



First record of *Eptesicus brasiliensis argentinus* Thomas, 1920 (Chiroptera, Vespertilionidae) in Entre Ríos province, Argentina

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Abstract

Here, we present the first record of *Eptesicus brasiliensis argentinus* Thomas, 1920 for the province of Entre Ríos, Argentina. This subspecies was originally described as a full species (*E. argentinus*) based on its morphological features that clearly separate it from all other species of the genus. However, it was later treated as a subspecies of *E. brasiliensis* by Cabrera (1957), a treatment that was followed by all authors until today. Our record raises the number of bat species for the province of Entre Ríos to 21. This locality represents the fourth record for this subspecies in Argentina, after 35 years since the last known record was obtained. Its geographic range is extended by approximately 130 km to the south, which represents the southernmost known record for this subspecies, and a new ecoregion, the Espinal, is added to its distribution.

Key words

Bats; Espinal; range extension; southern distribution.

Academic editor: Annia Rodríguez-San Pedro | Received 15 May 2018 | Accepted 05 July 2018 | Published 27 July 2018

Citation: Díaz MM, Sánchez RT, Oviedo M, Barquez RM (2018) First record of *Eptesicus brasiliensis argentinus* Thomas, 1920 (Chiroptera, Vespertilionidae) in Entre Ríos province, Argentina. Check List 14 (4): 601–607. <https://doi.org/10.15560/14.4.601>

Introduction

Entre Ríos is one of the least studied provinces of Argentina regarding its bat fauna; its natural vegetation has been so strongly affected that, at present, it is highly fragmented due to agricultural development (De La Fuente and Suárez 2008, Calamari et al. 2014). At the moment, only 20 species of bats have been cited for the province: 1 noctilionid, 2 phyllostomids, 7 molossids, and 10 vespertilionids (Barquez et al. 1999, 2011, Merino et al. 2000, 2003, Barquez 2006, De Souza et al. 2008, Udrizar

Sauthier et al. 2008, Barquez and Díaz 2009, De Souza and Pavé 2009, Lutz et al. 2016).

In Argentina, 4 species of the genus *Eptesicus* Rafinesque, 1820 have been recorded: *E. brasiliensis* (Desmarest, 1819), *E. chiriquinus* Thomas, 1920, *E. diminutus* Osgood, 1915 and *E. furinalis* (d’Orbigny and Gervais, 1847); the last 2 species are known to have a wide distribution in the country, while *E. chiriquinus* and *E. brasiliensis* are restricted to just a few localities. *Eptesicus chiriquinus* was recently added to Argentina, through specimens from a single province from the

