

Morcegos de Itaperuna, norte do estado do Rio de Janeiro, Sudeste do Brasil

Bats from Itaperuna town, northern of Rio de Janeiro state, southeastern Brazil

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ABSTRACT

The bat fauna from Rio de Janeiro State still exists gaps in knowledge, mainly to North of the State. This article attempts to fill this gap and increases some species to the State's final list. For the capture, mist nets were armed with the aid of aluminum stakes at different sampling points at ground level. For each night of capture, six to eight nets were stretched at dusk and collected after around four hours. The choice of the dimension and the quantity of nets was dependent on the conditions of the sampled site. In addition, an active search was carried out in places that could possibly be used as shelters for bat colonies. Were found 12 species, inserted in three families: Phyllostomidae, Molossidae, Vespertilionidae, and five subfamilies: Carollinae (two species), Desmodontinae (1), Glossophaginae (1), Stenodermatinae (4); Vespertilionidae (1), Phyllostominae (1), and Molossidae (2). Most of the recorded Chiroptera species in this study present a wide geographic distribution, occurring also in other Brazilian biomes. There are 77 species of bats to Rio de Janeiro State, and our study found which represents only 16.88% of the diversity from Rio de Janeiro. According to the richness estimator, 70.92% of the diversity was found. These values demonstrate how diversity may be even higher than that found in this study. However it is still believed that these values are far below reality. The reduced richness wasn't expected, because the areas are next to wildlife reserve areas as APA *Bacia do Rio São João*, *Estação Ecológica de Guaxindiba*, and National park of *Restinga de Jurubatiba*.

KEY-WORDS. Richness, assemblage, inventory.

RESUMO

A fauna de morcegos no Estado do Rio de Janeiro ainda apresenta lacunas no conhecimento, principalmente para o norte do Estado. Este artigo tenta sanar essa lacuna e aumenta algumas espécies para a lista final do estado. Para a captura, redes de neblina foram armadas com o auxílio de estacas de alumínio em diferentes pontos de amostragem e no nível do solo. Para cada noite de captura, seis a oito redes foram esticadas ao anoitecer e coletadas após cerca de quatro horas. A escolha

da dimensão e quantidade de redes dependeu das condições do local amostrado. Além disso, uma busca ativa foi realizada em locais que poderiam ser usados como abrigos para colônias de morcegos. Foram encontradas 12 espécies, inseridas em três famílias: Phyllostomidae, Molossidae, Vespertilionidae e cinco subfamílias: Carollinae (duas espécies), Desmodontinae (1), Glossophaginae (1), Stenodermatinae (4); Vespertilionidae (1), Phyllostominae (1) e Molossidae (2). A maioria das espécies de Chiroptera registradas neste estudo apresenta uma ampla distribuição geográfica, ocorrendo também em outros biomas brasileiros. Existem 77 espécies de morcegos no Estado do Rio de Janeiro, e nosso estudo descobriu apenas 16,88% da diversidade do estado. De acordo com o estimador de riqueza, 70,92% da diversidade foi encontrada. Esses valores demonstram como a diversidade pode ser ainda maior do que a encontrada neste estudo. No entanto, ainda acredita-se que esses valores estão muito abaixo da realidade. A reduzida riqueza não era esperada, porque as áreas estão próximas a áreas de reserva de vida selvagem, como a APA Bacia do Rio São João, a Estação Ecológica de Guaxindiba e o Parque Nacional da Restinga de Jurubatiba.

PALAVRAS-CHAVE. Riqueza, assembleia, inventário.

INTRODUCTION

The high biodiversity and the increase of anthropic actions have directed attention to tropical forests. The Atlantic Forest, which is have high diversity and a high degree of endemism⁽¹⁾ and considered the most complex and diverse forest, which remains only nearly 11.26% of its domain⁽²⁾.

Among the mammal groups present in the Atlantic Forest, bats are one of the three most representative⁽³⁾. They have a wide morphological variety and are important in the restoration and maintenance of native landscapes, mainly due to their different eating habits, which, combined with their high mobility capacity, make these animals large seed dispersers, plant pollinators, insects control, among others⁽⁴⁾.

The chiropterological fauna of the state of Rio de Janeiro is well known⁽⁵⁻⁸⁾. However, Bergallo et al.⁽⁹⁾ mentioned the lack of information for mammals in the north of Rio de Janeiro, which can create conservation problems for the remaining forest fragments. Therefore, the present study has the objective to describe the richness, abundance and composition of bat assemblage from Itaperuna, north of Rio de Janeiro.

METODOLOGY

The study was carried out in Itaperuna, northern part of the state of Rio de Janeiro, in two fragments at private non-protected area ($21^{\circ}11'43.18''\text{S}$ $41^{\circ}51'6.36''\text{W}$ and $21^{\circ}9'40.78''\text{S}$ $41^{\circ}54'3.09''\text{W}$) of ombrophilous forest of approximately 100 ha in the rural area (Figure 1). The rural zone was composed mainly by livestock, being far from the urban zone only 50 kilometers. The climate of the region according to Köppen is $\text{Aw}^{(10)}$, with average annual temperature of 23°C and rainfall between 1,000 and 1,200 mm annually. A total of eight nights of the collection were performed, in sequential days during the summer, and in the edge and interior of forests randomly. Priority areas were natural clearings, borders, proximity to possible natural shelters or plants with fruits and flowers that are known to attract bat species⁽¹¹⁾.



