Acta Zool. Mex. (n.s.) 82:29-81 (2001)

BATS OF THE ARGENTINE YUNGAS: A SYSTEMATIC AND DISTRIBUTIONAL ANALYSIS

Rubén M. BARQUEZ and M. Mónica DÍAZ
PIDBA (Programa de Investigaciones de Biodiversidad Argentina), Facultad de Ciencias Naturales e IML, Universidad Nacional de Tucumán, and CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas). Miguel Lillo 205, Tucumán (4000), ARGENTINA
E-mail: pidbatuc@infovia.com.ar

RESUMEN

En el presente estudio se analiza la composición de especies de murciélagos de las Yungas de la Argentina, donde 39 especies han sido registradas, lo que indica una diversidad alta (66% de las especies de Argentina) comparada con el total de especies que habitan el país. A modo de comparación se ha analizado también las especies que habitan las Yungas de Bolivia.

Desde mediados de los años '70 se han desarrollado estudios intensivos de campo a numerosas localidades de las Yungas en Argentina. A esta información se ha agregado la obtenida en colecciones científicas, con un total de 1682 ejemplares examinados, así como los registros de la literatura. Como resultado, se ha definido que las Yungas de Argentina contienen actualmente una especie de noctiliónido, 12 phyllostómidos, 13 vespertiliónidos y 13 molóssidos.

Para cada especie se detallan los ejemplares examinados, registros adicionales, comentarios sobre diferentes aspectos de su biología, distribución, reproducción, y otros aspectos de interés observados durante el trabajo de campo. Se presenta un análisis de la biogeografía de las especies de las Yungas de Argentina, a lo largo de un gradiente latitudinal, comparada con las Yungas de Bolivia y también con otras unidades fitogeográficas de Argentina, como el Chaco, Monte, Puna, Región Andina y Paranaense.
Palabras Clave: Argentina, Bolivia, Yungas, Biogeografía, Chiroptera, murciélagos.

ABSTRACT

In this study we analyze the composition of bat species of the Argentine Yungas, where 39 species have been recorded, number that indicates a high diversity of bats for the region compared with the total number of species in the country (66% of the species from Argentina). For comparative purposes we have incorporated in the analysis a revision of the species of the Bolivian Yungas. Since the mid-1970's, intensive field studies and surveys have been carried out in numerous localities of the Yungas in Argentina. The information obtained from personal collecting, plus the examination of museum specimens and literature records, allowed us to examine a total of 1682 specimens. One noctilionid, 12 phyllostomids, 13 vespertilionids, and 13 molossids were recorded in the area. For every species we include the specimens examined, additional records, distribution, reproduction and also provide additional comments related to the biology of the species observed by us during fieldwork studies. Biogeographical analyses were made considering the presence or absence of each species by degree of latitude along latitudinal gradients. The Yungas of Argentina was also compared with that of Bolivia and with other phytogeographic provinces, such as Chaco, Monte, Andean, and Paranaense regions, located at the same latitudinal range as the Yungas in Argentina.
Key Words: Argentina, Bolivia, Yungas Forests, Biogeography, Chiroptera, bats.

INTRODUCTION

Fifty-seven species of bats have been included in the fauna of Argentina (Barquez *et al.* 1993, 1999b). Later, the systematic consideration of *Histiotus laephotis* as a different species from *H. macrotus* (Autino, 1997; Autino *et al.* 1999) and the inclusion of *Micronycteris* sp. (Barquez *et al.* 1999a), has elevated the total number of species of the country to 59. In this study, 39 species have been recorded from the Yungas phytogeographic province of Argentina. This number indicates a high diversity (66% of the species of Argentina) of bats for this region. However, the Yungas is less diverse compared with the Chaco where 45 species have been recorded (Barquez and Ojeda, 1992; Barquez *et al.* 1999b; Díaz and Barquez, 1999).

Since the mid-1970's intensive fieldwork studies and surveys have been carried out in numerous localities of the Yungas in Argentina. As a result one noctilionid, 12 phyllostomids, 13 vespertilionids, and 13 molossids were gathered in the area.

Detailed studies on the bats of the Yungas are scarce. Autino *et al.* (1999) carried out research on ectoparasites. Iudica (1995) studied frugivory on *Sturnira lilium* in the Parque Nacional Calilegua, Jujuy, a zone of the province that has been the object of other investigations that have contributed with data on species composition of mammals community of the area (Olrog, 1979; Heinonen and Bosso, 1994). Giannini (1999) studied the selection of diet and altitudinal distribution of *Sturnira lilium* and *S. erythromos* in the wet montane forests of Tucumán Province.

Numerous species have been added to Argentina and to the region of the Yungas in recent years, but the knowledge of the final composition of species requires more effort and intensive surveys. The serious fragmentation of the Yungas in Argentina, and the fragility of the area, under human impact, puts the survival of natural populations and species, not only of bats but also the fauna and flora in general, at risk.

MATERIALS AND METHODS

Study Area.- The Yungas phytogeographic province is part of the Amazon Domain of the Neotropical Region (Cabrera, 1976). The area in Argentina (Fig. 1) comprises a region located between 22º and 28.5º south latitude.

The Argentine Yungas is not a continuous unit but exists in fragments located particularly between 24º and 27º south. The whole region has been significantly modified by human activity. In its natural condition, penetrations of other phytogeographic units take place, especially those of chacoan origin.

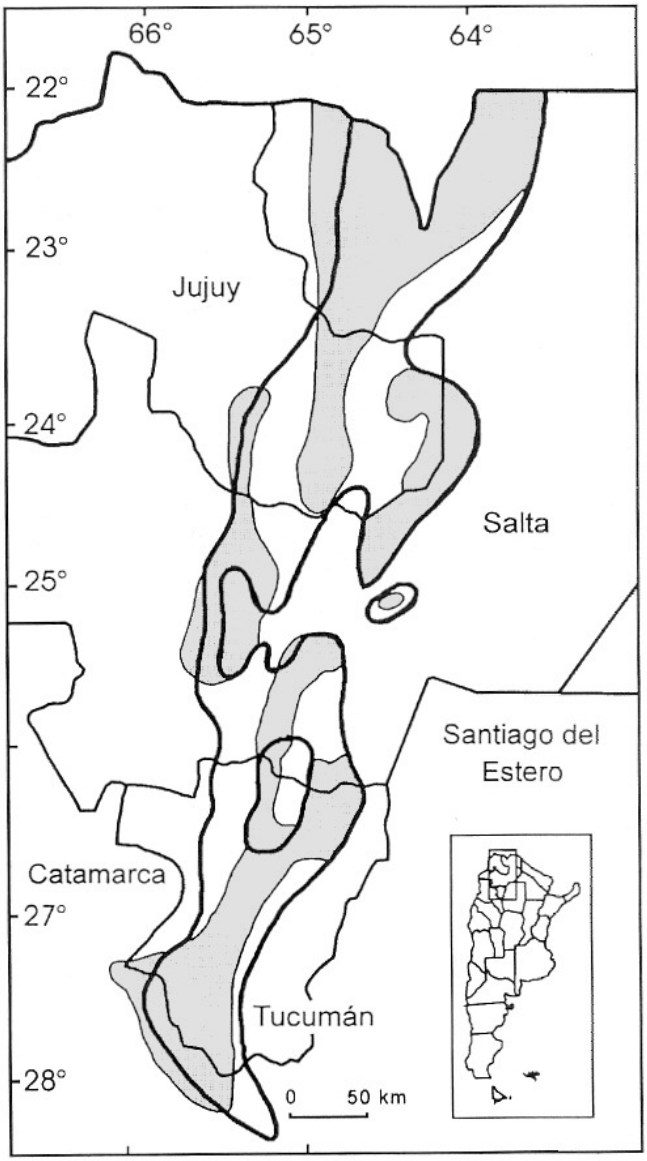

Figure 1

Regional map of the Yungas forests of Argentina. Thick line indicates the limits of the Yungas as considered by Cabrera (1976), Vervoorst (1979) and Cabrera and Willink (1973); shading indicates the actual distribution of the Yungas forests according to Brown (1995).

The ecosystem, as it exists in Argentina, is considered to be threatened (Prado, 1995) mainly due to the lack of control of human actions. From the descriptive point of view, the Yungas has been the object of several approaches to classification, especially regarding the denomination of their strata (Brown, 1995; Meyer, 1963; Morales *et al.* 1995; Prado, 1995). Consequently, the Yungas includes areas that are not forests, such as high grasslands, or places above 2000 m. Thus, some of the species included in our study are those that are not typical of the Yungas forests but rather typically inhabit dry or arid units, like the Monte, Chaco, or Andean.

The main objective of this study was to analyze the composition of bats species from the Yungas of Argentina, and as a comparison we have incorporated in the analysis a revision of the species of the Yungas in Bolivia.

The limits of the Yungas in Argentina (Fig. 1) are based on the work of several authors (Brown, 1995; Vervoorst, 1979, 1982; Cabrera, 1976; Cabrera and Willink, 1973). For Bolivia the region (Fig. 2) has been defined based on the information given by Anderson (1997), Anderson *et al.* (1982), Anderson and Webster (1983), and Charts of the Geographical Military Institute of Bolivia.

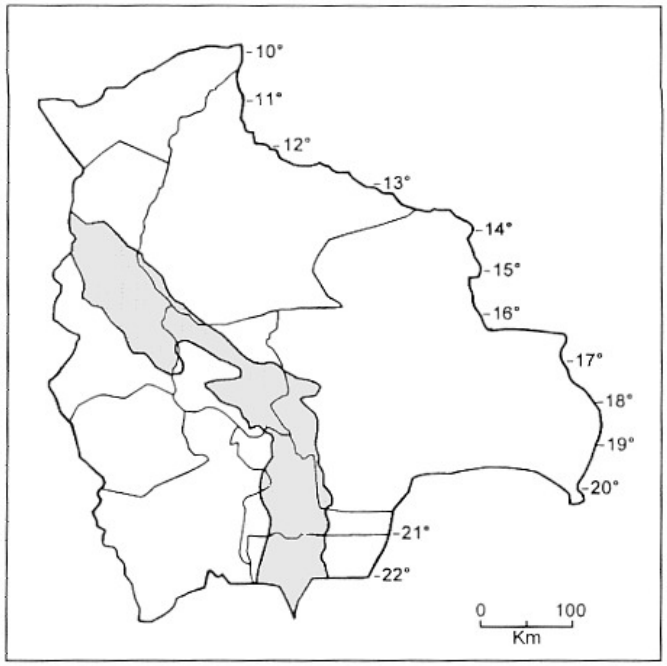

Figure 2
Map of Bolivia showing the Yungas(shaded).

Specimens examined.- A total of 1682 specimens from museum collections and personal collections have been examined; 292 of the specimens indicated in the "Specimens Examined" were released after examination in the field. We also reviewed the literature for other localities of bats of the Yungas from Argentina and Bolivia.

The acronyms for the museums and collections from where the specimens derive follows Genoways and Schlitter (1981), Yates *et al*. (1987), and Hafner *et al.* (1997), and those for the specimens that have not yet been deposited in institutions or museums are indicated by the initials of the collectors: AA, Analía Autino, Tucumán, Argentina; AMNH, American Museum of Natural History, New York; ARG, Collection of Collaborative project between The Sam Noble Oklahoma Museum of Natural History and the PIDBA (Programa de Investigaciones de Biodiversidad Argentina); BMNH, The Natural History Museum, London; CEM, Colección Elio Massoia y Familia, Buenos Aires, Argentina; CM, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; CML, Colección Mamíferos Lillo, Facultad de Ciencias Naturales e Instituto Miguel Lillo, Tucumán, Argentina; FCM, Colección Mamíferos, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Buenos Aires, Buenos Aires, Argentina; FMNH, Field Museum of Natural History, Chicago, Illinois; IADIZA-CM, Colección Mastozoológica del Instituto Argentino de Investigaciones de Zonas Áridas, Mendoza, Argentina; MACN, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia,” Buenos Aires, Argentina; MMD, M. Mónica Díaz, Tucumán, Argentina; MSB, Museum of Southwestern Biology, University of New Mexico, Albuquerque, New Mexico; OMNH, Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma; PIDBA, Programa de Investigaciones de Biodiversidad Argentina, Facultad de Ciencias Naturales, Tucumán, Argentina; RAO, Ricardo A. Ojeda, Mendoza, Argentina; ROM, Royal Ontario Museum, Toronto, Canada; SIG, Silvia I. Guerrero, Tucumán, Argentina; TCWC, Texas Cooperative Wildlife Collection, Texas A & M University, College Station, Texas; TTU, The Museum, Texas Tech University, Lubbock, Texas; USNM, United States National Museum of Natural History, Washington, D. C.

Localities.- All the localities mentioned in the text are shown in figure 3. The localities in the Gazeteer are listed alphabetically and numerically. They have been ordered from north to south by degrees and minutes of latitude and longitude.

For each locality the Department and the Province are provided in parenthesis followed by the geographical coordinates. The geographic coordinates were obtained with a GPS (Global Positioning System) at localities sampled personally, and calculated from Keegan and Keegan (1993), Anonymous (1968), Regional Maps of the Geographical Military Institute from Argentina, and from Barquez *et al.* (1999b) for the other localities.

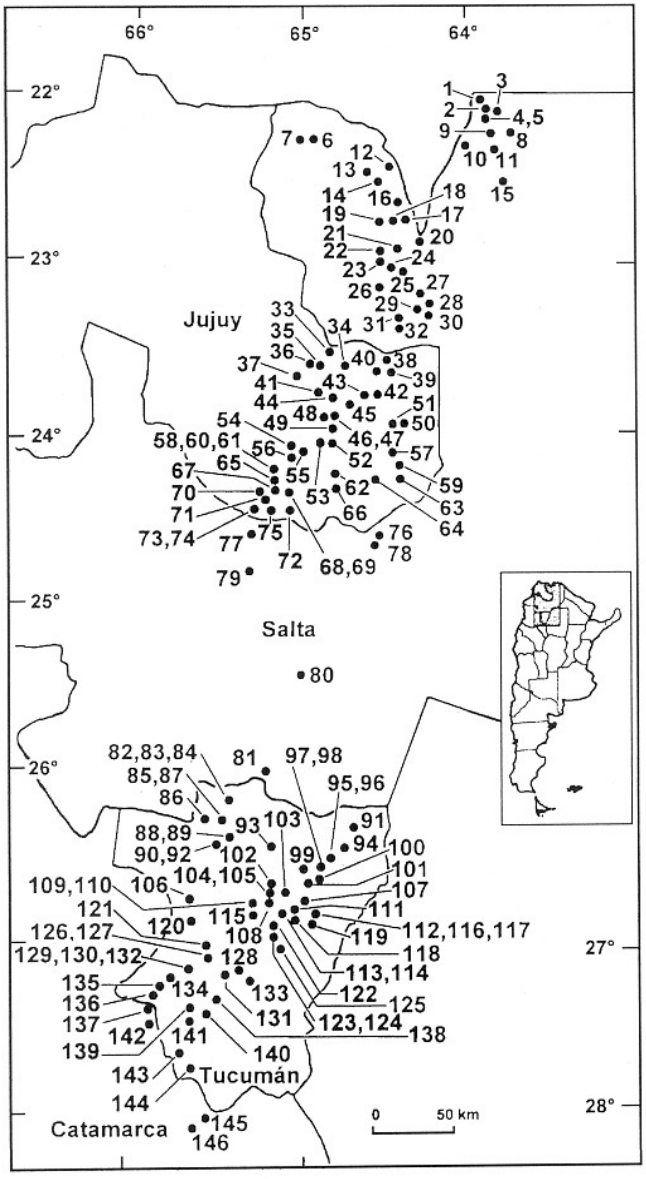

Figure 3

Collecting localities for bats in the Yungas of Argentina listed in text. Numbers correspond to those given in the Gazetteer.

It should be emphasized that in most of the museum specimens and literature citations the provincial Departments are not specified. Consequently, the provincial Departments presented are those that were in use at the dates of collection; it should be noted that numerous Departments have changed their limits and their names.

The table of species for degree of latitude includes all of the species that have been mentioned for a locality between 13˚ and 28˚ south latitude, including Bolivia and Argentina (Table 1).

Biogeography.- The analyses do not include the Yungas in its entirety, but only the portion in Bolivia and Argentina. The data were analyzed using two methods. The first one considered only the presence or absence of each species by degree of latitude. This allowed us to determine the total number of species by degree of latitude as well as the composition of species per family and its variations along the gradient. The presence of each species at every degree of latitude was plotted according to the information from the literature or specimens examined.

For an additional interpretation of data, we have included those species that potentially can be found at each degree of latitude. The inclusion, or exclusion, of a species at a certain degree of latitude was determined by the proximity of records to the borders of the Yungas or by the assumption that the species should be present in a degree of latitude located between two adjacent degrees where it was recorded. The latter, considered a theoretical analysis, shows the "potential" distribution of the species.

In the second analysis the Yungas of Argentina has been compared with that of Bolivia and also with other phytogeographic provinces of Argentina, such as the Chaco, Monte, Andean, and Paranaense, because these regions are located at the same latitudinal range as the Yungas. Our analysis includes the Yungas and the other regions to 28˚ south latitude.

The Chaco was analyzed using three levels of humidity in increasing order: the Western, the Eastern and the Central Chaco (Barquez and Ojeda, 1992; Bucher, 1980; Cabrera and Willink, 1973; Morello and Adamoli, 1968). The similarity between phytogeographic provinces was calculated by the presence or absence of species. Two similarity indices, Jaccard's Coefficient (S_j, Jaccard, 1908; Sneath, 1957) and the Simple Matching Coefficient (S_{sm}, Sokal and Michener, 1958) were used. Jaccard's Coefficient is given by S_j 3D a/(a+u) where *a* is the number of shared species and *u* is the sum of the unshared species between the two groups (phytogeographic provinces). It does not consider that the absences shared by two groups contribute to overall similarity. The Simple Matching Coefficient is given by S_{sm} 3D m/(m+u) where *m* is the number of shared presence plus the number of shared absences (species known from the fauna of zones but not present in/either of the compared phytogeographic regions),

and *u* is the sum of the unshared species. It does consider shared absences in assessing overall similarity.

Table 1

List of species recorded in the Yungas of Bolivia and Argentina. Species that were not registered but of probable occurrence are indicated with an x. BOL= Bolivia, ARG= Argentina.

			Degrees of latitude															
Families and Species	BOL	ARG	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Family Emballonuridae																		
Rhynchonycterys naso	1							x		x			1		x			
Saccopteryx bilineata	1			x	x	x	x	1										
Family Noctilionidae																		
Noctilio albiventris	1							1										
Noctilio leporinus	1	1	x	x	1	1	x			x	x	1	1	1	x			
Family Phyllostomidae																		
Chrotopterus auritus	1	1	x	x	x	x	x	1	x	x	x	1	1	1	x		1	1
*Micronycteris davies*i	1		1	x	x													
Micronycteris megalotis	1		1	x	x	1	x	x	x	x	x	x						
Micronycteris minuta	1		x	x	1	x												
Micronycteris nicefori	1		1	x	x													
Micronycteris sp.		1											1					
Phyllostomus discolor	1		x	x	x	x	1	x	x									
Phyllostomus elongatus	1		x	x	1	x												
Phyllostomus hastatus	1		x	x	1	1	x											
Tonatia bidens		1											1					
Tonatia brasiliense	1			x	x	x	1											
Tonatia saurophila	1		x	x	x	x	1											
Tonatia silvicola	1		x	x	1	1	x											
Trachops cirrhosus	1				1													
Lonchophylla thomasi	1				1	x	1											
Anoura caudifer	1	1			1	1	1	1	1	x	x	1	1					
Anoura cultrata	1				1													
Anoura geoffroyi	1			x	1	1	1	1	1									
Choeroniscus intermedius	1				1	1												
Glossophaga soricina	1	1	1	1	1	1	1	1	1	x	x	x	1					
Lychonycteris obscura	1						1											
Carollia brevicauda	1		1	1	1	1	1											
Carollia castanea	1		1	1	1	1	1											
Carollia perspicillata	1		1	1	1	1	1	1										
Rhynophylla pumilio	1				1	x	1											
Artibeus anderseni	1		x	x	1	1	1											
Artibeus glaucus	1				1	1	1											
Artibeus hartii	1				1	1	1											
Artibeus lituratus	1		1	1	1	1	1	x	1									
Artibeus planirostris	1	1	1	1	1	1	1	x	x	x	1	1	1	1	1		1	1
Artibeus obscurus	1		x	1	1	1	1											
Chiroderma salvini	1		x	x	1	x	1	x										
Chiroderma trinitatum	1		x	x	1	x	x											
Chiroderma villosum	1		x	x	1	x	x											
Mesophylla macconnelli	1		1	x	1	x												
Platyrrhinus brachycephalus	1		x	x	x	x	1											

Table 1. Continued

Families and Species	BOL	ARG	Degrees of latitude 13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Platyrrhinus dorsalis	1		x	x	1	1	1	x	x									
Platyrrhinus helleri	1		x	x	1	1	1	x										
Platyrrhinus infuscus	1		x	x	1	1	1	x										
Platyrrhinus lineatus	1		x	x	1	1	x	x										
Platyrrhinus vittatus	1		x	x	x	x	1											
Pygoderma bilabiatum	1	1					1	x	1	x	x	1	1					
Sturnira erythromos	1	1	x	x	1	1	1	x	1	x	1	1	1	1	1	1	1	x
Sturnira lilium	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sturnira magna	1		x	x	1	x	1											
Sturnira oporaphilum	1	1	x	x	1	1	1	1	x	x	x	1	1	x	x		1	1
Sturnira tildae	1		x	x	1	x	1	1										
Uroderma bilobatum	1		x	x	1	1	1	x										
Uroderma magnirostrum	1		x	1	x	x	x	x										
Vampyressa bidens	1		x	x	x	1												
Vampyrodes caraccioli	1		x	x	1													
Desmodus rotundus	1	1	x	x	1	1	1	1	1	1	1	1	1	1	x	1	1	1
Diaemus youngii	1	1	x	x	x	1	x	x	x	x	x	x	1					
Family Thyropteridae																		
Thyroptera tricolor	1		x	x	x	1												
Family Vespertilionidae																		
Eptesicus andinus	1		x	x	x	x	1	x	x	x	x							
Eptesicus furinalis	1	1	x	x	x	x	1	x	x	x	1	1	1	1	x	1	1	x
Eptesicus diminutus		1										1	1	1	x	1		
Histiotus laephotis	1	1			x	x	1	x	x	x	1	1	1	1	x	1	1	x
Histiotus macrotus		1													x	1	1	x
Histiotus velatus	1	1				1	x	1	x	x	1	1	x	1				
Lasiurus blossevillii	1	1	x	x	x	1	1	x	x	x	1	1	1	1	1	1	1	x
Lasiurus cinereus	1	1				1	1	x	1	x	1	1	x	1	x	1	1	x
Dasypterus ega	1	1	x	x	1	x	x	x	x	x	1	x	1	1	x	1	1	x
Myotis albescens	1	1	x	x	x	1	1	x	x	x	x	1	1	1	x	1	1	x
Myotis keaysi		1	1	x	x	x	1	1	1	1	x	1	x	1	x	x	1	1
Myotis levis	1	1					1	x	1	x	x	1	x	1	x	1	1	x
Myotis nigricans	1	1	x	1	1	1	1	1	x	x	1	1	1	1	x		1	1
Myotis riparius		1										1	1	1	x		1	1
Myotis oxyotus	1				x	1	1											
Family Molossidae																		
Cynomops planirostris	1	1	x	x	x	1	x	x	x	x	x	1	1	1				
Eumops auripendulus	1		1	1			1											
Eumops bonariensis		1															1	1
Eumops dabbenei		1														1		
Eumops glaucinus	X	1					x	x	x	x	x	x	1	1	x		1	x
Eumops patagonicus		1										1	1	1	x		1	1
Eumops perotis	X	1					x	x	x	x	x		1	1	x	1	1	x
Molossops temminckii	1	1	x	x	1	x	1	x	x	x	1	1	1	1	x	1		
Molossus ater		1	1	x	x	x	x	x	x	x	x	x	x	1	1	x		
Molossus molossus	1	1	x	1	1	1	1	x	x	1	1	1	1	1	x	1	1	x
Nyctinomops aurispinosus	1		x	x	1	x	x	x										
Nyctinomops laticaudatus	1	1	x	x	x	x	x	x	x	x	1	x	1	1	x	1		
Nyctinomops macrotis	1	1	x	x	x				x	x	x	x	1	x	x	1	x	x
Promops nasutus	1	1	x	x	x	x	1	x	x	x	x	1	1	x	x	1	x	x
Tadarida brasiliensis	1	1			x	1	1	1	x	1	1	1	1	1	1	1	1	x

Each set of similarity coefficients produced a matrix, the data from which were subjected to the unweighted pair-group arithmetic averaging cluster algorithm (UPGMA) to define associations among regions. Cophenetic correlation coefficients between the resultant phenogram and the original similarity matrix estimate the degree to which the relationships suggested by clustering are representative of the actual relation among elements in the original similarity matrix. Concensus between phenograms based upon the Simple Matching and Jaccard's coefficients indicate the group relationships common to both analyses (Sokal and Rohlf, 1962). The analysis was made using NTSYS (Rohlf, 1993).

