



## A redescription of *Rheotanytarsus lamellatus* Reiss in all stages (Diptera: Chironomidae) and new records from Argentina

EVA GABRIELA TEJERINA<sup>1,3</sup> & ANALÍA CONSTANCIA PAGGI<sup>2</sup>

<sup>1</sup>CONICET, Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Argentina

<sup>2</sup>Instituto de Limnología “Dr. R. A. Ringuelet” (ILPLA-CCT La Plata-CONICET-UNLP), Argentina

<sup>3</sup>Corresponding author. E-mail: tejerinaeva@yahoo.com.ar

### Abstract

Immature stages and adult female of *Rheotanytarsus lamellatus* Reiss are described for the first time, and the male is redescribed, diagnosed and compared with *R. meridionalis* (Johannsen). Both species are reported for the first time from Argentina. Keys to South American male adults and pupae are given.

**Key words:** Tanytarsini, *Rheotanytarsus*, systematics, new records, mountain streams, Neotropical

### Introduction

*Rheotanytarsus* Thienemann & Bause in Bause, 1913 is represented by 94 described species distributed worldwide and recorded from all zoogeographical regions except Antarctica (Sæther & Kyerematen 2001; Kyerematen & Andersen 2002). It includes 19 species described from the Neotropical region and Mexico (Spies & Reiss 1996; Kyerematen *et al.* 2000; Andersen & Kyerematen 2001; Kyerematen & Andersen 2002). Many of the species in *Rheotanytarsus* are only known as male adults. The species separation is based upon features of the male hypopygium, but females cannot always be assigned to species.

Although this genus is particularly rich in tropical rain forests (Cranston 1997), both in number of species and individuals, their species diversity in Argentina has not been estimated. Only one species was recorded from Argentina so far: *R. globosus* Reiss (Reiss 1972). Reiss (l.c.) described also *Rheotanytarsus lamellatus* from Chile (Valdivia) based on a single male adult. *R. meridionalis* (Johannsen) is known from Puerto Rico.

In this paper we introduce the first records of *R. lamellatus* and *R. meridionalis* from Argentina. Here we present the first description of immature stages (4th-instar larvae and pupa), the adult female and a redescription of the male of *R. lamellatus*, as well as a discussion on diagnostic characters of these two species recorded.

### Material and methods

Larvae and pupae were collected using a Surber net (mesh size 300 µm). The adults were collected using a light trap. The specimens were mounted on slides in Euparal following the procedure outlined in Epler (2001). The general terminology follows Sæther (1980). The term “taeniate” is used, in accordance with Langton (1994), for the filamentous setae on the pupal exuviae. Measurements are given as range (and mean) of all available specimens in µm. All the material is deposited in Instituto Miguel Lillo, Tucumán, Argentina (IML).

The key to adult males from South America includes five morphotypes known from Brazil, Peru, Puerto Rico, Chile and Argentina (Andersen & Kyerematen, 2001).

The key to pupae from South America includes four morphotypes known from Brazil: *Rheotanytarsus* sp1–sp4 which are illustrated by Wiedenbrug & Ospina–Torres (2005).

## Results

### *Rheotanytarsus lamellatus* Reiss

*Rheotanytarsus lamellatus* Reiss, 1972: 67

**Material examined.** Associated pharate adults and pupae with larval exuviae attached in their tubes. ARGENTINA: 4 male and 2 adult females, Tucuman, El Siambón stream, 26° 45' 12.9" S, 65° 27' 14" W, 1040 m a.s.l., 3.III.2009; 4 males, 4 males Jujuy, P.N. Calilegua, Yuto stream, 23° 38' 40" S, 64° 32' 21" W, 505 m a.s.l., 7.XI.2006; 5 pupae and 6 larvae, La Hoyada, San Miguel stream, 26° 41' 07.7" S, 65° 31' 09.9" W, 1300 m a.s.l., 12.IX.2006; 39 larvae, Rio Grande stream, 26° 46' 10" S, 65° 28' 20.4" W, 925 m a.s.l., 21.III.2007; 10 pupae, idem except date, 13.IX.2006; 27 pupae and 4524 larvae, San Javier stream, 26° 46' S, 65° 23' W, 860 m a.s.l., 21.III.2007; 23 larvae, idem except date, 13.IX.2006; 284 larvae, Potrero de las Tablas stream, 26° 51' 18.8" S, 65° 25' 55.5" W, 680 m a.s.l., 13.IX.2006; 61 larvae, idem except date, 21.III.2007. E. Tejerina coll. Deposited in IML.

