

## symposium summary

## Towards new directions and collaborations in macroecology

6<sup>th</sup> Annual Meeting of the Specialist Group for Macroecology of the Ecological Society of Germany, Austria and Switzerland (GfÖ) – Frankfurt am Main, Germany, 29<sup>th</sup> February–3<sup>rd</sup> May 2012

This year, Katrin Böhning-Gaese's group (Biodiversity and Climate Research Center, BiK-F), with support from the Senckenberg Gesellschaft für Naturforschung and the Ecological Society of Germany, Austria and Switzerland (GfÖ) hosted the annual meeting of the Macroecology Specialist Group. Over 100 people attended the conference and participated in a full schedule of events including stimulating talks and posters (6 keynotes, 24 contributed talks, 18 posters), a lively panel discussions on publication in ecology and reflections of the keynote speakers on the novelty of the conference and future research directions in macroecology<sup>1</sup>.

The conference opened with a warm welcome from Katrin Böhning-Gaese who set the stage for the meeting with an inspiring overview of macroecology research at the BiK-F. This presentation was followed by Carsten Rahbek who challenged the audience to “think big” and take on long-unresolved challenges in macroecology by embracing new tools (i.e., genomics, ancient DNA), gathering more empirical data and extending collaboration among research labs and different types of scientists. (Macro) ecologists should not be too modest in composing large research projects!

The major themes of the conference included: macroecological patterns and their underlying causes; niches, distributions, communities and phylogenies under global change; advances in modelling, which included both theoretical and statistical approaches aimed at including more biological realism in models; and extinctions, conservation and new frontiers. Macroecological topics ranged from consideration of ecologically mediated diversity limits when evaluating diversification rates (Yael Kisel) to quantification of spatial and environmental effects

of beta diversity in China's woody plants (Zhiheng Wang), and evaluation of the biogeographic patterns/hypotheses of thermal melanism in European dragonflies (Dirk Zeuss).

Presentations and posters under the themes of niches, distribution, communities and phylogenies under global change extended current state-of-the-art attempts to integrate these multiple types of data to address big questions in macroecology and biogeography. For instance, Sébastien Lavergne evaluated whether past rates of niche evolution influenced current demographic trends in European birds; Rafael Wüest explored how species pool definition influences inference about mechanisms (i.e., environmental filtering or biotic interactions) that structure assemblage composition; Dieter Thomas Tietze presented a poster evaluating different mechanisms causing variation in diversity gradients in Himalayan birds; and Sarah Whitmee teased apart phylogenetic relatedness and geographic location to evaluate patterns of range filling in mammals.

Advances in modelling included elegant examples of new process-based Bayesian models (Florian Hartig), models integrating statistical and mechanistic models (Oliver Schweiger), combining multiple interacting species, speciation and demography (Juliano Sarmiento Cabral and Miguel B. Araújo) as well as macroecological simulation studies that explored what patterns emerge when specific ecological and evolutionary processes are considered (David Orme). Finally, broad-scale process-based dynamic global vegetation models (DGVMs) were presented by Thomas Hickler who drew comparisons between these ecophysiological and macroecological models and called for further integration of the two approaches.

The last overarching topic (extinctions,

<sup>1</sup> See program abstracts for complete details: [http://www.bik-f.de/files/veranstaltungen/gfoe\\_macroecology/homepage\\_program\\_full.pdf](http://www.bik-f.de/files/veranstaltungen/gfoe_macroecology/homepage_program_full.pdf)

conservation and new frontiers) included talks about the loss of cryptic genetic diversity with climate change (Steffen Pauls), past population trends (and extinctions) estimated from ancient genetics (David Nogués-Bravo) and a call for a macroecological approach to study ecotoxicology (Mikhail Beketov).

Beside the scientific topics the hosts organized a rather unusual but therefore highly welcomed panel discussion about current problems within the publication circus. The podium was represented by editors-in-chief, associate editors and editors from a variety of journals. Topics such as how to acknowledge the labour-intensive reviewer and editor work ("reviewer crisis"), the future of (non-) open-access publishing, methods to acknowledge author contributions on multi-authored papers (an issue that has become more common with increased collaboration), and H-factors and impact factors (and other such metrics) were heatedly discussed (discussion continued afterwards at the nicely situated conference dinner). It was evident that the issues raised are alarming and need a larger platform for discussion and solutions among researchers as well as publishers.

The major themes that emerged from the talks and the discussions included the need for more interdisciplinary research and the realization that the macroecological approach can be usefully combined with a growing number of disciplines and types of data from a variety of spatial and temporal scales. This conclusion was partly prompted by presentations and discussions of fields that have had limited interaction with macroecology including: ecophysiological modelling of past vegetation, ecotoxicology, phenotypic plasticity and microevolution. All felt that exciting new frontiers lay at the intersection of disparate disciplines and new collaborations among these disciplines should be fostered.

Additionally, the sophistication of new types of models to address questions in macroecology was inspiring and prompted a loud and persistent call for more empirical data. Such data are not only necessary to parameterize models but are required to address unanswered questions in macroecology and biogeography. Further, it became clear that more collaboration among those gathering data and those using them is sorely needed. Finally, there was a call to stay relevant and use our science to address the on-going biodiversity crisis.

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