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Holding hands

Do Species Exist? Principles of Taxonomic Classification. Werner Kunz, 2012, Wiley–Blackwell. 280 pp. £65 (hardback). ISBN 978-3-527-33207-6. <http://wiley.com>



Coyne (1992: 290) famously described debates about species concepts as “like barnacles on a whale, their main effect is to retard slightly the progress of the field”. Nevertheless, following the prediction that Coyne made in the same paper, the

discussions have continued although the degree of angst about the topic varies rather among fields. Most evolutionary biologists are currently relaxed about species definitions, an attitude exemplified by Coyne and Orr (2004: 30) whose view is that species are characterised by “substantial but not necessarily complete reproductive isolation”. Personally, I find this rather unsatisfactory because it allows each scientist to draw a different boundary. Ecologists, including biogeographers, seem even less concerned about the nature of species, even though they continue to describe and analyse diversity in terms of species richness or patterns of species abundance and distribution. Taxonomists, one might argue, are those with the greatest need for a clearly articulated species concept. They are also the group where the most active disagreements have occurred in recent years (e.g., Wheeler and Meier 2000) and they are the target audience for Kunz’s book.

My wife was concerned that I might have an existential crisis if I read this book and found the answer to be ‘No’. Fortunately, Kunz supports the reality of species. His main point is that the species as a unit is defined by reproductive relationships, actual or potential, among individuals and not by character states or by genealogical relationships. Character states may vary among individuals within species, may change over time and may be shared by individuals of different species. They may diverge as a result of reproductive barriers and so they may be indicators of species status but they cannot define species. Genealogical rela-

tionships are unhelpful because bifurcating ancestor–descendant relationships do not exist within species. Kunz uses a nice analogy to illustrate the relational nature of species: he imagines children in a playground holding hands. Groups can be defined by the relational property of hand-holding and these groups might be quite independent of character states, connecting boys and girls or those with red or blue dresses. A more dynamic version would involve a dance in which hands are held only briefly and partners are exchanged: groups may still be defined, like the sets in a country dance.

This position is not new (Ghiselin 1997). Few evolutionary biologists would question this view of species, but it is problematic for taxonomists. The key difficulty is that relationships cannot easily be observed (and the ‘potential’ relationships on which this species concept relies cannot be observed at all). Thus taxonomists have to rely on traits. Surprisingly, Kunz spends many words, actually rather repetitively, arguing that trait-based species definitions are flawed, without offering taxonomists a practical way forward. He does not discuss the idea that taxonomic species can be considered as hypotheses concerning the ‘true’ species (e.g., Hey et al. 2003). Yet this seems to me to be a useful way forward.

Each individual can only have an actual reproductive relationship with a small number of other individuals. Even its potential relationships are limited in space and time. This means that species are held together by chains of relationships that spread over time and space and this is, to my mind, where the most difficult problems of delimitation are to be found. This is also the domain of the biogeographer. Kunz is comfortable with the idea that a species can be distributed over a wide geographical area and can vary extensively in phenotype and ecology, provided that the chain of potential reproductive relationships is intact. However, he considers a break in this chain that is due to a gap in the distribution to be

equivalent to a break for any other reason. This is problematic because very distinct populations may be considered conspecific, while very similar but allopatric populations must be considered different species. This is another practical problem arising from Kunz's conceptual position for which he does not offer a way forward. In fact, distributional breaks are often temporary. Given that the relationships that define species have to be viewed over long time scales, this seems to me to undermine the argument that allopatric populations should be considered separate species. However, this does not help with the practical delimitation problem.

There are some interesting ideas in this book but also some 'barnacles'. While biogeographers should be paying attention to the species problem, this analysis is not aimed at their needs. Hey's (2001) treatment may still be a more instructive read.

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