**Description. Adult male** (n = 4 except when otherwise stated)

Coloration: head light brown; thorax with light brown patches anteriorly and laterally on scutum, postnotum and scutellum; abdomen and legs light brown.

Total length 1780–2070 (1925), abdomen length 1220–1370 (1290), thorax length 560–700 (645), wing length 1220–1475 (1314). Total length/wing length 1.40–1.46 (1.42). Wing length/length of profemur 1.96–2.14 (2.05).

**Head.** Antenna 552–764 (657) long with 13 flagellomeres; AR 0.45–0.87 (0.63) (Fig. 1). Temporal setae 5–6. Clypeus with 16 setae. Length of palpomeres: 30–32 (31); 28–40 (34); 76–30 (53); 88–90 (89); 172 (n = 2).

**Thorax chaetotaxy** (n = 1). Dc 11, Ac 16, Scts 10.

**Wing** (Fig. 2). Length/width 2.92. VR 1.4–1.6 (1.5). Wing setae: brachiolum with 1 seta; Sc bare; R with 18; R<sub>1</sub> with 22; R<sub>4+5</sub> with 53; M bare; RM bare; M<sub>1+2</sub> with 42; M<sub>3+4</sub> with 28; Cu with 28; Cu<sub>1</sub> with 35; PCu with 56; An with 26 setae (n = 1).

**Legs.** Fore tibia with spur 35 µm long; 2 spurs of mid tibial combs unequal in size: 30 and 25 long; 2 spurs of hind tibial combs subequal in size: c. 25 long. Length and ratios of leg segments in Table 1.

**Hypopygium** (Fig. 3). Anal tergite with separated V-shaped bands and 8–10 (9) median setae. Anal point 35–40 (37) long. Crest well developed, open and V-shaped with 4–5 setae arranged in a row between anal tergite bands and anal point.

Gonocoxite 124–148 (136) long; gonostylus 84–104 (94) long.

Inferior volsella cylindrical, 56–64 (60) long, with microtrichia and 10 setae apically. Superior volsella 32 (32) long; 18–22 (20) wide, oval, with 6 dorsal setae in addition to 2 marginal. Median volsella (Fig. 4), stem 28 long (n = 2), with lamelliform setae fused into plate.

