

Preface

This book is aimed at exposing statistical techniques which are very essential to understand research work in the Biological, Agricultural, and Health Sciences. Other disciplines may also find the book useful. This book is born out of my teaching Experimental, field experimentation, and Biostatistics courses at various universities in the United States and Nigeria. The book has also benefited from lecture notes during my graduate program at the University of Reading, Berkshire, UK.

The book covers the basic aspects of statistics, such as data description, probability, sampling distributions, estimation, and hypotheses testing. These topics are covered in Chaps. 1 to 5. Regression analysis and analysis of categorical data are covered in Chaps. 7 and 8 respectively. Chapter 6 covers an introduction to analysis of variance. Here, students are first introduced to treatment comparison methods as well as multiple comparison procedures. This chapter also introduces students to the concepts of contrasts and orthogonality. Chapter 9 introduces students to the principles of experimental design, while Chap. 10 covers the completely randomized design including more coverage on contrast and multiple comparisons as well as the analysis of experiments designed with quantitative levels. Chapter 11 covers the randomized complete block design, including discussion on group balanced block design while Chap. 12 covers Latin square designs as well as cross-over designs. Several examples are introduced in this chapter. This chapter also covers materials relating to multiple Latin squares.

Chapter 13 covers the analysis of covariance in both the completely randomized design (CRD), and the randomized complete block design (RCBD). Chapter 14 introduces students to simple factorial designs in both 2^n and 3^2 designs. The concept of confounding and partial confounding is similarly introduced in this chapter. Resolutions III and IV designs are also introduced in this chapter. The split plot design is introduced in Chap. 15. Also introduced here are the strip-plot and the split-split plot designs with examples. Incomplete block and lattice designs are introduced in Chap. 16. Quantal-bioassay and the logistic regression are introduced in Chap. 17 including the probit

model. The repeated measures design for single and two-factor models is introduced in Chap. 18. Chapter 19 introduces students to survival analysis. Here, the concept of censoring and estimating survival functions is discussed. Hazard and proportional hazard models are similarly discussed. Chapter 20 discusses combined analysis of experiments over time, season, and sites.

Several different examples are presented in the text to illustrate the diversity of the various models. All examples in this text have been analyzed using MINITAB version 16. These examples have therefore been accompanied with their corresponding MINITAB codes embedded in the text. The examples have also been analyzed with R programs, and these are made available at the Springer site which is dedicated to this text. We have presented partial outputs arising from the use of MINITAB 16. To facilitate data entry, many of the data sets for examples and exercises are provided on the book's website (<http://extra.springer.com>). The example data files are contained in the folder DATAFILES and are presented chapter by chapter. All R program codes for analyzing the examples in the text are contained as ASCII files in RCODES folder. Partial outputs generated from the R programs are contained in the Routput.pdf. This also contains the necessary information on all the examples.

The book is intended for use in undergraduate courses in Agricultural Sciences, Nursing and Health Sciences as well as in Biological Sciences.

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