

INTECOL e-Bulletin

International Association for Ecology

Future of Ecology

What are the Ecological Challenges of the 21st Century?

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Recently I was invited to give a talk to the British Ecological Society on the topic '*Ecological Challenges of the 21st Century*'. Ecology is a broad discipline, with many paradigms, many schools of thought and recognisable sub-disciplines. So where is the subject going? Over the last few decades it has most definitely changed. Today I see more interaction between the sub-disciplines, more emphasis on large scale phenomena related to the needs of society, and a shift from research that is driven by purely intellectual curiosity towards research that has a strategic or utilitarian motivation. This evolution in thinking has been accompanied by a more interdisciplinary approach and in some instances by the launch of new academic departments and new journals (a process akin to niche-filling).

I was however surprised to be invited recently to comment on a European research proposal which boldly stated *Taking ecology into the future requires breaking down borders within ecology and merging ecology with other disciplines*. It is the second part of the sentence that surprised me. To merge, according to my dictionary, is to 'lose or cause to lose identity by absorption into something greater' and a merger is what commercial companies do when they think they can do much better

by combining forces. As ecology is already very broad, one should query the idea of merging it with something else. It made sense (most of us would agree) to merge Departments of Botany and Zoology in the 1990s to make Departments of Biology, because researchers and teachers in those departments had so much in common and something to learn from each other. So, where are the gains to be made by merging ecology with other disciplines?

There are many ways to approach this question. One way is to argue that research funding comes from taxes and so it should be responded to society's needs; those needs tend to be at the larger scale and often the questions cannot be solved by ecologists alone. This is especially true in applied ecology, as Sutherland *et al.* (2006) have demonstrated. Another way is to argue that synergies will arise when disciplines are thrown together- a sort of hybrid vigour whereby the attributes of one subject can compensate for a shortcoming in another and hence the resulting 'organism' is 'fitter'.

I can tell you what has happened here at Edinburgh University. In the last seven or eight years we have been merging ecology with other disciplines. We now have a mega-department called the School of GeoSciences which includes: geography, geology, geophysics, meteorology, ecology, environmental chemistry and a socio-economic element concerned with environmental sustainability. We coined the term GeoSciences (spelt with a capital S to mark it as different from Geoscience which is sometimes taken as a synonym for geology) to show that we have defined a new area of work. My local

academic network has now enlarged greatly, and I can 'talk the talk' across several disciplines. Moreover, I can access some quite clever measurement techniques that were unknown to me previously. And talented young geophysicists who we have been able to recruit can show me some time-series analysis methods that I really need. I still have all my contacts in Biology, and I hope we ecologists in GeoSciences as opposed to Biology are not regarded as traitors. I don't think we are, because the School of Biology is busy embracing the biomedical agenda. There has been a lot of excitement in reorganising (but time-consuming meetings too); now, one can embark on new research problems.

However, many people won't feel inclined to do all this, as not everyone has an appetite for change. We are naturally inclined to associate in small groups with a shared identity, and it is hard to reject the idea that humans work best in small groups. We can all see how research groups of about ten work efficiently, and we tend to belong to several of them, at national and international levels as well as Departmental. They can have a cross-disciplinary identity and they often do. There are still major unsolved questions at the heart of ecology as May (1999) has emphasised, but even these are open to researchers other than those who call themselves ecologists. May's questions are generally not the sort that policy makers ask. Rather, they are questions about how populations of plants and animals and ecosystems are regulated. Without the answers to these questions we really do not understand enough to make useful (predictive) models.

So what do I think are the *Ecological Challenges of the 21st Century*?

The first challenge: address the big questions through fundamental research on populations and ecosystems (May 1999). To do this requires us to retain the spirit of scientific enquiry, and pursue the scientific method using all the tools available. Ecologists alone will generally not be able to answer fully the most fundamental questions without a lot of help from other disciplines. Unfortunately, this type of research is not always fashionable with those who fund research.

The second challenge: define a new ecology that has the important concepts and thinking-tools which research ecologists of the 21st Century need. Build this into the curriculum. The new ecologist should be able to help us think about food and energy supply, population structure and regulation, climate change (especially the biological feedbacks), conservation and adaptation of ecosystems. Defining a new thinking-tool ought to include concepts ranging from physics and mathematics to economics and sociology.

The third challenge: train applied ecologists who will become the 'general practitioners' of ecology. They will work with policy-makers and local council officers; working with engineers they will design systems to clean up pollution from factories, and they will be organised into companies in much the same way as professions such as architects and builders are organised. This is beginning to happen of course, and indeed it appears to be a growth area of the subject as far as employment is concerned.