Species Accounts.- The systematics used in this work follows Barquez *et al.* (1999b) and Anderson (1997) in order to simplify the interpretation of the identity of the species, in relation with the previous published works. For the species of Bolivia, the identity of the species given by Anderson (1997) is accepted however *Phylloderma* is considered as a valid genus and the trinomial *Artibeus planirostris fallax* is used instead of *A. jamaicensis fallax*. We considered *Histiotus laephotis* as a full species and not a subspecies of *H. montanus*. The treatment of the species includes Specimens Examined, Additional Records, and Comments. In this last section we included some biological aspects, observed during the field studies, as well as remarks on distribution, taxonomic position, characteristics of the habitat, and other points of interest of the species.

RESULTS

Family Noctilionidae

Noctilio leporinus (Linnaeus)

Vespertilio leporinus Linnaeus, Systema naturae per regna tria naturae, secundum classis, ordines, genera, species cum characteribus, diffenetiis, synonymis, locis. Tenth ed. Vol 1. Laurentii Salvii, Stockholm, 1:32, 1758.

Specimens Examined.- (8). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N° 20, 1 (ARG); Yuto, 1 (AMNH). SALTA: Los Madrejones, Junta de los Ríos Tarija e Itaú, 1400 m, 4 (CML); Orán, 1 (MACN); San Ramón de la Nueva Orán, 1 (MACN).

Additional Records.- JUJUY: Santa Clara (Yepes, 1944). SALTA: Embarcación, Finca Tres Pozos, 247 km NE San Salvador de Jujuy (Villa-R. and Villa-C., 1971).

Comments.- The subspecies inhabiting in Argentina is *Noctilio leporinus rufescens* Olfers. Some authors have reported sexual dimorphism in the morphometric characters and patterns of

coloration (Allen, 1937; Willig, 1983) of this species, but these cannot be clearly defined in our sample due to the scarcity of specimens known for the area. According to our information, it is a rare species in northwestern Argentina and we have examined only eight specimens from the Yungas of Salta and Jujuy provinces. The specimens from Salta have a cream or yellowish medial dorsal line and the sagittal crest is poorly developed in the specimen from Yuto, Jujuy, while in the specimen from Río Las Capillas, 15 km al N de Las Capillas, Jujuy, it is well marked. Although some authors have observed this species in large groups (Willig, 1983) we have recorded only one specimen from Río Las Capillas. This is the first record for the species in the province of Jujuy in almost 40 years, since the last specimen was captured in Yuto, in 1959, as reported by Davis (1973).

Family Phyllostomidae

Subfamily Phyllostominae

***Chrotopterus auritus* (Peters)**

Vampyrus auritus Peters, Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin, p. 415, 1856.

Specimens Examined.- (18). JUJUY: Abra de Cañas, El Monolito, 1700 m, 1 (CML); Aguas Negras, 600 m, 1 (MACN); Aguas Negras, Parque Nacional Calilegua, 1 (CML); La Brea, 1 (MACN); Laguna La Brea, 3 (1 MACN, 2 MMD); Ruta 83, camino a Valle Grande, 9 km al N de San Francisco, 1 (MMD). SALTA: 27 km W of the junction of Argentine Highway 50 and the road to Isla de Cañas, 1 (ARG); Abra Grande, 20 km NW Orán, 1 (CML); Piquirenda Viejo, 6 km W, 1 (CML); Sendero Las Chuñas, Parque Nacional El Rey, 1 (PIDBA); Vado de Arrazayal, 20 km NW Aguas Blancas, 2 (CML). TUCUMÁN: Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas, 2 (CML); Dique Escaba, 1 (PIDBA); Dique San Ignacio, 1 (CML).

Additional Records.- SALTA: Abra Grande (Olrog, 1976).

Comments.- Before 1985 this species was known in northwestern Argentina only from the provinces of Salta and Jujuy. Barquez and Guerrero (1985) included it in Tucumán based on a specimen collected at Dique San Ignacio. Until then, the capture rate of this species was very low in the province of Tucumán, although its presence was suspected due to the remains of birds or bats eaten in the mist nets. We first observed this phenomenon at the locality of Arroyo Aguas Chiquitas in Tucumán, and in the last five years, we have added other specimens from several localities of the province. The specimen from Dique Escaba was captured in a mist net placed at the entrance to a shelter of about 12 million individuals of *Tadarida brasiliensis*, a species that could be a food source for *Chrotopterus*.

In Jujuy Province, at Laguna La Brea, we have recorded a male with abdominal testes and a female with closed vagina, in May; reproductive activity has not been observed in males collected in Jujuy in June at Aguas Negras, Parque Nacional Calilegua, in August at Ruta 83,

camino a Valle Grande, 9 km al N de San Francisco, and in Salta at Sendero Las Chuñas in October.

Micronycteris sp.

Specimens Examined.- (1). SALTA: 27 km W of the junction of Argentine Highway 50 and the road to Isla de Cañas, 1 (CML).

Comments.- This genus was recently included in the argentine fauna by Barquez *et al.* (1999a). The genus previously was not known for the country and the southernmost records from Bolivia correspond to the localities mentioned by Anderson (1997). The record from Salta extends the geographical distribution of the genus from central Bolivia to northern Argentina, about 500 km southward. However, the specimen was tentatively identified as a member of the genus *Micronycteris* based on the diagnostic characters presented by Simmons (1996) and Simmons and Voss (1998), Barquez et al. (1999a) have observed that the characters of the specimen may indicate that the unidentified species could be an undescribed taxon.

In Bolivia, the scarce records of the genus *Micronycteris* correspond to the Yungas region, as does the record from Salta. The latter was collected in Palo Blanco forest (*Callicophyllum multiflorum* and *Phyllostylon ramnhoides*) in the proximity of the Río San Andrés, a zone of great human impact consisting of forest exploitation, establishment of homes, and more recently to the construction of an extensive natural gas pipeline. The specimen was captured between 2000 and 2100 hs with a mist net; this was the only specimen of this species obtained during four nights of collecting bats. Other species captured at the same locality were *Desmodus rotundus, Sturnira lilium, Artibeus planirostris*, and *Chrotopterus auritus.*

Tonatia bidens (Spix)

Vampyrus bidens Spix, Simiarum et Vespertilionum Brasiliensium species novae ou histoire naturelle des especies nouvelles de singes et de chauve-souris observées et recueillies pendant le voyage dans l'intèrieur du Bresil execute par ordre de S. M. le Roi de Baviere dans les annees 1817, 1818, 1819,1820. Francisci Seraphici Hübschmanni, Monachii, p. 65, 1823.

Specimens Examined.- (8). JUJUY: Laguna La Brea, 7 (6 MACN, 1 ROM); Laguna La Brea, 25 km antes de Palma Sola sobre Ruta 1, 1 (OMNH).

Comments.- Some comments about specimens of this species from Laguna La Brea were given by Barquez (1988). Although it seems to be a common species at that locality it has not been collected in other localities of the Yungas of Argentina. Fornes *et al.* (1967) mentioned this species from Palma Sola, Jujuy, a locality near Laguna La Brea, but in the Chacoan region. The species also has been cited in Argentina from the Paranaense region, in the province of Misiones (Villa-R. and Villa-C., 1971).

Subfamily Glossophaginae

***Anoura caudifer* (É. Geoffroy St.- Hilaire)**

Glossophaga caudifer É. Geoffroy St.-Hilaire, Mèmoires du Muséum d'Histoire Naturelle, Paris, 4:418, 1818.

Specimens Examined.- (8). JUJUY: Arroyo Sauzalito, Parque Nacional Calilegua, 1 (CML). SALTA: Agua Blanca, 5 km W, 1 (MACN); Itaú (Campo Largo), Sierras de Tartagal, 1600 m, 1 (CML); Parque Nacional Baritú, naciente Arroyo Santelmita, 900 m, 1 (CML); Piquirenda Viejo, 6 km W, 1 (CML); Río Pescado, 3 (2 MACN, 1 OMNH).

Comments.- The specimen cited by Olrog and Barquez (1979) from Itaú (Campo Largo), Sierras de Tartagal, 1600 m, a young individual with the cranium not completely ossified and deciduous dentition, was captured by the middle of October. The specimen from Río Pescado (OMNH) was captured at the ground level in a mist net placed over a sand bar along the river. The specimen from Piquirenda Viejo, 6 km W, was obtained in a net placed across a stream with still water at one of the exits/entrances of a sewer. The specimen from Arroyo Sauzalito, Parque Nacional Calilegua, erroneously cited by Heinonen and Bosso (1994) as from Caimancito, was a male with abdominal testes, captured in June in a net placed near flowering plants; in the same locality *Sturnira oporaphilum, S. erythromos, S. lilium, Histiotus laephotis, Promops nasutus*, and *Molossus molossus* also were captured. A week later, two specimens of *Glossophaga soricina* were captured by collaborators in the same zone (Planta Caimancito). *Anoura caudifer, Sturnira oporaphilum, Cynomops planirostris*, and *Micronycteris* sp. represent the only species of bats until now known to be exclusive of the Yungas of Argentina.

***Glossophaga soricina* (Pallas)**

Vespertilio soricinus Pallas, Miscellanea Zoologica, quibus nov imprimis atque obscur animalium species describuntur et observationibus i conibusque illustrantur. Hagae Comitum, apud Petrum van Cleef, p.48, 1766.

Specimens Examined.- (3). JUJUY: Planta Caimancito, Parque Nacional Calilegua, 2 (CML). SALTA: Abra Grande, 10 km N Orán, 1 (CML).

Comments.- This species was recorded from northwestern Argentina by Barquez (1985) based on a specimen from Salta Province. Later the species was added to Jujuy by Heinonen and Bosso (1994) based on the specimens in the CML that are indicated in "Specimens Examined". Scarce records of this species are known from Argentina; in addition to the records above mentioned it has been reported for the provinces of Buenos Aires (Cabrera, 1930), Chaco (Podtiaguin, 1944), and Misiones (Barquez *et al.* 1993). The specimen from Salta was collected in disturbed transitional forest mixed with cultivation fields and intensive deforestation (Barquez, 1985), while in Jujuy the collecting place was a well-preserved area in a National Park.

Subfamily Stenodermatinae

***Artibeus planirostris* (Spix)**

Phyllostoma planirostre Spix, Simiarum et Vespertilionum Brasiliensium species novae ou histoire naturelle des especies nouvelles de singes et de chauve-souris observées et recueillies pendant le voyage dans l'intèrieur du Bresil execute par ordre de S. M. le Roi de Baviere dans les annees 1817, 1818, 1819,1820. Francisci Seraphici Hübschmanni, Monachii, p. 66, 1823.

Specimens Examined.- (177). JUJUY: Abra de Cañas, El Monolito, 1700 m, 1 (CML); Abra de Santa Laura, límite entre Salta y Jujuy, sobre Ruta Nacional N˚ 9, 1397 m, 9 (PIDBA); Aguas Negras, 1 (MACN); Aguas Negras, Parque Nacional Calilegua, 1 (CML); Arroyo Yuto, 13 km SW Yuto, 3 (released); Caimancito, 2 (MACN); Calilegua, 1 (FCM); Camino de Cornisa, 10 km W Dique La Ciénaga, 1 (CML); Fraile Pintado, 12 km W, sobre Río Ledesma, 2 (released); Laguna La Brea, 1 (MMD); Laguna La Brea, 25 km antes de Palma Sola, sobre Ruta 1, 3 (1 AMNH, 2 OMNH); Laguna La Brea, 25 km W Palma Sola, 9 (CML); On Highway 9 at border with Salta, at campground on the way to El Carmen, 3 (1 IADIZA, 2 OMNH); Río Blanco, 9 km al SW de San Antonio, 1495 m, 10 (2 ARG, 8 PIDBA); Río de Zora y cruce con ruta 34, 1 (CML); Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20, 9 (2 MMD, 7 ARG); Ruta 83, camino a Valle Grande, 9 km al N de San Francisco, 1 (MMD); Vinalito, 2 km al SE, al borde del segundo canal, 5 (released); Yuto, 4 (3 AMNH, 1 CML). SALTA: 12.6 km al W de Piquirenda Viejo, 1 (PIDBA); 27 km W of the junction of Argentine Highway 50 and the road to Isla de Cañas, 2 (ARG); 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Abra Grande, 1 (CML); Aguas Blancas, 2 (CML); Arroyo Los Noques, Parque Nacional El Rey, 1 (CM); Itaú (Campo Largo), Sierras de Tartagal, 1600 m, 1 (CML); Junta de los Ríos Tarija y Bermejo, 1 (CML); Juntas de San Antonio, 12 (CM); La Caldera, 1 (ROM); Los Madrejones, Junta de los Ríos Tarija e Itaú, 1400 m, 1 (CML); Orán, 15 km S, 15 km W, along Río Santa María, 4 (CM); Piquirenda Viejo, 30 km N Tartagal, 12 (CM); Piquirenda Viejo, 6 km W, 1 (CML); Piquirenda Viejo, 8 km W, 2 (CML); Río de las Conchas, 2 km N y 6 km W Metán, 2 (PIDBA); Serranía de las Pavas, 3 (CML); Tabacal, 41 (40 MACN, 1 TTU). TUCUMÁN: Agua Colorada, 8 (MACN); Aguas Chiquitas, Sierras de Medina, 800 m, 1 (CM); Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas, 1 (CML); Las Juntas, 22 km W Choromoro, 1 (CML); Las Juntas, 22 km W Choromoro on Hwy 312, 3,500 ft., 1 (OMNH); Playa Larga, Río Los Sosa, Ruta 307 km 19.7, 1 (CML); Quebrada del Toro, 1 (CML); Reserva Provincial "Aguas Chiquitas" El Cadillal, 4 (CM); Río Loro, 2 (PIDBA); Taco Yana, 1 (CML).

Additional Records.- JUJUY: Finca La Carolina, Los Perales, San Salvador de Jujuy, 1310 m (Villa-R. and Villa-C., 1971 as *A. lituratus*).

Comments.- *Artibeus planirostris* was the only species of the genus known until now from northwestern Argentina. *Artibeus planirostris* prefers forested habitats although displacements to the chacoan region have been recorded (Barquez and Ojeda, 1992).

At several localities in the Yungas of Jujuy reproductive activity of this species was recorded: males had abdominal testes in May at Abra de Santa Laura, Arroyo Yuto, Fraile Pintado, Laguna La Brea, Río Blanco, and Vinalito; in June at Aguas Negras and Laguna La Brea; in July at Laguna La Brea, Río Blanco, and Río Las Capillas; in August at Río Las Capillas and Ruta 83, camino a Valle Grande, 9 km al N de San Francisco; males with scrotal testes were recorded in February at On highway at border with Salta, at campground on the way to El Carmen; in May at Río Blanco, and in July at Río Las Capillas. Females with closed vaginas were captured in May at Abra de Santa Laura, Arroyo Yuto, Camino a Puesto Viejo, Fraile Pintado, Laguna La Brea, Río Blanco, and Vinalito; females with open vaginas in February at On highway at border with Salta, at campground on the way to El Carmen; in May at Abra de Santa Laura, and Vinalito; in July at Laguna La Brea, Río Blanco, and Río Las Capillas; in August at Río Las Capillas and in October at Río de Zora. We also have captured lactating females at Abra de Santa Laura in May.

***Pygoderma bilabiatum* (Wagner)**

Phyllostoma bilabiatum Wagner, Wiegmann's Archiv für Naturgeschichte, Jahrgang 9, Bd. 1:366, 1843.

Specimens Examined.- (5). SALTA: 43.7 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Agua Blanca, 2 (CML); Piquirenda Viejo, 30 km N Tartagal, 1 (CM); Vado de Arrazayal, 20 km NW Aguas Blancas, 1 (CML).

Additional Records.- JUJUY: Calilegua (CEM, not examined).

Comments.- No other records of this species from the Province of Jujuy than the specimen mentioned in "Additional Records," have been found in the literature. Although the specimen has not been examined, the information was obtained from the catalog of the Collection of Elio Massoia which is reliable. This species is not common in northwestern Argentina and its capture is very rare, in contrast to the forests of the Paranaense Region in the province of Misiones, where it is abundant.

***Sturnira erythromos* (Tschudi)**

Ph[yllostoma] erythromos Tschudi, Therologie. Untersuchungen über die Fauna Peruana. Scheitlin und Zollikofer, St. Gallen, Switzerland, p. 64, 1844.

Specimens Examined.- (156). CATAMARCA: Cuesta del Clavillo, 3 km SW La Banderita, 13 (CML). JUJUY: Abra de Cañas, 1710 m, 3 (MACN). Abra de Cañas, 1724 m, 2 (CML); Abra de Cañas, app. 30 km NW Calilegua, sobre ruta a Valle Grande, 2 (CM); Abra de Santa Laura, límite entre Salta y Jujuy, sobre Ruta Nacional N˚ 9, 1397 m, 3 (PIDBA); Aguas Blancas, 14 km E Santa Clara, 9 (OMNH); Aguas Negras, Parque Nacional Calilegua, 2 (CML); Arroyo Sauzalito, Parque Nacional Calilegua, 5 (CML); Arroyo Yuto, 13 km SW Yuto, 1 (MMD); Calilegua, El Monolito, 1 (CML); Cerro El Morado, 11 km al NO de San Antonio, sobre Río El Morado, 4 (3

MMD, 1 released); El Duraznillo, 3000 m, Cerro Calilegua, 3 (CML); El Simbolar, 25 km SW Palma Sola, 1000 m, 1 (CM); Laguna La Brea, 25 km antes de Palma Sola sobre Ruta 1, 1(OMNH); On Highway 9 at border with Salta, at campground on the way to El Carmen, 2 (1 IADIZA, 1 OMNH); Río Blanco, 9 km al SW de San Antonio, 1495 m, 3 (1 ARG, 2 PIDBA); Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N° 20, 4 (ARG); Yuto, 1 (CML). SALTA: 12.6 km al W de Piquirenda Viejo, 1 (PIDBA); 43.7 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 2 (PIDBA); 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Agua Blanca, 24 km NW, 5 (4 CM, 1 TTU); Alto Macueta, 2 km N del cruce de Macueta y Campo Largo, 1 (AA); Parque Nacional Baritú, Finca Jakulica, Angosto del Río Pescado, 650 m, 6 (CML); Parque Nacional Baritú, Las Juntas de Río Lipeo y Bermejo, 1 (CML); Río de las Conchas, 2 km N y 6 km W Metán, 13 (PIDBA); Serranía de las Pavas, 3 (PIDBA). TUCUMÁN: Aguas Chiquitas, El Cadillal, 1 (CM); Arroyo de las Cañas, Horco Molle, 4 (CML); Arroyo El Saltón, Reserva Provincial Santa Ana, 1 (CML); Biological Reserve at Horco Molle, near residencia, 2,400 ft., 1 (OMNH); Casa de Piedra, Río Los Sosa, ruta 307, km 24.9, 850 m, 8 (CML); Cerro San Javier, 2 (CML); El Naranjal, 1 (TTU); Horco Molle, 15 km W San Miguel de Tucumán, 11 (CM); Horco Molle, Biological Reserve, 1 (OMNH); Horco Molle, Río Las Cañas, 1 (CML); Las Juntas, 22 km W Choromoro, 1 (OMNH); Las Juntas, 22 km W Choromoro on Hwy 312, 3,500 ft., 1 (CML); Parque Provincial El Cochuna, km 40 sobre ruta 47, 1 (PIDBA); Piedra Tendida, 12 km WNW Burruyacú along Río Cajón, 2,500 ft., 3 (1 CML, 1 IADIZA, 1 OMNH); Piedra Tendida, 5 km W de Dique El Cajón, 1 (CML); Playa Larga, Río Los Sosa, Ruta 307 km 19.7, 2 (PIDBA); Quebrada de Lules, 11 km SW San Pablo, 2 (CM); Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 750 m, 1 (OMNH); Río Los Sosa, Ruta 307, km 23.9, camino a Tafí del Valle, 850 m, 5 (OMNH); Río Los Sosa, Ruta 307, km 24, 1 (CML); Río Los Sosa, Ruta 307, km 24.9, camino a Tafí del Valle, 850 m, 3 (OMNH); Río Pueblo Viejo, Reserva Provincial La Florida, 10 (CML); San Pedro de Colalao, south of, at km marker 42, on Hwy 364, 4,700 ft, 1 (OMNH).

Additional Records.- TUCUMAN: Horco Molle, Río Las Piedras (Autino and Barquez, 1994).

Comments.- This is one of the most common species of phyllostomids in the Yungas of Argentina, although less abundant than *S. lilium*. It is little studied from the point of view of ecology and biology. The correct locality for the specimens mentioned by Mares *et al.* (1997) as Cuesta del Clavillo, 5 SW La Banderita, Catamarca, is Cuesta del Clavillo, 3 SW km La Banderita.

Some aspects of their reproduction and feeding habits in Tucumán Province, were reported by Autino and Barquez (1994). In Jujuy males with scrotal testes were captured in May at Arroyo Yuto, Abra de Santa Laura, and Río Blanco, and in June at Cerro el Morado, Aguas Blancas, and Arroyo Sauzalito; females with closed vaginas were found in May at Río Blanco, in June at Cerro El Morado, Laguna La Brea and Aguas Blancas, and in July at Río Las Capillas and Río Blanco; females with open vaginas were captured in February at On highway 9 at border with Salta Province, in May at Abra de Santa Laura, and in July at Río Las Capillas.

