

FIRST RECORD OF THE BAT *Mimon crenulatum* (E. GEOFFROY, 1801) (MAMMALIA: CHIROPTERA) IN THE STATE OF RIO DE JANEIRO, SOUTHEASTERN BRAZIL

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(With 1 figure)

ABSTRACT

The present study reports an extension of the geographic range of the phyllostomid bat *Mimon crenulatum*. This is the first record of this species in the state of Rio de Janeiro, Southeastern Brazil. Bats were captured in two conservation units of the Atlantic Forest. Data on the ecology and morphometry of the individuals are presented and compared with data recorded for other localities. The occurrence of this bat species in the region, though new, is consistent with information on its natural history found in the literature.

Keywords: *Mimon crenulatum*, endangered species, geographic range, Atlantic Forest, Rio de Janeiro.

RESUMO

Primeiro registro do morcego *Mimon crenulatum* (E. Geoffroy, 1801) (Mammalia: Chiroptera) para o Estado do Rio de Janeiro, Sudeste do Brasil

O presente estudo relata uma extensão da distribuição geográfica do morcego filostomídeo *Mimon crenulatum*. Este é o primeiro registro desta espécie para o Estado do Rio de Janeiro, Sudeste do Brasil. Os morcegos foram capturados em duas unidades de conservação de Mata Atlântica de baixada. Dados sobre ecologia e morfometria são apresentados, e comparados a dados registrados para outras localidades. A ocorrência desta espécie de morcego na região, apesar de nova, é consistente com informações sobre sua história natural presentes na literatura.

Palavras-chave: *Mimon crenulatum*, espécies ameaçadas, distribuição geográfica, Mata Atlântica, Rio de Janeiro.

INTRODUCTION

The geographic range of the bat *Mimon crenulatum* (E. Geoffroy, 1801) includes Southern Mexico, the Guianas, Ecuador, Peru, Bolivia, Brazil and Trinidad (Koopman, 1993). In Brazilian territory, its occurrence is listed in a few records in the Northern, Northeastern and Southeastern regions (Pedro *et al.*, 1994). During recent fieldwork, conducted between November 1997 and

September 2001, seven specimens of *M. crenulatum* were collected. These records expanded this species' range to the South, and also provided some information on its little known natural history.

MATERIAL AND METHODS

Bats were captured in two Atlantic Forest areas in the state of Rio de Janeiro, Brazil: the Reserva Biológica Poço das Antas (Poço das Antas

Biological Reserve, RBPA – S 22° 30'–22° 33', W 42° 15'–42° 19' – municipality of Silva Jardim) and the Fazenda do Rio Vermelho (Rio Vermelho Farm, FRV – S 22° 42' 30'–42° 34' 05" W – municipality of Rio Bonito) (Fig. 1).

Both areas, which comprise mainly lowland and submontane Atlantic Forest, contain different kinds of habitats – such as swamps and open areas (locally known as “capoeiras”), and the region is characterized as a mosaic of habitats (Scarano, 2002; Souza *et al.*, 2000). The climate of this region is uniformly wet and hot, being classified as Am according to Koeppen’s system (Takizawa, 1995). The RBPA covers about 6,100 ha, while the FRV covers about 2,000 ha. The RBPA was extensively studied for some years; the inventory of its bat fauna is given in Baptista & Mello (2001), and data on the ecology of other bat species may be found in Mello & Fernandez (2000) and Mello *et al.* (2004).

Bats were captured monthly on three consecutive nights from January 1998 to September 2001, using six standard mist-nets (7 x 3 m) set at ground level or two meters above it, along trails, over ponds and streams, near fruiting and flowering plants and near other attractive sites. Data on sex,

age, reproductive condition, and body measurements (weight, and tibia and forearm length) were recorded. Individuals were considered adults on the basis of their degree of ossification of the wing’s phalangeal epiphyses (following Kunz, 1988). The reproductive condition was estimated on the basis of external characters, such as abdomen and nipple condition for females, and testis position for males.

Voucher specimens were killed using sulfuric ether; later they were fixed using formaldehyde solution (10%), and preserved in ethylic alcohol solution (70%). These specimens are stored in the Adriano Lúcio Peracchi Chiroptera Collection at the Universidade Federal Rural do Rio de Janeiro. External and skull measurements were taken following the protocol proposed by Pedro *et al.* (1994) in order to allow for comparisons. Due to the small sampling size, males and females were analyzed together. Body weight was measured with a Pesola spring scale (1 g accuracy).

