



First record of the genus *Paracloeodes* Day (Ephemeroptera: Baetidae) in Uruguay and description of two new species

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Abstract

Eleven species of the genus *Paracloeodes* are recorded from South America. This genus is reported for the first time in Uruguay. Two new species (*P. charrua* and *P. morellii*) are described based on nymphs. A key for all South American species of *Paracloeodes* is included.

Key words: Ephemeroptera, Baetidae, *Paracloeodes*, Uruguay

Introduction

There is little knowledge of the family Baetidae in Uruguay. Only a few species have been described from this area but, in most cases, they are out-of-date descriptions with partial collection data. In the last years the senior author began to collect in this country making available fresh material and new species.

The genus *Paracloeodes* was established in 1955 by Day. It was originally described from USA and Puerto Rico; later the genus was reported in South America and four new species were described by Lugo-Ortiz & McCafferty (1996); more recently Nieto & Salles (2006) described six new species and transferred the monotypic genus *Iguaira* (Type-species: *Iguaira poranga* Salles & Lugo-Ortiz, 2003) to *Paracloeodes*. Eleven species are known in South America, ten of them only from nymphs and one (*P. eurybranchus* Lugo-Ortiz & McCafferty, 1996) is known from nymphs and a female imago. The genus is distributed in South America as follows, Argentina: *P. eurybranchus*; *P. ibicui* Lugo-Ortiz & McCafferty, 1996; *P. yuto* Nieto & Salles, 2006. Bolivia: *P. pacawara* Nieto & Salles, 2006. Brazil: *P. assu* Nieto & Salles, 2006; *P. atroari* Nieto & Salles, 2006; *P. binodulus* Lugo-Ortiz & McCafferty, 1996; *P. eurybranchus*; *P. leptobranchnus* Lugo-Ortiz & McCafferty, 1996; *P. peri* Nieto & Salles, 2006; *P. poranga* (Salles & Lugo-Ortiz); *P. waimiri* Nieto & Salles, 2006; and Paraguay: *P. ibicui* and *P. leptobranchnus*. In this paper the genus *Paracloeodes* is reported for the first time in Uruguay and two new species are described from nymphs. A key is included for all the South American species.

Key to the nymphs of South American species (modified from Nieto & Salles, 2006)

- 1 Thorax with two small tubercles between fore wing pads *P. binodulus*
- Thorax without small tubercles 2
- 2(1) Hind wing pads absent 3
- Hind wing pads present 6
- 3(2) Body with pronotum, mesonotum and abdominal segments II–VII dark, remaining segments whitish, pronotum

	and mesonotum with a longitudinal whitish band, mesonotum with three median whitish spots along midline	<i>P. atroari</i>
-	Body color pattern not as above	4
4(3)	Body color pattern with small brownish spots; tarsal claws 0.5 or less the length of tarsi	5
-	Body color pattern not as above; tarsal claws at least 0.75 times the length of tarsi	<i>P. yuto</i>
5(4)	Abdominal segments with small brownish spots, segments II–III and IX brownish; segment II of labial palpi with strong distomedial projection more than 3 times width of segment III	<i>P. pacawara</i>
-	Abdominal segments II–VII with medial elongate spots (Fig. 13); segment II of labial palpi with distomedial projection 2 times width of segment III (Fig. 20)	<i>P. morelli</i> sp.n.
6(2)	Labrum without a pair of subapical setae near midline	7
-	Labrum with a pair of subapical setae near midline	8
7(6)	Tarsal claws with two rows of minute denticles; maxillary palp at least 2 times the length of galea-lacinia; hypopharynx with lingua apically pointed	<i>P. poranga</i>
-	Tarsal claws with two rows of 5–6 small denticles basally and 3–5 larger denticles distally; maxillary palp 1.5 times the length of galea-lacinia; hypopharynx with lingua apically rounded	<i>P. ibicui</i>
8(6)	Head, apical 2/3 of forewing pads and abdominal segments I, VII–VIII whitish, remainder of body blackish	<i>P. peri</i>
-	Body color pattern variable, never as above	9
9(8)	Frontal keel absent	10
-	Frontal keel present	11
10(9)	Tarsal claws 0.3 times the length of tarsi; posterior margin of abdominal terga with spines as wide as long; nymphs large, body length at least 7 mm.	<i>P. assu</i>
-	Tarsal claws 0.6 times the length of tarsi; posterior margin of abdominal terga with spines 2.0 times wider than long; nymphs small, body length less than 6 mm	<i>P. waimiri</i>
11(9)	Body with pronotum, mesonotum and abdominal segments pale and without a color pattern; maxillary palpi less than 1.5 times the length of galea-lacinia	12
-	Abdominal terga II–IX with three rounded spots, segments V and IX darker than others (Fig. 1); maxillary palpi twice the length of galea-lacinia (Fig. 6)	<i>P. charrua</i> sp. n.
12(11)	Length of nymph 3.9–4.1 mm; gills elongate and slender, weakly tracheated	<i>P. leptobranchus</i>
-	Length of nymph 4.7–5.5 mm; gills broad, main branch of trachea pigmented	<i>P. eurybranchus</i>