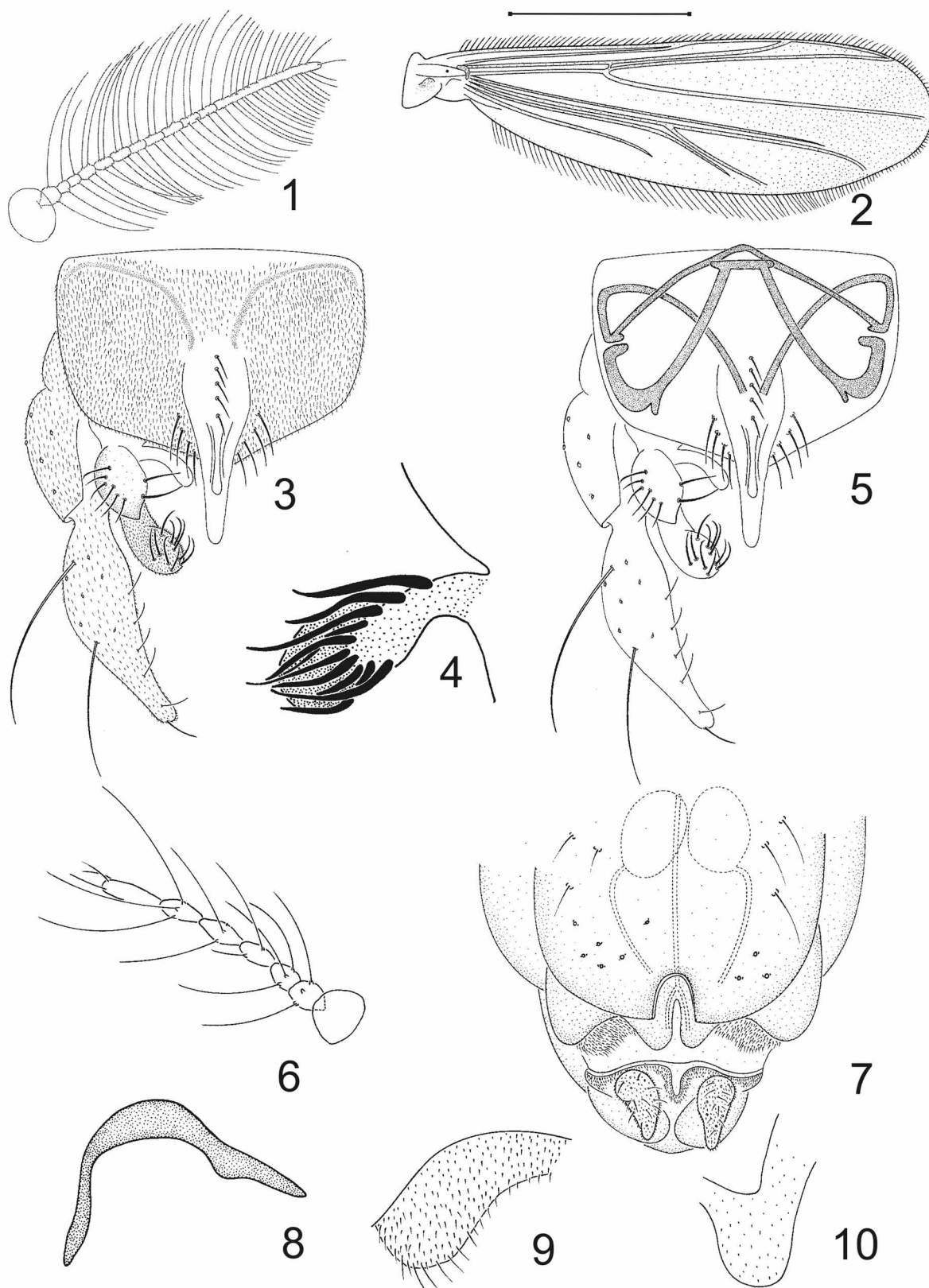
Transverse sternapodeme 22 long; lateral sternapodeme 78 long; phallapodeme 50 long (n = 1) (Fig. 5). HR 0.67–0.70 (0.68); HV = 1.99–2.12 (2.05) (n = 2).

**Adult female** (n = 2 except when otherwise stated)

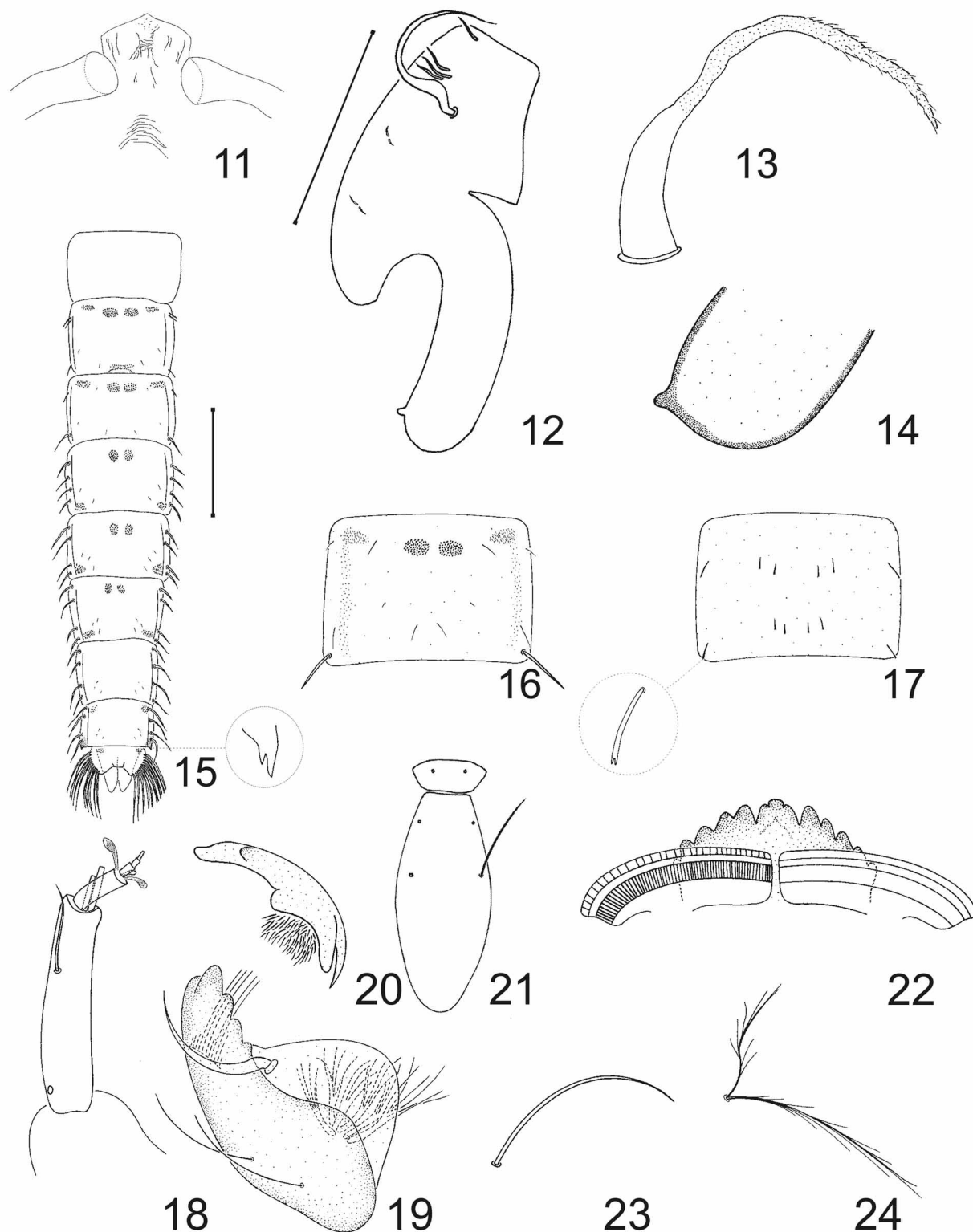
General color as in male. Total length 1606–1672 (1639), abdomen length 968, thorax length 645–704 (675); wing length 1348–1652 (1500).

