

protection, as it includes site design issues, appropriateness of management systems and processes, and delivery of protected area objectives [1]) Nigel Dudley (Equilibrium, Bristol, UK) pointed out that, although many protected areas are threatened with, or are already undergoing degradation, and thus require efficient management, the best role models for the assessment of management effectiveness come from experience gained in Latin America and Australia. The workshop participants recommended regular assessment of management effectiveness of protected areas in Europe, and, recognizing the diversity of existing protected areas, resources and needs, suggested that IUCN/WCPA should provide guidance with respect both to methodologies and their political application [1,2].

In another workshop, led by Jane Clark (Scottish Natural Heritage, Edinburgh, UK), the use of marketing as a tool to implement the objectives of protected areas came under scrutiny. Here again, Europe is not making full use of its potential. There are many products that, when identified, can be marketed to help the cause of a protected area. For example, biodiversity conservation might be an aim, but the marketable product might be provision of high-quality drinking water. Clearly, there is a need for a marketing task force to be set up, as suggested by workshop participants.

There are also problems within Europe in the coordination and management of transboundary protected areas, particularly in zones of human conflict.

Although considerable efforts are being made to resolve the issues, many initiatives fail, because of a lack of political and/or financial support. In this instance, the role of the IUCN/WCPA network would appear obvious, but action at the European level still remains to be taken.

On a more positive note, one workshop, (led by Jane Smart, Plantlife and Planta Europa, London, UK) concentrated on developing useful relationships between the Important Plant Areas Programme in Europe and the IUCN/WCPA. The synergies between botanical and management approaches to the identification and protection of important biodiversity areas quickly became apparent. Thus, it was noted that WCPA members include land managers, practitioners and planners who could benefit from the botanical information collated by the Important Plant Areas Programme, perhaps to aid formulation of site management strategies. However, such managers lack information as to how to use the information most efficiently. Amalgamating the two sides would not only help the managers and decision makers, but would also help Important Plant Areas to be accepted as a nature conservation tool rather than as a designation, and would ensure that the botanists include data relevant to management decisions in their European Programme. In discussions, it was recognized that management expectations should be defined along with the botanical details of any site from the outset. Future

close cooperation toward this and other aims would certainly be advantageous.

By definition, the entire meeting placed an emphasis on the internal workings and efficiency of the IUCN/WCPA. This was necessary and certainly beneficial for conservation biology in Europe. The wide variety of topics discussed certainly resulted in the suggestion of many potential actions to help improve management capacity for protected areas in Europe. The various talks by senior IUCN members also did their job of advertising the benefits of working under the auspices of such a large and powerful organization, even though important details might sometimes be overlooked. Let us hope that IUCN, in all its guises, can meet the challenges of protected area management in Europe, and also globally, in the 21st century.

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References

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Aquatic hotspots: speciation in ancient lakes III

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The conference Speciation in Ancient Lakes ('SIAL') III was held in Irkutsk, Russia from 2 to 7 September 2002.

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Most lakes are <15 000 years of age, but a few 'ancient' lakes are >100 000 years old [1]. These systems include some of the most famous cases of adaptive radiation [1–3] and they present a host of important problems. For example, just how many endemic fish species (or amphipods, gastropods, etc.) are there in each of the lakes? Why have only certain lineages

undergone explosive diversification? How can we conserve systems with such discrete, vulnerable concentrations of biodiversity? Such topics were the focus of the recent conference Speciation in Ancient Lakes (SIAL) III. The conference, appropriately situated adjacent to Lake Baikal, also facilitated the exchange of ideas and data among scientists from Russia and other, mainly Western, nations.

Evolutionary patterns and processes

Most of the evolutionary presentations concerned phylogenies and their implications, with some surprising findings.

In particular, Risto Väinölä (Finnish Museum of Natural History, Helsinki, Finland) reported deep molecular genetic divergences, probably from the Pliocene, within several conventional, morphologically defined amphipod species from Lake Baikal. The divergent forms are typically parapatric but are sympatric in some instances. If these results are general and the newly recognized forms are species, the endemic amphipod count could increase from an already spectacular 250–350 to >1000 species. These patterns of differentiation also suggest an important geographical aspect to amphipod speciation.