The fourth and final challenge is to learn to interact with scientists of other disciplines on a much larger scale than our institutional structures have generally permitted. Old-fashioned Departments were sometimes like fortresses with walls that were largely impenetrable. New-style institutional structures will be much less rigid. Why have Departments? The history of science shows us that some of the most fertile groupings of thinkers were not just scientists, but a collection of friends from diverse walks of life, such as the 'Lunar Men' in the 18th Century, well-described by Uglow (2002). We must rekindle creative thought by making these interactions.

May R (1999) Unanswered questions in ecology. *Philosophical Transactions of the Royal Society B* 354, 1951-1959.

Sutherland WJ et al. (2006) The identification of 100 ecological questions of high policy relevance in the UK. *Journal of Applied Ecology* 43, 617-627.

Uglow J (2002) *The Lunar Men: Five Friends whose Curiosity Changed the World*. Farrar, Straus and Giroux, New York.

10 Years of the Hungarian Biodiversity Monitoring System

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The diversity of living organisms is a fundamental biological feature without which life cannot exist on Earth. Biological diversity enables through natural selection the adaptation to a continuously changing environment, which results in the relative stability of living systems. Biological diversity varies in time and space. In a geological timescale, species have always evolved and become extinct, just as today. The ever-growing human population of Earth and the more and more widespread and intensive human activities (agriculture, forestry, fisheries, industry, transport, tourism, energy production and mining) that satisfy the increasing demands threaten the survival of wildlife.

The rapid extinction of species has drawn attention to the vulnerability of the biosphere. The exploitation of natural resources has led primarily to fragmentation and loss of habitats, expansion of invasive species, decline of wildlife, pollution of water, soil and air, and furthermore, to global climate change. These all contribute to the modification, usually reduction of biological diversity. At the same time nature provides renewable resources and services that are used daily by humans (e.g. soil formation, medicines, etc.). Thus, the loss of nature also threatens our own survival.

Sixteen years ago in 1992, an international convention, known as the Convention on Biological Diversity (CBD), was signed in Rio de Janeiro, Brazil. Hungary also joined the Convention. One of the basic commitments of the Parties is that a national strategy and supporting legislation have to be formed that enable the conservation of biological diversity and the sustainable use of its components.

The implementation of the nature directives of the EU also poses significant tasks for the preservation of biodiversity. The Commission of the European Union issued a declaration in 2006 with the title "Halting the loss of biodiversity until 2010 and beyond". This summarizes the scope of problems, and identifies key policy actions, objectives and the measures needed for implementation. To meet these obligations and undertakings, it is vital to know the status and trend of

the biota, and that this knowledge should be based on long-term, continuous and repeated surveys. In line with this, Hungary also joined the "Countdown 2010" campaign of IUCN (International Union for the Conservation of Nature) in 2006, among others, to spread information on biodiversity in order to raise awareness. Hopefully this publication will also contribute to achieving these goals.

Beyond the diversity of species, biodiversity also includes the variability within species and the diversity of associations of living organisms. Biodiversity monitoring implies the long-term observation of certain characteristics of selected species and communities. Observation of the natural conditions provides the basis for recognition and evaluation of processes different from natural. The aim of monitoring can also be to study the effects of certain known or predictable environmental changes on an ecosystem, such as the lowering of water-table or climate change. Taking into account of the extremely large number of species and habitats, it is simply not feasible and not reasonable to monitor everything and everywhere. The following principles were taken into consideration when designing the Hungarian monitoring activities:

- Monitoring of the status of protected and threatened natural values,
- Observation of indicators of the general state of ecosystems in the country,
- Study of direct or indirect effects of certain human activities or environmental factors.

The Hungarian Biodiversity Monitoring System (HBMS) is a national program governed by the State Secretariat for Nature and Environment Protection, Ministry of Environment and Water, and its mission is the long-term surveillance of the status and trends of biological diversity in Hungary.

History

In compliance with the National Nature Conservation Concept (1994), and in line with the forming National Biodiversity Strategy and Action Plan, the development of a national monitoring system was initiated by the Authority for Nature Conservation in 1996 with the support the Programme of Community aid to the countries of Central and Eastern Europe (PHARE) program of the European Union, involving several research institutes. As a result of several years of work,

the program of HBMS was published in a ten-volume manual in 1997, to which an eleventh volume was added in 1999, and later the whole series was made available on the internet. Building on the expert advice of many ecologists, this program provides the theoretical background of wildlife monitoring, the selection process and sampling methods of species, communities and habitats. As a major novelty in this field, the experts elaborated the habitat classification system of Hungary. It has been revised several times since, but still serves as the basis for habitat mapping. Based on this program, development of the monitoring system started in 1997. Field surveys began in 1998. The number of components monitored increases each year.

During 2003-2005, a comprehensive review was carried out for HBMS. For some taxa, it resulted in refining and improving the sampling methods, while in other taxa the data sets from several years were evaluated. Efficiency of the system and use of data were also studied, and the results verified that biotic data provided by the program are useful in the daily work of both professional researchers and nature conservation experts and practitioners.