Sturnira lilium **(E. Geoffroy St.- Hilaire)**

Phyllostoma lilium É. Geoffroy St.-Hilaire, Annales du Muséum d'Histoire Naturelle, Paris, 15:181, 1810.

Specimens Examined.- (589). CATAMARCA: Cuesta del Clavillo, 5 km S La Banderita, 1 (CML); La Merced, 2 (1 MACN, 1 TTU). JUJUY: Abra de Cañas, app. 30 km NW Calilegua, sobre ruta a Valle Grande, 2 (CM); Aguas Blancas, 14 km E Santa Clara, 4 (OMNH); Aguas Negras, 600 m, 1 (MACN); Aguas Negras, 650 m, 1 (MACN); Aguas Negras, Parque Nacional Calilegua, 12 (CML); Arroyo Sauzalito, Parque Nacional Calilegua, 4 (2 CML, 2 RMB); Arroyo Yuto, 13 km al SO de Yuto, 131 (7 MMD, 124 released); Camino de Cornisa, 10 km W Dique La Ciénaga, 1 (CML); El Duraznillo, 3000 m, Cerro Calilegua, 1 (CML); El Simbolar, 25 km SW Palma Sola, 1000 m, 5 (CM); Fraile Pintado, 12 km W, sobre Río Ledesma, 67 (3 MMD, 64 released); Laguna La Brea, 41 (4 MMD, 35 released); Laguna La Brea, 25 km W Palma Sola, 14 (12 OMNH, 2 CML); Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20, 6 (4 ARG, 2 MMD); Vinalito, 2 km al NW, al borde del segundo canal, 61 (4 MMD, 57 released); Yuto, 3 (AMNH). SALTA: 12.6 km al W de Piquirenda Viejo, 3 (PIDBA); 27 km W of the junction of Argentine Highway 50 and the road to Isla de Cañas, 11 (ARG); 43.7 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 2 (PIDBA); 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 3 (PIDBA); Agua Blanca, 20 km NW, 2 (TTU); Agua Blanca, 24 km NW, 11 (CM); Agua Blanca, 25 km NW, 5 (TTU); Agua Blanca, 5 km W, 4 (3 MACN, 1 TTU); Aguaray, 2 (MACN); Aguas Blancas, 4 (CML); Alto Macueta, 2 km N del cruce de Macueta y Campo Largo, 1 (AA); Arroyo Los Noques, Parque Nacional El Rey, 15 (CM); Finca El Arrazayal, Serranía de las Pavas, 1 (CML); Ingenio San Martín del Tabacal, 3 (TTU); Itaú (Campo Largo), Sierras de Tartagal, 1600 m, 3 (CML); Junta de los Ríos Tarija y Bermejo, 4 (CML); Juntas de San Antonio, 17 (CM); Orán, 20 km al NW, 9 (MACN); Parque Nacional Baritú, Finca Jakulica, Angosto del Río Pescado, 650 m, 1 (CML); Piquirenda Viejo, 30 km N Tartagal, 11 (CM); Piquirenda Viejo, 6 km W, 4 (CML); Quebrada de Acambuco, 5 km W Dique Itiyuro, 1 (IADIZA); Río de las Conchas, 2 km N y 6 km W Metán, 3 (PIDBA); Río Pescado, 22 (TTU); Tabacal, 4 (3 MACN, 1 TTU); Vado de Arrazayal, 20 km NW Aguas Blancas, 6 (CML). TUCUMÁN: Agua Colorada, 11 (8 MACN, 2 TTU); Arroyo El Saltón, Reserva Provincial Santa Ana, 1 (CML); Concepción, 1 (BMNH); Dique San Ignacio, 1 (CML); El Cadillal, Estación de Piscicultura, 1 (OMNH); El Naranjal, 1 (TTU); Horco Molle, 15 km W San Miguel de Tucumán, 7 (CM); Horco Molle, 900 m, 2 (CML); Horco Molle, Río Las Leñas, 2 (CML); Horco Molle, Río Las Piedras, 25 (CML); Ingenio San Pablo, 1 (MACN); Los Sarmientos, 1 (CML); Parque Provincial El Cochuna, km 40 sobre ruta 47, 4 (CML); Piedra Tendida, 5 km W de Dique El Cajón, 1 (CML); Playa Larga, Río Los Sosa, Ruta 307 km 19.7, 6 (CML); Reserva Provincial "Aguas Chiquitas" El Cadillal, 1 (CML); Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 700 m, 1 (OMNH); Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 750 m, 5 (OMNH); Río Los Sosa, Ruta 307, km 23.9, camino a Tafí del Valle, 850 m, 1 (OMNH); Río Los Sosa, Ruta 307, km 24.9, camino a Tafí del Valle, 850 m, 2 (OMNH); Río Pueblo Viejo, Reserva Provincial La Florida, 1 (CML); San Miguel de Tucumán, 1 (BMNH); San Pedro de Colalao, 2 (1 CML, 1 TTU); Tucumán, 1 (FMNH).

Additional Records.- JUJUY: Arroyo La Urbana, 45 km E y 5.4 km SE San Salvador de Jujuy, 620 m (Villa-R. and Villa-C., 1971); Paraje Palo Blanco, Parque Nacional Calilegua (Iudica, 1995)

Comments.- Like *Sturnira erythromos*, this is one of the most common species of bats of the forests of northwestern Argentina. Iudica (1995) studied frugivory in *S. lilium* at Parque Nacional Calilegua, Jujuy, and Autino and Barquez (1994) published information on the reproduction and feeding of this species at Horco Molle, Río Las Piedras, Tucumán. Mares *et al.* (1996) reported information on the reproduction of this species at Río Los Sosa, Ruta 307, km 23.9, camino a Tafí del Valle, 850 m, Tucumán. In Jujuy, we have captured males with abdominal testes and females with closed vaginas in May at Arroyo Yuto, Fraile Pintado, Laguna La Brea, and Vinalito; in June at Arroyo Sauzalito, Laguna La Brea, and Río Las Capillas; in July at Laguna La Brea, and Río Las Capillas; males with scrotal testes have been collected in May at Fraile Pintado and Laguna La Brea; in June at Aguas Blancas and in July at Laguna La Brea; in June at Aguas Negras and in June and July at Laguna La Brea; females with open vaginas were recorded in May at Arroyo Yuto, at Fraile Pintado, Laguna La Brea, and Vinalito; lactating females also were captured in May at Arroyo Yuto, Laguna La Brea, and Vinalito.

***Sturnira oporaphilum* (Tschudi)**

Ph[yllostoma] oporaphilum Tschudi, Therologie. Untersuchungen über die Fauna Peruana. Scheitlin und Zollikofer, St. Gallen, Switzerland, p. 64, plate 2, 1844.

Specimens Examined.- (6). JUJUY: Arroyo Sauzalito, Parque Nacional Calilegua, 2 (CML); Calilegua, El Monolito, 1 (CML); Laguna La Brea, 25 km antes de Palma Sola sobre Ruta 1, 1 (OMNH). SALTA: Serranía de las Pavas, 1 (OMNH). TUCUMÁN: Casa de Piedra, Río Los Sosa, ruta 307, km 24.9, 850 m, 1 (OMNH).

Additional Records.- TUCUMÁN: Piedra Tendida (Mares *et al.*, 1996).

Comments.- This is a rare species in Argentina according with the information from the literature, and specimens examined in museums. It is also one of the exclusive species from Yungas (see Comments for *Anoura caudifer*). Mares *et al.* (1996) offered data on the reproduction of this species in Argentina. We captured a male with abdominal testes in June at Laguna La Brea, Jujuy Province.

Subfamily Desmodontinae

***Desmodus rotundus* (É. Geoffroy St.- Hilaire)**

Phyllostoma rotundum É. Geoffroy St.- Hilaire, Annales Muséum d'Histoire Naturelle, Paris, 15:181, 1810.

Specimens Examined.- (38). JUJUY: Abra de Cañas, 1730 m, 1 (CML); Abra de Santa Laura, límite entre Salta y Jujuy, sobre Ruta Nacional N˚ 9, 1397 m, 3 (PIDBA); Aguas Negras, Parque Nacional Calilegua, 2 (CML); Dique Las Maderas, 1 (MACN); Laguna La Brea, 2 (CML); Laguna La Brea, 25 km W Palma Sola, 2 (CML); Laguna La Brea, 25 km antes de Palma Sola, 2 (1 AMNH, 1 OMNH); On Highway 9 at border with Salta, at campground on the way to El Carmen, 2 (1 IADIZA, 1 OMNH); Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20, 2 (1 ARG, 1 MMD); Ruta 83, camino a Valle Grande, 9 km al N de San Francisco, 1 (Released). SALTA: 12.6 km al W de Piquirenda Viejo, 2 (PIDBA); Agua Blanca, 1 (CML); Laguna de las Catas, 1 (CML); Orán, 20 km al NW de Agua Blanca, 1 (MACN); Piquirenda Viejo, 6 km W, 1 (PIDBA); Quebrada de Acambuco, 5 km W Dique Itiyuro, 1 (IADIZA). TUCUMÁN: Casa de Piedra, Río Los Sosa, ruta 307, km 24.9, 850 m, 1 (CML); Dique San Ignacio, 1 (CML); El Cadillal, 1 (CML); Horco Molle, 15 km W San Miguel de Tucumán, 1 (CM); Km 16, Ruta 307, 1 (PIDBA); Monte Bello, 3 (CML); Monte Bello, margen derecha del Río Medina, 1 (CML); Piedra Tendida, 5 km W de Dique El Cajón, 1 (CML); Playa Larga, Río Los Sosa, Ruta 307 km 19.7, 1 (CML); Río Los Sosa, Ruta 307, km 23.9, camino a Tafí del Valle, 850 m, 1 (OMNH).

Additional Records.- CATAMARCA: Cuesta del Totoral (S. Lougheed, personal communication). JUJUY: Arroyo La Urbana, 45 km E y 5.4 km SE San Salvador de Jujuy, 620 m; Cercanías de San Pedro; Cueva del Tigre, 74 km N Pampa Blanca, 700 m; Dique Las Maderas, 42 km San Salvador de Jujuy, 920 m; Finca Catamontaña, 33 km SSE San Salvador de Jujuy, 925 m (Villa-R. and Villa-C., 1971). SALTA: 27 km W of the junction of Argentine Highway 50 and the road to Isla de Cañas (Barquez *et al.*, 1999a); Cueva del Murcielagallo, 15 km SSW Santa Victoria, 2000 m (Villa-R. and Villa-C., 1971). TUCUMÁN: Ingenio Lules (Romaña and Abalos, 1950).

Comments.- In Jujuy, males with abdominal testes were recorded in June at Aguas Negras and Laguna La Brea, and at Río Las Capillas in August; males with scrotal testes were obtained in May at Abra de Santa Laura and at Laguna La Brea in July. Females with closed and with open vaginas were captured at Abra de Santa Laura, and females with open vaginas at Río Las Capillas in May.

***Diaemus youngi* (Jentink)**

Desmodus youngi Jentink, Notes of the Leiden Museum, 15:282, 1893.

Specimens Examined.- (1). JUJUY: Agua Salada, app. 15 km SE Agua Caliente, lado oriental del Río San Francisco, 1 (CML).

Comments.- This species of vampire bat seems to be very rare in Argentina. After several years of field surveys in northwestern Argentina only the specimen examined from Jujuy has been captured in the region. This, a female with an open vagina, was collected at the beginning of August in a mixed habitat of transitional forests of the Yungas with chacoan vegetation.

Family Vespertilionidae

***Dasypterus ega* (Gervais)**

Nycticeius ega Gervais, Deuxième Mémoire. Documents zoologiques pour servir à la monographie des Chéiropterès Sud-Américains. Pp. 25-88, in P.Gervais, ed., Mammiféres. *In* Animaux nouveaux ou rares recueillis pendant l'expédition dans les parties centrales de l'Amérique du sud, de Rio de Janeiro a Lima, et de Lima au Para; exécutée par ordre du gouvernement FranÇais pendant les années 1843 á 1847, sous la direction du compte Francis de Castelnau (F. Castelnau, ed.). P. Bertrand, Paris, 1(2):77, 1855 (1856).

Specimens Examined.- (15). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20, 1 (MMD); Yuto, 1 (AMNH). SALTA: Arroyo La Sala, Centro Administrativo, Parque Nacional El Rey, 1 (PIDBA); San Ramón de la Nueva Orán, 1 (MACN). TUCUMÁN: Acheral, 1 (CML); Ciudad Capital, 1 (OMNH); Los Vásquez, 445 m, 2 (BMNH); San Miguel de Tucumán, 4 (1 BMNH, 3 CML); Tafí Viejo, 1 (CML); Tucumán, 1 (FMNH); Tucumán, ciudad, 1 (CML).

Additional Records.- JUJUY: Arroyo La Urbana, 45 km E y 5.4 km SE San Salvador de Jujuy, 620 m (Villa-R. and Villa-C., 1971); Calilegua (CEM, not examined). TUCUMÁN: Muñecas; Tucumán (Romaña and Abalos, 1950).

Comments.- Morales and Bickham (1995) suggested that the frosted and red bats (*Lasiurus borealis, L. blossevilli*, and *L. cinereus*) constitute a group separate from the yellow bats (*Dasypterus*). The latter has been recognized as a different genus from *Lasiurus* by several authors (Barquez *et al.* 1999b; Cabrera, 1957; Husson, 1962, 1978; Miller, 1907). This suggestion also is supported by studies of dental morphology (Tate, 1942) and morphology of the bacula (Hill and Harrison, 1987).

Acosta and Lara (1950), Fornes and Massoia (1967), and Crespo (1974), have mentioned the capture of isolated individuals and groups of up to 20 individuals, between the leaves of palms. We have observed single individuals between the leaves of introduced palms in gardens in the city of Tucumán. Villa-R. and Villa-C. (1971) captured this species in roofs of houses built with leaves of palm and straw, in Arroyo La Urbana, Jujuy. Little is known about the reproduction of this species. During our study we have captured a female with an open vagina in August at Río Las Capillas, Jujuy province, and a female with closed vagina at Arroyo La Sala, Salta.

***Eptesicus diminutus* Osgood**

Eptesicus diminutus Osgood, Field Museum of Natural History, Zoological Series, 10:197, 1915.

Specimens Examined.- (11). JUJUY: Laguna La Brea, 25 km W Palma Sola, 2 (CML). SALTA: Agua Blanca, 24 km NW, 1 (CM); Aguaray, 700 m, 1 (MACN); Arroyo La Sala, Centro Administrativo, Parque Nacional El Rey, 2 (PIDBA); Quebrada de Acambuco, 5 km W Dique

Itiyuro, 1 (RAO). TUCUMÁN: Aguas Chiquitas, 1 (CM); Aguas Chiquitas, Sierras de Medina, 800 m, 2 (CM); El Cadillal, Estación de Piscicultura, 1 (CM).

Comments.- This species is relatively rare in the Yungas. The specimens from Laguna La Brea, 25 Km W Palma Sola, Jujuy, represent the first record for this species on this province (Barquez and Lougheed, 1990). The specimens collected at Arroyo La Sala were females, one with open vagina, and the other was pregnant with two fetuses of 13.7 and 11.1 C-R= crown-rump.

***Eptesicus furinalis* (D'Orbigny)**

Vespertilio furinalis d'Orbigny, Mammifères. In Voyage dans l'Amérique Méridionale (le Brésil, la République orientale de Uruguay, la République Argentine, la Patagonie, la République du Chili, la République de Bolivia, la République du Perou) exécuté pendant les années 1826, 1827, 1828, 1829, 1830, 1831, 1832, et 1833. Tome Quatrième. 2e Partie (A. d'Orbigny, ed.). Pitois-Levrault, et cie, Paris, 4:13, 1847.

Specimens Examined.- (77). JUJUY: Aguas Negras, 600 m, 1 (MACN); Laguna La Brea, 1 (CML); Laguna La Brea, 25 km W Palma Sola, 1 (CML); Ledesma, 1 (AMNH); Río de Zora y cruce con ruta 34, 1 (CML); Río Ledesma, 14 km S Pueblo Ledesma, 1 (CML); Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20, 2 (1 ARG, 1 MMD); Ruta 83, camino a Valle Grande, 9 km al N de San Francisco, 1 (MMD); Santa Bárbara, 4 (AMNH); Yuto, 22 (19 AMNH, 1 BMNH, 2 MACN). SALTA: 12.6 km al W de Piquirenda Viejo, 1 (PIDBA); 43.7 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Agua Blanca, 24 km NW, 1 (MSB); Agua Blanca, 5 km W, 4 (2 MACN, 2 TTU); Aguaray, 1 (MACN); Angosto del Pescado, Serranía de Las Pavas, 2 (PIDBA); Orán, 1 (CML); Piquirenda Viejo, 6 km W, 4 (CML); Piquirenda Viejo, 8 km W, 1 (CML); Quebrada de Acambuco, 5 km W Dique Itiyuro, 8 (2 CM, 6 RAO); Santa María, sobre Río Santa María, 1 (CML). TUCUMÁN: Aguas Chiquitas, Sierras de Medina, 800 m, 4 (CM); Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas, 3 (CML); Arroyo El Saltón, Reserva Provincial Santa Ana, 1 (CML); Concepción, 3 (BMNH); Las Mesadas, 1 (CML); Las Talas, 4 km al N de Bella Vista, 2 (OMNH); Tucumán, 450 m, 1 (BMNH); Tucumán, ciudad, 1 (CML).

Additional Records.- JUJUY: Caimancito, 550 m (Heinonen and Bosso, 1994).

Comments.- Some data on reproduction on this species has been recorded from the province of Jujuy, where males with scrotal testes have been captured at Laguna La Brea in July and at Ruta 83, camino a Valle Grande, in August; females with closed vaginas were noted at Río Las Capillas in June and at Río de Zora y cruce con Ruta 34 in October; two females, collected at Yuto had well-developed fetuses in November.

***Histiotus laephotis* Thomas**

Histiotus laephotis Thomas, Annals and Magazine of Natural History, ser. 8, 17:275, 1916.

Specimens Examined.- (41). CATAMARCA: Cuesta del Clavillo, 5 km S La Banderita, 1 (CML). JUJUY: Arroyo Sauzalito, Parque Nacional Calilegua, 1 (CML); Cucho, San Salvador de Jujuy, 2 (CML); Yuto, 2 (AMNH). SALTA: Parque Nacional El Rey, 1 (CM); Parque Nacional El Rey, Arroyo de Los Puestos, 2 (CM); Piquirenda Viejo, 6 km W, 1 (PIDBA); Quebrada de Acambuco, 5 km W Dique Itiyuro, 5 (2 CM, 3 RAO); San Lorenzo, 1 (ROM). TUCUMÁN: El Cadillal, 1 (CML); El Naranjal, 1 (TTU); El Naranjo, 8 (3 MACN, 5 TTU); Horco Molle, 1 (CM); Las Juntas, 22 km W Choromoro, 1 (CML); Las Juntas, 22 km W Choromoro on Hwy 312, 3,500 ft., 1 (OMNH); Ñorco, 1200 m, 2 (BMNH); Parque Provincial El Cochuna, km 40 sobre ruta 47, 1 (PIDBA); San Miguel de Tucumán, 450 m, 1 (CML); San Pedro de Colalao, 4 (SIG); Senda del Cedro Grande, Horco Molle, 1 (CML); Tafí, 2000 m, 1 (BMNH); Tucumán, ciudad, 2 (1 BMNH, 1 CM).

Additional Records.- JUJUY: Dique La Ciénaga, casa del club náutico, 30 km SSW San Salvador de Jujuy, 1000 m (Villa-R. and Villa-C., 1971); El Palmar del Río San Francisco (Del Ponte, 1944); Finca La Toma, 25 km SW San Salvador de Jujuy (Villa-R. and Villa-C., 1971); Jujuy, ciudad (Romaña and Abalos, 1950); San Lorenzo (Thomas, 1898, as *H. velatus*); San Salvador de Jujuy (Del Ponte, 1944). SALTA: Tala (Thomas, 1898, as *H. velatus*).

Comments.- Anderson (1997) treated *H. laephotis* as a subspecies of *H. montanus*, but Barquez *et al.* (1999b) considered it as a subspecies of *H. macrotus. Histiotus laephotis* in this paper is considered as a valid species, based on characteristics which differentiate from *H. macrotus*, and because both forms have been found in sympatry in some localities. Specimens from San Lorenzo, Jujuy Province, and from Caiza, Bolivia, were cited as *H. velatus* by Thomas (1898), but later (Thomas, 1916) he described *H. laephotis* based on the specimens from Caiza without mentioning that from San Lorenzo; consequently, we consider that the specimen from San Lorenzo is *H. laephotis* which is included in the same series. Both species (*H. macrotus* and *H. laephotis*) were found in sympatry at Cuesta del Clavillo, 5 Km S La Banderita, Catamarca Province.

A lactating female was captured at Piquirenda Viejo, 6 Km W, Salta Province in the middle of November.

***Histiotus macrotus* (Poeppig)**

Nycticeius macrotus Poeppig, Reise in Chile, Peru und auf dem Amazonenstrome während der Jahre 1827-1832. Friedrich Fleischer, Leipzig, 1:451, 1835.

Specimens Examined.- (13). CATAMARCA: Cuesta del Clavillo, 5 km S La Banderita, 5 (CML); La Banderita, 1 (CML); La Banderita, Ruta 62, camino a Las Estancias, 1 (CML). TUCUMÁN: El Nogalar, Ruta 307, 1700 m, 4 (CML); Ruta 307, km 46, 1700 m, 2 (CML).

Additional Records.- TUCUMÁN: Ruta 307, km 43, 1700 m (Barquez and Lougheed, 1990).

Comments.- Barquez and Lougheed (1990) extended the known distribution of this species to the provinces of Jujuy, Salta, and Tucumán. In these provinces, this species inhabits high

elevations, mainly in the Puna region and grasslands of the Yungas and do not overlap with *H. laephotis*, which inhabits the forested regions and is rarely found at high altitude.

***Histiotus velatus* (I. Geoffroy St.- Hilaire)**

Plecotus velatus I. Geoffroy St.- Hilaire, Annales des Sciences Naturelles, Paris, 3:446, 1824.

Specimens Examined.- (1). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20, 1 (MMD).

Comments.- The specimen examined represents the first record for the species in the province of Jujuy and extends the distribution to northwestern Argentina. Anderson (1997) mentioned this species for Tarija, Bolivia, a town near the border with Argentina.

The specimen examined was a non-breeding female captured in June in a mist net placed over a river. The external and cranial characters correspond with those of *H. velatus* and, compared with *H. laephotis*, has larger feet and smaller ears (Díaz, 1999).

The specimen cited by Thomas (1898) as *H. velatus* for Argentina here is considered as *H. laephotis* (see Comments for *H. laephotis*).

***Lasiurus blossevillii* (Lesson and Garnot)**

Vespertilio blossevillii Lesson and Garnot, Bulletin des Sciences Naturelles et de Géologie, 8:95, 1826.