**Head.** Antenna with 6 flagellomeres, 276 long; AR 0.64 (n = 1) (Fig. 6). Temporal setae 4. Clypeus with 18 setae. Palpomeres length: 35–32 (34); 30–48 (39); 75–80 (78); 85–104 (95); 165–176 (171).

**Thorax chaetotaxy.** Scts 6, Ac 15, Dc 12 (n = 1).



**FIGURES 1–10.** Adults of *Rheotanytarsus lamellatus* Reiss. Male: 1—antenna, 2—wing, 3—hypopygium in dorsal view, 4—median volsella, 5—internal view of segment IX (sternapodeme and median tergite bands). Female: 6—antenna, 7—genitalia (ventral view), 8—coxosternapodeme, 9—ventrolateral lobe, 10—dorsomesal lobe. Scale bar = 0.5 mm.



**FIGURES 11–24.** Immatures of *Rheotanytarsus lamellatus* Reiss. Pupa: 11—frontal apotome, 12—thorax, 13—thoracic horn, 14—wing nose, 15—abdomen dorsal (spurs of VIII segment in detail), 16—tergite III, 17—sternite III (ventral lateral seta in detail). Larva: 18—antenna, 19—mandible, 20—premandible, 21—frontoclypeal apotome, 22—mentum, 23—simple seta, 24—seta of abdominal segment.

**TABLE 1.** Length ( $\mu\text{m}$ ) of leg segments and leg ratios of *Rheotanytarsus lamellatus* (Reiss) male ( $n = 4$ ).

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>	LR	BV	SV
p <sub>1</sub>	576–750	290–390	630–880	320–420	190–320	160–260	70–104	1.79–2.44	1.69–2	1.26–1.47
p <sub>2</sub>	460–630	400–490	312–332	100–150	50–110	42–90	45–70	0.54–0.70	3.3–4.68	3.57–4.32
p <sub>3</sub>	700–760	460–600	384–412	216–220	204–170	85–130	63–85	0.50–0.76	2.48–2.8	3.31–5.13

**TABLE 2.** Length ( $\mu\text{m}$ ) of leg segments and leg ratios of *Rheotanytarsus lamellatus* (Reiss) female ( $n = 2$ ).

