Evolution and Biodiversity in the Antarctic: EBA

Written by Rhian Salmon

EBA is a complex interdisciplinary project involving over 40 research groups from approximately 22 nations, as well as links to the Arctic research community. Its work crosses traditional disciplinary divides within biology, in particular working across the marine and terrestrial realms. EBA has multiple aims reflected in its structure of 5 work packages. At a broad scale, these packages are aimed at understanding how the various ecosystems of Antarctica are structured and function, what historical processes have shaped them to be as they are now, what evolutionary processes have taken place in the Antarctic environment and, in turn, what that tells us about the environment itself. Finally, in the context of parts of Antarctica currently facing the fastest rates of environmental change on the planet, and also as it is currently the continent least affected by the direct impacts of human activity, EBA has a focus on identifying and understanding the consequences of environmental change in Antarctica, as a model and as a 'warning' for what may happen elsewhere. In doing so, EBA makes an important contribution in placing its scientific research into the public realm, and to policymakers.

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Period of field work (as appropriate)
Ongoing from 2007 to 2009 within IPY, and to at least 2012 within SCAR

Countries involved:
Italy, Australia, Germany, The Netherlands, UK, Spain, Brazil, USA, Ukraine, Japan, New Zealand, Belgium, Russia, Norway, Canada, Argentina, Poland, Czech Republic, Malaysia, France, Chile, Sweden

Preliminary results and conclusions

- Living in thermally very stable environments, many marine organisms and hence ecosystems may be particularly vulnerable to even small levels of warming in their environment.
- Antarctic deep sea marine diversity is far greater than previously recognised.
-Characteristics of marine benthic communities along the Victoria Land coast link to differences in ice conditions between locations.
- A large proportion of invertebrate animals and lichens living on the continent have survived there throughout multiple glacial cycles over millions or tens of millions of years.
- Lichen species numbers are high in the maritime Antarctic but relatively constant and low on the continent. There is no apparent cline in species number along the Victoria Land coast.
- The description of microbial diversity using molecular techniques is demonstrating both higher levels, and more distinctness in the ecosystems studied, than previously thought.
- Human assistance as a vector far outweighs the natural rates of colonisation of Antarctica by new species.
- Introduced or alien species add new complexity to existing ecosystems, which are poorly equipped to respond, thus native species and ecosystems are rapidly threatened (especially currently in the sub-Antarctic); increasing human contact with the continent, combined with regional change, will act in synergy to increase this risk.
- 'Climate change' involves far more than simple temperature warming, with other variables (e.g. precipitation, wind, cloudiness, frequency and size of extreme events) and their interactions all playing a role in defining biological responses. These responses are often subtle, involving small changes in energy investment in different biochemical pathways, but nonetheless are fundamentally important in defining how organisms can and will respond, and integrate throughout the ecosystem.

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On February 25th 2009, the IPY Joint Committee will release a report on 'The State of Polar Research'. In the lead-up to this event, major IPY research projects are releasing information for the press, and making themselves available for media enquiries. A wide range of projects will be profiled reflecting the diversity of IPY. For more information, please visit
http://www.ipy.org/index.php?ipy/detail/feb09_projects/