Specimens Examined.- (61). JUJUY: Aguas Negras, 600 m, 1 (MACN); Caimancito, El Arroyo, 600 m, Parque Nacional Calilegua, 1 (MACN); El Monolito, 1 (CML); Laguna La Brea, 25 km W Palma Sola, 2 (CML); Río Blanco, 9 km al SW de San Antonio, 1495 m, 2 (1 ARG, 1 PIDBA); Río Las Capillas, 15 km al N de Las Capillas, sobre Ruta Provincial N˚ 20, 1 (MMD); Río Tiraxi, 1.5 km al E de Tiraxi, por ruta 29, 1570 m, 3 (PIDBA); Yuto, 9 (7 AMNH, 1 CML, 1 FCM). SALTA: 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Arroyo La Sala, Centro Administrativo, Parque Nacional El Rey, 1 (PIDBA); Orán, 15 km S, 15 km W, along Río Santa María, 1 (CM); Piquirenda Viejo, 8 km W, 1 (CML); Quebrada de Acambuco, 5 km W Dique Itiyuro, 1 (IADIZA); Río de las Conchas, 2 km N y 6 km W Metán, 1 (PIDBA); Vado de Arrazayal, 1 (OMNH). TUCUMÁN: Agua Rosada, 1 (CML); Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas, 1 (CML); Concepción, 3 (BMNH); Horco Molle, 1 (TTU); Ingenio Amalia, 2 (CML); Ingenio Santa Lucía, 1 (CML); Instituto Lillo, 1 (CML); Las Juntas, 22 km W Choromoro, 1 (CML); Las Juntas, 22 km W Choromoro on Hwy 312, 3,500 ft., 1 (OMNH); Los Vásquez, 445 m, 3 (BMNH); Pinar Velardez, 1560 m, 1 (CML); Reserva Provincial Santa Ana, Remanso del Gallego, 1 (CML); Río Pueblo Viejo, Reserva Provincial La Florida, 1 (CML); San Miguel de Tucumán, 8 (CML); San Pedro de Colalao, 2 (CML); Timbó Nuevo, 1 (MACN); Tucumán, 2 (1 FMNH, 1 MCZ); Tucumán, 456 m, 2 (BMNH); Tucumán, ciudad, 1 (MACN).

Addtitional Records.- JUJUY: Caimancito, 550 m (Heinonen and Bosso, 1994); Cerro Calilegua (Olrog, 1979). TUCUMÁN: El Colmenar (Romaña and Abalos, 1950).

Comments.- Thomas (1902) described *L. borealis salinae* from Cruz del Eje, Córdoba. We have examined the type specimen in the British Museum (BMNH 2.2.5.39). This individual is darker in coloration than most of the *L. blossevillii* we have examined, but it is preserved in alcohol. A specimen form Los Vázquez, Tucumán, (BMNH 3.6.6.3), collected by L. Dinelli, was prepared and identified by O. Thomas as *L. salinae*. It appears that Thomas later considered *L. salinae* a different species based on this new collecting locality, but the specimen from Tucumán is also a young individual with cartilaginous phalanges. Mares *et al.* (1995) recognized *L. salinae* as a different species after collecting dark specimens in the same nets with specimens of reddish coloration. We also collected a specimen from Río Tiraxi, 1.5 km E Río Tiraxi, por ruta 29, 1570 m, Jujuy, that was of grayish coloration with ossified phalanges. Morales and Bickham (1995), in an analysis of mtRNA of *L. blossevillii* from the provinces of Catamarca and San Juan, they found one haplotype only for *L. blossevillii*, suggesting that *L. salinae* and *L. blossevillii* are conspecific. In Jujuy males with abdominal testes were captured at Río Blanco, 9 km al SW de San Antonio, 1495 m, in May and July and females with open vaginas at Río Tiraxi, 1.5 km E de Río Tiraxi, por ruta 29, 1570 m in August. The record from Vado de Arrazayal, Salta, was a lactating female, collected in the middle of November.

***Lasiurus cinereus* (Beauvois)**

Vespertilio cinereus Beauvois, A scientific and descriptive catalogue of Peale's museum. S. H. Smith, Philadelphia, p. 18, 1796.

Specimens Examined.- (18). SALTA: 12.6 km al W de Piquirenda Viejo, 1 (PIDBA); Arroyo La Sala, Centro Administrativo, Parque Nacional El Rey, 2 (PIDBA); Dique Itiyuro, 5 km W, 1 (RAO); Piquirenda Viejo, 6 km W, 3 (PIDBA); Río Pescado, 2 (CML). TUCUMÁN: Horco Molle, Río Las Piedras, 1 (CML); Las Mesadas, 1 (CML); Los Vásquez, 1 (BMNH); Marcos Paz, 1 (CML); Playa Larga, Río Los Sosa, Ruta 307 km 19.7, 1 (PIDBA); Río Las Piedras, Parque Biológico Sierra de San Javier, 1 (CML); San Miguel de Tucumán, 1 (CML); Tafí Viejo, 1 (CML); Tucumán, 456 m, 1 (BMNH).

Additional Records.- JUJUY: León (Díaz and Barquez, 1999).

Comments.- This species recently was recorded in the province of Jujuy by Díaz and Barquez (1999). Males with scrotal testes were recorded in Salta at Arroyo La Sala in October, and at Río Pescado in the middle of November.

***Myotis albescens* (É. Geoffroy St.- Hilaire)**

Vespertilio albescens É. Geoffroy St.- Hilaire, Annales du Muséum d'Histoire Naturelle, Paris, 8:204-5, 1806.

Specimens Examined.- (20). JUJUY: Río Las Capillas, 15 km al N de Las Capillas, sobre Ruta Provincial N˚ 20, 3 (1 ARG, 2 MMD). SALTA: 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 2 (PIDBA); Aguas Blancas, 27 km W, 1 (MACN); Orán, 15 km S, 15 km W, along Río Santa María, 1 (CM); Parque Nacional Baritú, Finca Lipeo, a 15 km de Las Juntas, 600 m, 1 (CML). TUCUMÁN: Aguas Chiquitas, Sierras de Medina, 800 m, 1 (CM); Arroyo El Saltón, Reserva Provincial Santa Ana, 1 (CML); Concepción, 1 (MACN); Dique San Ignacio, 3 (CML); El Cadillal, Usina, 3 (CML); Las Talas, 4 km al N de Bella Vista, 2 (1 CML, 1 OMNH); Tranquitas, 1 (MACN).

Additional Records.- TUCUMÁN: Tucumán, ciudad (Romaña and Abalos, 1950).

Comments.- Díaz and Barquez (1999) added this species to the bat fauna of the province of Jujuy, with the specimens from Río Las Capillas, 15 km al N de Las Capillas, sobre Ruta Provincial N˚ 20. One of these specimens was a male with abdominal testes, collected on August 22. Specimens from El Cadillal, Usina, Tucumán, were males with scrotal testes collected at the end of June.

***Myotis keaysi* J. A. Allen**

Myotis ruber keaysi J. A. Allen, Bulletin of the American Museum of Natural History, 33: 383, 1914.

Specimens Examined.- (14). JUJUY: Río Tiraxi, 1.5 km al E de Tiraxi, por ruta 29, 1570 m, 1 (PIDBA). TUCUMÁN: Agua Colorada, 4 (1 CML, 2 MACN, 1 TTU); Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas, 2 (CML); El Nogalar, Ruta 307, 1700 m, 1 (CML); Piedra Tendida, 12 km WNW Burruyacú along Río Cajón, 2,500 ft., 1 (OMNH); Ruta 307, 6 km S cruce con ruta a El Mollar, 1 (CML); Ruta 307, km 43, 1700 m, 1 (CML); Tranquitas, 3 (1 CML, 1 MACN, 1 TTU).

Comments.- The specimen from Río Tiraxi, 1.5 km al E de Tiraxi, por ruta 29, 1570 m, represents the first record of the species for the province of Jujuy; it was a female with an open vagina, captured in August. Little is known about the biology of this species; published information shows that its distribution is associated with the humid forests of the Andes, most of the localities are situated above 2000 m, although several of our records are below that altitude. The localities from Tucumán correspond to a mixture of Transitional and Montane Forests, close to the Chaco phytogeographic province and are isolated from the main mountain chains of the west.

***Myotis levis* (I. Geoffroy St.- Hilaire)**

Vespertilio levis I. Geoffroy St.- Hilaire, Annales des Sciences Naturelles, Paris, ser. 1, 3:444-445, 1824.

Specimens Examined.- (76). CATAMARCA: Cuesta del Clavillo, 5 km S La Banderita, 2 (CML); Puesto Fronterizo, 6 km W La Banderita, 6 (CML). JUJUY: Río Blanco, 9 km al SW de San

Antonio, 1495 m, 1 (ARG). SALTA: San Lorenzo, 1 (MACN); Santa Victoria Oeste, 2200 m, 2 (MACN). TUCUMÁN: Agua Rosada, San Pedro de Colalao, 2 (CML); Aguas Chiquitas, 25 km NE San Miguel de Tucumán, 800 m, 1 (CM); Aguas Chiquitas, Sierras de Medina, 800 m, 4 (CM); Arroyo El Saltón, Reserva Provincial Santa Ana, 4 (CML); Concepción, 4 (3 BMNH, 1 FMNH); Dique Escaba, 3 (CML); Dique San Ignacio, 1 (CML); Horco Molle, Parque Biológico Sierra de San Javier, 10 (CML); Horco Molle, Residencia Universitaria, 1 (CML); La Ciénaga, 2500 m, 1 (BMNH); La Higuera, 1 (CML); La Rinconada, 1 (CML); Las Pavas, Aconquija, 1 (MACN); Las Talas, 4 km al N de Bella Vista, 3 (SIG); Ñorco, Vipos, 2500 m, 2 (BMNH); Parque Provincial El Cochuna, km 40 sobre ruta 47, 1 (CML); Río Pueblo Viejo, Reserva Provincial La Florida, 2 (CML); San Pedro de Colalao, south of, at km marker 42, on Hwy 364, 4,700 ft, 13 (3 CML, 3 IADIZA, 7 OMNH); Tacanas, 1 (CML); Tafí de Valle, 2200 m, 1 (CML); Tucumán, 400 m, 3 (BMNH); Tucumán, 450 m, 2 (MACN); Tucumán, 456 m, 2 (BMNH).

Comments.- Barquez *et al.* (1993) erroneously recorded *Myotis levis dinellii* in Jujuy with a specimen from El Simbolar (the correct locality is El Simbolar, 25 km al SO de Palma Sola, 1000 m). This specimen later was reidentified as *Myotis riparius* (Díaz and Barquez, 1999). We have captured a specimen at Río Blanco, 9 km al SW de San Antonio, 1495 m, which represents the first real record of this species for the province of Jujuy.

***Myotis nigricans* (Schinz)**

Vespertilio nigricans Schinz, Naturgeschichte und Abbildungen der Säugethiere. Das Thierreich eingetheilt nach dem Bau der Thiere als Grundlage ihrer Naturgeschichte und der vergleichenden Anatomie von dem Herrn Ritter von Cuvier. Säugethiere und Vögel. J. G. Cotta'schen Buchhandlung, Stuttgart und Tübingen, 1:179, 1821.

Specimens Examined.- (18). JUJUY: Caimancito, 600 m, 1 (MACN); Laguna La Brea, 1 (MMD); Laguna La Brea, 25 km W Palma Sola, 1 (CML). SALTA: Finca Abra Grande, 1 (PIDBA); Orán, 15 km S, 15 km W, along Río Santa María, 1 (CM); Piquirenda Viejo, 6 km W, 2 (1 CML, 1 PIDBA); San Ramón de la Nueva Orán, 2 (CML); Santa María, sobre Río Santa María, 1 (CML). TUCUMÁN: Acheral, 1 (CML); Agua Colorada, 1 (TTU); Cerro del Campo, 900 m, 1 (CML); El Cadillal, 25 km N San Miguel de Tucumán, 1 (CM); El Naranjo, 1 (TTU); Piedra Tendida, 12 km WNW Burruyacú along Río Cajón, 2,500 ft., 1 (OMNH); Senda del Pluviómetro, 800 m, Horco Molle, 1 (CML); Tafí Viejo, 1 (CML).

Additional Records.- JUJUY: Arroyo La Urbana, 45 km E y 5.4 km SE San Salvador de Jujuy, 620 m (La Val, 1973); El Monolito (Olrog, 1979); Yuto (Olrog, 1959). TUCUMÁN: Monte Bello; San Pedro de Colalao; Tafí del Valle; Tucumán, ciudad (Romaña and Abalos, 1950).

Comments.- *Myotis nigricans* represents one of the most complex species of the genus in Argentina. It is difficult to determine which citations in literature correspond to this species except those for which voucher specimens are available. Traditionally several authors have identified specimens as *M. nigricans* considering that the species exhibited a high degree of geographic

variations. However, with the examination of specimens deposited in museums we have found that large series, identified as *nigricans*, were in fact *riparius* and occasionally any of the other small species of *Myotis*. As a consequence, the criterion used to identify *nigricans* is the absence of a sagittal crest, an almost diagnostic character to separate this species from *M. riparius*. All the specimens from the localities indicated in the Additional Records have voucher specimens, except for those of Tucumán. Because the identity of the species cited in earlier publications is unclear, the data on several aspects published about *M. nigricans* in Argentina, are not completely reliable.

At Laguna La Brea, Jujuy, we have collected females with closed vaginas in May and July. The specimen from Piedra Tendida, Tucumán, was a male with abdominal testes collected in July.

***Myotis riparius* Handley**

Myotis simus riparius Handley, Proceedings of the United States National Museum, 112:466-468, 1960.

Specimens Examined.- (15). JUJUY: El Simbolar, 25 km al SO de Palma Sola, 1000 m, 1 (CML); Laguna La Brea, 1 (MMD); Laguna La Brea, 25 km antes de Palma Sola, sobre Ruta 1, 2 (OMNH); Yuto, 1 (AMNH). SALTA: 12.6 km al W de Piquirenda Viejo, 3 (PIDBA); Piquirenda Viejo, 6 km W, 1 (CML). TUCUMÁN: Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas, 1 (CML); Arroyo El Saltón, Reserva Provincial Santa Ana, 1 (CML); Cuesta del 25, 3 km N entrada al Dique El Cadillal, 1 (CML); Dique El Cadillal, 25 km N San Miguel de Tucumán, 1 (CM); Piedra Tendida, 5 km W de Dique El Cajón, 1 (CML); Río Pueblo Viejo, Reserva Provincial La Florida, 1 (CML).

Comments.- The specimen from Yuto, Jujuy (AMNH, 185210) was cited by La Val (1973) and Barquez *et al.* (1999b) as *M. nigricans*, who indicated the locality as Santa Bárbara W of San Pedro ca 1000 m. The specimen is here reidentified as *M. riparius* and the correct locality is Yuto as indicated on the specimen label.

The specimen from El Simbolar, 25 km al SO de Palma Sola, 1000 m, represents the first record for the species in the province of Jujuy (Díaz and Barquez, 1999). In this province males had abdominal testes at Laguna La Brea in May; the specimen from Yuto was a male with scrotal testes collected in April; at Laguna La Brea this species was sexually inactive in June. In Tucumán, at Piedra Tendida a female with an open vagina was captured at the beginning of April.

Family Molossidae

***Cynomops planirostris* (Peters)**

Molossus planirostris Peters, Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin, p. 575, 1865.

Specimens Examined.- (12). JUJUY: Arroyo Yuto, 13 km al SO de Yuto, 1 (MMD); Caimancito, 2 (MACN), Río Las Capillas, 15 km al N de Las Capillas, sobre Ruta Provincial N˚ 20, 1 (MMD). SALTA: 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Arroyo La Sala, Centro Administrativo, Parque Nacional El Rey, 1 (PIDBA); Itaú (Campo Largo), Sierras de Tartagal, 1600 m, 1 (CML); Quebrada de Acambuco, 5 km W Dique Itiyuro, 2 (1 CML, 1 IADIZA); Serranía de las Pavas, 1 (MACN); Tartagal, 1 (CML).

Comments.- The locality Quebrada Acambuco, Dique Itiyuro, Sierras de Tartagal, 1500 m (Olrog and Barquez, 1979)is here cited as Quebrada de Acambuco, 5 km W Dique Itiyuro, based on the same specimens examined at the CML. This species was recorded in Argentina by Olrog and Barquez (1979). However, records from northwestern Argentina were scarce.

For the province of Jujuy the species was only known from Caimancito (Barquez *et al.*, 1999b). The record from Río Las Capillas, 15 km al N de Las Capillas, sobre Ruta Provincial N˚ 20, extends its distribution to western Jujuy Province.

The specimen from Arroyo Yuto, 13 km al SO de Yuto, Jujuy, was a female with open vagina captured in a net placed on the river in a zone of transitional forests close to the limits with the National Park Calilegua in May. At Quebrada de Acambuco, 5 Km W Dique Itiyuro, Salta, a pregnant female with a well-developed fetus (3 g) was captured at the end of November in a zone of transitional forests of Palo Blanco trees (*Calycophyllum multiflorum*) and petiribí (*Cordia trichotoma*).

***Eumops bonariensis* (Peters)**

Promops bonariensis Peters, Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin, p. 232, 1874.

Specimens Examined.- (30). TUCUMÁN: Aguas Chiquitas, El Cadillal, 3 (CML); Aguas Chiquitas, Sierras de Medina, 800 m, 11 (CM); Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas, 5 (CML); Dique San Ignacio 1 (RMB 1322); Las Talas, 4 km al N de Bella Vista, 3 (OMNH); Reserva Provincial "Aguas Chiquitas" El Cadillal, 3 (CM); San Miguel de Tucumán, 28 km NE, 3 (CM); San Miguel de Tucumán, 29 km NE, 1 (CM).

Comments.- The biology of this species is practically unknown. The records from Argentina are scarce and are only known for the province of Tucumán in the northwestern part of the country. We have found it in the transitional forests in Tucumán and also in urban and rural areas. Specimens from Aguas Chiquitas, Sierra de Medina, were captured in nets placed over still water inside the forest; the species was reproductively inactive in October but lactating females were captured at the end of December. We captured sexually inactive specimens at Las Talas at the end of April, in the same nets with a specimen of Eumops patagonicus that was reproductively active.

Recently, we have found a female preserved in alcohol (CML), from Dique San Ignacio, collected in the middle of December, which had a fetus with a crown-rump length of 27.8 mm.

***Eumops dabbenei* Thomas**

Eumops dabbenei Thomas, Annals and Magazine of Natural History, ser. 8, 13:481, 1914.

Specimens Examined.- (1). TUCUMÁN: San Miguel de Tucumán, 1 (CML).

Comments.- Barquez and Lougheed (1990) reported the locality of the only specimen examined as Tucumán, ciudad. The specimen examined was a young individual with cartilaginous phalanges captured in the roof of a house of the city of Tucumán in the middle of December.

***Eumops glaucinus* (Wagner)**

Dysopes glaucinus Wagner, Wiegmann's Archiv für Naturgeschichte, Jahrgang, 9(1):368, 1843.

Specimens Examined.- (2). JUJUY: Yuto, 1 (CML). TUCUMÁN: San Miguel de Tucumán, 456 m, 1 (CML).

Comments.- This species was known for Jujuy based on the specimen indicated in Specimens Examined. This was a young individual with cartilaginous phalanges, captured in September 1955. A young individual with cartilaginous phalanges was captured in San Miguel de Tucumán, also in September.

***Eumops patagonicus* Thomas**

Eumops patagonicus Thomas, Annals and Magazine of Natural History, 9 (13):234, 1924.

Specimens Examined.- (4). SALTA: Orán, 15 km S, 15 km W, along Río Santa María, 1 (CM). Tartagal, 1 (MACN). TUCUMÁN: Las Talas, 4 km al N de Bella Vista, 1 (OMNH); San Miguel de Tucumán, 1 (CML).

Comments.- This species is basically a chacoan bat and their presence in the Yungas is associated with altered zones, towns, and crop fields. Díaz and Barquez (1999) collected a specimen from Río Lavayén, a locality that is close to the Yungas forests of the Province of Jujuy. We examined six specimens from "Jujuy" which are housed in the MACN; they were collected by Salvador Mazza in 1939 and the locality probably corresponds to the city of San Salvador de Jujuy.

***Eumops perotis* (Schinz)**

Molossus perotis Schinz, Naturgeschichte und Adildungen der Säugethiere. Das Thierreich eingetheilt nach dem Bau der Thiere als Grundlage ihrer Naturgeschichte und der vergleichenden Anatomie von dem Herrn Ritter von Cuvier. Säugethiere und Vögel. J. G. Cotta'schen Buchhandlung, Stuttgart und Tübingen, 1:870, 1821.

Specimens Examined.- (47). JUJUY: Yuto, 1 (AMNH). TUCUMÁN: Concepción, 28 (7 BMNH, 1 FMNH, 20 MACN); Dique San Ignacio, 1 (CML); Instituto Lillo, San Miguel de Tucumán, 1 (CML); Las Talitas, 1 (CML); Río Salí, 1 (CML); San Miguel de Tucumán, 9 (8 CML, 1 SIG); San Miguel de Tucumán, Plaza Independencia, 1 (CM); San Pedro de Colalao, 1 (CML); Tucumán, 1 (FMNH); Tucumán, 456 m, 2 (BMNH).

Additional Records.- JUJUY: Dique La Ciénaga, casa del club náutico, 30 km SSW San Salvador de Jujuy, 1000 m (Villa-R. and Villa-C., 1971); Libertador General San Martín; San Salvador de Jujuy (Eger, 1977). TUCUMÁN: Caspichango (Massoia, 1976); Tucumán, ciudad (Romaña and Abalos, 1950).

Comments.- This is a common species in urban and suburban areas where they frequently use the roofs of houses, and holes of trees as shelters. Little is known of the reproductive activity of the species; a young with erupting teeth was captured in San Miguel de Tucumán, Plaza Independencia, in the middle of December. The specimen from Yuto, Jujuy was a male with scrotal testes collected in May.

***Molossops temminckii* (Burmeister)**

Dysopes temminckii Burmeister, Systematische Üebersicht der Thiere Brasiliens, welche während einer Reise durch die Provinzen von Rio de Janeiro und Minas Geraës... gesamnelt oder beobachtat wurden von Dr. Hermann Burmeister. Pt. 1. Georg Reimer, Berlin, p. 72, 1854.

Specimens Examined.- (39). JUJUY: Laguna La Brea, 25 km W Palma Sola, 1 (CML); Ledesma, 1 (AMNH); Yuto, 22 (21 AMNH, 1 CML); Yuto, Río San Francisco, altura de Estación, 1 (BMNH). SALTA: Dique Itiyuro, 1 (CML); Ingenio San Martín del Tabacal, 1 (TTU); Quebrada de Acambuco, 5 km W Dique Itiyuro, 1 (CML); Tabacal, 1 (TTU). TUCUMÁN: Cerro del Campo, 900 m, 2 (CML); El Cadillal, 1 (CML); El Corte, 1 (CML); El Paraíso, 1 (CML); La Higuera, 1 (CML); Las Mesadas, 3 (CML); San Miguel de Tucumán, 1 (CML).

Additional Records.- JUJUY: Calilegua (CEM, not examined); San Lorenzo (Thomas, 1898).

Comments.- This species has as a main habitat the chacoan region with sporadic introductions in the Yungas. Information on its reproduction is scarce. Mares et al. (1981) reported a pregnant female from Dique Itiyuro, Salta, in November. At El Cadillal, Tucumán, a male with scrotal testes was captured at the middle of October. In Laguna La Brea, Jujuy, a female with an open vagina was obtained in July.