Figura 1 - Map of study area. The star is Itaperuna Town, Rio de Janeiro State, Southeastern Brazil.

For this work we obtained a collection license from IBAMA act n° 036/2012. For the capture, mist nets (12x2.5m, 7x2.5m and 4x2.5m) were armed in the form of zigzag with the aid of aluminum stakes at different sampling points and at ground level. For each night of capture, six to eight nets were stretched at dusk and collected after around four hours, normally between 18h30 to 22h30. The choice of the dimension and the quantity of nets was dependent on the conditions

of the sampled site. In addition, an active search was carried out in places that could possibly be used as shelters for bat colonies.

The taxonomic identification of the species was the Gardner identification key⁽¹²⁾; the external morphology was analyzed by qualitative and quantitative aspects (skin color, length total, tail presence and size, nasal leaf format)⁽¹³⁾. After biometry, each individual was placed in a containment bag, being released only at the end of the sampling to avoid that the same animal was retaken.

The species nomenclature and the taxonomic arrangement in the family and subfamily categories were based on Wilson and Reeder⁽⁴⁾, Reis et al.⁽¹⁴⁾ and Gardner⁽¹²⁾.

DATA ANALYSIS

The sample effort was calculated by the expression $E = m^2 \cdot h$ ⁽¹⁵⁾, in which “m²” is the number of mist nets open per night and “h” is the total number of hours of nets opened. The sampling effort module and locality are described in Table 1.

Table 1 – Sampling sites of fragments 1 and 2 in each collect day and sample effort.

Day	Fragment	Sampling Effort
1	2	960 m ² h
2	2	590 m ² h
3	2	960 m ² h
4	2	493,75 m ² h
5	1	540 m ² h
6	1	1023,75 m ² h
7	1	1200 m ² h
8	-	3 hours

The frequency of occurrence, success of capture and the accumulation curves were obtained for the sampled bats. The curve was constructed using an abundance matrix using the EstimateS 7.5 program⁽¹⁶⁾.

RESULTS

Fifty-five individuals were collected from 12 species, including Phyllostomidae, Molossidae, Vespertilionidae, and five subfamilies: Carrollinae (two species), Desmodontinae (one specie), Glossophaginae (one specie), Stenodermatinae (four species), Vespertilionidae (one specie), Phyllostominae (one specie) and the Molossidae with two species, according to Table 2.

Table 2 – List of species and occurrence frequency of bat species from Itaperuna, Rio de Janeiro State, Southeastern Brazil.

Family Subfamily		Occurrence frequency
Phyllostomidae		
Glossophaginae	<i>Anoura geoffroyi</i> Gray, 1838	1.89
Sternodermatinae	<i>Artibeus fimbriatus</i> Gray, 1838	1.89
	<i>Artibeus lituratus</i> (Olfers, 1818)	20.75
	<i>Artibeus</i> sp.	3.77
	<i>Pygoderma bilabiatum</i> (Wagner, 1843)	1.89
	<i>Sturnira lilium</i> (E. Geoffroy, 1810)	11.32
Carollinae	<i>Carollia brevicauda</i> (Schinz, 1821)	3.77
	<i>Carollia perspicillata</i> (Linneus, 1758)	7.55
Desmodontinae	<i>Desmodus rotundus</i> (E. Geoffroy, 1810)	20.75
Phyllostominae	<i>Mycronycteris minuta</i> (Gervais, 1856)	1.89
Vespertilionidae		
Vespertilioninae	<i>Histiotus velatus</i> (I. Geoffroy, 1824)	1.89
Molossidae	<i>Molossus molossus</i> (Pallas, 1766)	18.87
	<i>Molossus rufus</i> E. Geoffroy, 1805	3.77
Total		100

The capture success for the two fragments was 0.15 individual/m² h. The general species accumulation curve for the two fragments did not reach asymptote, and did not show curve stabilization. The increase of the sampling effort would increase the number of recorded species. The first-order Jackknife richness estimator was outside the 95% confidence interval with 16.91 species.

