



SIL news

Volume 38 - January 2003

The International Association of Theoretical and Applied Limnology (Societas Internationalis Limnologiae Theoreticae et Applicatae, SIL) promotes and communicates new and emerging knowledge among limnologists to advance the understanding of inland aquatic ecosystems and their management.

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An air-photo of the Puhoslahti Bay area of Lake Saimaa taken by Jouko Meriläinen.

Material for the May 2003 issue
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Contributions on a PC formatted disk,
in any standard word processor or
DOS (ASCII) text, or as email
attachments, will assist the Editor.

Lake Saimaa The Heart of the Finnish Lakeland

by

Elisabeth Grönlund, Markku Viljanen, Heikki Simola and Riitta Niinioja

continued on next page



Figure 1 - Location of the drainage basin of the River Vuoksi in Finland and Russia (right) and the drainage basin of the Lake Saimaa complex (left).

Finland is well and truly a lakeland: it has 187,888 lakes (10% of its territory) with areas $>500 \text{ m}^2$ which includes 47 lakes that are larger than 100 km^2 . The Lake Saimaa complex, with a surface area of $4,400 \text{ km}^2$, is the largest of all and ranks as the fourth largest lake in Europe. Lake Saimaa is the central lake of the $68,500 \text{ km}^2$ Vuoksi drainage area, and drains via the River Vuoksi into Lake Ladoga in Russia and eventually into the Gulf of Finland. Its water level is about 76 m above sea level. The lake is extremely complex in terms of its geomorphology, consisting of several large sub-basins of varying limnological character connected by relatively narrow straits (Figure 1). Its labyrinthine character is also revealed statistically by its long shore line ($14,850 \text{ km}$) and large number of islands (around 14,000) (Kuusisto 1999). The maximum depth is 85 m and there are several sub-basins with depths exceeding 50–60 m, but the median depth is only 8 m.

The water quality of the lake ranges from oligotrophic to mesotrophic, and humus loading from the catchment renders much of the lake dystrophic, with water colour typically $40\text{--}70 \text{ mg Pt l}^{-1}$, although some pristine oligotrophic basins have values as low as $5\text{--}10 \text{ mg Pt l}^{-1}$. The pelagic areas are thermally stratified in summer and winter, while mixing of the entire water column takes place during the spring and autumn. The ice cover usually lasts from November to May.

The landforms of the Finnish lakeland are dictated by the fractured crystalline bedrock of the Fennoscandian Shield and the effects of the last glaciation, resulting in a generally level but a microtopographically very variable landscape. Since the melting of the continental ice mass, the rebound action of the earth's crust has resulted in isostatic land uplift around the northern Baltic Sea. Most of the lake basins of southern Finland were part of the Baltic in the early post-glacial period, and became isolated from it in a stepwise manner during the Yoldia Sea and Ancylus Lake stages of the Baltic (11,600–10,700 and 10,700–9,500 years ago, respectively).



Figure 2 - The most endangered species in Lake Saimaa is the Saimaa ringed seal (*Phoca hispida saimensis* Nordq.). This three month old pup seal (typically there were approximately 250 seals) is resting on a rock during the day. Photo was taken by Mervi Kunnasranta at Lake Haukivesi.

The Saimaa ringed seal (*Phoca hispida saimensis* Nordq., Figure 2) was trapped in the isolating Saimaa basin at this time, together with some relict fish species, i.e., a landlocked salmon and the arctic charr and some crustaceans. Owing to land uplift, the terrain in southern Finland is gradually tilting towards the SE. Since the initial outlet from the Saimaa basin was towards the NW, this resulted in rising water levels and the formation of new outlets; first, towards the SW and eventually, about 5,000 years ago, through the opening up of the River Vuoksi on the SE margin of the basin.

Lake Saimaa may be considered Finland's most valuable lake, both ecologically and economically. Its environment offers a great diversity of aquatic and terrestrial habitats and landscapes, and it is therefore an essential area for nature

conservation. There are at present two national parks and numerous EU Natura 2000 network conservation areas within its drainage basin. The main economic assets are connected with hydro power, wood processing and municipal water supplies, but shipping and log rafting via the 600 km network of deep-water navigable channels are also important. In addition, there are about 30,000 summer cottages on the shores of Lake Saimaa and about 100,000 summer visitors every year engage in recreational fishing.

Organisation of water quality monitoring and research in Lake Saimaa.