***Molossus ater* É. Geoffroy St.-Hilaire**

Molossus ater É Geoffroy Saint-Hilaire, Nouveau Bulletin des Sciences par la Société Philomatique, Paris, 3(96):279, 1805.

Specimens Examined.- (2). JUJUY: Río de Zora y cruce con ruta 34, 1 (CML). SALTA: Manuel Elordi, Vermejo, 500 m, 1 (BMNH).

Additional Records.- JUJUY: Dique La Ciénaga; Dique La Ciénaga, 13 km SSW S. S. de Jujuy; Dique La Ciénaga, casa del club náutico, 30 km SSW San Salvador de Jujuy, 1000 m (Villa-R. and Villa-C., 1971).

Comments.-This is a rare species in northwestern Argentina, particularly in the Yungas region. Until now it had not been reported for the provinces of Tucumán and Catamarca. The specimen from Río de Zora y cruce con ruta 34 was a female with an open vagina captured in October. No other information on the reproduction of this species in northwestern Argentina is known.

***Molossus molossus* (Pallas)**

V[espertilio] molossus Pallas, Miscellanea zoologica, quibus nov imprimis atque obscur animalium species describuntur et observationibus i conibusque illustratur. Hagae Comitum, apud Petrum van Cleef, p. 49-50,1766.

Specimens Examined.- (19). JUJUY: Arroyo Sauzalito, Parque Nacional Calilegua, 1 (CML); Calilegua, 2 (FMNH). Yuto, 2 (AMNH). SALTA: 12.6 km al W de Piquirenda Viejo, 1 (PIDBA); Piquirenda Viejo, 6 km W, 1 (CML); Quebrada de Acambuco, 5 km W Dique Itiyuro, 3 (RAO); Serranía de Las Pavas, 2 (SIG). TUCUMÁN: El Manantial, 1 (CML); Reserva Provincial Santa Ana, Remanso del Gallego, 1 (CML); San Miguel de Tucumán, 3 (CML); San Pedro de Colalao, 1 (CML); Tucumán, Ciudad, casa céntrica, 1 (OMNH).

Additional Records.- JUJUY: San Salvador de Jujuy, 20 km W (Villa-R. and Villa-C., 1971). TUCUMÁN: Parque 9 de Julio, Tucumán (Romaña and Abalos, 1950).
Comments.-This is a very common species in urban and suburban areas generally in large colonial groupings. A female from Quebrada de Acambuco, 5 km W Dique Itiyuro, Salta, captured at the end of November, was near parturition. Young individuals have been reported in San Miguel de Tucumán at the end of December.

***Nyctinomops laticaudatus* (É. Geoffroy St.- Hilaire)**

Molossus laticaudatus É. Geoffroy Saint-Hilaire, Annales du Muséum d'histoire Naturelle, Paris, 6:156, 1805.

Specimens Examined.- (3). SALTA: Orán, 15 km S, 15 km W, along Río Santa María, 1 (CM). TUCUMAN: San Miguel de Tucumán, 2 (CML).

Comments.- Díaz and Barquez (1999) first reported this species from Jujuy through specimens from Río Lavayén, a locality that does not belong strictly to the Yungas, but it is located very

close to the region and allow us to suspect their presence in the area. The records from Tucumán also represent the first for this species for the province.

In northwestern Argentina this is a rare species and the only well-known localities are those indicated in the Specimens Examined.

Nyctinomops macrotis (Gray)

Nyctinomus macrotis Gray, Annals and Magazine of Natural History, ser. 11, 4:5, 1839.

Specimens Examined.- -(5). JUJUY: Yuto, 1 (MACN). TUCUMÁN: San Miguel de Tucumán, 4 (3 CML, 1 SIG).

Comments.- The biology of this species is practically unknown, especially in Argentina. The specimens of San Miguel de Tucumán (Guerrero, 1985) were obtained in buildings in the city, where it is very common. They were collected in May and June and were reproductively inactive. F. Contino collected the specimen from Yuto, Jujuy, in 1957 and since that time no one specimen was collected in the province.

Promops nasutus (Spix)

Molossus nasutus Spix, Simiarum et Vespertilionum Brasiliensium species novae ou histoire naturelle des especies nouvelles de singes et de chauve-souris observées et recueillies pendant le voyage dans l'intérieur du Bresil execute par ordre de S. M. le Roi de Baviere dans les annees 1817, 1818, 1819, 1820. Francisci Seraphici Hübschmanni, Monachii, p. 58, 1823.

Specimens Examined.- (13). JUJUY: Arroyo Sauzalito, Parque Nacional Calilegua, 1 (CML); Yuto, 4 (AMNH). SALTA: 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Piquirenda Viejo, 6 km W, 1 (CML); Quebrada de Acambuco, 5 km W Dique Itiyuro, 2 (CML). TUCUMÁN: El Cadillal, Río Loro, 2 (PIDBA); San Miguel de Tucumán, 1 (BMNH); Tucumán, 450 m, 1 (BMNH).

Comments.- The specimens from El Cadillal, Río Loro, Tucumán, were males with scrotal testes at the end of June and they were collected when they abandoned their refuges, located in cracks in a hillside beside the river. A female, collected at Quebrada de Acambuco, 5 km W Dique Itiyuro, Salta, was a pregnant with a 3 g fetus, at the end of November.

Tadarida brasiliensis (I. Geoffroy St.- Hilaire)

Nyctinomus brasiliensis I. Geoffroy Saint-Hilaire, Annales des Sciences Naturelles, Zoologie, Paris, ser. 1, 3:343, 1824.

Specimens Examined.- (107). CATAMARCA: Cuesta del Clavillo, 5 km S La Banderita, 1 (CML). JUJUY: Los Perales, San Salvador de Jujuy, 1 (TCWC); Río Las Capillas, 15 km al N de

Las Capillas, sobre ruta provincial N˚ 20, 1 (MMD); Río Tiraxi, 1.5 km al E de Tiraxi, por ruta 29, 1570 m, 1 (PIDBA); Yuto, 4 (3 AMNH, 1 CML). SALTA: 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas, 1 (PIDBA); Ingenio San Martín del Tabacal, 1 (TTU); Parque Nacional El Rey, 4 (CM); Quebrada de Acambuco, 5 km W Dique Itiyuro, 1 (RAO); Río de las Conchas, 2 km N y 6 km W Metán, 4 (PIDBA); San Lorenzo, 1 (TCWC). TUCUMÁN: Agua Rosada, San Pedro de Colalao, 1 (CML); Biological Reserve at Horco Molle, 3 (1 IADIZA, 2 OMNH); Cerro San Javier, 1 (CML); Concepción, 10 (4 BMNH, 1 FMNH, 5 MACN); Dique Escaba, 1 (CML); Dique San Ignacio, 17 (CML); El Cadillal, 1 (CML); Horco Molle, Biological Reserve, 1 (IADIZA); Horco Molle, Residencia Universitaria, 3 (CML); Instituto Lillo, San Miguel de Tucumán, 2 (CML); Las Juntas, 22 km W Choromoro on Hwy 312, 3,500 ft., 5 (3 IADIZA, 2 OMNH); Las Mesadas, 2 (CML); Las Pavas, 5 (MACN); Las Talas, 4 km al N de Bella Vista, 2 (PIDBA); Marcos Paz, 1 (CML); Playa Larga, Río Los Sosa, Ruta 307 km 19.7, 1 (PIDBA); Río Chulca, 7 km al N de San Pedro de Colalao, 2 (PIDBA); Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 750 m, 3 (OMNH); San Javier, 1 (CML); San Miguel de Tucumán, 7 (CML); San Pedro de Colalao, 2 (CML); Tacanas, 2 (CML); Tafí del Valle, 1 (PIDBA); Timbó Nuevo, 3 (TTU); Tucumán, 5 (3 BMNH, 2 CML); Tucumán, 370 m, 1 (CML); Tucumán, 450 m, 2 (USNM); Tucumán, Hotel Savoy, 2 (USNM).

Additional Records.- JUJUY: Dique La Ciénaga, casa del club náutico, 30 km SSW San Salvador de Jujuy, 1000 m (Villa-R., and Villa-C., 1971); El Carmen (Yepes, 1944). TUCUMÁN: Ingenio Lules; Monte Bello; Tucumán, ciudad; Yerba Buena (Romaña and Abalos, 1950).

Comments.- This species is distributed throughout Argentina, and is well known by abundant records. It is found practically in all types of habitats, including houses and buildings in urban areas. They prefer to live in colonies. At Dique Escaba, Tucumán, a colony has been found that contains an estimated 12 million individuals. A national law for their protection has been proposed. In spite of their abundance and extensive distribution, the reproductive activity is not well known in Argentina. We have recorded reproductively active specimens in Tucumán in October. Inactive specimens were collected at Parque Nacional El Rey, Salta. In Jujuy, in August, a male with abdominal testes was captured at Río Las Capillas and a female was captured with an open vagina in Tiraxi.

DISCUSSION AND CONCLUSIONS

The total number of species inhabiting the Yungas of Argentina and Bolivia is 88, with 78 from Bolivia and 39 from Argentina; 29 species are found in both countries. At a higher taxonomic level, the Yungas of Bolivia contains 6 families and 39 genera of bats, while the Yungas of Argentina contains only 4 families and 23 genera.

The family Thyropteridae, represented by one species found in the Yungas (*Thyroptera tricolor*), is not found south of 16˚ south latitude. The southern limits of the

two species of emballonurid bats, *Rhinchonycteris naso* and *Saccopteryx bilineata*, are 15˚ and 17˚, respectively. Although the remaining families are shared between the Yungas of Argentina and Bolivia, a notable variation in the species diversity along a latitudinal gradient is observed.

The family Noctilionidae which contains one genus and two species, is widely distributed and shows almost no influence in the global tendency of the total number of species to fall along the latitudinal gradient. *Noctilio albiventris* inhabits the Yungas of Bolivia; however, in Argentina, this species is found in the Paranaense and Eastern Chaco regions. *N. leporinus* is found in the Yungas of Bolivia and Argentina between 15˚ and 24˚ south latitude. In the family Phyllostomidae, 23 genera and 51 species are known to occur in Bolivia; this number decreases to 10 genera and 12 species in Argentina. Within this family three genera, *Carollia* (subfamily Carolliinae), *Platyrrhinus*, and *Vampyressa*, and one species of Artibeus (*A. lituratus*), which are not present in the Yungas in Argentina, they are present in the eastern part of the country in the Paranaense and Eastern Chaco regions.

In addition to these three genera, 10 others do not reach the Yungas or any other area of Argentina (*Phyllostomus, Trachops, Lonchophylla, Choeroniscus, Rhinophylla, Chiroderma, Mesophylla, Uroderma*, and *Vampyrodes*). All of the phyllostomid genera that are found in the Yungas of Argentina are present also in Bolivia. Two genera; however, show a change in species composition.

Micronycteris sp. is a different species from those occurring in Bolivia (Barquez *et al.* 1999a); *Tonatia bidens* has not been registered for Bolivia although it is of probable occurrence there (Williams *et al.* 1995). The genus *Anoura* loses two species in Argentina (*A. geoffroyi* and *A. cultrata*), *Artibeus* five (*A. anderseni, A. glaucus, A. hartii, A. lituratus*, and *A. obscurus*), and *Sturnira* two (*S. magna* and *S. tildae*).

All of the genera in the family Vespertilionidae are shared between the Yungas of Argentina (12 species) and Bolivia (13 species). A replacement of species is observed. *Eptesicus andinus* and *Myotis oxyotus*, with a southern distributional limit of 17˚ south latitude, do not reach Argentina. However, three species (*Eptesicus diminutus, Histiotus macrotus*, and *Myotis riparius*), appear at 22˚, 26˚, and 22˚ south latitude respectively, in Argentina.

The Yungas of both countries share all of the genera in the Family Molossidae, but in Argentina 13 species are known while only 10 are found in Bolivia. *Eumops auripendulus*, which disappears at 17˚ south latitude in Bolivia, is not found in the Yungas of Argentina but is present in the Paranaense and Eastern Chaco regions. *Nyctinomus aurispinosus*, which has a southern distributional limit of 15˚ south latitude, does not reach Argentina. Five species of molossid bats, all in the genus *Eumops* that

inhabit Argentina were not found in the Yungas of Bolivia. These include *E. bonariensis, E. dabbenei, E. glaucinus, E. patagonicus*, and *E. perotis*.

Vespertilionids and molossids contribute to an increase in the total number of species between 19˚ and 23˚ south latitude. If we include the species with probable occurrence, a curve would be somewhat constant between the 19˚ and the 27˚ of latitude (Fig. 4). The decrease in the number of species of phyllostomids is undeniable, even when the species of probable distribution are included, and the decrease is marked.

The highest number of phyllostomids in the argentine Yungas (6 species) are found between 24˚ and 27˚; however, the species diversity is well below that exhibited by molossids and vespertilionids, which have 11 and 12 species respectively. Species in all three families show a marked decline at 25˚ south latitude due to the lack of data at that latitude. The numbers show a clear disadvantage of phyllostomids, numerically overcome by molossids and vespertilionids toward the south of the Yungas.

As a result of the use of the Simple Matching (Fig. 5a) and the Jaccard (Fig. 5b) coefficients of similarity, a consensus of five divisions was obtained (Fig. 5c). The Yungas of Bolivia form a discrete cluster. The Yungas of Argentina, the Western Chaco, the Paranaense forests, and the Eastern Chaco, form a cluster that represents zones of higher humidity in comparison with more arid regions (Central Chaco, Andean, and Monte), which each represent a different cluster.

The differences between the clusters in the two phenograms (Fig. 5 a and b) are related to the assumptions of the coefficients; *i.e*., the Simple Matching Coefficient considers shared absences. Thus, the clustering of the Andean region and the Monte when the Simple Matching Coefficient was used is due to the sharing of 86 absences.

Based on the analyzed areas, the Yungas of Bolivia contain 44 species that are not shared with the other regions. The Yungas of Argentina contains only one non-shared species (*Micronycteris* sp.), as does the Western Chaco (*Histiotus montanus*). The Paranaense Forest has three species that are not shared (*Macrophyllum macrophyllum, Vampyressa pusilla*, and *Molossops neglectus*); the Eastern Chaco also has three non-shared species (*Eptesicus brasiliensis, Cynomops paranus*, and *Promops centralis*). The Central Chaco, the Andean Region, and the Monte do not possess species whose distributions are limited to these areas; all of their species are present in the Yungas of Argentina with the exception of *Cynomops abrasus*, which also is present in the Central Chaco. The clustering of the Yungas with the Western Chaco is linked mainly to the presence of 31 shared species, and the union of the Paranaense Forest with the Eastern Chaco is a consequence of the sharing of 27 species.

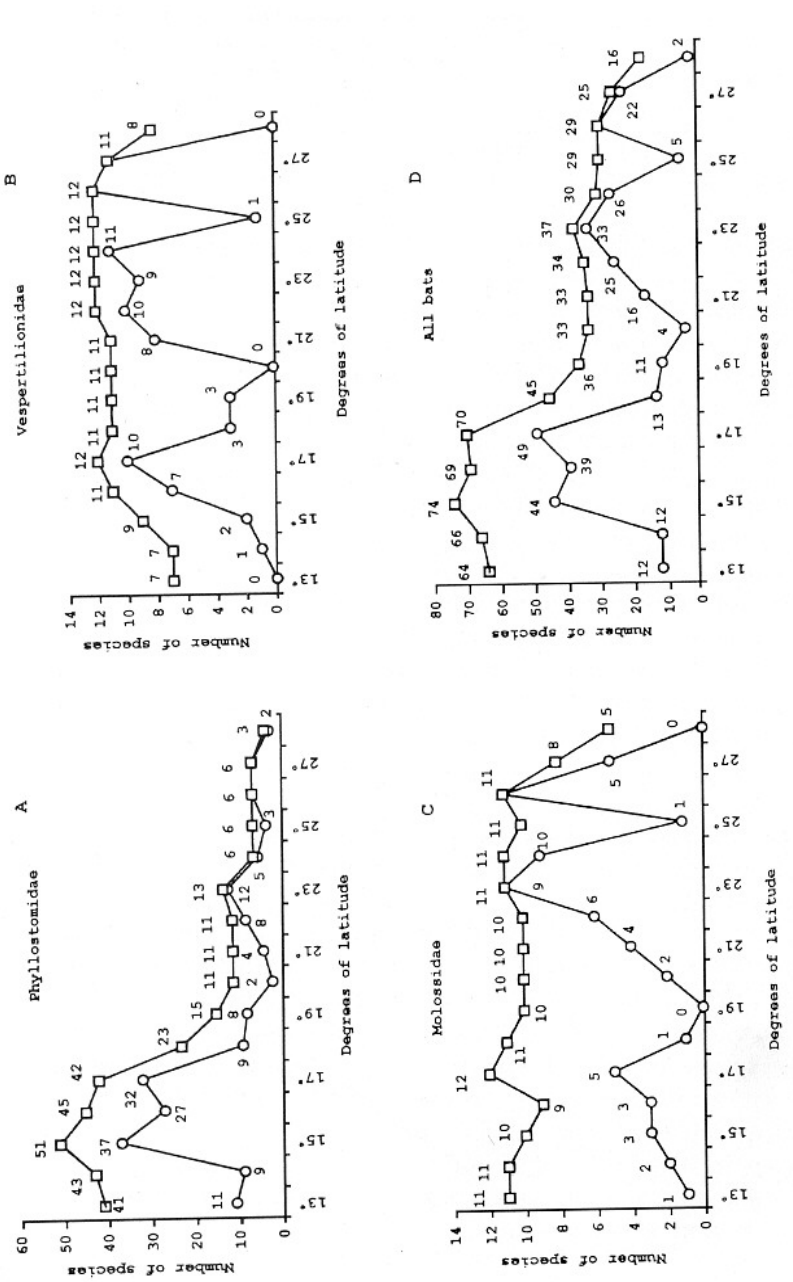

Figure 4

Number of species by degree of latitude for the Families Phyllostomidae (A), Vespertilionidae (B), Molossidae (C), and for all species of bats (D) including the families Thyropteridae, Emballonuridae, Noctilionidae, Phyllostomidae, Vespertilionidae and Molossidae. Squares indicates the number of species that were cited or recorded for each degree. Circles indicates the projected number of species according to proximity of records (see methods).

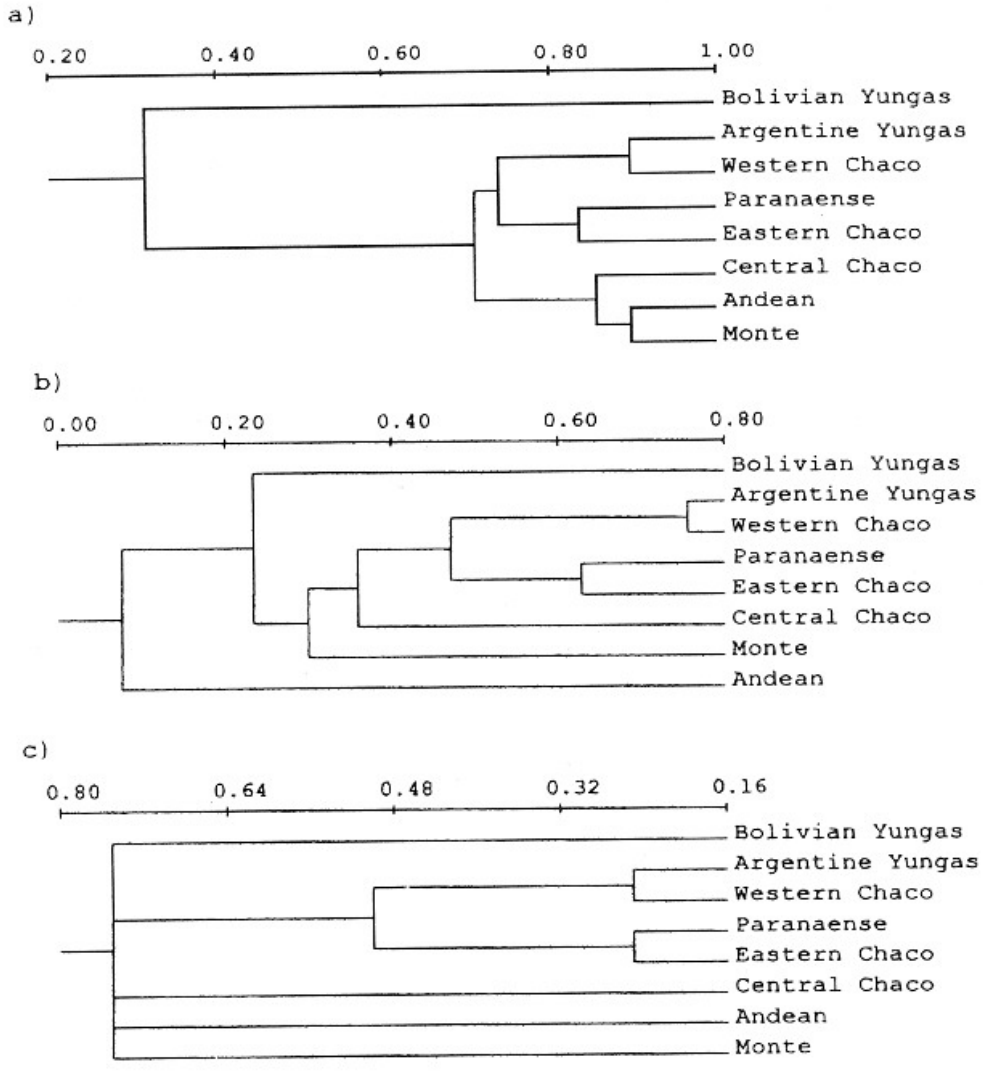

Figure 5

Phytogeographic region phenograms based upon UPGMA; clustering algorithms were performed on Simple Matching (a) and Jaccard's (b) coefficients. The cophenetic correlation coefficient for clustering based on the Jaccard's (0.95) and Simple Matching (0.97) coefficient indicate little distortion in either phenogram. The degree of similarity between regions may be obtained with reference to the scale above each phenogram. A consensus tree for the phenogram is shown in c.

The Yungas of Bolivia shares 29 species with the Yungas of Argentina, three of which (*Anoura caudifer, Sturnira oporaphilum* and *Cynomops planirostris*) are present only in these forests and absent from all other phytogeographic units. They also share 26 species with the Paranaense region and 22 with the Eastern Chaco. Five species (*Noctilio albiventris, Carollia perspicillata, Artibeus lituratus, Platyrrhinus lineatus*, and *Eumops auripendulus*) from the Paranaense Region and the Eastern Chaco, which are not shared with the other regions of Argentina, are shared with the Yungas of Bolivia.

The Yungas has been considered as a peninsula (Ojeda and Mares, 1989; Ojeda, 1999), in a sense analogous to the "peninsular effect" of Simpson (1964), considering their fauna of mammals and birds. A detailed analysis of bats indicates that the Yungas does not act like a peninsula, thus calling into question the generalized hypothesis for all the higher vertebrates.