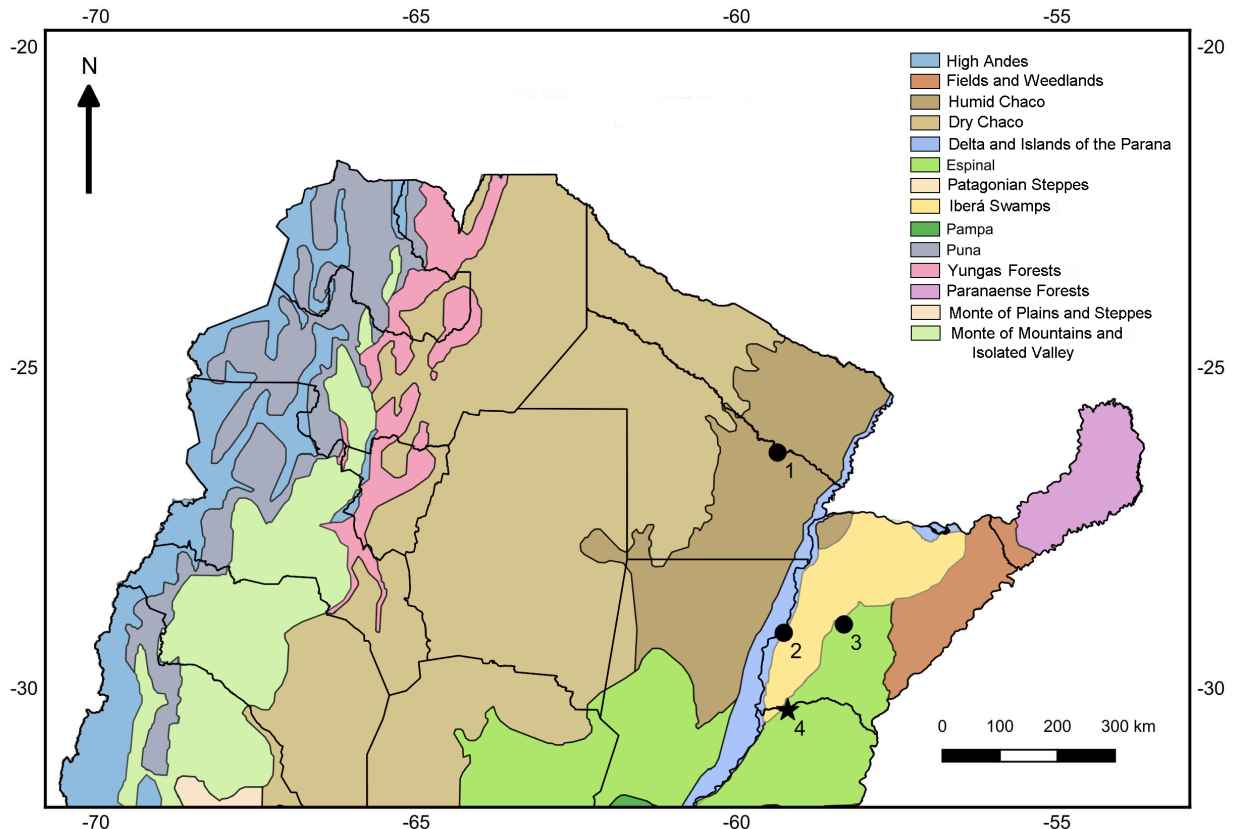


Figure 1. Distribution of *Eptesicus brasiliensis argentinus*. The black circles indicate the previously known localities and the star shows the new one. 1 = Puente sobre el río Bermejo (Chaco), 2 = Estancia El Pilar, 2 km de parada Tataré (Corrientes), 3 = Goya (Corrientes), 4 = Finca San Sebastián a orillas del Arroyo Las Mulas, 31 m (Entre Ríos).

northwest of the country (Barquez et al. 2009, 2011). *Eptesicus brasiliensis* has a broad distribution in South America (Davis and Gardner 2008, Díaz et al. 2016), but the subspecies *E. b. argentinus* was known to be restricted to only 3 localities in 2 provinces of Argentina (Romaña and Toranzos 1947, Massoia 1976, Barquez et al. 1999): (1) Puente sobre el río Bermejo (26°20' S, 059°21' W) (San Martín Department, Chaco Province), (2) Estancia El Pilar, 2 km de Parada Tataré (29°08' S, 059°15' W) (Mercedes Department, Corrientes Province), and (3) Goya (29°00' S, 058°19' W) (Goya Department, Corrientes Province) (Fig. 1). We here report *E. b. argentinus* for the province of Entre Ríos, Argentina, which represents the fourth known locality for the distribution of the species in the country.

Methods

An intensive examination of specimens deposited at the CML (Colección Mamíferos Lillo), National University of Tucumán, Argentina, has allowed us to find specimens of *Eptesicus brasiliensis argentinus*, which represent a new locality for the distribution of the species, and the first report for the province of Entre Ríos.

The specimens were collected with mist nets of different sizes, placed randomly in different microhabitats, mainly inside, or on borders of vegetation, and over streams. Specimens were originally fixed in formaldehyde

10% and preserved in alcohol 70%, and posteriorly prepared as skins, skulls and skeletons and deposited at the Colección Mamíferos Lillo (CML), Tucumán, Argentina.

The identification of the species was made using identification keys published by Barquez et al. (1999) and Díaz et al. (2016) as well as by comparison with specimens of several species of the genus deposited at the CML and other collections (see Appendix).

