22. Lengths (in μm) and proportions of legs of *Beardius tupinamba* **sp. n.**, female (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	533	393	683	346	290	196	75	1.74	1.77	1.36	2.0
p_2	570	458	281	140	103	47	37	0.61	4.03	3.70	3.0
p_3	617	514	374	215	159	84	37	0.72	3.04	3.03	4.0

Legs. Spur of fore tibia (including scale) 27 μm long, spur of mid tibia (including comb) 37 μm long, spur of hind tibia (including comb) 48 μm long. Width at apex of fore tibia 37 μm, of mid tibia 43 μm, of hind tibia 54 μm. Lengths and proportions of legs as in Table 22.

Genitalia (Figs 120–121). Tergite IX with 18 setae. Cercus 66 µm long, 51 µm wide. Notum 127 µm long. Gonocoxite IX without setae. Seminal capsule 30 µm long, excluding 13 µm long neck.

Pupa (n = 1–3). Total length 2.83–3.34 mm.

Coloration. Cephalothorax and abdomen pale.

Cephalothorax (Fig. 124). Frontal apotome conical (Fig. 122), frontal setae 45 µm long. Thorax without dorsal granulation. Thoracic horn with at least 3 branches; anterior branch stout, with 1 spinule about midlength (Fig. 123). Distance between Dc1 and Dc2 8–15 µm; between Dc2 and Dc3 171–203 µm; between Dc3 and Dc4 11–12 µm. Precorneal 1, antepronotals and prealars absents.

Abdomen (Fig. 126). Tergites I, VII and VIII without shagreen. Tergites II–VI with anterior transverse band of shagreen a little stronger than posterior contiguous shagreen. Row of hooklets on tergite II about 1/3 of tergite width. Conjunctive IV/V with single patch of spinules. Paratergite V with few spinules, restricted to posterior margin. Pedes spurii A and pedes spurii B present. Segment I bare; segments II–IV with 3 L setae; segment V with 3 taeniate L setae; segments VI–VIII with 4 taeniate L setae. Segment VIII without lateral spines, spur simple (Fig. 125). Anal lobe 120–142 µm long, with 15–17 taeniate setae.

Larva (n = 1). Total length not measurable. Head capsule 324 µm long.

Head dorsum (Fig. 131). Frontoclypeal apotome and labral sclerite 2 present. Frontoclypeal apotome with anterior granulation, extending to S4.

Antenna (Fig.128). With 5 segments. AR 0.87. Length of segments (in µm): 33, 15, 10, 8, 5. Blade 63 µm long, 1.7 times longer than flagellum. Lauterborn organs 10 µm long, alternating on segments 2 and 3.

Labrum. Pecten epipharyngis (Fig. 129) with 3 plates, mid with 3 teeth, laterals with 4 teeth each. Premandible 58 µm long.

Mentum (Fig. 127). Pale median tooth much shorter than first lateral tooth. Ventromental plates 58 µm wide, distance between plates 5 µm. Postmentum 154 µm long, with granulose area between ventromental plates.

Mandible (Fig.130). 116 µm long. Seta subdentalis 28 µm long. Seta interna with 3 major branches. Pecten mandibularis indistinct or absent. Mola without spines. Outer margin granulose.

Abdomen. Lost.

Biology. The single larva was found in submerged wood in a low order stream in the Atlantic Rainforest near Salesópolis, São Paulo State.

Distribution. The species is collected in the Bahia, Minas Gerais, Rio de Janeiro, and São Paulo states in Brazil.

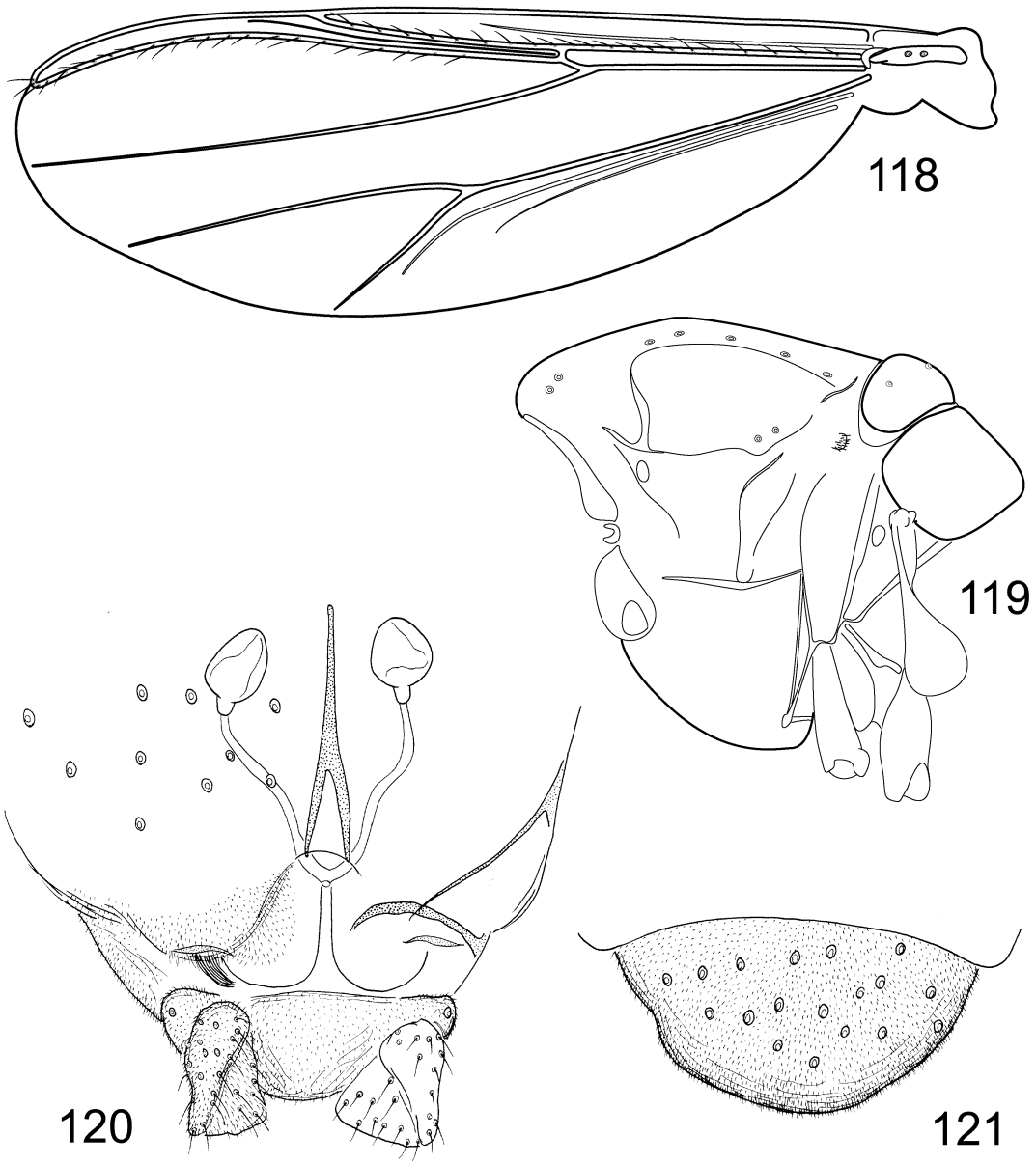
Beardius urupeatan Pinho, Mendes *et* Andersen

(Figs 132–143)

Beardius urupeatan Pinho, Mendes *et* Andersen, 2009: 261.

