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New Records of Bat Ectoparasites (Diptera, Hemiptera and Siphonaptera) from Northern Argentina

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Nuevos Registros de Insectos Ectoparásitos de Murciélagos (Diptera, Hemiptera y Siphonaptera) del Norte de la Argentina

RESUMEN - Se agregan nuevas especies de insectos ectoparásitos de murciélagos a la fauna de Argentina y se extiende los límites de distribución de otras, mediante ejemplares colectados de 21 especies de murciélagos. Se reportan novedades distribucionales para 23 especies de ectoparásitos de las cuáles 17 pertenecen al Orden Diptera [14 Streblidae: *Anastrebla caudiferae* Wenzel, *Anatrichobius scorzai* Wenzel, *Aspidoptera phyllostomatis* (Perty), *Megistopoda aranea* (Coquillett), *M. proxima* (Sèguy), *Metelasmus pseudopterus* Coquillett, *Noctiliostrebla aitkeni* Wenzel, *N. dubia* (Rudow), *Paradyschiria fusca* Speiser, *Paradyschiria* sp., *Strebla chrotopteri* Wenzel, *Strebla diaemi* Wenzel, *Trichobius parasiticus* Gervais y *Xenotrichobius noctilionis* Wenzel, y tres Nycteribiidae: *Basilia carteri* Scott, *B. plaumanni* Scott y *B. neamericana* Schuurmans Stethoven (Jr)], tres pertenencen al Orden Siphonaptera [un Ischnopsyllidae: *Myodopsylla isidori* (Weyenbergh), un Tungidae: *Rhynchopsyllus pulex* Haller y un Stephanocircidae: *Craneopsylla m. minerva* (Rothschild)] y tres al Orden Hemiptera [dos Polyctenidae: *Hesperoctenes fumarius* (Westwood) y *H. vicinus* Jordan, y un Cimicidae: *Latrocimex spectans* Lent]. Algunos registros son nuevos para Argentina, mientras que otros son nuevos para las provincias de Corrientes, Chaco, Entre Ríos, Jujuy, Misiones y Salta. Además se registran nuevas asociaciones hospedador-ectoparásito.

PALABRAS CLAVE: Chiroptera, relación parásito-hospedador, insecto, taxonomía, distribución

ABSTRACT - New species of bat-ectoparasite insects are added to the fauna of Argentina and distributional limits are extended for others, based on information obtained from 21 species of bats collected. New data is reported for the distribution of 23 species of bat ectoparasites, of which 17 belong to the Order Diptera [14 Streblidae: *Anastrebla caudiferae* Wenzel, *Anatrichobius scorzai* Wenzel, *Aspidoptera phyllostomatis* (Perty), *Megistopoda aranea* (Coquillett), *M. proxima* (Sèguy), *Metelasmus pseudopterus* Coquillett, *Noctiliostrebla aitkeni* Wenzel, *N. dubia* (Rudow), *Paradyschiria fusca* Speiser, *Paradyschiria* sp., *Strebla chrotopteri* Wenzel, *Strebla diaemi* Wenzel, *Trichobius parasiticus* Gervais y *Xenotrichobius noctilionis* Wenzel, and three Nycteribiidae: *Basilia carteri* Scott, *B. plaumanni* Scott y *B. neamericana* Schuurmans Stekhoven (Jr)], three belong to the Order Siphonaptera [one Ischnopsyllidae: *Myodopsylla isidori* (Weyenbergh), one Tungidae: *Rhynchopsyllus pulex* Haller, and one Stephanocircidae: *Craneopsylla m. minerva* (Rothschild)] and three belong to Order Hemiptera [two Polyctenidae: *Hesperoctenes fumarius* (Westwood) and *H. vicinus* Jordan, and one Cimicidae: *Latrocimex spectans* Lent]. Some records are new for Argentina, while others are new for the provinces of Corrientes, Chaco, Entre Ríos, Jujuy, Misiones and Salta. Also new host-parasite relationships are reported.

KEY WORDS: Chiroptera, host-parasite relationships, insect, taxonomy, distribution

The knowledge of the ectoparasite insects of the bats of Argentina was, until the decade of the 80's, extremely restricted and virtually limited to scarce publications (Del Ponte 1944, Romaña & Abalos 1950, Hopkins & Rothschild 1956). Since 1989 further integrated investigations were developed, focused in obtaining information on the relationships between hosts and ectoparasites (Autino *et al* 1998, Autino & Claps 2001, Claps *et al* 1992), which were complemented by a then more accurate knowledge of the systematic and distribution of the bats of Argentina (Barquez *et al* 1993, 1999, Barquez 2006). Those studies basically reported new information on distribution of the ectoparasites of all the bat families inhabiting Argentina, mostly for species of the orders Diptera (Nycteribiidae and Streblidae), Hemiptera (Polyctenidae) and Siphonaptera (Ischnopsyllidae and Tungidae).

During the last years, the knowledge on this subject was widely increased, mainly in what is related with the species from the north of Argentina (Autino *et al* 1999, 2005, Claps *et al* 2000), but information on several aspects of the biology of the species, as their relationships with hosts and distribution, among others, is still incomplete. Partially, these studies started in northern Argentina, and some of the results are being exposed here. Consequently, new host-parasite associations were discovered, and new species are added to the provinces of Catamarca, Chaco, Corrientes, Entre Ríos, Jujuy, Misiones and Salta. Also, seven species of ectoparasites, of the families Streblidae and Cimicidae, are added to Argentina, increasing their previously known distributions.

Material and Methods

Specimens were obtained during field trips made to 25 localities of the provinces of Catamarca, Corrientes, Chaco, Entre Ríos, Jujuy, Misiones, Salta and Tucumán in northern Argentina (Fig 1). Field trips were made between 1998 and 2004 by the authors and members of the PIDBA (Programa de Investigaciones de Biodiversidad Argentina). Information from two trips made in 1995 is also included.

All the localities (see Table 1) were ordered from north to south by geographical coordinates, and then numbered and placed in the map of the Fig 1. The geographic coordinates were obtained with a GPS (Global Positioning System). Following each locality, the list of registered bats and ectoparasites (in parenthesis) is included.

Nets were placed across probable bat flight paths; monitoring began at dusk and nets were checked every 20 min for a minimum of 4h for three nights at each locality. Bats were captured with mist nets (12 x 3 and 6 x 3 m) and taken to the camp site to be analyzed, measured and weighted. All collected specimens were catalogued indicating collector's number, sex, reproductive condition, precise locality, name of collector, body measurements in millimeters, weight in grams, and collecting date.