Although Baikal is the most ancient of ancient lakes, reports of the relatively recent radiation of some lineages [4] were confirmed and extended. Two groups of Baikal's gastropods experienced a late Pliocene burst of speciation (Dmitri Sherbakov, Limnological Institute SB RAS, Irkutsk, Russia), coinciding approximately with the formation of Baikal's modern, oxygenated abyss and an increased diversity of depth-related niches. The *Cytherissa* flock of ostracods also went through an explosive, possibly Pliocene radiation (Isa Schön and Koen Martens, Royal Belgian Institute of Natural Sciences, Brussels, Belgium).

Less speciose groups are receiving more attention as the scope of research in ancient lakes broadens. For example, analysis of mitochondrial sequences from Baikal's isopod crustaceans shows that this small set of species is derived from at least two colonizations (Albert Hidding, University of Amsterdam, the Netherlands). More research will be needed to elucidate the factors responsible for disparities in speciation rates among groups, but characterization of the histories of depauperate taxa, such as the isopods, is a useful start.

Noteworthy results are also emerging from seemingly straightforward taxonomic and biogeographical studies. In Sulawesi's Malili lakes, the proportion of diatom species shared among lakes separated by tens of km is lower than the proportions typically shared by lakes on different islands (Andy Bramburger, University of Windsor, Canada). The cause of this extraordinary endemism remains a mystery, but other taxa in the lakes also exhibit fine-scale endemism, such as fish (Jeffrey McKinnon, University of Wisconsin, Whitewater, USA; Denis Roy, University of Windsor, [5]). In Lake Malawi, closer examination of ostracods from benthic samples has tripled the number of reported species from 20 to 60, with at least 35 of these being new (Martens). These findings support the view that much work is still needed simply to characterize patterns of diversity.

Departing from the emphasis on phylogenies and taxonomy, Axel Meyer (University of Konstanz, Germany) discussed genomic and developmental features that might have contributed to the cichlid radiations. Meyer's research team is investigating key coloration and trophic traits with several approaches,

including one that involves assays for candidate genes previously characterized in zebrafish and other model organisms. Already a gene known to cause near albinism in some mammals has been found to differ among cichlid color morphs.

Theory was not a central focus of the conference, but one theoretical presentation drew strong connections with empirical talks. Sergei Semovski (Limnological Institute SB RAS) built on previous models [6] to look at the interaction between geographically constricted gene flow and ecological selection in speciation around the shorelines of large lakes. He found that the extent of gene flow, relative to ecological pressures, influenced the number of newly arising species and whether they were delimited mainly by geographical distribution or by ecological niche. Semovski also incorporated DNA sequence evolution into his models, with the goal of understanding how sequences diverge in such situations.

Ecology and conservation

Presentations in the areas of ecology and conservation were sometimes a synthesis of the two, reflecting the need to take human disturbances into account when studying the ecology of ancient lakes. In Lake Tanganyika, an unusually comprehensive paleoecology study has compared lake cores from a set of localities paired for either deforestation or intact forests. Adjacent to deforested areas, sedimentation rates were much higher than alongside forested sites, with reduced diversities of fish, molluscs and ostracods. Ecological effects of deforestation are apparent in deposits dating back to the 19th century, but a second wave of pronounced changes in sedimentation rates started around 1961, during a period of exceptionally high rainfall and runoff. Thus, the ecological effects of human disturbance appear to be modulated strongly by climatic variation (Andy Cohen, University of Arizona, USA). Using a similarly synthetic approach and a novel limnological model, Doug Haffner (University of Windsor), argued that interactions between climate change and other human activities might place the endemic fauna of Sulawesi's Lake Matano at risk.

Conference discussions

The business meeting and final discussions were exceptionally productive

at SIAL III. George Coulter (Whangarei, New Zealand) pointed out the recent decline in the status of biodiversity as an international priority and the lack of awareness of ancient lake systems in particular. He urged action on the part of participants and, by the end of the discussion, there was consensus that the SIAL group needs to work on a joint statement aimed at elevating ancient lakes on the conservation agenda. A proposal for an international agreement on the conservation of ancient lakes, perhaps along the lines of agreements on wetlands, was discussed as a possible focus of such a statement. Cohen also argued for a greater emphasis on the integration of results from larger sets of lakes. He proposed initiating a series of workshops to this end, at which participants would strive to synthesize findings in core research areas. Thus the meeting concluded by looking ahead, with new agendas in both conservation and research.

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