Results

New record. Argentina: Department La Paz, Entre Ríos Province: Finca San Sebastián, orillas del Arroyo Las Mulas (30°21'6" S, 059°12'12" W, 31 m above sea level) (Fig. 1), collected by Mirna Oviedo on March 23, 2009. One male with scrotal testes (CML 11965) and a female with closed vagina (CML 11966).

The locality of collection belongs to the Espinal ecoregion, which is characterized by low and xerophilous forests, where 93 endemic species were listed, among them, *Prosopis caldenia* Burkart, 1939 (Fabaceae), *Condalia microphylla* Cav. 1799 (Rhamnaceae), *Senecio subulatus* D. Don ex Hook. and Arn. (Asteraceae), *Gaillardia megapotamica* (Spreng.) Baker (Asteraceae) (Matteucci 2012). The dominant landscape varies from flat plains to soft undulated land and to a lesser extent, low mountainous areas, with loessic and sandy soils (Matteucci 2012). Most of the Espinal is located on land



Figure 2. *Eptesicus brasiliensis argentinus* skin. Dorsal and ventral views of the skin of specimen CML 11965 of *E. b. argentinus*.

with high agricultural and urban development, especially in the province of Entre Ríos, where deforestation has recently been intensified by the rapid expansion of soybean crops and eucalyptus plantations (Arturi 2006). The collection area is a patch of natural vegetation, surrounded by crops.

Identification. The specimens were identified by comparing external and cranial characters with specimens at the CML and descriptions published by Barquez et al. (1999) and Díaz et al. (2016). The most distinguishing

characters, which led us to recognize our specimens as *E. b. argentinus* were the combination of large size and pale dorsal coloration of the specimens, besides the short dorsal hairs (ca 8 mm), forearms greater than 41 mm and the measurements of the skull (Table 1).

Discussion

The Argentine population of this species corresponds to the subspecies *Eptesicus brasiliensis argentinus* Thomas, 1920 which is characterized by its dorsal light brown

Table 1. External and cranial measurements in mm (following Barquez et al. 1999) of the specimens of *Eptesicus brasiliensis argentinus* included in this study (CML), compared with the holotype and paratypes in the Natural History Museum, London (BMNH).

Variable	This study		Holotype	Paratypes		
	CML 11965	CML 11966	BMNH 98.3.4.6	BMNH 98.3.4.7	BMNH 98.3.4.8	BMNH 98.3.4.4
Sex	Male	Female	Female	Female	Female	Male
Total length	105	104	111	117	109	102
Tail length	45	41	44	49	45	37
Hindfoot length	10	9	11	11	8	16
Ear length	17	17	18	17	18	16
Weight	13	13.5	—	—	—	—
Forearm length	45.8	45.7	45.0	45.0	41.3	43.3
Greatest length of skull	16.3	—	—	—	15.8	16.7
Condylobasal length	16.7	—	16.4	—	17.3	15.5
Postorbital constriction	4.4	—	4	—	4.1	4.1
Zygomatic breadth	11.8	—	—	—	—	12
Breadth of braincase	8.7	—	7.7	—	8.1	7.8
Mastoideal breadth	9.1	—	9.2	—	9.5	9.2
Length of maxillary toothrow	5.1	—	6.7	—	6.3	6.2
Length of mandible	12.6	—	13.5	—	13.1	13.0



Figure 3. *Eptesicus brasiliensis argentinus* skull and mandible. Dorsal, ventral and lateral views of the skull and lateral view of the mandible of the specimen CML 11965 of *E. b. argentinus*.

coloration with reddish tones, with hairs dark at the bases but with light tips; the slight contrast between dorsal and ventral coloration is also notable. *Eptesicus b. argentinus* cohabits in Argentina with 2 other species of the genus and differs from them mainly by size (Table 1), being the largest species with a forearm greater than 41 mm, while in *E. furinalis* is less than 41 mm and in *E. diminutus* is less than 37 mm. A fourth species occurring in Argentina, *E. chiriquinus*, is similar in size to *E. b. argentinus*, but both are morphologically quite different and their distri-

butions do not overlap. *Eptesicus chiriquinus* has long dorsal fur (10–12 mm) and the skull has well developed sagittal and lambdoidal crests, while *E. b. argentinus* has short dorsal hairs (ca 8 mm) and much less developed crests (Figs 2, 3).