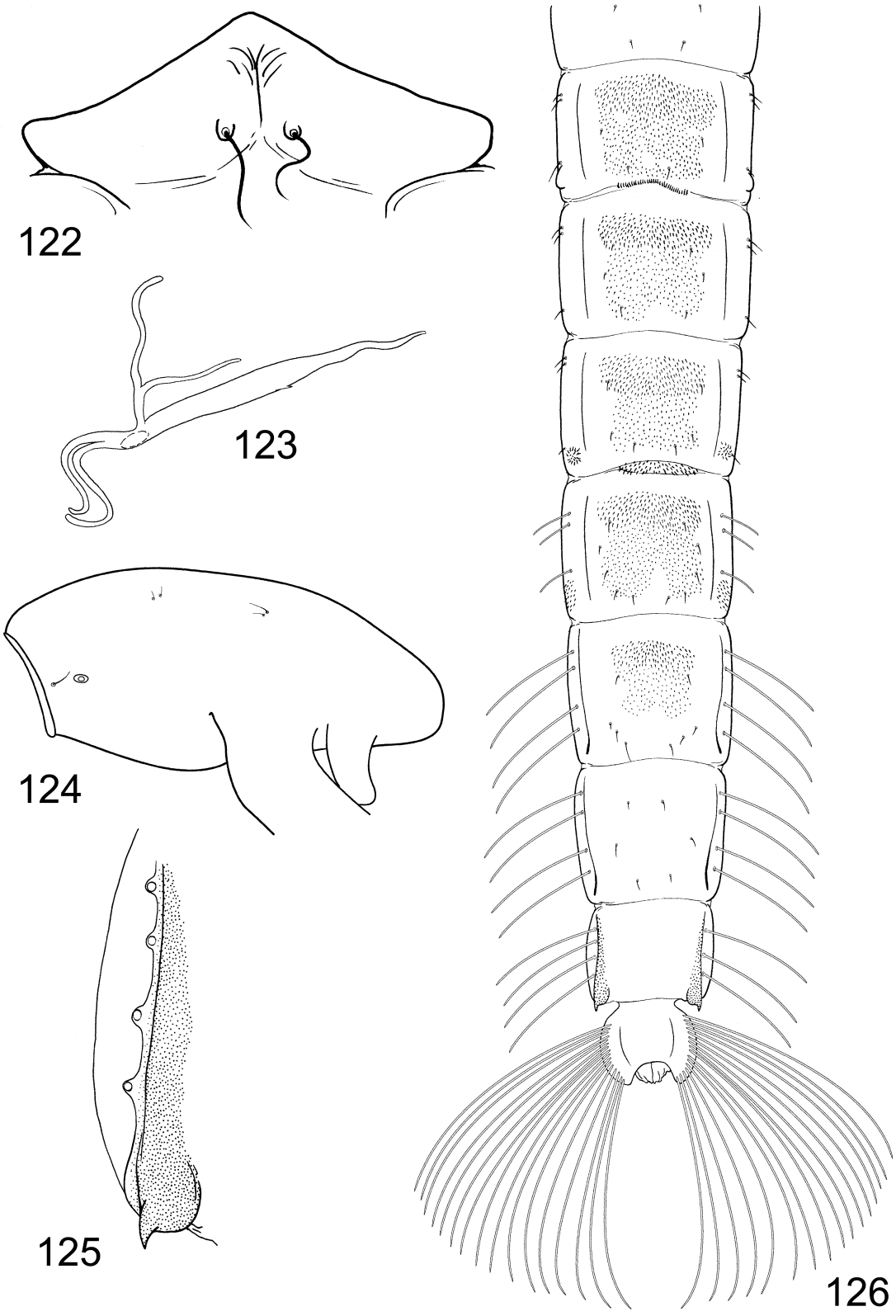
Material examined. Type material, as in Pinho *et al.* (2009). Additional material: **BRAZIL, Amazonas State:** Rio Cuieiras, 1 pupa, 24.iv.1961, Brundin-net, A168, E.J. Fittkau. Rio Tonantins, 2 pupae, 30.viii.1961, Brundin-net, A246, E.J. Fittkau. Rio Tonantins, Vila Nova, 1 pupa, 29–30.viii.1961, Brundin-net, A244, E.J. Fittkau. Uatumã Biological Reserve, Acampamento Cachoeira, 1 male, 31.i–02.ii.2008, light trap, N. Hamada *et al.* Rio Marauiá, Missão Santo Antônio, 2 males, 22.i.1963, light trap, A484, E.J. Fittkau. Rio Branquinho, 1 male, 21.iv.1961, light trap, A164, E.J. Fittkau. Rio Cuieiras, na foz do Rio Branquinho, 1 male, 20.xii.1961, light trap, A307, E.J. Fittkau.

Maranhão State: Aldeia Escalvado, S6° W45°, 2 pupae, 08.iv.1991, E.J. Fittkau. **Mato Grosso State:** Nova Xavantina, Fazenda Senhor Queté, Córrego Voadeira, S14°32'11" W52°30'54", 1 male, 16.x.2007, light trap, L.C. Pinho *et al.* **Pará State:** Rurópolis, Rio Tambor, 2 males, 29.x.2007, Pennsylvania-trap, N. Hamada *et al.* Rio Parú do Oeste, Malloca Apicó, 400 m a.s.l., 7 males, 20.iv.1962, light trap, A366–1, E.J. Fittkau. Serra Tumucumaque, Igarapé Okueima, Acampamento II, 6 males, 18.iv.1962, light trap, A371–1, E.J. Fittkau. Igarapé Kumadueni, 2 males, 19.iv.1962, light trap, A377, E.J. Fittkau. Rio Paru, Missão Tiriyos, 1 male, 21.iv.1962, light trap, A361–10, E.J. Fittkau. Missão Cururu, 1 male, 19.i.1961, light trap, A88–1, E.J. Fittkau. **Santa Catarina State:** Florianópolis, Afluente Rio Ratones, S27°30'66" W48°29'22", 1 male with larva and pupa, 1 female with larva and pupa, 3 larvae, 12.vii.2008, in wood, L.C. Pinho; as previous except 11 larvas, 28.vi.2006. **São Paulo State:** Salesópolis, Boraceia Biological Station, Córrego Venerando, 2 males, 09.xii.2005, light trap, C.G. Froehlich *et al.*; as previous except 1 male, 12.xii.2001.



FIGURES 118–121. *Beardius tupinamba* **sp. n.**, female. **118**—wing; **119**—thorax; **120**—genitalia, ventral view; **121**—tergite IX.

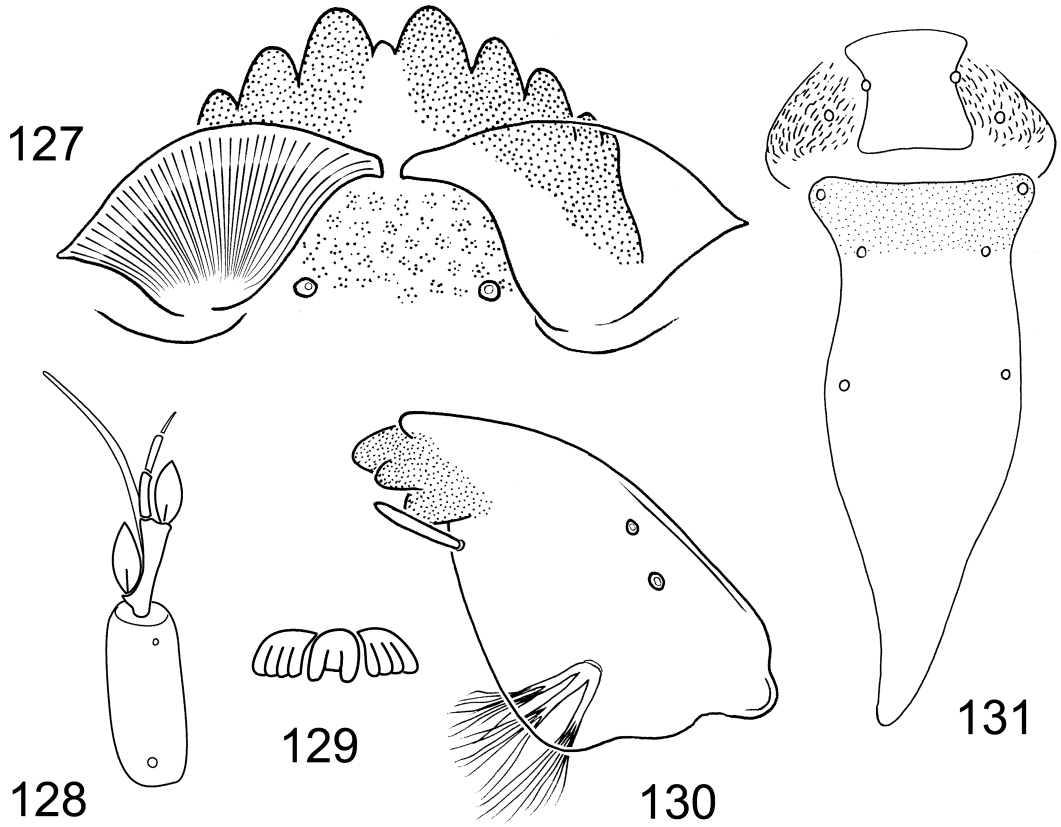
Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals and anal point lacking; and inferior volsella with large, transverse basal projection. The female by: acrostichals present; clypeus with about 10 setae; and gonocoxite IX with setae. The pupa by: shagreen on tergite II stronger orally; tergites VII and VIII without shagreen; conjunctive I/II and paratergite VI bare; and paratergite VIII with long, curved spines. The larva by: antenna with 5 segments; pecten mandibularis absent or indistinct; and mentum with median tooth about 1/2 the length of first lateral tooth.



