

First record of two molossid bats (Chiroptera: Molossidae) from Piauí state and distributional review for Brazil

Roberto Leonan Morim Novaes^{1*}, Rafael de Souza Laurindo², Marcione Brito de Oliveira³, Camila de Rezende Barreto² and Leonardo dos Santos Avilla¹

- 1 Universidade Federal do Estado do Rio de Janeiro, Departamento de Zoologia, Laboratório de Mastozoologia. Av. Pasteur, 459, sala 501, IBIO. CEP 22290-240. Rio de Janeiro, RJ, Brazil.
 - 2 Instituto Sul Mineiro de Estudos e Conservação da Natureza. Fazenda Lagoa, Núcleo de Pesquisas Integradas. Área rural, CP 72. CEP 37115-000. Monte Belo, Minas Gerais, Brazil.
 - 3 Universidade Federal do Rio de Janeiro. Rio de Janeiro, Departamento de Zoologia, Laboratório de Mastozoologia. Brasil. Av. Carlos Chagas Filho, 373, CCS - Bloco A, sala: A1-121, Ilha do Fundão, Rio de Janeiro, RJ, Brazil.
- * Corresponding author: robertonovaes@gmail.com

ABSTRACT: The family Molossidae has a cosmopolitan distribution; it is common in urban areas as well as in agricultural and forested environments. In Brazil, the group comprises seven genera with 25 species. In spite of this representative number of taxa, Molossidae is insufficiently documented in biological inventories. Thus, there is a gap in knowledge about the actual distribution of most species. Here we present new records of two molossids, *Cynomops planirostris* and *Neoplatymops mattogrossensis*, for the state of Piauí, Northeastern Brazil, and review locality records for these species throughout the Brazilian territory.

The family Molossidae is composed of approximately 16 genera and 85 species (Simmons 2005), including seven genera and 25 species that occur in Brazil (Fabián and Gregorin 2007). Molossid bats have a pantropical distribution and are common in urban, agricultural, and forested areas (Peracchi *et al.* 2011). Despite the large number of species in the family, there are few records of molossid bats in biological inventories, mainly because they tend to fly at high altitudes, making it difficult to capture them using mist nets (Freeman 1981; Kalko 1998; Gregorin and Taddei 2002). Because of the scarcity of records, the actual geographic distribution of Molossidae in Brazil is not well known. This report presents new records of the occurrence of two molossids, *Cynomops planirostris* (Peters, 1866) and *Neoplatymops mattogrossensis* (Vieira, 1942), in the state of Piauí, Northeastern Brazil.

The genus *Cynomops* Thomas, 1920 was once considered a subgenus of *Molossops* Peters, 1866. However, Barquez *et al.* (1999) recognized *Cynomops* as a distinct genus and other authors have used this classification since then (Peters *et al.* 2002; Simmons 2005; Fabián and Gregorin 2007; Peracchi *et al.* 2010; Peracchi *et al.* 2011). Currently, this genus is composed of five species: *C. abrasus* (Temminck, 1827), *C. greenhalli* Goodwin, 1958, *C. mexicanus* (Genoways & Jones, 1967), *C. paranus* (Thomas, 1901), and *C. planirostris*. The Southern Dog-faced Bat, *C. planirostris*, has a wide distribution in the Neotropics, occurring from Panama to the south-central portion of South America; this species' occurrence has been confirmed in Guyana, Suriname, Venezuela, Colombia, Peru, Bolivia, Brazil, Paraguay, and northern Argentina (Koopman 1994; Eger 2008). In Brazil, *C. planirostris* has been officially recorded in nine states (Fabián and Gregorin 2007).