Eptesicus b. argentinus is known only from Argentina and it was described by Thomas (1920) as *Eptesicus argentinus*, from Goya, Corrientes Province. It was later placed under synonymy of *E. brasiliensis* by Cabrera (1957) as *E. b. argentinus*. More recently, Davis and

Gardner (2008) arbitrarily, without taxonomic or any other explanation, decided to place this subspecies as a synonym of *Eptesicus b. arge* (Cope, 1889) despite the significant differences of the 2 taxa, according to the original descriptions of both, *E. argentinus* and *Vesperus arge* Cope, 1889. It should be noted that when *Vesperus arge* was described, no holotype was designated nor specimen (or specimens) examined were indicated, so the existence of comparative or reference material for that species is not known. The short written description of this species is so general and superficial that no diagnostic characters can be found, and no forearm or cranial measurements were given, making comparisons with the species described by Thomas (1920) impossible, which is quite complete in this sense.

Furthermore, the few data indicated by Cope (1889) rule out the possibility that these forms can be interpreted as equals, starting with color description, which are strongly different and already separates the 2 species since *V. arge* was described as a dark brown species, and *E. argentinus* was remarked as very pale (“the palest of all known species of the genus”, as remarked by Thomas 1920). In general, the most significant difference between the 2 species is the general coloration; *E. argentinus* is light brown whereas *E. arge* is dark brown. Barquez et al. (2009) suggested that *V. arge* is significantly different from *E. argentinus*, reinforcing the idea of *E. argentinus* as a full species as originally described by Thomas (1920).

This new locality extends the distribution of this species by approximately 130 km to south, representing the southernmost known record for *E. b. argentinus*. Davis and Gardner (2008) mentioned a record from Montevideo (Uruguay), without any citation, and according to the last comprehensive studies carried out in that country, this species is not in Uruguay (Botto et al. 2008, Rodales 2009), but instead all previous mentions of *E. brasiliensis* in that country belong to *E. furinalis*. We add here a new ecoregion, the Espinal, to the habitat preferences of the species, which until now had only been recorded in the Humid Chaco, and Delta and Islands of the Paraná river system. The locality “Estancia El Pilar, 2 km de Parada Tataré”, indicated by Barquez et al. (1999) as “not located”, is now located in this study and also belongs to the Espinal ecoregion (Fig. 1).

The type specimen and all the eight specimens of the type series of *E. argentinus*, were collected back in 1895 and the next record for the species, from Chaco province, was obtained in 1974. No information for this species has been cited after that so our specimens from Entre Ríos, represent the first record obtained after 35 years since the last known information about the distribution of this species.

The lack of surveys and the fact that the Province of Entre Ríos has suffered great deterioration in its natural vegetation are some of the reasons that may explain the current scarcity and absence of records of this and other species of bats in the province. For example, if

we compare the number of species of bats registered in Entre Ríos with the number of species from a neighboring province such as Corrientes, the latter has 30 species listed which is 9 more than Entre Ríos (Barquez and Díaz 2009, Barquez et al. 2011, Pavé and Giraudó 2014).

Acknowledgements

We wish to thank to Dr. Lucía Claps (Facultad de Ciencias Naturales and Instituto Miguel Lillo, University of Tucumán, Argentina) who organized and collaborated with the fieldwork; also thank to the Secretaría de Ciencia y Técnica de la Universidad Autónoma de Entre Ríos and to Eugenia Montani for the drawing of the map. Thanks to Sergio Solari for his helpful comments to improve the manuscript as well to an anonymous reviewer.

Authors' Contributions

MO participates in specimens' collection, MMD, RTS and RMB reviewed and identified the specimens at the collection Colección Mamíferos Lillo; MMD, MO, RTS and RMB wrote the text.

