

Gardiner, W. P.: **Statistics for the Biosciences. Data Analysis Using Minitab Software.** - Prentice Hall, London - New York - Toronto - Sydney - Tokyo - Singapore - Madrid - Mexico City - Munich - Paris 1997. 416 pp. US \$ 35.95. ISBN 0-13-447582-8.

Statistics is a distinct science, the participation of which is desirable in any kind of experimental research. During the last century, statistics has been progressively used in biological sciences. While some 2 decades ago and earlier, the most tedious task for experimental botanists applying statistical analyses to their experimental data was the computation itself, the wide availability of statistical software packages and personal computers enabled to pay attention predominantly to the correct choice and explanation of the appropriate statistical procedure. At present, the knowledge of principles of statistics, of their application in the planned or realized experiment, and of the correct interpretation of results is by far more important than the computation itself. The author of the reviewed book (Department of Mathematics, Glasgow Caledonian University, U.K.) wrote it in order to "develop student's appreciation and understanding of statistical usage within the biosciences and to equip them with the ability to apply statistical methods and reasoning as an integral aspect of analysis and interpretation of experimental data" (from the Preface). Chapter 1 is devoted to "Introduction to statistical principles in the biosciences" (pp. 1 to 21). Chapter 2 describes "Data analysis principles for analysing biological data" (22 to 47). Chapter 3 deals with "Introduction to hypothesis testing for simple biological experiments" (48 to 111). "Non-parametric methods for simple biological experiments" (112 to 143) are described in Chapter 4 and Chapter 5 is entitled "One factor design structures for biological experimentation" (144 to 201). "Factorial design structures for biological experimentation" (202 to 244) and "Regression modelling methods in the biosciences" (245 to 298) are titles of Chapter 6 and 7, respectively. Chapter 8 is devoted to "Applications of linear regression specific to laboratory experimentation" (299 to 320) and the final Chapter 9 contains "Introduction to the application of multivariate methods in the biosciences" (321 to 357). The next Appendix A describes "Statistical formulae" (358 to 363) and Appendix B "Statistical tables" (364 to 380). The book ends with a list of References, Further reading, Answers to selected problems and an Index. The book both explains principles of statistics in biosciences and illustrates them with many examples described in detail. Each chapter starts with a Chapter summary. The main text explains the principles and immediately presents realistic examples taken from various fields of biosciences. Many boxes describing either terms and definitions or important features of the analysed experiment have been inserted into the text. At the end of each chapter, Problems are included in the form of experimental results and suggested statistical analysis related to the chapter's topic. Hence, the book could be used either to revise or acquire information of statistical procedures or as an example protocol for directly carrying out the computation with one's own data. The diversity of examples is such that one is able to find the appropriate experimental design for most experiment types carried out in biosciences.

There is another special feature of the book. "All aspects of data analysis are illustrated through the use of output from the statistical software package Minitab". Basic information is provided as to how to enter the data into Minitab as well as detailed menu command operation for the appropriate analysis. This description enormously facilitates the computation for anybody familiar with Minitab. On the other hand, its usefulness is less obvious for those who do not use or do not want to learn Minitab.

The book will bring little information to a researcher in statistics. However, it seems to me that the majority of both students and researchers in experimental botany have quite a limited knowledge of statistics. A clear description of principles and many realistic examples make the book desirable for all who need introduction to this science or simply look for formulae and the instructions for their use with his or her own data.

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