System structure

In addition to giving technical guidance, the HBMS program also made a proposal for the structure and development of a monitoring organization within the state nature conservation organizations to govern and administratively manage HBMS, and to carry out coordination and implementation of sampling. The first year in the operation of the system was 1997, when a Central Coordination Unit (CCU) was formed. Development and coordination of the national programs are provided by the CCU, while local tasks are coordinated regionally. Since 1998, one regional coordinator works on implementation of local tasks in each of the ten Hungarian national park directorate. The CCU puts special emphasis on involving a wide range of experts. Decisions reached by consensus of concerned experts provide a strong ground for close collaboration within the frame of the monitoring system. Expert groups have been formed for each higher taxon to discuss the results of surveys and data analysis. These expert groups carry out the review and constant improvement of methodologies.

Technical supervision of the entire program is provided by an independent Advisory Committee consisting of prominent experts. HBMS also rests on the contribution of external institutions, i.e. research institutes, universities and NGOs that carry out sampling

and data analysis on a national or regional scale. Some tasks that do not require expert input are carried out by involving volunteers from nature conservation societies or schools. In addition to technical work, informing the general public is also an important task. Hungary's natural heritage is still outstanding at a European comparison, and its conservation needs a concerted response from society, including other sectors of public administration and local communities.

European Union

Monitoring and long-term observation of biodiversity is not only a requirement of the Convention on Biological Diversity, but it is also a priority task in the European Union. As a member state, Hungary has to implement the nature directives, including the Directive on the Conservation of Wild Birds (79/409/EEC), and the Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EC), which aim to preserve the natural heritage and biological diversity of Europe through the conservation of species and habitats of Community importance.

During the selection of components to be studied by HBMS, both nationally protected natural values as well as vulnerable, rare, endangered or endemic species and threatened habitats listed on the annexes of the two directives for community level protection were considered. Under Article 17 of the Habitats Directive, the conservation status of species and habitats of community importance has to be continuously monitored and reported every six years to the European Commission. HBMS covers many of the species and habitats of community importance. For certain taxa, steps have already been made to test the methodology used for several years and improve it towards EU compliance. Therefore, data gathered in the frame of HBMS are suited to comply with EU reporting obligations, but the components to be studied and the numbers of sampling sites have to be extended.

The Water Framework Directive (2000/60/EC), aiming to protect surface and underground waters and enhance their quality, is also relevant for nature conservation, as it requires to use ecological water qualification based on macrophyton, phytoplankton, phytobenthos, macroscopic invertebrates and fishes to determine the status of waters. Despite the differing goals of individual monitoring projects, the surveys can be based on a common methodology. For wetland-related components studied, sampling methods have been harmonized with the requirements of the directives in the past few years.

Projects and protocols

Monitoring activities have been grouped into projects that have been formulated, based on the series of monitoring manuals, by defining the objectives and identifying the exact tasks. In addition to the ten projects defined in the first stage, a new project has also been elaborated in order to implement the monitoring tasks of the nature directives of the European Union.

Monitoring activities have been grouped into projects

- I. Monitoring of protected and threatened species
- II. Monitoring of wetland habitats and their communities
- III. Surveying, mapping and monitoring of habitat types in Hungary
- IV. Monitoring of invasive species
- V. Monitoring of forest reserves and managed deciduous woodlands
- VI. Monitoring of plant and animal species in the Kis-Balaton region
- VII. Monitoring of wildlife communities of the River Drava region
- VIII. Monitoring of saline habitats
- IX. Monitoring of dry grasslands
- X. Monitoring of montane meadows
- XI. Monitoring of species and habitats of community importance (Natura 2000)

Within each project, appropriate components (such as habitats, communities, populations of species) have been carefully selected to achieve the objectives. Detailed guidance (termed as protocols) has been prepared for each component with the help of specialist teams, to standardize monitoring activities. The protocols contain guidance for the selection of sample plots, the studied parameters, sampling methods, frequency of sampling and the derived parameters that are able to show correlations and trends. Components monitored by the HBMS are habitats, plant communities, protected and invasive plant species, mosses, fungi, mammals (small mammals, root voles, bats, European ground squirrels, red squirrels, steppe mouse, and dormice), amphibians, reptiles, fishes, aquatic macroscopic invertebrates, dragonflies, butterflies, larger moths, terrestrial arthropods and orthopterans. Monitoring programs focusing on particular regions also cover other taxa, depending on the special features of the given site, such as birds, mollusks, spiders, caddis flies, algae and zooplankton.

Volunteer activity

There are several projects of HBMS that also involve

volunteers (students, undergraduates, teachers, NGOs etc.). By activating large numbers of people, these projects make countrywide monitoring possible. Furthermore, the participation of volunteers helps raising awareness of the importance of biodiversity. Careful planning and management is required to ensure data quality. It is necessary to describe the sampling method in detail in handouts by using simple text. Prior to the survey, it is also useful to organize trainings and field visits. Precise data collection and standardized data sets can only be ensured if tasks are unambiguously determined. The organization of sustained monitoring is an extremely difficult task, and experience has shown that involving persistent participants requires a lot of time and effort, therefore training needs to be repeated many times.