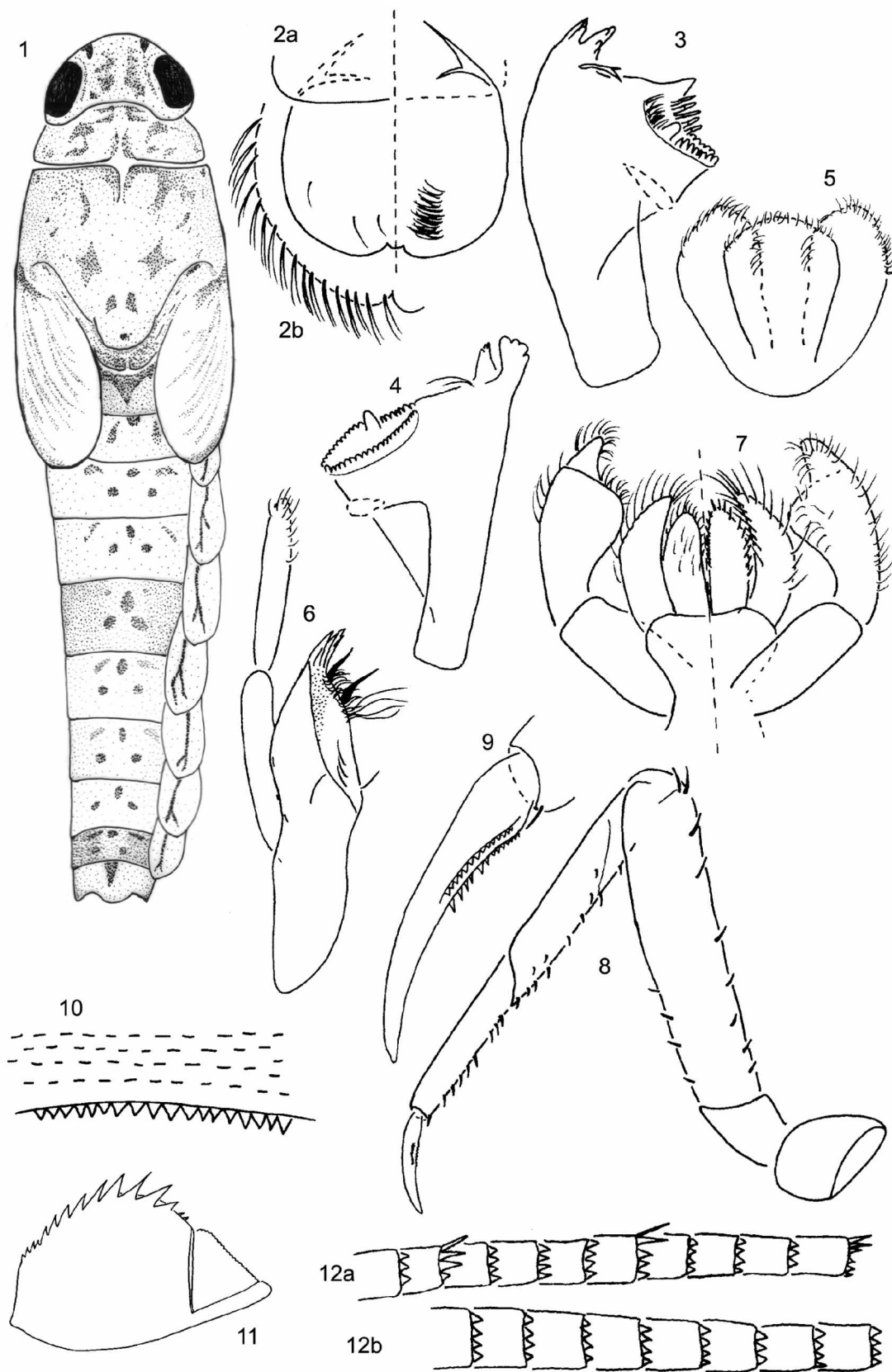
***Paracloeodes charrua* sp. nov.**

(Figs. 1–12)