The species were identified following Barquez (2006). Specimens collected were prepared as skin, skull and skeleton, or preserved in alcohol, and deposited in the Colección Mamíferos Lillo (CML), Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Argentina; and at the Museo de La Plata (MLP), La Plata, Argentina. Specimens that have not yet been catalogued

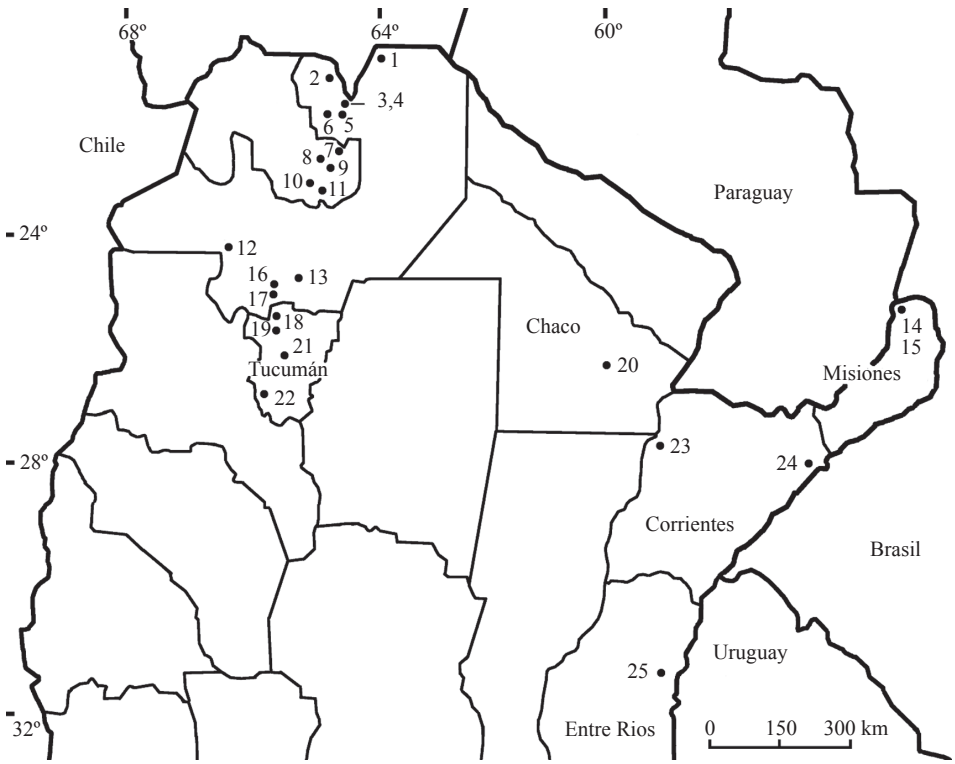

Fig 1 Map of northern Argentina, showing the collecting localities listed in Table 1.

Table 1 List of sampled localities and species of bats collected and their ectoparasites.

Local[1]	Coordenates	Bat species[2]
1. Piquirenda Viejo, 12.6 km al W, 775 m (San Martín, Salta)	22° 20' S; 63° 50' W	*Artibeus planirostris* (*A. phyllostomatis*, *M. aranea*, *M. pseudopterus*), *Chrotopterus auritus* (*Craneopsylla m. minerva*, *S. chrotopteri*), *Desmodus rotundus* (*T. parasiticus*), *Eptesicus furinalis* (*B. neamericana*), *Sturnira lilium* (*M. proxima)*
2. Arroyo Arrazayal, 18 km al NW del cruce de rutas 50 y 19, por ruta 19, 450 m (Santa Victoria, Salta)	2 22° 39' S; 64° 25' W	*Diaemus youngi* (*S. diaemi*)
3. Camino a Isla de Cañas, Ruta 18, 48.9 km al NW del cruce con ruta nacional 50, 700 m (Orán, Salta)	22° 57' S; 64° 33' W	*Eptesicus furinalis* (*B. neamericana*), *Myotis albescens* (*B. carteri*), *Sturnira lilium* (*M. proxima*)
4. Camino a Isla de Cañas, Ruta 18, 43.7 km al NW del cruce con ruta nacional 50, 700 m (Orán, Salta)	22° 57' S; 64° 33' W	*Eptesicus furinalis* (*B. neamericana*), *Sturnira lilium* (*M. proxima*)
5. Camino a Isla de Cañas, Ruta 18, 27 km al W de la intersección con ruta nacional 50 (Orán, Salta)	23° 5' S; 64° 32' W	*Artibeus planirostris* (*M. aranea*, *M. pseudopterus*), *Sturnira lilium* (*A. phyllostomatis*, *M. proxima*)
6. Camino de inspección del gasoducto paralelo al camino de San Andrés, 40 km al NW del cruce de rutas 50 y 18, 96 m (Orán, Salta)	23º 5' S; 64º 38' W	*Sturnira lilium* (*M. proxima*)
7. Arroyo Yuto, 13 km SW Yuto, por ruta 34 (Ledesma, Jujuy)	23º 38' S; 64º 32' W	*Sturnira lilium* (*M. proxima*)
8. Río Tiraxi, 1.5 km al E de Tiraxi por ruta 29, 1570 m (Dr. Manuel Belgrano, Jujuy)	23° 59' S; 65° 19' W	*Myotis keaysi* (*A. Scorzai, M. isidori*)
9. Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20 (Dr. Manuel Belgrano, Jujuy)	24° 02' S; 65° 07' W	*Anoura caudifer* (*A. caudiferae*), *Artibeus planirostris* (*M. aranea*, *M. pseudopterus*), *Eptesicus furinalis* (*B. neamericana*), *Eumops glaucinus* (*H. fumarius*), *Myotis albescens* (*A. scorzai*, *B. carteri*), *M. dinelli* (*M. isidori*), *Noctilio leporinus* (*N. aitkeni*, *P. fusca*), *Sturnira lilium* (*M. proxima*), *S. oporaphilum* (*M. proxima*)
10. Río Blanco, aproximadamente 9 km al E de San Antonio, 1443 m (San Antonio, Jujuy)	24° 24' S; 65° 22' W	*Artibeus planirostris* (*M. aranea*, *M. pesudopterus*)
11. Río Lavayén, aproximadamente 1 km al N de Santa Rita (San Pedro, Jujuy)	24° 28' S; 64° 48' W	*Myotis albescens* (*B. carteri*), *Molossops temminckii* (*H. vicinus*), *Tadarida brasiliensis* (*R. pulex*)
12. Laguna El Brealito (Molinos, Salta)	25° 17' S; 66° 22' W	*Histiotus macrotus* (*B. plaumanni*)
13. Río Las Conchas, 2 km al N y 6 km al W de Metán, 1027 m (Metán, Salta)	25° 28' S; 65° 01' W	*Sturnira lilium* (*M. proxima*), *Tadarida brasiliensis* (*R. pulex*)
14. Puerto Península, 1 km al E, 87 m (Iguazú, Misiones)	25° 41' S; 54° 37' W	*Myotis levis* (*B. carteri*)
15. Puerto Península, 4.7 km al E (Iguazú, Misiones)	25° 42' S; 54° 36' W	*Artibeus fimbriatus* (*M. aranea*, *M. pseudopterus*)
16. Río Cachi, 7.8 km al NNE de Pampa Grande por Ruta provincial 6, 1750 m (Guachipas, Salta)	25° 47' S; 65° 27' W	*Myotis dinelli* (*M. isidori*)
17. Potrerillos, 3.9 km al N, por ruta provincial 6, 1214 m (Candelaria, Salta)	26° 03' S; 65° 30' W	*Artibeus planirostris* (*M. aranea*), *Eptesicus furinalis* (*B. neamericana*), *Myotis dinelli* (*M. isidori*)
18. La Junta, 22 km al W de Choromoro, 1013 m (Trancas, Tucumán)	26° 23' S 65° 30' W	*Artibeus planirostris* (*M. aranea*), *Myotis riparius* (*B. carteri*)
19. Río Grande, 5 km al S de El Siambón, (Tafí Viejo, Tucumán)	26º 46' S; 65º 28' W	*Artibeus planirostris* (*M. aranea*, *M. pseudopterus*), *Desmodus rotundus* (*T. parasiticus*)
20. Machagay, 15 km al S por ruta 16 entre Machagay y Quitilipi, 160 m (25 de Mayo, Chaco)	27° 02' S; 60° 11' W	*Myotis nigricans* (*B. carteri*)

