
“The bread and butter of an ecologist’s life” is what the authors call multidimensional data on community composition, populations, and the environment. Separate inspection of a variable’s properties is not appropriate in most cases. Instead, multidimensionality needs to be taken into account. The book’s goal is to provide guidelines for how this can be done using the statistical software package CANOCO.

The book is structured into a preface and ten chapters, followed by seven case studies with various applications of the techniques described in the earlier chapters. In the Appendix, among other information, the authors give a web site where data used in the various chapters and case studies can be downloaded.

In the first three chapters, some basic aspects of the methodology are introduced, including various experimental designs for data collection and how data have to be formatted or treated and manipulated for use in the program package CANOCO. In the third chapter on gradient analysis, ordination diagrams are given. Those readers who have not been exposed to this kind of data analysis or visualization of results will have some difficulty following the background and operational aspects of this analysis. Although the authors do refer the reader to Chapter 10 for more complete explanations, some readers may decide to gain a closer background from an environmental statistics book or other sources before continuing at this point.

The special features of statistical tools applicable with this package become apparent: distribution of nonquantitative variables, such as plant species, and their distribution along other environmental quantitative and qualitative variables can be analyzed.

In Chapter 4 the CANOCO program package for Windows is introduced. Examples of flow charts that should guide the reader and user through some specific analyses are given. Typical Windows message boxes are displayed in the book to show where and which specific program options should be checked.

In Chapter 5, the use of constrained ordination and permutation tests with this package are described. Spatial and temporal constraints of data are discussed; however, spatial and temporal autocorrelations of observations are not considered, which is unusual for readers experienced in spatial or temporal analysis in vadose zone data sets. A promising feature of the analysis is that the relatedness of samples does not have to be assumed to be uniform across an entire data set.

Similarity measures, being especially relevant for detecting genetic similarity, are described in Chapter 6. How can data be classified? To answer this question, examples of different clustering techniques are presented in Chapter 7. Besides the CANOCO package, additional software is necessary to apply these algorithms.

The use of different regression model techniques is described in Chapter 8. Classification and regression tree analyses are introduced. It appears difficult to find a justification for fitting a second-order polynomial model to a rather random species distribution, such as the one given in Fig. 8–6. The same arbitrariness has apparently been applied to fit models in other examples given in this chapter.

The authors apply advanced use of ordination in Chapter 9. Visualization of multivariate data in Chapter 10 might have been better presented in an earlier chapter of this book, together with a more thorough explanation that a visual inspection of observations is an important basis for making a decision on further statistical analysis. In the following case studies, examples of investigations are described that are based on random sampling designs.

In accordance with its title, the way this book is written allows one to use it as an in-depth handbook or manual for the computer package CANOCO rather than a source from which the reader not experienced in this kind of data analysis can gain basic conceptual ideas of why to prefer these techniques and to use this software package instead of others. With the numerous figures displaying program messages and check boxes for alternative options and program settings, as well as the instructions on which keystroke the user has to press, the book is a manual for users who have already gained theoretical background in the methodology. The reader should therefore not expect theoretical explanations and equations that underlie the calculations.

The book is helpful for users interested in analyses of distributions of qualitative variables. Via the software package CANOCO, the authors provide access to a set of “bread and butter”. Besides the technologies presented in this book, other approaches exist and are widely used, especially in landscape ecological research based on georeferenced sampling and data analysis, spatial covariance, and regionalized variable theory. These approaches considering spatial correlations are not the focus of applying CANOCO. Anyway, it remains to the individual researcher’s interest which kind of “salt” he or she wants to add to the “bread and butter”.

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