The first program based on the active participation of volunteers was launched in 2000 to assess the Hungarian population of European ground squirrel (*Spermophilus citellus*). The program was a great success as shown by the fact that each year numerous volunteers take part in the Ground Squirrel Monitoring Event, organized on Earth Day. The key to success is a simple method to count the burrow entrances of ground squirrels in a standardized way. An information leaflet has been published to help this monitoring project.

The population of the native red squirrel (*Sciurus vulgaris*) in Hungary seems to be stable. However, the American gray squirrel (*Sciurus carolinensis*) is increasingly popular as a pet, and eventually released, might result in similar population collapse of red squirrel, as it happened in Great Britain. In a century, this species has displaced the native squirrel, and only a few small populations exist. Similar invasion of gray squirrel is observed in Italy. For the protection of the red squirrel, we have to collect data on their population, monitor its changes. This way we can alert and mobilize nature conservation authorities before this native species gets threatened. Even children can participate in the so called squirrel monitoring program ("Mokusleso" www.mokusleso.net). Online data entry is possible by the wider public on squirrel observations with the indication of location and time.

In the course of testing the monitoring methods for amphibians during 2001, volunteers played a significant role in collecting data from five regions of the country. Over 80% of their data were identical with those of experts, who worked at the same time and in the same localities. A conclusion of the pilot project was that an expert coordinator is necessary in each region, and handouts must be prepared. Prior to commencing independent field work, volunteers should participate in

several surveys, guided by the coordinator. In several European countries butterfly monitoring networks are successfully operated by involving civil groups. After the appropriate training, volunteers can be involved in surveying certain species, and occasionally in estimating caterpillar or food plant numbers. A short, illustrated description of the method has also been published to support volunteers' participation.

Data and results

Data entry of a huge amount of collected data is on the way into the new, national, GIS-based Hungarian Nature Conservation Information System (HNCIS). Data once only used by a handful of researchers has gained widespread interest, since IT and more specifically GIS enabled the policy decision processes to consider information which had previously been regarded irrelevant or not accessible. The HNCIS aims to inform also the general public concerning environmental, nature conservation related information and spatial data. This function is performed via the Public Relations Module of the HNCIS. The module is composed of two elements: a web-based interactive map (using ArcIMS technology) and a Google Earth application. The map site is available at

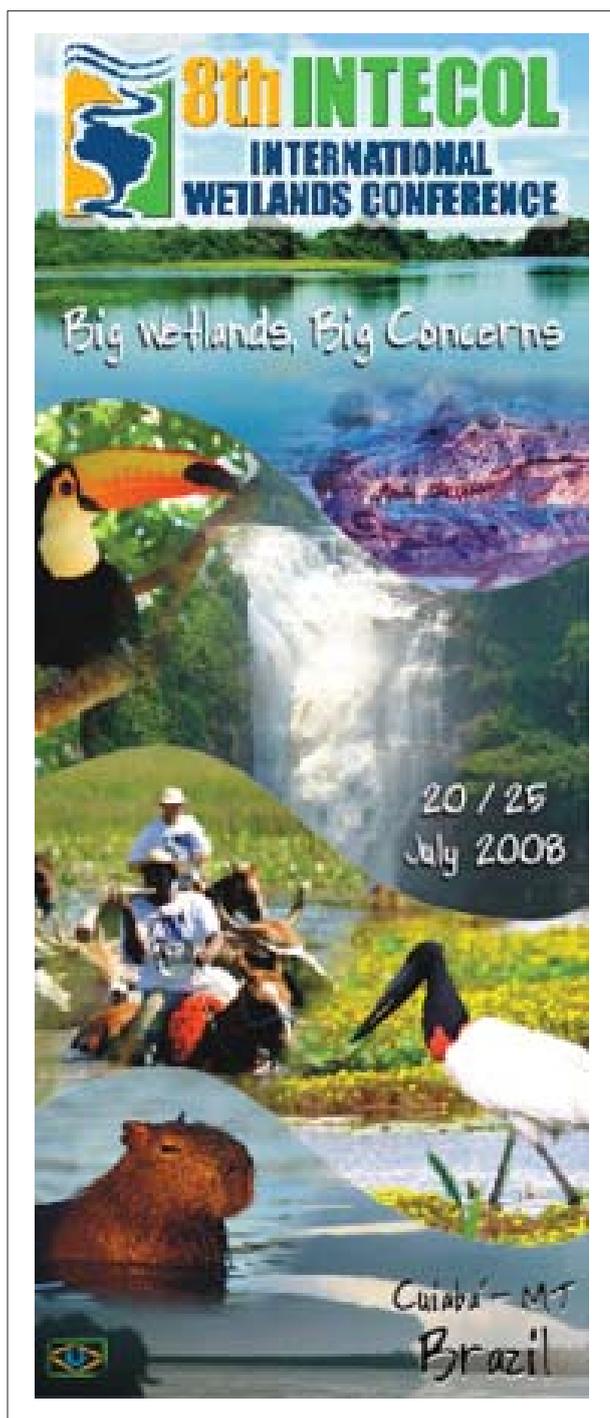
http://geo.kvvm.hu/tir_en, with links to the Google Earth interface. The website allows for searching, identifying elements provides links toward external information sources and has printing capabilities. The Google Earth map is a generalized dataset with more common information.

