Short Note

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First record of *Dermanura anderseni* (Chiroptera, Phyllostomidae) for the Atlantic Forest

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Abstract: The genus *Dermanura* currently comprises 11 species, four of which occur in Brazil. *Dermanura anderseni* was previously recorded only in the Amazon and Cerrado biomes. Here, we expand the known geographic distribution of *D. anderseni* over 1000 km eastwards for the Atlantic Forest biome. We captured an adult male specimen in mist-nets set at ground level in the Caju Private Natural Heritage Reserve, Itaporanga D'Ajuda, Sergipe State, northeastern Brazil. Owing to their similarities in external morphology, *D. anderseni* may be easily mistaken for *Dermanura cinerea*. Thus, considering that *D. cinerea* is one of the most common species in the Atlantic Forest of northeastern Brazil, we are alert for the possibility of misidentified specimens in zoological collections.

Keywords: northeastern Brazil; range extension; Sergipe; Stenodermatinae.

Many of the small Neotropical fruit bats from the genus *Artibeus* have recently been placed either in the subgenus *Artibeus* (*Dermanura*) (e.g. Gardner 2007) or in the genus *Dermanura* (e.g. Hoofer et al. 2008, Redondo et al. 2008, Solari et al. 2009), and we follow this classification here. The genus *Dermanura* (*sensu* Hoofer et al. 2008) currently comprises 11 species (Solari et al. 2009), four of which occur in Brazil: *Dermanura anderseni* (Osgood 1916), *Dermanura bogotensis* (Andersen 1906), *Dermanura cinerea* Gervais 1856, and *Dermanura gnoma* (Handley 1987) (Nogueira et al. 2014). *Dermanura gnoma* and *D. cinerea* have been recorded throughout most of Brazil, in the Atlantic Forest, Amazon and Cerrado biomes, while *D. bogotensis* is restricted to the Amazon basin (Marques-Aguiar 2007). The fourth species, *D. anderseni*, has previously been recorded only in the Amazon (Marques-Aguiar 2007) and Cerrado biomes (Gonçalves and Gregorin 2004, Gregorin et al. 2011) (Figure 1; Table 1).

Here, we expand the known distribution of *Dermanura anderseni* eastwards for the Atlantic Forest of the northeastern Brazil. On October 27th, 2014, we captured an adult male specimen in mist-net set at ground level in the Caju Private Natural Heritage Reserve, or RPPN Caju (11°06′08″S, 037°11′05″W; 763.37 ha), a privately-owned protected area in the municipality of Itaporanga D'Ajuda, Sergipe State, northeastern Brazil (Figure 1). The site encompasses a variety of ecosystems typical of the coastal Atlantic Forest, such as coastal restingas, mangroves, and salt flats (Silva et al. 2000). The local mean annual temperature is 25°C, with a dry summer and a wet winter, raining typically from May to August (EMBRAPA 2013). The specimen was captured in a fragment of arboreal restinga.

We handled the specimen in accordance with Sikes et al. (2011), and subsequently fixed it in 10% formaldehyde and then preserved it in ethanol 70%, for the extraction and preparation of the skull (License number: SISBIO 8516-1). We recorded basic external and cranial measurements with a calipers with a precision 0.02 mm, following Velazco et al. 2010); the specimen was deposited in the Mammalian Collection of the Federal University of Sergipe (voucher number: CMUFS 0260), in São Cristóvão, Sergipe, Brazil. The specimen's morphological measurements are within the range of those for *Dermanura anderseni* reported in the literature (Table 2). Although there are only few series of measurements

