



## CASE REPORT OF BAT PREDATION BY *PHYLLOSTOMUS HASTATUS* AT GLEBA CENTENÁRIO, MARINGÁ. PR.

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### INTRODUÇÃO

Predation, put simply, is the consumption of one organism (the prey) by another organism (the predator), and it occurs when the prey is alive at the moment the predator first attacks it (Begon, 2006). The form and the function of a predator are closely related to its diet. Differences apparently simple in the teeth structure, for example, show important ecological differences (Ricklefs, 2001). Predation is readily studied in the laboratory and, under certain favorable circumstances in the field (Pianka, 1994), but with regard to bat predation this could be very difficult due to its nocturnal habits, wildness, and velocity. Despite this difficulty, foraging behavior description is very important to enhance the knowledge of ecological interaction of bats. The majority of the Phyllostominae are omnivores. However, some have strong tendencies toward carnivory. As a result of several studies, researchers observed that the diet of *Phyllostomus hastatus* (Pallas, 1767) consists of vertebrates, small mammals and bats (Gardner 1977; Martuscelli, 1995; Esbérard & Bergallo, 2004; Oprea, 2006), as well as fruits, pollen, nectar and insects (Gardner 1977, Silva & Peracchi, 1995).

*P. hastatus* is very large. It is the biggest species of the Phyllostominae sub - family and is the second largest American bat with a head and body length varying from 100 - 130 mm, a forearm length from 83 - 97 mm, a tail length from 10 - 25 mm, and a wingspread length of about 457 mm. An adult individual's weight is about 50 - 142 grams. It has dark brown, grayish, and reddish brown fur on its upper side or chestnut brown fur on its upper side, being somewhat paler on its underside. *P. hastatus* is easily distinguishable from other *Phyllostomus* species that occur in its range (Taddei, 1975; Koopman, 1994; Nowak, 1995; Reid, 1997; Simmons & Voss, 1998; Emmons & Feer, 1999; Santos *et al.*, 003; Nogueira *et al.*, 007).

Most species of Phyllostominae have the ability for hovering flight and, as suggested by their relative large ears and eyes,

probably are able to detect and capture prey on the ground or from foliage, tree trunks and other surfaces, and indeed their great canine teeth generally seem especially adapted for piercing and tearing open the skin, the rind and the fleshy part of fruits. The power for this tear is derived from the force of their flight after they have seized the fruit with their teeth (Gardner, 1977).

The use of mist nets to catch bats for study purposes is greatly disseminated among researchers. Oprea *et al.*, (2006), for instance, describe a bat predation by some individuals of *Phyllostomus hastatus* preying upon individuals of *Glossophaga soricina* (Pallas, 1766), *Carollia perspicillata* (Linnaeus, 1758), *Myotis nigricans* (Schinz, 1821), *Desmodus rotundus* (E. Geoffroy, 1810) and *Anoura caudifer* (E. Geoffroy, 1818) when these species were entangled in the mist net used for catching them. The ability for hovering was used by the *P. hastatus* individuals to prey on the bats tied up the mist net. One of the predators observed quickly ate the prey's abdomen and flew away. The attacks occurred even when the researchers were handling another bat that had been captured, and the predator landed near the mist net for some attacks.

### OBJETIVOS

The aim of this report is to contribute to survey new data about the feeding behavior of *P. hastatus*, by describing an attribute or aspect of this omnivorous species niche (predation). It also focuses on this species probable interference/regulation in the population of others bat species preyed on by it, reporting a case of predation by *Phyllostomus hastatus* on other bat species.

## MATERIAL E MÉTODOS

This study was part of an environmental diagnosis of the direct influence, in the mammalian fauna, of a real state transaction (EIA-Environment Impact Assessment) at Gleba Centenário (23° 21'S; 52° 00'O), an area of 170 ha in the municipality of Maringá, north of PR State, southern Brazil. The site of the research is situated at the Biome Atlantic Forest (FA), and it is of the semideciduous seasonal forest type. Agriculture is the activity in the areas around the fragment.

