African Queens and their Kin. A Darwinian Odyssey, D.A.S. Smith. Brambleby Books, UK, India, Spain (2014). 811 pp.+80 colour plates (Hardback), ISBN: 978-1908241-153

Charles Darwin and Homer's Odyssey: how big seems the contrast and how appetizing is the title! The author of this opus is a renewed world expert of butterflies who spent extended periods in Africa (e.g. Tanzania) where, for more than 40 years, he studied African butterflies in detail, focussing on the taxonomically difficult Danainae which include genetically diverging lineages, supposedly young speciations, and a lot of interesting biological phenomena such as mimicry and migration.

The book is well structured and divided into 14 chapters: (1) Introduction; (2) Life histories of Danainae (here called 'Danaans' instead of danaines as one would have expected); (3) Who's Who of the genus *Danaus* within the Danainae, with a classification and phylogeny (integrative with DNA data); (4) 'Nature's tablet' with information on the inheritance of wing colour and pattern; (5) 'Daughters of Danaus' on 'all female families'; (6) 'Sons of Aegyptus' on male-killing bacteria; (7) mate choice and sexual selection; (8) 'Illicit liaisons and the Wallace effect' dealing also with hybridization and 'semispecies'; (9) 'The rank-scented many' on Pyrrolizidine alcaloids (PA) and Cardenolide glycosides with excurses into chemistry, pharmacology and toxicology (and the amazing fact that males sucking plant toxins make them attractive to females); (10) Mimikry types with explanations of functionality and genetics; (11) 'The Diademe' (*Hypolimnas misippus*); (12) 'The Queen's Diadem'; (13) 'Allies and auxiliaries', mainly on Müllerian mimicry and (14) Epilogue, with information on DNA clocks and phylogeny with several hypotheses. The monograph is concluded by several comprehensive glossaries (on host plants, pathogens, parasites, predators, nectar sources, PA sources, morphological, biochemical, colour and gene characters, etc.) and three indexes (geography, subject and taxonomy).

The reader will enjoy the large number of instructive black-and-white illustrations and tables. The colour figures are concentrated in the centre of the book which is not really user-friendly, but compensated by the large number (80!) of plates showing the butterflies in nature and collections (the latter not always in the very best quality), habitats, maps, host plants, immature stages, Danainae on stamps, and – somewhat unusual – one photo of the author "eyeballing a gorilla skeleton".

In chapter 12, the author revises erroneous statements in a Letter to *Nature* that he previously published and states that "the anecdote of a flawed Letter to *Nature* emphasizes the inestimable value of long-term, patient work in ecological and evolutionary studies." The book is a brilliant example for that. Whoever expects a 'traditional' identification guide with some fragmentary information on systematics,

biogeography and synecology is completely wrong. There is MUCH more. Indeed, the book presents a firework of fascinating observations and facts on evolution, showing that a simplistic understanding of evolution (isolation, mutation, selection, dichotomous speciation) does not reflect and explain everything. The author investigates hybrid zones, different genetic lineages all over Africa, and includes all behavioural, phenotypic, genetic, biochemical etc. aspects of his study organisms, leading to a comprehensive, holistic view as we may not have it for any other (taxonomically difficult) Lepidopteran genus at the moment.

The author loves to 'play with the language', to use metaphors and analogisms, and to draw parallels to human history (e.g. when naming hypotheses after the discoverers of the New World, when citing bible, Roman philosophers) which makes the reading of the book amazing and entertaining. The book is targeted at academics but will surely fascinate everybody who is deeply interested in the biology of butterflies. I can warmly recommend it.

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Ecological Statistics: Contemporary Theory and Application, G.A. Fox, S. Negrete-Yankelevich, V.J. Sosa (Eds.). Oxford University Press, Oxford, UK (2015). 389+xv pp., Price: €47.00 (paperback), ISBN: 978-0-199-67254-7

The analysis of ecological data is particularly difficult, compared to many other natural sciences, because data sets are small, observations are missing, experimental designs are complicated, predictors are correlated, response variables are strangely distributed and so forth. Introductory classes in statistics nowadays provide a good grasp of the *simple* cases, but not of the typical, dirty ones. And, to date, there was no book that would comprehensively cover the next step, still building on GLMs but addressing the real-world complications we encounter. *Ecological Statistics* is an attempt to provide such a text, and in my opinion a very good one!

The book aims at graduates, PhD researchers, Postdocs, anyone with a basic understanding of statistics. It provides theoretical background and real-world examples to teach more advanced topics. To make full use of this book, one has to work through each chapter of interest, and there is no shortcut.

Ecological Statistics has roughly three parts. The first one is more theoretical-conceptual, covering concepts such as

how to obtain knowledge through statistics, explain maximum likelihood and critically reviewing what we actually get from different experimental designs. The second part contains chapters on where real-world analyses deviate from text-book examples: missing data, censoring and model selection. The third and longest part presents specific techniques relevant for the advanced parametric analysis stage: structural equation modelling, meta-analysis, spatial regression, phylogenetic analyses, and mixed effect models. Worth highlighting are also the two chapters on issues largely unknown to ecologists: instrumental variables and mixture models. This is not the place to explain them, but here is a teaser: instrumental variables are widely used in medicine and sociology and are an alternative way to make causal inference with observational data. Mixture models allow the response data to be derived from several distributions *at the same time*, opening the door to zero-inflation analyses and alike. (Regrettably, this chapter focusses entirely on zero-inflation, while mixture models are useful also for other problems, e.g. dynamics of temporally overlapping populations, abundance estimates in multispecies assemblages, etc.)

The editors managed to recruit world-class authors for the different chapters (to drop a few names: M.A. McCarthy, S.A. Richards, Y.M. Buckley, B.E. Kendall, J.B. Grace, S.M. Scheiner, J. Gurevitch, J.R. Rhodes and B.M. Bolker). While I do not agree with every statement in every chapter, I find the quality of this book surprisingly and consistently high. It is an editorial achievement to maintain the right balance between theory and application, between example and abstract, between tricks and fundamentals, between generics and R-specifics. Clearly, some authors did not like to follow this overall balance, in particular the SEM chapter is short on critical theory and long on examples, and occasionally I felt the writers were didactically simplifying the theory a bit

too much. But then the chapters on missing data (by Shinichi Nakagawa) and on censoring/truncation (by Gordon Fox) are so illuminating and beyond the scope of traditional text books that they alone easily make up for any glitch in the book.

What this book does not deliver, and does not intend to, are ecology-specific statistics, such as capture-recapture analyses, population models or any of the richness-estimation analyses. I agree with the editors that the content is more generic than that, and it will help address also many topics beyond those covered by delivering understanding. With over 400 pages the book is already long, so adding more material is not indicated. If so, I would have liked to see coverage of time series (ideally linked to population dynamics) and the inevitable culmination when stirring multiple topics into a single porridge: (Bayesian) hierarchical models. The book's main contender, *A Primer in Ecological Statistics* by Gotelli and Ellison (2013, Sinauer), is more comprehensive and includes these subjects, but lacks the self-contained style of *Ecological Statistics* that makes the book valuable for people interested in a specific topic only.

This book is ideal course material for an advanced statistics course at MSc or PhD level. It takes weeks to go through it, but when we did, it led to many Eureka!-moments. *Ecological Statistics* can be largely read (and understood) on its own, and the online material (regrettably wrongly referenced throughout the book) with data and occasionally messy R-code help to apply the content to one's own data.

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