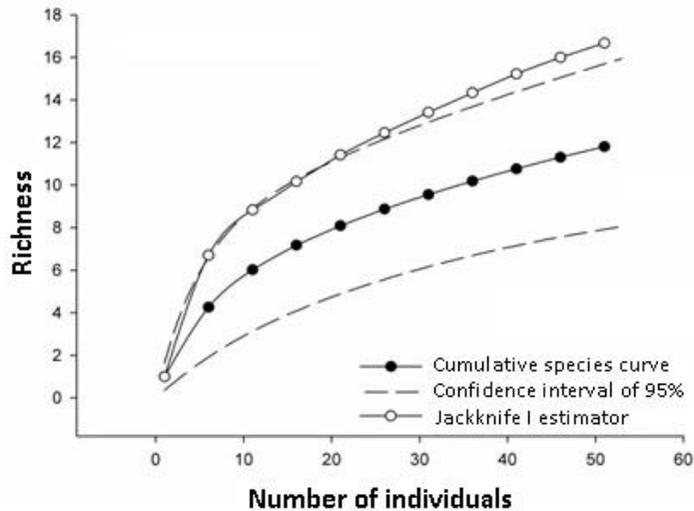


Figure1 – Cumulative species curve and Jackknife of first order estimator to fragments 1 and 2 from Itaperuna, Rio de Janeiro State, Southeastern Brazil.

DISCUSSION

Most of the recorded Chiroptera species in this study present a wide geographic distribution, occurring also in other Brazilian biomes⁽⁸⁾ gathered all the species already found in the state of Rio de Janeiro. These authors mentioned the existence of 77 species of bats, which represents only 16.88% of the diversity from Rio de Janeiro^(17,6). According to the richness estimator, 70.92% of the diversity was found. These values demonstrate how richness may be even higher than that found in this study. However, it is still believed that these values are far below reality.

The capture success was much lower than other studies conducted in the state of Rio de Janeiro. For example, Lourenço *et al.*⁽⁷⁾ found a capture success of 0.32 ind/ m² h, which is low compared to other studies in the state: Lourenço *et al.*⁽⁷⁾ obtained 34 species in 3559.2 net-hour on the Island of Marambaia (RJ) and Luz *et al.*⁽¹⁸⁾ obtained 30 species in 242,424 nets per hour. The main factors that contributed to this result are: the high degree of anthropization, the reduced size of

the fragment, and the high degree of slope of the area. Besides that, the Chiroptera community was sampled using mist nets⁽¹⁹⁾, which is a commonly and efficient method to capture species of the Phyllostomidae family, due to foraging habit below the canopy of trees⁽²⁰⁾. The prominent presence of the Phyllostomidae family was expected, since the methodology employed increases the capture of this family⁽¹⁹⁾.

The capture efficiency is a relevant fact in bat fauna inventories⁽²¹⁾ suggests the need for at least 1,000 captures to sample the diversity of phyllostomid bats in the Atlantic Forest and Esberárd and Bergallo⁽²²⁾ suggest a minimum of 700 captures for areas in the State of Rio de Janeiro. Taking into account that the present work obtained only 53 captures, it is understood that the diversity recorded represents a small sample of the community. The low richness was not expected, because the sampling area are relatively close to wildlife reserves such as *APA Bacia do Rio São João*, *Estação Ecológica de Guaxindiba*, and *ParNa da Restinga de Jurubatiba* (~90 km from away). These areas are some of the few well-preserved forest remnants in the State. In this way, more species were expected for the sampled areas, since bats have extensive living areas, exceeding 500 hectares⁽²³⁾.

The Phyllostomidae family was the most abundant, representing 75.47% of the total number of captured individuals, covering 9 of the 13 registered species. The prevalence of this family in inventories in Brazil is common, and this result has also been observed in other studies^(5, 21, 24, 6). There is also the fact that insectivorous species, which make up most of the other families, fly higher and/or perceive the net more easily⁽²¹⁾, not being captured by the nets^(19, 25). In addition, this family is the most diverse and abundant in South America, presenting 150 species; and is the largest family in Brazil with 90 species⁽¹⁴⁾.

The subfamily with the largest number of species was Stenodermatinae, subfamily that also had the largest number of captured individuals. The high diversity and abundance of this subfamily in the present study may be related to the type of vegetation, with elements of Dense Ombrophylous Forest. Within this subfamily, the species with the highest number of captured individuals from the overall total was *A. lituratus*, which is one of the most well-known species in Brazil

because of its high abundance, even in urban environments⁽¹⁴⁾. This species is sheltered in the canopy of trees, under the leaves of palm trees and other plants and found in conserved environments. It is one of the best-adapted species to urban environments^(26,27).

The species *Desmodus rotundus* is strictly hematophagous, preferring blood from large mammals and the introduction of domestic animals such as horses, cattle and pigs have increased the number of individuals in the last 300 years⁽²⁸⁾, which explains its high abundance for the study area, because the environment is basically composed of pastures. Due to its food habit and its importance in the transmission of rabies, this species is one of the most well-known and studied in the world⁽²⁹⁾.

The other species with the greatest abundance is *Molossus molossus*, which is strictly insectivorous and can be found in urban and non-urbanized areas, occupying hollows of trees⁽¹⁴⁾. The Molossidae family is primarily recorded in inventories with the use of alternative methods such as active search. It is emphasized that this family was only registered in the study area because of the use of this methodology.

CONCLUSION

It is concluded that the diversity found in this research is low and the result of a sample effort considered as medium when compared with other articles previously published in the state of Rio de Janeiro. However, the composition includes important species for the north of the state and due to a lack of research, the importance of such records is reiterated for a broadly anthropized region.

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