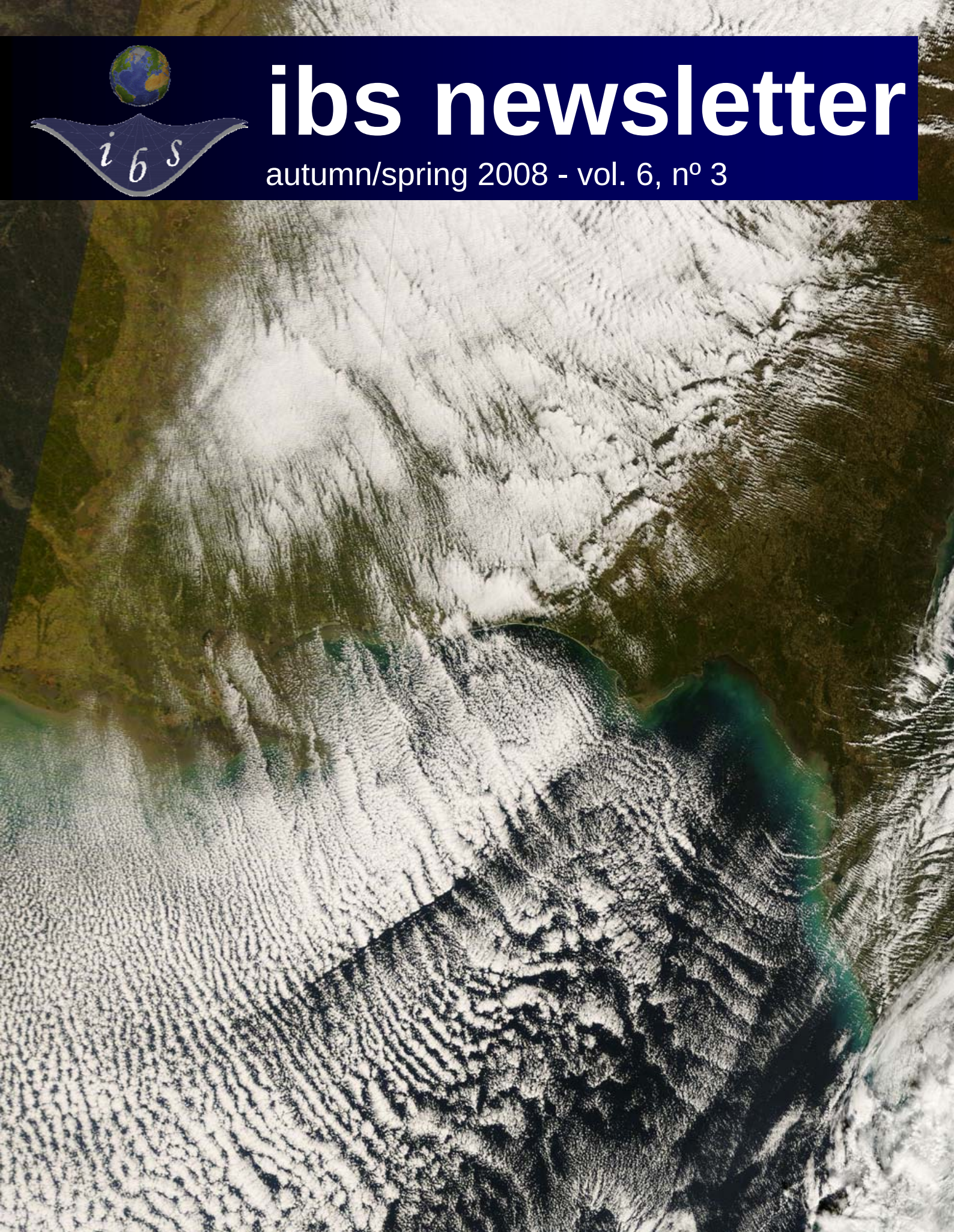
ibs newsletter

autumn/spring 2008 - vol. 6, nº 3



published by the **International Biogeography Society**, an international and interdisciplinary society contributing to the advancement of all studies of the geography of nature

The International Biogeography Society

Autumn/Spring 2008 Newsletter - Vol 6, No. 3

Produced by the Committee for Publications

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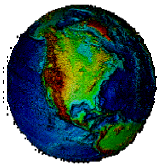

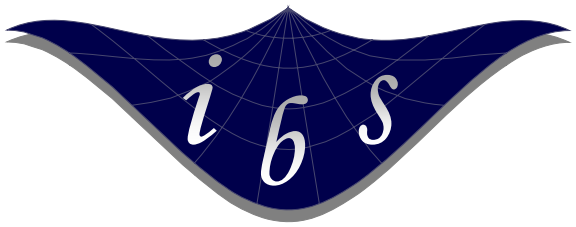

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Letter from the president

Dear Biogeographers:

The International Biogeography Society is "moving into high gear" to get ready for the 4th IBS meeting in January of 2009 in Merida, Mexico. For more information you can check our new website (http://www.biogeography.org/). Please note that the registration fee is reasonable and includes lunch and the banquet.

We have four ½-day symposia planned: 1) Patterns & Processes in Biotic Exchange, 2) The Biogeography of Disease, 3) Asian & American Disjuncts, and 4) The Biogeography of Extinction. Poster sessions are an important part of our meeting and we invite posters that cover all areas of biogeography. We also have three popular Workshops: Visualizing Evolution, Spatial Analysis, and Communicating Biogeography.

Check out the website for more information on all of these. And there are some exciting new developments to look for as well:

First I am pleased to announce that Carsten Rahbek and the board of the Nordic Ecological Society (NES; Ecography) have agreed to sponsor one of our symposia, "The Biogeography of Extinction". Having such sponsorship is critical to keeping the costs of the meeting reasonable. In addition, invited speakers for all symposia will be offered the opportunity to submit a paper to a special issue of Ecography. Collaboration between IBS and NES should help both societies. In addition, this idea fits in well with one of the current goals of IBS: seeking to broaden the awareness of our society and to increase collaboration with other likeminded societies and journals. I would like to thank Carsten Rahbek along with Miguel Araújo and Jack Williams for originating the proposal for potential sponsorship and to NES for approving it.

Second, for the first time the presentations in the symposia are of varying length and involve IBS members from different stages of their career.

Third, this meeting will have, also for the first time, ½ day of concurrent sessions of contributed (oral) short papers. Anyone submitting a poster abstract can ask that it be considered for one of these sessions; a committee has been set up to evaluate the submitted abstracts and select the ones that will be asked to present a short paper (15 min).

Fourth, IBS has been successful in acquiring funds that can be used to help support travel costs for students. Details of these awards and application material will be posted on the IBS website by October 1. Thanks to Jack Williams, George Stevens, Mike Dawson, and Dov Sax for their help with this effort.

Finally, there will be awards presented at the business meeting for the best posters. Our local host for the meeting is Ella Vazquez from UNAM, our Vice President for Conferences is Dave Hafner, and Lois Alexander is our web master: without a large commitment of time from all of these members this meeting would not be possible.

I will conclude by asking you to please consider sponsoring a graduate student so that we continue to attract the young members of our society to our meeting. I encourage you to register now; we are operating on a first come first served basis for all attendees and posters.

