
SURVEY OF BATS (MAMMALIA, CHIROPTERA), WITH COMMENTS ON REPRODUCTION STATUS, IN SERRA DAS ALMAS PRIVATE HERITAGE RESERVE, IN THE STATE OF CEARÁ, NORTHWESTERN OF BRAZIL

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Abstract

This bat survey was conducted in Serra das Almas (SAR) Natural Heritage Private Reserve, in the Ceará state, in order to improve the knowledge about chiropterans of the Brazilian Caatinga and the northwestern region of Brazil. A total of 182 specimens of 16 species were collected, and reproductive conditions were checked. *Artibeus fimbriatus* collected in the decidual forest during the dry season is the most northern record for this species. The results of this survey reinforce the urgent need for more extensively studies in this region of Brazil to provide a better understanding of the bat diversity and their ecological role in this unique ecosystem.

Key words: Caatinga, chiroptera, inventory, Northeastern Brazil, reproduction.

INTRODUCTION

There are few bat studies in the Brazilian northwestern region, and fewer realized in the state of Ceará. Thomas (1910) studied specifically the “Planalto da Ibiapaba” and listed *Artibeus lituratus*, *Platyrrhinus lineatus* and *Carollia perspicillata* for that region. Seventy years later Uieda *et al.* (1980) listed *Carollia perspicillata*, *Chrotopterus auritus*, *Desmodus rotundus*, *Furipterus horrens*, *Glossophaga soricina*, *Phyllostomus discolor*, *Phyllostomus hastatus*, *Peropteryx macrotis* and *Peropteryx* sp. for Ubajara and Araticum municipalities. There is a management plan for the Ubajara National Park, published by IBDF (1981) that cites *Furipterus horrens* to occur in the area. Mares *et al.* (1981) published a list of 50 chiroptera species recorded in the municipalities of Crato (Ceará state) and Exu (Pernambuco state). Willig (1983, 1985) also publishes a 38 species list of bats registered in Crato. Two decades later Silva *et al.* (2001) reviewed the management plan for Ubajara National Park and list the presence of 13 bat species in the area.

In order to improve the knowledge about chiropterans in this region and ecosystem of Brazil we present the results of a bat survey in the southern part of the

Planalto da Ibiapaba, Ceará State, Brazil.

MATERIAL AND METHODS

Study Area

The bat survey was conducted at the “Reserva Particular do Patrimônio Natural Serra das Almas” (SAR) located at coordinates 05°05', 05°15' S - 40°50', 41°00' W, in the municipality of Crateús, state of Ceará (Figure 1). The Reserve comprises a total area of 4,740 ha, and has three major vegetation types: decidual forest, “carrasco” and “caatinga”. Sampling was done within and nearby the Reserve region in order to trial all types of vegetation.

The decidual forest is located in a narrow area near the border of the superior plateau, above 750 meters. It is supported by the plateau drainage and by orographic rain. Due to the altitude and the exposition of the slope to the humid winds from NE and E make possible the maintenance of species that are typical of humid environments such as trees, herbs and bushes.

Carrasco is found on the plateau always above 600m and usually around 700m. A flat relief containing a deep

Figure 1: Map showing the Municipality of Crateús localization.



sandy soil without superficial water and poor nutrients represents the physical environment. Its flora is xerophytic and sclerophyllous, and its physiognomy present high density, comprising trees, short bushes and vines. Although being xerophytic vegetation, “carrasco” differs from “caatinga” due to its higher species diversity and to the presence of humid elements.

Caatinga is a xerophytic vegetation community that occupies the areas with plain relief at the base of the plateau, presenting an open physiognomy with high predominance of *Auxemma oncocalyx* and *Mimosa caesalpiniaefolia* (M. A. Figueiredo *et al.* 2000).

METHODS

Bats were collected during the months of January and July, which correspond to the wet and dry seasons, in the year of 2000. Bats were captured using mist nets (9.0 x 2.5 m) from 18:00 to 22:00, totalizing 9,000m² of capture effort. Bats that were pregnant, lactating or with evident testicles were set free at the end of each night sample. Species identification followed Koopman (1993). Material referred as “SAR” and “ALP” is currently deposited in the Federal University of Ceará and Adriano Lúcio Peracchi collections, respectively.

RESULTS

During the survey 182 specimens of bats were collected, representing 16 species (Table 1). Here we present a gazetteer, with capture data for each species.

MORMOOPIDAE

Pteronotus parnelli (Gray, 1843) – This species was found in decidual forest (n=7) and carrasco (n=3). Apparently bats were not reproductive during collecting months. Two young individuals were collected in the dry season (July). Examined material (m=male, f=female): ALP 6044 m (24-VII-00), SAR 083 m (25-VII-00), ALP 6044 f (12-I-00), ALP 6056 f (22-VII-00), SAR 052 f (22-VII-00), ALP 6064 f (24-VII-00), ALP 6069 f young (25-VII-00).

