

Statistical Methods for Field and Laboratory Studies in Behavioral Ecology provides the reader with an explanation of how statistical methods may be used to make sense of behavioral ecology and other types of data. The text is fairly self-contained, in that it presents fundamental concepts in statistical inference as well as intermediate topics such as multiple least squares regression and ANOVA. However, advanced methods not contained in a first applied statistics course, including multivariate methods such as clustering, survival analysis, time series modeling, and machine learning methods such as neural networks and Bayesian model averaging, are included. The goal is for the reader to be able to recognize situations arising in behavioral ecology research, where various statistical methods should be used, understand the strengths and limitations of those methods, and learn how these methods are implemented in R code. Examples are based on research described in the literature of behavioral ecology, with data sets (generated via simulation) and analysis code provided. Chapters have three basic sections:

- General Ideas – the basic description of methods and the situations in which the methods are applied;
- Examples with R Code – demonstrate how the methods described can be computed;
- Theoretical Aspects – some mathematical background, hopefully just enough to understand how the methods work and the assumptions required for those methods;

A final chapter titled “When Things Go Wrong” describes some possible problems that can occur in experimentation, such as errors in randomization and missing data, and how to compensate for those problems.

It is assumed the reader has had a first statistics course, and is familiar with the R language. Although familiarity with some elementary calculus would be helpful, it is not absolutely necessary. Similarly, familiarity with some basic matrix algebra would be good, although an Appendix describes all of the matrix manipulations required to understand the various statistical methods described in the text.

 **CRC Press**
Taylor & Francis Group
an informa business
www.crcpress.com

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