



New host records for Anenterotrematidae, Lecithodendriidae and Urotrematidae trematodes in bats from Argentina, with redescription of *Anenterotrema liliputianum*

Nuevos registros de trematodos Anenterotrematidae, Lecitodendriidae y Urotrematidae en murciélagos de Argentina y redescrición de *Anenterotrema liliputianum*

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Abstract. *Anenterotrema liliputianum* (Travassos, 1928) (Anenterotrematidae) is redescribed based on the type specimens from *Molossus molossus* (Pallas) and *Phyllostomus elongatus* (Geoffroy) from Brazil, and also on new specimens collected from the Dwarf Dog-faced Bat, *Molossops temminckii* (Burmeister) (Molossidae) in Argentina. In addition, we report the finding of *Gymnoacetabulum talaveraensis* (Lunaschi, 2002), *Ochoterenatrema labda* Caballero, 1943 (Lecithodendriidae), and *Urotrema scabridum* Braum, 1900 (Urotrematidae) parasitizing Vespertilionidae and Molossidae bats from Buenos Aires and Misiones provinces, and measurements, prevalence, and mean intensity for these trematodes are provided. In addition, the host spectrum and distribution for *A. liliputianum* and *O. labda* is increased, and *U. scabridum* is recorded for the first time parasitizing bats in Argentina.

Key words: Trematoda, bats, *Anenterotrema liliputianum*, *Gymnoacetabulum talaveraensis*, *Ochoterenatrema labda*, *Urotrema scabridum*, Argentina.

Resumen. Se re-describe *Anenterotrema liliputianum* (Travassos, 1928) (Anenterotrematidae) a partir de ejemplares tipo depositados en el Instituto Oswaldo Cruz recolectados de *Molossus molossus* (Pallas) y *Phyllostomus elongatus* (Geoffroy) de Brasil y de ejemplares hallados parasitando al moloso pigmeo *Molossops temminckii* (Burmeister) (Molossidae) en Argentina. Se registra además, el hallazgo de *Gymnoacetabulum talaveraensis* (Lunaschi, 2002), *Ochoterenatrema labda* Caballero, 1943 (Lecithodendriidae) y *Urotrema scabridum* Braum, 1900 (Urotrematidae) parasitando a murciélagos Vespertilionidae y Molossidae de las provincias de Buenos Aires y Misiones. Se proporcionan las medidas, prevalencia e intensidad media para estos digéneos. Además, se amplía el registro de hospedadores y localidades para *A. liliputianum* y *O. labda* y se encuentra por primera vez *U. scabridum* como parásito de quirópteros en la Argentina.

Palabras clave: Trematoda, murciélagos, *Anenterotrema liliputianum*, *Gymnoacetabulum talaveraensis*, *Ochoterenatrema labda*, *Urotrema scabridum*, Argentina.

Introduction

Reports on the digenean trematodes parasitizing bats from the Neotropical Region are well documented by Caballero (1940; 1960), Pérez-Ponce de León et al. (1996) and Guzmán-Cornejo et al. (2003) from Mexico; Bärtschi (2002) from Belize; Thatcher (1982), Castiblanco and Vélez (1982), Vélez and Thatcher (1990), Caro et al. (2003) from Colombia; Travassos (1928), Travassos et al. (1969), Foster and Mertins (1996), Portes Santos and Gibson (1998) from Brazil; Marshall and Miller (1979)

from Ecuador; Caballero (1964), Caballero and Brenes (1957) from Costa Rica; Pérez Viguera (1940), Dubois (1960), Odening (1973), Zdzitowiecki and Rutkowska (1980) from Cuba; Caballero (1960) from Honduras; Thatcher (1982) from Panama; Lent et al. (1945), Vaucher (1981), Caballero (1964) from Paraguay; Dubois (1983) from Perú, and finally, by Mañé-Garzón and Telias (1965), Mañé-Garzón and González (1976) from Uruguay.

In Argentina more than 60 species of bats pertaining to 4 families have been recorded (Barquez et al., 2006), but only 3 species of bats, *Myotis nigrigans* (Schinz), *Myotis levis* (Geoffroy) (Vespertilionidae), and *Tadarida brasiliensis* (Geoffroy) (Molossidae) were recorded

as hosts of trematodes from Lecithodendriidae and Topsiturvitrematidae (Lunaschi 2002a; 2004; 2006; Lunaschi et al., 2003).

