

'come away from such courses believing that statistics is a difficult subject of little practical use'. While I would wholeheartedly agree that it is both useful and important to teach statistical approaches that go beyond the assumption of normality, standard regression and ANOVA do form both a historical and conceptual starting point for understanding the wider family of Generalized Linear Models and I see it as entirely appropriate to teach standard methods first and then generalize (a structure also taken by a number of recent textbooks, e.g. Crawley, 1993, 2002; Quinn & Keough, 2002). Therefore, it is 'usual' to discuss the normal distribution and standard regression before mentioning non-normally distributed data, such as binomially distributed proportions or Poisson-distributed count data and the associated logistic and log-linear analyses. In massive contrast, Lindsey introduces logistic analyses between pp. 65 and 79, the binomial distribution (assumed by logistic analyses) on p. 168 and standard analyses on p. 233! Lindsey's overall rationale (p. 291) is to emphasize the principles of statistical modelling. While this is entirely laudable, it is not made impossible by the more usual sequence of subject matter (e.g. Crawley, 1993).

Despite my major concerns regarding the prevalence of equations and the unusual sequence in which topics are presented, there were things about this book that I liked. When reading a statistics book one never knows what tip or new perspective one is going to encounter, and there are lots of handy one-liners scattered throughout this one. For me, the most useful sections were the discussion of model selection criteria (e.g. significance tests vs. the Akaike information criterion) and the chapter on probability distributions (despite the mathematics).

In summary, I am very pleased to have this book on my shelf for reference, but I will not be using it as a means either to deliver or to structure my teaching.

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- Reaching for the skies: rainforest entomology aims high**
- Basset, Y., Novotny, V., Miller S.E. & Kitchen, R.L. (eds) (2003) *Arthropods of tropical forests: spatio-temporal dynamics and resource use in the canopy*. Cambridge University Press, Cambridge, UK. xvi + 474 pp., figs, tables, line diagrams, halftones, index. Hardback: price £75.00, US \$110.00. ISBN 0521820006.
- For too long, rain forest ecologists were grounded on *terra firma*, unable to access the dizzy heights of the space above ground and unaware of the riches that dwelt there. Vertebrate biologists could stare up and gauge mammal activity, but for anything smaller study above ground was problematic. Like deep-sea oceanographers stuck in the top few meters of water, rain forest entomologists could only guess at how little they really knew. Then came the scientists brave enough to climb into the canopy on ropes, followed by the walkways, canopy cranes, rafts and other innovative canopy-access techniques. The boom in canopy studies started in the seventies, but only now is the subject reaching maturity, and reaching a stage when past work can be consolidated and the future looked to with a perspective born of experience and a growing confidence.
- One of the major criticisms of this branch of ecology in the past has been that there has been too little 'hard science' – too little replication, too much description and too little process-led analysis, and 'naïve' discussion threads that have led down intellectual cul-de-sacs (e.g. the 'How many species are there' exercise of the 1980s and 1990s). As with any new branch of science, initial work has to be largely descriptive – until

you know what you're dealing with, it's difficult to go much deeper. Earlier seminal books, such as *Canopy arthropods* (Stork *et al.*, 1997), were limited to cataloguing the current knowledge of the subject, reviewing methods of canopy access, and attempting to standardize sampling methods and ways of analysing data. *Arthropods of tropical forests* attempts to take the discussion one stage further, by providing a framework to hang existing studies on and then providing a synthesis from which the 'big ideas' can emerge. The subject has to show it is contributing to growing areas of ecological theory, by studying ecosystem function, addressing questions of species generation and evolution, and investigating life-history patterns.

The book is based on papers presented at the 21st International Congress of Entomology held in Brazil in August 2000. It succeeds in bringing together leading authorities in tropical entomology, and has been rigorously put together by editors who have a clear vision of where the subject needs to go in the future. The volume is divided into five sections: an introduction that includes current themes of research, three sections on case studies divided into broad themes (stratification studies, temporal patterns and resource use), and a synthesis section where interpretable patterns are summarized. Many chapters could have appeared in any section (some 'shoe-horning' is evident), but sections are a useful way of establishing a framework for future studies and giving structure and narrative to the volume. Each section brings together studies from different biogeographical regions (although Africa is poorly represented) in an effort to overcome problems of replication within individual studies and to see whether community patterns hold up at different geographical locations. Individual chapters are largely descriptive and highlight patterns rather than processes, although some chapters do address the determinants of species' assemblages (e.g. chapters by Didham & Springate; Floren & Linsenmair; Odegaard). There are several excellent chapters on life-history strategies (e.g. Barrios; Janzen; chapters by the editors) which show the possibilities for better understanding of population dynamics, and the concomitant benefit of such 'bottom-up' studies in terms of the ability of canopy scientists to pose increasingly complex questions. Although there are some chapters on disturbance, more on the effect of habitat loss on species diversity and ecosystem function would have been useful,

as knowledge of canopy arthropods will be essential in predicting the effects of forest disturbance and fragmentation. It is in the chapters by the editors (seven of the 35) that real progress is made in pulling together the main themes of the volume, and in moving the discussion towards processes and ecosystem function, e.g. the use of phylogenetic approaches to understand evolutionary processes, and how the underlying processes that connect insect assemblages to plant hosts can be studied (e.g. Kitchen, Hurley & Thalib). It is in these author-led chapters that the 'hard science' emerges.

Just like an emerging understorey seedling suddenly exposed to the sunlight, seeking the illumination that growing towards the sky will give it, so also is canopy entomology now starting to see the funda-

mental contribution it can make to the big issues in ecology and conservation. Rain forest entomology is in the difficult position of still being in its infancy in terms of discovering 'what's out there', whilst having to prove itself as a hard science so as to attain recognition and funding. This book succeeds in demonstrating how relevant a subject it is to the study of a range of broader issues. Without the canopy, rain forests cannot be understood, and without the arthropods the rain forests cannot begin to be comprehended – this book gives the blueprint for how rain forest arthropods can be studied and used to address the big biological questions. Indeed, the editors and contributing authors put forward a very persuasive argument that *only* by looking at such diverse and complex assemblages can

ecological theory be progressed – this and the blueprint for future work are the key contributions made by this comprehensive and pivotal volume.

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