

Short Note

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New distributional records for bats of the Argentine Patagonia and the southernmost known record for a molossid bat in the world

Abstract: We add new localities to the distribution of bats of the families Molossidae and Vespertilionidae in southern Argentina. We report the southernmost known record for any bat species of the family Molossidae in the world, which corresponds to a locality in the Argentine province of Santa Cruz, for *Tadarida brasiliensis*. Also, new records of this species are added to the provinces of Chubut and Río Negro. Additionally, we provide new localities that extend the distribution of some species of Vespertilionidae, by adding *Histiotus magellanicus* and *Lasiurus varius* to Chubut, and new records for *Histiotus montanus* to Santa Cruz and for *Myotis chiloensis* to Chubut and Tierra del Fuego.

Keywords: Chiroptera; Molossidae; South America; southern distribution; Vespertilionidae.

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Bats of the families Molossidae and Vespertilionidae have distributions that include the coldest regions of the planet.

Vespertilionids, typically inhabitants of temperate zones, have colonized the higher latitudes (McNab 1982), while the molossids, considered “tropical bats”, can mainly penetrate temperate zones in Europe as well as in the Americas. The possibilities of latitudinal movements in these bats are strongly influenced by their insect-eating habits, while tropical species with different diets have only limited displacements within temperate areas where their food items are available (McNab 1982). Among molossids, the species of the genus *Tadarida* seems to be the most latitudinally extended, both northward and southward. For instance, *Tadarida teniotis* (Rafinesque, 1814) has been recorded as far up as 46° N latitude (Arlettaz et al. 2000), representing the northernmost known record for a bat. On the other hand, vespertilionids can reach even higher latitudes, considering that *Myotis chiloensis* (Waterhouse, 1840) was recorded at 55° S in Chile, which is the southernmost known record for any bat in the world (Koopman 1967).

In Argentina, the diversity of bat species decreases markedly in the austral region, below 38° S latitude. In addition to the natural decrease of species by response to the latitudinal effect, it should be added that Patagonia has not been well studied by mammalogists, resulting in the fact that various aspects of the species, for example, their ecology and distribution, are still poorly known in the region. Indeed, the knowledge of the current distribution of species is based mainly on information obtained from occasional or incidental collections. Previous studies (Eger 2007, Gardner and Handley 2007, Handley and Gardner 2007, Barquez and Díaz 2009) reveal that the area contains 10 species of bats, two Molossidae [*Eumops patagonicus* (Thomas, 1924) and *Tadarida brasiliensis* (I. Geoffroy 1824)] and eight Vespertilionidae [*Myotis aelleni* (Baud, 1979), *Myotis chiloensis*, *Myotis dinelli* (Thomas, 1902), *Histiotus macrotus*, *Histiotus magellanicus* (Philippi 1866), *Histiotus montanus* (Philippi and Landbeck 1861), *Lasiurus cinereus* (Beauvois, 1796), and *Lasiurus varius* (Poeppig 1835)]. To date, the Argentine Patagonia is represented only by a few species of bats, most of them recorded in

a few localities, being Neuquén, Río Negro, and Chubut, with the maximum of seven species, the provinces with the highest diversity, while to the south the diversity decreases abruptly. In most of the territory, a single species has been recorded, with only two in Tierra del Fuego. Worthy of mention is the presence of questionable records of *Sturnira lilium* (É. Geoffroy, 1810; Phyllostomidae) for Río Negro and of *Desmodus rotundus* (É. Geoffroy, 1810; Phyllostomidae) and *Molossops temminckii* (Burmeister, 1854; Molossidae) for Chubut (Barquez et al. 1999).