See you in Merida!

Vicki Funk, President of IBS

P.S. The link has been re-established and you may now access the journals on line again (thanks Rob and Lois)!

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IBS 2009 Biennial Meeting in Mérida, Yucatán, México

International Biogeography Society

Biennial Conference
Mérida, México – January 8-12, 2009

Invited Symposia and Speakers:

Biogeography of Extinction
(S. Andelman, J. Donlan, D. Erwin, K. Johnson, S. Pimm)

Patterns and Process in Biotic Transition Zones
(D. Hafner, J. Klicka, B. Riddle and others)

Biogeography of Disease
(K. Jones, C. Mundt, A. Pedersen and others)

Asian and American Disjunct Distributions
(I. Jimenez, R. Ree, S. Renner, B. Shapiro, J. Wen)

Keynote Address: John Avise

Contributed oral and poster sessions, work-shops and field trips

Check http://www.biogeography.org/html/Meetings/index.html to register and for updates on the conference



perspectives in biogeography

Hypothesis testing, curve fitting, and data mining in macroecology

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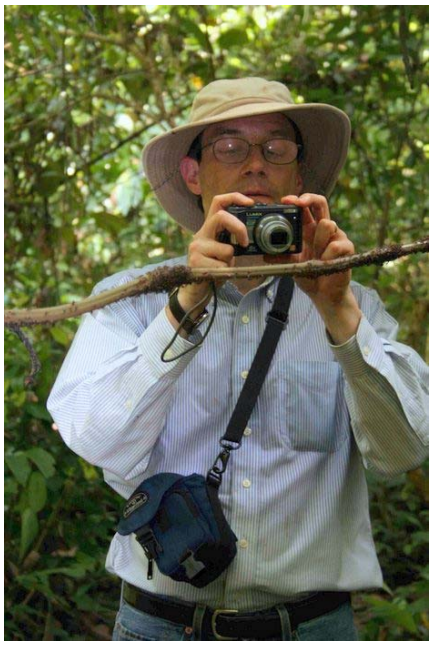
Changes in technology and methodology can have a big influence on how we do science. In this essay, I will discuss how new methods for the acquisition and analysis of data have affected biogeography and macroecology.

The underlying data used by macroecologists are geo-referenced specimen collections (GBIF 2008). For many decades, biogeographers explored the globe to collect and catalog these kinds of data (e.g. Darlington 1957). The numbers, usually counts of species or maps of geographic ranges, were plotted in simple graphs and used in support of narrative explanations and historical accounts of the patterns. Explicit hypothesis-testing was rare, although pioneering analyses of taxonomic diversity indices by C.B. Williams and other European ecologists (Järvinen 1982) foreshadowed the statistical perspective that would begin to dominate ecology and biogeography in the 1970s (Gotelli and Graves 1996).

Today, the widespread availability of compiled data sets on the internet means that young scientists can begin successful careers in macroecology without ever going in the field to collect data themselves. Of course, since most of the earth's biota has not even been described taxonomically (May 1995) – much less mapped biogeographically – there is still a great deal of primary data collecting to do. But even some of this activity may become automated, with the most promising avenue being the mapping of vegetation through the use of remote sensing and satellite imagery (Gillespie et al. 2008).

With less emphasis on data collection, more energy has gone into statistical analysis and interpretation. Sophisticated methods such as spatial regression analysis (Lichstein et al. 2002) have been used to compare patterns in multiple data sets and address long-standing



hypotheses about the origin and maintenance of the latitudinal gradient in species richness (Rohde 1992, Willig et al. 2003). An entire subdiscipline of bioclimatic niche modeling has emerged as macroecologists have used species occurrence data to predict how biotas will respond to global climate change (Elith et al. 2006).

In spite of this statistical sophistication, macroecologists still have not achieved a satisfactory understanding of global patterns of species diversity (Currie et al. 2004), nor have they developed trustworthy tools for forecasting future biotic change (Araújo and Rahbek 2006). In fact, the published conclusions still sound an awful lot like the narratives of the early biogeographers! But instead of making these arguments on the basis of simple species richness plots, macroecologists make them on the size of the *p*-values or the correlation coefficients from their regression models.

There are two related problems here, one with the hypotheses and the other with the statistical methods. For the most part, hypotheses in

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macroecology are just verbal descriptions of mechanisms ("higher productivity in the tropics allows for more biodiversity"). But since multiple explanations can generate the same qualitative patterns ("greater temperature stability in the tropics allows for more biodiversity"), we are not going to easily distinguish these mechanisms through qualitative assessment of correlations alone.

In this regard, I think the most important recent breakthrough in macroecology has been the development of metabolic theory (Allen et al. 2002). This theory, derived from first principles that do not depend in a circular way on existing data, predicts a quantitative relationship between temperature and biodiversity. Instead of just testing a null hypothesis of a slope of zero, we can now test whether observed slopes (with appropriate transformations) deviate from -0.65, the predicted value from the model (Hawkins et al. 2007). Controversy over the empirical support for metabolic theory (Hawkins et al. 2007, Gillooly and Allen 2007) should not obscure its importance: metabolic theory makes quantitative, not just qualitative, predictions and that is what we need right now in macroecology.

Theoreticians should step up to the plate and develop quantitative theories for other hypotheses in macroecology. As recently proposed by O'Brien (2006), the water-energy model may provide an emerging framework that will generate functional forms for water and energy variables derived from first principles of physiology and physical constraints imposed by the energetics of liquid water. For now, however, these models are either entirely verbal (Vetaas 2006), or they are derived from fitted regression functions that are specific to particular taxa, spatial scales, and continents (O'Brien 1998).

In addition to the development of new theory, we need to move beyond analytical methods that simply fit curves to data and test patterns against simple statistical null hypotheses. Some macroecologists are beginning to develop stochastic simulation models that include explicit algorithms for the origin, spread, and extinction of species in a bounded geographic domain (e.g. Storch et al. 2006, Rahbek et al. 2007, Rangel et al. 2007) These mechanistic simulation models (Grimm et al. 2005) have their roots in the mid-domain effect (Colwell and Lees 2000), a pleasingly simple explanation for species richness gradients that emerged from the random placement of contiguous species ranges in a bounded domain. This kind of modeling exercise raises its own challenges: how do we empirically estimate model parameters, and how do we explore the behavior of such a model over a potentially very large parameter space? But this simulation approach may allow macroecology to move beyond statistical correlations, and can serve as a nice complement to theoretical investigations. Simulation models may even provide quantitative predictions in cases where the mathematical models do not have a tractable analytic solution.

In a provocative essay in *Wired* magazine, Anderson (2008) speculates that one day traditional hypothesis testing will be unnecessary. Some data-mining enthusiasts believe that, with enough data, correlations will reveal mechanisms in comprehensive statistical models that encompass all possible data. I think the data miners are probably right. Exciting new work in computer science has led to very sophisticated "reverse-engineering" algorithms that have great promise for uncovering the functional form of relationships among correlated variables. These new iterative methods use data partitioning, automated probing, and snipping to sequentially modify and test underlying nonlinear functions with data-rich time series.