Continue

Table 1 Continuation.

Local[1]	Coordenates	Bat species[2]
21. Arroyo Mista (Leales, Tucumán)	27º 13' S; 65º 10' W	*Tadarida brasiliensis* (*B. carteri*, *M. isidori*)
22. Parque Provincial El Cochuna, camping (Chicligasta, Tucumán)	27° 18' S; 65° 54' W	*Desmodus rotundus* (*T. parasiticus*)
23. Arroyo San Lorenzo y Ruta 12, aproximadamente 4 km al N de San Lorenzo (Saladas, Corrientes)	28º 07' S; 58º 46' W	*Noctilio leporinus* (*N. aitkeni*, *N. dubia*, *L. spectans*, *P. fusca*, *Paradyschiria* sp., *X. noctilionis*)
24. Estancia La Blanca, 10 km al N de Santo Tomé sobre Río Uruguay, 96 m (Santo Tomé, Corrientes)	28º 29' S; 55º 57' W	*Artibeus planirostris* (*M. aranea*)
25. Arroyo Perucho Verna, Villa Elisa (Colón, Entre Ríos)	32º 11' S; 58º 25' W	*Molossus molossus* (*H. fumarius*)

[1]For each locality the provincial department and province are indicated in parenthesis followed by the geographical coordinates in degrees and minutes of latitude and longitude; [2]in parentheses, the bat´s ectoparasites.

In institutions or museums are indicated by the initials of the collectors or acronyms as follow: ARG (Mammal project assigned by National Science Foundation, USA, to M A Mares); DO (Diego Ortiz); MS (Mariano S Sánchez); PIDBA (Programa de Investigaciones de la Biodiversidad Argentina, Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán).

Ectoparasites were collected from live bats, following the methodology of Autino (1996), and placed in a solution of 70% ethylic alcohol, 5% glycerin and 25% distilled water (Whitaker Jr 1988). Ectoparasites were identified with the same number of the parasited bat. Species of parasites were determined in laboratory using stereoscopic microscope. Some individuals were mounted in Canada Balsam to be observed with optical microscope. Voucher specimens were deposited at the CML annexes.

The host-ectoparasite relationships analysis (Marshall 1981) was based in the associations found during this study, and compared with information previously obtained in Argentina (Table 2).

Systematic arrangement for Diptera follows Wenzel *et al* (1966), Theodor (1967), Guimarães (1968), Wenzel (1976), and Graciolli & Carvalho (2001); for Hemiptera we follow Ferris & Usinger (1939), Lent (1941) & Ronderos (1962 a, b), and for Siphonaptera Hopkins & Rothschild (1953, 1956) and Johnson (1957). For Chiroptera we follow Barquez (2006).

Order Diptera

Family Streblidae

Anastrebla caudiferae Wenzel

Anastrebla caudiferae Wenzel 1976:166.

Specimens examined. (4). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, two males on *Anoura caudifer* (CML 4278), October 10, 2001; one female and one male, on *A. caudifer* (released), October 12, 2001, collected by A G Autino.

Comments. This species was described by Wenzel based in an holotype male and an alotype female. It was known only from Venezuela (Wenzel 1976) and Brasil (Graciolli & Carvalho 2001), also parasiting *A. caudifer*. Our records widely extend the distribution of this species, which is here cited for the first time for Argentina. Very similar to *A. modestini* Wenzel, with which it can be confused, although they can be differentiate because R_1 and A_1 veins of the wings are bare in *A. modestini*, while R_1 of *A. caudiferae* have dorsal setae only at the distal end and A_1 is hairy except at the base (Graciolli & Carvalho 2001).

Anatrichobius scorzai Wenzel

Anatrichobius scorzai Wenzel, 1966, *en*: Wenzel *et al* 1966:503, figs 76-78.

Specimens examined. (2). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, one female on *Myotis albescens* (ARG 4238), July 3, 1998, collected by R M Barquez; Río Tiraxi, 1.5 km al E de Tiraxi por ruta 29, one male on *M. keaysi* (CML 6224), August 9, 1998, collected by A G Autino.

Comments. This species was previously known in Argentina only for the province of Tucumán, and it is here extended northward to be included in the province of Jujuy (Autino *et al* 1999, Claps *et al* 2000).

Aspidoptera phyllostomatis (Perty)

Lipoptena phyllostomatis Perty 1833:190, pl. 37, fig 17.

Aspidoptera phyllostomatis, Jobling 1949:137, fig 1.