Nymph. Length: body: 3.8–4.3 mm; cerci 1.8 mm. Antennae long, 2.1 mm, 3.5 times width of the head capsule. General color yellowish brown. Head yellowish brown with a characteristic pattern (Fig. 1). Frontal keel present, ocelli black. Antennae pale yellow. Mouthparts (Figs. 2–7): labrum (Figs. 2 a–b) dorsally with a pair of subapical setae near midline, anterior margin with bifid setae. Mandibles (Figs. 3–4) without setae between prostheca and mola, incisors cleft in two sets, inner set at right angle with outer set. Left mandible (Fig. 3) with molars with constrictions, prostheca with two denticles. Right mandible (Fig. 4) with prostheca slender and bifid. Hypopharynx with lingua shorter than superlinguae and rounded apically. Maxillae (Fig. 6) with palpi two-segmented, twice the length of galea-lacinia. Labium (Fig. 7) with segment II of palpi with rounded projection, 2 times width of segment III, segment III conical.

Thorax yellowish brown, shadowed with brown (Fig. 1). Pleura brownish, sterna pale yellow. Legs (Fig. 8) pale yellow, femora with brownish transverse band apically (more conspicuous in female). Tarsal claws (Fig. 9) 0.5 times the length of tarsi, with 2 rows of small denticles basally and 4–5 denticles increasing in size apically. Hind wing pads present.

Abdomen yellowish brown (Fig. 1). Color pattern: segment II–IX with 3 brownish spots forming a triangle, segment V and IX darker than others. Posterior margin of terga with spines 2 times longer than wide (Fig. 10). Sterna yellowish brown, sternum IX darker than others. Gills whitish, elongate, less than twice the length of each tergum, main branch of trachea pigmented. Paraprocts (Fig. 11) with 10–12 spines apically. Terminal filaments with crown of spines on each segment, cerci with long spines toward the external margin every four segments (Fig. 12).



FIGURES 1–12. *Paracloeodes charrua* sp. n. Nymph. 1, General view. Mouthparts (Figs. 2–7): 2a, labrum, left d.v., right v.v.; 2b, labrum: apical setae; 3, left mandible v.v.; 4, right mandible v.v.; 5 hypopharynx v.v.; 6, maxilla v.v.; 7, labium, left d.v., right v.v.; 8, leg I; 9, tarsal claw I; 10, posterior margin of tergum IV; 11, paraproct; 12, caudal filament detail; 12a, left cercus; 12b, terminal filament.

Adults. Unknown.

Etymology. Charrua: ethnic group that inhabited Uruguay and was exterminated in the middle of the 19th Century. We dedicate this species to their memory.

Discussion. This species can be distinguished from the other species of the genus by the following combination of characters: 1) frontal keel present; 2) antennae long, 3.5 times width of head capsule; 3) maxillae with palpi twice the length of galea-lacinia (Fig. 6); 4) segment II of labial palpi with rounded projection, 2 times width of segment III (Fig. 7); 5) tarsal claws 0.5 times the length of tarsi with two rows of small denticles basally and 4–5 denticles increasing in size apically (Figs. 8–9); 6) hind wing pads present; 7) abdomen with a characteristic color pattern: segment II–IX with 3 brownish spots forming a triangle (Fig. 1); 8) posterior margin of terga with spines twice longer than wide; 9) paraprocts with 10–12 spines apically; 10) cerci with long spines toward the external margin every four segments (Fig. 12).

Material. Holotype, female nymph: URUGUAY, Depto. Cerro Largo, Arroyo Otazo, ruta 8, km 335, S 32°50'00'', W 54°14'55'', 123 m. 20/02/2008, Emmerich & Molineri cols. Paratypes: 4 nymphs same data (mouthparts, legs and paraprocts of one nymph mounted on slides); 4 nymphs: Depto. Rivera, Tranqueras, ruta 30, km 251, Río Tacuarembó, S 31°10'40'', W 55°45'44'', 147 m, 19/02/2008, same collectors; 5 nymphs: Depto. Tacuarembó, ruta 5, km 379, A° Tranqueras, S 31°47'29'', W 55°58'51'', 124 m, 22/02/2008, same collectors; 3 nymphs: Dpto Soriano, ruta 21, km 339, A° Las Maulas, S 33° 23' 32'', W 58° 07' 02'', 16 m, 6/03/08, Emmerich & Pérez cols.; 11 nymphs: Dpto Paysandú, "Predio", A° Grande, S 32° 39' 34.2'', W 57° 14' 56.7'', 9/08/07, Morelli col. The holotype is deposited in the Museo de la Universidad de la República, Montevideo Uruguay (MUR), paratypes are deposited in Instituto Miguel Lillo, Tucumán, Argentina (IML).