The taxonomy of some trematode species belonging to Lecithodendriidae and Anenterotrematidae is confusing because they have been incompletely described, type specimens have been lost, or the species have been synonymized without studying the type material. For instance, *Prosthodendrium paeminosum* Caballero, 1943 was synonymized with *P. naviculum* Macy, 1936, and later with *Ochoterenatrema labda* Caballero, 1943 (Dubois, 1955; Lunaschi, 2002b); *Edcaballerotrema* Freitas, 1960 was considered synonym of *Anenterotrema* Stunkard, 1938 (Caballero, 1960; Portes Santos and Gibson, 1998). Lunaschi (2002a; 2002b; 2004) and Lunaschi et al. (2003) re-described and synonymized species of Lecithodendriidae based on the re-examination of type material and new specimens recovered from bats in Argentina.

Continuing with the surveys on parasites from Chiroptera, several species of bats were collected in Buenos Aires and Misiones provinces, Argentina. In this paper we report the species of digeneans found during these collections, and re-describe *Anenterotrema liliputianum* (Travassos, 1928) (Anenterotrematidae).

Materials and methods

During January 1995, Dr. Carola Sutton from Museo de La Plata (MLP) trapped 8 *Tadarida brasiliensis* and 32 *M. levis* on Isla Talavera, Zárate, Buenos Aires province. In August 1999 and May 2000, the authors collected 43 *T. brasiliensis* and 8 *M. levis* at Estancia San Pedro, Castelli, 8 *T. brasiliensis* in La Plata city, and 8 *T. brasiliensis* at González Chaves, Buenos Aires province. Bats were caught using a mist net. We also trapped 1 specimen of *Eumops bonariensis* (Peters) and 2 *Molossops temminckii* (Burmeister) (Molossidae) in May 1997 and September 1999, respectively, in the Reserva Valle del Arroyo Cuñá Pirú, Cainguás, Misiones province. These specimens were hand-caught while rooting within pipes of a bridge. Bats were killed with ether and dissected. Trematodes were recovered from the intestine, fixed in warm formalin, and flattened. They were stained with 1:6 dilutions in 96° ethanol of hydrochloric carmine, dehydrated and mounted in Canada balsam. Measurements are given in micrometers (μm), and ranges are followed by means in parentheses. Drawings were made with the aid of a drawing tube. For comparative purposes, we also studied specimens of *A. liliputianum* from the Helminthological Collection of the Instituto Oswaldo Cruz (CHIOC). Bats from Isla Talavera were identified to the species level

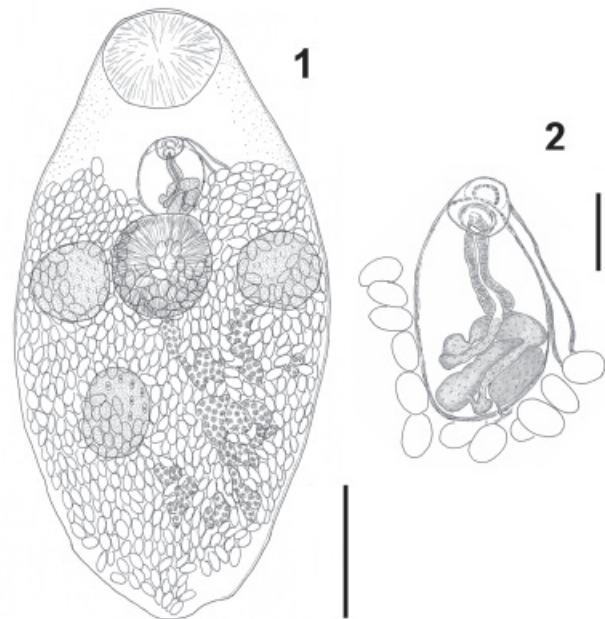
by François Baud and deposited at the Département de Mammalogie et Ornithologie of the Muséum d'Histoire Naturelle of Genève (MHNG), France. The remaining bats were identified by Mariano Merino of the Museo de La Plata, Argentina, and deposited in the Mammal Collection there (CMMLP). Hosts are numbered as follow: CMMLP corresponds to the Mammal Collection of the Museo de La Plata; CHBS and "sp. 1 to 8" correspond to field numbers from Bahía de Samborombón; and CHLP to field number from La Plata. For the systematic of the host we followed Wilson and Reeder (2005). Specimens of parasites were deposited in the Helminthological Collections of the Museo de La Plata (MLP).