Specimens examined. (4). SALTA: Piquirenda Viejo, 12.6 km al W, two females on *Artibeus planirostris* (released), August 11, 1999; Camino a Isla de Cañas, Ruta 18, 27 km al W de la intersección con ruta nacional 50, two females on *Sturnira lilium* (CML 6803 and ARG 4727), November 26 and 27, 1998, collected by A G Autino.

Table 2 Host specificity of insects ectoparasitic on bats using all observed associations from this study and previous records from Argentina (Autino & Claps 2001, and Claps *et al*. 2004).

Ectoparasite species	Records in this study		Previous records from Argentina	
	Bat species	H.S.	Bat species	H.S.
Anastrebla caudiferae	*Anoura caudifer*	M		
Anatrichobius scorzai	*Myotis albescens*, *Myotis keaysi*	O	*M. keaysi*	M
Aspidoptera phyllostomatis	*Artibeus planirostris*, *Sturnira lilium*	Pl	*A. fimbriatus*, *A. lituratus*, *C. perspicillata*, *D. rotundus*, *S. erythromos*, *S. lilium*	Pl
Basilia carteri	*M. albescens*, *Myotis levis*, *Myotis nigricans*, *Myotis riparius*, *Tadarida brasiliensis*	Po	*M. albescens*, *M. keaysi*, *M. nigricans*, *M. riparius*, *Mo. temminckii*, *T. brasiliensis*	Po
Basilia neamericana	*Eptesicus furinalis*	M	*E. diminutus*, *E. furinalis*	O
Basilia plaumanni	*Histiotus macrotus*	M	*E. furinalis*, *Histiotus laephotis*	Pl
Craneopsylla m. minerva	*Chrotopterus auritus*	M	Especies de roedores y marsupiales	Po
Latrocimex spectans	*Noctilio leporinus*	M		
Hesperoctenes fumarius	*Eumops glaucinus*, *Molossus molossus*	Pl	*E. bonariensis*, *M. molossus*, *P. nasutus*	Pl
Hesperoctenes vicinus	*Molossu temminckii*	M		
Megistopoda aranea	*Artibeus fimbriatus*, *A. planirostris*	O	*A. fimbriatus*, *A. lituratus*, *A. planirostris*, *D. rotundus*	Pl
Megistopoda proxima	*S. lilium*, *Sturnira oporaphilum*	O	*S. erythromos*, *S. lilium*, *S. oporaphilum*	O
Metelasmus pseudopterus	*A. fimbriatus*, *A. planirostris*	O	*A. fimbriatus*, *A. planirostris*	O
Myodopsylla isidori	*Myotis dinelli*, *M. keaysi*, *T. brasiliensis*	Po	*M. albescens*, *M. levis*, *M. nigricans*	O
Noctiliostrebla aitkeni	*N. leporinus*	M	*N. leporinus*	M
Noctiliostrebla dubia	*N. leporinus*	M		
Paradyschiria fusca	*N. leporinus*	M	*N. leporinus*	M
Par. sp.	*N. leporinus*	M		
Rhynchopsyllus pulex	*T. brasiliensis*	M	*M. nigricans*, *E. perotis*, *T. brasiliensis*	Po
Strebla chrotopteri	*C. auritus*	M		
Strebla diaemi	*Diaemus youngi*	M		
Trichobius parasiticus	*Desmodus rotundus*	M	*D. rotundus*	M
Xenotrichobius noctilionis	*N. leporinus*	M		

Abbreviations: H.S.: host specificity; M: monoxenous; O: oligoxenous; Pl: pleioxenous; Po: polyxenous; Mol: Molossidae; Noc: Noctilionidae; Phyll: Phyllostomidae; Vesp: Vespertilionidae.

Comments. Although known from Salta province (Autino *et al* 1998, 1999), records were scarce and these two new localities extend the distribution of this species to the northwest of the province.

***Megistopoda aranea* (Coquillett)**

Pterellipsis aranea Coquillett 1899:334.

Megistopoda aranea, Machado Allison 1966:70, figs 1-4.

Specimens examined. (23). CORRIENTES: Estancia La Blanca, 10 km al N de Santo Tomé sobre Río Uruguay, one female on *Artibeus fimbriatus* (CML 7265), May 13 to 19, 2003, collected by L Guardia Claps. JUJUY: Río Blanco, aproximadamente 9 km al E de San Antonio, two females on *Artibeus planirostris* (released), Mayo 26, 1998, collected by A G Autino; Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, one male on *A. planirostris* (ARG 4215), July 2, 1998; one female on *A. planirostris* (CML 4158), July 3, 1998; one female on *A. planirostris* (ARG 4243), July 4, 1998; one female and one male on *A. planirostris* (CML 4279), one female on *A. planirostris* (CML 4280), two females on *A. planirostris* (released), October 12, 2001, collected by A G Autino. MISIONES: Puerto Península, 4.7 km al E, two females on *A. fimbriatus* (CML 6149), November 9, 1998, collected by R M Barquez. SALTA: Camino a Isla de Cañas, Ruta 18, 27 km al W de la intersección con ruta nacional 50, one female on *A. planirostris* (ARG 4730), October 28, 1998, collected by D A Flores; Piquirenda Viejo, 12.6 km al W, five females and one male on *A. planirostris* (released), August 11, 1999, collected by A G Autino; Potrerillos, 3.9

km al N, por ruta provincial 6, one female on *A. planirostris* (ARG 4539), September 11, 1998, collected by A G Autino. TUCUMÁN: La Junta, 22 km al W de Choromoro, one female on *A. planirostris* (ARG 4856), September 20, 1999, collected by M M Díaz; Río Grande, 5 km al S de El Siambón, one female on *A. planirostris* (MS 22), September 18, 2004, collected by M Sánchez.
Comments. This species is now cited for the first time for the provinces of Corrientes and Tucumán. Also three new localities are added to the province of Salta, extending south the distribution of the species close to the border with Tucumán province. Furthermore new localities are included in the provinces of Jujuy and Misiones.

***Megistopoda proxima* (Sèguy)**

Pterellipsis proxima Sèguy 1926:194.

Megistopoda proxima, Wenzel *et al* 1966:543, figs 100 C, 101.