FIGURES 122–126. *Beardius tupinamba* **sp. n.**, pupa. **122**—frontal apotome; **123**—thoracic horn; **124**—thorax; **125**—paratergite VIII; **126**—abdominal segments I–IX and anal lobe, dorsal view.

TABLE 23. Lengths (in µm) and proportions of legs of *Beardius urupeatan* Pinho, Mendes *et* Andersen, female (n = 1–2).

	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	468–589	402	776	383	327	243
p_2	477–617	393–477	262–318	131–168	94–122	56–65
p_3	514–664	524	439	234	187	94
	ta_5	LR	BV	SV	BR	
p_1	103	1.93	1.67	1.28	2.8	
p_2	36–38	0.66–0.68	3.56–3.60	3.32–3.44	3.3–3.8	
p_3	47	0.84	2.90	2.70	3.5	



FIGURES 127–131. *Beardius tupinamba* **sp. n.**, larva. **127**—mentum and ventromental plates; **128**—antenna; **129**—pecten epipharyngis; **130**—mandible; **131**—dorsal sclerites of head capsule.

Description

Male. The male was described in detail by Pinho *et al.* (2009).

Female (n = 1–2). Total length 2.34 mm. Wing length 0.98–1.19 mm. Total length / wing length 1.97. Wing length / length of profemur 2.02–2.10.

Coloration. Head, thorax and abdomen pale. Legs pale.

Head. AR 0.35, ultimate flagellomere 114 µm long. Temporals 8, not well separated in inner and outer verticals and postorbitals. Clypeus with 12 setae. Tentorium 147 µm long, 20 µm wide. Stipes 116 µm long. Palpomere lengths (in µm): 33, 35, 86, 121, 197. Third palpomere with 2–3 sensillae subapically, longest 13–15 µm long.

Thorax (Fig. 133). Scutal tubercle absent. Dorsocentrals 7–8, 1–2 of them close to antepronotum; acrostichals 2–3; prealars 2. Scutellum with 4–6 setae.

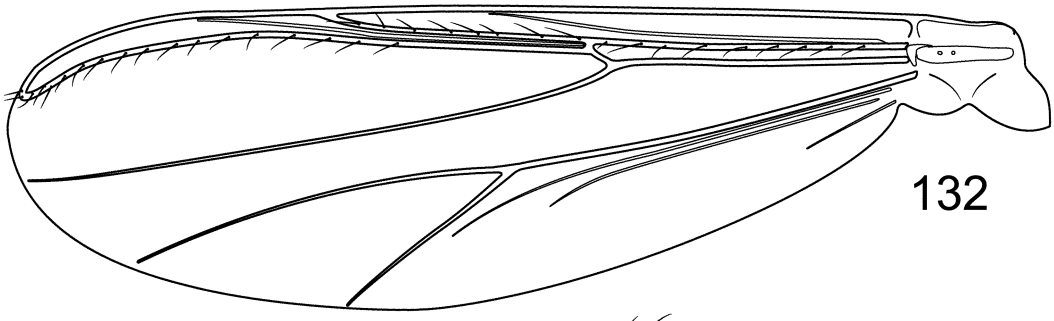
Wing (Fig. 132). VR 1.44–1.47. R with 8–9 setae, R_1 with 4–8 setae, R_{4+5} with 17–19 setae. Brachiolum with 2 setae. Remaining veins bare.

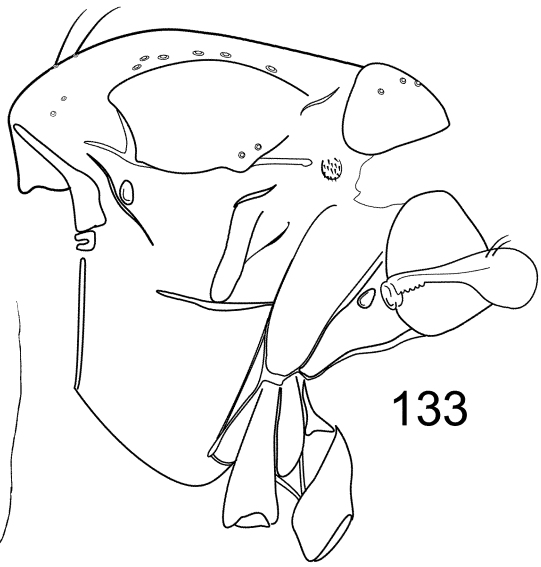
Legs. Spur of fore tibia (including scale) 54 µm long, spur of mid tibia (including comb) 48–59 µm long, spur of hind tibia (including comb) 54 µm long. Width at apex of fore tibia 54 µm, of mid tibia 37–48 µm, of hind tibia 54 µm. Lengths and proportions of legs as in Table 23.

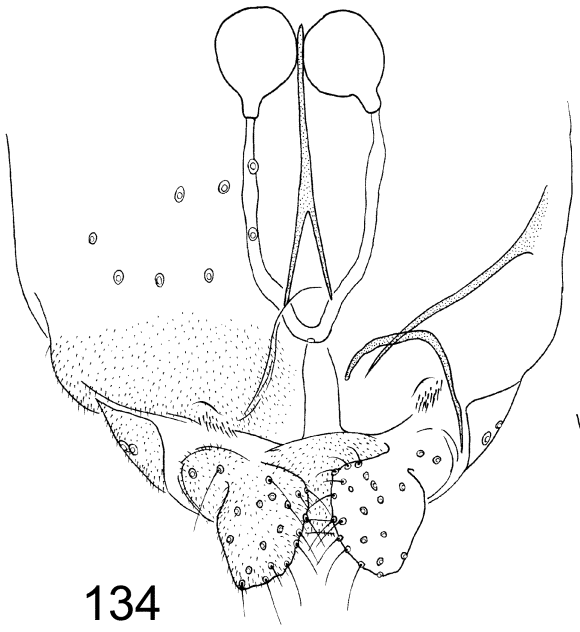
Genitalia (Figs 134–135). Tergite IX with 20 setae. Cercus 61 µm long, 46 µm wide. Notum 119 µm long. Gonocoxite IX with 2 setae. Seminal capsule 40 µm long, excluding 10 µm long neck.

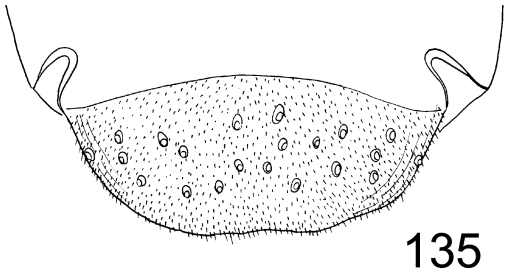
Pupa (n = 7–9, except when otherwise stated). Total length 2.20–3.18, 2.82 mm.