For example, Bongaard and Lipson (2007) successfully recovered the functional form of the movement of a pendulum using as input

the temporal series of spatial coordinates of a swinging pendulum. Their algorithm repeatedly "sampled" the data set from the most critical regions (where the pendulum was changing direction) and iteratively arrived successfully at the correct equations for motion.

Interestingly, the same methods were not so successful when applied to the famous ecological time series of snowshoe hare and Canadian lynx populations (Elton and Nicholson 1942). The algorithm did generate a pair of coupled differential equations (Bongaard and Lipson 2007). However, we know that the hare-lynx cycle is not caused entirely by coupled predator-prey interactions.

The problem, of course, is not the algorithm, but the limited data that it was fed. The time series of pelt records from the Hudson Bay Company does not reveal the critical observations of hare populations on islands in eastern Canada that cycle in the absence of the lynx (Keith 1963). The analysis also did not include time series on the secondary plant compounds in tundra vegetation, which accumulate under intense grazing and may be ultimately responsible for endogenous cycles of the hare (Keith 1983). And the model did not include time-series on snowpack depth or solar sunspot activity, both of which probably contribute to the regional synchrony of hare lynx cycles (Sinclair et al. 1993).

Without such "expert knowledge" it is easy to understand why the model failed. If those data inputs were provided, I think it is very likely the model would reveal the correct functional form of the relationships among hare, lynx, vegetation, and climate. But for now, the use of passive machine-learning algorithms applied to large data sets is an inefficient way to test hypotheses and make progress in macroecology. And given the pressing need to understand how biotas will respond to climate change, I am not sure we have the luxury of waiting for these comprehensive data sets to accumulate.

Nevertheless, the paradigm of machine learning seems to be the direction that much of the bioclimatic niche modeling research is going. If the goal of this research is to understand how biotas will shift in response to climate change, I think it is going to be much more fruitful if we combine it with an experimental approach. Experimental translocation of individuals beyond their current range boundaries (Hellmann et al. 2008) and experimental manipulations of abiotic variables to mimic effects of climate change on populations and communities (Harte and Shaw 1995, Suttle et al. 1997) are very powerful approaches. Experiments can provide realistic parameter estimates for bioclimatic niche models. Even simple models that are supported by experimental data will probably be more trustworthy than sophisticated models that are not.

In sum, the availability of large data bases, the emergence of quantitative predictive theories, and the development of new computational tools and simulation methods make this an exciting time to be studying macroecology. There are pressing applied problems of global climate change that we can address with these new tools and data. And along the way, perhaps we will even answer some unresolved questions in biogeography about species richness gradients.

Acknowledgements

This essay was inspired by the work of the Synthetic Macroecological Models of Species Diversity Working Group supported by the National Center for Ecological Analysis and Synthesis, a Center funded by NSF (Grant #DEB-0553768), the University of California, Santa Barbara, and the State of California.

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If you want to comment on this article go to http://biogeography.blogspot.com/2008/10/hypothesis-testing-curve-fitting-and.html

International Congress: ISLAND EVOLUTION 150 YEARS AFTER DARWIN

150 Years after Darwin's On the Origin of Species, island evolution is entering a new phase. By habitat fragmentation, we humans create more and more islands, while at the same time, by transporting species from their native biomes, we remove the dispersal barriers that kept habitats isolated.

To explore the implications of this new era of island evolution, the National Museum of Natural History in Leiden, together with the Darwin Center for Biogeology in Utrecht, will organise an international congress on "Evolutionary islands 150 years after Darwin", to be held 12 & 13 February 2009 at the Museum Naturalis Leiden, the Netherlands.

The meeting will bring together traditional students of island biotas, experimental/ theoretical community ecologists, and evolutionary biologists, to explore the role of island-biological processes in a world in which the "island processes" of isolation and dispersal are being drastically altered.

Registration closes on January 28th, 2009. Abstracts for posters (A1 format, 59.4 x 84.0 cm) should be submitted to Jeremy Miller (miller@naturalis.nl) before December 15th, 2008.

For more information, scientific programme and registration:
http://www.naturalis.nl/darwin2009

highlights from the literature

High-altitude small mammals of the North American Great Basin are not completely isolated

Source of article: Journal of Biogeography highlighted papers

The term "sky islands" sounds intriguing, but it may be more lyrical than useful when discussing mammal distributions, according to new research from Eric Waltari of the Sackler Institute of Comparative Genomics at the American Museum of Natural History and Robert Guralnick from the University of Colorado at Boulder. The team used an emerging technique, ecological niche modeling, to show that the populations of small mammals living on mountaintops in the Great Basin—on islands in the sky—are not as isolated as previously thought.

In the new paper published in the *Journal of Biogeography*, Waltari and Guralnick test the concept of geographic isolation on thirteen species of small mammals. The species chosen were mapped with current and past climate data to "backcast" the distribution of each species at the height of the last ice age 21,000 years ago. The predictions of the model are calibrated with known fossil records. Backcasting allows researchers to test whether species had different distributions in the past; the current study, for example, found that most of the species (12 of 13) lived at lower elevations 21,000 years ago and that the average distribution of each species was larger than it is now.

Determining the area that species inhabited in the past helps researchers understand current population distribution within the Great Basin and potential linkages between "sky islands." Many of the species in this study (9 of 13) had suitable habitat below their current range that could link different populations. This surprising result can be further tested with molecular research. Waltari and Guralnick also found that not all species were widespread across the basin 21,000 years ago, highlighting the idiosyncratic nature of species' responses to climate change.

"Niche modeling is a quick and straightforward approach to addressing problems that molecular data will eventually solve," says Waltari.

Great Basin National Park (Nevada).
Courtesy of the National Park Service.

Source paper: Waltari, E. & Guralnick, R.P. (2008) Ecological niche modelling of montane mammals in the Great Basin, North America: examining past and present connectivity of species across basins and ranges. Journal of Biogeography, doi: 10.1111/j.1365-2699.2008.01959.x

If you want to comment on this article go to http://biogeography.blogspot.com/2008/10/high-altitude-small-mammals-of-north.html

Editor's note: *IBS highlights from the literature publishes press releases on exciting papers in all fields of biogeography. If you have published, or are about to publish, a paper in biogeography and have prepared a press release in a widely accessible language, we are willing to consider its publication in the IBS Newsletter and Blog. Press releases of biogeographical papers must be sent to ibs@mncn.csic.es for consideration by two members of the IBS board or the editorial board of the IBS Newsletter. Comments about these press releases would be also considered, subjected to the same conditions.*

highlights from the literature

Racing cane toads reveals they get cold feet on Southern Australia invasion

Source of article: Press release at Blackwell Ecology

Cane toads weren't allowed to compete in the Olympics, but scientists have raced cane toads in the laboratory and calculated that they would not be able to invade Melbourne, Adelaide or Hobart and are unlikely to do well in Perth or Sydney, even with climate change.

According to research recently published in *Ecography* by Dr Michael Kearney, from the Department of Zoology at the University of Melbourne, and collaborators from Australia and the USA, the cane toad's march will grind to a halt once it is physically too cold for the toads to hop. "The cane toads cannot survive in much of Southern Australia because they would be too cold to move about and forage or spawn" said Dr Kearney. Their study is unique in that it is based on an understanding of the capabilities of the toad itself whereas many other studies – some predicting that Melbourne would be invaded by the toads – are based on correlations between climate and the places the toads are living at now, which can lead to errors.