RESULTS

In the Poço das Antas Biological Reserve, six individuals of *M. crenulatum* were separately

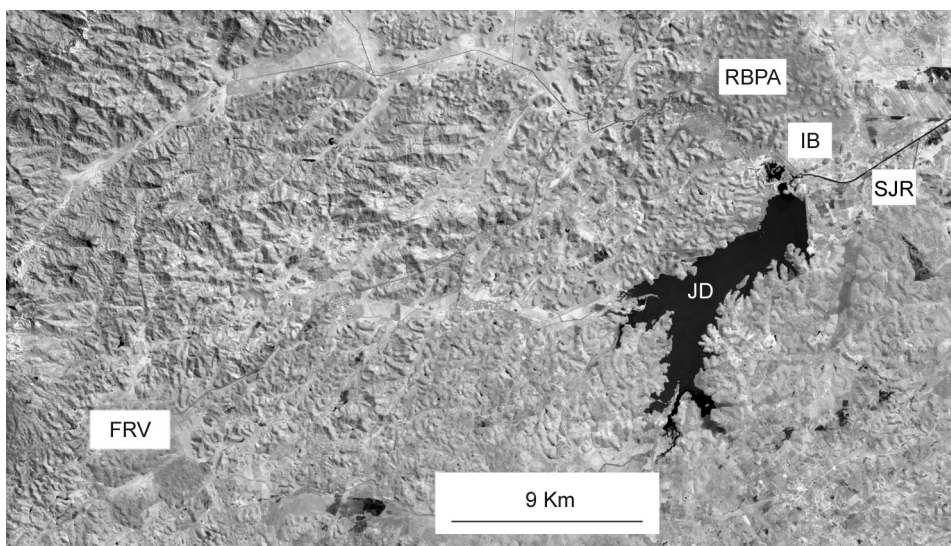


Fig. 1 — Satellite image of the region where the two study areas are located, Fazenda Rio Vermelho (FRV) and Reserva Biológica Poço das Antas (RBPA), including the area of the Ilhas dos Barbados (IB), the Juturnaíba Dam (JD) and the São João River (SJR). Dark gray patches are forests, black patches are water, straight lines are roads, and other lighter grayish patches are open vegetation. Clinton Jenkins (University of Tennessee) provided us the Landsat 7 ETM+ image (bands 4, 5 and 6).

sampled in December 1998, January 1999, February 1999, March 1999, October 1999, and January 2000. On the other hand, on Rio Vermelho Farm, only one specimen was sampled in January 2000 over the Rio Vermelho river. *M. crenulatum* accounted for 0.3% of the total of 2,596 captures during the monthly four-year study in the RBPA (Mello, 2002).

Except for one individual sampled at a four-meter height, all the specimens were captured at ground level, near water (swamps or rivers). All the individuals were captured before 19 h 30 except for one female captured at 23 h at RBPA. Only two fecal samples of the bats were obtained, and both contained only unidentifiable insect fragments.

In the present study two juveniles (a male and a female) were captured in January 1999 and January 2000, respectively, and a post-lactating female was captured in December 1999. All the captured males appeared to be reproductively inactive in February, March, and October 1999, and January 2000.

Cranial measurements (mm) were taken from captured specimens and were compared with data found in the literature. The values are presented as "mean (minimum-maximum) sample size": forearm length = 52.27 (50.10-53.70) 7; longest skull length = 23.62 (23.30-23.80) 4; condylobasal length = 21.22 (21.10-21.40) 4; length of maxillary toothrow = 8.53 (8.45-8.60) 4; length of mandibular toothrow = 9.32 (9.20-9.50) 4; breadth across upper molars = 9.15 (9.00-9.20) 4; postorbital constriction = 4.52 (4.40-4.80) 4; zygomatic breadth = 13.19 (12.90-13.70) 4; breadth of braincase = 9.00 (8.80-9.40) 4; breadth across mastoid processes = 12.51 (12.20-12.80) 4; and weight = 18.0 (14.0-24.0) 7.

DISCUSSION

The available data suggest that *M. crenulatum* prefers the understory (Bernard, 2001; Simmons & Voss, 1998), but there are few studies on vertical stratification of bat communities in the Neotropics (e.g., Bernard, 2001; Handley, 1967; Kalko, 1998). This species is frequently found in damp places such as rivers, ponds and waterholes, and our findings are consistent with this pattern (Handley, 1976; Pedro *et al.*, 1994). However, *M. crenulatum* has also been sampled in dry forest environments

(Pedro *et al.*, 1994; Simmons & Voss, 1998), in the Brazilian semi-arid biome of the Caatinga (Willig, 1983), and in a Brazilian amazonian savannah (Bernard & Fenton, 2003).