PHYLLOSTOMIDAE

Phyllostomus discolor (Wagner, 1843) – In July, one pregnant female was collected among other 25 individuals captured. No specimen was collected during the rainy season. The presence of this species during the dry season is probably associated with the denser vegetation in the sample sites during this time of the

year, although it was also collected in the caatinga, a more open vegetation. Examined material (m=male, f=female): ALP 6047 m (22-VII-00), SAR 065 f (22-VII-00), ALP 6057 m (23-VII-00), ALP 6059 m (23-VII-00), SAR 081 m (24-VII-00).

Phyllostomus hastatus (Pallas, 1767) – During the survey in the decidual forest area one male and one female were collected together with the specimens of *P. discolor*. The male presented an orange-reddish fur, which seems to be a case of melanin variation, similar to A. L. Peracchi's specimens collected in Linhares (Espírito Santo state, Southeastern Brazil). Examined material (m=male, f=female): ALP 6062 m (23-VII-00) and ALP 6069 f (23-VII-00).

Trachops cirrhosus (Spix, 1823) – This species was collected in decidual forest during the dry season. Examined material (m=male, f=female): ALP 6049 m (22-VII-00) and ALP 6060 f (23-VII-00).

Tonatia bidens (Spix, 1823) – One male specimen was collected in decidual forest during the dry season. Examined material (m=male): ALP 6053 m (22-VII-00).

Tonatia sp. – One individual was collected in the decidual forest during the dry season. Its unusual ventral pelage coloration and overall size did not allow a specific identification until this date. Examined material (f=female): ALP 6068 f (25-VII-00).

Anoura geoffroyi Gray, 1838 – During the survey, 13 specimens were captured. Two males and one female presented reproductive signs on July. The pregnant female was captured in the caatinga, and the other specimens were collected in the decidual forest. Examined material (m=male, f=female): ALP 6048 m (22-VII-00), ALP 6055 m (22-VII-00), SAR 067 m (23-VII-00), SAR 073 m (23-VII-00), ALP 6058 f (23-VII-00), SAR 070 f young (23-VII-00).

Glossophaga soricina (Pallas, 1766) – This species was recorded in the carrasco and decidual forest, in both seasons. However, the higher number of captures occurred in the dry season (July), including a pregnant female. Examined material (m=male, f=female): ALP 6045 f (12-I-00), ALP 6046 f (12-I-00), ALP 6054 f (22-VII-00), SAR 048 f (22-VII-00), SAR 050 f (22-VII-00), SAR 060 f (22-VII-00), ALP 6052 m (22-VII-00), ALP 6065 m (22-VII-00), SAR 091 f (25-VII-00).

Carollia perspicillata (Linnaeus, 1758) – This species is very common in the region (n=71). On January only two males were collected, but both of them had reproductive signs. In July more individuals were collected, mainly in areas of denser vegetation, as the decidual forest (n=55) and carrasco (n=14). From the 40 females captured, five were pregnant in July.

Examined material (m=male, f=female): ALP 6042 m (10-I-00), ALP 6043 m (10-I-00), SAR 027 m (11-I-00), SAR 045 m (22-VII-00), SAR 049 m (22-VII-00), ALP 6066 m (24-VII-00), ALP 6051 f (22-VII-00), SAR 046 f (22-VII-00).

Sturnira lilium (E. Geoffroy, 1810) – A total of 14 specimens of this frugivorous species were collected, always in areas of decidual forest. The existence of individuals in reproductive period (lactated and pregnant females) was observed in both seasons. Examined material (m=male, f=female): ALP 6039 m (10-I-00), SAR 068 m (23-VII-00), SAR 051 f (22-VII-00), ALP 6040 f (10-I-00), ALP 6041 f (10-I-00).

Platyrrhinus lineatus (E. Geoffroy, 1810) – Captured in the decidual forest. Examined material (f=female): ALP 6061 f (23-VII-00).

Artibeus planirostris (Spix, 1823) – This species was found in areas of decidual forest during the dry season. From the 13 collected individuals, 12 were in reproductive period (5 females and 7 males). Examined material (m=male): ALP 6050 m evident testicles (22-VII-00).

Artibeus lituratus (Olfers, 1818) – This species was collected in both seasons, in areas of decidual forest and carrasco. Two individuals were in reproductive period during January. Examined material (m=male): ALP 6035 m (08-I-00), SAR 044 m (22-VII-00), SAR 082 m (24-VII-00), ALP 6067 m (25-VII-00).

Artibeus fimbriatus (Gray, 1838) – Collected in the decidual forest during the dry season. Examined material (f=female): f pregnant (22-VII-00). This is the most northern record for this species.