Specimens examined. (71). JUJUY: Arroyo Yuto, 13 km SW Yuto, por ruta 34, one female on *Sturnira lilium* (CML 5028), June 3, 2000, collected by M M Díaz; Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, one female on *S. lilium* (CML 6508), July 2, 1999, collected by R M Barquez; one male on *S. lilium* (CML 4284), October 8, 2001, collected by A G Autino; three females and three males on *S. lilium* (CML 4283), October 12, 2001, collected by A G Autino; five females and six males on *S. lilium* (released), October 11 and 12, 2001, collected by A G Autino; one female and one male on *S. oporaphilum* (CML 4285), October 12, 2001, collected by A G Autino. SALTA: Camino a Isla de Cañas, Ruta 18, 27 km al W de la intersección con ruta nacional 50, one female on *S. lilium* (ARG 4718); five females and two males on *S. lilium* (ARG 4719); one male on *S. lilium* (ARG 4721); one female on *S. lilium* (ARG 4722); one female and one male on *S. lilium* (CML 6803); two females on *S. lilium* (ARG 4724), all October 26, 1998; Camino a Isla de Cañas, Ruta 18, 43.7 km al NW del cruce con ruta nacional 50, nine females and three males on *S. lilium* (released), August 5 to 8, 1999, all collected by A G Autino; one female and one male (CML 5139), August 5, 1999, collected by A G Autino; Camino a Isla de Cañas, Ruta 18, 48.9 km al NW del cruce con ruta nacional 50, six females and two males on *S. lilium* (released), August 7 and 8, 1999; five females and four males on *S. lilium* (three females and one male on CML 5135 and one male on CML 5134), August 7, 1999, all collected by A G Autino; Camino de inspección del gasoducto paralelo al camino de San Andrés, 40 km al NW del cruce de rutas 50 y 18, one male on *S. lilium* (PIDBA 1066), January 12, 2004, collected by M S Sánchez; Piquirenda Viejo, 12.6 km al W, one female on *S. lilium* (CML 5093), August 11, 1999, collected by A G Autino; Río Las Conchas, 2 km al N y 6 km al W de Metán, one female and one male on *S. lilium* (one female on CML 5025; one male on CML 5155), August 24, 25, 1998, respectively, collected by M M Díaz.
Comments. Six new records are added to Salta and two to the province of Jujuy.

***Metelasmus pseudopterus* Coquillett**

Metelasmus pseudopterus Coquillett 1907:292.

Specimens examined. (16). JUJUY: Río Blanco, aproximadamente 9 km al E de San Antonio, two males on *Artibeus planirostris* (CML 3830 and CML 3835), two females on *Artibeus planirostris* (CML 3832), May 26, 1998; Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, one female on *A. planirostris* (CML 4280), October 12, 2001, all collected by A G Autino. MISIONES: Puerto Península, 4.7 km al E, two females on *A. fimbriatus* (CML 6149), November 9, 1998, collected by R M Barquez. SALTA: Camino a Isla de Cañas, Ruta 18, 27 km al W de la intersección con ruta nacional 50, one female on *A. planirostris* (ARG 4730), October 28, 1998; Piquirenda Viejo, 12.6 km al W, five females and one male on *A. planirostris* (released), August 11, 1999, all collected by A G Autino. TUCUMÁN: Río Grande, 5 km al S de El Siambón, one male on *A. planirostris* (CML 7287), one male on *A. planirostris* (released), June 19, 2004, collected by M S Sánchez.
Comments. Two localities are added to Salta, expanding the known distribution of this species to the eastern part of the province. We are also adding new localities in the provinces of Jujuy, Misiones and Tucumán.

***Noctiliostrebla aitkeni* Wenzel**

Aspidoptera megastigma Speiser, de Jobling 1949:140, figs 3 A-C.

Noctiliostrebla aitkeni Wenzel, Wenzel *et al* 1966:567, figs 107 C, 108.

Specimens examined. (14). CORRIENTES: Arroyo San Lorenzo y Ruta 12, aproximadamente 4 km al N de San Lorenzo, two females and two males on *Noctilio leporinus* (CML 7262), April 26, 2004, collected by D Ortiz, R Ovejero, P Capllonch and R Lobo. JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, five females and five males on *Noctilio leporinus* (ARG 4246), July 4, 1998, collected by M M Díaz.
Comments. This species is here included in the province of Jujuy, expanding its known distribution from Corrientes in the northeast of the country to northwestern Argentina (Autino *et al* 1992).

***Noctiliostrebla dubia* (Rudow)**

Lipoptena dubia Rudow 1871 (37):122.

Noctiliostrebla dubia, Wenzel *et al* 1966:563. Guerrero 1995:147.

Specimens examined. (5). CORRIENTES: Arroyo San Lorenzo y Ruta 12, aproximadamente 4 km al N de San Lorenzo, two females and three males on *Noctilio leporinus* (CML 7262), April 26, 2004, collected by D Ortiz, R Ovejero, P Capllonch and R Lobo.
Comments. It was cited for Bolivia, Brasil, Paraguay, Perú

and Venezuela (Guerrero 1995, 1997, Dick & Gettinger 2005). This species was not known previously for Argentina and ours the first record for the country as well as for the province of Corrientes.

Paradyschiria fusca Speiser

Paradyschiria fusca Speiser 1900:56, lám. 3, fig 1.

Specimens examined. (22). CORRIENTES: Arroyo San Lorenzo y Ruta 12, aproximadamente 4 km al N de San Lorenzo, seven females and six males (one female and four males in microscope slides) on *Noctilio leporinus* (CML 7262), April 26, 2004, collected by D Ortiz, R Ovejero, P Capllonch and R Lobo. JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, seven females and two males on *Noctilio leporinus* (ARG 4246), July 4, 1998, collected by M M Díaz.
Comments. Until now this species was collected in only one locality from Salta and one from Corrientes provinces (Autino *et al*. 1992); our records includes the species in the province of Jujuy.

Paradyschiria sp.

Specimens examined. (8). CORRIENTES: Arroyo San Lorenzo y Ruta 12, aproximadamente 4 km al N de San Lorenzo, seven females and one male (one female and one male in microscope slides) on *Noctilio leporinus* (Linnaeus) (CML 7262), April 26, 2004, collected by D Ortiz, R Ovejero, P Capllonch and R Lobo.
Comments. Specimens examined are not coincident with any of the known species of the genus, and it is in process of being described as a new species to science.

Strebla chrotopteri Wenzel

Strebla chrotopteri Wenzel 1976:144.

Specimens examined. (11). SALTA: Piquirenda Viejo, 12.6 km al W, one female and four males on *Chrotopterus auritus* (CML 7289), May 29, 2004, collected by M S Sánchez; two females and four males (two females; two males and two postgonite in microscope slides) on *C. auritus*, CML 7290), May 31, 2004, collected by M S Sánchez.
Comments. The type material of this species was collected on *C. auritus* from Venezuela. Then it was registered in Brasil, Bolivia and Paraguay (Graciolli & Carvalho 2001, Dick & Gettinger 2005), and it is now being added to Argentina. This species mainly parasites *C. auritus*, but it was also found on other bat species as *Chiroderma villosum* and *Phyllostomus discolor* (Phyllostomidae) (Graciolli & Carvalho 2001).