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- cific site and coordinates between parentheses, numbers of specimens, collection acronym and number. The acronyms used in the text are: AMNH (American Museum of Natural History), New York; BMNH (Natural History Museum), London; CFA (Colección Félix de Azara), Buenos Aires, Argentina; CML (Colección Mamíferos Lillo), Tucumán, Argentina; IADIZA-CM (Instituto Argentino de Investigaciones de las Zonas Áridas), Mendoza, Argentina; MACN (Museo Argentina de Ciencias Naturales “Bernardino Rivadavia”), Buenos Aires, Argentina; MLP (Colección de Mamíferos, Museo de La Plata), La Plata, Argentina; MVZ (Museum of Vertebrate Zoology), University of California, Berkeley, California; ROM (Royal Ontario Museum), Toronto, Canada; TCWC (Texas Cooperative Wildlife Collection), Texas A&M University, College Station, Texas, TTU (Museum of Texas Tech University), Lubbock, Texas.
- Eptesicus brasiliensis argentinus* (9). Argentina. Chaco (1): Gral. San Martín Department, cercanías del puente sobre el río Bermejo, 1 (CFA 4182). Corrientes (6), Goya Department: Goya (29°8'39.5" S, 059°15'51.56" W), 6 (BMNH 98.3.4.3, 98.2.4.4 paratype, 98.3.4.5, 98.3.4.6 holotype, 98.3.4.7, 98.3.4.8 paratypes). Entre Ríos (2), La Paz Department: Finca Don Sebastián a orilla de arroyo La Mulas (30°21'6.5" S, 059°12'12" W), 2 (CML 11965, 11966).
- Eptesicus brasiliensis brasiliensis* (3). Brazil (2). Rio Grande do Sul: Candelaria (29°40'3.02" S, 052°47'19.71" W), 1 (AMNH 235933); Harmonía (29°32'52" S, 051°25'32" W), 1 (AMNH 235937). Perú (1). Loreto Department, Maynas Province: Asentamiento Bambú, Pasaje Los Cedros-Bambú (03°46.140' S, 073°17.120' W), 1 (CML 12025).
- Eptesicus chiriquinus* (2). Argentina. Jujuy (2), Dr. Manuel Belgrano Department: Arroyo Los Matos y Ruta Provincial 20, Finca Las Capillas (24°04'30" S, 065°08'36" W), 1 (CML 7541); Parque Provincial Potrero de Yala (24°06'26.38" S, 065°28'53.35" W), CML 1 (9901).
- Eptesicus diminutus* (16). Argentina. Buenos Aires (1), Campana Department: Delta, Canal 6 y Paraná de Las Palmas (34°10'50.49" S, 058°51'9.09" W), 1 (CML 1820). Catamarca (2), Paclín Department: El Durazno, 8 km S cruce rutas 38 nueva y vieja, por ruta vieja (28°06'04" S, 065°35'55.58" W), 2 (CML 7738, 7741). Jujuy (2), Santa Bárbara Department: Laguna La Brea, 25 km al W de Palma Sola (23°51'22.48" S, 064°26'40.53" W), 2 (CML 3084, 3086). Salta (6), Anta Department: 7 km N ruta 5 por el camino a El Piquete (24°51'52.02" S, 064°28'36" W), 2 (CML 7336, 7337); Arroyo La Sala, Centro Administrativo Parque Nacional El Rey (24°43'20" S, 064°38'39.93" W), 1 (CML 6050); Chicoana Department: 5 km NW Pulares (25°05'26.94" S, 065°36'51" W), 1 (CML 7682); Gral. San Martín Department: 11 km, intersección Ruta 34, camino a Acambuco (22°19'46.56" S, 063°50'40.15" W), 2 (CML 6139, 6140). Tucumán (4), Burruyacú Department: Aguas Chiquitas (26°36'28.63" S, 065°10'35.01" W), 3 (CM 42880, 42881, 42882); Piedra Tendida (26°27'33" S, 064°54'24.79" W), 1 (CML

Appendix

Analyzed specimens by species

For each specimen, the localities are listed by country, alphabetically by province and department then by spe-

9840). Uruguay (1), Río Negro, Balneario Cañas (33°10' S, 058°21' W), 1 (CML 1859).