On the other hand, an analysis of this type could be highly variable depending on the group under study and on the conceptual bases on which the study is based. According to Ojeda (1999) the biogeographical analysis reveals a pattern of decline in species richness similar to the "peninsular effect" in which the number of species declines in relation to the distance between the base (considered at 22˚ latitude) of the "peninsula" and the tip (28˚ latitude). However, this "peninsula" is not exactly a peninsula and the base has been "arbitrarily" defined using the geopolitical boundaries of Argentina. This analysis failed to consider that, when viewed in its entirety, the form of the Yungas appears as a fringe, such that is not possible to clearly define a base and a tip.

The analyzed portion, particularly in Argentina, is actually highly fragmented and deeply modified by the human action, thus preventing the continuity in dispersal of the species within the phytogeographical unit. On the other hand in the last several years the number of bat species for the area has been increased substantially, modifying the original idea of species decrease because of the latitudinal effect, at least in the Yungas. This increase in the number of species was a consequence of a major trapping effort developed by us in several localities where no bat species were previously known.

According with the new information regarding the identity of the different taxa, we have observed a real decrease in the composition of species of the Family Phyllostomidae, but also an increase in the number of species of Vespertilionidae and Molossidae, particularly if we analyze the records compared with the potential presence of species at every degree (Fig. 4). As a consequence, regarding bats, the Yungas does not appear as a unit that could be interpreted as an island. Along the extension of the Yungas, interrelations with other plant formations permanently supply and/or exchange species.

This type of contact with other phytogeographic units is variable along the latitudinal gradient. In the area north of the Yungas in Argentina a strong influence of the species from the Amazonian forests is evident, while in the south the relationship with the species from the Chacoan region it is more marked.

AKNOWLEDGEMENTS

We thank to members of the PIDBA (Programa de Investigaciones de Biodiversidad Argentina) for their cooperation in the field trips, especially to David Flores, Analía Autino, and Norberto Giannini. Pablo Martinez has also collaborated in fieldwork and preparation of specimens. Drs. Michael A. Mares and Janet K. Braun are especially thanked by their invaluable support in all matters. We thank the curators of the collections mentioned in Methods, for allowing us to study the specimens under their care. S. Anderson, H. Genoways, D. Schlitter, D. Wilson, and the late K. Koopman, provided special assistance to RMB during extended visits to the collections. R. A. Ojeda collaborated in a large part of the first stages of collecting data for this work and also by discussions about the latitudinal gradients of the argentine Yungas. Janet Braun and Paul Handford have helped in editing an earlier version of the manuscript. The CONICET has facilitated this work through a grant to R. M. Barquez and several fellowships to M. M. Díaz. Also FOSDIC made possible the revision of the systematic collections of Argentina, USA, and London, by a grant given to M. M. Díaz. The studies at the Natural Reserves of Tucumán Province, were partially funded by the Biodiversity Support Program (World Wildlife Fund, Nature Conservancy, and World Resources Institute). The National Parks of Argentina (APN) offered economic support to R. M. Barquez making possible several trips to northwestern Argentina. Finally we thank to the University of Tucumán for facilities offered to the authors.

LITERATURE CITED

Acosta y Lara, E. F. 1950. Los quirópteros del Uruguay. *Com. Zool. Mus. Hist. Nat*. Montevideo, 58(3):1-73.

Allen, G. M. 1937. Sex dichromatism in *Noctilio*. *J. Mamm*., 18:514.

Anderson, S. 1997. Mammals of Bolivia, Taxonomy and Distribution. *Bull. Am. Mus. Nat. Hist*., 231:652 pp.

Anderson, S., K. F. Koopman, & K. Creighton. 1982. Bats of Bolivia: An annotated checklist. *Am. Mus. Novitates*, 2750:1-24.

Anderson, S. & W. D. Webster. 1983. Notes on Bolivian mammals. 1. Additional records of bats. *Am. Mus. Novitates*, 2766:1-3.

Anonymous. 1968. Gazetteer No.103 (Argentina) of the United States Board of Geographic Names, Office of Geography, Department of Interior, Washington D.C.

Autino, A. G. 1997. Contribución al conocimiento de la sistemática y biología de los murciélagos de las Yungas de la Argentina y sus insectos ectoparásitos. Unpubl. Ph.D. Thesis. Fac. Cs. Nat. e Inst. M. Lillo, Univ. Nal. Tucumán, Argentina, 310 pp.

Autino, A. G., G. L. Claps, & R. M. Barquez. 1999. Insectos ectoparásitos de murciélagos de las Yungas de la Argentina. *Acta Zool. Mex.* (N.S.), 78:119-169.

Autino, A. G. & R. M. Barquez. 1994. Patrones reproductivos y alimenticios de dos especies simpátricas del género Sturnira (Chiroptera, Phyllostomidae). *Mastozool. Neotrop*., 1(1):73-80.

Barquez, R. M. 1985. *Glossophaga soricina* (Pallas, 1766) en el noroeste Argentino (Chiroptera: Phyllostomidae). *Hist. Nat*., *Argentina*, 5(12):93-96.

_____**.** 1988. Notes on identity, distribution, and ecology of some argentine bats. *J. Mamm*., 69:873-876.

Barquez, R. M. & R. A. Ojeda. 1992. The bats of the argentine Chaco. *Ann. Carnegie Mus*., 61(3):239-261.

Barquez, R. M. & S. C. Lougheed. 1990. New distributional records of some argentine bat species. *J. Mamm*., 71(2):261-263.

Barquez, R. M. & S. I. Guerrero. 1985. *Chrotopterus auritus* (Peters, 1856), nueva especie para la provincia de Tucumán, Argentina (Mammalia: Chiroptera: Phyllostomidae). *Hist. Nat*., *Argentina*, 5(4):29-32.

Barquez, R. M., J. K. Braun, M. A. Mares, J. P. Jayat, & D. A. Flores. 1999a. First record for Argentina for a bat in the genus *Micronycteris*. *Mamm*., 63:368-372.

Barquez, R. M., M. A. Mares, & J. K. Braun. 1999b. The Bats of Argentina. *Spec. Publ. Texas Tech Univ. and Oklahoma Mus. Nat. Hist*., USA, 275 pp.

Barquez, R. M., N. P. Giannini, & M. A. Mares. 1993. Guide to the Bats of Argentina. *Oklahoma Mus. Nat. Hist.,* 119 pp.

Brown, A. D. 1995. Las selvas de montaña del noroeste de argentina: problemas ambientales e importancia de su conservación. Pp. 9-18, *In:* (Brown, A. D. y H. R. Grau, eds.) *Investigación, Conservación y Desarrollo en Selvas Subtropicales de Montaña*, *Proyecto de Desarrollo Agroforestal-L.I.E.Y*., 270 pp.

Bucher, E. H. 1980. Ecología de la fauna chaqueña, una revisión. *Ecosur*, 7:11-159.

Cabrera, A. 1930. Breve sinopsis de los murciélagos argentinos. *Rev. Centro de Estud. Agron. Veter., Univ. Buenos Aires*, 23:418-442.

_____. 1957. Catálogo de los mamíferos de América del Sur. *Rev. Mus. Argent. "Bernardino Rivadavia" e Inst. Nal. Invest. Cienc. Nat., Cienc. Zool*., 4(1):1-308.

Cabrera, A. L. 1976. Regiones fitogeográficas Argentinas. *Encicl. Argentina Agric. y Jard*., 1(1):1-85.

Cabrera, A. L. & A. Willink. 1973. Biogeografía de América Latina. OEA, *Ser. Biol., Monogr*. 13, Washington, D. C., 117 pp.

Crespo, J. A. 1974. Comentarios sobre nuevas localidades para mamíferos de Argentina y de Bolivia. *Rev. Mus. Argent. "Bernardino Rivadavia" e Inst. Nal. Invest. Cienc. Nat., Cienc. Zool.*, 11(1):1-31.

Davis, W. B. 1973. Geographic variation in the fishing bat, *Noctilio leporinus*. *J. Mamm*., 54:862-874.

Del Ponte, E. 1944. *Basilia romañai nobis* (Diptera, Nycteribiidae) de la Argentina. *Anls. Inst. Med. Reg. Univ. Nal*., Tucumán, 1(1):117-128.

Díaz, M. M. 1999. Mamíferos de la Provincia de Jujuy: sistemática, distribución y ecología. Unpubl. Ph.D. Thesis, Fac. Cs. Nat. e Inst. M. Lillo, Univ. Nal. Tucumán, Argentina, 640 pp.

Díaz, M. M. & R. M. Barquez. 1999. Contributions to the knowledge of the mammals of Jujuy Province, Argentina. *Southwestern Nat.* 44(3):324-333.

Eger, J. L. 1977. Systematics of the Genus *Eumops* (Chiroptera: Molossidae). *Life Sci. Contrib., Royal Ontario Mus.,* 110:1-69.

Fornes, A. & E. Massoia. 1967. Procedencias nuevas o poco conocidas para murciélagos (Noctilionidae, Phyllostomidae, Vespertilionidae y Molossidae). *Seg. Jorn. Entomoepid. Arg*., 1:133-145 (for 1965).

Fornes, A., E. Massoia, & G. E. Forrest. 1967. *Tonatia sylvicola* (d'Orbigny) nuevo género y especie para la República Argentina (Chiroptera: Phyllotomidae). *Physis*, 27(74):149-152.

Genoways, H. H. & D. A. Schlitter. 1981. Collections of Recent mammals of the World, exclusive of Canada and the United States. *Ann. Carnegie Mus*., 50:47-80.

Giannini, N. P. 1999. Selection of diet and elevation by sympatric species of *Sturnira* in an Andean Rainforest. *J. Mamm*., 80:1186-1195.

Guerrero, S. I. 1985. Nueva localidad Argentina para *Nyctinomops macrotis* (Gray, 1839) (Mammalia: Chiroptera: Molossidae). *Hist. Nat*., *Argentina*, 5:57-60.

Hafner, M. S., W. L. Gannon, J. Salazar-Bravo, & S. Ticul Alvarez-Castañeda. 1997. Mammals Collections in the Western Hemisphere. A Survey and directory of existing collections. *American Soc. Mammal*., 1-93.

Heinonen, S. & A. Bosso. 1994. Nuevos aportes para el conocimiento de la mastofauna del Parque Nacional Calilegua (Provincia de Jujuy, Argentina). *Mastozool. Neotrop*., 1(1):51-60.

Hill, J. E. & D. L. Harrison. 1987. The baculum in the Vespertillioninae (Chiroptera: Vespertillionidae) with a systematic review, a synopsis of *Pipistrellus* and *Eptesicus*, and the description of a new genus and subgenus. *Bull. Br. Mus. (Nat. Hist.), Zool. Ser*., 52:225-305.

Husson, A. M. 1962. The bats of Suriname. *Zoöl. Verhand*., Leiden, 58:1-222.

_____. 1978. The mammals of Suriname. *Zoöl. Monogr. Rijksmus. Nat. Hist*., 2:xxxxiv+569.

Iudica, C. A. 1995. Frugivoría en murciélagos: el frutero común (*Sturnira lilium*) en las Yungas de Jujuy, Argentina. Pp. 123-128, *In*: (Brown, A. D. y H. R. Grau, eds.) *Investigación, Conservación y Desarrollo en Selvas Subtropicales de Montaña*, *Proyecto de Desarrollo Agroforestal-L.I.E.Y*., 270 pp.

Jaccard, P. 1908. Nouvelles aecherches sur la distribution florale. *Bull. Soc. Vaud. Sci. Nat*., 44:223-270.

Keegan, R. A. & J. M. Keegan. 1993. Atlas de la República Argentina. Agrupación de Diarios del Interior, S. A., Buenos Aires, published by Editorial Antártica, Chile.

La Val, R. K. 1973. A revision of the Neotropical bats of the genus *Myotis*. *Nat. Hist. Mus. Los Angeles Co., Sci. Bull*., 15:1-54.

MacArthur, R. H. & E. O. Wilson. 1967. The theory of island biogeography. *Princeton Univ. Press*, Princeton, 203 pp.

Mares, M. A., R. A. Ojeda, & M. P. Kosco. 1981. Observations on the distribution and ecology of the mammals of Salta Province, Argentina. *Ann. Carnegie Mus.,* 50:151-206.

Mares, M. A., R. A. Ojeda, J. K. Braun, & R.M. Barquez. 1997. Systematics, distribution, and ecology of the mammals of Catamarca Province, Argentina. Pp. 89-141, *In:*T. L. Yates, W.

L. Gannon & D. E. Wilson (eds.). *Life among the muses: Papers in Honor of James S. Findley. Mus. Southwestern Biol*., Univ. New México, Albuquerque.

Mares, M. A., R. M. Barquez, & J. K. Braun. 1995. Distribution and ecology of some argentine bats. *Ann. Carnegie Mus.,* 64(3):219-237.

Mares, M. A., R. M. Barquez, J. K. Braun, & R. A. Ojeda. 1996. Observations on the mammals of Tucumán Province, Argentina. I. Systematics, distribution, and Ecology of the Didelphimorphia, Xenarthra, Chiroptera, Primates, Carnivora, Perissodactyla, Artiodactyla, and Lagomorpha. *Ann. Carnegie Mus.,* 65(2):89-152.

Massoia, E. 1976. Cuatro notas sobre murciélagos de la República Argentina (Molossidae y Vespertilionidae). *Physis*, 35(91):257-265.

Meyer, T. 1963. Estudios sobre la Selva Tucumana: La Selva de mistáceas de "Las Pavas". *Op. Lilloana*, 10:1-127.

Miller, G. S., Jr. 1907. The families and genera of bats. *Bull. U. S. Nat. Mus*., 57, 282 pp.

Morales, J. C. & J. W. Bickham. 1995. Molecular systematics of the Genus *Lasiurus* (Chiroptera: Vespertilionidae) based on restriction site maps of mitochondrial ribosomal genes. *J. Mamm*., 76:730-749.

Morales, J. M., M. Sirombra, & A. D. Brown. 1995. Riqueza de árboles en las Yungas argentinas. Pp. 163-174, *In*: Brown, A. D. y H. R. Grau, (eds.) *Investigación, Conservación y Desarrollo en Selvas Subtropicales de Montaña*, *Proyecto de Desarrollo Agroforestal-L.I.E.Y.,* 270 pp.

Morello, J. & J. Adamoli. 1968. La vegetación de la República Argentina. Las grandes unidades de vegetación y ambiente del Chaco Argentino. Primera parte: objetivos y metodología. *INTA, Ser. Fitogeograf*., 10, 125 pp.

Ojeda, R. A. 1999. Biodiversidad y conservación de mamíferos de la interfase tropical-templada de la Argentina. Chapter 20, Pp. 443-462, *In:* Matteucci, S. D., O. T. Solbrig, J. Morello, and G. Halffter (eds.) *Biodiversidad y uso de la tierra: conceptos y ejemplos de latinoamérica*. *Eudeba*, Buenos Aires.

Ojeda, R. A. & M. A. Mares. 1989. A Biogeographic analysis of the Mammals of Salta Province, Argentina. Patterns of species assemblage in the Neotropics. *Spec. Publ. Texas Tech Univ.,* 27:1-66.

Olrog, C. C. 1959. Notas mastozoológicas. II. Sobre la colección del Instituto Miguel Lillo. *Acta Zool. Lilloana*, 17:403-419.

_____. 1976. Sobre mamíferos del noroeste Argentino. *Acta Zool. Lilloana*, 32:5-14.

_____. 1979. Los mamíferos de la selva húmeda, Cerro Calilegua, Jujuy. *Acta Zool. Lilloana*, 33:9-14.

Olrog, C. C. & R. M. Barquez. 1979. Dos quirópteros nuevos para la fauna Argentina. *Neotrópica*, 25(74):185-186.

Podtiaguin, B. 1944. Contribución al conocimiento de los murciélagos del Paraguay. *Rev. Soc. Cient.* Paraguay, 6(4):1-62.

Prado, D. E. 1995. Selva montana: contexto regional y lista florística de un ecosistema en peligro. Pp. 19-52, *In*: Brown, A. D. y H. R. Grau (eds.) *Investigación, Conservación y Desarrollo en Selvas Subtropicales de Montaña*. *Proyecto de Desarrollo Agroforestal-L.I.E.Y.,* 270 pp.

Rohlf, F. J. 1993. NTSYS-pc. Numerical taxonomy system of multivariate analysis system. Version 1.80. *Exeter Software*, New York.

Romaña, C. and J. W. Abalos. 1950. Lista de los quirópteros de la colección del Instituto de Medicina Regional y sus parásitos. *Anls. Inst. Med. Reg*., 3(1):111-117.

Simmons, N. B. 1996. A new species of *Micronycteris* (Chiroptera: Phyllostomidae) from northeastern Brazil, with comments on phylogenetic relationships. *Am. Mus. Novitates*, 3158:1-34.

Simmons, N. B. & R. S. Voss. 1998. The mammals of Paracou, French Guiana: a Neotropical lowland rainforest fauna. Part 1. Bats. *Bull. Am. Mus. Nat. Hist*., 237:1-219.

Simpson, G. G. 1964. Species density of North American recent mammals. *Systematic Zool.,* 13:57-73.

Sneath, P. H. A. 1957. Some thoughts on bacterial classification. *J. Gen. Microbiol*., 17:184-200.

Sokal, P.H. & C. D. Michener. 1958. A statistical method for evaluating systematic relationships. *Univ. Kansas Sci. Bull*., 38:1409-1438.

Sokal, R. R., & F. J. Rohlf. 1962. Biometry. W. H. Freeman, San Francisco, 776 pp.

Tate, G. H. H. 1942. Results of the Archbold Expeditions. N˚ 47. Review of the Vespertilioniae bats, with special attention to the genera and species of the Archbold collections. Bulletin of the American Museum of Natural History, 80:221-297.

Thomas, O. 1898. On the small mammals collected by Dr. Borelli in Bolivia and northern Argentina. *Boll. Mus. Zool. Anat. Comp. Univ. Torino*, 13:1-4.

_____. 1902. On mammals collected at Cruz del Eje, Central Córdova. *Ann. Mag. Nat. Hist*., ser. 7, 9:237-245.

_____. 1916. Notes on the bats of the genus *Histiotus*. *Ann. Mag. Nat. Hist*., ser. 8, 17:272-276.

Vervoorst, F. 1979. La vegetación del noroeste argentino y su degradación. *Fund. Miguel Lillo, ser. Conservación de la Naturaleza,* 9 pp.

_____. 1982. Noroeste. Pp. 9-24, *In*: Conservación de la Vegetación Natural en la República Argentina. *Simposio XVIII Argentinas Jornadas de Botánica, Fund. Miguel Lillo*, Tucumán, Argentina, 127 pp.

Villa-R., B. & M. Villa-C. 1971. Observaciones acerca de algunos murciélagos del norte de Argentina, especialmente de la biología del vampiro *Desmodus r. rotundus*. *Anls. Inst. Biol., Univ. Nal. Autón*. México, Ser. Zool., 42:107-148.

Williams, S. L., M. R. Willig, & F. A. Reid. 1995. Review of the Tonatia bidens complex (Mammalia: Chiroptera), with descriptions of two new species*. J. Mamm*., 76:612-626.

Willig, M. R. 1983. Composition, microgeographic variation, and sexual dimorphism in Caatingas and Cerrado bat communities from northeast Brazil. *Bull. Carnegie Mus. Nat. Hist*., 23:1-131.

Yates, T. L., W. R. Barber, & D. M. Armstrong. 1987. Survey of North American collections of Recent mammals. *J. Mamm*. supplement, 68:1-76.

Yepes, J. 1944. Comentarios sobre cien localidades nuevas para mamíferos Sudamericanos. *Rev. Argentina Zoogeogr*., 4:59-71.

Recibido: 12 de junio 2000
Aceptado: 14 de noviembre 2000

GAZETEER

Localities are listed in both alphabetical and numerical order. Departments and Provinces are given in parenthesis. Numbers in parenthesis correspond to the numbered localities indicated in the map of the Figure 3.