During the last several years, we have received at the Colección Mamíferos Lillo, University of Tucumán and Fundación Miguel Lillo, Tucumán, Argentina (CML collection), specimens of five species of bats, four vespertilionids (*Myotis chiloensis*, *Histiotus magellanicus*, *Histiotus montanus*, and *Lasiurus varius*) and one molossid (*Tadarida brasiliensis*), from nine localities (Appendix 1) and four provinces of the Argentine Patagonia. All samples represent important extensions to the distribution of these species, and almost all records were taken from buildings. The new distributional information for each species is as follows:

Myotis chiloensis

Specimens examined are from (Figure 1) Chubut: Parque Nacional Lago Puelo, 1 (CML 8424) and Parque Nacional Lago Puelo, Intendencia, 1 (CML 6953), and Tierra del Fuego: Río Lapataia, seccional Fenocchio, Parque Nacional Tierra del Fuego, 1 (CML 4519). Although *Myotis chiloensis* is the species with the southernmost known distribution for any bat in the world, the records documenting this occurrence correspond to two specimens from Puerto Pescado, at 55° S on the north shore of Navarino Island, Chile (Koopman 1967). Although the presence of this species in the Argentine territory of Tierra del Fuego was predictable because of the proximity with the Chilean locality, the southernmost published record is from Tecka, in Chubut Province (Mares et al. 1995).

A specimen from “Tierra del Fuego” (CML 4519), but with unknown precise locality, was the one that motivated Barquez (2006) to include the species in Tierra del Fuego, as well as in the distributional maps shown in Barquez and Díaz (2009). The collecting information of this specimen was not available at the time these articles were written, but has recently been recovered by contacting the collector, Anabel Yacianci, who informed us that it was captured in 1999, at the eastern shore of the Río Lapataia, just 20 or 30 m away from Sectional Fenocchio. She provided us with photographs of the specimen that are now

preserved at the annexes section of the CML. This is the first vouchered record for the Argentine section of Tierra del Fuego, and constitutes the southernmost known locality for the species in the country. In addition, we add this species to Lago Puelo in Chubut, representing the fifth locality for the species in this province, sustained by a mummified specimen collected in 2002.

Histiotus magellanicus

Specimens examined are from (Figure 2) Chubut: Parque Nacional Lago Puelo, Intendencia, 1 (CML 4333) and Parque Nacional Lago Puelo, 1 (CML 8423), and Santa Cruz: Lago Belgrano, Parque Nacional Perito Moreno, 1 (CML 6143). Specimens from Lago Puelo represent the first documented record of this species for the province of Chubut. Two adult males were collected at the mezzanine level of the National Park Superintendence building in 2003. One of them (CML 8423) was found mummified. Although this species was cited for the province of Santa Cruz by Cabrera (1958), the specimens mentioned by this author were examined and reidentified as *Histiotus montanus* (Barquez et al. 1999); consequently, the specimen from Lago Belgrano constitutes the first vouchered record of this species for the province. Its presence was previously mapped by Barquez and Díaz (2009); however, the precise locations of occurrence were not mentioned. Barquez et al. (1999) proposed *Histiotus magellanicus* as a valid species; later, several authors such as Simmons (2005) mention their acceptance of the species name as treated by Barquez et al. (1993) and by Mares et al. (1995). Although this species has not been well studied from the biological point of view, it is clearly recognizable among the other sympatric species of *Histiotus* in the Patagonia. The arguments expressed by Handley and Gardner (2007) for not accepting *H. magellanicus* as a valid species are outdated and inconsistent. They question the validity of some differential characters presented by Barquez et al. (1993, 1999), such as the degree of development of the connecting band between the ears and the dark coloration. This latter character was attributed by Handley and Gardner (2007) to the fact that darker color seems to be associated with the humid forest habitats that characterize its distribution in southern Chile and adjacent Argentina. However, the two species inhabit the same habitat to a point where their ranges overlap in the Patagonia. In fact, specimens from both species have been found in the region but their characteristics are so different that leave no doubt that they are two separate systematic entities (Barquez et al. 1999). These characters



Figure 1 Distribution of *Myotis chiloensis*.