Strebla diaemi Wenzel

Strebla diaemi Wenzel, *in* Wenzel *et al*. 1966:599.

Specimens examined. (5). SALTA: Arroyo Arrazayal, 18 km al NW del cruce de rutas 50 y 19, por ruta 19; five males on *Diaemus youngi* (PIDBA 1372), August 13, 2005, collected by M S Sánchez.
Comments. Specimens examined represent the first citation of this species for Argentina; it was known from Colombia, Bolivia, Brasil, Panamá, Paraguay, Perú and Venezuela (Graciolli & Carvalho 2001, Dick & Gettinger 2005). Although the vampire *Diaemus youngi* is known as the most important host for *Strebla diaemi*, this parasite was also found on other three species of phyllostomid bats, on other vampire bat (*Diphylla ecaudata*), and on two frugivorous bats (*Carollia perspicillata* and *Sturnira lilium*) (Guerrero 1996, Graciolli & Carvalho 2001).

Trichobius parasiticus Gervais

Trichobius parasiticus Gervais 1844:14.

Specimens examined. (3). SALTA: Piquirenda Viejo, 12.6 km al W, one female on *Desmodus rotundus* (CML 7008), August 11, 1999, collected by A G Autino. TUCUMÁN: Parque Provincial El Cochuna, camping, one male on *D. rotundus* (CML 3762), June 16, 1999, collected by N Carmona; Río Grande, 5 km al S de El Siambón, one male on *D. rotundus* (CML 7318), June 21, 2004, collected by M S Sánchez.
Comments. Two new records for the distribution of this species are added, one to the province of Salta and two to the province of Tucumán. The one from Salta is the second known for the province, while those from Tucumán widely expand the distribution of the species south of the province, to near the border with Catamarca.

Xenotrichobius noctilionis Wenzel

Xenotrichobius noctilionis Wenzel 1976:81. Guerrero, 1998:143-143 (Redescription).

Specimens examined. (3). CORRIENTES: Arroyo San Lorenzo y Ruta 12, aproximadamente 4 km al N de San Lorenzo, one female and two males on *Noctilio leporinus* (CML 7262); April 26, 2004; collected by D Ortiz, R Ovejero, P Capllonch and R Lobo.
Comments. Previously known only from Venezuela (Guerrero 1998) and Paraguay (Dick & Gettinger 2005); it is here included in Argentina

Order Diptera

Family Nycteribiidae

Basilia carteri Scott

Basilia carteri Scott 1936:498, figs 9, 10.

Specimens examined. (16). CHACO: Machagay, 15 km al S por ruta 16 entre Machagay y Quitilipi, two females on *Myotis nigricans* (one on CML 06832 and other on CML 6832), September 19, 2003, collected by L Guardia Claps.

JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, one male on *M. albescens* (ARG 4238), July 3, 1998, collected by A G Autino; Río Lavayén, aproximadamente 1 km al N de Santa Rita, one female and one male on *Myotis albescens* (CML 5833), October 8, 1995, collected by M M Díaz. MISIONES: Puerto Península, 1 km al E, two females and three males on *Myotis levis* (CML 6157), November 9, 1998, collected by R M Barquez. SALTA: Camino a Isla de Cañas, Ruta 18, 48.9 km al NW del cruce con ruta nacional 50, two males on *M. albescens* (CML 5149); one female and one male on *Myotis albescens* (CML 5136), August 7, 1999, collected by A G Autino. TUCUMÁN: Arroyo Mista, one female on *Tadarida brasiliensis* (DO 029), October 19, 2003, collected by D Ortiz; La Junta, 22 km al W de Choromoro, one female on *M. riparius* (ARG 4858), September 29, 1999, collected by M M Díaz.

Comments. This species was known only from the northwest in Argentina (Autino *et al*. 1999) and its distribution is now significantly extended to the northeast, and included in the provinces of Chaco and Misiones. New localities are also added to the provinces Salta, Jujuy and Tucumán in northwest. We also report a new association of this species with the host *M. levis*, which was not known.

Basilia neamericana Schuurmans Stekhoven Jr

Basilia neamericana Schuurmans Stekhoven Jr 1951:102, figs 1-3.

Specimens examined. (18). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, two females and one male on *Eptesicus furinalis* (ARG 4222), July 2, 1998, collected by M M Díaz. SALTA: Camino a Isla de Cañas, Ruta 18, 43.7 km al NW del cruce con ruta nacional 50, three females y one male on *E. furinalis* (CML 5142), August 7, 1999, collected by A G Autino; Camino a Isla de Cañas, Ruta 18, 48.9 km al NW del cruce con ruta nacional 50, one female and four males on *E. furinalis* (CML 5145), August 7, 1999, collected by A G Autino; Piquirenda Viejo, 12.6 km al W, one male on *E. furinalis* (CML 7009), August 11, 1999, collected by A G Autino; Potrerillos, 3.9 km al N, por ruta provincial 6, two females on *E. furinalis* (one on ARG 4514 and one on ARG 4525), September 9, and 11, 1998; one female and two males on *E. furinalis* (CML 4529), September 9, 1998, collected by A G Autino.

Comments. This species is here cited for the first time for the province of Jujuy, and new localities are added to the province of Salta.

Basilia plaumanni Scott

Basilia plaumanni Scott 1940:58, figs 1, 2.

Specimens examined. (9). SALTA: Laguna El Brealito; todos los ejemplares on *Histiotus macrotus* (one male on ARG 5007, two males and four females on ARG 5008, two males on ARG 5009), November 14, 1999, collected by M M Díaz.

Comments. In Argentina this species was known from only three localities in the province of Jujuy (Del Ponte 1944, Autino *et al*. 1999), and now is added to the province of Salta.

Order Siphonaptera

Family Ischnopsyllidae

Myodopsylla isidori (Weyenbergh)

Ceratophyllus isidori Weyenbergh 1881:271.

Myodopsylla isidori, Hopkins & Rothschild 1956:242.