At the national and regional levels, the Finnish Environment Institute and Regional Environment Centres (subordinate to the Ministry of the Environment, and in their work related to the use and management of water resources supervised by the Ministry of Agriculture and Forestry) conduct water quality monitoring in Lake Saimaa (Niemi & Heinonen 2000), in addition to which, statutory monitoring supervised by the Environment Centres is carried out and paid for by a large number of point-source polluters. The Regional Environment Centres approve these programmes, which are carried out by independent water research laboratories or private water protection associations (Hildén *et al.* 2000).

The Eurowaternet monitoring system of the European Environment Agency was established in Finland in 2000, and 24 of its 253 Finnish lake sites are located in Lake Saimaa (Niemi *et al.* 2000). The network will be further developed upon implementation of the EU (European Union) Water Policy Directive (WPD), which should be in full operation by 2015. This relies to a great extent on the use of biological quality elements (phytoplankton, macrophytes, zoobenthos and fish) instead of the physico-chemical ones traditionally used for water quality assessment during recent decades (Niemi *et al.* 2000).

Aquatic research in Lake Saimaa is carried out by several universities, research institutes and environmental authorities, which are also represented in a coordinating organisation (Coordination Committee for Research on Large Finnish Lakes), which aims to enhance large lake research through the preparation of research programmes, i.e., for Lake Saimaa. Many of the research projects are conducted jointly, for example, a joint EU LIFE Vuoksi project (2001–2004), “The role of the littoral area as a part of an optimal model for environmental monitoring and the involvement of local people” (Airaksinen *et al.* 2001).



Figure 3 - The research vessel Muikku at work in the labyrinthine landscape of Lake Saimaa. Photo was taken by Markku Viljanen in the Kolovesi area.

Much of the research is conducted on board the research vessel Muikku (Muikku = vendace, *Coregonus albula* L., Figure 3). It has been in active use for 13 years for scientific research and education concerned with the limnology, hydrology, fisheries and environmental geology of the lakes of the Vuoksi catchment area, and also on the Baltic coast. The vessel is managed jointly by three Finnish governmental institutions: the South Savo Regional Environmental Centre, the University of Joensuu and the Finnish Game and Fisheries Research Institute.

Trends in water quality and foreseeable threats to the Lake Saimaa ecosystem.

Along with the growth in the wood processing industry and in the local municipalities, the water quality of Lake Saimaa deteriorated gradually until the 1970s. Since then, however, legislation and its effective enforcement along with technological development in wastewater purification has resulted in a considerable decrease in point-source loading from both municipal and industrial sources. As a result, both organic loading and toxic pollution have diminished dramatically in recent decades. Total phosphorus concentrations in the most serious affected basins of Lake Saimaa, for example, have decreased by about 50% and pH and oxygen concentrations have increased significantly (Hildén *et al.* 2000, Pietiläinen *et al.* 2003). In the latest water usability classification, 90% of the water samples from Lake Saimaa were classified as excellent or good and 7% as satisfactory or passable. Only 26 ha of the lake area, in the vicinity of wood processing centres near the towns of Lappeenranta and Imatra, (Figure 2) were assigned to the lowest category, “poor” (Antikainen 2000, Antikainen *et al.* 1999). There have been limited possibilities, however, to enforce water protection with respect to non-point sources such as forestry, fuel peat mining and agriculture. Measures planned to solve these problems have included environmental subsidies and incentives for developing agricultural and forest management practices and the progressive tightening of the conditions attached to peat mining permits (Hildén *et al.* 2000). At a general level, Finland’s third programme of water protection targets (Council of State 19.3.1998) has set out guidelines for planners, policy-makers and those monitoring water protection up to 2005, stipulating that the Ministry of the Environment together with representatives of various sectors of the community must prepare a programme of action that incorporates details of jointly agreed measures and actions to be taken on water protection in general and on specific pollutants in order to meet the targets set.

Hildén *et al.* (2000) have presented short-term regional-scale scenarios that see the threats to the Lake Saimaa ecosystem as being the following: 1) risks associated with transport, i.e., an extensive oil spill from a large freighter, 2) extinction of the Saimaa seal population or other populations of special value, and 3) the exceeding of critical nutrient loads and acceleration of eutrophication from point and non-point sources. In addition, continental scale long-term changes (i.e., rising winter temperatures) may have profound effects on ecosystems in boreal lakes.

Websites related to Finnish lake research, Lake Saimaa and R/V Muikku (partly in English):

<http://www.joensuu.fi/suurjarvitutkimus> (website of the Large Lakes Research Unit, University of Joensuu)
<http://www.ymparisto.fi/eng/> (web-site of the Finnish environmental administration in English).