Descriptions

Family Anenterotrematidae

Anenterotrema liliputianum (Travassos, 1928) Caballero, 1964 Table 1. (Figs. 1-2)

Redescription. Body elongate-oval, minute. Tegument smooth. Oral sucker subterminal, without lateral papiliform projections. Ventral sucker in the anterior half of the body, of similar size as the oral sucker. Pharynx and intestinal caeca absent. Genital pore median in middle



Figures 1-2. *Anenterotrema liliputianum* (Travassos, 1928) Caballero, 1964. 1, specimen from *Phyllostomus elongatus* (CHIOC N° 28215), ventral view. Scale bar: 200 μm . 2, enlarged ventral view of terminal genitalia. Scale bar: 50 μm . Abbreviations: c- cirrus, cp- cirrus pouch, e- egg, ga- genital atrium, gp- genital pore, m- metraterm, sv- seminal vesicle.

half of forebody. Genital atrium slightly deepened. Cirrus pouch lies close to the anterior margin of the ventral sucker, and contains folded and elongated seminal vesicle, wide pars prostatica, and cirrus (see Fig. 2). Testis lateral, symmetrical, and posterior or at the level of the ventral sucker. Ovary median or submedian, posterior to ventral sucker (Fig. 1). Seminal receptacle present. Vitellarium follicular, extending posteriorly to left testis; great follicles in 1 lateral field, irregularly placed between uterine coils. Uterus occupying the hindbody, reaching the level of the cirrus pouch in the forebody. Metraterm large. Eggs numerous, operculate, with bright yellow coloration. Excretory vesicle not seen.

Taxonomic summary

Material studied: *Edcaballerotrema liliputianum* (Travassos, 1928) Freitas, 1961 from *Molossus molossus* (Pallas) (Molosidae) (originally cited as *Molossus major crassicaudatus*) CHIOC N° 28208; and from *Phyllostomus elongatus* (Geoffroy) (Phyllostomidae) CHIOC N°

28214; 28215. Material identified as *Anenterotrema eduardocaballeroi* (Freitas 1960) Caballero 1960 from *Molossus rufus* Geoffroy CHIOC N° 28004, 28005 a-c, 28006 a-c

Site of infection: intestine.

Locality: Recife, Pernambuco and Serra do Tinguá, RJ, Brazil.

Other hosts: *Molossops temminckii* (Burmeister) (Molosidae) CMMLP31.XII.02.76

Site of infection: intestine.

Locality: Reserva Valle del Arroyo Cuñá Pirú (27°05'15'' S; 54°57'09'' W), Cainguás, Misiones.

Prevalence, intensity: 1 of 2; 15 worms

Voucher specimens deposited: MLP 5598

Remarks

Table 1 gives measurements based on 15 specimens from *P. elongatus*, 3 specimens from *M. molossus*, 38 specimens from *M. rufus*, and 11 specimens from *Molossops temmincki*.

Table 1. Measurements of *Anenterotrema liliputianum* based on material deposited in the Helminthological Collection Instituto Oswaldo Cruz CHIOC from Brazil and collected in the present study

Locality	Serra do Tinguá, Rio do Janeiro, Brazil		Recife, Pernambuco, Brazil
Host	<i>Molossus rufus</i>		<i>Molossus molossus</i>
Body length	361-998 (732)		437-608 (542)
Body width	276-495 (371)		266-361 (306)
Oral sucker	133-152 x 105-199 (138 x 138)		77-133 x 102-143 (107 x 117)
Ventral sucker	114-181 x 114-219 (138 x 176)		114-173 x 114-154 (143 x 134)
Sucker ratio	0.9-1.4 (1.3)		1.0-1.5 (1.25)
Cirrus pouch	25-166 x 14-97 (90 x 58)		93-104 x 70-83 (98 x 75)
Right testis	70-128 x 74-125 (106 x 86)		102-117 x 74-96 (107 x 85)
Left testis	99-166 x 96-105 (128 x 67)		80-97 x 80-97 (88 x 86)
Ovary	48-95 x 48-105 (77 x 74)		54-80 x 54-74 (67 x 63)
Eggs	21-30 x 16-21 (26 x 15)		23-30 x 14-18 (27 x 16)
N° specimens	CHIOC 28004, 28005, 28006		CHIOC 28208
			<i>Phyllostomus elongatus</i>
			390-903 (751)
			310-542 (392)
			96-171 x 109-162 (131 x 132)
			81-275 x 104-275 (148 x 147)
			1.0- 1.2 (1.1)
			93-152 x 70-106 (123 x 87)
			110-147 x 102-127 (125 x 115)
			108- 141 x 81-128 (130 x 111)
			93-127 x 80-97 (108 x 91)
			25-30 x 14-18 (28 x 16)
			CHIOC 28214, 28215