Data collection took place for eight hours at a specific night in February 2009. Four mist nets (12 x 2, 5 m and 7 x 2, 5 m wide) were used. They were opened between trees and in trails inside the fragment, after the sunset. Visits to the mist nets were done at fifteen - minute intervals.

To calculate the effort of capture, the number of specimens collected was divided by the number of the mist nets  $m^2$  divided by the hours of collection ( $n^0$  specimens/ $m^2$ /hours) in accord with Reis and Schubart's study (1979) .

The bats were identified according to the identification keys of Vieira (1942); Goodwin & Greenhall (1961); Husson (1962); Vizotto & Taddei (1973); Jones & Carter (1976), Reis *et al.*, (1993) e Gregorin & Taddei (2002).

## RESULTADOS

Twelve specimens from two families of bats - Stenodermatinae and Phyllostominae - and four species - *Artibeus lituratus* (Olfers, 1818); *Artibeus fimbriatus* (Gray, 1838), *Sturnira lilium* (E. Geoffroy, 1810) and *Micronycteris megalotis* (Gray, 1842) - were collected. The mist nets were visited every fifteen minutes. The effort of capture obtained was 0,015 ( $12 \div 95 \div 8 = 0,015$ ).

During the work, five specimens of bats were found entangled in a mist net. While the researchers were handling one of the bats, an individual of *Phyllostomus hastatus* was seen hovering the area, very close to the researchers. The predator, then, landed near the trap to attack the entangled bats, which were vocalizing and very stressed.

The predator *Phyllostomus hastatus* must have been guided by the vocalizations of the captured bats. It attacked the prey even in the presence of the researchers, who, in turn, drove it away, in view of the fact that the mist net, regarded as an interference into nature, favored the attacks.

When the teamwork came to another mist net, they encountered a *Phyllostomus hastatus* individual preying on an unidentified specimen of bat tied up in the trap. As an evidence of its feeding behavior, the predator took off the abdomen of the prey, carrying it probably to the roost. Only a small piece of the arms and wings of the prey was left behind.

## CONCLUSÃO

It can be noticed that *Phyllostomus hastatus* can easily escape from the mist net, maybe due to its teeth, that can tear it easily. There may also be other means for this species to avoid the trap.

It seems that its ability for hovering flight is essential for the *Phyllostomus hastatus* species to prey on individuals of bats entangled in the mist net. In addition to this, the structure of its teeth is an adaption not only for the species to feed on fruits, but to be carnivorous too.

Data collected in this study can, thus, contribute to define the real niche of the *Phyllostomus hastatus* species once the predation on bats by this species has not been largely described in studies in the area. This kind of bat has great amplitude of niche, once it presents a very diverse feeding behavior.

*P. hastatus* may have, therefore, an important role in the regulation/control of other bat species populations preyed on by it. Corroborating Oprea's ideas (2006), it really seems that carnivory is an important feeding behavior of *P. hastatus*, maybe the most important one.