12.6 km al W de Piquirenda Viejo (San Martín, Salta) 22º 20' S 63º 50' W (11)
27 km W of the junction of Argentine Highway 50 and the road to Isla de Cañas (Orán, Salta) 23˚05' S 64º32' W (26)
43.7 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas (Orán, Salta) 23˚ 00' S 64º 33' W (23)
48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas (Orán, Salta) 22º 57' S 64º 33' W (22)
Abra de Cañas, 1710 m (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W (41)
Abra de Cañas, 1724 m (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W (41)
Abra de Cañas, 1730 m (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W (41)
Abra de Cañas, app. 30 km NW Calilegua, sobre ruta a Valle Grande (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W (41)
Abra de Cañas, El Monolito, 1700 m (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W (41)
Abra de Santa Laura, límite entre Salta y Jujuy, sobre Ruta Nacional n˚ 9, 1397 m (El Carmen, Jujuy) 24º30' S 65 19' W (75)
Abra Grande (Orán, Salta) 23˚ 05' S 64º 22' W (25)
Abra Grande, 10 km N Orán (Orán, Salta) 23˚ 05' S 64º 22' W (25)
Abra Grande, 20 km NW Orán (Orán, Salta) 23˚ 04' S 64º 30' W (24)
Acheral (Monteros, Tucumán) 27º 07' S 65º 27' W (133)
Agua Blanca (Orán, Salta) 22º 45' S 64º 22' W (17)
Agua Blanca, 20 km NW (Orán, Salta) 22º 33' S 64º 32' W (16)
Agua Blanca, 24 km NW (Orán, Salta) 22º 33' S 64º 32' W (16)
Agua Blanca, 25 km NW (Orán, Salta) 22º 33' S 64º 32' W (16)
Agua Blanca, 5 km W (Orán, Salta) 22º 45' S 64º 25' W (18)
Agua Colorada (Burruyacú, Tucumán) 26˚ 26' S 64º 53' W (91)
Agua Rosada (Trancas, Tucumán) 26˚ 22' S 65º 26' W (88)
Agua Rosada, San Pedro de Colalao (Trancas, Tucumán) 26˚ 22' S 65º 26' W (88)
Agua Salada, app. 15 Km SE Agua Caliente, lado oriental del Río San Francisco (Santa Bárbara, Jujuy) 23˚57' S 64º 38' W (51)
Aguaray (San Martín, Salta) 22º 16' S 63º 46' W (8)
Aguaray, 700 m (San Martín, Salta) 22º 16' S 63º 46' W (8)
Aguas Blancas (Orán, Salta) 22º 45' S 64º 22' W (17)
Aguas Blancas, 14 km E Santa Clara (Santa Bárbara, Jujuy) 24º 18' S 64º 28' W (63)
Aguas Blancas, 27 km W (Iruya, Salta) 22º 45' S 64º 45' W (19)
Aguas Chiquitas (Burruyacú, Tucumán) 26˚ 37' S 65º 12' W (99)
Aguas Chiquitas, 25 km NE San Miguel de Tucumán, 800 m (Burruyacú, Tucumán) 26˚ 37' S 65º 12' W (99)
Aguas Chiquitas, El Cadillal (Burruyacú, Tucumán) 26˚ 37' S 65º 12' W (99)
Aguas Chiquitas, Sierras de Medina, 800 m (Burruyacú, Tucumán) 26˚ 37' S 65º 12' W (99)
Aguas Negras (Ledesma, Jujuy) 23˚ 45' S 64º 56' W (44)
Aguas Negras, 600 m (Ledesma, Jujuy) 23˚ 45' S 64º 56' W (44)
Aguas Negras, 650 m (Ledesma, Jujuy) 23˚ 45' S 64º 56' W (44)
Aguas Negras, Parque Nacional Calilegua (Ledesma, Jujuy) 23˚ 45' S 64º 56' W (44)
Alto Macueta, 2 km N del cruce de Macueta y Campo Largo (San Martín, Salta) 22º 02' S 63º 59' W (1)
Angosto del Pescado, Serranía de Las Pavas (Orán, Salta) 22º 33' S 64º 32' W (16)
Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas (Burruyacú, Tucumán) 26˚ 37' S 65º 12' W (99)
Arroyo de Las Cañas, Horco Molle (Yerba Buena, Tucumán) 26˚ 45' S 65º 23' W (105)
Arroyo El Saltón, Reserva Provincial Santa Ana (Río Chico, Tucumán) 27º 26' S 65º 46' W (141)
Arroyo La Sala, Centro Administrativo, Parque Nacional El Rey (Anta, Salta) 24º 32' S 64º 38' W (76)
Arroyo La Urbana, 45 Km E y 5.4 km SE San Salvador de Jujuy, 620 m (San Pedro, Jujuy) 24º 20' S 64º 50' W (66)
Arroyo Los Noques, Parque Nacional El Rey (Anta, Salta) 24º 32' S 64º 38' W (76)
Arroyo Sauzalito, Parque Nacional Calilegua (Ledesma, Jujuy) 23˚ 40' S 64º 42' W (40)
Arroyo Yuto, 13 km SW Yuto (Ledesma, Jujuy) 23˚ 38' S 64º 28' W (38)
Biological Reserve at Horco Molle (Yerba Buena, Tucumán) 26˚ 45' S 65º 21' W (104)

Biological Reserve at Horco Molle, near residencia, 2,400 ft. (Yerba Buena, Tucumán) 26˚ 45' S 65º 21' W (104)
Caimancito (Ledesma, Jujuy) 23˚ 44' S 64º 36' W (42)
Caimancito, 550 m (Ledesma, Jujuy) 23˚ 44' S 64º 36' W (42)
Caimancito, 600 m (Ledesma, Jujuy) 23˚ 44' S 64º 36' W (42)
Caimancito, El Arroyo, 600 m, Parque Nacional Calilegua (Ledesma, Jujuy) 23˚ 44' S 64º 36' W (42)
Calilegua (Ledesma, Jujuy) 23˚ 46' S 64º 47' W (45)
Calilegua, El Monolito (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W (41)
Camino de Cornisa, 10 km W Dique La Ciénaga (El Carmen, Jujuy) 24º 29' S 65º 22' W (74)
Casa de Piedra, Río Los Sosa, ruta 307, km 24.9, 850 m (Monteros, Tucumán) 27º 04' S 65º 40' W (129)
Caspichango (Monteros, Tucumán) 27º 04' S 65º 30' W (128)
Cercanías de San Pedro (San Pedro, Jujuy) 24º 15' S 64º 50' W (62)
Cerro Calilegua (Valle Grande, Jujuy) 23˚ 35' S 64º 54' W (35)
Cerro del Campo, 900 m (Burruyacú, Tucumán) 26˚ 35' S 64º 57' W (95)
Cerro El Morado, 11 km al NO de San Antonio, sobre Río El Morado (San Antonio, Jujuy) 24º 19' S 65º 24' W (65)
Cerro San Javier (Yerba Buena, Tucumán) 26˚ 47' S 65º 24' W (109)
Ciudad Capital (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Concepción (Chicligasta, Tucumán) 27º 20' S 65º 35' W (138)
Cucho, San Salvador de Jujuy (Dr. Manuel Belgrano, Jujuy) 24º 04' S 65º 15' W (56)
Cuesta del 25, 3 km N entrada al Dique El Cadillal (Tafí Viejo, Tucumán) 26˚ 37' S 65º 12' W (99)
Cuesta del Clavillo, 3 km SW La Banderita (Andalgalá, Catamarca) 27º 29' S 66º 06' W (142)
Cuesta del Clavillo, 5 km S La Banderita (Andalgalá, Catamarca) 27º 29' S 66º 06' W (142)
Cuesta del Totoral (Paclín, Catamarca) 28º 01' S 65º 35' W (145)
Cueva del Murcielagallo, 15 Km SSW Santa Victoria, 2000 m (Santa Victoria, Salta) 22º 15' S 65º 02' W (7)
Cueva del Tigre, 74 km N Pampa Blanca, 700 m (Ledesma, Jujuy) 23˚ 57' S 64º 47' W (52)
Dique El Cadillal, 25 km N San Miguel de Tucumán (Tafí Viejo, Tucumán) 26˚ 37' S 65º 12' W (99)
Dique Escaba (Alberdi, Tucumán) 27º 40' S 65º 46' W (143)
Dique Itiyuro (San Martín, Salta) 22º 10' S 63º 50' W (3)
Dique Itiyuro, 5 km W (San Martín, Salta) 22º 10' S 63º 55' W (5)
Dique La Ciénaga (El Carmen, Jujuy) 24º 25' S 65º 17' W (71)
Dique La Ciénaga, 13 km SSW S. S. de Jujuy (El Carmen, Jujuy) 24º 25' S 65º 17' W (71)
Dique La Ciénaga, casa del club náutico, 30 Km SSW San Salvador de Jujuy, 1000 m (El Carmen, Jujuy) 24º 25' S 65º 17' W (71)
Dique Las Maderas (El Carmen, Jujuy) 24º 27' S 65º 15' W (72)
Dique Las Maderas, 42 Km San Salvador de Jujuy, 920 m (El Carmen, Jujuy) 24º 27' S 65º 15' W (72)
Dique San Ignacio (La Cocha, Tucumán) 27º 44' S 65º 40' W (144)
El Cadillal (Tafí Viejo, Tucumán) 26˚ 37' S 65º 12' W (99)
El Cadillal, 25 km N San Miguel de Tucumán (Tafí Viejo, Tucumán) 26˚ 37' S 65º 12' W (99)
El Cadillal, Estación de Piscicultura (Tafí Viejo, Tucumán) 26˚ 37' S 65º 12' W (99)
El Cadillal, Río Loro (Burruyacú, Tucumán) 26˚ 37' S 65º 10' W (98)
El Cadillal, usina (Tafí Viejo, Tucumán) 26˚ 37' S 65º 12' W (99)
El Carmen (El Carmen, Jujuy) 24º 24' S 65º 15' W (69)
El Colmenar (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
El Corte (Yerba Buena, Tucumán) 26˚ 49' S 65º 26' W (115)
El Duraznillo, 3000 m, Cerro Calilegua (Valle Grande, Jujuy) 23˚ 28' S 64º 55' W (33)
El Manantial (Lules, Tucumán) 26˚ 51' S 65º 17' W (118)
El Monolito (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W (41)
El Naranjal (Monteros, Tucumán) 27º 02' S 65º 41' W (127)
El Naranjo (Burruyacú, Tucumán) 26˚ 40' S 65º 03' W (100)
El Nogalar, Ruta 307, 1700 m (Monteros, Tucumán) 27º 01' S 65º 40' W (126)
El Palmar del Río San Francisco (Santa Bárbara, Jujuy) 24º 08' S 64º 33' W (57)
El Paraíso (Yerba Buena, Tucumán) 26˚ 49' S 65º 26' W (115)
El Pinar (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
El Simbolar, 25 km SW Palma Sola, 1000 m (Santa Bárbara, Jujuy) 24º 11' S 64º 28' W (59)
Embarcación, Finca Tres Pozos, 247 km NE San Salvador de Jujuy (San Martín, Salta) 23˚ 13' S 64º 07' W (28)
Finca Abra Grande (Orán, Salta) 23˚ 05' S 64º 22' W (25)
Finca Catamontaña, 33 Km SSE San Salvador de Jujuy, 925 m (El Carmen, Jujuy) 24º 23' S 65º 07' W (68)
Finca El Arrazayal, Serranía de las Pavas (Orán, Salta) 22º 33' S 64º 32' W (16)

Finca La Carolina, Los Perales, San Salvador de Jujuy, 1310 m (Dr. Manuel Belgrano, Jujuy) 24º 11' S 65º 19' W (60)
Finca La Toma, 25 Km SW San Salvador de Jujuy (San Antonio, Jujuy) 24º 20' S 65º 21' W (67)
Fraile Pintado, 12 km W, sobre Río Ledesma (Ledesma, Jujuy) 23˚ 57' S 64º 55' W (53)
Horco Molle (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, 15 km W San Miguel de Tucumán (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, 900 m (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, Biological Reserve (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, Parque Biológico Sierra de San Javier (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, Residencia Universitaria (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, Río Las Cañas (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, Río Las Leñas (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Horco Molle, Río Las Piedras (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Ingenio Amalia (Capital, Tucumán) 26˚ 52' S 65º 13' W (119)
Ingenio Lules (Lules, Tucumán) 26˚ 55' S 65º 20' W (123)
Ingenio San Martín del Tabacal (Orán, Salta) 23˚ 15' S 64º 15' W (29)
Ingenio San Pablo (Lules, Tucumán) 26˚ 54' S 65º 19' W (122)
Ingenio Santa Lucía (Monteros, Tucumán) 27º 06' S 65º 31' W (131)
Instituto Lillo (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Instituto Lillo, San Miguel de Tucumán (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Itaú (Campo Largo), Sierras de Tartagal, 1600 m (San Martín, Salta) 22º 05' S 63º 55' W (2)
Jujuy ciudad (Dr. Manuel Belgrano, Jujuy) 24º 12' S 65º 19' W (61)
"Jujuy" (not specific locality)
Junta de los Ríos Tarija y Bermejo (Orán, Salta) 22º 51' S 64º 20' W (20)
Juntas de San Antonio (Orán, Salta) 22º 51' S 64º 20' W (20)
km 16 ruta 307 (Tafí del Valle, Tucumán) 27º 06' S 65º 40' W (132)
La Banderita (Andalgalá, Catamarca) 27º 19' S 65º 58' W (137)
La Banderita, Ruta 62, camino a Las Estancias (Andalgalá, Catamarca) 27º 19' S 65º 58' W (137)
La Brea (Santa Bárbara, Jujuy) 23˚ 56' S 64º 28' W (50)
La Caldera (La Caldera, Salta) 24º 37' S 65º 23' W (77)
La Ciénaga, 2500 m (Tafí del Valle, Tucumán) 26˚ 46' S 65º 39' W (106)
La Higuera (Trancas, Tucumán) 26˚ 23' S 65º 26' W (89)
La Horqueta (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
La Merced (Paclín, Catamarca) 28º 10' S 65º 41' W (146)
La Rinconada (Yerba Buena, Tucumán) 26˚ 49' S 65º 20' W (114)
Laguna de las Catas (San Martín, Salta) 22º 16' S 63º 52' W (9)
Laguna La Brea (Santa Bárbara, Jujuy) 23˚ 56' S 64º 28' W (50)
Laguna La Brea, 25 km antes de Palma Sola sobre Ruta 1 (Santa Bárbara, Jujuy) 23˚ 56' S 64º 28' W (50)
Laguna La Brea, 25 km W Palma Sola (Santa Bárbara, Jujuy) 23˚ 56' S 64º 28' W (50)
Las Juntas, 22 km W Choromoro (Trancas, Tucumán) 26˚ 24' S 65º 31' W (90)
Las Juntas, 22 km W Choromoro on Hwy 312, 3,500 ft. (Trancas, Tucumán) 26˚ 24' S 65º 31' W (90)
Las Mesadas (Trancas, Tucumán) 26˚ 27' S 65º 30' W (92)
Las Pavas (Chicligasta, Tucumán) 27º 15' S 65º 52' W (135)
Las Pavas, Aconquija (Chicligasta, Tucumán) 27º 15' S 65º 52' W (135)
Las Talas, 4 km al N de Bella Vista (Leales, Tucumán) 27º 00' S 65º 17' W (125)
Las Talitas (Tafí Viejo, Tucumán) 26˚ 50' S 65º 13' W (117)
Ledesma (Ledesma, Jujuy) 23˚ 50' S 64º 47' W (47)
Libertador General San Martín (Ledesma, Jujuy) 23˚ 49' S 64º 47' W (46)
Los Madrejones, Junta de los Ríos Tarija e Itaú, 1400 m (San Martín, Salta) 22º 18' S 64º 09' W (10)
Los Perales, San Salvador de Jujuy (Dr. Manuel Belgrano, Jujuy) 24º 11' S 65º 19' W (60)
Los Sarmientos (Río Chico, Tucumán) 27º 25' S 65º 42' W (140)
Los Vásquez (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Los Vásquez, 445 m (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Manuel Elordi, Vermejo, 500 m (Orán, Salta) 23˚ 16' S 64º 09' W (30)
Marcos Paz (Yerba Buena, Tucumán) 26˚ 49' S 65º 17' W (111)
Monte Bello (Río Chico, Tucumán) 27º 22' S 65º 45' W (139)
Monte Bello, margen derecha del Río Medina (Río Chico, Tucumán) 27º 22' S 65º 45' W (139)
Muñecas (Capital, Tucumán) 26˚ 47' S 65º 15' W (107)

Ñorco, 1200 m (Trancas, Tucumán) 26˚ 29' S 65º 22' W (93)
Ñorco, Vipos, 2500 m (Trancas, Tucumán) 26˚ 29' S 65º 22' W (93)
On Highway 9 at border with Salta, at campground on the way to El Carmen (El Carmen, Jujuy) 24º28' S 65º21' W (73)
Orán (Orán, Salta) 23˚ 08' S 64º 20' W (27)
Orán, 15 km S, 15 km W, along Río Santa María (Orán, Salta) 23˚ 19' S 64º 14' W (32)
Orán, 20 km al NW (Orán, Salta) 23˚ 04' S 64º 30' W (24)
Orán, 20 km al NW de Agua Blanca (Orán, Salta) 22º 33' S 64º 32' W (16)
Paraje Palo Blanco, Parque Nacional Calilegua (Ledesma, Jujuy) 23˚ 50' S 65º 00' W (48)
Parque 9 de Julio, Tucumán (Capital, Tucumán) 26˚ 49' S 65º 13' W (112)
Parque Nacional Baritú, Finca Jakulica, Angosto del Río Pescado, 650 m (Orán, Salta) 22º 33' S 64º 32' W (16)
Parque Nacional Baritú, Finca Lipeo, a 15 km de Las Juntas, 600 m (Santa Victoria, Salta) 22º 27' S 64º 46' W (13)
Parque Nacional Baritú, Las Juntas de Río Lipeo y Bermejo (Santa Victoria, Salta) 22º 26' S 64º 32' W (12)
Parque Nacional Baritú, naciente Arroyo Santelmita, 900 m (Santa Victoria, Salta) 22º 31' S 64º 34' W (14)
Parque Nacional El Rey (Anta, Salta) 24º 42' S 64º 38' W (78)
Parque Nacional El Rey, Arroyo de Los Puestos (Anta, Salta) 24º 42' S 64º 38' W (78)
Parque Provincial El Cochuna, km 40 sobre ruta 47 (Chicligasta, Tucumán) 27º 18' S 65º 54' W (136)
Piedra Tendida (Burruyacú, Tucumán) 26˚ 30' S 64º 52' W (94)
Piedra Tendida, 12 km WNW Burruyacú along Río Cajón, 2,500 ft. (Burruyacú, Tucumán) 26˚ 30' S 64º 52' W (94)
Piedra Tendida, 5 km W de Dique El Cajón (Burruyacú, Tucumán) 26˚ 30' S 64º 52' W (94)
Pinar Velardez, 1560 m (Tafí Viejo, Tucumán) 26˚ 43' S 65º 22' W (102)
Piquirenda Viejo, 30 km N Tartagal (San Martín, Salta) 22º 21' S 63º 50' W (11)
Piquirenda Viejo, 6 km W (San Martín, Salta) 22º 21' S 63º 50' W (11)
Piquirenda Viejo, 8 km W (San Martín, Salta) 22º 21' S 63º 50' W (11)
Planta Caimancito, Parque Nacional Calilegua (Ledesma, Jujuy) 23˚ 44' S 64º 36' W (42)
Playa Larga, Río Los Sosa, Ruta 307 km 19.7 (Monteros, Tucumán) 27º 05' S 65º 40' W (130)
Puesto Fronterizo 6 km W La Banderita (Andalgalá, Catamarca) 27º 19' S 65º 58' W (137)
Quebrada de Acambuco, 5 km W Dique Itiyuro (San Martín, Salta) 22º 10' S 63º 53' W (4)
Quebrada de Acambuco, Dique Itiyuro, Sierras de Tartagal, 1500 m (San Martín, Salta) 22º 10' S 63º 53' W (4)
Quebrada de Lules, 11 km SW San Pablo (Lules, Tucumán) 26˚ 56' S 65º 21' W (124)
Quebrada del Toro (Trancas, Tucumán) 26˚ 18' S 65º 41' W (86)
Reserva Provincial "Aguas Chiquitas" El Cadillal (Burruyacú, Tucumán) 26˚ 37' S 65º 12' W (99)
Reserva Provincial Santa Ana, Remanso del Gallego (Río Chico, Tucumán) 27º 26' S 65º 46' W (141)
Río Blanco, 9 km al SW de San Antonio, 1495 m (San Antonio, Jujuy) 24º 24' S 65º 22' W (70)
Río Chulca, 7 km al N de San Pedro de Colalao (Trancas, Tucumán) 26˚ 12' S 65º 27' W (83)
Río de las Conchas, 2 km N y 6 km W Metán (Metán, Salta) 25˚ 28' S 61º 01' W (80)
Río de Zora y cruce con ruta 34 (Ledesma, Jujuy) 23˚ 44' S 64º 40' W (43)
Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20 (Dr. Manuel Belgrano, Jujuy) 24º 02' S 65º 07' W (55)
Río Las Piedras, Parque Biológico Sierra de San Javier (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Río Ledesma, 14 km S Pueblo Ledesma (Ledesma, Jujuy) 23˚ 55' S 64º 47' W (49)
Río Loro (Burruyacú, Tucumán) 26˚ 37' S 65º 10' W (98)
Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 700 m (Monteros, Tucumán) 27º 05' S 65º 40' W (130)
Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 750 m (Monteros, Tucumán) 27º 05' S 65º 40' W (130)
Río Los Sosa, Ruta 307, km 23.9, camino a Tafí del Valle, 850 m (Monteros, Tucumán) 27º 04' S 65º 40' W (129)
Río Los Sosa, Ruta 307, km 24 (Monteros, Tucumán) 27º 04' S 65º 40' W (129)
Río Los Sosa, Ruta 307, km 24.9, camino a Tafí del Valle, 850 m (Monteros, Tucumán) 27º 04' S 65º 40' W (129)
Río Pescado (Orán, Salta) 22º 53' S 64º 27' W (21)
Río Pueblo Viejo, Reserva Provincial La Florida (Monteros, Tucumán) 27º 13' S 65º 37' W (134)
Río Salí (Capital, Tucumán) 26˚ 50' S 65º 12' W (116)
Río Tiraxi, 1,5 km al E de Tiraxi por ruta 29, 1570 m (Dr. Manuel Belgrano, Jujuy) 23˚ 59' S 65º 19' W (54)
Ruta 307, 6 km S cruce con ruta a El Mollar (Monteros, Tucumán) 26˚ 53' S 65º 41' W (121)
Ruta 307, km 43, 1700 m (Monteros, Tucumán) 26˚ 53' S 65º 41' W (121)
Ruta 307, km 46, 1700 m (Monteros, Tucumán) 26˚ 53' S 65º 41' W (121)
Ruta 83, camino a Valle Grande, 9 km al N de San Francisco (Valle Grande, Jujuy) 23˚ 35' S 64º 58' W (36)
San Javier (Tafí Viejo, Tucumán) 26˚ 48' S 65º 23' W (110)
San Lorenzo (Ledesma, Jujuy) 23˚ 33' S 64º 40' W (34)

San Lorenzo (Capital, Salta) 24º 44' S 65º 30' W (79)
San Miguel de Tucumán (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
San Miguel de Tucumán, 28 km NE (Capital, Tucumán) 26˚ 37' S 65º 07' W (97)
San Miguel de Tucumán, 29 km NE (Capital, Tucumán) 26˚ 37' S 65º 07' W (97)
San Miguel de Tucumán, 450 m (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
San Miguel de Tucumán, 456 m (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
San Miguel de Tucumán, Plaza Independencia (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
San Pedro de Colalao (Trancas, Tucumán) 26˚ 14' S 65º 29' W (84)
San Pedro de Colalao, south of, at km marker 42, on Hwy 364, 4,700 ft (Trancas, Tucumán) 26˚20' S 65º33' W (87)
San Ramón de la Nueva Orán (Orán, Salta) 23˚ 08' S 64º 20' W (27)
San Salvador de Jujuy (Dr. Manuel Belgrano, Jujuy) 24º 12' S 65º 19' W (61)
San Salvador de Jujuy, 20 Km W (Dr. Manuel Belgrano, Jujuy) 24º 10' S 65º 20' W (58)
Santa Bárbara (Valle Grande, Jujuy) 23˚ 36' S 65º 04' W (37)
Santa Clara (Santa Bárbara, Jujuy) 24º 18' S 64º 41' W (64)
Santa María, sobre Río Santa María (Orán, Salta) 23˚ 17' S 64º 14' W (31)
Santa Victoria Oeste, 2200 m (Santa Victoria, Salta) 22º 15' S 64º 58' W (6)
Senda del Cedro Grande, Horco Molle (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Senda del Pluviómetro, 800 m, Horco Molle (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W (108)
Sendero Las Chuñas, Parque Nacional El Rey (Anta, Salta) 24º 42' S 64º 38' W (78)
Serranía de Las Pavas (Orán, Salta) 22º 33' S 64º 32' W (16)
Tabacal (Orán, Salta) 23˚ 15' S 64º 15' W (29)
Tacanas (Trancas, Tucumán) 26˚ 18' S 65º 30' W (85)
Taco Yana (Trancas, Tucumán) 26˚ 11' S 65º 30' W (82)
Tafí de Valle, 2200 m (Tafí del Valle, Tucumán) 26˚ 52' S 65º 41' W (120)
Tafí del Valle (Tafí del Valle, Tucumán) 26˚ 52' S 65º 41' W (120)
Tafí Viejo (Tafí Viejo, Tucumán) 26˚ 44' S 65º 16' W (103)
Tafí, 2000 m (Tafí del Valle, Tucumán) 26˚ 52' S 65º 41' W (120)
Tala (La Candelaria, Salta) 26˚ 07' S 65º 17' W (81)
Tartagal (San Martín, Salta) 22º 32' S 63º 49' W (15)
Timbó Nuevo (Burruyacú, Tucumán) 26˚ 42' S 65º 07' W (101)
Tranquitas (Burruyacú, Tucumán) 26˚ 37' S 65º 02' W (96)
Tucumán (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Tucumán, 370 m (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Tucumán, 400 m (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Tucumán, 450 m (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Tucumán, 456 m (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Tucumán, ciudad (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Tucumán, Ciudad, casa céntrica (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Tucumán, Hotel Savoy (Capital, Tucumán) 26˚ 50' S 65º 13' W (117)
Vado de Arrazayal (Orán, Salta) 22º 33' S 64º 32' W (16)
Vado de Arrazayal, 20 km NW Aguas Blancas (Orán, Salta) 22º 33' S 64º 32' W (16)
Vinalito, 2 km al NW, al borde del segundo canal (Santa Bárbara, Jujuy) 23˚ 40' S 64º 25' W (39)
Yerba Buena (Yerba Buena, Tucumán) 26˚ 49' S 65º 19' W (113)
Yuto (Ledesma, Jujuy) 23˚ 38' S 64º 28' W (38)
Yuto, Río San Francisco, altura de Estación (Ledesma, Jujuy) 23˚ 38' S 64º 28' W (38)

1.- Alto Macueta, 2 km N del cruce de Macueta y Campo Largo (San Martín, Salta) 22º 02' S 63º 59' W.
2.- Itaú (Campo Largo), Sierras de Tartagal, 1600 m (San Martín, Salta) 22º 05' S 63º 55' W.
3.- Dique Itiyuro (San Martín, Salta) 22º 10' S 63º 50' W.
4.- Quebrada de Acambuco, 5 km W Dique Itiyuro (San Martín, Salta) 22º 10' S 63º 53' W.
Quebrada de Acambuco, Dique Itiyuro, Sierras de Tartagal, 1500 m.
5.- Dique Itiyuro, 5 km W (San Martín, Salta) 22º 10' S 63º 55' W.
6.- Santa Victoria Oeste, 2200 m (Santa Victoria, Salta) 22º 15' S 64º 58' W.
7.- Cueva del Murcielagallo, 15 Km SSW Santa Victoria, 2000 m (Santa Victoria, Salta) 22º 15' S 65º 02' W.
8.- Aguaray (San Martín, Salta) 22º 16' S 63º 46' W.
Aguaray, 700 m.
9.- Laguna de las Catas (San Martín, Salta) 22º 16' S 63º 52' W.