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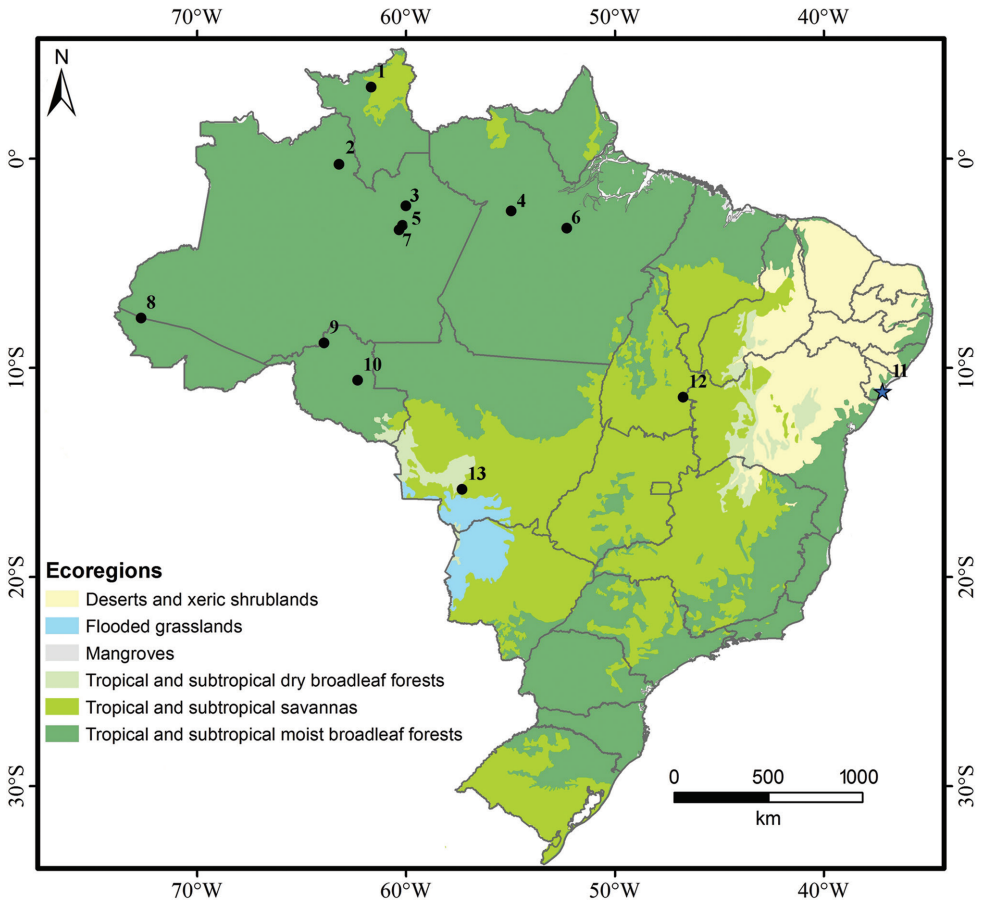

Figure 1: Geographic distribution of *Dermanura anderseni* in Brazil and the first record for the Atlantic Forest (star) in the state of Sergipe, northeastern Brazil.
Localities are numbered as in Table 1.

Table 1: Localities in which *Dermanura anderseni* was recorded in Brazil.

Code	Coordinates		State	Locality	References
	Latitude	Longitude			
1	3.415902	−61.6583	Roraima	Ilha de Maracá, Amajarí	Robinson (1998)
2	−0.26741	−63.2032	Amazonas	Jaú National Park, Barcelos	Barnett et al. (2006)
3	−2.26484	−59.9908	Amazonas	Biological Dynamic of Forest Fragments Project (BDFFP), 90 km north of Manaus	Sampaio et al. (2003)
4	−2.50426	−54.9546	Pará	Alter do Chao village, Santarem	Bernard and Fenton (2002)
5	−3.19664	−60.1548	Amazonas	Estrada Manaus Manacapuru, 20 km	Mok et al. (1982)
6	−3.32762	−52.2886	Pará	Baixo Rio Xingu, Altamira	Saldanha et al. (2009)
7	−3.40303	−60.3255	Amazonas	Lago Janauaca, Manaquiri	Gardner (2007)
8	−7.62804	−72.6762	Acre	Serra do Divisor, Cruzeiro do Su	Nogueira et al. (1999)
9	−8.81775	−63.9131	Rondônia	Pôrto Velho (type locality of *Artibeus anderseni* Osgood)	Osgood (1916)
10	−10.6008	−62.3096	Rondônia	Ouro Preto D'Oeste	Marques-Aguiar (1989)
11	−11.1213	−37.1884	Sergipe	RPPN do Caju, Itaporanga d'Ajuda	This study
12	−11.4077	−46.7242	Tocantins	Estação Ecológica Serra Geral do Tocantins	Gregorin et al. (2011)
13	−15.8145	−57.3016	Mato Grosso	Estação Ecológica da Serra das Araras, Porto Estrela	Gonçalves and Gregorin (2004)

