

in the fields of epidemiology, ecology, veterinary science and microbiology. This brainstorming, collaborative format is a major strength and a great example of how to develop a new discipline. The book builds on the proceedings of a 1981 Dahlem workshop and meeting at Cambridge in 1993. However, it is much more than a follow up. The editors had the vision to understand what is needed to take this field to the next level. Rather than delve more deeply into the minutiae of mathematical models, they bring us real case studies, identify key questions and suggest future work that will expand our understanding. They pepper the text with boxed case studies – each a gem of synopsis that explains a key concept (e.g. evolution of virulence, metapopulation theory and disease) or describes a model system or epidemic (e.g. louping ill or phocine distemper). These draw the reader into a text that gently and intelligently explains the mechanics and implications of these systems.

The Ecology of Wildlife Diseases is essential reading for all ecologists and evolutionary biologists. It is the perfect portal into a field that explains a key factor in the dynamics of all the populations that we study. For epidemiologists already versed in the field, it is an invaluable state-of-the-art update that is bound to broaden the mind. Finally, for Bryan Grenfell's cat, which makes its debut in the introduction, this book is a posthumous honor that will make the creature proud.

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A perspective on the 'species problem'

Genes, Categories and Species

by Jody Hey. Oxford University Press, 2001.
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Since 1985, the number of named species of amphibians in the world increased by 35%. Is that fact interesting or important? Jody Hey questions the value of such counts in this idiosyncratic book, and

worries about species, both as concepts and as categories. He accepts that there are 'real species', entities that approximate 'evolutionary groups', but he doubts that most named species qualify as 'real'. Hey, an evolutionary geneticist, endorses as 'real species' something approximating classic biological species, a concept that is operational for experimental geneticists but problematic for many systematists. There is a 'species problem', Hey believes, and he starts at the beginning – with the most basic issues of cognition, categorization and the human condition. Early in the book, he sets the tone: 'For some reason, the common knowledge that nature is not made up of objective, distinct species has not prevented biologists from using species counts as their main index of biological diversity'. This idea recurs, in several different forms, throughout *Genes, Categories and Species*.

How readers react will depend on previous experience. For me, much of the book is 'déjà vu', but I have long taught an advanced evolution course that features intensive analysis of species, including diverse concepts, criteria, processes of species formation and pattern. Furthermore, many (but not all) of the issues raised by Hey have been tackled by others, notably Hull and Ghiselin, whose contributions are given little attention here.

Hey focuses on the mismatch between categorization and conceptualization. We describe and recognize species taxonomically, but Hey believes these often

are only an approximation of 'real species'. To design a perfect species concept is futile, and the core of the species problem is '... a very strong wish to have our categories match up with real evolutionary groups, and a failure to appreciate that that cannot happen'. But what are 'real species' and 'evolutionary groups'? They are close to synonyms for Hey – a group of DNA replicators and the organisms generated by them that share a history of common descent. Such groups can be created by a beneficial mutation in the DNA that causes them, and they can be localized in space and time. Their function in the environment can be replaced by the descendants of other organisms within the group. The group is the arena of evolution.

Is it rational to try to describe all of the species that exist and will it matter anyway? Hey argues that biodiversity conservation should focus on larger rather than smaller groups, so he thinks it might be better to have larger species. But this conflicts with his desire that species be 'real'. Most species are structured genetically and few are truly cohesive – their common ancestry being responsible for the impression of 'cohesion'. Systematists are mainly interested in lineages and most would favor using lineages, at some hierarchical level, as biodiversity units. Contrary to Hey's belief that nominalism no longer exists, it is becoming more common among systematists, and this, coupled with strong phylogenetic perspectives, is leading to major changes in how systematists function. Although Hey endorses phylogenetic taxonomy, he does not go far enough. If he were more lineage oriented, I believe that he, too, would become more of a nominalist and perhaps give up his insistence that species be 'real'.

Reactions of readers to this unusual book will vary greatly. I found it repetitive, and erratically written and edited. Yet, it is thoughtful and analytical. Hey's fears of misuse of species have some foundation, but he is overwrought. We have a lot of history and intellectual baggage to overcome in dealing with 'the species problem', and I am not convinced that Hey has hastened that process.

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