Like *Cynomops*, the genus *Neoplatymops* Peterson, 1965 was also once considered a subgenus of *Molossops* (Viera

1942; Fabián and Gregorin 2007). However, recent reviews consider this a valid genus (Peterson 1965; Peracchi *et al.* 2011). *Neoplatymops* is a monotypic genus, endemic to South America, and represented by *N. mattogrossensis*. This species occurs in Venezuela, Guyana, Colombia, Bolivia, and Brazil, where it has been documented in the northern, northeastern, mid-west and southeastern regions, which contain the following biomes: Amazonia, Caatinga, Cerrado, and Atlantic Forest.

The records we present here were made while monitoring the bats around the São João do Piauí - Milagres section of the 500kV transmission energy line. Between June 2010 and March 2012, we conducted surveys of bats in the municipality of São João do Piauí, Piauí, Northeastern Brazil. The individuals were taken in areas of Caatinga where xerophytic and heliophytic vegetation is dominant (Figure 1). In some areas there are seasonal artificial dams, which reach their maximum total volume during the rainy season and dry completely or partially during the driest



FIGURE 1. Landscape of shrub Caatinga in Serra da Jitirana, municipality of São João do Piauí, Piauí State, Northeastern Brazil. Photo by Roberto Leonan Morim Novaes

time of year. Much of the region in which we sampled bats is highly fragmented, including many open areas and grasslands. However, in some areas there are large fragments of less disturbed Caatinga habitat.

The bats were captured with mist nets of 9 x 3 m placed in areas where there are water holes, as well as tracks and clearings in the vegetation. The body mass of the bats captured was measured using a dynamometer (0.1 g) and the forearm was measured with a caliper precise to 0.01 mm. The captured individuals were classified according to age category (Anthony 1988), sex, and reproductive stage (Zortéa 2003). Individuals of each species were prepared as voucher for further diagnosis and then deposited in the Coleção de Mamíferos do Museu Nacional do Rio de Janeiro, Brazil, under the license IBAMA/MMA, process n^o. 02001.001113/2008-11, authorization n^o. 192/2010.

On October 7, 2010, at 20:40 h, we obtained a *C. planirostris* identified as an adult male with abdominal testes, forearm measuring 34.6 mm in length, and weight of

5.11 g (Figure 2). It was captured in a ground-level mist net at the margin of an artificial pond in the edge of a shrubby Caatinga fragment of Serra da Jitirana, municipality of São João do Piauí (8°18'28.66" S and 42°1'19.62" W, altitude ca. 370 m). This individual was collected and deposited under the number MN 75209. The identification was performed according to the characters proposed by Gregorin and Taddei (2002) and Fabián and Gregorin (2007). *Cynomops planirostris* is distinguished from its most similar congener, *C. paranus*, by its smaller size, including forearm and tail length, and distinct fur coloration. *Cynomops planirostris* has reddish brown, opaque dorsal pelage, and lighter ventral pelage, with a white spot on his chest and belly (Figure 2) (Simmons and Voss 1998). *C. paranus*, on the other hand, shows a homogeneous dark gray-brown, bright pelage (Simmons and Voss 1998; Fabián and Gregorin 2007). In addition to the present record, *C. planirostris* has been recorded in 10 other sites in nine Brazilian states (Table 1; Figure 3).



FIGURE 2. Specimen of *Cynomops planirostris* (MN 75209) collected in Serra da Jitirana, Piauí State, northeastern Brazil, with a facial close-up (A) and views of the dorsal (B) and ventral (C) pelage. Photos by Roberto Leonan Morim Novaes.

TABLE 1. Localities of occurrence of *Cynomops planirostris* in Brazil.