The numbers are the same as those in in Figure 1.

Table 2: Measurements of the *Dermanura anderseni* specimen collected during the present study and from specimens analyzed by Osgood (1916), Anderson (1997) and Gonçalves and Gregorin (2004).

Measurements				CMUFS 0260
	Present study	Osgood	Anderson	Gonçalves and Gregorin
	1 M	Type	7 M and 3 F	1F
Body mass	12		8–12	
Body length	52.6		49–55	
Hind foot length	10.2	10	9–11	
Ear length	15.2		14–16	
Forearm length	38.78	35	36–39	38.45
Greatest length of skull	19.92	18.2		18.94
Condylobasal length	17.82	16.3	16.4–17.3	17.35
Zygomatic breadth	11.28		10.8–11.0	11.39
Breadth of braincase	9.08	8.6	8.6–8.9	8.53
Postorbital constriction	4.84		5.05	
Breadth across upper canines	4.84		5.0–5.4	
Breadth across upper molars	8.02	7.8		8.27
Maxillary toothrow length	6.72	5.8	5.7–6.1	6.07
Length of mandible	13.78			12.6
Mandibular toothrow length	7.40		7.6–8.3	

Measurements are given in grams (g) and millimeters (mm), CMUFS 0260 represent the specimen from the present study, while males (M) and females (F) specimens are indicated.

available in the literature, *D. anderseni* can be distinguished from its congeners by the following combination of characters: molars 2/2; maxillary toothrows nearly parallel; palatal length greater than the post-palatal; posterior nasal opening (choana) opens close to the mesopterygoid fossa (observed from the ventral view of the skull); thinly haired uropatagium (Marques-Aguiar 2007, Díaz et al. 2016).

In Brazil, *Dermanura anderseni* may be easily mistaken for *Dermanura cinerea* based on external morphology, although the amount of fur on the dorsal uropatagium may often be helpful to separate them in the field. Figure 2 illustrates the principal characteristics of the skull that support the identification of *D. anderseni* and allows to distinguish this species from *D. cinerea* (CMUFS 0267; from Sergipe), including: the rostrum is usually elevated anteriorly (vs. straight and oriented in the transversal plane in *D. cinerea*) (1a); the well-developed hypocone of the M1 (3a) (vs. reduced in *D. cinerea*; 3b) (*sensu* Díaz et al. 2016).

The present record extends the known eastern limit of the geographic distribution of *Dermanura anderseni* to the Atlantic Forest of the Sergipe State, approximately 1000 km east of its nearest record in a Cerrado landscape at the Serra Geral do Tocantins Ecological Station (Gregorin et al. 2011) (Figure 1). At the Brazilian Cerrado, two individuals were recorded in enclaves of wetland ecosystems: the vereda palm swamps (Gonçalves and Gregorin 2004) and gallery forests (Gregorin et al. 2011). Our record of this species from the Atlantic Forest reinforces the prediction of Rocha et al. (2015), who propose that some small forest-dwelling bats tend to have discontinuous geographic ranges in the main Amazonian and Atlantic forests, as well as the scattered enclaves of humid ecosystems inserted in the dryland biomes of South America, such as the Cerrado and Caatinga.