The shaded area on the map shows the known distribution of this species, and the dots indicate the localities added in this study (see Appendix 1).

are constant in all specimens examined and not related to age or geographical variations. Contrary to the view expressed by Handley and Gardner (2007), all the examined specimens of *H. montanus* from the area have ventral hairs with black bases and contrastingly white tips, while *H. magellanicus* has ventral hairs with black bases and yellow tips. Although Barquez et al. (1993), and later Mares et al. (1995), reported records for the province of Neuquén, including very adult specimens, a pregnant female and male with scrotal testes, Handley and Gardner (2007) still retain the old distribution of *H. magellanicus* and cite only the southern portion of Chile and the island portion of the southern tip of Argentina.

Histiotus montanus

Specimens examined are from (Figure 3) Santa Cruz: Parque Nacional Los Glaciares, Seccional Río Mitre,

1 (CML 6142). This species was not registered at the western part of the territory in the Patagonia region of Argentina below parallel 42°. All previously documented records are from the eastern part corresponding to the Patagonian steppe, and none was known from the western forests. The specimen from Seccional Río Mitre, deposited at the CML since 1999, was found mummified. This record adds information indicating a more uniform distribution for this species in the province, and demonstrates that it is widespread and able to inhabit the dry environments of Patagonia, as well as the humid forests of the west where it can be found sympatric with *Histiotus magellanicus*.

Lasiurus varius

Specimens examined are from (Figure 4) Chubut: Parque Nacional Lago Puelo, Intendencia, 1 (CML 4334) and

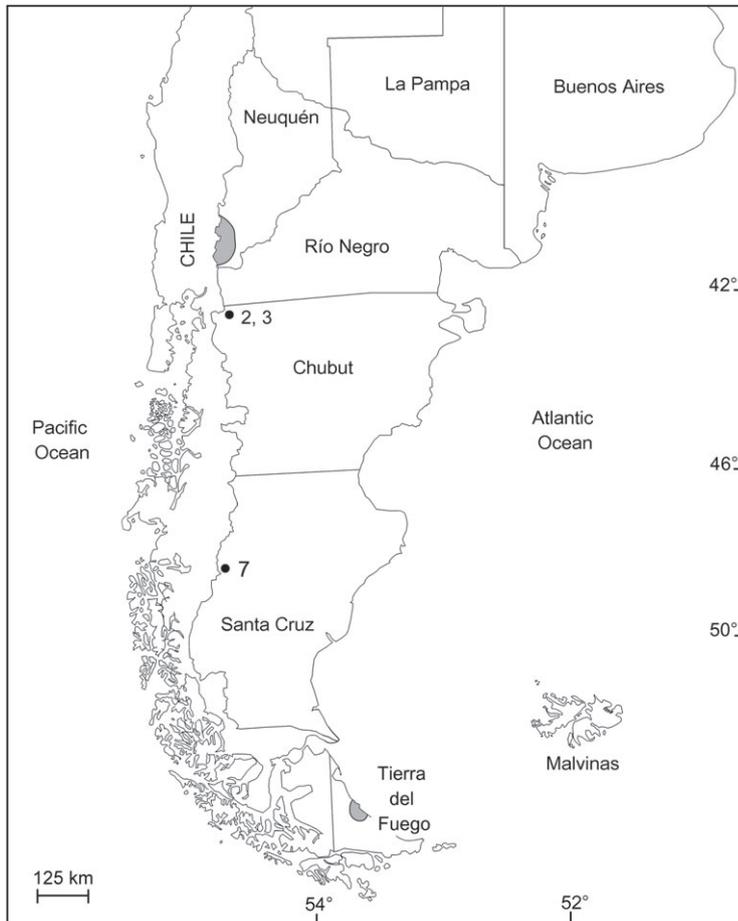


Figure 2 Distribution of *Histiotus magellanicus*.

The shaded area on the map shows the known distribution of this species, and the dots indicate the localities added in this study (see Appendix 1).