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>	LR	BV	SV
p <sub>1</sub>	340–680	304–692	392–860	240–436	232–364	224–236	80–118	1.24–1.28	1.63–1.77	1.2–2.51
p <sub>2</sub>	704–716	536–684	312–332	160–168	120–128	88	72–76	0.48–0.58	3.52–3.76	3.97–4.21
p <sub>3</sub>	768–772	600–640	384–412	232–254	192–216	138–208	92–96	0.64–0.66	2.41–2.61	3.42–3.56

**TABLE 3.** Length ( $\mu\text{m}$ ) of leg segments and leg ratios of *Rheotanytarsus meridionalis* (Johannsen) male ( $n = 2$ ).

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>	LR	BV	SV
p <sub>1</sub>	375–775	170–350	1035	450	340	250	120	2.96	0.99	1.09
p <sub>2</sub>	560–765	525–615	27–35	135–235	100–215	60–140	45–80	0.51–0.57	2.58–3.98	3.94–4.02
p <sub>3</sub>	705–750	555–590	285–350	145–240	105–210	60–145	50–75	0.51–0.59	2.52–4.29	3.82–4.42

*Wing.* Length/width 2.86. VR 1.54–1.57 (1.56). Wing setae: brachiolum with 1 seta; Sc bare; R with 18; R<sub>1</sub> with 22; R<sub>4+5</sub> with 53; M bare; M<sub>1+2</sub> with 42; M<sub>3+4</sub> with 28; Cu with 28; Cu<sub>1</sub> with 35; PCu with 56; An with 26 setae ( $n = 1$ ).

*Legs.* Fore tibia with spur 24  $\mu\text{m}$  long; 2 spurs of mid tibial combs unequal in size: 32 and 24 long; 2 spurs of hind tibial combs subequal in size: c. 20 long. Lengths and ratios of leg segments in Table 2.

*Genitalia* (Figs 7–10). Tergite IX with 16 setae. Cercus 62 long. Seminal capsule 50–66 (58) long. Notum 152 (152) long.

**Pupa** ( $n = 9$  except when otherwise stated)

Color brown yellowish. Total length 2320–2728 (2515).

*Cephalothorax.* Length 712–760 (734). Frontal apotome with frontal setae 22–32 (27) long ( $n = 2$ ) (Fig 11). Anteprenotals taeniate 88 long ( $n = 1$ ). Precorneals elongate and taeniate, anterior 164 long; median 168 long; posterior 104 long ( $n = 1$ ).

Two pairs of narrowly taeniate dorsocentrals, Dc<sub>1</sub> and Dc<sub>2</sub> 30 long; Dc<sub>3</sub> 28 long; Dc<sub>4</sub> 24 long ( $n = 1$ ) (Fig 12).

Thoracic horn 344–476 (395)  $\mu\text{m}$  long, with bare basal half, with small spinules on apical half (Fig. 13).

Wing sheath with nose 14–16 (15) long ( $n = 4$ ), as in Fig. 14.

*Abdomen* (Fig. 15). Length 1768–2752 (2202). Tergite I bare. Tergites II–VI each with paired patches of spines. Tergite II with posterior transverse row of hooks medially, about 40–70 (53) long ( $n = 5$ ), weak shagreen present medially. Weak shagreen present anterolaterally on tergites II, III, VIII and IX and caudolaterally on tergites IV, V and VI. Lateral setae: segment II with 3 narrow taeniate setae, III with 1 narrow taeniate seta and 1 broad taeniate seta; IV–VIII with 4 taeniate setae 85–133 (115). Dorsal setae all simple (Fig. 16). Ventral setae all bifid: II with 4, III–VII with 12 and VIII only 4 setae (Fig. 17).

Segment VIII with darkened margins and two caudolateral spurs, smallest spur 16–20 (18) long; largest spur 28–36 (31) long ( $n = 3$ ). Anal lobe fringe with 20–25 taeniate setae.

**Larva** ( $n = 8$  except when otherwise stated)

Fourth instar larva. Color yellowish brown. Total length 2664–2792 (2715). Head capsule 276–308 (291)

long, 200–212 (206) wide.

*Head.* Antenna with 5 segments placed on tall pedestal, as in Fig. 18. Basal antennal segment 84–90 (87) long, 15 (15) wide, distance from base to ring organ 5–8 (7) and to basal mark of seta 48–53 (50); segment II 24–26 (25) long; segment III 6–8 (7) long; segment IV 3–5 (4) long; and segment V 2–4 (3) long. AR 2.05–2.57 (2.31). Blade 20 (n = 1) long, accessory blade 16 long (n = 1), both truncate. Peg sensillum of second segment 4 long, and two subequal Lauterborn organs 4 long, pedicel 8 long (n = 1).