Locality	Cainguás, Misiones, Argentina
Host	<i>Molossops temmincki</i>
Body length	306-614 (455)
Body width	192-278 (230)
Oral sucker	92-144 x 92-125 (123 x 110)
Ventral sucker	103-126 x 103-154 (118 x 135)
Sucker ratio	0.7-0.9 (0.8)
Cirrus pouch	67-92 x 45-72 (81 x 61)
Right testis	39-58 x 36-55 (50 x 48)
Left testis	43-74 x 42-54 (52 x 48)
Ovary	36-60 x 49-63 (46 x 57)
Eggs	20-28 x 12-19 (25 x 15)
N° specimens	MLP 5598

A brief description of the genus *Anenterotrema* Stunkard, 1938 was given by Portes Santos and Gibson (1998). This genus comprises 6 species, 1 of which, *A. liliputianum* was originally described by Travassos (1928) as *Paralecithodendrium liliputianum* Travassos, from the intestine of *Peropteryx macrotis* (Wagner) (Emballonuridae) (cited as *Peropteryx canina*, latter assigned to Molossidae sp.cf. Freitas, 1961) from Angra dos Reis, RJ, Brazil, including it between the lecithodendriids. Travassos (1928) could not observe the vitellarium. Freitas (1961) redescribed and transferred *P. liliputianum* to the genus *Edcaballerotrema*, as *E. liliputianum* (Travassos, 1928), on the basis of the type specimens. Later, Freitas

and Dobbin (1962) reported this species from *M. molossus* and from *P. elongatus* in Brazil. However, these authors could not clarify the position of the vitellarium, which was established by Yamaguti (1971), as posterior to the left testis plus a compact vitelline reservoir. Thus, he transferred these specimens to the genus *Anenterotrema* (Anenterotrematidae). Finally, Portes Santos and Gibson (1998) examined the holotype (CHIOC 33.657) and concluded that it is not possible to see the vitellarium due to the large number of eggs in the uterus. The specimens studied herein (CHIOC 28004, 28005 a-c, 28006 a-c, 28208, 28214, 28215, plus our specimens) confirm the position of the vitellarium as Yamaguti (1971) stated. With this finding, we increase the number of host species and its distribution, recording it for the first time in Argentina.

Family Lecithodendriidae

Gymnoacetabulum talaveraensis (Lunaschi, 2002)
Lunaschi, 2007

In Table 2 are given the measurements based on 3 specimens.

Taxonomic summary

Hosts: *Tadarida brasiliensis* (Geoffroy) (Molossidae) N° CHBS 001-025; 028; 029; 034-048; *Myotis levis* (Geoffroy) (Vespertilionidae) N° sp.1-8.

Site of infection: intestine. Coparasitism with *O. labda*.

Locality: Estancia San Pedro (36°1' S; 57°26' W), Castelli, Buenos Aires

Prevalence and mean intensity: from *T. brasiliensis* 34.8 % (15 of 43), 31.93 (11– 66) parasites; from *M. levis* 12.5% (1 of 8), 20 parasite, respectively.

Specimens deposited: Vials MLP 5599/1 to 5603/1, 5605/1, 5607/1 – 5609/1, 5611/1 – 5613/1 and 5615/1; slide 5620/1.

Remarks

Lunaschi (2002a) originally described this species as *Suttonia talaveraensis*; recently was transferred by Lunaschi (2007) [in Lunaschi and Drago (2007)] to *Gymnoacetabulum talaveraensis* (Lunaschi, 2002) because the generic name was preoccupied. As the author stated, this species display a genito-acetabular pouch more complex than those presented in the genera *Sturniratrema* Vélez and Thatcher, 1990 and *Chiropterotrema* Vélez and Thatcher, 1990. Herein, we found these digeneans parasitizing the same host species as the original publication. Estancia San Pedro is located 200 kilometers south to the type locality, Isla Talavera, and both localities are constituted by wetlands, near Rio de la Plata.

Ochoterenatrema labda Caballero, 1943

In Table 2 are given the measurements based on 28 specimens.