Coloration. Cephalothorax and abdomen light brown.

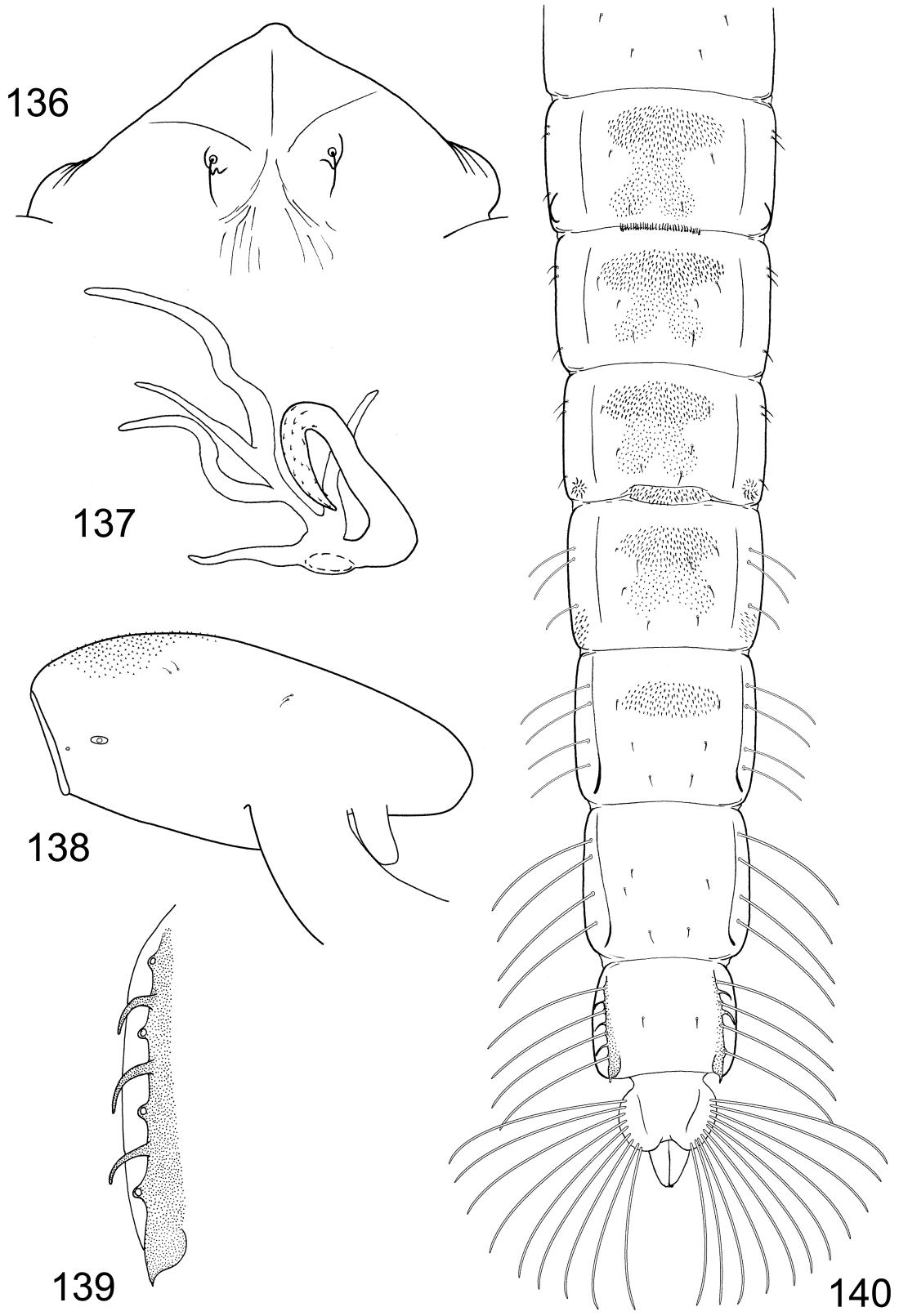




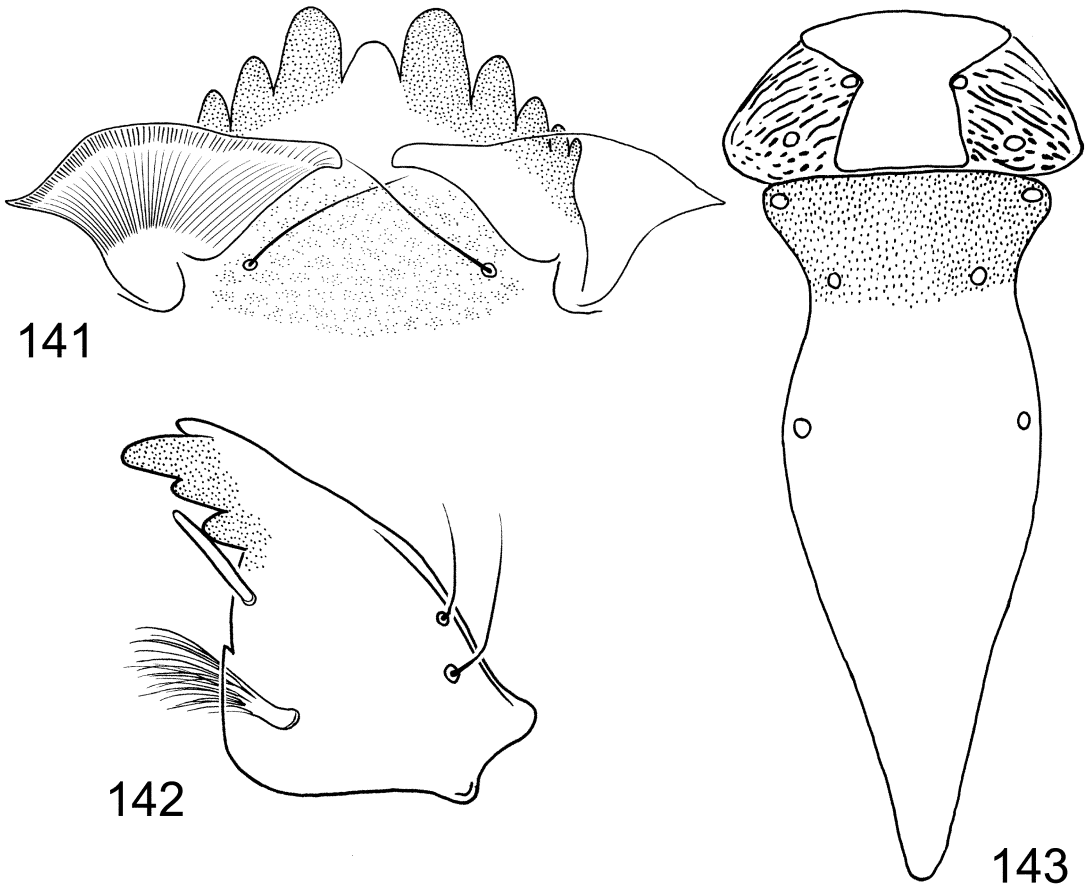




FIGURES 132–135. *Beardius urupeatan* Pinho, Mendes *et* Andersen, female. **132**—wing; **133**—thorax; **134**—genitalia, ventral view; **135**—tergite IX.



FIGURES 136–140. *Beardius urupeatan* Pinho, Mendes *et* Andersen, pupa. **136**—frontal apotome; **137**—thoracic horn; **138**—thorax; **139**—paratergite VIII; **140**—abdominal segments I–IX and anal lobe, dorsal view.



FIGURES 141–143. *Beardius urupeatan* Pinho, Mendes *et* Andersen, larva. **141**—mentum and ventromental plates; **142**—mandible; **143**—dorsal sclerites of head capsule.