Since their introduction to Australia in the 1930s, cane toads have been steadily advancing across Australia and have already invaded Brisbane and Darwin. Once used as pest control, the toads are now a devastating pest themselves so an accurate prediction of their final range and rate of movement is essential.

If there were a cane toad Olympics, all eyes would be on the weather: because they are cold-blooded, the toad's ability to move depends on its body temperature which fluctuates with its environment. Dr Kearney and his colleagues, including Dr. Ben Phillips from the University of Sydney and Dr. Chris Tracy from Charles Darwin University, set up a 2m sprint event for toads at a range of different temperatures to see what temperatures would slow toads down the most. The team used field-collected toads from four populations across the invasion front. "We found that cane toads can barely hop once they get below about 15 degrees Celsius", said Dr. Tracy. "Their range would also be constrained by the limited availability of water for their tadpoles in some parts of Australia".

After racing their toads, Kearney and his colleagues used sophisticated computer models developed by Dr Warren Porter at the University of Wisconsin, Madison USA, to predict how cold toads would get at different times of the year across Australia. They found that it is so warm and wet around Darwin that toads there can hop more than 50 kms per year. However, the cooler, drier conditions around Sydney or Perth mean that toads can barely manage 1 km per year. And they couldn't move at all under typical weather conditions in Adelaide, Melbourne and Hobart.

They found that toads have particular difficulties in parts of southern Australia with what are known as Mediterranean climates – places with cold wet winters and warm dry summers. "These are perfect conditions for growing wine, but you are unlikely to meet a toad at a winery" said Dr Kearney. In many of these places the air temperature at night – the active period for toads - is often above 15 degrees Celsius, but this only happens during summer, and evaporation in the dry summer air cools them down too much.

"Our study is particularly helpful in predicting where cane toads could live under climate change because we have identified a cause-and-effect way that climate limits the toads". Dr. Kearney said. "In one way it is obvious why dry conditions are bad for frogs – they lose too much water" explained Dr. Kearney. "But having wet skin also provides frogs with a thermal challenge because the evaporating water takes heat away from their bodies and often makes them colder than the air." They found that a moderate global warming could allow toads to move 100 km further south than their present limit by 2050. This would make

highlights from the literature

Racing cane toads reveals they get cold feet on Southern Australia invasion

conditions in Sydney slightly better for toads, and the only other city at risk of toad invasion under this scenario would be Perth.

Source paper: Kearney, M., Phillips, B.L., Tracy, C.R., Christian, K.A., Betts, G., & Porter, W.P. (2008) Modelling species distributions without using species distributions: the cane toad in Australia under current and future climates. Ecography, 31, 423-434.

If you want to comment on this article go to http://biogeography.blogspot.com/2008/09/racing-cane-toads-reveals-they-get-cold.html

highlights from the literature

Macroevolutionary mosaics – revealing the history for complex host–parasite systems

Source of article: Journal of Biogeography highlighted papers

An emerging synthesis linking biogeography, ecology and coevolution provides a new framework to explore the structure and history of intricate biological associations such as those represented by host and parasite systems. A general model, established by Dr. Eric Hoberg from the US National Parasite Collection, USDA and Dr. Daniel Brooks from the University of Toronto, for the evolution of parasite biotas emerges from empirical evidence describing a complex mosaic in which host switching and geographic colonization have served as determinants of diversity.

Complex assemblages of hosts and parasites are explained through coevolution and colonization and by integrating aspects of three hypotheses – ecological fitting, oscillation (episodes of increasing host range alternating with isolation on particular hosts) and taxon pulses (cyclical episodes of geographical expansion of ancestral species followed by isolation of populations producing descendant species, occasionally accompanied by ecological divergence, setting the stage for the next episode of expansion) – to establish a context for host and geographical distribution across varying temporal and spatial scales. Concepts are examined and framed by equating colonization with a breakdown in mechanisms for ecological isolation such as those driven by periodic global extinction, or episodic and cyclical climate fluctuation and environmental perturbation that have characterized marine and terrestrial systems in evolutionary and ecological time. Major radiations for assemblages of hosts and parasites, across nearly all taxa, have their roots in episodic events of extinction and biotic expansion in Earth history.

The synthesis signifies a conceptual shift from a mechanistically simplistic view of diversification through long-term mutual association and mutual modification of lineages to one involving an intricate historical mosaic involving host switches resulting from change in ecological context and geographic distribution. This view suggests that major episodes of climate change can trigger multiple rapid host switches, including those we call emerging diseases. This provides an appropriate ecological and evolutionary dimension for understanding patterns of introduction and dissemination of invasive species, and emergence of pathogens, parasites and disease in the current regime of global climate change with attendant disruption of ecological continuity.

Source paper: Hoberg, E.P. & Brooks, D.R. (2008) A macroevolutionary mosaic: episodic host-switching, geographical colonization and diversification in complex host–parasite systems. Journal of Biogeography, doi: 10.1111/j.1365-2699-2008-01951.x.

highlights from the literature

Phylogeography of red deer in Europe revealed by mitochondrial DNA markers

Source of article: Journal of Biogeography highlighted papers

Red deer (*Cervus elaphus*) is one of the most important and widespread game species throughout Europe, with an estimated population size exceeding half a million. The current distribution of red deer is assumed to be strongly influenced by human activities in addition to the colonization history and the last glaciation event. Due to the stationary habits of female social groups, the establishment of new populations by human translocations has often been reported. There are even historical data describing such translocations from the Viking sagas.

Worldwide, red deer has a circumboreal distribution, and genetic investigations have pointed to a central Asian origin. Despite its prominence as a big game animal, a detailed investigation of the genetic relationships of red deer populations in Europe has not been performed until now. As a consequence, the large (geographic) scale impacts of human translocations have not been known. In an article published in *Journal of Biogeography*, Anna Skog and co-workers report on the mitochondrial phylogeography of red deer in Europe.

Skog et al. analysed two regions within the mitochondrial genome from most European populations and by phylogenetic analyses of the gene sequences found that there are three main evolutionary lineages in Europe. The southern lineage is the most ancient. This genetic lineage is found in Africa in Sardinia/ Corsica and at one site in Spain. The rest of Europe is populated by two genetically distinct red deer lineages, showing a western/northern and an eastern distribution, respectively.

Within each main lineage there are several variants, and the diversity and distribution of these variants give indications about putative glacial refugia. Skog and co-workers suggest that such refugia have existed in Spain (the Iberian Peninsula) and in the Balkans. Thus, the Western and Eastern clades have survived during the last glaciation in these regions and subsequently repopulated Europe from their respective refugia. This is further substantiated by calculations of how old the Western and Eastern clades are. Using the mutations separating the clades and estimated mutation rates for the genes, they calculated the split between the Western and Eastern clades to date at least 150,000 years ago, thus pre-dating the last glaciation.