MAP	LOCALITY	UF	COORDINATES	AUTHOR
1	Alter do Chão	PA	02°30'S 04°57'W	Bernard and Fenton (2002)
2	Exu	PE	07°31'S 39°43'W	Mares et al. (1981)
3	São João do Piauí	PI	08°18'S 42°05'W	Presente study
4	Xavantina	MT	14°39'S 52°20'W	Pine et al. 1970
5	Una	BA	15°17'S 39°04'W	Faria et al. (2006)
6	Uberlândia	MG	18°53'S 48°17'W	Pedro and Taddei (1998)
7	Nhecolândia	MS	19°16'S 57°00'W	Pulchério-Leite et al. (1998)
8	Santa Tereza	ES	20°17'S 40°21'W	Ruschi (1951)
9	Aquidauana	MS	20°29'S 55°48'W	Pulchério-Leite et al. (1998)
10	ESEC Caetetus	SP	22°20'S 49°35'W	Pedro et al. (2001)
11	Foz do Rio Jordão	PR	25°41'S 52°17'W	Miretzki (2003)

On October 8, 2010 at 22:20 h, a colony of *N. mattogrossensis* was found roosting in a horizontal cleft 3.8 cm wide between carbonate rocks at the same location where *C. planirostris* was captured – a fragment of Caatinga in the Serra da Jitirana. The colony had at least six individuals, three of which were captured with the aid of grippers. These non-reproductive adults were prepared as voucher and recorded as follows: a male (MN 75213) with the forearm measuring 28.5 mm and weighing 4.5 g (Figure 4); a female (MN 75212) with forearm measuring 29.1 mm and weighing 5.5 g; and another female (MN 75214) with forearm measuring 28.2 mm and 4.5 g of weight. *Neoplaticomops mattogrossensis* was identified by its external morphology: flattened rostrum and granulation in the forearm (Figure 4), characters that differentiate them from other Neotropical molossid bats (Willig and Jones 1985; Peracchi et al. 2011). Furthermore, *Neoplaticomops* differs from *Cynomops* and *Molossops* by the presence of two pairs of premolars on each side of the jaw, an easily visible character even in living individuals. In addition to this record, *N. mattogrossensis* has been recorded in 15 locations in 10 states, presenting a wide distribution and occurring in nearly all tropical regions in Brazil (Table 2; Figure 3).