Specimens examined. (15). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, one female on *Myotis dinelli* (CML 4317), October 12, 2001, collected by A G Autino; Río Tiraxi, 1.5 km al E de Tiraxi por ruta 29, four females and two males on *M. keaysi* (CML 6224), August 9, 1998, collected by A G Autino. SALTA: Potrerillos, 3.9 km al N, por ruta provincial 6, one male and one female on *M. dinelli* (ARG 4512), September 9, 1998; one female on *M. dinelli* (ARG 4524), September 11, 1998; Río Cachi, 7.8 km al NNE de Pampa Grande por Ruta provincial 6, one female and two males on *M. dinelli* (ARG 4551), September 13, 1998, collected by A G Autino. TUCUMAN: Arroyo Mista, two females on *Tadarida brasiliensis* (DO 028), October 19, 2003, collected by D Ortiz.

Comments. *Myodopsylla isidori* is added to the province of Jujuy; the new localities for Salta are important given that the species was only known from one locality in that province; we are also adding one locality to the province of Tucumán. The association of this species with *Myotis keaysi*, here reported, was not known for this parasite.

Family Tungidae

Rhynchopsyllus pulex Haller

Rhynchopsyllus pulex Haller 1880:46, lám. 6, figs 1-13.

Specimens examined. (3). JUJUY: Río Lavayén, aproximadamente 1 km al N de Santa Rita, two females on *Tadarida brasiliensis* (CML 7077), October 6, 1995, collected by M M Díaz. SALTA: Río Las Conchas, 2 km al N y 6 km al W de Metán, one female on *T. brasiliensis* (CML 5153), August 24, 1998, collected by M M Díaz.

Comments. The records for Salta and Jujuy widely extend north the distribution of this species. In Argentina it was known from Buenos Aires, Catamarca, Salta and Tucumán (Autino & Claps 2001). so that their presence in Jujuy is here reported for the first time.

Family Stephanocircidae

Craneopsylla minerva minerva (Rothschild)

Stephanocircus minerva Rothschild 1903:319.

Craneopsylla minerva minerva, Hopkins 1951:537.

Specimens examined. (1). SALTA: Piquirenda Viejo, 12.6 km al W, one female on *Chrotopterus auritus* (CML 7289), May 5, 2004, collected by M S Sánchez.

Comments. This subspecies was previously found, in Argentina, parasiting rodents and marsupials (Del Ponte 1977), but until now it was not registered on bats. The subspecies *Craneopsylla minerva wolffhuegeli* Rothschild, also inhabiting Argentina has been cited on *Myotis nigricans* from Córdoba (Hopkins & Rothschild 1956, Del Ponte 1977, Autino & Claps 2001). Our specimen from Salta was collected on a specimen of the carnivorous bat *C. auritus*.

Order Hemiptera

Family Cimicidae

Latrocimex spectans Lent

Latrocimex spectans Lent 1941: 41-46. Graciolli *et al* 1999:913.

Specimens examined. (3). CORRIENTES: Arroyo San Lorenzo y Ruta 12, aproximadamente 4 km al N de San Lorenzo, three males on *Noctilio leporinus* (CML 7262), April 26, 2004, collected by D Ortiz, R Ovejero, P Capllonch y R Lobo.
Comments. Our specimens are clearly coincident with the characters mentioned in the original description by Lent (1941) with specimens from Brazil. This is a significant extension of the distributional range of the species, and represents the first mention for Argentina.

Family Polyctenidae

Hesperoctenes fumarius (Westwood)

Polyctenes fumarius Westwood 1874:198.

Hesperoctenes fumarius, Ueshima 1972:17.

Specimens examined. (2). ENTRE RIOS: Arroyo Perucho Verna, Villa Elisa, one female on *Molossus molossus* (MLP 25.IV.01. 27), January 18, 2001, Collected by A. Abba and D. Udrizar Sauthier. JUJUY: Río Las Capillas, 15 km al N de Las Capillas, por ruta provincial 20, one female on *Eumops glaucinus* (CML 4318), October 9, 2001, collected by A G Autino.
Comments. The relationship of this species with *E. glaucinus* is here reported for the first time. The species is added to the province of Entre Ríos and a new locality is cited for the province of Jujuy (Ronderos 1962a, Autino & Claps 2001).

Hesperoctenes vicinus Jordan

Hesperoctenes vicinus Jordan 1922:210-211, figs 201-202.

Specimens examined. (1). JUJUY: Río Lavayén, aproximadamente 1 km al N de Santa Rita, one male on *Molossops temminckii* (CML 5831), October 8, 1995, collected by M M Díaz.
Comments. The inclusion of this species in Argentina is quite interesting because it was known only by the original record from Paraguay, and collected on an unidentified host (Jordan 1922), later referred as to "possibly" *Molossus rufus* by Ferris & Usinger (1939) (see also Ueshima 1972). Our specimens represent the second known record for the species and is the first collected on a clearly identified host (*Molossops temminckii*).

Discussion

Extensive surveys of bats in northern Argentina have permitted us to obtain newness information for 23 species of ectoparasites, found on 21 species of bats. We have added eight new species of bat ectoparasites to the fauna of Argentina, including six species of Diptera (Streblidae) and two Hemiptera (one Polyctenidae and one Cimicidae). Also the number of species was increased for some provinces of northern Argentina, by the addition of eight species to Jujuy, five to Corrientes, three to Salta, and one to Chaco, Misiones, Entre Ríos and Tucumán.

Order Diptera was represented by the families Streblidae and Nycteribiidae; Order Hemiptera by Polyctenidae and Cimicidae, and Siphonaptera by Ischnopsyllidae, Tungidae and Stephanocircidae. Five subfamilies of Streblidae are known around the World, containing 33 genera and 230 species. Three of these five subfamilies are to be found in America (Nycterophiliinae, Streblinae and Trichobiinae), but none of them is shared with the Old World, and in total they includes 26 genera and 156 species (Dick & Graciolli 2007). In South America Nycterophiliinae is represented by two genera and six species, Streblinae by four genera and 33 species, and Trichobiinae by 18 genera and 114 species (Guerrero 1993, 1997, 1998, Graciolli 2003b, Graciolli & Dick 2004, Dick & Wenzel 2006).

Streblidae species parasite bats of the families Emballonuridae, Furipteridae, Molossidae, Mormoopidae, Natalidae, Noctilionidae, Phyllostomidae and Vespertilionidae (Marshall 1982, Guerrero 1997, 1998, Graciolli 2003a, b). After the 11 species of Streblidae cited for Argentina until now, we are here adding six species to the fauna of the country (*Anastrebla caudiferae*, *Noctiliostrebla dubia*, *Paradyschiria* sp., *Strebla chrotopteri*, *Strebla diaemi* and *Xenotrichobius noctilionis*) that were found parasiting bats of the families Molossidae, Phyllostomidae, Noctilionidae and Vespertilionidae.