Taxonomic summary

Hosts: *Tadarida brasiliensis* (Geoffroy) (Molossidae) N° CHBS 001 to 025; 028; 029; 034 to 048; CHLP 024;

Table 2. Measurements of *Gymnoacetabulum talaveraensis*, *Ochoterenatrema labda* and *Urotrema scabridum* from bats found in different localities from Buenos Aires and Misiones provinces

	<i>Gymnoacetabulum talaveraensis</i>	<i>Ochoterenatrema labda</i>	<i>Urotrema scabridum</i>
Body length	393-633 (474)	399-836 (625)	1.7-2.5 (2.1) mm
Body width	369-576 (461)	256-722 (474)	360-450 (412)
Oral sucker	64-67 x 64-81 (65 x 70)	61-102 x 35-131 (81 x 97)	133-142 x 123-142 (136 x 130)
Ventral sucker	53-61 x 59-68 (58 x 62)	45-149 x 35-144 (97 x 100)	128-144 x 134-152 (138 x 145)
Sucker width ratio	1.08-1.2 (1.16)	0.85-1.14 (0.98)	1.06-1.24 (1.12)
Sucker length ratio	1.03-1.25 (1.12)	-	-
Esophagus	-	-	204 (165-256)
Pharynx	43-50 x 40-55 (47 x 46)	19-64 x 19-57 (37 x 39)	58-76 x 51-61 (68 x 56)
Cirrus pouch	93-190 x 68-183 (128 x 129)	67-128 x 70-128 (93 x 105)	163-355 x 51-154 (259 x 103)
Right testis	74-155 x 69-159 (104 x 112)	74-161 x 80-150 (102 x 100)	-
Left testis	71-155 x 69-174 (101 x 121)	80-150 x 80-156 (103 x 104)	-
Anterior testis	-	-	128-323 x 134-285 (245 x 222)
Posterior testis	-	-	112-351 x 122-323 (256 x 250)
Ovary	57-119 x 48-81 (84 x 59)	74-147 x 80-154 (95 x 101)	154-218 x 112-209 (190 x 173)
Eggs	16.6-21.4 x 11.4-12.6 (18.7 x 12)	18-22 x 9-13 (20 x 11)	21-22 x 10-13
Hosts species	<i>Tadarida brasiliensis</i> <i>Myotis levis</i>	<i>Tadarida brasiliensis</i> <i>Myotis levis</i>	<i>Tadarida brasiliensis</i> <i>Myotis levis</i> <i>Molossops temminckii</i> <i>Eumops bonariensis</i>

Myotis levis (Geoffroy) (Vespertilionidae) N° sp.1 to 8.
Site of infection: intestine, anterior portion; coparasitism with *G. talaveraensis*.
Localities: Isla Talavera (34°06' S; 59°04' W); González Chaves (37°54'33'' S; 60°16'20'' W); Estancia San Pedro (36°01' S; 57°26' W), Castelli; La Plata city (34°55' S; 57°59' W) (Buenos Aires, Argentina).
Specimens deposited: from *T. brasiliensis*, Isla Talavera: slide MLP 4859; from *M. levis*, Isla Talavera: slides MLP 4860 to 4863/1; from *M. levis*, Estancia San Pedro: vials MLP 5618, 5619/2, 5621/2; *T. brasiliensis*, La Plata: vials MLP 5599/2 to 5616/2.

Remarks

In Table 3, the prevalence and mean intensity are detailed. This species was originally described from *T. brasiliensis* and *Natalus stramineus* Gray, 1838 (Natalidae) (cited as *Natalus mexicanus* Miller) from Mexico (Caballero 1943a). *Ochoterenatrema labda* has also been reported parasitizing bat species from the USA, Mexico, Colombia, and Panama, mainly in North and Central America (Caballero, 1943b, 1960, 1964; Cain, 1966; Foster and Mertins, 1996; Castiblanco and Vélez, 1982; Guzmán-Cornejo et al., 2003; Nahhas et al., 2005). Herein, we present the first record of *O. labda* in Argentina, and *M. levis* represents a new host record.