DESMODONTINAE

Desmodus rotundus (E. Geoffroy, 1810) – All the four specimens were collected in the deciduous forest, inside a stable where horses were kept at night. One pregnant female was captured in July. Examined material (m=male, f=female): ALP 6037 f (08-I-00), 6038 f (08-I-00), ALP 6036 m (08-I-00).

VESPERTILIONIDAE

Myotis sp. – Collected during the rainy season. Some individuals were observed flying around, and inside the house used by the researchers. Its overall size such as the forearm did not allow a specific identification until this date. Examined material (m=male): ALP 6034 m (08-I-00).

DISCUSSION

Results presented here show the expressive number of

Table 1: Comparative list of bat species known to occur at the different vegetation formations in the “Reserva Particular do Patrimônio Natural Serra das Almas” (SAR) and in the Ubajara National Park (PNU) (Silva *et al.* 2001).

SPECIES	VEGETATION	
	SAR	PNU
Mormoopidae		
<i>Pteronotus parnelli</i>	carrasco / decidual forest	-
Phyllostomidae		
<i>Anoura geoffroyi</i>	Caatinga / decidual forest	-
<i>Artibeus fimbriatus</i>	Decidual forest	-
<i>Artibeus lituratus</i>	Carrasco / decidual forest	Perennial tropical forest
<i>Artibeus planirostris</i>	Decidual forest	Perennial tropical forest
<i>Artibeus obscurus</i>	-	Perennial tropical forest
<i>Carollia perspicillata</i>	Carrasco / decidual forest	Perennial tropical forest
<i>Chiroderma villosum</i>	-	Perennial tropical forest
<i>Desmodus rotundus</i>	Decidual forest	Vegetation transition (*)
<i>Glossophaga soricina</i>	Carrasco / decidual forest	Perennial tropical forest
<i>Lonchophylla</i> sp.	-	Vegetation transition (*)
<i>Phyllostomus discolor</i>	Caatinga / decidual forest	Perennial tropical forest
<i>Phyllostomus hastatus</i>	Decidual forest	Vegetation transition (*)
<i>Platyrrhinus lineatus</i>	Decidual forest	Perennial tropical forest
<i>Sturnira lilium</i>	Carrasco / decidual forest	Perennial tropical forest
<i>Tonatia bidens</i>	Decidual forest	-
<i>Tonatia</i> sp.	Decidual forest	-
<i>Trachops cirrhosus</i>	Decidual forest	-
Furipteridae		
<i>Furipterus horrens</i>	-	Vegetation transition (*)
Vespertilionidae		
<i>Myotis</i> sp.	Decidual forest	-
Molossidae		
<i>Molossus molossus</i>	-	Perennial tropical forest

species found in this area and add new data on the biology of northwestern Brazilian chiropterans. The great predominance of frugivorous species may promote the maintenance of the vegetation cover due their role as seed dispersers (*e.g.* Aguirre, 2002). The carrasco region at SAR presented similar diversity when compared to the transition vegetation of perennial tropical forest and caatinga found in PNU (six and four species, respectively). In caatinga areas of SAR, only specimens of *Anoura geoffroyi* and *Phyllostomus discolor* were found, which characterizes those sites as low-diversity areas. This can be a consequence of the hard conditions in the dry period, and animals probably migrate to areas with better climate conditions and food supply. This hypothesis is corroborated by the fact that species collected in the caatinga were also collected in deciduous forest areas. The same fact occurred in PNU – caatinga areas had no collected specimen, however the deciduous forest had a great diversity.

Regarding the reproductive activity we observed that bats were more reproductive during the dry season. Wilson (1979) hypothesized that the reproduction of bats in the northwestern Brazil would occur during the

rainy season. Willig *et al.* (1993) observed that at the cerrado incrustations within the caatinga the periods of pregnancy and lactation occurred during the dry season in frugivorous species; nectarivorous species were reproductive in the end of the dry season and along the rainy season; and hematophagous species reproduce along all the year. At PNU, Silva *et al.* (2001) observed reproductive specimens at the end of the dry season and at the beginning of the rainy season, corroborating Willig *et al.* (1993) on frugivorous species. However, in the southern portion of the Planalto da Ibiapaba (SAR) the reproduction of all species was observed mainly in the dry season.

Finally, our data indicate reasonable diversity of chiropterans for the Planalto da Ibiapaba, an area that is still poorly known. Therefore, we reinforce the urgent need for more extensively studies in these regions of Brazil in order to provide a better understanding of the biology of bats and their ecological role in the unique ecosystems they contain. A better knowledge about such rich, but poorly known ecosystems is the best way to elaborate management strategies and to allow the preservation and protection of areas threatened by human impact such as those in northwestern Brazil.

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