Somewhat surprisingly, the analysis revealed no obvious signs of long-distance human translocations. While there is little doubt that this has happened in the past, the data of Skog et al. indicate that translocations have predominantly been short distance, or involved animals being translocated between regions where animals belong to the same main clade.

Source paper: Skog, A., Zachos, F.E., Rueness, E.K., Feulner, P.G.D., Mysterud, A., Langvatn, R., Lorenzini, R., Hmwe, S.S., Lehoczky, I., Hartl, G.B., Stenseth, N.C. & Jakobsen, K.S. (2008) Phylogeography of red deer (Cervus elaphus) in Europe. Journal of Biogeography, doi: 10.1111/j.1365-2699.2008.01986.x

If you want to comment on this article go to http://biogeography.blogspot.com/2008/10/phylogeography-of-red-deer-in-europe.html

highlights from the literature

Azorean arthropods do it fast in dark caves

Source of article: Journal of Biogeography highlighted papers

Azorean arthropods have diversified according to the age, area and relative isolation of each island within the archipelago. However, each group experiences these factors differently; hence their patterns of diversification differ according to their particular life histories. This is the main finding of a study conducted by Joaquín Hortal from the NERC Centre of Population Biology of the Imperial College, and Paulo Borges from the Azorean Biodiversity Group (CITA-A) of the University of the Azores, recently published in the *Journal of Biogeography*. The authors show that although the shape of the relationship between diversification and time is in general the same, different groups show different rhythms of evolution. They reach these conclusions within the first independent evaluation of the General Dynamic Model of Oceanic Island Biogeography, recently proposed by Robert J. Whittaker and colleagues, which merges the geological evolution of islands with the biological evolution happening on them. Borges and Hortal used the framework provided by this new model to study the relationship between the number of species that are single island endemics (i.e., exclusive of each island) and the age, area and isolation of each island.

Within the Azores, cave species appear to have evolved quite quickly, producing a number of species during the initial stages of development of the islands, when cave systems formed by lava tubes and volcanic pits were abundant and pristine due to the high volcanic activity. When the islands settle, cave systems start to collapse, diminishing the area available for cavernicolous species, which eventually end up either facing extinction or surviving in the small crevices of the soil under the forest. This rapid pace of diversification and early decline is exclusive to cave arthropods and does not appear to be evident for the other arthropod groups studied. In most islands some lineages are still evolving into new species, so older islands show more exclusive species than younger ones, except for the older island, Santa Maria, where some groups show some decrease in the pace of diversification. Such differences between groups are caused by the opposing roles of the two components of diversification. When speciation is predominant, diversification is positive and the number of endemic species on an island increases. This pace slows down as extinction takes the lead, and diversification gets slower and eventually negative when the islands age and erode and they start to lose species numbers. While for most arthropods the Azores is a land full of opportunities, those inhabiting caves already feel the pressure of living in aging islands.

Other factors, such as dispersal capacity, also affect the pace of diversification within the Azores, suggesting that the diversity of evolutionary responses in different kinds of organisms is so wide that no general model, like the one proposed by Whittaker and colleagues is able to predict the pattern and process of diversification of all living groups. What this model does, however, is to allow integration of deviations from the general pattern into a common theoretical framework. By relating these deviations with the particular characteristics of each group, we might be able to ascertain how and why evolutionary processes happen on the isolated archipelagos that constitute some of the few long-term experiments provided by nature.

Source paper: Borges, P. A. V. & Hortal, J. (2008) Time, area and isolation: factors driving the diversification of Azorean arthropods. Journal of Biogeography, doi: 10.1111/j.1365-2699.2008.01980.x.

If you want to comment on this article go to http://biogeography.blogspot.com/2008/10/azorean-arthropods-do-it-fast-in-dark.html

conservation biogeography forum

Interview with Philip Platts, Marie Curie Early Stage Researcher, University of York, UK

Philip is currently studying for a Ph.D. at the York Institute for Tropical Ecosystem Dynamics (KITE). With a background in ecological mathematics, his research is now focused on the understanding of the spatial patterns of forest dynamics in the Eastern Arc Mountains of Tanzania and Kenya.

Relevance of biogeography to conservation

Antje Ahrends. Do you think that biogeography has important implications for conservation in practice? Do you agree with Whittaker et al. 2005 (Conservation Biogeography: assessment and prospect. Diversity and Distributions 11: 3-23) that conservation biogeography should be regarded and consolidated as a sub-discipline of conservation science?

Philip Platts. An understanding of biogeography and spatial processes in general is fundamental for effective conservation. As a mathematician by training, I am fortunate to work alongside ecologists, geneticists and economists, as well as those involved in advising on policy. I think that collaboration across disciplines is the way forward, rather than debating the headings under which specific lines of research would best be placed.

AA. Do you read conservation journals, or otherwise receive information on new developments in conservation practice/policy?

PP. My core reading is generally of modelling techniques and applications, though the thread of citations lands me amidst the conservation literature from time to time. When discussing the implications of my modelling work for conservation I read more widely and seek the advice of those with backgrounds in conservation.

AA. Do you think that biogeographers should contribute to conservation in practice, or should research be entirely free of political agendas? Does your research help conservation in practice? Which stakeholder groups are benefiting from your research, and how do you communicate your findings?

PP. I think most would agree that the life sciences should be focussed solely on furthering our understanding of the natural world, without getting caught up in political whims. In practice though, I suspect that research funding and thus publications are to some extent influenced by political trends. At KITE we work in collaboration with East African institutions, and believe that the advancement of African science itself will pay dividends for effective conservation management in the region. We discuss our research with Tanzanian stakeholders, and present our findings both locally in Tanzania, and internationally via journals and conferences.

The general practicality of incorporating new biogeographic findings in conservation work

AA. It is still uncertain to which degree predictive species models are applicable at a local scale. Also, there are necessarily a lot of uncertainties associated with the predictions at all scales. Do you think that the results of these models should nevertheless be communicated to conservation practitioners and potentially influence management decisions? Is there a risk that the validity of these models is over-estimated?

PP. There is a risk, yes. Models, by definition, are not perfect representations of reality, but rather tools for investigating specific aspects

conservation biogeography forum

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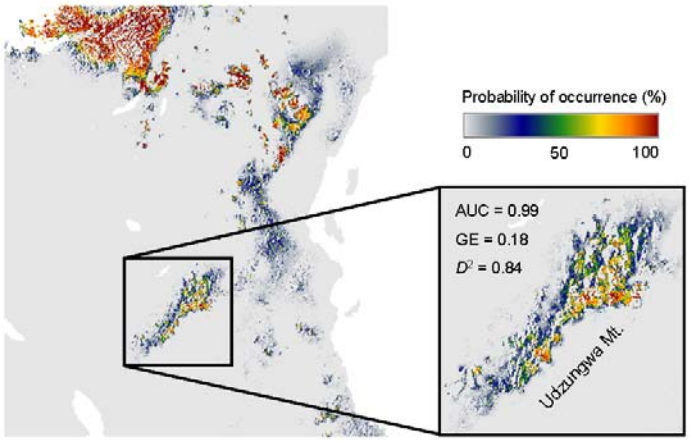

Figure adapted from

Platts et al. (2008). Predicting tree distributions in an East African biodiversity hotspot: model selection, data bias and envelope uncertainty. Ecological Modelling 218, 121-134

of a system. It is up to scientists to communicate their findings clearly and objectively in the literature, but it is the responsibility of conservation practitioners to utilise the clues that models provide responsibly and with the appropriate degree of caution.