Cephalothorax (Fig. 138). Frontal aptome conical (Fig. 136), frontal setae 14–24, 19 (6) μm long. Thorax with fine dorsal granulation. Thoracic horn with 5–6 branches; anterior branch stout, with spinule in apical 1/3 (Fig. 137). Distance between Dc1 and Dc2 6–18, 12 μm; between Dc2 and Dc3 126–193, 165 μm; between Dc3 and Dc4 8–14, 12 μm. Precorneal 1, antepronotals and prealars absent.

Abdomen (Fig. 140). Tergites I, VII and VIII without shagreen. Tergites II–V with anterior transverse band of shagreen a little stronger than posterior contiguous shagreen. Tergite VI with anterior transverse band of shagreen only. Row of hooklets on tergite II about 2/3 of tergite width. Conjunctive IV/V with single patch of spinules. Paratergite V with few spinules, restricted to posterior margin. Pedes spurii A and pedes spurii B present. Segment I without L-seta; segments II–IV with 3 L setae; segment V with 3 taeniate L setae; segments VI–VIII with 4 taeniate L setae. Segment VIII with 2–3, 2 long, curved lateral spines, spur simple (Fig. 139). Anal lobe 91–122, 108 (6) μm long, with 8–15, 11 taeniate setae.

Larva (n = 4–7, except when otherwise stated). Total length 3.92–3.98 (2) mm. Head capsule 325–335, 329 μm long.

Head dorsum (Fig. 143). Frontoclypeal apotome and labral sclerite 2 present. Frontoclypeal apotome with anterior granulation, extending to S4.

Antenna. With 5 segments. AR 0.81–1.03, 0.91. Length of segments (in μm): 38–51, 46; 19–21, 20; 13–15, 14; 8–10, 9; 3–5, 4. Blade 56–83, 73 μm long, about 1,5 times longer than flagellum. Lauterborn organs 13–14, 13 μm long, alternating on segments 2 and 3.

Labrum. With 3 plates, mid with 3 teeth, laterals with 4 teeth each. Premandible 75–78, 76 μm long.

Mentum (Fig. 141). Pale median tooth about 1/2 length of first lateral tooth. Ventromental plate 71–81, 76 μm wide, distance between plates 10–15, 13 μm. Postmentum 154–167, 159 μm long; with granulose area between ventromental plates.

Mandible (Fig. 142) 119–144, 132 µm long. Seta subdentalis 25–35, 30 µm long. Seta interna with 3 major branches. Pecten mandibularis indistinct or absent. Mola without spines. Outer margin granulose.

Abdomen. Procercus about 25 µm long, with 8 anal setae, longest about 405 µm long. Seta supraanalis about 340 µm long. Posterior prolegs about 65 µm long.

Remarks. The structure considered to be the "median volsella" by Pinho *et al.* (2009) must be regarded as a basal projection of inferior volsella. Median volsella is often absent, when present, it is a wart-like tubercle at the base of the projection of inferior volsella.

Biology. Larvae were collected in submerged, strongly decomposed wood in a low order stream near Florianópolis on the island of Santa Catarina, Santa Catarina State.

Distribution. The species is collected in the Amazonas, Maranhão, Mato Grosso, Pará, São Paulo, and Santa Catarina states in Brazil.

TABLE 24. Lengths (in µm) and proportions of legs of *Beardius vanessae* **sp. n.**, male (n = 1–3).

	fe	ti	ta_1	ta_2	ta_3	ta_4
p_1	701–729	402–421	916	411	365	252
p_2	655–729	505–542	402	215	159	84
p_3	739–814	561–608	570–580	318–327	215–243	215–243
	ta_5	LR	BV	SV	BR	
p_1	103	2.23	1.79	1.21	2.5	
p_2	37	0.80	3.11	2.88	4.5	
p_3	37–47	1.02–1.03	2.56–2.82	2.28–2.29	3.8–5.2	

***Beardius vanessae* sp. n.**
(Figs 144–149)

Type material. Holotype male, **BRAZIL, São Paulo State:** Guaíra, Fazenda Boa Esperança, S20°23'59" W48°22'03", 25.xii.2005, at light, V.S. Kataguiri (MZSP). Paratypes: 2 males, as holotype (MZSP, ZMBN).

Diagnostic characters. The species belongs in the *truncatus* group. The male can be separated from all other members of the genus by the unique, rounded projection of the inferior volsella, arising from the very base of the volsella and fused to the ventral surface of the superior volsella.

Etymology. Named after MSc. Vanessa Suzuki Kataguiri, who collected the specimens.

Description

Male (n = 1–3). Total length 2.71–2.94 mm. Wing length 1.30–1.36 mm. Total length / wing length 2.03–2.18. Wing length / length of profemur 1.85–1.87.

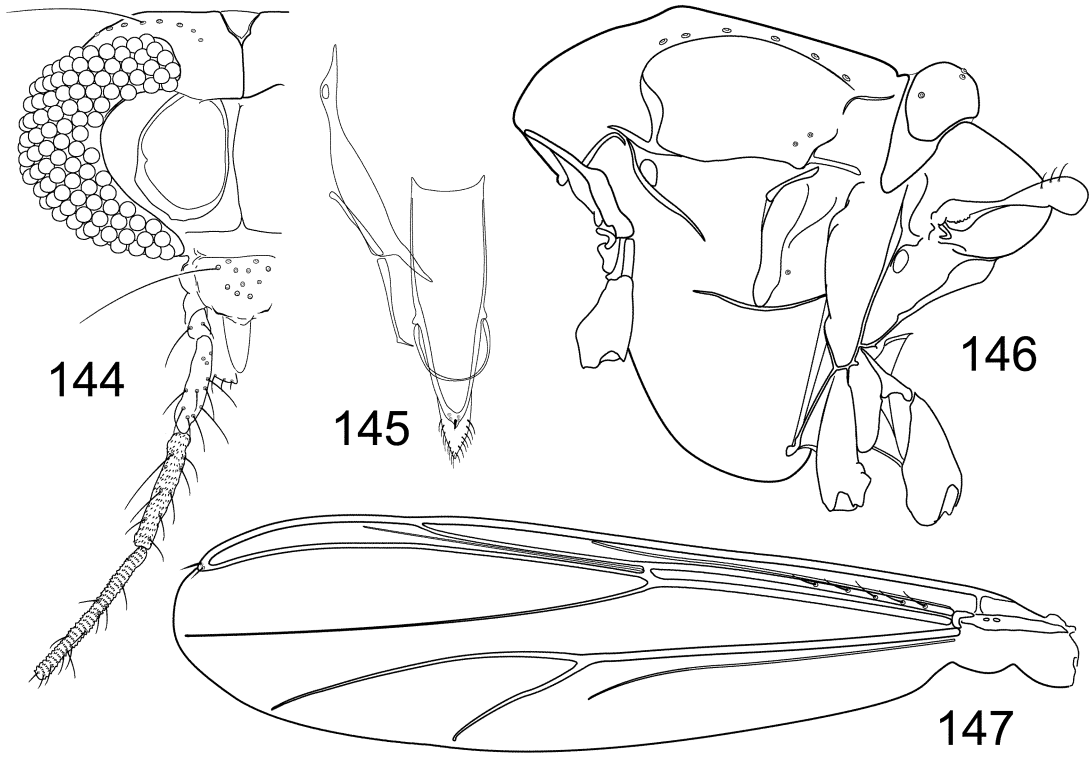
Coloration. Head and thorax pale; abdomen pale, with narrow anterior brown bands on tergites II–VIII. Legs pale.

