In a previous study, I compared the morphology of the noseleaves of phyllostomid bats using multivariate analysis of seven measurements (Arita, 1990). The comparison showed that nectarivorous species (Glossophaginae and Brachyphyllinae) and hematophagous bats (Desmodontinae) possess noseleaves that are distinctively different from those of the frugivores (Stenodermatinae) and the insectivores and omnivores (Phyllostominae). To allow comparisons, herein I use the traditional classification of Phyllostomidae, not the one proposed by Baker et al. (1989). The previous study suggested a correlation between noseleaf morphology and diet among phyllostomines and stenodermatines, but was unable to discriminate the two groups on the basis of the measurements of their noseleaves. In this study, I use Fourier analysis to compare the outline shape of the noseleaves of several phyllostomid bats.

METHODS

I used the figures of bat faces in Goodwin and Greenhall (1961) to draw the outlines of the noseleaves of nine phyllostomines and seven stenodermatines; I also included one carolliine (*Carollia perspicillata*) as an outside point of comparison. All stenodermatines included are frugivores; among the phyllostomines are strict insectivores, omnivores, and insectivore-carnivores.

The basic data set for a Fourier analysis is a series of radii measured from a constant "center" at equally spaced angles. I used as reference the middle point between the two nostrils. Phyllostomids use their noseleaves to direct the echolocation signals that are emitted from the nostrils (Fenton, 1985; Hartley and Suthers, 1987), so using the nostrils as reference point to measure distances to the margins of the noseleaf seems a reasonable choice. I measured 36 radii at 10-degree intervals (0 to 360 degrees) using as starting radius the sagital line from the reference point to the tip of the noseleaf. Fourier equations are series of sine and cosine elements of the form:

$$r(\theta) = \bar{r} + \sum_{i\,1}^{\infty} (a_i \cos i\theta + b_i \, sen i\theta) \qquad \text{Eq.(1)}$$

where $\mathbf{r}\,(\theta)$ is the radius at angle θ, $\bar{\mathbf{r}}$ is the mean radius, and $\mathbf{a}_i$ and $\mathbf{b}_i$ are parameters that fit the equation to the data. For symmetric objects, the sine elements vanish, and the equation simplifies to:

$$r(\theta) = \sum_{i=1}^{\infty} c_i \backslash cos i\,\theta \qquad \text{Eq. (2)}$$

where the $\mathbf{c}_i$ are the parameters of the equation.