AA. Implementing conservation strategies is partly reliant on the support of the public and decision makers. The communication of uncertainty or conflicting messages can be difficult. Do you feel that this aspect of conservation hampers the integration of newer research findings? Do you generally perceive a gap between biogeography science and conservation policy?

PP. I don't know whether or not this hampers the integration of new research. It shouldn't. The way in which uncertainty and ongoing scientific debate ought to be communicated for political and/or conservational ends is not something I feel qualified to comment on.

AA. Conservation planning needs long-term strategies. Do you perceive a gap between the comparatively rapid development and sophistication of tools such as species distribution models in science and their acceptance in the conservation world?

PP. Probably there is, yes, though I think it's debatable whether or not this should be considered a bad thing. Techniques for estimating species distributions are developing quickly, and receive their fair share of criticism (and praise). One the one hand, the lag between scientific advances and their acceptance in conservation allows time for their validity to be challenged and defended – an important process that ultimately increases their worth. On the other, conservationists and policymakers must utilise all the knowledge and resources at their disposal if the world's ecosystems are to be properly conserved and managed.

Model design requires an idea of how the underlying processes function, empirical and experimental data, and of course the guidance of experts in the relevant fields. Criticising simple distribution models for, say, omitting community interactions is sort of missing the point in my view: just because a model can't tell us everything, that's not to say it can't tell us anything.

If you want to comment on this article go to http://biogeography.blogspot.com/2008/11/interview-with-philip-platts-marie.html

This section contains short interviews with both biogeographers and conservation stakeholders about the role of biogeography in conservation. We intend this to be an open forum, so we will be happy to receive offers of participation and/or suggestions for potential interviewees. Please contact either Antje Ahrends (aa528@york.ac.uk) or the IBS editor (ibs@mncn.csic.es).

conservation biogeography forum

Interview with Werner Schroeder, Head of Africa Working Group, Naturschutzbund Deutschland (NABU)

Werner Schroeder's passion for international bird conservation stems from many travels to biodiverse areas in Africa. From 1983-1988 he studied biology and since then worked as an environmental consultant to a municipality close to Bielefeld, Germany. Since 1992 Werner Schroeder has been working in an honorary capacity as the Head of the Africa Working Group of NABU, the German BirdLife partner. Mainly focusing on Ethiopia, Kenya and South Africa, his work involves the coordination of support to local BirdLife International partners and the joint implementation of conservation programmes, including ecotourism, environmental education, alternative income generating activities and integrated conservation and development projects.

Relevance of biogeography to your work

Antje Ahrends. Is biogeography – "the study of the geography of life" – a relevant discipline to your work for NABU, the German BirdLife partner? Do you think it is relevant to practical conservation planning in general?

Werner Schroeder. I think that in general biogeography is of great relevance to conservation, in particular with respect to providing knowledge about the distribution of conservation target species across and within priority areas. NABU is basing its work on existing conservation models, primarily on the Important and Endemic Bird Area scheme developed by BirdLife International and to a lesser extent Conservation International's biodiversity hotspots and WWF's Global 200. These schemes are easily accessible and provide us with data relevant to conservation. If biogeographers have any further suggestions as to how to prioritise our work these are welcome. There certainly is a lack of communication.

AA. Do you read biogeographic journals, or otherwise receive information on new findings in the field of biogeography? What are your main sources for this?

WS. I read *Oryx* and *Bird Conservation International* on a regular basis but no biogeographic journals. Having said this, I am certainly interested in biogeographic research papers if they provide information on the species that we are trying to conserve. As such, a recently published study predicting the habitat suitability of the endemic Mountain Nyala in Ethiopia was of great interest to us. I can see that there is a divide between academia and practical conservation. Working in conservation I just do not have the time to get to grips with all the specifics of and engage in academic discussions.

AA. Does NABU collaborate with biogeographic research institutions?

WS. The NABU Africa Working Group does not collaborate with any biogeograhic research institutions.

The general practicality of incorporating new biogeographic findings in conservation work

AA. Most species are difficult to monitor due to the lack of data. Do you believe that quantitative biogeographic methods (e.g. species distribution modelling) are useful to fill in these gaps, for example for the design of reserve networks or to establish the vulnerability of species to environmental change? Or do you think that given that these methods are inherently uncertain, it is difficult, if not risky, to allow them to guide conservation planning?

conservation biogeography forum

Interview with Werner Schroeder, Head of Africa Working Group, Natur-schutzbund Deutschland (NABU)

WS. Distribution modelling techniques and related methods would certainly be useful to inform conservation planning. However, it is important that the models are empirically tested and ground truthed to the greatest possible extent in order to know whether their assumptions and predictions are realistic. Furthermore, it would be useful if these methods would be reasonably easily accessible for non-specialists. BirdLife International African Partnership is recently working on o two year's project "Conservation in the face of climate change together with RSPB (UK) and Durhan University (UK) to develop a practical framework by using models to assess the possible impact of climate change on bird distribution. This information will be used to check whether IBAs in Africa will still meet their purpose for bird conservation.

AA. Existing prioritisation schemes such as biodiversity hotspots, Global 200, or Important and Endemic Bird Areas necessarily suffer from data inadequacies, and also reflect the interests and values of the NGOs that generated them. Is there a need for objective reviews of the merits of these schemes, and alternative scenarios? Or do you think these schemes are so institutionalised that reviews would confuse decision makers, compromise public and financial support for conservation and therefore ultimately be counter-productive?

Arabuko Sokoke Forest, Kenya
Picture by Antje Ahrends.

WS. There already have been studies on the overlap between the different schemes. I understand that a coarse agreement has been found, suggesting that where diversity is high in one taxonomic group it is likely to be high in other taxonomic groups too. However, I am certainly of the opinion that we should humbly revise our conservation prioritisation schemes when new data or methods suggest that we have been going wrong. I do not think that conservationists will lose face by doing so, and there is certainly no reason to quarrel over this. On the contrary, it is helpful to have these corrections. On the other hand, it is of course important not to come across as implausible to the public and politicians. We need to present them with data that is as sound as however possible. Given the rapid loss of species and habitats it is absolutely necessary that we all work together in this. We are already entirely and with increasing speed on the loser side and we cannot effort to engage in unhelpful quarrels. Allowing our decisions to be influenced by concurrence between organisations or the run for high profile publications is unethical.

At NABU we base our work on the prioritisation scheme suggested by BirdLife International. The rationale for doing so is that (1) it is probably not helpful if everybody developed their own prioritisation scheme, and (2) for me as a conservation practitioner time is too scarce to engage in the all the specifics of this often rather academic debate. Having said this, it would be useful if datasets on species and their distributions and alternative suggestions for prioritisations would be made available and easily accessible (!) to the conservation community in order for us to review our focal areas on a regular basis.

conservation biogeography forum

Interview with Werner Schroeder, Head of Africa Working Group, Naturschutzbund Deutschland (NABU)

AA. Do you think that idealistic prioritisation schemes have much relevance on the ground (other than attracting funding)? I.e. is it useful to have these benchmarks although they are (1) necessarily based on incomplete data and (2) generally do not take into account political or socioeconomic constraints?

