Short Note

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Expansion of the known range of *Marmosops incanus* (Mammalia, Didelphimorphia, Didelphinae) to the right bank of the São Francisco River in north-east Brazil

Abstract: The family Didelphidae includes most of the New World marsupials, with 97 species distributed in 18 genera. The slender opossums, genus *Marmosops*, include 15 species, of which 8 can be found in Brazil. Two of these species, *Marmosops paulensis* and *Marmosops incanus*, are endemic to eastern Brazil. *M. incanus* is more widely distributed, being found in coastal Atlantic forests of south-eastern Brazil, but also further north into peripheral areas of the Cerrado savannas and the Caatinga scrublands. Before the present study, the northernmost record of *M. incanus* was from the municipality of São Gonçalo dos Campos, in the Brazilian state of Bahia. The present study provides the first records of the species from the Brazilian state of Sergipe, and extends its geographic range as far as the right bank of the São Francisco River, 320 km north and east of its previous northernmost locality in the state of Bahia. Specimens were collected from two sites in Sergipe, the Mata do Junco Wildlife, in the Atlantic Forest, and a highland forest enclave in the Caatinga at Serra da Guia, in the eastern extreme of the state.

Keywords: distribution; *Marmosops*; São Francisco River; Sergipe.

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The family Didelphidae includes most of the New World marsupials, with 97 species distributed in 18 genera (Voss and Jansa 2009). The slender opossums, genus *Marmosops* (Matschie 1916), include 15 species, of which 8 can be found in Brazil (Gardner and Creighton 2008, Voss and Jansa 2009). Two of these species – the Brazilian slender opossum *Marmosops paulensis* (Tate 1931) and the grey slender opossum *Marmosops incanus* (Lund 1840) – are endemic to eastern Brazil. While *M. paulensis* is found in the moist montane Atlantic forests of south-eastern Brazil (Brito et al. 2004), *M. incanus* is more widely distributed, being found in Atlantic forests of coastal Brazil, from about 10° to 25° south latitude (Mustrangi and Patton 1997, Passamani et al. 2004, Paglia et al. 2005), but also further north into peripheral areas of the Cerrado savannas and the Caatinga scrublands (Câmara et al. 2003).

Before the present study, the northernmost record of *Marmosops incanus* was from the municipality of São

Gonçalo dos Campos, in the Brazilian state of Bahia (Gardner and Creighton 2008). This study provides the first records of the species from the Brazilian state of Sergipe (Figure 1). Specimens were collected from two sites in Sergipe, the Mata do Junco Wildlife Refuge, in the Atlantic Forest, and a highland forest enclave in the Caatinga at Serra da Guia, in the eastern extreme of the state. Standard body and cranial measurements were recorded for all specimens (Table 1), which are in accordance with the characters described by previous authors (Mustrangi and Patton 1997).

The specimens were collected in Sherman-type live-animal traps. Small non-volant mammals were live-trapped at the Mata do Junco Wildlife Refuge (10°32′ S, 37°03′ W) in the municipality of Capela, Sergipe [120 m above sea level (asl)], between July and November 2011. The refuge encompasses an area of open Atlantic rainforest with numerous clearings, surrounded by an anthropogenic matrix dominated by sugar cane (*Saccharum* sp.) plantations (Mikalauskas et al. 2011). The three *Marmosops incanus* specimens – all males – collected at this site were deposited in the mammal collection of the Federal University of Sergipe in São Cristovão (CMUFS 17, 18, 19).

The second site was a high-altitude humid forest (known locally as a *brejo de altitude* – see Andrade-Lima 1982) at the Serra da Guia (9°58′ S, 37°52′ W) in the municipality of Poço Redondo. This forest enclave is located at an altitude of 750 m asl, within a matrix of arboreal Caatinga vegetation, which dominates the surrounding area, at lower altitudes (below 650 m asl). Two adult specimens, one male (UFPB 6330) and one female (UFPB 6329), were collected at this site between October 2008 and September 2009. The material was deposited in the mammal collection of the Federal University of Paraíba in João Pessoa.

Marmosops can be distinguished from other didelphid genera primarily by the mask of blackish fur surrounding the eyes, which contrasts with the paler fur of the crown and cheeks; uniformly coloured dorsal pelage; tail longer than the combined length of head and body; premaxillary rostral process that is usually well developed; petrosal usually exposed on the lateral surface of the braincase