Labrum with fine and simple clypeal seta SIII.

Mandible (Fig 19) 96–100 (98) long, seta subdentalis 46–48 (47) long (n = 2). Premandible and frontoclypeal apotome as in Figs 20 and 21 respectively. Mentum 67–70 (68) wide, 36–42 (39) high (n = 4). Mentum with 11 teeth, with median tooth with notches which may be more or less worn down (Fig. 22). Ventromental plate 68 wide, 20 long, width/length 3.4 (n = 4), number of ventromental plate striations about 88.

*Thoracic segments.* With simple setae (Fig. 23), anterior parapods with single claws.

*Abdominal segments.* With a pair of bifid multibranching setae (Fig. 24). Procercus 8–12 (10), anal setae 148–164 (159). Anal tubuli 40–60 (48).

**Diagnosis and discussion.** Male adults of *Rheotanytarsus lamellatus* can be separated from all other Neotropical species by: 1) short and strongly curved median volsella, 2) median volsella not extending beyond apex of superior volsella [except *R. exiguus* (Johannsen) and *R. kusii* Kyerematen & Andersen], 3) with lamelliform setae fused into a plate [except *R. meridionalis* (Johannsen)] and 4) 4–5 setae arranged in a line between anal tergite bands and anal point. Differing from *R. exiguus* on the presence of spurs on mid and hind tibiae, from *R. kusii* in having an oval superior volsella and from *R. meridionalis* in having a parallel-sided anal point and gonostyli which are gradually tapered.

*R. lamellatus* specimens from Argentina are in general smaller than those reported by Reiss for Chilean specimens.

The pupa of *R. lamellatus* and *R. exiguus* share tergites II–VI with paired anterior patches of spinules, differing on that *R. exiguus* has a weak caudolaterally shagreen only on tergites IV and V and *R. lamellatus* possesses anterolaterally shagreen on tergites II, III, VIII and IX and caudolaterally on tergites IV, V and VI.

Wiedenbrug & Ospina-Torres (2005) in their key to pupae of Tanytarsini from Neotropical region illustrated four morphotypes of *Rheotanytarsus* from Brazil, differing all of them from the species we described in this paper. Roback & Coffman (1983) described a pupa as *Rheotanytarsus* spp from Peru and Bolivia which may be conspecific to *R. lamellatus*, in having tergites II–VI with paired anterior patches of spinules, similar shagreen distribution and bifid ventral setae.

At present, the unique *Rheotanytarsus* pupa from Argentina is *R. globosus* Reiss (1972) and can be distinguished from *R. lamellatus* by having the former anterior paired point-patches on TII–V and segment VIII with 5 taeniate lateral setae.

Only two species are known from larvae in the Neotropical region. The larvae of *Rheotanytarsus lamellatus* differ from those of *R. exiguus* in being smaller; having bifid multibranching setae on abdominal segments, shorter antennae, lower AR, longer distance from base to ring organ as well as from base to basal mark of seta, shorter and more truncate antennal blades, higher ventromental width/length ratio, having a procercus that is shorter than 1/3 length of the anal setae. Cranston (1997) reported all *Rheotanytarsus* larvae from Australia present bifid multibranching setae on abdominal segments, similar to those of *R. lamellatus*.

**Ecology and distribution.** We collected our specimens from mountain streams in subtropical cloud forests. During low water periods, *R. lamellatus* larval density reached 16755 ind/m<sup>2</sup>, while this was reduced to 85 ind/m<sup>2</sup> during high water periods. The difference in larval density denotes an important seasonal variation in this population of *Rheotanytarsus lamellatus*.

***Rheotanytarsus meridionalis* (Johannsen)***Tanytarsus* (*Rheotanytarsus*) *meridionalis* Johannsen, 1938: 222*Rheotanytarsus meridionalis* (Johannsen): Spies & Reiss 1996:73; Kyerematen & Andersen, 2002: 32

**Material examined.** 2 adult males from Jujuy, Ledesma, Zora stream, 23°45'4" S, 64°41'27", 411 m a.s.l., 8.II.2006. E. Tejerina coll. Deposited in IML.

**Description.** *Adult male* (n = 2 except when otherwise stated)

Total length 2872 (n = 1), abdominal length 1536–2080 (1808), thorax length 800 (n = 1), total length/wing length 2130 (n = 1), wing length/profemur 1850–3600 (2725).