WS. The Important Bird Area (IBA) scheme by BirdLife International does also take socio-economic aspects into account. In over 190 IBAs so called "Site Support Groups" (SSGs) have been formed by members of the adjacent local communities who have economic and other benefits from the conservation of their sites. The collection of socio-economic and biological data is routinely done for all these sites by trained SSG members, and the data collected is far more extensive than could ever be provided by biologists or the government. To your question: albeit idealistic, I think it is important to have a prioritisation as a form of orientation. Particularly in Endemic Bird Areas it is very important to immediately establish contact to people on the ground, to identify potential socio-economic issues conflicting with the sites' conservation and to find a solution. If in the end it turned out that an area was not as important to biodiversity conservation as previously thought, it would not be the end of the world if this area was sustainably managed, would it? To me, this seems to be a rather theoretical debate. Every area that harbours biological diversity harbours also ecosystem services and is important. Also, realistically, 99% of the areas that now seem "less important" will have lost their importance due to anthropogenic influences. I would not hesitate to communicate this to the public. In order to prevent the opposite scenario – that an important area has been overlooked by the prioritisation exercises – it is important that conservation and biogeographers work hand in hand. In fact, I would wish for a closer collaboration with biogeographers in our Africa work and herewith like to invite biogeographers to visit/study our project areas.

AA. The nature of scientific research is to continuously challenge existing paradigms, and as a consequence there frequently is a lot of disagreement and a rapid-turnover of paradigms. For instance, a predictive model for species distributions that was deemed the state of the art a few years ago might already be regarded as flawed today! Does this scientific rationale make it difficult to include biogeographic findings in conservation practice given that conservation generally needs longer term strategies and commitments?

WS. I do not think at all that this is a problem. It is helpful to have disagreements that further the debate and our work should be flexible enough to incorporate reviews and corrections.

Communication between biogeographers and conservation practitioners

AA. Do you think that biogeographers communicate the applicability of their research findings to conservationists adequately? And *vice versa*, do conservationists adequately communicate their information needs to biogeographers?

WS. I think that there is too little communication between biogeographers and conservationists. Before agreeing to participate in this interview, I was not even sure what exactly falls within the scope of biogeog-

Barbet, Kenya. Picture by Werner Schroeder.

conservation biogeography forum

Interview with Werner Schroeder, Head of Africa Working Group, Natur-schutzbund Deutschland (NABU)

raphy . The word “geography” sounds purely geographic orientated and not relevant to species conservation. I did not see the immediate relevance of biogeography to conservation.

AA. Is an intensified exchange between conservationists and biogeographers necessary, and if so, where do you see potential platforms for this?

WS. It would be very helpful if biogeographers were present at conservation meetings and conferences. I could imagine that such a contribution would be very welcome at BirdLife Regional Partnership meetings or meetings of the German Society for Ornithology. I would welcome a course organised by biogeographers on how to use the software they are developing to look at the probability of species’ occurrence in the face of climate change, and I would be interested in a collaboration to test the accuracy of these models using bird data.

Crablovers, Kenya. Picture by Werner Schroeder.

AA. And *vice versa* - would you be interested to join us at the annual meeting of the IBS?

WS. To be honest, I fear that many of the symposia will be so specific that I would not get a lot out of them. I am more interested in the interdisciplinary work between biogeography and conservation. A pure biogeography meeting would only be useful for me to attend if their was a symposium on the biogeography link to conservation or on particular geographic areas or species that fall within the scope of my work for NABU.

Any further thoughts you would like to share:

WS. I think that it would be extremely helpful if the outputs of species distribution models would be readily available to conservation practitioners on CDs or the internet, for example in order to identify sites with a high probability of occurrence of particular species that we are trying to conserve. I am sure that there is a lot of information out there in the form of peer-reviewed publications, however, as mentioned before I lack the time to go through these in detail and not working in an academic institution I also do not have free access to the majority of the relevant journals.

If you want to comment on this article go to http://biogeography.blogspot.com/2008/11/interview-with-werner-schroeder-head-of.html

job announcements

Postdoctoral fellowships

Santa Fe Institute, New Mexico, USA

Postdoctoral Fellowship appointments at the Santa Fe Institute begin fall 2009. Appointed for up to three years, fellows pursue research questions of their own design, are encouraged to transcend disciplinary lines, and collaborate with SFI faculty, other Fellows, and researchers from around the world. Fellows are encouraged to invite speakers, organize workshops and working groups, and engage in research outside their fields. Funds are available to support this full range of research activities.

View the full position announcement and application instructions at http://www.santafe.edu/postdoc. Applications are due by November 14, 2008. For further information, email postdocinfo@santafe.edu.

Postdoctoral Position and 4 PhD fellowships in Plant Invasion Ecology

Bioprotection Research Centre, Lincoln University, New Zealand

We have exciting opportunities for one Postdoctoral Fellow and four PhD students to work in the area of plant invasions. The positions are based in the Weed Invasions research group in the Bioprotection Research Centre, Lincoln University, New Zealand. The successful candidates will join an active and dynamic group of invasion ecologists and are part of a three-year funded project headed by Profs Phil Hulme and Richard Duncan. You can find out more about our work at http://bioprotection.org.nz/project/world-leading-biosecurity/weed-dynamics-and-invasion-processes.

The Postdoctoral Fellow will undertake research aimed at understanding how plasticity in key life history traits affects invasion success. Salary will be in the range of $55-60,000 NZ dollars per annum. This position is funded for three years. For more information and an application form see http://www.lincoln.ac.nz/section269.html, Vacancy 08-213. Applications close 14 November 2008; please send applications to: The Human Resources Director, PO Box 94, Lincoln University, Canterbury. New Zealand quoting reference 08-213.

The four PhD fellowships aim to address key questions in invasion ecology using a variety of approaches (including field data collection, field and glasshouse experiments, and modelling). Each fellowship is fully funded covering fees, a three year student stipend ($26,000 NZ dollars per annum) and operating expenses associated with each project. For more details on these projects see: http://bioprotection.org.nz/vacancies. Applications close 14 November 2008 and should be e-mailed to Philip.Hulme@lincoln.ac.nz.

Alternatively, contact Prof Phil Hulme (Philip.Hulme@lincoln.ac.nz) or Prof Richard Duncan (Richard.Duncan@lincoln.ac.nz).

Postdoc position in Plant Ecology

Institute of ecology and earth sciences, University of Tartu, Estonia

We wish to recruit an enthusiastic post-doctoral researcher in the field of plant ecology, to undertake research on patterns of species diversity on various spatial scales. The position is at the Centre of Scientific Excellence 'Frontiers in Biodiversity Research' at the Institute of ecology and earth sciences, University of Tartu, Estonia (http://www.botany.ut.ee/). Research involves the description and explanation of diversity patterns of vascular plants and related organisms like mycorrhizal fungi, with an emphasis on co-variation of both groups. Data include those from small-scale plots from intensively studied ecosystems, as well as regional and global distribution data.