Parque Nacional Los Alerces, sendero a Cascada Los Alerces, 1 (CML 4335). Barquez and Díaz (2009) have included this species in their distribution maps; however, voucher specimens and their localities have not been cited previously, and the inclusion in these maps was based on our “specimens examined”. The individual from Lago Puelo was collected in the mezzanine of the National Park Administration Building. This record is the first artificial roost reported for the species. Gardner and Handley (2007) indicated the presence of this species in Ushuaia, Tierra del Fuego, on the basis of a mention of Dabbene (1902), who offered accurate information only for *Myotis chiloensis* and *Histiotus magellanicus*. With regard to *Lasiurus varius* Dabbene wrote: “El *Atalapha borealis* Müller, se encuentra también en este punto y ha sido importando tal vez por algún buque” (translation: The *Atalapha borealis* Müller, is also at this point and has been imported perhaps by some ship). Despite his mention of the

species, there are no references to any specimen collected in the area; however, given the current knowledge about bats of Argentina and their distributions, it is possible to think that their presence in the region is highly probable, especially when records are known by the same latitudes in Chile.

Tadarida brasiliensis

Specimens examined are from (Figure 5) Chubut: Parque Nacional Lago Puelo, orilla N del Lago, entretecho de la casa N° 4, 1 (CML 4332); Río Negro: San Antonio Oeste, Escuela 179 Tomás Espora, 1 (CML 8427); and Santa Cruz: Faro Cabo Vírgenes, Reserva Faunística Cabo Vírgenes, instalaciones de la Armada Argentina, 1 (CML 8426). The southernmost known record for this species was reported



Figure 3 Current distribution of *Histiotus montanus* in southern Argentina.

The shaded area on the map shows the known distribution of this species, and number 6 the locality that extends the distribution in the western part of southern Argentina.

by Hill (1988) from Isla Goldin, West Falkland (Islas Malvinas) at 51° S latitude, corresponding to a mummified specimen collected in December 1985 and sent to the British Museum (Natural History), London. Hill states that the origins of this specimen must remain speculative, and that the bat may have reached the islands as an unauthorized passenger on a ship or an aircraft; he also suggests the possibility of arrival to the islands by wind-assisted vagrancy. Mickleburgh et al. (2002) also consider this specimen as imported or accidental. Although *Tadarida brasiliensis* is a common and abundant species in tropical regions, where they even form colonies with millions of individuals, its southern distribution is poorly known, particularly in the Argentine Patagonia where, in general, records come from isolated and casual collections. We recently received an adult male specimen (CML 8426), collected on April 10, 2011, whose place of collection exceeds all known southern

distribution limits, not only for this but for any species of the family Molossidae in the world. The new locality extends the known continental distribution limit for *T. brasiliensis* by >700 km south of the southernmost known point, cited by Nabte et al. (2011). The specimen was found in the Argentina Army installations, Faro Cabo Vírgenes, at the southeastern end of the Argentine mainland at the entrance of the Estrecho de Magallanes, Santa Cruz Province. The place is in a provincial area protected since 1986, and corresponds to the Patagonian Steppe eco-region, where the weather is semidesert with an almost evenly distributed annual precipitation of around 260 mm, and mean annual temperatures between 5°C and 8°C. The dominant vegetation is in the form of shrubs, low thorny cushion-shaped bushes, with small leaves or no leaves, with species such as “calafate” (*Berberis buxifolia*, Berberidaceae), “mata verde” (*Lepidophyllum cupressiforme*, Asteraceae), “mata negra”



Figure 4 Distribution of *Lasiurus varius*.

The shaded area on the map shows the known distribution of this species, and the dots indicate the localities added in this study (see Appendix 1).

(*Verbena tridens*, Verbenaceae), “romerillo” (*Chilothrichum diffusum*, Asteraceae), and xeric grasses such as “coirones” (*Festuca gracillima*, Poaceae). In addition to this extreme locality, we add two more records for this species; one to Chubut Province, a male captured in September 2003 in Parque Nacional Lago Puelo, which is the third known locality for the species in the province, and extends its distribution about 500 km west. The other is a male (CML 8427) from Río Negro Province, collected in San Antonio Oeste, in October 2004, representing the first coastal locality for the province, at about 200 km SE of the closest known locality in the province. In San Antonio Oeste, the species is frequently observed by one of us (MNC) during the summer, flying over the beach and swimming pools. Data from the Argentine Patagonia came from donors, usually related to conservation, wildlife rangers, and biologists who, when finding specimens, send the information to museums or collections.

