DESCRIPTION OF NOSELEAVES OF PHYLLOSTOMID BATS USING FOURIER ANALYSIS

HECTOR T. ARITA

Centro de Ecología, Universidad Nacional Autónoma de México, Apartado Postal 70-275, México, D. F. 04510, MEXICO. (Correo electrónico: harita@miranda.ecologia.unam.mx).

ABSTRACT.- The outline shape of noseleaves of Phyllostomid bats is described using Fourier analysis. Line drawings of the noseleaves of nine phyllostomines, seven stenodermatines, and one carolliinae were used to calculate the parameters of a simplified Fourier equation fitted using a multiple-regression model. The outline of noseleaves can be reconstructed by plotting the corresponding Fourier equations. Noseleaves of phyllostomines and stenodermatines were compared using the coefficients of the Fourier equations and no significant difference was detected, although some species such as *Lonchorhina aurita* were clearly outliers.

RESUMEN.- Se utilizó el análisis de Fourier para describir la forma de las hojas nasales de los murciélagos filostómidos. Se usaron dibujos del contorno de las hojas nasales de nueve filostominos, siete estenodermatinos y un carolino para calcular los parámetros de una ecuación de Fourier simplificada ajustada por un modelo de regresión múltiple. El contorno de las hojas nasales puede reconstruirse graficando las ecuaciones de Fourier correspondientes. Se compararon las hojas nasales de los filostominos y de los estenodermatinos usando los coeficientes de Fourier y no se detectó ninguna diferencia significativa, a pesar de que algunas especies, como *Lonchorhina aurita,* se salieron totalmente del patrón general.

Key words: Chiroptera, Phyllostomidae, Neotropical fauna, noseleaves morphology.

INTRODUCTION

Fourier analysis is a method of describing the shape of a curve using a mathematical formula that consists of a series of sine and cosine terms. This technique, and the related elliptic Fourier analysis, have been used to describe the outlines of several biological objects, including ostracodes (Kaesler and Waters, 1972), bryozoans (Anstey and Delmet, 1972), hominoid femurs (Lestrel et al., 1977), leaves (Kincaid and Schneider, 1983), protozoans (Roberts et al., 1983), mosquito wings (Rohlf and Archie, 1984), and mussel shells (Ferson et al., 1985). The analysis of biological shape using Fourier series has been criticized on the basis of alleged lack of objectivity (Bookstein et al., 1982), but as discussed by Ehrlich et al. (1983), no method of quantifying shape is infallible, and Fourier series can be valid estimators of shape if the technique is properly used.