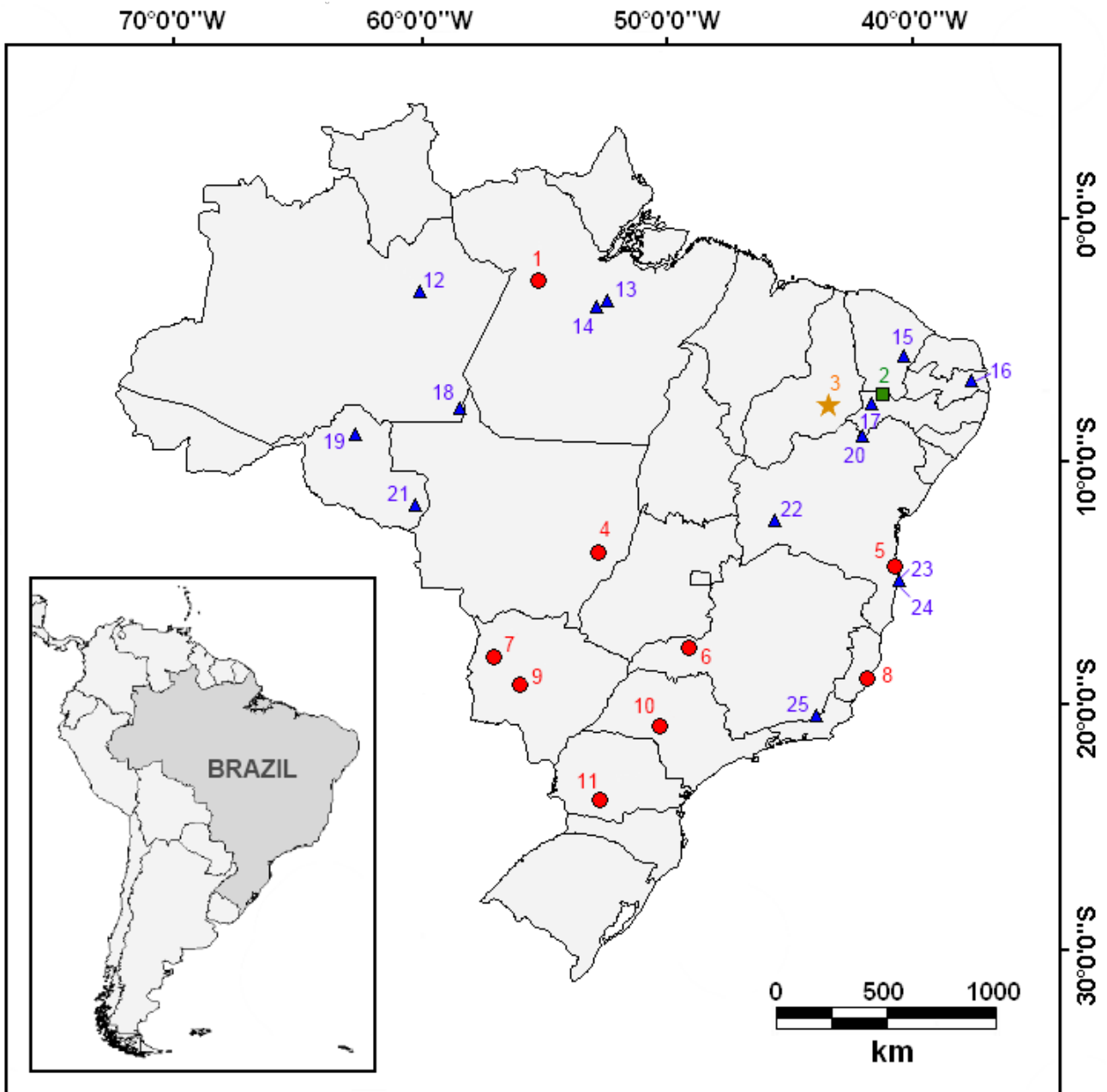


FIGURE 3. Map with localities of occurrence of *Cynomops planirostris* and *Neoplatymops mattogrossensis* in Brazil (red circles: *C. planirostris*; blue triangles: *N. mattogrossensis*; green square: both species). The new locality record in Piauí State, Northeastern Brazil, is assigned as a yellow star.



FIGURE 4. Specimen of *Neoplatymops mattogrossensis* (MN 75213) collected in Serra da Jitirana, Piauí State, Northeastern Brazil, with emphasis for flattened rostrum (A) and granulation in the forearm (B). Photos by Roberto Leonan Morim Novaes.

TABLE 2. Localities of occurrence of *Neoplattymops mattogrossensis* in Brazil.

MAP	LOCALITY	UF	COORDINATES	AUTHOR
12	Manaus	AM	03°00'S 60°16'W	Voss and Emmons (1996)
13	Cachoeira Juruá	PA	03°25'S 51°53'W	Gregorin (1998)
14	Ilha Jabuti	PA	03°38'S 52°22'W	Voss and Emmons (1996)
15	Jaguaribe	CE	05°52'S 38°39'W	Gregorin (1998)
16	Areia	PB	06°57'S 35°41'W	Souza et al. (2004)
2	Exu	PE	07°31'S 39°43'W	Mares et al. (1981)
17	Ouricuri	PE	07°57'S 40°05'W	Present study
18	São Simão	MT	08°12'S 58°29'W	Vieira (1942)
3	São João do Piauí	PI	08°18'S 42°05'W	Present study
19	Ariquemes	RO	09°19'S 63°08'W	Gregorin (1998)
20	Joazeiro	BA	09°23'S 40°31'W	Gregorin (1998)
21	Km 575, BR364	RO	12°31'S 60°26'W	Gregorin (1998)
22	Irecê	BA	13°12'S 44°25'W	Sazima and Taddei (1976)
23	Ilheus	BA	14°47'S 39°02'W	Faria et al. (2006)
24	Belmonte	BA	15°51'S 38°52'W	Faria et al. (2006)
25	Carmo	RJ	21°55'S 42°36'W	Avilla et al. (2001)

ACKNOWLEDGMENTS: We are very grateful to Frederico Bonissoni Pego for help in preparing the map of species occurrence, Ana Claudia Delciellos and Carlos Eduardo Cândido for their help in the field, Renan de França Souza and Camila Bernardes for the revision of manuscript, and Dossel Ambiental Ltda. for release of the data.

