

The multidisciplinary nature of biogeography

Malte C. Ebach

Received 2 April 2015, accepted 25 June 2015, published online 13 November 2015

Having been appointed as an Associate Editor for *Australian Systematic Botany* and given the task to specialise in the area of biogeography, I wish to discuss a slight alteration to the journal scope and guidelines and discuss some of the new, exciting directions for the journal. My hope is that in expanding into biogeography, we offer both a wider scope and articles of interest to our existing readership. Before revealing this new direction I wish examine the multidisciplinary role of biogeography.

Biogeography *n.* The branch of biology that deals with the geographical distribution of plants and animals. Also: the characteristics of an area or organism in this respect. [Oxford English Dictionary 2015]

Biogeography is a truly multidisciplinary science, one that incorporates the theories, methods and aims from a variety of very different fields (Morrone 2009; Wen *et al.* 2013; Haris Saslis-Lagoudakis *et al.* 2014; Ebach 2015). For instance taxonomists, ecologists and geographers have introduced separate aims, classification systems and methods that deal with increasing understanding of different aspects of algal, fungal, plant, bacterial and animal distributions. In doing so, these fields have contributed different approaches allowing us to view biogeography diagrammatically as an overlapping research program comprising many fields, rather than as a field in its own right (Fig. 1).

The multidisciplinary nature of biogeography is being undermined by calls for its unity or integration, something that started in the late 19th century. In 1891, German geographer Friedrich Ratzel, one of the first people to use the term biogeography, called for a unification of plant and animal geography within the larger discipline of geography,

It is the duty of geography to go ahead and summarise and create a biogeography that shares a single common principle, to study the distribution of life on Earth. [Ratzel 1891, p. xxiv]

Today the same calls are made by ecologists, conservation biologists, molecular geneticists and evolutionary biologists hoping to integrate biogeography into their own fields, for example:

We see a need for a new research program to explain large-scale biogeographical patterns in a combined ecological and phylogenetic framework. [Wiens and Donoghue 2004, p. 643]

Much progress is needed to merge these two arenas [vicariance and dispersal] into a more unified, molecular-based historical biogeography. [Riddle *et al.* 2008, p. 178]

As ecologists begin to invoke historical/biogeographic processes to reconcile different patterns within and among regions [...] they will hasten the unification of ecology and biogeography. [Ricklefs and Jenkins 2011, p. 2441]

Progress in understanding large-scale biogeographic patterns will be made by carefully integrating niche modeling with biogeographic approaches [Wen *et al.* 2013 p. 917]

Biogeography does not need to be integrated into other fields, thereby excluding some aims and methods in favour of

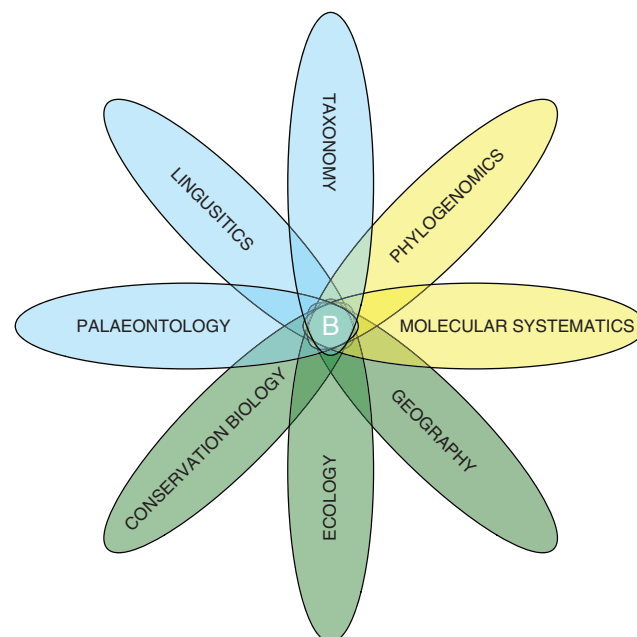


Fig. 1. The biogeographical 'flower' (modified from Morrone 2009, p. 8, fig. 2.1). The geographical distribution of organisms, taxa and their areas is studied in an array of scientific disciplines. This figure illustrates the multidisciplinary nature of biogeography (denoted by a white 'B') and the diversity of its progenitor disciplines. Each discipline contributes their own methods, data and analyses to the multidisciplinary research program of 'biogeography'.

others. Rather a multidisciplinary biogeography celebrates existing and new, diverse research programs without the need to integrate. Accepting multidisciplinary biogeography as a new direction, we invite a wide range of diverse and at times conflicting aims and viewpoints and hope to provide a platform to showcase them equally.