Till HNCIS will be fulfilled with collected data since early years of HBMS, Digital tables and hard copy based biotic data provided by the program are useful in the daily work of both professional researchers and nature conservationists. Results of several surveys of the program were analyzed by specialists and publications were published in different scientific papers. High international interest was shown for long term results and experiences of HBMS at conferences and workshops all over the world. In 2006, a new book series was launched to publish the results of ten years of far-ranging activities under HBMS, including the development of methodologies and the field surveys. The first volume deals with habitats, mosses and fungi. The second volume is in preparation and will analyze zoological monitoring activities. More information on HBMS is available at the home page of the system (www.nbmr.hu).



1. 8th International Wetlands Conference, Cuiabá, Brazil

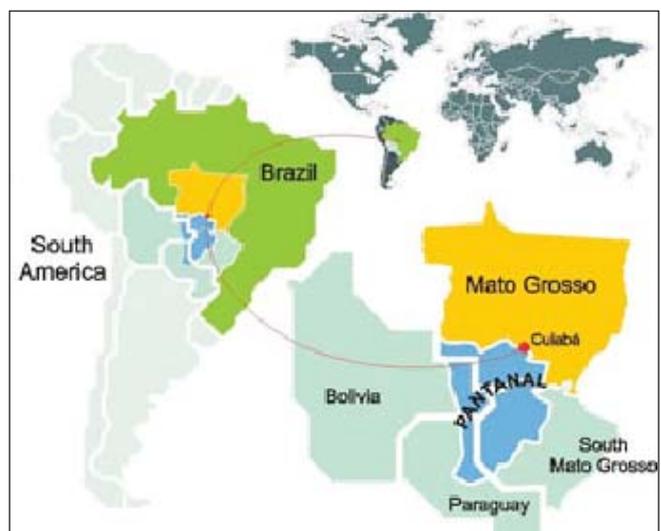
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The **8th International Wetlands Conference** was held in Cuiabá, Brazil, from 20 to 25 July 2008. These Conferences occur every four years and constitute a forum for the numerous technical sessions, allied meetings, and workshops about wetland research, education, conservation, politics, protection, management, and sustainability. This was the first WWG conference meeting in South America.

Cuiabá is one of the gateways to the 160 thousand square kilometers of the Pantanal - one of largest floodplains in the world and the third largest environmental Biosphere Reserve. Its ecological importance is immense - it shelters one of the world's richest wetland ecosystems of different types of seasonal forest and savannas that undergo periodic flooding. The abundance of animals and plants makes the Pantanal one the most propitious locations to observe fauna (especially birds) and flora and to fish and a focal point for discussions at the meeting.

The conference slogan was "Big Wetlands, Big Problems" and included sessions on the Pantanal as a topic of discussion and field trips. The registration included 700+ people from 28 countries. There were 325 presentations made in the 9 plenary talks, 22 workshops, and oral sessions. There were also 246 poster presentations, and 9 Special meetings, including one to organize a wetland science society for South America. The Plenary talks focused on the regional and global effects of climate change on wetlands, and how wetlands influence climate change. All aspects of wetland ecology and management were covered in the workshops and oral presentations, including fish ecology and management, hydrology, gas exchange,



monitoring and inventory, fire impacts, integrated management, biodiversity, disturbance, theory, invasive species, classification schemes, sustainability, and traditional knowledge systems. Some interesting topics at the special 'open' meetings including discussions of the impacts of hydroelectric power dams, using photography as an instrument of preservation, a public hearing on ecological socioeconomic zoning and on environmental education in Mato Grosso State, and how to secure the preservation of the Pantanal.

The Sunday night opening included an official announcement that there would be a new Pantanal Research Center at the University of Mato Grosso. The Governor attended the meeting and agreed to revisit some laws inhibiting the conservation of the Pantanal and tropical forests, in general.

There was a film festival each night, and a lively Thursday night banquet featuring a local musician specializing in the esoterica of Pantanal inhabitation (including tourists). Dr. Wolfgang Junk, Max-Planck-Institute for Limnology, received the WWG International Wetland Scientist Award that was initiated by Dr. Jos Verhoeven in 2004. A well-attended closing session approved the Cuiabá Declaration, which will be posted on the INTECOL website. The press coverage included at least all the major international press.



