frontiers of biogeography

vol. 1, nº 2 - december 2009

the scientific magazine of the
International Biogeography Society

ISSN 1948-6596 – freely available at http://www.biogeography.org/

ISSN 1948-6596

congress summary

EMAPI 10: Bridging approaches to plant invasions

10th International Conference on the Ecology and Management of Alien Plant Invasions (EMAPi 10) – Stellenbosch, South Africa, 23-27th August 2009

"Invasion biology" has developed considerably in the 17 years since the first meeting on the Ecology and Management of Alien Plant Invasions (EMAPI) in 1992. Biological invasions provide a broad umbrella under which an increasingly wide variety of interdisciplinary studies are conducted. Nowhere was this more clearly illustrated than at this year's EMAPI 10 conference hosted by the Centre of Excellence for Invasion Biology in Stellenbosch, South Africa. The 31 sessions covered a broad spectrum of topics from understanding ecological and evolutionary mechanisms driving invasions, predicting future invasion patterns and dynamics, to designing and implementing effective management strategies. More than 230 presenters and attendants came from all continents to discuss the state of the art of invasion ecology and management.

Until now invasion biology has to a large extent been concerned with identifying general patterns and processes, for example particular plant traits or natural enemy release, to explain why, and ultimately to aid in predicting which, taxa become invasive (Richardson and Pysek 2006). Some novel approaches to these problems were discussed during the conference such as the use of altitudinal gradients to tease apart the relative roles of climate, habitat and anthropogenic influences as drivers of invasion using multi-scale, multi-regional comparisons (Pauchard et al. 2009). The conference also reflected the growing importance of an evolutionary perspective. Indeed, a large proportion of the more theoretical presentations addressed evolutionary questions using molecular approaches, for example to reconstruct invasion pathways and assess levels of genetic variation in introduced populations. There was also recognition that climate change will impact patterns of invasion and community invasibility. Several studies used niche modelling approaches to predict some of these changes, but apart from a presentation by Bruce Osborne few attempts to experimentally assess synergistic impacts of climate change and invasion were presented. Despite the advances, there was generally a lack of presentations which tested or introduced novel theory and mechanisms of invasion. To an extent this might reflect the difficulty of making broad generalisations across invasions. This might also represent a shift towards the use of plant invasions as tools to address basic ecological and evolutionary questions (e.g. Sax et al. 2007), for example the evolution of species range margins or breeding systems, rather than as a research topic in its own right.

Although theory and management of invasions are usually treated separately in the literature, EMAPI meetings have always provided a platform for discussion of the interaction between science and application. One of the main points discussed in the meeting was to what extent we should worry about controlling invasive species in countries with lower resources and where other conservation issues seem to be more urgent (Nuñez and Pauchard 2009). However, plenary addresses by Arne Witt and Sue Milton emphasised the negative impacts of invasive species on human livelihood in sub-Saharan Africa, for example as a drain on scarce water resources. This is also the message of the South African "Working for Water" programme (http://www.dwaf.gov.za/wfw/) which employs annually approximately 20,000 people from underprivileged sectors of society in the control of invasive species. As noted by David Richardson, the chief-organizer, this meeting included a large number of managers coming from many developing countries of Africa. This unique opportunity to share experiences between scientists and practitioners should be encouraged in all scientific meetings, especially when dealing directly with conservation themes.

Another important message we can extract from the meeting is the need to clarify the goals and implications of our management actions.

There seems to be in some cases an excessive prejudice against non-native species, reflected in the language we use (e.g. “enemy”, “invader”), which might sometimes have beneficial ecological properties, for example when used for remediation of ecosystems damaged by mining or industrial activities (Dye et al. 2008). Rather than focusing so much on controlling invasive species, we should aim to restore native ecosystems, a task that requires much more effort than just the eradication of particular species. The implications of controlling invasive species go far beyond their ecosystem effects and include complex social aspects. How we communicate to society the need for management of invasive species and the restoration of biodiversity and ecosystem services is a crucial task not only for managers, but also for scientists. This was explicitly addressed in a symposium specifically focussed on pine invasions; no matter how much research is done on the invasion of pines, little progress can be made if we do not convince the key stakeholders about the implications of such invasions and the need for control.

EMAPI meetings as well as other invasion biology meetings should serve to advance our understanding about the implications of invasive species in conserving biodiversity and ecosystem services. However, only three sessions at the conference dealt explicitly with impacts of alien plants on native species richness, multitrophic interactions and ecosystem functioning. This reflects some concerns, voiced at the meeting for example by Marcel Rejmánek, that statements about the impacts of plant invasions are often based on very limited data. It is therefore crucial for the credibility of the discipline and to convince policy makers of the need for management action that this imbalanced is addressed. The future challenge of invasion biology and future EMAPI conferences therefore remains to bridge the gap between theory and the application of effective management.

References

Dye, P.J., Jarmain, C., Oageng, B., Xaba, J. & Weiersbye, I.M. (2008) The potential of woodlands and reed-beds for control of acid mine drainage in the Witwatersrand Gold Fields, South Africa. In: Mine Closure 2008: Proceedings of the Third International Seminar on Mine Closure, pp. 487–497, Johannesburg, South Africa.

Nuñez, M. & Pauchard, A. (2009) Biological invasions in developing and developed countries: does one model fit all? Biological Invasions, doi:10.1007/s10530-009-9517-1.

Pauchard, A., Kueffer, C., Dietz, H., Daehler, C.C., Alexander, J., Edwards, P.J., Arévalo, J.R., Cavieres, L.A., Guisan, A., Haider, S., Jakobs, G., McDougall, K., Millar, C.I., Naylor, B.J., Parks, C.G., Rew, L.J. & Seipel, T. (2009) Ain’t no mountain high enough: plant invasions reaching new elevations. Frontiers in Ecology and the Environment, 7, 479-486.

Richardson, D.M. & Pysek, P. (2006) Plant invasions: merging the concepts of species invasiveness and community invasibility. Progress in Physical Geography, 30, 409-431.

Sax, D.F., Stachowicz, J.J., Brown, J.H., Bruno, J.F., Dawson, M.N., Gaines, S.D., Grosberg, R.K., Hastings, A., Holt, R.D., Mayfield, M.M., O'Connor, M.I. & Rice, W.R. (2007) Ecological and evolutionary insights from species invasions. Trends in Ecology & Evolution, 22, 465–471.

Jake Alexander

Institute of Integrative Biology, ETH Zürich, Switzerland

e-mail: jake.alexander@env.ethz.ch

http://www.ibz.ethz.ch/

Aníbal Pauchard

Laboratorio de Invasiones Biológicas (LIB), Universidad de Concepción and Institute of Ecology and Biodiversity, Chile

e-mail: pauchard@udec.cl

http://www.lib.udec.cl/

Edited by Núria Roura-Pascual

Your pictures can be the cover of the next **Frontiers of Biogeography** issue. If you have photos or artwork related to biogeography that could make a great cover send them to ibs@mncn.csic.es or frontiersofbiogeography@gmail.com. The best pictures received will be the cover of forthcoming issues (in the case of pictures in landscape layout, an excerpt will be used). We will also consider pictures for the inside of the journal.

