

Table 2. Cranial and forearm (FA) measurements (in mm) of two specimens of *Platyrrhinus aurarius* from Guyana and the holotype* from Venezuela as reported by Handley & Ferris (1972). Specimens are deposited at the Royal Ontario Museum (ROM), the British Natural History Museum (BM), and United States National Museum of Natural History (USNM). Cranial measurement abbreviations: GLS, greatest length of skull; CIL, condylo-incisive length; ZB, zygomatic breadth; MB, mastoid breadth; POB, post-orbital breadth; MTR, maxillary toothrow length; M²-M², width across upper molars.

Specimen	GLS	CIL	ZB	MB	POB	MTR	M ² -M ²	FA
ROM 108220	28.2	25.8	16.4	13.8	6.5	11.1	12.7	52
BM 80.744	30.0	26.2	17.2	13.8	6.6	11.0	13.0	—
*USNM 387163	28.6	—	17.1	—	6.6	10.9	—	52.3

NOTES ON THE NATURAL HISTORY OF *PHYLLOPS FALCATUS* (GRAY, 1839) (PHYLLOSTOMIDAE: STENODERMATINAE) IN CUBA

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The genus *Phyllops* is endemic of the Greater Antilles. Jones and Baker (1976) and Hall (1981) considered the genus to be polytypic, with two species, *Phyllops falcatus* endemic to Cuba and *P. haitiensis* endemic to Hispaniola. Koopman (1989) grouped the two species, making *P. haitiensis* a subspecies of *P. falcatus*. Relative to other bats found in the West Indies, which have some degree of threatened status (IUCN 1996), little is known about the basic biology and natural history of *Phyllops falcatus*. So far, the greatest amount of information gathered on the biology of this species is in Silva Taboada (1979); however, there is insufficient data there. The objective of this paper is to contribute to the knowledge on the basic natural history of *Phyllops falcatus* populations found in Cuba.

The greater part of the data was collected in six field expeditions, carried out in the Biosphere Reserve of Sierra del Rosario (BRSR) in western Cuba, from 1995 to 1999. In addition to, occasional field expedition made in the following regions: western Cuba (Bosque de La Habana), central Cuba (Archipiélago Sabana Camagüey), and eastern Cuba (National Park Alejandro de Humboldt).

Bats were captured using mist nets, placed at ground level. The nets were open from 18:00 to 24:00 hours. For each individual the following data was recorded:

sex, reproductive condition (pregnant or lactating females), and when possible, the mass, forearm length, wingspan and third and fifth digit length was recorded. Length of third and fifth digit was measured from wrist to the tip of the digit. Most animals were captured and released; however, a few specimens were deposited in the Mammal Collection at the Instituto de Ecología y Sistemática.

Phyllops falcatus presents a wide distribution in Cuba, including some keys of the Archipelago as Coco and Paredón Grande, both of them located north of central Cuba. Before to this study this species had not been reported alive in the central region of Cuba. This data also show remarkable habitat diversity for populations of *P. falcatus*. Specimens were captured in evergreen, submontane, pine, semideciduous, and secondary forests: including the Bosque de La Habana, an "urban forest". The altitude record is 680 m above sea level in a pine grove of *Pinus cubensis* in the National Park Alejandro de Humboldt. To date, no specimens have been collected on the Isla de la Juventud, but this can be an artifact of inadequate survey of the island.

On three occasions, fecal samples were collected from *Phyllops falcatus* from a total of 16 captured individuals in the BRSR. Two samples contained seeds of *Cecropia scheberiana* and the other sample contained indeterminate vegetable matter and insects. One individual was captured while carrying fruit from the plant *Syzygium jambos*. This data is the first recorded of food habits for this species in Cuba.

We captured a total of 12 individuals in evergreen forest of BRSR, 83% were females. Similar data were obtained by Klingener *et al.* (1978) in several localities from southwestern of Haiti. This data may indicate the ability for males of this species to form harems, which is a character exhibited by other stenodermatines such as *Artibeus jamaicensis* (Kunz *et al.* 1983). This data is different from sex ratios

Table 1. Selected measurements of adult individuals of *Phyllops falcatus* collected in the Biosphere Reserve Sierra del Rosario (mean and range).

	Males (n=10)	Females (n=11)
Mass (g)	19.50 [16-24.5]	22.31 [16-25.5]
Forearm length (mm)*	42.96 [42.2-43.5]	45.35 [43.2-46.8]
Wingspan (mm)	320 [307-331]	326.25 [305-347]
Third digit length (mm)*	81.60 [79.1-86.2]	91.62 [86-98.2]
Fifth digit length (mm)*	61.72 [59.5-64.6]	66.75 [58.3-68.6]
Tibial length (mm)	19.11 [16-24.5]	18.73 [17.1-20]

* Statistically significant differences obtained by a t-test.

obtained by Silva Taboada (1979), who reported sex ratios of 1:1 from mist net in forest habitats.

Reproductive activity (as determined by percentages of pregnant and lactating females) peaked at the end of the dry season (April) and beginning of the wet season (May) in the BRSR. Peaks in fruit biomass could determine this. Of five females collected in April, four were lactating, and of nine females analyzed in May, four were pregnant and one was lactating. Two females collected in May, in a pine grove in eastern Cuba were pregnant. Silva Taboada (1979) reported pregnant females in February, March, and December (one each month). This data is evidence of a wide variation in reproductive cycle of this species; Klingener *et al.* (1978) observed the same for *Phyllops f. haitiensis* from Hispaniola.