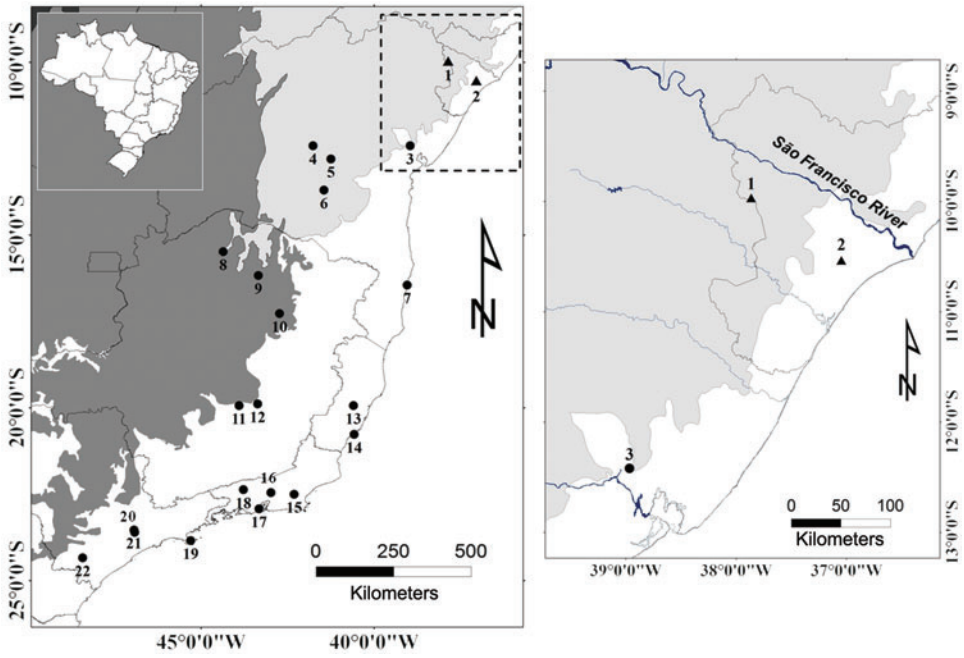

Figure 1 Recorded distribution of *Marmosops incanus* in the terrestrial biomes of eastern Brazil (Atlantic Forest – white; Caatinga – light grey, and Cerrado – dark grey): Sergipe – (1) Serra da Guia (present study); (2) RVS Mata do Junco (present study); Bahia – (3) São Gonçalo dos Campos (Gardner and Creighton 2008); (4) Seabra (Pereira and Geise 2009); (5) Chapada Diamantina (Pereira and Geise 2009); (6) Lamarão (Tate 1933); (7) Porto Seguro (Gardner and Creighton 2008); Minas Gerais – (8) Januária (Câmara et al. 2003); (9) Mocambinho (Oliveira et al. 1992); (10) Turmalina (Oliveira et al. 1992); (11) Parque das Mangabeiras (Oliveira et al. 1992); (12) São Gonçalo do Rio Abaixo (Paglia et al. 2005); Espírito Santo – (13) Santa Tereza (Passamani and Ribeiro 2009); (14) Samarco Mineração S.A. Anchieta (Passamani et al. 2004); Rio de Janeiro – (15) Reserva Biológica Poço das Antas (Brito et al. 2004) (16) Parque Nacional Serra dos órgãos (Olifiers et al. 2005); (17) Parque Estadual da Pedra Branca (Amaral 2008); (18) Serra da Concórdia (Modesto et al. 2008); São Paulo – (19) Ilha de São Sebastião (Gardner and Creighton 2008); (20) Reserva Florestal do Morro Grande (Pardini and Umetsu 2006); (21) Itapevi (Barros-Battesti et al. 2000); (22) Fazenda Intervales (Oliveira et al. 1992).

	RVSMJ	Serra da Guia		Mustrangi and Patton (1997)	
	Male	Male	Female	Male	Female
Greatest length of skull	39.57±2.31/37.19–41.8 (3)	42.71	33.21	40.08±0.24/33.0–45.0 (122)	36.37±0.25/32.1–41.2 (76)
Condylobasal length	38.27±2.69/35.42–40.76 (3)	42.31	31.48	–	–
Mastoidal breadth	13.26±0.44/12.86–13.74 (3)	14.79	12.03	–	–
Zygomatic breadth	19.67±1.41/18.6–21.27 (3)	21.42	16.26	19.87±0.14/17.1–23.7 (126)	17.94±0.14/16.0–20.4 (76)
Breadth of braincase	13.31±0.10/13.22–13.3 (3)	14.11	12.51	13.1±0.05/11.5–14.4 (123)	12.34±0.05/11.4–13.2 (87)
Postorbital constriction	6.31±0.16/6.19–6.49 (3)	5.86	5.64	–	–
Palatal length	21.19±1.25/19.8–22.23 (3)	22.49	17.55	–	–
Palatal breadth	7.71±0.67/6.97–8.28 (3)	7.37	5.66	–	–
Breadth across upper canines	5.93±0.36/5.55–6.26 (3)	6.93	4.75	–	–
Breadth across upper molars	11.94±0.28/11.63–12.03 (3)	12.41	10.29	–	–
Length of maxillary toothrow	18.98±0.60/18.33–19.11 (3)	17.22	14.29	–	–
Length of mandible	29.61±2.36/31.9–29.76 (3)	31.9	26.38	–	–

Table 1 Cranial measurements of the specimens of *Marmosops incanus* collected in Sergipe, Brazil.
RVSMJ, Mata do Junco Wildlife Refuge.