LITERATURE CITED

Anthony, E.L.P. 1988. Age determination in bats; p. 47-58 In T.H. Kunz (ed.). *Ecological and behavioral methods for the study of bats*. Washington: Smithsonian Institution Press.

Avilla, L.S., A.M.S. Rozenzstranch and E.A.L. Abrantes. 2001. First record of the South American flat-headed bat, *Neoplattymops mattogrossensis* (Vieira, 1942) in southeastern Brazil (Chiroptera, Molossidae). *Boletim do Museu Nacional* 463: 1-6.

Bernard, E. and M.B. Fenton. 2002. Species diversity of bats (Mammalia, Chiroptera) in forest fragments, primary forest, and savannas in central Amazonia, Brazil. *Canadian Journal of Zoology* 80: 1124-1140.

Barquez, R.M., M.A. Mares and J.K. Braun. 1999. *The bats of Argentina*. Lubbock: Texas Tech University Press.

Eger, J.L. 2008. Family Molossidae P. Gervais, 1856, p. 399-440 In Gardner A.L. (ed.). *Mammals of South America, volume 1: Marsupials, Xenarthrans, Shrews, and Bats*. Chicago: The University of Chicago Press.

Fabián, M.E. and R. Gregorin. 2007. Família Molossidae; p. 149-165 In N.R. Reis, A.L. Peracchi, W.A. Pedro and I.P. Lima (ed.). *Morcegos do Brasil*. Londrina: Editora da Universidade Estadual de Londrina.

Faria, D., B. Soares-Santos and E. Sampaio. 2006. Bats from the Atlantic rainforest of southern Bahia, Brazil. *Biota Neotropica* 6(2): 1-13.

Freeman, P.W. 1981. A multivariate study of the family Molossidae (Mammalia: Molossidae): morphology, ecology, evolution. *Fieldiana, Zoology*. 7: 1-173.

Gregorin, R. 1998. Notes on the geographic distribution of *Neoplattymops mattogrossensis* (Vieira, 1942) (Chiroptera, Molossidae). *Chiroptera Neotropical* 4(1): 88-90.

Gregorin, R. and V.A. Taddei. 2002. Chave artificial para a identificação de molossídeos brasileiros (Mammalia, Chiroptera). *Mastozoologia Neotropical* 9(1): 13-32.

Kalko, E.K.V. 1998. Organization and diversity of tropical bat communities through space and time. *Zoology* 101: 281-297.

Koopman, K.F. 1994. Chiroptera: Systematics. Part 60 of Mammalia, Vol. 8 of *Handbook of Zoology*. New York: Walter de Gruyter: 217p.

Mares, M.A., M.R. Willig, K.E. Streilein and T.E.J. Lacher. 1981. The mammals of northeastern Brazil: a preliminary assessment. *Annals of Carnegie Museum* 50(4): 81-137.

Miretzki, M. 2003. Morcegos do Estado do Paraná, Brasil (Mammalia, Chiroptera): riqueza de espécies, distribuição e síntese do conhecimento atual. *Papéis Avulsos de Zoologia* 43(6): 101-138.

Pedro, W.A. and V.A. Taddei. 1998. Bats from southwestern Minas Gerais, Brazil (Mammalia: Chiroptera). *Chiroptera Neotropical* 4(1): 85-88.

Pedro, W.A., F.C. Passos and B.K. Lim. 2001. Morcegos (Chiroptera, Mammalia) da Estação Ecológica dos Caetetus, estado de São Paulo. *Chiroptera Neotropical* 7(1-2): 136-140.