Thus, the knowledge of bat diversity in the Patagonia has historically been constructed by simple addition of occasional data, or random records.

The localities we add in this note show, undoubtedly, that there is an urgent need for more systematic and methodical studies to help further the knowledge about the distributions and movements of the species in the area. Similarly, it is essential to develop studies on the biology of the species that would help us propose guidelines favorable to their protection. For many years, the lack of information was so significant that it was problematic even to solve problems of identity and systematics of the species. Lately, the addition of more information helped improve the diagnosis of some forms and resolve some systematic problems, such as the revalidation of *Lasiurus varius* and *Histiotus magellanicus*. However, studies to improve the knowledge of the systematics of some forms as *Myotis aelleni*, and to solve the possible existence of



Figure 5 Southern distribution of *Tadarida brasiliensis*.

The shaded area on the map shows the known distribution of this species. A) indicates the southernmost point of distribution known until the present study (Hill 1988), B) shows the southernmost point within mainland (Nabte et al. 2011), and 1) is the new record representing the southernmost known locality for any molossid bat on Earth (see Appendix 1).

more than one biological population for the species of *Histiotus*, are pending.

The knowledge of the habits, roosts, migratory movements, and various aspects of the ecology and natural history of the species continues to be very limited and this lack of biological information is even more serious when foreseeing an increasing number of wind farms, and other works that would have an impact on wild populations of bats and other wild fauna species in the region. In light of the low populations of bats that live on these austral regions, the urgent coordination among the appropriate provincial authorities in the Patagonia is recommended, in order to include bats in regional management plans for wildlife, which until now have been dismissed for lack of information. Our data already indicate clearly that the distributions of the southern species are more extensive than previously thought; thus, a greater number of studies are necessary to

improve the knowledge of their distribution, and also to add information about the biology of each species.

Acknowledgments: The authors wish to acknowledge the collaboration of several individuals who have provided valuable information and specimens. In particular, we thank Anabel Yacianci, Silvina Sturzenbaum, the agents of the Department of Wildlife and Natural Areas of Santa Cruz, Miguel Angel Morales, and Guardaparques Carlos Zoratti. We also like to extend our gratitude to the Departments of Wildlife in the provinces of Santa Cruz and Río Negro, where the authorities efficiently took care of administrative issues, allowing the shipment of samples in a timely manner.

Received April 9, 2012; accepted August 7, 2012; previously published online September 5, 2012

Appendix 1

List of localities indicated in the text and maps. The province followed by the provincial department are indicated in parentheses.

1. Faro Cabo Vírgenes, Reserva Faunística Cabo Vírgenes, instalaciones de la Armada Argentina (Santa Cruz, Güer Aike) 52°20' S, 68°21' W
2. Parque Nacional Lago Puelo (Chubut, Cushamen) 42°05' S, 71°37' W
3. Parque Nacional Lago Puelo, Intendencia (Chubut, Cushamen) 42°05' S, 71°37' W
4. Parque Nacional Lago Puelo, orilla N del Lago, casa N° 4 (Chubut, Cushamen) 42°05' S, 71°37' W
5. Parque Nacional Los Alerces, sendero a Cascada Los Alerces (Chubut, Futaleufú) 42°50' S, 71°52' W
6. Parque Nacional Los Glaciares, Seccional Río Mitre (Santa Cruz, Lago Argentino) 50°28' S, 72°48' W
7. Parque Nacional Perito Moreno, Lago Belgrano (Santa Cruz, Río Chico) 47°52' S, 72°06' W
8. Río Lapataia, seccional Fenocchio, Parque Nacional Tierra del Fuego (Tierra del Fuego) 54°49' S, 68°33' W
9. San Antonio Oeste, Escuela 179 Tomás Espora (Río Negro, San Antonio) 40°44' S, 64°57' W.