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We welcome you to the 29th Congress of SIL in Lahti, Finland, in August 2004. The City of Lahti, at the gate to the Finnish Lake District, will provide an inspiring congress venue to discuss, debate and evaluate the scientific progress of limnology as well as environmental issues addressed by the use of fresh waters. Our logo, a Finno-Ugrian boat motif from the Stone Age, bears a message that we are in the same boat heading for new challenges and inventions.

We look forward to receiving contributions and papers to be presented in the congress especially under the following major themes:

- Limnology and global change
- Biodiversity of aquatic ecosystems
- Limnology of humic waters
- Restoration and management of lakes and streams
- Catchment impacts and external load
- Food web interactions in aquatic ecosystems
- Molecular biology in aquatic sciences
- Sediment-water interactions
- Wetland-littoral ecology
- Limnology of brackish waters
- Ecology of invasive species
- Evolutionary ecology of aquatic organisms
- European Water Framework Directive

For further information on the congress and pre-registration, please visit our website at:

<http://www.palmenia.helsinki.fi/congress/SIL2004>

On behalf of the Organizing Committee
Timo Kairesalo



Professor dr. Zdzislaw Kajak working at his home in Dziekanów Lesny, spring 2002. Photo was taken by W. Wojewoda.

Professor Zdzislaw Kajak 1929 – 2002

Professor Zdzislaw Kajak – an outstanding Polish hydrobiologist, author of several hundred research papers, organiser of hydrobiology in Poland, member of numerous committees and scientific councils, esteemed colleague and friend - passed away on 16 July 2002.

It is uncommon for the professional activity of a single scientist to be so closely associated with the 50-year development of hydrobiology in Poland but such was the research, educational and organisational activity of Professor Zdzislaw Kajak.

Zdzislaw Kajak started his undergraduate studies at the Faculty of Biology, Warsaw University in 1949. Although he was a student in 1949-1950 he participated in research on the Masurian lakes. In those years his basic research focus was – benthic communities with special attention to the biology and ecology of chironomids, profundal habitats and bottom sediments. Most of his studies were devoted to this habitat and its biocoenose and he soon became recognized as a domestic, as well as, an international expert of this component of aquatic ecosystems. He also developed wider interests in processes of ecosystem functioning. Since the beginning of the 1950s, his individual scientific passions had always been closely associated with modern trends in ecology and particularly with ecological applications. In those days, the latter were focused on fisheries and fish nutrition. The earlier period of his life as a talented and diligent student revealed his other features – an aptitude for team work, a talent to organise and oversee younger colleagues' work and to formulate and guide complex studies. Kajak's first paper appeared in the

early 1950s and dealt with the food of fish in Lake Tajty, one of the Masurian lakes. Since 1952 he worked at the Institute of Ecology, Polish Academy of Sciences (PAS), where he spent all his professional life leading the Department of Hydrobiology.

Being a true ecologist, Kajak soon started to improve research methods and techniques. One of his numerous innovations – The tubular bottom sampler, invented in 1965 – is now a common tool in the world of limnology (Kajak *et al.* 1965). An inclination for handicrafts, his other passion, was, as he often used to say, a result of his one-year training in mechanical work during the the Second World War, when standard education was impossible. This benefited Kajak's research and his experiments conducted *in situ* with various devices, sediments and benthic fauna. A review of quantitative methods in benthic studies was the topic of Kajak's Ph.D. thesis in 1963. Even in his last projects (1999 – 2002) he still experimented with fragments of bottom sediments isolated in containers and placed at different depths in a reservoir.

In the 1950s Kajak headed studies on the Vistulan oxbow lakes that focused on the importance of these particular riverine habitats for the growth and reproduction of fishes. These studies also had a broader focus – the specific character of these habitats and their significance for, as we would call it now, biodiversity. Kajak's papers from this period dealt with the effect of periodical river water inflows to oxbow lakes and on the life cycle and dynamics of *Chironomus*.