This post is funded for 24 months, with a good perspective to prolong the contract. The salary level corresponds to that of EU framework projects and is liable to negotiations. The position is available immediately and the

job announcements

starting date is negotiable. In the case of applications of very strong candidates, it is possible to transform the post-doctoral position into that of a senior researcher.

For enquiries please contact Martin Zobel at martin.zobel@ut.ee. Please express your interest before November 20th 2008.

Visiting Fellowship in Conservation Biology

Harvard University, Department of Organismic and Evolutionary Biology

The Department of Organismic and Evolutionary Biology invites both nominations and direct applications for the Hrdy Visiting Fellowship in Conservation Biology for the academic year 2009-2010. The Hrdy Visiting Fellowship is available either at the senior faculty level or at the junior (i.e., postdoctoral) level for one or two semesters. Duties will include teaching one course and/or giving lectures in conservation biology, as well as research and collaboration with members of the Harvard community.

Applicants should contact a faculty sponsor (s), with whom they will collaborate, before applying. Applicants should submit the following application materials online to http://www.lsdiv.harvard.edu/oeb/academic_search: a cover letter with statement of intent, a curriculum vitae, representative publications, and arrange for three references to be uploaded to the website. Letters of nomination from third parties are also welcome and may be sent via e-mail to Jonathan Losos, Professor of Organismic and Evolutionary Biology c/o Katie Parodi kparodi@oeb.harvard.edu. Review of applications will begin on December 1, 2008.

Further information about OEB is available at http://www.oeb.harvard.edu; Information about the Hrdy Visiting Fellowship can be found at http://www.oeb.harvard.edu/employment/hrdy.html.

Full professor position in Conservation Biology

University of Copenhagen, Department of Biology, Center of Macroecology and Evolution

The Department of Biology, University of Copenhagen, seeks a professor in Conservation Biology starting in spring 2009. The appointee is to pursue an independent and internationally competitive research program in conservation biology focusing on organisms, populations, species and/or biodiversity, and to conduct science on major issues that underpin the conservation of species and/or the diversity of species and their environments.

The successful applicant will be affiliated with the 'Biodiversity and Macroecology' Research-group, which includes the Center of Macroecology and Evolution (http://www.macroecology.ku.dk). The research group is part of the Section for Ecology and Evolution. Information about the Department of Biology can be found at www.bio.ku.dk.

The position is supported by starting funds from a private foundation (Aage V. Jensen Naturfond, http://www.avjf.dk/) for a five-year postdoc and a five-year research assistant position, as well as funds for student fieldwork.

Full description and more details are at http://www1.bio.ku.dk/om/jobs/conservation/.

Applications must be based on this full description of the positions and submitted before December 1st, 2008 at 12.00 noon.

Inquiries concerning the position can be made to Professor Carsten Rahbek, Head of the Biodiversity and Macroecology Group, Phone: +45 35 32 10 30; E-mail: crahbek@bio.ku.dk

job announcements

PhD position in Evolutionary Niche dyNamics of Invasive Species (ENNIS)

University of Lausanne, Department of Ecology and Evolution

A 3-year PhD position is available within the ENNIS project, which seeks to understand the relationship between the evolutionary history of a clade, the niche variation and accompanying variation in the distribution of species, and the tendency for plant species to become invasive and/or naturalized.

Full description and more details on http://www2.unil.ch/phylo/.

Applications will be accepted until February 15, 2009 or until an acceptable applicant is found.

Postdoctoral fellowship in Biodiversity

Biodiversity Research Centre, University of British Columbia, Canada

We seek applicants for a 2-year postdoctoral fellowship in the U.B.C. Biodiversity Research Centre (http://www.biodiversity.ubc.ca). Preference will be given to candidates with bold ideas, demonstrated research ability, and strong communication skills. The successful candidate will be expected to: conduct original research on core problems in biodiversity, foster interactions within the Centre, run a seminar series and organize a retreat. Starting date, 1 September 2009. Salary $40,000 per yr. Research stipend: $7,000 per yr. Send curriculum vitae, three letters of reference, and a brief statement of goals to Search Chair, Biodiversity Research Centre, U.B.C., 6270 University Blvd., Vancouver, B.C., Canada V6T 1Z4. (Fax 604-822-0653, e-mail biodiversity.centre@ubc.ca). Closing date for application, 5 January 2009.

upcoming meetings of interest

APGC Symposium

"Plant Functioning in a Changing Global Environment"

7-11 December 2008 — Creswick, Australia

http://www.apgc.eu/

Sackler Colloquium

"Biogeography, Changing Climates and Niche Evolution"

12-13 December 2008 — Irvine, CA, USA

http://www.nasonline.org/

4th International Conference of the International Biogeography Society

8-12 January 2009 — Mérida, México

http://www.biogeography.org/meetings.htm

Sackler Colloquium

"In the Light of Evolution III: Two Centuries of Darwin"

15-17 January 2008 — Irvine, CA, USA

http://www.nasonline.org/

your participation in the **ibs newsletter** is welcomed
texts, letters, comments and book/paper reviews will be considered
you can also send pictures, drawings and/or cartoons
we are also open to suggestions on content and/or structure
contact us at ibs@mncn.csic.es
the editorial board

upcoming meetings of interest

II Congreso Nacional de Biodiversidad — Diversitas

10-13 February 2009 — Blanes, Spain
http://nodens.ceab.csic.es/biodiversidad/

Conference on Island Evolution

"Island evolution 150 years after Darwin"

12-13 February 2009 — Leiden, The Netherlands
http://science.naturalis.nl/darwin2009/

Conference on Climate Change

"Beyond Kyoto: Addressing the Challenges of Climate Change"

5-7 March 2009 — Aarhus, Denmark
http://klima.au.dk/dk/forside/konferencebeyondkyotoconferen/

e-Biosphere 09 — International Conference on Biodiversity Informatics

1-5 June 2009 — London, UK
http://www.e-biosphere09.org/

6th WDA International Congress of Odonatology

7-12 June 2009 — Xalapa, México
http://www.ecologia.unam.mx/

XXIII International Congress of History of Science and Technology

"Ideas and Instruments in Social Context"

28 July - 2 August 2009 — Budapest, Hungary
http://www.conferences.hu/ichs09/

First World Congress of Environmental History

"Local Livelihoods And Global Challenges: Understanding Human Interaction With The Environment"

4-8 August 2009 — Copenhagen, Denmark
http://www.wceh2009.org/

Xth International Congress of Mammalogy (IMC-10)

9-14 August 2009 — Mendoza, Argentina
http://www.cricyt.edu.ar/imc10/

10th International Congress of Ecology - INTECOL

16-21 August 2009 — Brisbane, Australia
http://www.intecol.net/

2nd DIVERSITAS Open Science Conference

"Biodiversity and Society: Understanding connections, Adapting to change"

13-16 October 2009 — Cape Town, South Africa
http://www.diversitas-osc.org/

The International Biogeography Society

if you want to announce a meeting or event that could be of interest for (some) biogeographers, or to publish a call for manuscripts or talks, please contact the IBS editorial board at ibs@mncn.csic.es