Eptesicus furinalis (37). Argentina. Buenos Aires (1), La Plata Department: La Plata (34°55'16.5" S, 057°57'15.6" W), 1 (MLP11-VIII-35-29). Chaco (3): Almirante Brown Department: 20 km N and NW by road, and 11 km NE by road Pampa El Mangrullo (25°58'00" S, 061°15'00" W), 3 (CML 3220, 3221, 3225). Córdoba (1), Marcos Juárez Department: La Maya, 35 km al SE de Bell Ville (33°00'14.19" S, 062°26'40.41" W), 1 (MVZ 134224). Corrientes (1), Santo Tomé Department: Laguna Galarza y Lago de la Luna (28°06'40.94" S, 056°43'36.47" W), 1 (CML 3697). Entre Ríos (4), Gualaguaychú Department: Gualaguaychú (33°00'27.8" S, 058°30'40" W), 3 (2 TCWC 22670, 22669; 1 ROM 50216); Islas del Ibicuy Department: Delta Brazo Largo (33°46'32.42" S, 058°36'28.03" W), 1 (TTU 32488). Formosa (2), Bermejo Department: El Churcal, 10 km SSE Buena Vista (23°24'00.9" S, 061°31'35.72" W), 1 (CML 3856); Matacos Department: 35 km S, 5 km E Ing. G. Juárez, Puesto Divisadero (24°8'12.93" S, 61°54'30.09" W), 1 (CML 3855). Jujuy (6), El Carmen Department: 3 km al N de Oyeros, camino entre rutas 61 y 43 (24°30'07.75" S, 064°59'34" W), 2 (CML 7876, 7877); Río Ledesma app. 14 km S del pueblo Ledesma sobre ruta 34 (23°54'21.72" S, 064°48'31.56" W), 1 (CML 5223); Río de Zora en cruce con ruta 34 (23°45'08.36" S,

064°40'52.38" W), 1 (CML 5224); Yuto (23°38'36.06" S, 064°28'12.51" W), 2 (AMNH 180304, 180305). Misiones (5), Capital Department: Parada Leis (27°36'6.43" S, 055°50'16.91" W), 3 (MACN 16779, 16780, 16781); Guaraní Department: 6 km NE by Hwy 2 of jct. Hwy 2 and Arroyo Paraíso (27°01'37" S, 054°04'01.84" W), 1 (CML 3857); San Pedro Department: 47 km al SE de San Pedro (26°49'57.58" S, 053°47'54.31" W), 1 (CML 2157). Salta (2): Gral. José de San Martín Department: a 11 km de la intersección con la Ruta 34, camino a Acambuco (22°19'46.6" S, 063°50'40.2" W), 1 (CML 6138); 6 km W Piquirenda (22°20'49.05" S, 063°48'44.53" W), 1 (CML 5220). Santa Fe (1), Iriondo Department: Totoras (32°35'02.52" S, 061°10'00.21" W), 1 (MACN 16776). Santiago del Estero (6), Alberdi Department: San Félix (26°37'58.03" S, 063°23'53.29" W), 1 (MACN 16792); Jiménez Department, San Pedro (27°05'57.36" S, 064°16'37.23" W), 1 (TTU 32485); La Banda Department, Huyamampa (27°23'20.79" S, 064°17'42.09" W), 4 (CML 527, 981, 982, 983). Tucumán (5), Burruyacú Department: Reserva Provincial Aguas Chiquitas, Arroyo Aguas Chiquitas (26°36'28.63" S, 065°10'35.01" W), 3 (CML 5225, 5226, 5227); Leales Department: INTA Leales (27°11'33.18" S, 065°14'45.63" W), 1 (CML 10992); Trancas Department: Las Mesadas (26°17'4" S, 065°29'39.32" W), 1 (CML 1193).