



# BAT DIVERSITY AND POPULATION PARAMETERS OF THE BAT *PHYLLOSTOMUS ELONGATUS* WAGNER, 1843 (CHIROPTERA: PHYLLOSTOMIDAE) IN CAVE OF THE MOSQUITOS, CURVELO, BRAZIL.

Ricardo Souza Santana<sup>1</sup> & Sônia A. Talamoni<sup>1,2</sup>

<sup>1</sup>Pos Graduate Program in Vertebrate Zoology, Catholic University of Minas Gerais. <sup>2</sup>Conservation, Ecology and Behavior Group.

## INTRODUCTION

Bats are the less known group of mammals, especially regarding to their geographic distribution, habitat use and the use of natural shelters (Fenton, 1997). The type of shelter chosen by bats is influenced by their social behavior and the energetic cost of foraging (Willis & Brigham, 2004). Among natural shelters, caverns present advantages since they provide better defense against predators and weather conditions. Shelter diversity as well as their selection and availability are important factors that account for the high diversity of bats, especially in tropical environments where bats use a wider range of shelters that in temperate climates (Kunz *et al.*, 1983). Because of that, previous studies have suggested that the selection of appropriate shelters can have a critical value for bats survival. *Phyllostomus discolor* is known to occur in Central and South American countries as Mexico, Guiana, Paraguay, Argentina, Peru, Trinidad, Venezuela and Brazil. Due to its large geographical distribution *P. discolor* is considered a common species in spite of the scarce knowledge about its life history that only includes information on the feeding habits and the echolocation calls of the species. *Phyllostomus discolor* is an omnivorous species, as all the other species belonging to this genus. In the present study the structure of a *P. discolor* colony found in a cavern located in a karstic area in southeastern Brazil was studied during a year.

## MATERIAL AND METHODS

The study was carried out in a cave known as Cave of the Mosquitos in the municipality of Curvelo. The studied *P. discolor* colony is found at this point, roosting in a calcite flowstone in the roof of the room. The captures were carried out along 13 months, in bimensal campaigns totalizing 59 nights, using a mist net (7m x 2.5 m, 20 mm opening

diameter). The net was mounted before dusk, checked every 20 minutes, and dismantled in the next morning, always totalizing 13 hours of exposition. The total sampling effort was 767 hours/net. Before the release of the captured animals all were identified, marked and weighed using a Pesola® dynamometer. The right forearm was measured and their reproductive condition was verified. The Mann-Whitney non parametric test was used to test if there is sexual dimorphism in this species. Possible associations between the number of captures, precipitation and temperature were assessed using a Spearman's correlation test. The statistical software Minitab (version 14) was used for these analyses.

## RESULTS AND DISCUSSION

From the 563 individuals captured, 524 were *P. discolor* corresponding to 93% of the captures. The other species encountered were *Chrotopterus auritus* (n = 2), *Glossophaga soricina* (n = 4), *Desmodus rotundus* (n = 30) and *Phyllostomus hastatus* (n = 3). There were only 22 recaptures (4.19%). The highest capture success was obtained in September 2004 with 163 individuals captured (31.1%, 55 males and 108 females) and the lower success was registered in March 2005 with 41 individuals captured (7.8%, 12 males and 29 females). The entire sample is composed by 190 males and 334 females resulting in a mean sex ratio of  $0.5 \pm 0.2$  (males/females) (Table 1). The observed sex ratio is significantly different from the expected 1:1 ( $\chi^2 = 39.5$ ,  $df = 1$ ,  $p = 0.00$ ). However, the mean sex ratio observed for sub adult individuals was  $0.7 \pm 0.1$ . During November 2004 the sex ratio observed was closer to the expected 1:1 ratio with 41 females and 36 males captured. The greatest deviation from the expected ratio was registered during July 2005 since there were 48 females and 13 males captured. In all months the number of sub adult individuals captured ( $28.3\% \pm 4.6$ ) was smaller than the number of adults.

Individuals displaying reproductive activity were found during several sampling periods however, the highest frequency of reproductively active males and females was observed during September 2004, November 2004 and September 2005, which correspond to the end of the dry seasons.

There was a higher number of captures during the dry season (195) than during the wet season (166) and the number of males and females captured during the dry season was significantly different than the number of males and females captured during the wet season ( $\chi^2 = 4.38$ ,  $df = 1$ ,  $p = 0.03$ ). The correlation between the number of captures and rainfall was inverse and negative ( $r_s = -0.821$ ,  $p = 0.02$ ). The dominance of *P. discolor* individuals among all the species sampled, associated to the fact that this population has been observed in the studied cave for more than 15 years, indicates that the species has a stable colony at the "Lapa dos Mosquitos". The behavior of high fidelity to diurnal shelters is common in tropical bats that can remain using the same local for several years. The species *P. discolor* and *D. rotundus* apparently have small colonies in this cavern, while the small number of captures of *C. auritus*, *G. soricina* and *P. hastatus* individuals suggests that these species could be using the cavern only as a temporary shelter.

This spatial segregation can be due to a thermal gradient inside the cavern or can also be related to the diverse microstructures (stalactites, stalagmites, flowstones, etc) and architectural features of the cavern that provide roosts for the individuals. Therefore, the observed dominance of *P. discolor* in the studied cave could be related to some characteristics that are common to phyllostomid and mormopid species. There was a variation in the number of individuals, apparently, this variation in size was not only related to the dispersion or recruiting of younger animals because the percentage of young individuals in the colony did not show large oscillations along the studied period. Therefore, it is possible that there is a dispersion of part of the colony to other locals. *Phyllostomus discolor* presents the polygyny mating system. This indicates that some sub adult individuals, especially males, probably disperse to other areas before the onset of their sexual maturity, and also could be the reason of the observed variation of the size of the colony during the sampled period.

In spite of being considered common, the absence of data about this species can be related to the difficulty of finding the natural shelters of the species. Consequently, the type of shelter used by

this species could be the limiting factor of its distribution. *P. discolor* can be very selective regarding the locals to establish new colonies. This selectiveness could be associated to cave and other natural shelters that favor the formation of larger colonies.

## REFERENCES

- Fenton, M.B. 1997. **Science and conservation of bats**. Journal of Mammalogy 78:1-14.
- Willis, C.K.R.; Brigham, R.M. **Roost switching, roost sharing and social cohesion: forest-dwelling big brow bats. *Eptesicus fuscus*, conform to the fission - fusion model**. Animal behavioral 68:495-505.
- Kunz, T.H.; August, P.V. and Burnett, C.D. 1983. **Haren social organization in cave roosting *Artibeus janaiscensis* (Chiroptera: Phyllostomidae)**. Biotropica 15:133-138.