***Paracloeodes morellii* sp. nov.**

(Figs. 13–25)

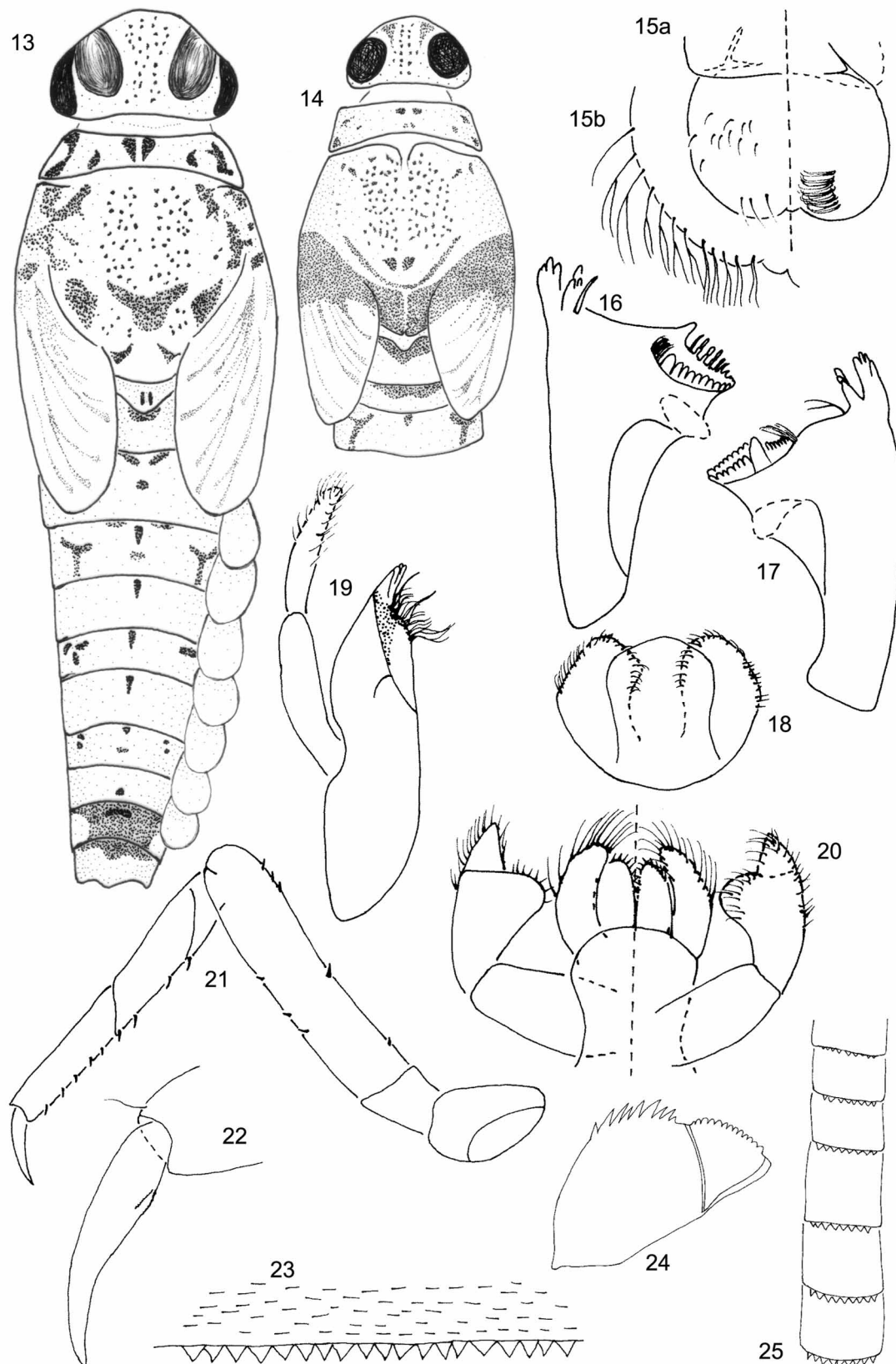
Nymph. Length: body: 2.8–3.3 mm; cerci 1.0–1.3 mm. Antennae 0.7–0.8 mm, 1.5 times the head capsule. General color brownish orange. Head orange brown, with small brownish spots as in Figs. 13–14. Frontal keel present, ocelli brownish. Antennae: scape and pedicel pale yellow, flagellum pale. Mouthparts (Figs. 15–20): labrum (Figs. 15 a–b) dorsally with 2–3 subapical setae near midline, anterior margin with bifid setae. Mandibles (Figs. 16–17) without setae between prosthema and mola, incisors cleft in two sets, inner set at right angle with outer set. Left mandible (Fig. 16) with molars with constrictions, prosthema broad with 1–2 denticles. Right mandible (Fig. 17) with prosthema bifid. Hypopharynx (Fig. 18) with lingua subequal to superlinguae and rounded apically. Maxillae (Fig. 19) with palpi two segmented, 1.5 times the length of galea-lacinia. Labium (Fig. 20) with segment II of palpi with rounded projection, 2 times width of segment III, segment III conical.