Journal guidelines for biogeography manuscripts

As Associate Editor for Biogeography, I welcome a wide range of approaches as well as discussion papers offering different opinions and including studies that use phylogenies, cladograms, areagrams or tracks of single or multiple taxa. This also includes systematic treatments of biotic areas within an area taxonomy or bioregionalisation that may not include phylogenetic information. I strongly encourage authors revising or proposing new area names to use the *International Code of Area Nomenclature* (Ebach *et al.* 2008; and Morrone 2015 for examples in *Australian Systematic Botany*). Systematic monographic treatments with biogeographical components are also welcome.

We also welcome relevant points-of-view (perspective) papers as well as book reviews on biogeographical treatments, methods, theory and history (see Heads 2014a, 2014b for an example in *Australian Systematic Botany*). Any article that receives a published response will be entitled to a reply, ensuring all sides are heard within the same volume of *Australian Systematic Botany*.

A multidisciplinary biogeography reflects our vastly different disciplines, and as Associate Editor I am committed to ensuring that the all viewpoints are heard and the aims and methods of our readers and authors are treated with dignity and respect.

Dr Malte C. Ebach is a Senior Lecturer at UNSW Australia and Research Associate at the Australian Museum, Sydney

References

- Ebach MC (2015) 'Origins of Biogeography: the Role of Biological Classification in Early Plant and Animal Geography.' (Springer: Dordrecht, Netherlands)
- Ebach MC, Morrone J, Parenti L, Vilorio A (2008) International code of area nomenclature. *Journal of Biogeography* **35**, 1153–1157. doi:[10.1111/j.1365-2699.2008.01920.x](https://doi.org/10.1111/j.1365-2699.2008.01920.x)
- Haris Saslis-Lagoudakis C, Cowman PF, Cardillo M, Catullo RA, Rosauer DF, Warren DL (2014) Biogeography: multidisciplinary approaches in space and time. *Frontiers of Biogeography* **6**, 61–62.
- Heads M (2014a) [2015] Biogeography by revelation: investigating a world shaped by miracles. *Australian Systematic Botany* **27**(4), 282–304. doi:[10.1071/SB14038](https://doi.org/10.1071/SB14038)
- Heads M (2014b) [2015] Panbiogeography, its critics, and the case of the ratite birds. *Australian Systematic Botany* **27**(4), 241–256. doi:[10.1071/SB14027](https://doi.org/10.1071/SB14027)
- Morrone JJ (2009) 'Evolutionary Biogeography: an Integrative Approach with Case Studies.' (Columbia University Press: New York)
- Morrone JJ (2015) Biogeographical regionalisation of the world: a reappraisal. *Australian Systematic Botany* **28**, 81–90. doi:[10.1071/SB14042](https://doi.org/10.1071/SB14042)
- Oxford English Dictionary (2015) biogeography, *n.* In 'OED Online'. (Oxford University Press) Available at <http://www.oed.com/view/Entry/19209?redirectedFrom=biogeography> [Verified 25 March 2015]
- Ratzel F (1891) 'Anthropogeographie', vol. 2. (Engelhorn: Stuttgart).
- Ricklefs RE, Jenkins DG (2011) Biogeography and ecology: towards the integration of two disciplines. *Philosophical Transactions of the Royal Society of London – B. Biological Sciences* **366**, 2438–2448. doi:[10.1098/rstb.2011.0066](https://doi.org/10.1098/rstb.2011.0066)
- Riddle BR, Dawson MN, Hadly EA, Hafner DJ, Hickerson MJ, Mantooth SJ, Yoder AD (2008) The role of molecular genetics in sculpting the future of integrative biogeography. *Progress in Physical Geography* **32**, 173–202. doi:[10.1177/0309133308093822](https://doi.org/10.1177/0309133308093822)
- Wen J, Ree RH, Ickert-Bond SM, Nie Z, Funk V (2013) Biogeography: where do we go from here? *Taxon* **62**, 912–927. doi:[10.12705/625.15](https://doi.org/10.12705/625.15)
- Wiens JJ, Donoghue MJ (2004) Historical biogeography, ecology and species richness. *Trends in Ecology & Evolution* **19**, 639–644. doi:[10.1016/j.tree.2004.09.011](https://doi.org/10.1016/j.tree.2004.09.011)