The highest level of nocturnal activity was noted from 21:00 to 23:00 hours. Of a total of 31 individuals captured in different localities in Cuba, 61.3 % were captured during this time, although individuals were captured at all hours of the night. Silva Taboada (1979) characterized this species as vespertine, however we caught only one specimen before sunset.

Sexual dimorphism in *P. falcatus* is noteworthy, with females exhibiting the greater average sizes in all characters examined except tibial length. There are significant differences ($p < 0.05$) in the length of the forearm, third and fifth digit. These differences, particularly those relating to wing morphology, may be related to maternal care. The average body mass value for both sexes, of *P. falcatus* populations in BRSR, was larger than the average value given by Silva Taboada (1979) for this species in Cuba. Previously Silva Taboada (1979) and Klingener *et al.* (1978) observed a marked secondary sexual dimorphism in this species.

In Cuba, *Phyllops falcatus* is apparently a foliage roosting bat. The species seems to exhibit limited aggregation, with groups ranging from 3 to a maximum of 5 individuals (Silva Taboada, 1979). This behavior could be the reason behind the status,

rare in collections, given by Silva Taboada (1979). Chamizo Lara and Rodríguez Schettino (1998) placed the species in the Endangered status, among the threatened species in the Cuban Archipelago; although they did not adequately explain why.

P. falcatus is captured with frequency throughout Cuba, and the skulls are often found in the pellets of the Common Barn Owl, *Tyto alba* (this was noted by Silva Taboada, 1979). *P. falcatus* could be considered a common species in night captures within both Biosphere Reserve of the Sierra del Rosario and National Park Alejandro de Humboldt (Mancina, 1999). Its abundance in these localities is exceeded only by other phyllostomids. In southern Haiti, *Phyllops* is the second most abundant species while *Artibeus jamaicensis* is the first (Klingener *et al.*, 1978). It also has a wide distribution in Cuba and it is present in different habitats. Based on this data, we think that the threatened status for this species should be determined more carefully. On the other hand we know that the loss and fragmentation of natural habitat in Cuba due to agricultural development may be affecting population numbers and densities of this species. In order to understand the biology and population dynamics of *P. falcatus*, over both spatial and temporal scales, longer-term studies are needed. These studies will help to better determine the threatened status of this species in Cuba.

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ROUND-EARED-BAT (*TONATIA BIDENS*) IN CAPTIVITY (CHIROPTERA: PHYLLOSTOMIDAE)

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Only a few species of bats are maintained at zoos for public exhibition, principally frugivorous species. In Brazil only the RIOZOO Foundation maintains an enclosure with a group of fruit bats (*Artibeus lituratus* and *Artibeus fimbriatus*) since 1988, using reversed photoperiod regime. Starting in August of 1997 we opted in trying to maintain other less known species, among these the Round-Eared-Bat (*Tonatia bidens*) still in facilities off-exhibit using normal photoperiod.

This species is found in borders of forests in the east and southeast of Brazil, where it captures its preys; insects and birds (Martuscelli, 1995). It forms harems composed by one male and up to a dozen females and

their young. They refuge in caves, hollows of trees and abandoned constructions. The animals used in this procedure were captured at five different places in the State of Rio de Janeiro: Morro São João (Casemiro de Abreu), Estação Ecológica Paraíso (Magé), Reserva Ecológica Rio das Pedras (Mangaratiba), Parque Lage (Rio de Janeiro) and Parque Nacional da Tijuca (Rio de Janeiro).

Bats were captured in mist nets placed near the feeding roosts identified for the remains of prey found on the floor. The animals were transported in individual cloth bags and housed separately in small cages (0.4 x 0.4 x 0.4 m) at least for a month. During the night capture they were supplemented with glucose solution and fed insects. From 1997 to 1998 we caught 24 *Tonatia bidens*, 50% of which survived to their first year in captivity and seven are still living in our facilities, two years after the capture. Among the captured animals was a pregnant female that took her gestation to term 29 days after capture isolated in a cage. The newborn lived 17 days and measured 35.00 mm forearm, cranial length 21.10 mm and tibia length 15.05 mm and weighed 8.0 g when it was 16 days old.

Males maintained together showed cannibalism. After 1-3 months of observation the animals were housed in small groups composed by 1 male and 2-4 females or only females. We use wire cages, with 1,0 x 0,5 x 0,5 m, dimensions that allow shorts flights.

The animals were initially fed with fragments of young mice that were gradually substituted by recently dead adult mice. Although rodents are not confirmed to be part of the diet in natural conditions we know these bats capture and ingest other small mammals (bats), birds and amphibians through the analysis of remains in the feeding roost. Furthermore, the bats readily accepted the dead mice, which allowed for the success of this procedure. Eventually we offered captured insects (Order Orthoptera, Lepidoptera and Blattaria) offered live or frozen, frozen shrimp and dried Amphipods (TetraReptomin - Gammarus, Tetra™) for variation. We offered daily for each animal 60% to 130% of its weight. Today we use canned food for cats (Whiskas™). We noticed in the second semester of 1998, 18 months after the capture, that the animals started losing fur and we began to complement the cat food with vitamins and more recently with insect flour Cedé™, which solved the problem. We force a day of fasting per week to avoid obesity.

We noticed that when maintained in small groups they could share the same prey, a behavior that should also happen in natural conditions, because this species uses the same feeding roost for ingestion of the captured