Additional information on the program is available at the conference website at <http://www.cppantanal.org.br/intecol>.

Inquiries about hosting the next meeting are being accepted until at least November, 2008. If you are interested in hosting a meeting, then please send an email to R. Eugene Turner (eurturne@lsu.edu)

The INTECOL Brisbane congress (<http://www.intecol10.org/>) to be held during 16-21 August 2009, is an opportunity to organize several sessions on wetlands as a follow-up to the Cuiaba wetland meeting.



2. EU COST 859 Workshop at Smolenice, Slovakia, 22 - 24 May 2008 *CONTAMINANTS AND NUTRIENTS: availability, accumulation/exclusion and plant-microbial-soil interactions*

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The main objective of EU COST 859 Workshop is to provide a sound understanding of the absorption/exclusion, translocation, storage or detoxification mechanisms of essential or toxic mineral elements, as well as organic contaminants, at physiological, biochemical and molecular levels, and to prepare the best use of plants for sustainable land use management and improve food safety (www.gre.ac.uk/cost859). The overall action is divided into 4 working groups (WG) on which WG 1 is mainly related to plant uptake/exclusion and translocation of nutrients and contaminants.

The meeting took place at the end of May in Slovakia in the Smolenice Castle, a remote place about 50 km NE of Bratislava which belongs to the Slovak Academy of Sciences. Scientists of 21 nations took part in 2 days of lectures, poster sessions and discussions, followed by a professional field trip to visit old mining sites in Slovakia. The scientific programme was divided into four topics: Uptake and distribution of trace elements; Uptake and metabolism of organic pollutants; Plant-microbe associations for improving phytoremediation; and finally, tools to manipulate contaminant bioavailability. One of the main conclusions which can be drawn from the discussion sessions is the need for more basic research in three topics: Two important topics of basic research were stressed during the discussion sessions:

1. More anatomical and cytological studies on plant structure (especially the root cortex) should be combined with detailed physiological studies on ion uptake and transport. These two aspects are generally studied individually; however, presentations given throughout the meeting highlighted the fact that modifications in the structure and function of root cortical tissues may help us to explain differences in root system functioning and ion uptake between plant species.
2. More extensive research should be performed (preferably between species of the same genus or even better between ecotypes of the same species) in order to determine whether apoplastic movement is involved in the hyper-accumulation of metals. More interdisciplinary research is needed in the rhizospheric complex interactions between plant roots and microorganisms (mycorrhizal fungi, rhizosphere and endophytic bacteria). Abstract contributions regarding plant-microbial interactions are ever-increasing, as this area has drawn the attention of scientists in recent years. This complex

system can potentially improve phytotechnology systems in various ways: they can enhance plant root growth/formation and biomass production; they can alter the solubility, availability and transport of contaminants and nutrients; they can alter contaminant degradability; and they can increase plant tolerance to contaminants. However, understanding the different system components and mechanisms operating will be vital before they can successfully be implemented in phytotechnology systems.

Most likely there are interactions between an organism's performance and flow rates as well as flow patterns of the elements via the different components and compartments of an ecosystem, which can only be interpreted accurately if all possible compounds have been analytically detected. Undoubtedly the type and extent of these reciprocal influences are, for most elements and ecosystems, dependent on abiotic influences such as the weather/climatic and topographical conditions. Consequently the flow rates and flow patterns will vary in accordance with these influences. One must always consider this fact when interpreting ecochemical data. The final results are characteristic only for the parameters under which the sampling was performed.

Two other important points have additionally been discussed:

Most sponsored research projects are financed for a short period (usually 2-3 years), but the application of these techniques at large field-scale requires at least 5-10 years. As a consequence PhD students are not involved in potential long-term applications. Therefore it is often difficult to bring lab-scale studies into practice, and additionally to convince stakeholders and end-users to use and promote these phytotechnologies.

And finally, how many potentially contaminated sites really exist in Europe? At the conference 80.000 for Sweden and 30.000 for Austria were numbered. More detailed information is needed for different nations. During a one day field trip the participants visited Spania Dolina, a region with old copper mines and heaps with interesting flora. The old mining town Banská Štiavnica, which is on the UNESCO's World Heritage List, was also visited. In this area old silver and gold mines can be found. The workshop participants were fortunate to be able to visit one of these, during a one hour underground tour.

1. The 10th International Congress of Ecology, Brisbane, Australia (16 - 21 August 2009)



Ecology in a Changing Climate Two Hemispheres - One Globe

In 2009, the Ecological Society of Australia, jointly with the New Zealand Ecological Society, will be hosting the 10th INTECOL Congress - the largest international ecological meeting. This will be the first time that INTECOL 10 is held in the southern hemisphere. The 10th INTECOL Congress will be the major forum for the global community of ecological scientists and practitioners. The 10th INTECOL Congress is themed '*Ecology in a Changing Climate, Two Hemispheres, One Globe*'. Ecologists from around the world will explore how global climate change has impacted, and will further impact, ecosystems and their vital services to human communities.