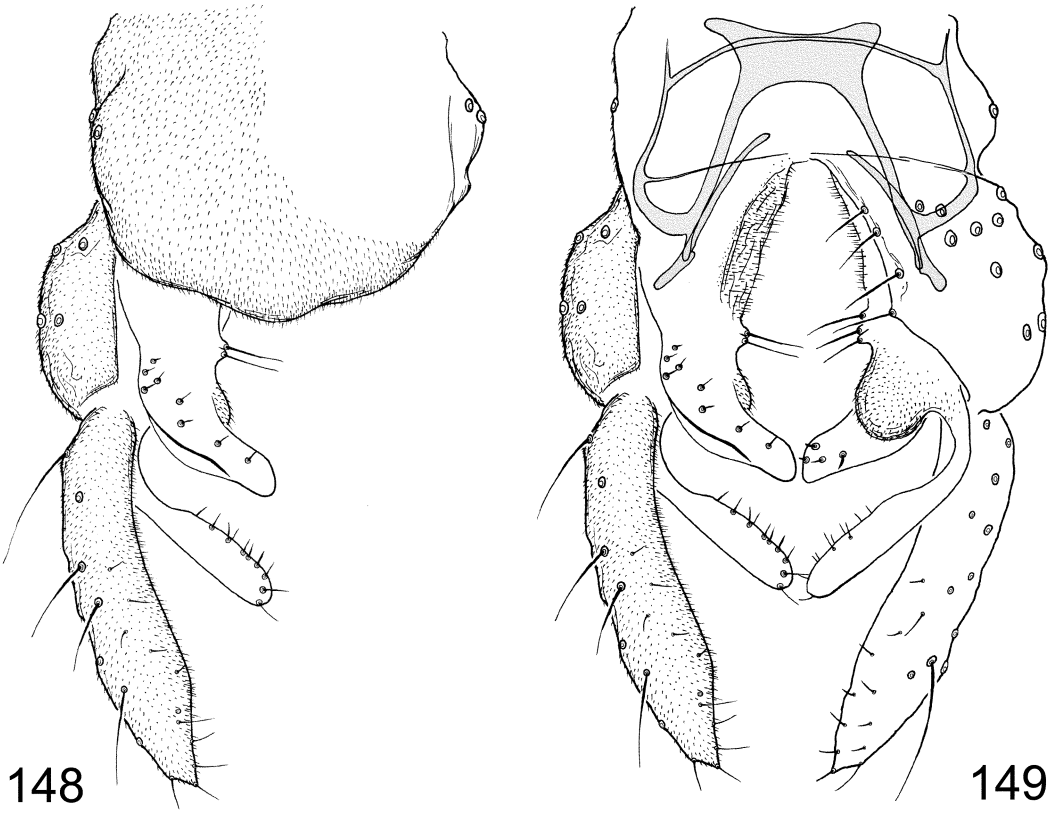
Head (Fig. 144). AR 1.20–1.45, ultimate flagellomere 137–147 µm long. Inner verticals 2–3, outer verticals 5, postorbitals 3–4. Clypeus with 10–12 setae. Cibarial pump, tentorium and stipes as in Figure 145. Tentorium 96–132 µm long, 25–30 (2) µm wide. Stipes 121–127 µm long. Palpomere lengths (in µm): 30–33; 34–37; 104–106; 124–134; 183–186. Third palpomere with 2–3 sensillae subapically, longest 13–15 µm long.

Thorax (Fig. 146). Scutal tubercle present. Dorsocentrals 6–7, acrostichals absent, prealars 2. Scutellum with 4 setae.

Wing (Fig. 147). VR 1.20–1.27. R with 0–5 setae, R_{4+5} with 2–3 setae at apex. Brachiolum with 2 setae. Remaining veins bare.

Legs. Spur of fore tibia (including scale) 43–48 µm long, spur of mid tibia (including comb) 73–77 µm long, spur of hind tibia (including comb) 64–80 µm long. Width at apex of fore tibia 41–45 µm, of mid tibia 52–56 µm, of hind tibia 54–64 µm. Lengths and proportions of legs as in Table 24.





FIGURES 144–149. *Beardius vanessae* **sp. n.**, male. **144**—head; **145**—tentorium, stipes and cibarial pump; **146**—thorax; **147**—wing; **148**—tergite IX and dorsal aspect of left gonocoxite and gonostylus; **149**—hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect.

Hypopygium (Figs 148–149). Anal point absent. Tergite IX without setae, tergal bands absent. Laterosternite IX with 2 setae. Phallapodeme 58–63 μm long. Transverse sternapodeme 46–48 μm long. Gonocoxite 101–114 μm long. Superior volsella digitiform, 58–61 μm long, with 8–9 dorsal and 4 ventral setae. Median volsella 3–4 μm long, with 2–3 apical setae, longest 23–25 μm long. Inferior volsella clavate, curved, with apical 1/3 parallel-sided, straight, 78–89 μm long, with 2 apical thin and 6–9 subapical thin setae; projection rounded, fused to ventral surface of superior volsella, with microtrichia. Gonostylus 132–139 μm long. HR 0.73–0.83. HV 2.11–2.33.

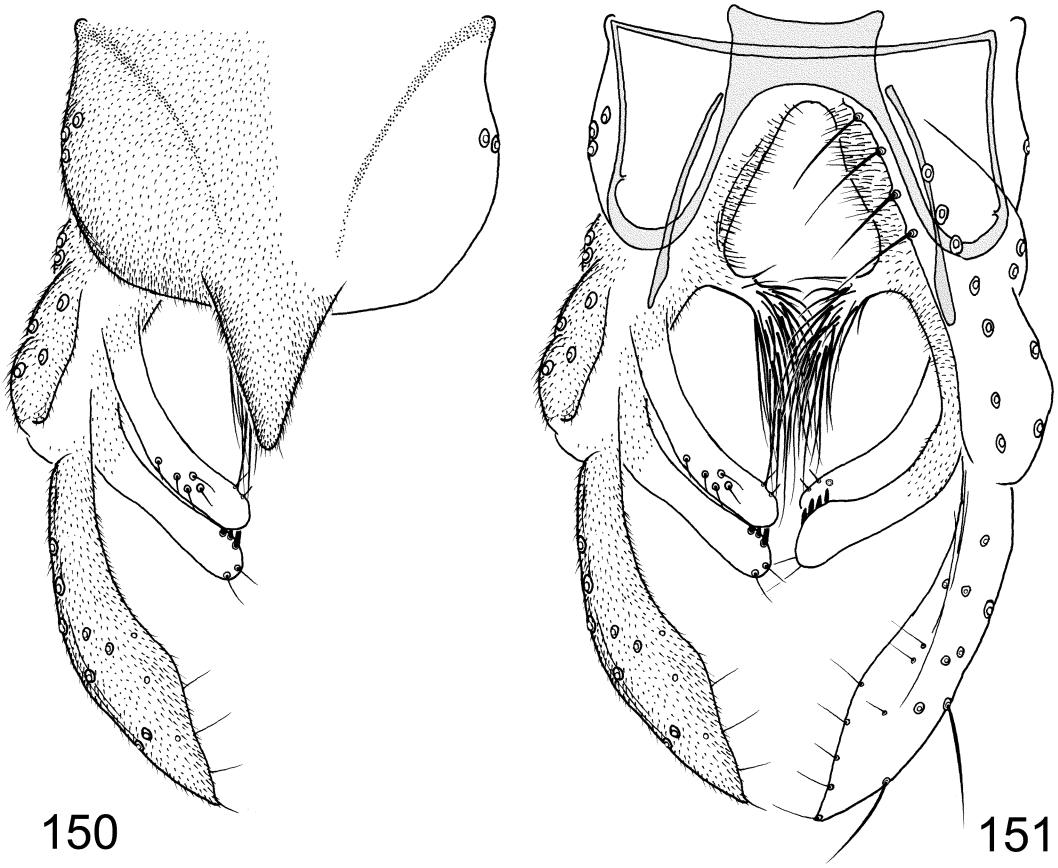
Female and immatures. Unknown.

Distribution. The species is collected in the São Paulo State in Brazil.

Beardius xylophilus Trivinho-Strixino *et* Strixino
(Figs 150–151)

Beardius xylophilus Trivinho-Strixino *et* Strixino, 2000: 246.
Beardius sp. 2 Trivinho-Strixino & Strixino (1995: 79).