Lunaschi (2002b) redescribed *O. labda* based on the type material of Caballero from Mexico, clarifying the synonymies. Specimens are characterized by a pseudogonotyl and pretesticular vitellaria (Cain, 1966). The pseudogonotyl had been interpreted as a conspicuous poral area, with a developed sexual pore located at the left of the ventral sucker. Cain (1966) described the pseudogonotyl very well in specimens from *T. brasiliensis mexicana* (Saussure) from New Mexico-USA, and he observed the same structure in specimens loaned by Caballero from Mexico. Because of the pseudogonotyl is difficult to observe, several authors have included specimens belonging to *Ochoterenatrema* in other genera [e.g.: *Prosthodendrium cordiforme* Caballero and Brenes,

1957 was transferred to *O. diminutum* by Dubois (1960); *P. travassosi* Macy, 1938 to *O. travassosi* by Lotz and Font (1983); *P. paeminosum* to *O. labda* by Lunaschi (2002b)]. Morphology and measurements of the present specimens are in agreed with those studied by Lunaschi (2002b) from Mexico. Despite *O. labda* parasitizing several host species and display a large geographic distribution, its morphology and dimensions are very constant.

Family Urotrematidae

***Urotrema scabridum* Braum, 1900**

In Table 2 are given the measurements based on 8 specimens.

Taxonomic summary

Hosts: *Myotis levis* (Geoffroy) (Vespertilionidae) N° sp.2; sp.8; *Molossops temminckii* (Burmeister) CMMLP31. XII.02.76; *Eumops bonariensis* (Peters) CMMLP 02.IX.97.01; and *Tadarida brasiliensis* (Geoffroy) (Molossidae).

Site of infection: intestine. Coparasitism with *A. liliputianum* on *M. temminckii*.

Localities: Isla Talavera (34°06' S; 59°04' W); González Chaves (37°54'33'' S; 60°16'20'' W); Estancia San Pedro (36°01' S; 57°26' W), Buenos Aires; and Reserva Valle del Arroyo Cuñá Pirú (27°05'15'' S; 54°57'09'' W), Cainguás, Misiones, Argentina.

Specimens deposited: from *M. levis*, Isla Talavera: slides MLP 4863/2, 4864; González Chaves: MLP 4867; Castelli: slides MLP 5617, 5619/3, 5620/3, 5621/3; from *M. temminckii*: slide MLP 4865; from *E. bonariensis*: slide MLP 4866.

Remarks

In Table 4 prevalence and mean intensity are detailed for *Urotrema scabridum*. This is a well-known species, frequently found in different bats from America (Braun, 1900; Chandler, 1938; Pérez Viguera, 1940; Lamothe-Argumedo et al., 1997; Castiblanco and Vélez, 1982; Caro et al., 2003, among others). It has been also found

Table 3. Prevalence (P) and Mean Intensity (MI) of *Ochoterenatrema labda* from 2 species of bats from different localities of the Buenos Aires province

<i>Host species</i>	<i>Locality</i>	<i>P</i>	<i>MI</i>
<i>Tadarida brasiliensis</i>	Isla Talavera, Zárate	12.5 % (1 of 8)	6
	Estancia San Pedro, Castelli	65.1% (28 of 43)	34 (3-100)
	La Plata city	12.5% (1 of 8)	10
	González Chaves	33.3% (2 of 6)	5 (4-6)
<i>Myotis levis</i>	Isla Talavera, Zárate	15.6% (5 of 32)	8 (2-22)
	Estancia San Pedro, Castelli	50% (4 of 8)	10 (4-15)

Table 4. Prevalence (P) and Mean Intensity (MI) of *Urotrema scabridum* from 4 species of bats in different localities of Buenos Aires and Misiones provinces

Host species	Locality	P	MI
<i>Myotis levis</i>	Isla Talavera, Zárate	6.5% (2 of 32)	1.5 (1-2)
	Estancia San Pedro, Castelli	37.5% (3 of 8)	2 (2-3)
<i>Tadarida brasiliensis</i>	González Chaves	16.7% (1 of 6)	1
<i>Molossops temminckii</i>	Reserva Valle del Arroyo Cuñá Pirú, Misiones	50% (1 of 2)	2 (1)
<i>Eumops bonariensis</i>	Reserva Valle del Arroyo Cuñá Pirú, Misiones	1 of 1	1

parasitizing rodents from USA (Price, 1931; Penner, 1941) and Uruguay (Mañé-Garzón and Telias, 1965; Sutton and Lunaschi, 1990); in Argentina, Sutton and Lunaschi (1990) recorded this species in *Holochilus brasiliensis vulpinus* (Brants) (Rodentia). Hence, this is the first report of *U. scabridum* in bats from this country.

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