References

- Arlettaz, R.L., C. Ruchet, J. Aeschmann, E. Brun, M. Genoud and P. Vogel. 2000. Physiological traits affecting the distribution and wintering strategy of the bat *Tadarida teniotis*. *Ecology* 81: 1004–1014.
- Barquez, R.M. 2006. Order Chiroptera Blumenbach, 1779. In: (R.M. Barquez, M.M. Díaz and R.A. Ojeda, eds.) Mamíferos de Argentina. Sistemática y distribución. Sociedad Argentina para el Estudio de los Mamíferos (SAREM), Mendoza, Argentina. pp. 56–86.
- Barquez, R.M. and M.M. Díaz. 2009. Los murciélagos de Argentina. Clave de identificación. Publicación Especial N° 1 PCMA (Programa de Conservación de los Murciélagos de Argentina), Tucumán, Argentina. pp. 1–86.
- Barquez, R.M., N.P. Giannini and M.A. Mares. 1993. Guide to the bats of Argentina. Oklahoma Museum of Natural History, Norman, OK. pp. 1–119.
- Barquez, R.M., M.A. Mares and J.K. Braun. 1999. The bats of Argentina. *Spec. Publ. Mus. Texas Tech. Univ.* 42: 1–275.
- Cabrera, A. 1958. Catálogo de los mamíferos de América del Sur. *Rev. Mus. Argentino Cienc. Nat. "Bernardino Rivadavia"* e *Inst. Nac. Invest. Cienc. Nat., Cienc. Zool.* 4: 1–308.
- Dabbene, R. 1902. Fauna magellanica. Mamíferos y Aves de la Tierra del Fuego é islas adyacentes. *An. Mus. Nac. Buenos Aires* 3: 341–409.
- Eger, J.L. 2007. Family Molossidae P. Gervais, 1856. In: (A.L. Gardner, ed.) *Mammals of South America, Volume 1, Marsupials, xenarthrans, shrews, and bats*. The University of Chicago Press, Chicago, IL. pp. 399–439.
- Gardner, A.L. and C.O. Handley Jr. 2007. Genus *Lasiurus* Gray, 1831. In: (A.L. Gardner, ed.) *Mammals of South America, Volume 1, Marsupials, xenarthrans, shrews, and bats*. The University of Chicago Press, Chicago, IL. pp. 457–468.
- Handley Jr., C.O. and A.L. Gardner. 2007. Genus *Histiotus* P. Gervais, 1856. In: (A.L. Gardner, ed.) *Mammals of South America, Volume 1, Marsupials, xenarthrans, shrews, and bats*. The University of Chicago Press, Chicago, IL. pp. 450–457.
- Hill, J.E. 1988. A bat from the Falkland Islands. *Bat News* 15: 1–16.
- Koopman, K.F. 1967. The southernmost bats. *J. Mammal.* 48: 487–488.
- Mares, M.A., R.M. Barquez and J.K. Braun. 1995. Distribution and ecology of some argentine bats. *Ann. Carnegie Mus.* 64: 219–237.
- McNab, B.K. 1982. The physiological ecology of South American mammals. In: (M.A. Mares and H.H. Genoways, eds.) *Mammalian biology in South America. The Pymatuning Symposia in Ecology* 6. Special Publications Series. Pymatuning Laboratory of Ecology, University of Pittsburgh, Pittsburgh, PA. pp. 187–207.
- Mickleburgh, S.P., A.M. Hutson and P.A. Racey. 2002. A review of the global conservation status of bats. *Oryx*. 36: 18–34.
- Nabte, M.J., A. Andrade, A. Monjeau, J.L. Hernandez, D. Vaquero and S.L. Saba. 2011. Mammalia, Chiroptera, Molossidae, *Tadarida brasiliensis* I. Geoffroy, 1824: Distribution extension. *Check List* 7: 142–143.
- Simmons, N.B. 2005. Order Chiroptera. In: (D.E. Wilson and D.M. Reeder, eds.) *Mammal species of the world: a taxonomic and geographic reference*, 3rd ed., vol. 1. The Johns Hopkins University Press, Baltimore, MD. pp. 312–529.