Material examined. Type material, as in Trivinho-Strixino & Strixino (2000). Additional material: **Brazil, Acre State:** Mâncio Lima, Serra do Divisor National Park, Pé da Serra, Igarapé Amor, 1 male, 18.iii.2006, light trap, A.R. Calor. **Bahia State**: Barreiras, Rio de Janeiro, Cachoeira Acaba-Vidas, S11°53'40" W45°36'06", 1 male, 14.x.2008, light trap, A.R. Calor *et al.* Camacan, Serra Bonita Reserve, córrego 2, S15°23'10" W39°34'03", 1 male, 01.viii.2008, light trap, A.R. Calor *et al.* **Mato Grosso State:** Ribeirão Cascalheira, Estrada para Fazenda Manaus, Represa 1 km após 2º afluente do Ribeirão Bonito, S12°55'36" W51°53'28", 1 male, 08.x.2007, light trap, L.C. Pinho *et al.* **São Paulo State:** Jundiaí, Serra do Japi State Park, Trilha para Cachoeira Paraíso, 2 males, 29.viii.2007, light trap, L.S. Lecci *et al.*



FIGURES 150–151. *Beardius xylophilus* Trivinho-Strixino *et* Strixino, male. **150**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **151**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Diagnostic characters. The species belong in the *xylophilus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; anal point long, bluntly triangular, fully covered with microtrichia; and basal projection of inferior volsella long, digitiform, bearing long lamellae reaching apex of inferior volsella. The larvae by the combination of: antenna with 6 segments; antennal blade longer than flagellum; and median ends of ventromental plates pointing medially.

Description. The species was described in detail by Trivinho-Strixino & Strixino (2000). The structure considered as "median volsella" by Trivinho-Strixino & Strixino (2000) must be regarded as a basal, digitiform projection of the inferior volsella, bearing long lamellae. Median volsella is absent. The projection of the inferior volsella is longer than figured by Trivinho-Strixino & Strixino (2000) and the base of inferior volsella has microtrichia (Figs 150–151).

Distribution. The species is collected in the Acre, Bahia, Mato Grosso, and São Paulo states in Brazil.

TABLE 25. Lengths (in μm) and proportions of legs of *Beardius yperoig* **sp. n.**, male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	552	374	–	–	–	–	–	–	–	–	–
p_2	524	411	281	122	94	103	75	0.68	3.10	3.33	3.9
p_3	552	477	374	178	150	112	84	0.78	2.46	2.75	2.6

***Beardius yperoig* sp. n.**
(Figs 152–154)

Type material. Holotype: male, **BRAZIL, São Paulo State:** Ubatuba, Serra do Mar State Park, S23°21'43" W44°49'22", 21.i.2002, Malaise trap I-trilha, N.W. Periotto *et al.* (MZSP).

Diagnostic characters. The species belongs in the *parcus* group. The male can be separated from all other members of the genus by the combination of the following characters: acrostichals present; superior volsella digitiform; and inferior volsella lacking projection.

Etymology. The name refers to the "Yperoig Village", the ancient name of Ubatuba, where the type was collected. The name is to be regarded as a noun in apposition.

Description

Male (n = 1). Total length 2.26 mm. Wing length 1.01 mm. Total length / wing length 2.24. Wing length / length of profemur 1.83.

Coloration. Head and thorax pale; abdomen pale, with wide anterior brown band on tergites II–VIII. Legs pale.

Head. AR 1.05, ultimate flagellomere 364 μm long. Temporals 8, not well separated in inner and outer verticals and postorbitals. Clypeus with 10 setae. Tentorium 101 μm long, 23 μm wide. First and second palpomeres 33 and 30 μm long, remaining palpomeres lost.

Thorax. Scutal tubercle absent. Dorsocentrals 7, acrostichals 6, prealars 2. Scutellum with 4 setae.

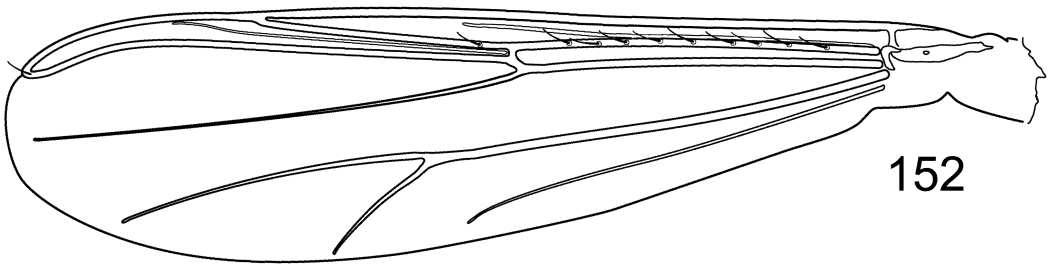
Wing (Fig. 152). VR 1.33. R with 9 setae, R_1 with 1 seta, R_{4+5} with 1 seta at apex. Brachiolum with 2 setae. Remaining veins bare.

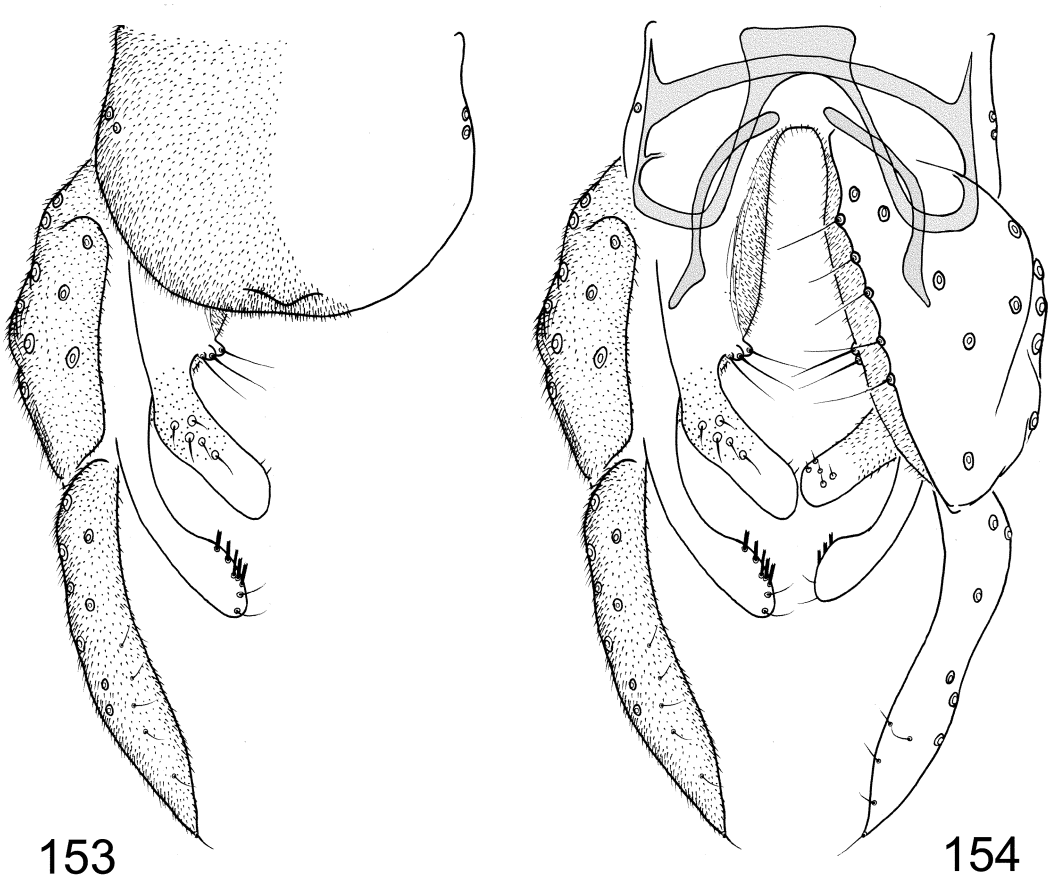
Legs. Spur of fore tibia (including scale) 40 μm long, spur of mid tibia (including comb) 58 μm long, spur of hind tibia (including comb) 61 μm long. Width at apex of fore tibia 40 μm, of mid tibia 35 μm, of hind tibia 43 μm. Lengths and proportions of legs as in Table 25.