10.- Los Madrejones, Junta de los Ríos Tarija e Itaú, 1400 m (San Martín, Salta) 22º 18' S 64º 09' W.
11.- 12.6 km al W de Piquirenda Viejo (San Martín, Salta) 22º 20' S 63º 50' W.
Piquirenda Viejo, 30 km N Tartagal.
Piquirenda Viejo, 6 km W.
Piquirenda Viejo, 8 km W.
12.- Parque Nacional Baritú, Las Juntas de Río Lipeo y Bermejo (Santa Victoria, Salta) 22º 26' S 64º 32' W.
13.- Parque Nacional Baritú, Finca Lipeo, a 15 km de Las Juntas, 600 m (Santa Victoria, Salta) 22º 27' S 64º 46' W.
14.- Parque Nacional Baritú, naciente Arroyo Santelmita, 900 m (Santa Victoria, Salta) 22º 31' S 64º 34' W.
15.- Tartagal (San Martín, Salta) 22º 32' S 63º 49' W.
16.- Agua Blanca, 24 km NW (Orán, Salta) 22º 33' S 64º 32' W.
Agua Blanca, 25 km NW.
Agua Blanca, 20 km NW.
Angosto del Pescado, Serranía de Las Pavas.
Finca El Arrazayal, Serranía de las Pavas.
Orán, 20 km al NW de Agua Blanca.
Parque Nacional Baritú, Finca Jakulica, Angosto del Río Pescado, 650 m.
Serranía de Las Pavas.
Vado de Arrazayal.
Vado de Arrazayal, 20 km NW Aguas Blancas.
17.- Agua Blanca (Orán, Salta) 22º 45' S 64º 22' W.
Aguas Blancas.
18.- Agua Blanca, 5 km W. (Orán, Salta) 22º 45' S 64º 25' W.
19.- Aguas Blancas, 27 km W (Iruya, Salta) 22º 45' S 64º 45' W.
20.- Junta de los Ríos Tarija y Bermejo (Orán, Salta) 22º 51' S 64º 20' W.
Juntas de San Antonio.
21.- Río Pescado (Orán, Salta) 22º 53' S 64º 27' W.
22.- 48.9 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas (Orán, Salta) 22º57' S 64º33' W.
23.- 43.7 km NW del cruce de ruta 50 y ruta provincial 18, camino a Isla de Cañas (Orán, Salta) 23˚00' S 64º33' W
24.- Abra Grande, 20 km NW Orán (Orán, Salta) 23˚ 04' S 64º 30' W.
Orán, 20 km al NW.
25.- Abra Grande (Orán, Salta) 23˚ 05' S 64º 22' W.
Abra Grande, 10 km N Orán.
Finca Abra Grande.
26.- 27 km W of the junction of Argentine Highway 50 and the road to Isla de Cañas (Orán,Salta) 23˚05' S 64º32'W.
27.- Orán (Orán, Salta) 23˚ 08' S 64º 20' W.
San Ramón de la Nueva Orán.
28.- Embarcación, Finca Tres Pozos, 247 km NE San Salvador de Jujuy (San Martín, Salta) 23˚ 13' S 64º 07' W.
29.- Ingenio San Martín del Tabacal (Orán, Salta) 23˚ 15' S 64º 15' W.
Tabacal.
30.- Manuel Elordi, Vermejo, 500 m (Orán, Salta) 23˚ 16' S 64º 09' W.
31.- Santa María, sobre Río Santa María (Orán, Salta) 23˚ 17' S 64º 14' W.
32.- Orán, 15 km S, 15 km W, along Río Santa María (Orán, Salta) 23˚ 19' S 64º 14' W.
33.- El Duraznillo, 3000 m, Cerro Calilegua (Valle Grande, Jujuy) 23˚ 28' S 64º 55' W.
34.- San Lorenzo (Ledesma, Jujuy) 23˚ 33' S 64º 40' W.
35.- Cerro Calilegua (Valle Grande, Jujuy) 23˚ 35' S 64º 54' W.
36.- Ruta 83, camino a Valle Grande, 9 km al N de San Francisco(Valle Grande, Jujuy) 23˚ 35' S 64º 58' W.
37.- Santa Bárbara (Valle Grande, Jujuy) 23˚ 36' S 65º 04' W.
38.- Yuto (Ledesma, Jujuy) 23˚ 38' S 64º 28' W.
Yuto, Río San Francisco, altura de Estación.
Arroyo Yuto, 13 km SW Yuto.
39.- Vinalito, 2 km al NW, al borde del segundo canal (Santa Bárbara, Jujuy) 23˚ 40' S 64º 25' W.
40.- Arroyo Sauzalito, Parque Nacional Calilegua (Ledesma, Jujuy) 23˚ 40' S 64º 42' W.
41.- Abra de Cañas, 1710 m (Valle Grande, Jujuy) 23˚ 40' S 64º 54' W.
Abra de Cañas, 1724 m.
Abra de Cañas, 1730 m.
Abra de Cañas, app. 30 km NW Calilegua, sobre ruta a Valle Grande.
Abra de Cañas, El Monolito, 1700 m.

Calilegua, El Monolito.
El Monolito.

42.- Caimancito (Ledesma, Jujuy) 23˚ 44' S 64º 36' W.
Caimancito, 550 m.
Caimancito, 600 m.
Caimancito, El Arroyo, 600 m, Parque Nacional Calilegua.
Planta Caimancito, Parque Nacional Calilegua.

43.- Río de Zora y cruce con ruta 34 (Ledesma, Jujuy) 23˚ 44' S 64º 40' W.

44.- Aguas Negras (Ledesma, Jujuy) 23˚ 45' S 64º 56' W.
Aguas Negras, 600 m.
Aguas Negras, 650 m.
Aguas Negras, Parque Nacional Calilegua.

45.- Calilegua (Ledesma, Jujuy) 23˚ 46' S 64º 47' W.

46.- Libertador General San Martín (Ledesma, Jujuy) 23˚ 49' S 64º 47' W.

47.- Ledesma (Ledesma, Jujuy) 23˚ 50' S 64º 47' W.

48.- Paraje Palo Blanco, Parque Nacional Calilegua (Ledesma,Jujuy) 23˚ 50' S 65º 00' W.

49.- Río Ledesma, 14 km S Pueblo Ledesma (Ledesma, Jujuy) 23˚ 55' S 64º 47' W.

50.- La Brea (Santa Bárbara, Jujuy) 23˚ 56' S 64º 28' W.
Laguna La Brea.
Laguna La Brea, 25 km antes de Palma Sola sobre Ruta 1.
Laguna La Brea, 25 km W Palma Sola.

51.- Agua Salada, app. 15 Km SE Agua Caliente, lado oriental del Río San Francisco (Santa Bárbara, Jujuy) 23˚ 57' S 64º 38' W.

52.- Cueva del Tigre, 74 km N Pampa Blanca, 700 m (Ledesma, Jujuy) 23˚ 57' S 64º 47' W.

53.- Fraile Pintado, 12 km W, sobre Río Ledesma (Ledesma, Jujuy) 23˚ 57' S 64º 55' W.

54.- Río Tiraxi, 1,5 km al E de Tiraxi por ruta 29, 1570 m (Dr. Manuel Belgrano, Jujuy) 23˚ 59' S 65º 19' W.

55.- Río Las Capillas, 15 km al N de Las Capillas, sobre ruta provincial N˚ 20 (Dr. Manuel Belgrano, Jujuy) 24º 02' S 65º 07' W.

56.- Cucho, San Salvador de Jujuy (Dr. Manuel Belgrano, Jujuy) 24º 04' S 65º 15' W.

57.- El Palmar del Río San Francisco (Santa Bárbara, Jujuy) 24º 08' S 64º 33' W.

58.- San Salvador de Jujuy, 20 Km W (Dr. Manuel Belgrano, Jujuy) 24º 10' S 65º 20' W.

59.- El Simbolar, 25 km SW Palma Sola, 1000 m (Santa Bárbara, Jujuy) 24º 11' S 64º 28' W.

60.- Finca La Carolina, Los Perales, San Salvador de Jujuy, 1310 m (Dr. Manuel Belgrano, Jujuy) 24º11' S 65º19' W.
Los Perales, San Salvador de Jujuy.

61.- Jujuy ciudad (Dr. Manuel Belgrano, Jujuy) 24º 12' S 65º 19' W.
San Salvador de Jujuy.

62.- Cercanías de San Pedro (San Pedro, Jujuy) 24º 15' S 64º 50' W.

63.- Aguas Blancas, 14 km E Santa Clara (Santa Bárbara, Jujuy) 24º 18' S 64º 28' W.

64.- Santa Clara (Santa Bárbara, Jujuy) 24º 18' S 64º 41' W.

65.- Cerro El Morado, 11 km al NO de San Antonio, sobre Río El Morado(San Antonio, Jujuy)24º 19' S 65º 24' W.

66.- Arroyo La Urbana, 45 Km E y 5.4 Km SE San Salvador de Jujuy, 620 m (San Pedro, Jujuy) 24º20' S 64º50' W.

67.- Finca La Toma, 25 Km SW San Salvador de Jujuy (San Antonio, Jujuy) 24º 20' S 65º 21' W.

68.- Finca Catamontaña, 33 Km SSE San Salvador de Jujuy, 925 m (El Carmen, Jujuy) 24º 23' S 65º 07' W.

69.- El Carmen (El Carmen, Jujuy) 24º 24' S 65º 15' W.

70.- Río Blanco, 9 km al SW de San Antonio, 1495 m (San Antonio, Jujuy) 24º 24' S 65º 22' W.

71.- Dique La Ciénaga (El Carmen, Jujuy) 24º 25' S 65º17' W.
Dique La Ciénaga, 13 km SSW S. S. de Jujuy.
Dique La Ciénaga, casa del club náutico, 30 Km SSW San Salvador de Jujuy, 1000 m.

72.- Dique Las Maderas (El Carmen, Jujuy) 24º 27' S 65º 15' W.
Dique Las Maderas, 42 Km San Salvador de Jujuy, 920 m.

73.- On Highway 9 at border with Salta, at campground on the way to El Carmen (El Carmen, Jujuy) 24º 28' S 65º 21' W.

74.- Camino de Cornisa, 10 km W Dique La Ciénaga (El Carmen, Jujuy) 24º 29' S 65º 22' W.

75.- Abra de Santa Laura, límite entre Salta y Jujuy, sobre Ruta Nacional n˚ 9, 1397 m (El Carmen, Jujuy) 24º 30' S 65º 19' W.

76.- Arroyo La Sala, Centro Administrativo, Parque Nacional El Rey (Anta, Salta) 24º 32' S 64º 38' W.
Arroyo Los Noques, Parque Nacional El Rey.

77.- La Caldera (La Caldera, Salta) 24º 37' S 65º 23' W.
78.- Parque Nacional El Rey (Anta, Salta) 24º 42' S 64º 38' W.
Parque Nacional El Rey, Arroyo de Los Puestos.
Sendero Las Chuñas, Parque Nacional El Rey.
79.- San Lorenzo (Capital, Salta) 24º 44' S 65º 30' W.
80.- Río de las Conchas, 2 km N y 6 km W Metán (Metán, Salta) 25˚ 28' S 61º 01' W.
81.- Tala (La Candelaria, Salta) 26˚ 07' S 65º 17' W.
82.- Taco Yana (Trancas, Tucumán) 26˚ 11' S 65º 30' W.
83.- Río Chulca, 7 km al N de San Pedro de Colalao (Trancas, Tucumán) 26˚ 12' S 65º 27' W.
84.- San Pedro de Colalao (Trancas, Tucumán) 26˚ 14' S 65º 29' W.
85.- Tacanas (Trancas, Tucumán) 26˚ 18' S 65º 30' W.
86.- Quebrada del Toro (Trancas, Tucumán) 26˚ 18' S 65º 41' W.
87.- San Pedro de Colalao, south of, at km marker 42, on Hwy 364, 4,700 ft (Trancas, Tucumán) 26˚20' S 65º33'W.
88.- Agua Rosada (Trancas, Tucumán) 26˚ 22' S 65º 26' W.
Agua Rosada, San Pedro de Colalao.
89.- La Higuera (Trancas, Tucumán) 26˚ 23' S 65º 26' W.
90.- Las Juntas, 22 km W Choromoro (Trancas, Tucumán) 26˚ 24' S 65º 31' W.
Las Juntas, 22 km W Choromoro on Hwy 312, 3,500 ft.
91.- Agua Colorada (Burruyacú, Tucumán) 26˚ 26' S 64º 53' W.
92.- Las Mesadas (Trancas, Tucumán) 26˚ 27' S 65º 30' W.
93.- Ñorco, 1200 m (Trancas, Tucumán) 26˚ 29' S 65º 22' W.
Ñorco, Vipos, 2500 m.
94.- Piedra Tendida (Burruyacú, Tucumán) 26˚ 30' S 64º 52' W.
Piedra Tendida, 12 km WNW Burruyacú along Río Cajón, 2,500 ft.
Piedra Tendida, 5 km W de Dique El Cajón.
95.- Cerro del Campo, 900 m (Burruyacú, Tucumán) 26˚ 35' S 64º 57' W.
96.- Tranquitas (Burruyacú, Tucumán) 26˚ 37' S 65º 02' W.
97.- San Miguel de Tucumán, 28 km NE(Capital, Tucumán) 26˚ 37' S 65º 07' W.
San Miguel de Tucumán, 29 km NE.
98.- El Cadillal, Río Loro (Burruyacú, Tucumán) 26˚ 37' S 65º 10' W.
Río Loro.
99.- Aguas Chiquitas (Burruyacú, Tucumán) 26˚ 37' S 65º 12' W.
Aguas Chiquitas, 25 km NE San Miguel de Tucumán, 800 m.
Aguas Chiquitas, El Cadillal.
Aguas Chiquitas, Sierras de Medina, 800 m.
Arroyo Aguas Chiquitas, Reserva Provincial Aguas Chiquitas.
Cuesta del 25, 3 km N entrada al Dique El Cadillal.
Dique El Cadillal, 25 km N San Miguel de Tucumán.
El Cadillal.
El Cadillal, 25 km N San Miguel de Tucumán.
El Cadillal, Estación de Piscicultura.
El Cadillal, usina.
Reserva Provincial "Aguas Chiquitas" El Cadillal.
100.- El Naranjo (Burruyacú, Tucumán) 26˚ 40' S 65º 03' W.
101.- Timbó Nuevo (Burruyacú, Tucumán) 26˚ 42' S 65º 07' W.
102.- Pinar Velardez, 1560 m (Tafí Viejo, Tucumán) 26˚ 43' S 65º 22' W.
103.- Tafí Viejo (Tafí Viejo, Tucumán) 26˚ 44' S 65º 16' W.
104.- Biological Reserve at Horco Molle (Yerba Buena, Tucumán) 26˚ 45' S 65º 21' W.
Biological Reserve at Horco Molle, near residencia, 2,400 ft.
105.- Arroyo de Las Cañas, Horco Molle (Yerba Buena, Tucumán) 26˚ 45' S 65º 23' W.
106.- La Ciénaga, 2500 m (Tafí del Valle, Tucumán) 26˚ 46' S 65º 39' W.
107.- Muñecas (Capital, Tucumán) 26˚ 47' S 65º 15' W.
108.- Horco Molle. (Yerba Buena, Tucumán) 26˚ 47' S 65º 23' W.
El Pinar.
Horco Molle, 15 km W San Miguel de Tucumán.
Horco Molle, 900 m.
Horco Molle, Biological Reserve.

Horco Molle, Parque Biológico Sierra de San Javier.
Horco Molle, Residencia Universitaria.
Horco Molle, Río Las Cañas.
Horco Molle, Río Las Leñas.
Horco Molle, Río Las Piedras.
La Horqueta.
Río Las Piedras, Parque Biológico Sierra de San Javier.
Senda del Cedro Grande, Horco Molle.
Senda del Pluviómetro, 800 m, Horco Molle.

109.- Cerro San Javier (Yerba Buena, Tucumán) 26˚ 47' S 65º24' W.
110.- San Javier (Tafí Viejo, Tucumán) 26˚48' S 65º 23' W.
111.- Marcos Paz (Yerba Buena, Tucumán) 26˚ 49' S 65º 17' W.
112.- Parque 9 de Julio, Tucumán (Capital, Tucumán) 26˚ 49' S 65º 13' W.
113.- Yerba Buena (Yerba Buena, Tucumán) 26˚ 49' S 65º 19' W.
114.- La Rinconada (Yerba Buena, Tucumán) 26˚ 49' S 65º 20' W.
115.- El Corte (Yerba Buena, Tucumán) 26˚ 49' S 65º 26' W.

El Paraíso.

116.- Río Salí (Capital, Tucumán) 26˚ 50' S 65º 12' W.
117.- Ciudad Capital (Capital, Tucumán) 26˚ 50' S 65º 13' W.

El Colmenar.
Instituto Lillo.
Instituto Lillo, San Miguel de Tucumán.
Las Talitas.
Los Vásquez.
Los Vásquez, 445 m.
San Miguel de Tucumán.
San Miguel de Tucumán, 450 m.
San Miguel de Tucumán, 456 m.
San Miguel de Tucumán, Plaza Independencia.
Tucumán.
Tucumán, 370 m.
Tucumán, 400 m.
Tucumán, 450 m.
Tucumán, 456 m.
Tucumán, ciudad.
Tucumán, Ciudad, casa céntrica.
Tucumán, Hotel Savoy.

118.- El Manantial (Lules, Tucumán) 26˚ 51' S 65º 17' W.
119.- Ingenio Amalia (Capital, Tucumán) 26˚ 52' S 65º 13' W.
120.- Tafí de Valle, 2200 m (Tafí del Valle, Tucumán) 26˚ 52' S 65º 41' W.

Tafí del Valle.
Tafí, 2000 m.

121.- Ruta 307, 6 km S cruce con ruta a El Mollar (Monteros, Tucumán) 26˚ 53' S 65º 41' W.

Ruta 307, km 43, 1700 m.
Ruta 307, km 46, 1700 m.

122.- Ingenio San Pablo (Lules, Tucumán) 26˚ 54' S 65º 19' W.
123.- Ingenio Lules (Lules, Tucumán) 26˚ 55' S 65º 20' W.
124.- Quebrada de Lules, 11 km SW San Pablo (Lules, Tucumán) 26˚ 56' S 65º 21' W.
125.- Las Talas, 4 km al N de Bella Vista (Leales, Tucumán) 27º 00' S 65º 17' W.
126.- El Nogalar, Ruta 307, 1700 m (Monteros, Tucumán) 27º 01' S 65º 40' W.
127.- El Naranjal (Monteros, Tucumán) 27º 02' S 65º 41' W.
128.- Caspichango (Monteros, Tucumán) 27º 04' S 65º 30' W.
129.- Casa de Piedra, Río Los Sosa, ruta 307, km 24.9, 850 m (Monteros, Tucumán) 27º 04' S 65º 40' W.

Río Los Sosa, Ruta 307, km 23.9, camino a Tafí del Valle, 850 m.
Río Los Sosa, Ruta 307, km 24.
Río Los Sosa, Ruta 307, km 24.9, camino a Tafí del Valle, 850 m.

130.- Playa Larga, Río Los Sosa, Ruta 307 km 19.7 (Monteros, Tucumán) 27º 05' S 65º 40' W.

Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 700 m.
Río Los Sosa, Ruta 307, km 19.7, camino a Tafí del Valle, 750 m.
131.- Ingenio Santa Lucía (Monteros, Tucumán) 27º 06' S 65º 31' W.
132.- km 16 ruta 307 (Tafí del Valle, Tucumán) 27º 06' S 65º 40' W.
133.- Acheral (Monteros, Tucumán) 27º 07' S 65º 27' W.
134.- Río Pueblo Viejo, Reserva Provincial La Florida (Monteros, Tucumán) 27º 13' S 65º 37' W.
135.- Las Pavas (Chicligasta, Tucumán) 27º 15' S 65º 52' W.
Las Pavas, Aconquija.
136.- Parque Provincial El Cochuna, km 40 sobre ruta 47 (Chicligasta, Tucumán) 27º 18' S 65º 54' W.
137.- La Banderita (Andalgalá, Catamarca) 27º 19' S 65º 58' W.
La Banderita, Ruta 62, camino a Las Estancias.
Puesto Fronterizo, 6 km W La Banderita.
138.- Concepción (Chicligasta, Tucumán) 27º 20' S 65º 35' W.
139.- Monte Bello (Río Chico, Tucumán) 27º 22' S 65º 45' W.
Monte Bello, margen derecha del Río.
140.- Los Sarmientos (Río Chico, Tucumán) 27º 25' S 65º 42' W.
141.- Arroyo El Saltón, Reserva Provincial Santa Ana (Río Chico, Tucumán) 27º 26' S 65º 46' W.
Reserva Provincial Santa Ana, Remanso del Gallego.
142.- Cuesta del Clavillo, 3 km SW La Banderita (Andalgalá, Catamarca) 27º 29' S 66º 06' W.
Cuesta del Clavillo, 5 km S La Banderita.
143.- Dique Escaba (Alberdi, Tucumán) 27º 40' S 65º 46' W.
144.- Dique San Ignacio (La Cocha, Tucumán) 27º 44' S 65º 40' W.
145.- Cuesta del Totoral (Paclín, Catamarca) 28º01'S 65º 35' W.
146.- La Merced (Paclín, Catamarca) 28º 10' S 65º 41' W.