Abstract

Statistical Time Series Analysis of a Howler Monkey Population

by

Gretchen Erika Stockmayer

Master of Arts in Statistics

University of California, Berkeley

Professor David Brillinger, Chair

This paper presents a data analysis of measurements of the howler monkey population of Barro Colorado Island, Republic of Panama, in order to ascertain whether this population is changing over time in terms of its size, age distribution, adult sex ratio, or fertility indicators. While the analysis does find changes in some population parameters from year to year and across seasons, for other parameters it was not always possible to separate long-term from seasonal variation. Overall, population size and characteristics seem to fluctuate around a long-term central tendency. This supports the hypothesis that this population is at an equilibrium size and structure, raising the possibility that a density-dependent mechanism may be preventing population growth. Given the picture of a long-term equilibrium found in the statistical analysis, observed age distributions are compared with those from a theoretical stationary population. The comparison suggests that the mortality schedule for howler monkeys is very severe, with a maximum of 14% of infants reaching adulthood, and with a large portion of mortality concentrated at the time of transition from infant to juvenile. It is possible that the mortality estimates arising from the analysis are faulty, however, if age and sex identification of some monkeys suffers from consistent errors.

Professor David Brillinger
Thesis Committee Chair