Call for Abstracts and Registration opens

The 'Call for Abstracts' and Registration will open on **15 September 2008!** The planned scientific program will consist of 8 concurrent sessions for the duration of 5 days with 10 high profile plenary speakers that represent different fields of ecology. We invite you to submit an abstract for inclusion in the scientific program. Visit the Congress website for more details: www.intecol10.org

Early Bird Rate - Register Now for a Discount!

Take advantage of the special Early Bird registration rate to receive discounted registration rates! For additional information on delegate registration fees and entitlements please visit the Congress website.

Expression of interest

Would you like to get more updates on this Congress? Please visit the website and join our mailing list at <http://www.intecol10.org/rego.asp>

Field Trips

Delegates will have the opportunity to join a range of interesting field trips providing the perfect opportunity to visit some of Australia and New Zealand's diverse ecosystems. The Organizing Committee offers delegates the opportunity to participate in the following field trips:

- Southeast Queensland - Birdwatching & Bushwalking
- Tropical Rainforest - Daintree and Cooktown Adventures
- Coral Reef - Great Barrier Reef Snorkeling
- Tropical Savannas - Kakadu National Park
- Arid Rangelands - Uluru Walk
- Island - Fraser Island
- There will also be a choice of 2 longer duration field trips offered in New Zealand!

Stay tuned for the Registration opening for more details! (i.e. details won't be on website until rego opens)

Day Tours

Visiting Brisbane is like finding yourself in an adventure wonderland. There's so much to do and see, explore the city and its surroundings with a huge choice of day tours available.

- Brisbane Highlights - including Lone Pine Koala Sanctuary
- Australia Zoo - Crocodile Experience
- Moreton Island Dolphin Feeding and Whale watching
- Worm Night Tour
- O'Riellys and Mt. Tambourine rainforests Winery Visit

Visit the INTECOL website to find out more!

Workshops and Business Meetings:

A range of professional development workshops will be offered as part of the INTECOL Congress. You will be able to register for these during the Congress Registration process at an additional cost. Stay tuned for more info!

An opportunity will be available for other Societies and groups to organise business meetings utilising the Congress venue as required. A call for these kinds of meetings will occur in early 2009.

The ESA and the NZES are working hard to promote INTECOL to the world and would appreciate any assistance. If you or your colleagues are travelling to or

participating in conferences where it would be appropriate to promote INTECOL 2009, please contact the INTECOL Congress Managers on **intecol10@tourhosts.com.au**

INTECOL 2009 will incorporate sustainable initiatives to minimise the ecological footprint of the event.

2. 2009 Annual conference of US-IALE (Snowbird, 12-16 April 2009)

"*Coupling Humans and Complex Ecological Landscapes*" is the theme of the U.S. Regional Association of IALE, International Association for Landscape Ecology (www.usiale.org). The conference will be held in Snowbird, Utah, USA. Proposals for symposia and workshops are due September 15, 2008; and abstracts are due November 17, 2008.

Several types of financial support for attending and presenting at the conference are available:

(1) the "Sponsored Student Travel Awards Program" of local sponsors (USGS, Utah State University, and Utah Department of Natural Resources), (2) US-IALE's "Foreign Scholar Travel Award" Program (<http://www.usiale.org/fstaward.htm>), (3) the "NASA-

MSU Professional Enhancement Awards Program" (<http://www.csis.msu.edu/NASA-MSU.htm>, supported by NASA and Michigan State University), and (4) the "CHANS Fellows Program" of the new International Network of Research on Coupled Human and Natural Systems (CHANS-Net, supported by NSF, see background papers in Science http://www.csis.msu.edu/Publication%20files/CHANS_Science.pdf and Ambio http://www.csis.msu.edu/Publication%20files/CHANS_Ambio.pdf).

US-IALE conferences are particularly students-friendly, with two popular programs - Lunch with Mentors and NASA-MSU dinner, and a new program - We'll "Pick Up The Tab!".

Website: <http://www.usiale.org/snowbird2009/>

3. HydroEco2009

The 2nd International Multidisciplinary Conference on Hydrology and Ecology: Ecosystems Interfacing with Groundwater and Surface Water (Vienna, Austria, 20-23 April 2009)

ABSTRACT SUBMISSION

The deadline for abstract submission is 5 September 2008.