Head. Antenna 830–836, AR 0.58–0.59 (0.59). Temporal setae 7. Length of palpomeres 1–4 (fifth palpomere missing): 28, 116, 64, 208 (n = 1).

Wing length 1350–1430 (1390), width 410–420 (415). VR 1.49–1.54 (1.52).

Legs (see table 3). Tibial spur of fore leg 27; 2 spurs of mid tibiae subequal in size 25–37; 2 subequal spurs of hind tibiae 27–37 (n = 2).

Hypopygium. Gonocoxite 102–140 (121), gonostylus 96–124 (110). Median volsella 56, inferior volsella 80, anal point 32 (n = 1).

**Discussion**

*Rheotanytarsus meridionalis* is recorded for the first time from Argentina. The species has only been recorded from Puerto Rico. According to Kyerematen & Andersen (2002), *Rheotanytarsus meridionalis* is similar to *R. hamatus* Sublette & Sasa, but it can be distinguished by having a median volsella with an apical plate. The specimens here reported from Argentina are larger than Puerto Rico specimens but all other characters are identical. *R. meridionalis* can be distinguished from *R. lamellatus* by the characters discussed in the redescription of *R. lamellatus*.

**Key to male adults of *Rheotanytarsus* from South America [emended from Andersen & Kyerematen (2001)]**

1. Median volsella with apical plate, reaching apex of superior volsella or shorter; wing length < 2 mm ..... 2
  - Median volsella straight and slender with apical subulate setae, extends beyond of superior volsella; wing length > 2 mm. Chile, Argentina (Reiss 1972, fig. 11) ..... *Rheotanytarsus globosus* Reiss
2. Median volsella with distal setae fused into a rounded plate ..... 3
  - Median volsella with distal setae fused into a distinct petal-like apical plate. Peru (Andersen & Kyerematen 2001, figs 9–12) ..... *Rheotanytarsus pelus* (Roback)
3. Superior volsella oval, apically rounded or pointed, with 5 or 6 dorsal setae ..... 4
  - Superior volsella subtriangular, with 4 dorsal setae; wing length c. 1.10 mm. Brazil (Andersen & Kyerematen 2001, figs 1–8) ..... *Rheotanytarsus pantanalensis* Andersen & Kyerematen
4. Median volsella reaching apex of superior volsella; superior volsella with 5 dorsal setae, apically rounded; wing length c. 1.40 mm; Puerto Rico, Argentina ..... *Rheotanytarsus meridionalis* (Johannsen)
  - Median volsella never reaching apex of superior volsella; superior volsella with 6 dorsal setae, apically pointed; wing length c. 1.31 mm. Chile, Argentina ..... *Rheotanytarsus lamellatus* Reiss

**Key to pupae of *Rheotanytarsus* from South America [emended from Wiedenbrug & Ospina–Torres (2005)]**

1. Tergites IV–VII with paired fields of dark-colored reticulation; shagreen present on tergites V–VI, absent on tergite VII ..... *Rheotanytarsus* sp. 1 Wiedenbrug & Ospina–Torres

- Tergites IV–VII not as above ..... 2
- 2. Three taeniate lateral setae on segment VIII. .... *Rheotanytarsus* sp. 2 Wiedenbrug & Ospina-Torres
- Lateral setae on segment VIII not as above. .... 3
- 3. Tergites II–VI with paired anterior patches of spinules, bifid ventral setae, segment VIII with darkened margins and two caudolateral spurs. .... *Rheotanytarsus lamellatus* Reiss
- Tergites II–V with paired anterior point patches, segment VIII never as above. .... 4
- 4. Segment VIII with 5 taeniate lateral setae ..... *Rheotanytarsus globosus* Reiss
- Segment VIII with 4 taeniate lateral setae ..... 5
- 5. Tergite II with paired anterior transverse point patches and fine shagreen in the middle of tergite (Wiedenbrug & Ospina-Torres 2005, fig. 5 C) ..... *Rheotanytarsus* sp. 3 Wiedenbrug & Ospina-Torres
- Tergite II with only paired anterior transverse point patches, without fine shagreen in the middle of tergite (Wiedenbrug & Ospina-Torres 2005, fig. 5 I) ..... *Rheotanytarsus* sp. 4 Wiedenbrug & Ospina-Torres

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