Thorax (Fig. 13) orange brown. Pronotum with a pair of brownish spots in the midline. Mesonotum shadowed with brown and with small brownish spots. Metanotum brownish. Pleura reddish brown, sterna whitish. Legs (Fig. 21) pale yellow. Tarsal claws 0.4 times the length of tarsi, with 2 rows of minute denticles (Fig. 22). Hind wing pads absent. Female (Fig. 14) paler than male and with a brown band in metanotum and anterior portion of fore wing pads.

Abdomen orange brown. Color pattern: segment II–VII with medial elongate spot as in Fig. 13, segment IX brownish. Posterior margin of terga with spines as long as wide (Fig. 23). Sterna pale yellow, sternum IX brownish except at lateral sides. Gills whitish, translucent, oblong, 1.5 times the length of each tergum. Paraprocts (Fig. 24) with 8–10 spines apically. Terminal filaments pale yellow, with crown of small spines on each segment (Fig. 25).

Adults. Unknown.

Etymology. This species is dedicated to Dr. Enrique Morelli, entomologist of Universidad de la República (Uruguay) who continually stimulates the study of the aquatic insects of Uruguay.



FIGURES 13–25. *Paracloeodes morellii* sp. n. Nymph. 13, Male general view; 14, female head and thorax. Mouthparts (Figs. 15–20): 15a, labrum, left d.v., right v.v.; 15b labrum: apical setae; 16, left mandible v.v.; 17, right mandible v.v.; 18, hypopharynx v.v.; 19, maxilla v.v.; 20, labium, left d.v., right v.v.; 21, leg I; 22, tarsal claw I; 23, posterior margin of tergum IV; 24, paraproct; 25, detail of cercus.

Discussion. This species can be distinguished from the other species of the genus by the following combination of characters: 1) frontal keel present; 2) antennae short, 1.5 times the head capsule; 3) segment II of labial palpi with rounded projection, 2 times width of segment III (Fig. 20); 4) tarsal claws with two rows of minute denticles (Fig. 22); 5) hind wing pads absent; 6) general color pattern with head and thorax with small spots, abdomen with segment II–VII with medial elongate spot as in Fig. 13; 7) posterior margin of terga with spines as long as wide (Fig. 23); 8) paraprocts with 8–10 spines apically (Fig. 24); 9) terminal filament with crown of small spines on each segment (Fig. 25).

Material. Holotype, male nymph: URUGUAY, Deptos. Rivera-Tacuarembó, R 44, km 26.5, A° Carpintería, S 31°48'28'', W 55°13'09'', 121 m, 20/02/2008, Emmerich & Molineri col. Paratypes: 5 nymphs same data (mouthparts, legs and paraprocts of 1 nymph mounted on slide); 1 nymph (parts on slide Depto. Durazno, Sarandí del Yi, Río Yi, S 33°20'41'', W 55°37'07'', 132 m, 21/02/2008, same collectors); 2 nymphs (1 on slide): Depto. Cerro Largo, ruta 8, km 335, A° Otazo, S 32°50'00'', W 54°14'55'', 123 m, 20/02/2008, Same collectors. The holotype and 1 paratype female are deposited in the Museo de la Universidad de la República, Montevideo, Uruguay (MUR); remaining paratypes are housed in Instituto Miguel Lillo, Tucumán, Argentina (IML).

Acknowledgements

The first author is very grateful to Carlos Molineri and Santiago Pérez for their assistance in the field work. We want to thank E. Domínguez for reading the manuscript. Financial support from the Argentine National Council of Scientific and Technological Research (CONICET) to which one of the authors belongs, is acknowledged. This research was partially supported by the following grants: FONCyT 524/ 2007 and 528/ 2007.

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