As for its activity, the pattern of higher frequency at dusk has also been reported in other studies (Pedro *et al.*, 1994; Bernard, 2001; Simmons & Voss, 1998), and may be related to its mainly insectivorous diet, as in the case of molossid and vespertilionids, for instance (Pedro *et al.*, 1994).

Most studies indicate that *M. crenulatum* feeds mainly on insects (Pedro *et al.*, 1994; Bernard, 2001; Simmons & Voss, 1998), but it can also consume small vertebrates, pollen and nectar (Pedro *et al.*, 1994). Our study is consistent with the insectivore feeding habit, which was confirmed by the analysis of fecal samples of *M. crenulatum* composed only of insect fragments (unfortunately unidentifiable).

In Central Amazonia, Bernard & Fenton (2003) observed that two *M. crenulatum* individuals used areas of 65 and 78 ha, and flew maximum linear distances of 0.5 and 1.0 Km, suggesting a pattern of activity not restricted to the vicinity of their day roosts. These two individuals also flew over open savanna areas, suggesting that the matrix environment of our study area may not be a barrier for dispersal. They also found that *M. crenulatum* displayed strong roost fidelity, sleeping in the same hollow tree for 16 consecutive nights. Therefore, we may consider that the bats captured in the present study could be residents of the area.

There is a lack of information on the reproductive pattern of *M. crenulatum*. Pedro *et al.* (1994) suggested that breeding starts at the beginning of the rainy season in Southeastern Brazil. Although our data pool may be insufficient to allow for safe inferences and comparisons, we suggest that the pattern at our study site is similar.

Descriptions and measurements of *M. crenulatum* are available in many publications; we consulted those given in Handley (1960), Goodwin & Greenhall (1961), Husson (1962), Pedro *et al.* (1994) and Simmons & Voss (1998). Koopman (1993) recognized five subspecies for *M. crenulatum*, and these specimens found in the state of Rio de Janeiro closely match previous descriptions of *M. c. picatum* (Handley, 1960; Pedro *et al.*, 1994). The measurements are slightly higher than those obtained for specimens from the

Brazilian municipalities of Uberlândia in the state of Minas Gerais (Pedro *et al.*, 1994) and Lamarão in the state of Bahia (Carter & Dolan, 1978), which are referred to as *M. c. picatum* (Pedro *et al.*, 1994).

The low relative abundance of *M. crenulatum* found in the present study (0.3%) and in the literature suggests that it can be considered a rare species in the bat community throughout its range. Other papers have reported the following relative abundances: Pedro *et al.* (1994) in Uberlândia (Brazil) reported a value of 5/233 = 2%; Brosset *et al.* (1996) in French Guiana, 35/8,031 = 0.4%; Bernard (2001) near Manaus (Brazil), 9/936 = 0.9%; Kalko & Handley (2001) in Belém (Brazil), 3/1,871 = 0.1%; and Schultze *et al.* (2000) in Guatemala, 1/901 = 0.1%. In Southeastern Brazil, a few specimens of *M. crenulatum* have been documented from only three localities: Três Marias (18° 12' 24" S-45° 14' 31" W) (Mares *et al.*, 1989); and Uberlândia (18° 55' 08" S-48° 16' 39" W) in the state of Minas Gerais (Pedro *et al.*, 1994), and Linhares (19° 23' 29" S-40° 04' 21" W) in the state of Espírito Santo (Peracchi & Albuquerque, 1993).

In the state of Rio de Janeiro, the occurrence of *M. crenulatum* had been previously reported by Esbérard (1998), and again by Bergallo *et al.* (2000), on the basis of a single specimen collected in the Grajaú Forest Reserve (22° 55' 31" S-43° 16' 04" W), a Conservation unit located inside the urban area of Rio de Janeiro.

Before the present report was written, the above-mentioned specimen, which was kindly yielded for our analysis, had been identified as another member of the Phyllostominae subfamily (*Phyllostomus discolor* – identified by André Pol), which proves that prior records of this species in the state were erroneous. The present record is really the first for the state of Rio de Janeiro, which seems to represent the southernmost record for *M. crenulatum* in Brazilian territory.

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