Even when Streblidae is widely distributed in the neotropics, distributional records of its species are scarce and a refined distribution is not possible to be defined by now. In our case some of the species that are being added to Argentina were known before from quite distant places including other countries; this is certainly not reflecting a disjunct distribution, but only the lack of studies in areas between localities.

Nycteribiidae includes 286 species in three subfamilies: Nycteribiinae, Cyclopodiinae and Archinycteribiinae. Nycteribiinae has a worldwide distribution and is the only subfamily of Nycteribiidae that inhabits America; comprises six genera, two in America (*Basilia* Miranda-Ribeiro and *Hershkovitzia* Guimarães & D'Andretta). The American species of *Basilia* (52) parasite mainly bats of the family Vespertilionidae, but they have also been found on some species of the families Molossidae, Phyllostomidae, and

Emballonuridae; the four species of *Hershkovitzia* were only found on bats of the family Thyropteridae (Graciolli & Carvalho 2001, Graciolli *et al*. 2007).

Six species of *Basilia* are actually known from Argentina, three of them being studied here to extend their distributions to new provinces: *Basilia carteri* is added to the provinces of Chaco and Misiones, *B. neamericana* to Jujuy and *B. plaumanni* to Salta. The association of *B. carteri* with *M. levis* it was also registered.

The lower number of species of Nycteribiidae compared with that of Streblidae is mainly due to the more abundant surveys made in the Yungas forests, where the host bats for these species (family Phyllostomidae) are more abundant.

Family Polyctenidae includes five genera and 32 species (Cassis & Gross 1995), but in the Neotropical region it is known only by 16 species (Ueshima 1972, Ryckman & Casdin 1977, Marshall 1982) of the genus *Hesperoctenes* (Ferris & Usinger 1939, Usinger 1946, Maa 1964) which parasites bats of the families Emballonuridae and Molossidae.

This group is practically unknown, and deserves more attention. For Argentina, eight species were cited (Del Ponte 1945, Ronderos 1962a, b, Autino *et al* 1999, Autino & Claps 2001), and one more is being added here, *H. vicinus*, found on *Molossops temminckii* which also represent an association not previously reported. In addition, *H. fumarius* was found on *Eumops glaucinus*.

Family Cimicidae includes 23 genera and 108 species (Cassis & Gross 1995) in the world. It has been found parasiting bats of the families Emballonuridae, Molossidae, Noctilionidae and Vespertilionidae in America (Marsahll 1982). In Argentina the members of Cimicidae parasiting bats are not well known (Wygodzinsky 1951, Ronderos 1961) and the relationships between ectoparasites and hosts are an unexplored field in science. In Argentina *Cimex lectularius* L. was cited but on an undetermined species of bat (Wygodzinsky 1951) and *C. tucmatiani* Wigodzinsky was cited on *M. nigricans* and on an undetermined bat (Wygodzinsky 1951, Ronderos 1961). We are here adding *L. spectans* found parasiting the bat *N. leporinus* in Corrientes province.

The order Siphonaptera comprises 2005 species in 242 genera (Medvedev & Krasnov 2006). The family Ischnopsyllidae, an exclusive parasite of bats, includes about 70 species in America, all found in bats of the families Emballonuridae, Molossidae, Noctilionidae, Phyllostomidae and Vespertilionidae (Marshall 1982 Whitaker Jr 1988). This family is represented in South America by the genera *Myodopsylla* Jordan and Rothschild, *Sternopsylla* Jordan and Rothschild, *Ptilopsylla* Jordan and Rothschild, *Hormopsylla* Jordan and Rothschild, and *Rothschildopsylla* Guimarães, all with origin in the neotropical region (Linardi & Guimarães 2000); in Argentina it is represented by the genera *Hormopsylla*, *Myodopsylla* and *Sternopsylla* (Autino & Claps 2001). Here we includes *M. isidori* in the province of Jujuy, collected on *M. keaysi*.

With respect to the family Tungidae (Hectopsyllinae), we are here adding *R. pulex* to Jujuy, a species that is an exclusive parasite of bats of the families Molossidae and Vespertilionidae (Linardi & Guimarães 2000).

Family Stephanocircidae contains two subfamilies, Craneopsyllinae (South America) and Stephanocircinae (Australia) (Lewis 1993). In Argentina it is represented by five genera: *Barreropsylla* Jordan, *Craneopsylla* Rothschild, *Plocopsylla* Jordan, *Sphinctopsylla* Jordan, and *Tiarapsylla* Wagner (Del Ponte 1977). We are here adding new information about *Craneopsylla m. minerva* which was found parasiting the bat *C. auritus* in Argentina; this flea has been mainly collected on rodents and marsupials, so we believe that it was an accidental finding; our idea is based on the carnivorous feeding habits of *C. auritus*, who hunts and feed on several species of rodents and marsupial along its range. Nevertheless another bat species, the frugivorous *S. lilium*, and the nectarivorous *Anoura geoffroyi*, were also mentioned as hosts for this species in Brazil by Linardi & Guimarães (2000).

In our sample most of the specimens of bats were parasited by one to five individuals. Only one specimen, a *N. leporinus*, apparently in good health had 36 parasites belonging to six species (*N. aitkeni*, *N. dubia*, *P. fusca*, *Paradyschiria* sp., *X. noctilionis* and *L. spectans*). Previously the maximum number of species parasiting an individual was four (Graciolli, personal comm.).

Host specificity. We made an analysis of specificity, host-parasite, including accidental infestation, and compared the behavior of the parasite with the previous knowledge on the subject (Table 1). Out of the 14 species of Streblidae, nine are monoxenous (*A. caudiferae*, *N. aitkeni*, *N. dubia*, *P. fusca*, *Paradyschiria* sp., *S. chrotopteri*, *S. diaemi*, *T. parasiticus*, *X. noctilionis*), four are oligoxenous (*A. scorzai*, *M. aranea*, *M. proxima*, *M. pseudopterus*) and one is a pleioxenous species (*A. phyllostomatis*).

Two of the three species of Nycteribiidae are monoxenous (*B. americana*, *B. plaumanni*) and the other (*B. carteri*) is polixenous on five species of bats of the families Molossidae and Vespertilionidae. The only species of Ischnopsyllidae (*M. isidori*) was polixenous on three species of the families Molossidae and Vespertilionidae. Tungidae, Stephanocircidae and Cimicidae had each only one monoxenous species. In Polyctenidae we found two species, one monoxenous (*H. vicinus*) and one pleioxenous (*H. fumarius*).

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