Measuring Biological Diversity

Anne E. Magurran
Contents

Preface vii

Chapter 1 Introduction: measurement of (biological) diversity 1
What has changed in the last 15 years? 4
Biodiversity, biological diversity, and ecological diversity 6
What this book is about . . . 9
. . . and what it is not about 10
Assumptions of biodiversity measurement 11
Spatial scale and biodiversity measurement 12
Plan of the book 15
Summary 17

Chapter 2 The commonness, and rarity, of species 18
Methods of plotting species abundance data 21
Species abundance models 27
Statistical models 28
Goodness of fit tests 43
Biological (or theoretical) models 45
Other approaches 58
Fitting niche apportionment models to empirical data 61
General recommendations on investigating patterns of species abundance 64
Rarity 66
Summary 71
## Contents

### Chapter 3  How many species?  
Measures of species richness  
Surrogates of species  
How many species are there on earth?  
Summary

### Chapter 4  An index of diversity . . .
Diversity measures  
"Parametric" measures of diversity  
"Nonparametric" measures of diversity  
Taxonomic diversity  
Functional diversity  
Body size and biological diversity  
Summary

### Chapter 5  Comparative studies of diversity
Sampling matters  
Comparison of communities  
Diversity measures and environmental assessment  
Summary

### Chapter 6  Diversity in space (and time)
Measuring $\beta$ diversity  
Estimating the true number of shared species  
$\beta$ diversity and scale: practical implications  
Comparing communities  
Turnover in time  
Summary

### Chapter 7  No prospect of an end
Some challenges  
The biodiversity toolkit  
Conclusion

References  
Worked examples  
Index