The present record also increases the current known bat diversity of the state of Sergipe to 52 species (see Rocha et al. 2017a,b). As *Dermanura cinerea* is one of the most common species in the Atlantic Forest of northeastern Brazil, it is possible that there are other specimens of *Dermanura anderseni* misidentified in zoological collections, particularly from ecological monitoring results. Thus, we recommend a more systematic and robust diagnosis of *Dermanura* specimens in future ecological monitoring, as well as a revision of *Dermanura* specimens housed in scientific collections.

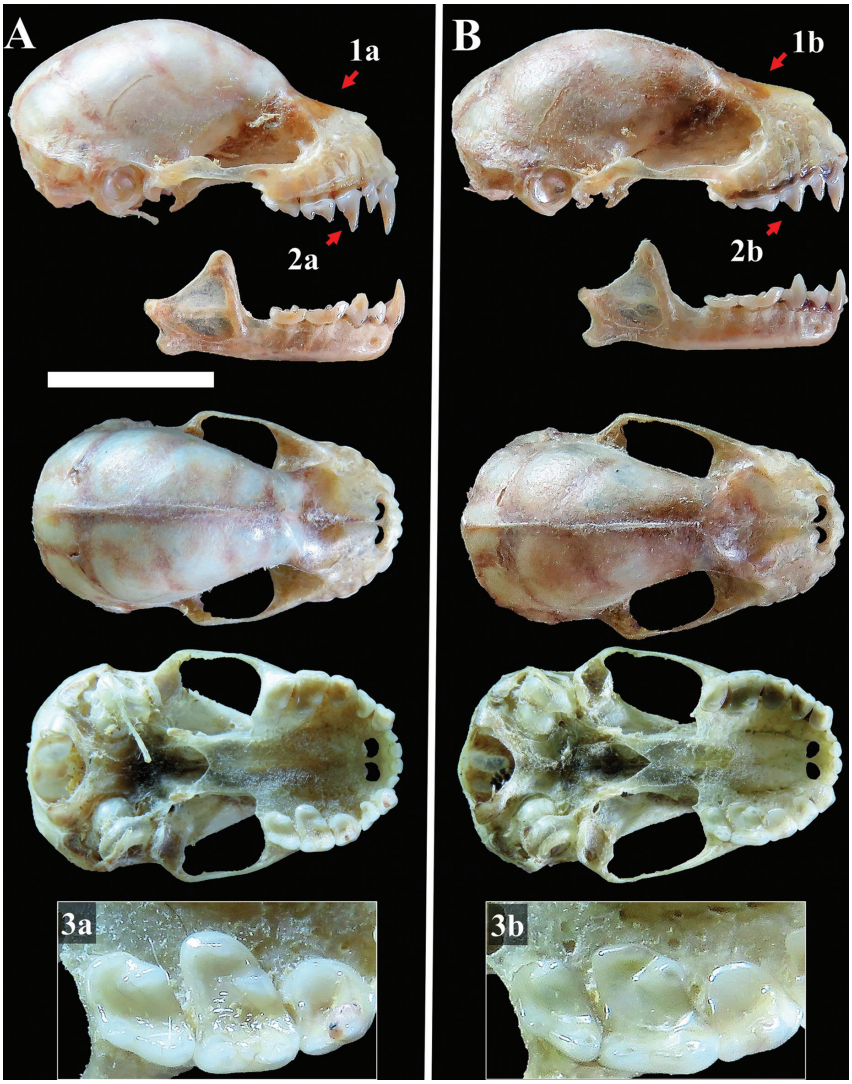

Figure 2: Comparison between the skulls of *Dernamura anderseni* and *D. cinerea*.
Dorsal, ventral and lateral views of the skull and lateral view of the mandible (scale bar = 10 mm) of (A) *Dermanura anderseni* (CMUFS 0260) and (B) *D. cinerea* (CMUFS 0267) from Sergipe state in Brazil (from the same locality) showing the cranial differences between these species. (1a) rostrum usually elevated anteriorly; (1b) straight oriented in transversal plane; (2a) caniniform PM2; (2b) non-caniniform PM2; (3a) well-developed hypocone of M1 and (3b) reduced hypocone of M1.

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