Hypopygium (Figs 153–154). Anal point broadly triangular, 2 μm long, not reaching posterior margin of tergite IX. Tergite IX without setae, tergal bands absent. Laterosternite IX with 1 seta. Phallapodeme 51 μm long. Transverse sternapodeme 25 μm long. Gonocoxite 101 μm long. Superior volsella digitiform, slightly curved, 38 μm long, with 5 dorsal, 2 apical, and 2 ventral setae, with microtrichia in basal 2/3 on both dorsal and ventral surfaces. Median volsella 3 μm long, with 3 apical setae, longest 18 μm. Inferior volsella clavate, curved, 53 μm long, with 2 apical thin and 5 subapical stout, bifid setae; projection absent. Gonostylus 99 μm long. HR 1.03. HV 2.28.

Female and immatures. Unknown.

Distribution. The species is collected in the São Paulo State in Brazil.





FIGURES 152–154. *Beardius yperoig* **sp. n.**, male. **152**—wing; **153**—anal point and tergite IX and dorsal aspect of left gonocoxite and gonostylus; **154**—hypopygium with anal point and tergite IX removed, left dorsal aspect, right ventral aspect.

Acknowledgements

We are indebted to Neusa Hamada, Dalton S. Amorim, Claudio G. Froehlich, Adolfo R. Calor, Fabio O. Roque, Lucas S. Lecci, Sidnei Mateus, Marcia R. Spies, Vanessa S. Kataguiri, Lívia M. Fusari and Luís E.M. Bizzo for making *Beardius* material available to us. Thanks are also due to Susana Trivinho-Strixino for loan of types and valuable comments on the manuscript, and to Martin Spies and Marion Kotrba for loan of an unidentified *Beardius* species described here and types deposited in the Zoologische Staatssammlung München. The first author received funding from FAPESP (05/53026–0 and 07/55833–6) and H.F. Mendes from FAPESP (11/50162–1), within the Biota / FAPESP—The Biodiversity Virtual Institute Program (www.biota.org) while completing this paper. Gladys Ramirez made some of the slide preparations.

References

Andersen, T. & Sæther, O.A. (1996) New species and records of *Beardius* Reiss et Sublette (Diptera: Chironomidae). *Annales de Limnologie,* 32, 33–44.
http://dx.doi.org/10.1051/limn/1996003

Cranston, P.S. (2006) A new genus and species of Chironominae (Diptera: Chironomidae) with wood-mining larvae. *Australian Journal of Entomology,* 45, 227–234.
http://dx.doi.org/10.1111/j.1440-6055.2006.00539.x

Epler, J.H. (1992) *Identification Manual for the Larval Chironomidae (Diptera) of Florida.* Florida Department of Environmental Regulation, Orlando, Florida, 302 pp.

Epler, J.H. (1995) *Identification Manual for the Larval Chironomidae (Diptera) of Florida. Revised edition.* Florida Department of Environmental Protection, Tallahassee, Florida, 317 pp.

Epler, J.H. (2001) *Identification manual for the larval Chironomidae (Diptera) of North and South Carolina. A guide to the taxonomy of the midges of the southeastern United States, including Florida*. Special Publication SJ2001-SP13, North Carolina Department of Environment and Natural Resources, Raleigh, NC, and St. Johns River Water Management District, Palatka, Florida, 526 pp.

Farris, J.S. (1969) A successive approximations approach to character weighting. *Systematic Zoology,* 18, 374–385.
http://dx.doi.org/10.2307/2412182

Jacobsen, R.E. (2008) *A Key to the Pupal Exuviae of the Midges (Diptera: Chironomidae) of Everglades National Park, Florida*. Scientific Investigations Report 2008–5082, US Geological Survey, Reston, Virginia, 119 pp.

Jacobsen, R.E. & Perry, S.A. (2000) A review of *Beardius* Reiss & Sublette, with the description of a new species from Everglades National Park, Florida (Insecta, Diptera, Chironomidae). *Spixiana*, 23, 129–144.

Maddison, W.P. & Maddison, D.R. (2009) Mesquite. A modular system for evolutionary analysis. Version 2.72. Available from: http://mesquiteproject.org (accessed 1 July 2013)

Page, R. (2001) Nexus Data Editor for windows, v. 0.5.0. Available from: http://taxonomy.zoology.gla.ac.uk/rod/NDE/nde.html (accessed 1 July 2013)

Pinho, L.C., Mendes, H.F. & Andersen, T. (2009) New species and records of *Beardius* Reiss & Sublette from Brazil (Diptera, Chironomidae). *Spixiana,* 32, 255–264.

Reiss, F. (1976) Die Benthoszoozönosen zentralamazonischer Várzeaseen und ihre Anpassungen an die jahresperiodischen Wasserstandsschwankungen. *Biogeographica*, 7, 125–135.

Reiss, F. (1977) The benthic zoocoenoses of Central Amazon Várzea lakes and their adaptations to the annual water level fluctuations. *Geo-Eco-Trop*, 1, 65–75.

Reiss, F. & Sublette, J.E. (1985) *Beardius* new genus with notes on additional Pan-American taxa (Diptera, Chironomidae). *Spixiana,* Supplement 11, 179–193.

Roque, F.O., Pepinelli, M., Fragoso, E.N., Ferreira, W.A., Barillari, P.R., Yoshinaga, M.Y., Trivinho-Strixino, S., Verani, N.F. & Lima, M.I.S. (2003) Ecologia de Macroinvertebrados, Peixes e Vegetação ripária de um córrego de primeira ordem de cerrado do estado de São Paulo. *In:* Henry, R. (Ed.), *Ecótonos nas Interfaces dos Ecossistemas Aquáticos*. RiMa, São Carlos, pp. 313–338.

Sonoda, K.C. & Trivinho-Strixino, S. (2000) Dinâmica da emergência de Chironomidae (Diptera) da fitofauna de *Cabomba piauyhensis* Gardney, 1844, na Lagoa do Infernão (Estação Ecológica de Jataí, Luiz Antônio, SP). *In:* Santos, J.E. & Pires, J.S.R. (Eds.), *Estudos Integrados em Ecossistemas*. Estação Ecológica de Jataí. RiMa. São Carlos, pp. 743–754.

Sæther, O.A. (1969) Some Nearctic Podonominae, Diamesinae, and Orthocladiinae (Diptera: Chironomidae). *Bulletin of the Fisheries Research Board of Canada*, 170, 1–154.

Sæther, O.A. (1980) Glossary of chironomid morphology terminology (Diptera: Chironomidae). *Entomologica scandinavica, Supplement,* 14, 1–51.

Swofford, D.L. (2002) *PAUP*. Phylogenetic Analysis Using Parsimony (* and other methods), v. 4.0b10.* Computer program distributed by Sinauer Associates Inc., Sunderland, MA.

Trivinho-Strixino, S. & Siqueira, T. (2007) New species of *Beardius* Reiss *et* Sublette, 1985 (Diptera: Chironomidae) from Southeastern Brazil. *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. 281–286.

Trivinho-Strixino, S. & Strixino, G. (1995) *Larvas de Chironomidae (Diptera) do Estado de São Paulo. Guia de identificação e diagnose dos gêneros*. Universidade Federal de São Carlos/PPG-ERN, São Carlos, São Paulo, 229 pp.

Trivinho-Strixino, S. & Strixino, G. (2000) Two new species of *Beardius* Reiss et Sublette (Diptera, Chironomidae) from Southeastern Brazil. *In:* Hoffrichter, O. (Ed.), *Late 20th Century Research on Chironomidae: An Anthology from the 13th International Symposium on Chironomidae.* Shaker Verlag, Aachen, pp. 245–250.