The 1960s in Kajak's life were first devoted to comparative studies of several lakes of different trophic status and in fishery exploitation. Later he studied productivity, energy flows and trophic relationships as the basis of ecosystem structure. In Polish ecology it was the golden age, which we owed to Professor Kazimierz Petruszewicz and which was also favourable for Polish hydrobiology. Kajak was then a competent leader of the national programme, he represented the achievements of Polish hydrobiology in the International Biological Programme and organised conferences like the International Symposium on the Productivity of Freshwaters (IBP-PF) in Kazimierz Dolny in 1970. Of course, he also continued his studies and published. A comprehensive study on factors affecting abundance and production of benthos, in which Kajak applied experimental techniques *in situ*, appeared in 1968 (Kajak 1968). His other papers dealt with: trophic relations and predation (the role of *Chaoborus* larvae) in benthos; growth and production of larvae and their life cycle; methods for the assessment of benthic production; methods for studying the smallest, freshly hatched larvae (flotation method); and studies on meiobenthos – organisms of a size smaller than usually analysed and retained on a sieve. All this resulted in nearly 50 publications, some in international journals, a contribution to the international methods handbook (still being

used) and in a synthesis of results of the IBP programme, which finally appeared in 1981 through Cambridge University Press (Morgan *et al.* 1981).

In the 1970s, Kajak pursued his interests in the effects of intentional or unintentional changes in entire ecosystems or their large fragments isolated from the rest of the system (limnocorrals). We entered the era of biomanipulation through Kajak's and his colleagues' attempts but it did not receive enough attention in those days. First were the studies on the complex response of shallow Lake Warniak to experimentally altered fish stocks and on biocoenotic effects of the introduction of herbivorous and filter-feeding fish (silver carp). Then Kajak analysed changes of the thermal and mixing patterns in "heated" lakes (those receiving cooling waters from a power plant), the response of various lakes to increased nutrient inputs (experimentally driven eutrophication) and the effects of impoundment on river habitat and fauna. He also tested various methods of lake restoration (aeration, liming, introduction of seston-feeding fish). Nearly a hundred papers by Kajak from this period considered eutrophication (including the special monograph written in Polish and dealing with this process) and pollution of lakes and reservoirs. He recommended measures to minimise these effects and to restore natural values to lakes. Kajak's research and organisational activity in those days made him an expert in ecological applications and water protection in our country.

In the 1980s Kajak had the idea, to analyse complex problems of productivity and diversity, which was to be one of the most creative of his studies. He selected 44 lakes that were ordered in a way to form a constant trophic gradient from lowland mesotrophic to polytrophic with two morphometric variants – shallow (non-stratified) and deep dimictic. The studies enlarged our understanding of directional trophic changes in lakes and their biodiversity. The results were used to construct indices for lake monitoring introduced later to control lake water quality.

The last decade (the 1990s) brought new ideas and problems: complex analyses of lowland reservoirs, which resulted for example, in interesting studies on life strategies of chironomid larvae with the use of special devices to suspend fragments of bottom sediment layers in the water column. Kajak was deeply involved in the protection of rivers, particularly of the middle Vistula stretch; in 1983 he published an extensive study (a collection of papers) on the ecology of the Vistula River.

Professor Kajak's 50 years of professional achievements have produced over 250 research papers (monographs, chapters in books, standard papers and discussions) many of them in international journals and several still in press. He coordinated several national programmes, was a member of scientific councils and committees (Committee of Ecology, Man and the Biosphere Committee) and of editorial boards of journals

(including one international). His citation index long remained at a level of dozens per year and was one of the highest among Polish hydrobiologists. In 1988 Kajak became a full professor and in 1997 he was awarded a honorary membership of the Polish Hydrobiological Society, of which he was the founder and president for several terms. He was also a member of the International Association of Theoretical and Applied Limnology (SIL). He participated in its congresses and during the years 1955-1992 represented Polish hydrobiologists.

Kajak founded and chaired for 15 years the Department of Hydrobiology at the University in Bialystok. It was then a new centre of Polish hydrobiology. Kajak delivered hydrobiological and monograph lectures, supervised 25 masters and several Ph.D. students (the latter at the Institute of Ecology). He wrote a handbook on limnology (in 1994 and revised edition in 1998) entitled: "Hydrobiology – Limnology. Freshwater Ecosystems" (Kajak 1998 and 2001).

For his close co-workers at the Department of Hydrobiology, Institute of Ecology, PAS and at the Hydrobiological Station in Mikolajki, Kajak was an esteemed and friendly chief, a kind-hearted colleague who provided perceptive critiques but above all was an honest man. We will miss him!

Professor Kajak had deep feelings for his family, who always supported him and, in the last years, took care of him. His wife, Professor Anna Kajak, is a reputed soil ecologist and still an active specialist in arachnology. His children, daughter Danuta (veterinarian) and son Peter (engineer) are also professionally active. Four grandchildren were the joy of Professor Kajak's life.