OBJECTIVES AND SCOPE

Many ecological systems owe their existence to physical/chemical properties of groundwater and surface water, and can be damaged if water flow or water properties are changed by anthropogenic or natural processes. The ecological systems may be - the terrestrial ecosystems we see every day, such as the riparian systems along the rivers, and wetlands found in headwaters as well as in low land areas or - the subsurface ecological systems that maintain the

groundwater that sustains so many people. To address the resulting issues, this conference brings together engineers and researchers from engineering and ecological disciplines. The disciplines include, but are not limited to, hydrology, ecology, environmental engineering, biology, chemistry, geochemistry, environmental biogeochemistry, and subsurface microbiology. The unifying theme is the interaction between groundwater and / or surface water and ecological systems. A typical example is the hyporheic zone in riparian areas, where the ecological system interacts with water and chemical flows between surface and groundwater.

The goals of the conference are;

(1) to provide information that will help that interactions between groundwater, surface water and ecology are better understood, measured, simulated, and managed, and (2) to improve the technological basis for policy decisions (including WFD implementation) related to the reconstruction of ecologically valuable environments and the use of water resources in these environments.

PRELIMINARY CONFERENCE SESSIONS

- Session A: Interactions between surface water, hyporheic zone, saturated and unsaturated groundwater
- Session B: Connections between ecology and groundwater recharge and evapotranspiration
- Session C: Plant-groundwater interactions
- Session D: Links between hydrology and biogeochemistry in groundwater
- Session E: Modelling surface water-groundwater systems
- Session F: Modelling interactions between hydrology and ecology
- Session G: Management, legal and regulatory issues
- Session H: Bio-indicators of groundwater and surface water quality
- Session S: Special Session on the implementation of

WFD, with particular relevance to Groundwater and Surface water dependent terrestrial Ecosystems

The Special Session aims to: a) identify how the different countries across Europe have used scientific information to characterize the Ground and Surface water dependent terrestrial ecosystems (i.e. what methodologies and how scientific information is used to underpin the methodology); b) evaluate how the different countries across Europe have defined and/or used the term 'Significant damage' to the groundwater dependent terrestrial ecosystem, due to the status (qualitative or quantitative) of the groundwater body (i.e. what science based thresholds are used to define significant damage both within national and international protected nature conservation sites and outside those sites); c) share experience on how the different countries across Europe have used groundwater and surface water dependent ecosystems as measures to remedy problems of surface or groundwater bodies. (i.e. which countries have used groundwater or surface water dependent terrestrial ecosystems as measures for either ground or surface water bodies that are failing their criteria under WFD).

The Special Session will be chaired by Dr. Johan Schutten (Hans), Senior Wetland Ecologist, Scottish Environment Protection Agency.

Website: <http://www.natur.cuni.cz/hydroeco2009/>

4. Symposium on Biomathematics and Ecology Education and Research (Illinois State University, USA, 6-7 September 2008)

You are invited to join us for the Symposium on Biomathematics and Ecology Education and Research (BEER-2008), which will take place at Illinois State University, Normal, IL during 6-7 September 2008. The scientific theme and the program of BEER-2008 will include sessions with invited talks and a workshop from a broad range of topics of Biomathematics and Ecology research as well as education. Special emphasis will be given to interdisciplinary research and the interaction between mathematics, biology and ecology. The meeting is planned around the theme of linking mathematical and statistical modeling to biology and ecology to stimulate cross-fertilization of theoretical,

methodological and computational research issues of high-dimensional data by focusing attention to the arena of applied problems in these cross-disciplinary areas. A primary goal of the conference is to present important venues for young researchers, international researchers, and graduate students an opportunity to interact with world class senior researchers, to share, and to disseminate their research and expertise. Additionally a workshop focusing on educational aspects of biomathematics will be conducted by Dr. Tim Comar of Benedictine University. Participants intending to present a talk are invited to submit an abstract by e-mail or online from the symposium website.

Website: <http://www.biomath.ilstu.edu/beer>

5. *Climate Change: Global Risks, Challenges & Decisions* (Copenhagen, Denmark, 10-12 March 2009)

The main findings of this congress will be included in the official material for the COP 15. The Scientific Committees of the 4 global change programmes (WCRP, IGBP, Diversitas, and IHDP)

will take on part of the responsibility for the review the synthesis of the Conference that will be passed on to the COP.

Website: www.climatecongress.ku.dk

INTECOL, International Association for Ecology

INTECOL is affiliated with the ICSU family of scientific organizations as the section responsible for general ecology within the International Union of Biological Sciences (IUBS). The association will assist and/or support the development of the science of ecology and the application of ecological principles to global problems, especially by assisting international cooperation; the collection, evaluation and distribution of information about ecology; national, regional and international actions which will serve ecological research, training of personal, coordination of general publications of ecological principles and the recognition of the importance of ecology for economy and society; the organization of conferences, meetings, symposia, programs and projects, conduct of speaking-series, publication of manuscripts, and measures which are deemed necessary to reach the goals of the association.

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Deadline for sending information for next e-Bulletin

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Mt. Tamborine-Waterfall (from Tour Program Site in 10th INTECOL Congress, Brisbane)