Peracchi, A.L., I.P. Lima, N.R. Reis, M.R. Nogueira and H. Ortêncio-Filho. 2011. Ordem Chiroptera; p. 155-234. In N.R. Reis, A.L. Peracchi, W.A. Pedro and I.P. Lima (ed.). *Mamíferos do Brasil*, 2ª Edição. Londrina: Editora da Universidade Estadual de Londrina.

Peracchi, A.L., P.H. Gallo, D. Dias, I.P. Lima and N.R. Reis. 2010. Ordem Chiroptera; p. 293-461 In N.R. Reis, A.L. Peracchi, M.N. Fregonezi and B.K. Rossaneis (ed.). *Mamíferos do Brasil: Guia de identificação*. Rio de Janeiro: Technical Books Editora.

Peters, S.L., B.K. Lim and M.D. Engstrom. 2002. Systematics of dog-faced bats (*Cynomops*) based on molecular and morphometric data. *Journal of Mammalogy* 83(4): 1097-1110.

Peterson, R.L. 1965. A review of the flat-headed bats of the family Molossidae from South America and Africa. *Contributions of Life Science of Royal Ontario Museum* 64: 1-32.

Pine, R.H., I.R. Bishop and R.L. Jackson. 1970. Preliminary list of mammals of the Xavantina/Cachimbo expeditions (central Brazil). *Transactions of the Royal Society of Tropical Medicine and Hygiene* 64: 668-670.

Pulchério-Leite, A., V.A. Taddei and M. Meneghelli. 1998. Morcegos (Chiroptera, Mammalia) dos Pantanais de Aquidauana e da Nhecolândia, Mato Grosso do Sul. I. Diversidade de espécies. *Ensaio e Ciência* 2(2): 149-163.

Ruschi, A. 1951. Morcegos do estado do Espírito Santo: introdução e considerações gerais. *Boletim do Museu de Biologia Prof. Mello Leitão* 1:1-16.

Sazima, I. and V.A. Taddei. 1976. A second Brazilian record of the South American flat-headed bat, *Neoplattymops mattogrossensis*. *Journal of Mammalogy* 57(4): 757-758.

Simmons, N.B. 2005. Order Chiroptera; p. 312-529 In D.E. Wilson and D.M. Reeder (ed.). *Mammals Species of the World: a taxonomic and geographic reference*. Chicago: Johns Hopkins University Press.

Simmons, N.B. and R.S. Voss. 1998. The mammals of Paracou, French Guiana: a neotropical lowland rainforest fauna - Part 1. Bats. *Bulletin of the American Museum of Natural History* 237: 219p.

Souza, M.A., A. Langguth and E.A. Gimenez. 2004. Mamíferos dos Brejos de altitude da Paraíba e Pernambuco; pp. 229-254. In K.C. Porto, J.J.P. Cabral and M. Tabarelli (eds). *Brejos de altitude em Pernambuco e Paraíba: história natural, ecologia e conservação*. Brasília: Ministério do Meio Ambiente.

Vieira, C.O.C. 1942. Ensaio monográfico sobre os quirópteros do Brasil. *Arquivos de Zoologia do Estado de São Paulo* 3: 219-417.

Voss, R.S. and L.H. Emmons. 1996. Mammalian diversity in Neotropical lowland rainforests: a preliminary assessment. *Bulletin of the American Museum of Natural History* 230: 1-115.

Willig, M.R. and J.K. Jones Jr. 1985. *Neoplattymops mattogrossensis*. *Mammalian Species* 244: 1-3.

Zortéa, M. 2003. Reproductive patterns and feeding habits of three nectarivorous bats (Phyllostomidae: Glossophaginae) from Brazilian Cerrado. *Brazilian Journal of Biology* 63(1): 159-168.

RECEIVED: July 2012

ACCEPTED: November 2012

PUBLISHED ONLINE: June 2013

EDITORIAL RESPONSIBILITY: Marcelo R. Nogueira