through the fenestra between the squamosal and parietal bones; and absent maxillary fenestrae. *Marmosops* can be distinguished from *Marmosa* and *Micoureus* by the lack of laterally projecting postorbital processes (Figure 2C), and the relatively long digit III of the manus in comparison with the adjacent digits (digits III and IV are subequal in length in *Marmosa* and *Micoureus*). *Marmosops* can be differentiated from *Cryptonanus* and *Gracilinanus* in the

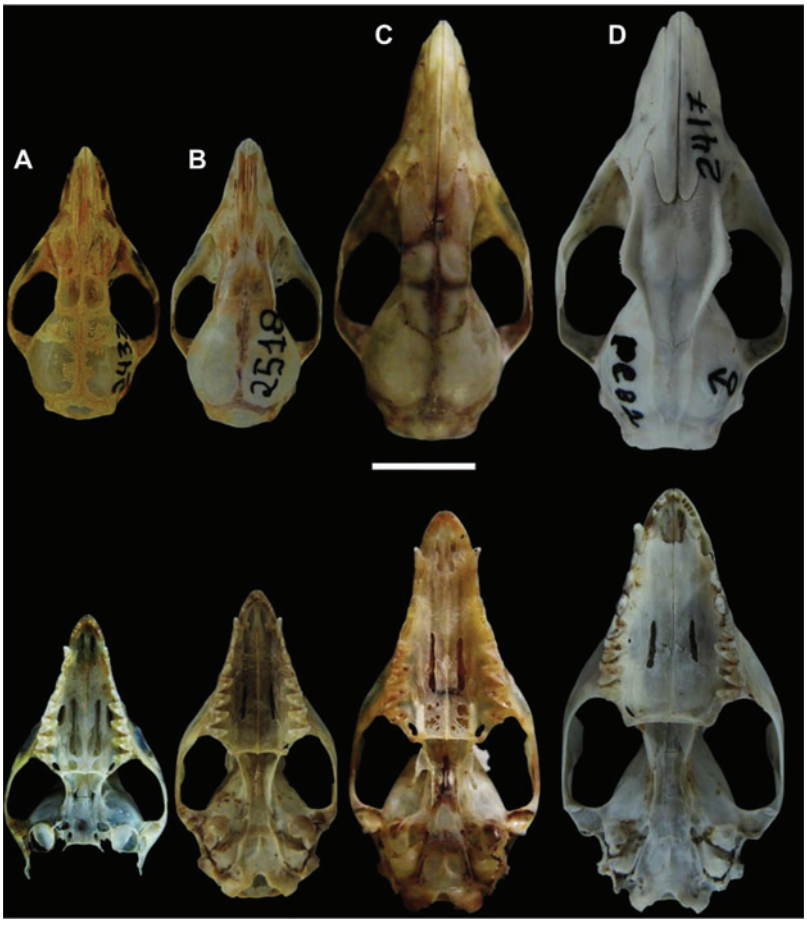

Figure 2 Dorsal and ventral view of *Gracilinanus agilis* (Burmeister 1854) (A: top, UFPB 2437; bottom, UFPB 2481), *Marmosa murina* (Linnaeus 1758) (B: top, UFPB 2518; bottom, UFPB 3941), *Marmosops incanus* (C: UFS20) and *Micoureus demerarae* (O. Thomas 1905) (D: UFPB 2417).

form of the auditory bulla, the configuration of the scales and bristles of the tail, its premolariform lower canines and large P2 (Voss et al. 2004, Gardner and Creighton 2008). The different patterns of the palatal fenestrae also contribute to the differentiation of *M. incanus* from other sympatric monodelphins (Figure 2).

The diagnosis of *Marmosops incanus* is relatively straightforward, not least because it is the only representative of the genus known to occur in north-eastern Brazil (Mustrangi and Patton 1997, Gardner and Creighton 2008). The characteristics for the separation of this species from the sympatric *Marmosops paulensis* are the gradual transition between dorsum and venter; white ventral pelage restricted to midline; entirely white lower leg and ankle; convergent posterior margins of the nostrils; small incisive foramina, extending to C1; large and numerous postero-medial fenestrae on the palate; and conical auditory bulla (Mustrangi and Patton 1997).

The records of the species from Sergipe extend its geographic range as far as the right bank of the São Francisco River, 320 km north and east of its previous northernmost locality in the state of Bahia (Figure 1). As there are no records from the northern (left) margin of this river, it seems reasonable to assume that the São Francisco is a barrier to the dispersal of this genus, as it is for some other mammalian genera such as *Callicebus* (Van Roosmalen et al. 2002), *Cerradomys* (Percequillo et al. 2008), and species such as *Bradypus torquatus* Illiger 1811 (Chagas et al. 2009). This barrier may reinforce the effects of the much harsher climatic conditions found in the Brazilian northeast, and is consistent with the greater diversity found in the Atlantic Forest to the south of this river (Vivo 1997).

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