## REFERÊNCIAS

- Begon, M. *et al.*, 2006. *Ecology from individuals to ecosystems*. 4ed. Oxford: Blackwell Publishing.
- Esbérard, C. E. L. & Bergallo, H. G. 2004. Aspectos sobre a biologia de *Tonatia bidens* (Spix) no Estado do Rio de Janeiro, sudeste do Brasil (Mammalia, Chiroptera, Phyllostomatidae). *Revista Brasileira de Zoologia*. Curitiba, v.21, n.2, p.253 - 259.
- Emmosn, L. H. & Feer, F. 1999. *Neotropical Rainforest Mammals, a field guide*. 2 ed. London: University of Chicago Press.
- Gardner, A. L. 1977. Feeding habits. In: Baker, R. J.; Jones JR., J. K.; Carter, D. C. (Eds.). *Biology of the bats of the New World family Phyllostomatidae. Special Publications Museum Texas Tech University*. v.13, Lubbock: p.293 - 350.
- Goodwin, G.G. & Greenhall, A. 1961. A review of the bats of Trinidad and Tobago: descriptions, rabies infection and ecology. *Bulletin of the American Museum of Natural History*. New York:, v.122, n.3, p.187 - 302.
- Gregorin, R. & Taddei, V. A. 2002. Chave artificial para determinação de monossídeos brasileiros (Mammalia: Chiroptera). *Mastozoologia Neotropical*. Mendoza: v.9, n.1, p.13 - 32.
- Husson, A. M. 1962. The bats of Suriname. *Zoologische Verhandelingen*. Leiden:, n.58, p.1 - 282.
- Jones Jr., J. K. & Carter, D. C. 1976. Annotated checklist with keys to subfamilies and genera. In: Baker, R. J.; Jones Jr., J. K.; Carter, D. C. (eds.). *Biology of bats of the New World family Phyllostomatidae. Part I. Special publication Museum Texas Tech University*. Lubbock: v.10, p.7 - 38.
- Koopman, K. V. 1994. *Chiroptera: systematics. Handbook of Zoology, VII (Mammalia)*. Berlin and New York: Walter de Gruyter, , 217p.
- Marstucelli, P. 1995. Avian predation by the round-eared bat (*Tonatia bidens*, Phyllostomatidae) in the Brazilian Atlantic Forest. *Journal of Tropical Ecology*. v.11, p.461 - 464.
- Nogueira, M. R. *et al.*, 2007. Subfamília Phyllostominae. In: Reis, N. R. *et al.*, (eds.). *Morcegos do Brasil*. Londrina: p.61. 97.

- Nowak, R. M. 1999.** *Walker's Mammals of the World*. v.1, 6 ed. Baltimore and London: The John Hopkins University Press, 836p.
- Oprea, M. 2006.** Bat predation by *Phyllostomus hastatus*. Chiroptera neotropical. Brasília: v.12, n.1 jul., p.255 - 258.
- Ricklefs, R. E. 2003.** *A economia da natureza*. 5ed. Rio de Janeiro: Editora Guanabara Koogan.
- Reid, F. A. 1997.** *A Field guide to the mammals of Central America and southeast Mexico*. New York: Oxford University Press. 334p.
- Reis, N. R. & Schubart, H. O. R. 1979.** Notas preliminares sobre os morcegos do Parque Nacional da Amazônia (Médio Tapajós). *Acta Amazonica*. v.9, n.3, p.507 - 515.
- Reis et al., 1993.** Quirópteros de Londrina, Paraná, Brasil. (Mammalia, Chiroptera). *Revista Brasileira de Zoologia*. Curitiba: v.10, n.3, p.371 - 381.
- Santos, M. et al., 2003.** *Phyllostomus hastatus*. *Mammalian species*. v.722, p. 1 - 6.
- Silva, S. S. P. & Peracchi, A. L. 1995.** Observação da visita de morcegos (Chiroptera) as flores de *Pseudobombax grandifolium*. *Revista Brasileira de Zoologia*. v.12, p.859 - 865.
- Simmons, N. B. & Voss, R.S. 1998.** The mammals of Paracou, French Guiana: a neotropical lowland rainforest fauna part 1. Bats. *Bulletin of the American Museum of Natural History*. v.237. New York: p.1 - 219.
- Taddei, V. A. 1975.** Phyllostomidae (Chiroptera) do Norte - Ocidental do Estado de São Paulo. I - Phyllostominae. *Ciência e Cultura*. v.27, n.6. São Paulo: p.621 - 632.
- Vieira, C. O. C. 1942.** Ensaio monográfico sobre os quirópteros do Brasil. *Arquivos de Zoologia do Estado de São Paulo* 3. v.8, p.1 - 471.
- Vizzoto, L. D. & Taddei, V. A. 1973.** Chave para determinação de quirópteros brasileiros. *Revista da Faculdade de Filosofia Ciências e letras São José do Rio Preto-Boletim de Ciências*. São José do Rio Preto: p.1 - 72.