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Announcements

DIALOG Symposium for recent Ph.D.s

The Dissertations Initiative for the Advancement of Limnology and Oceanography (DIALOG) is an interdisciplinary, international program for recent Ph.D. recipients across the biologically oriented aquatic sciences. The program includes:

Ph.D. Dissertation Registry. Abstracts are posted online at <http://aslo.org/dialog/dcite.html> in a searchable format to provide a concise overview of the field and highlight individual accomplishments.

Electronic Communication. The DIALOG e-mail list facilitates cross-institutional dialogue and provides graduates with job announcements, aquatic science news and other items of interest. Submit job and other announcements of interest for recent Ph.D.s to dialog@whitman.edu.

Symposium. Biennial symposia enable recent graduates to present their dissertation research and current interests in an interdisciplinary forum, meet peers from around the world, discuss emerging research, education and societal issues, and learn about national research initiatives and funding.

DIALOG V will be held October 19-24, 2003 at the Bermuda Biological Station for Research. Graduates who completed their Ph.D. between January 1, 2001 and March 31, 2003 and whose work is relevant to freshwater or marine biological/ecological science are eligible. Participation is limited to 40, with selection based on the application materials submitted. Travel support is provided by the sponsoring agencies (NASA, NOAA, NSF, ONR; support from the European Commission is pending).

Deadline for symposium applications is May 1, 2003.

Program information is available at: <http://aslo.org/phd.html>. For further information about the program, please contact:

C. Susan Weiler
DIALOG Program Director
dialog@whitman.edu

Reminder from the President

Dear Members of SIL:

Please give us your opinion!

Professor Robert G. Wetzel and I would appreciate your comments or suggestions on the proposed new Mission Statement for SIL which appeared on page 5, in Volume 35 of the January 2002 issue of SILnews. As I indicated in my earlier message to you, we want to adopt some version of this Mission Statement at the Congress in Finland in August, 2004 so your input is important.

Please forward your comments to: limnology@unc.edu **prior to 1 March 2003.**

Thank you.

Gene E. Likens

For Your Information

SILnews is now on the SIL web site in PDF format. The newsletter is created in Adobe Acrobat, Version 5. To open, use Adobe Acrobat Reader.

Reports on Working Groups

8th International Conference on Salt Lake Research

Since 1979 a series of international symposia on inland saline waters have served to strengthen and expand the scope of limnological research on salt lakes. The 8th International Conference on Salt Lakes (July 23-26, 2002) was held at the little spa resort town of Zhemchuzhny on hyposaline Shira Lake and hosted by the Institute of Biophysics of the Siberian Branch of the Russian Academy of Sciences (RAS) in Krasnoyarsk and the Republic of Khakassia. While the host country was well-represented by 127 Russian Federation scientists, the remoteness of the site and economic factors likely limited foreign participation to 26 scientists from Australia, Belgium, China, Germany, Great Britain, The Netherlands, Ukraine and USA.

The study of microbial processes is a very active area of research in saline lakes and was well-represented at the conference. While papers on bacterial processes, geochemistry, lake modelling, and biotechnological and medical purposes dominated, there was a scattering of papers on geology, paleoecology, hydrogeology, climatology, genetics, ecology and biogeography of invertebrates, and lake management. However, fish and bird scientists would have been disappointed and there were few review papers and hence little 'discussion on grand themes'. One innovation saw presenters of poster papers being given a few minutes to verbally explain their papers, though too many authors misunderstood the intentions and gave a full oral presentation

The conference was very well-organized by Prof. Andrei G. Degermendzhy, Director of the Institute of Biophysics, Siberian Branch of Russian Academy of Sciences and in addition to the scientific program included a tour of several nearby salt lakes, a concert including traditional and modern music (including throat singers), grand opening and closing banquets including many toasts with excellent Russian vodka, and the ever-present, helpful, and amiable troupe of translators. In addition to simultaneous translation of presentations from English to Russian and vice versa, translators dined with foreign participants at every meal and thus facilitated our visit.

Both opening and closing ceremonies and banquets were attended by the press and an array of local and regional

officials. There appears to be a sincere interest in understanding and protecting the unique natural and scientific resources represented by salt lakes in Khakassia. In closing the delegates passed a motion encouraging the local government to support salt lake research and protection. In summary, the conference afforded a valued exchange of information and networking between scientists from remote places. Andrei Degermendzhy and his team are to be congratulated and thanked for their efforts, against many odds, in organising this international conference.

Brian Timms

Chairman of the SIL Salt Lake Study Group
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Moving?

Send your change of address to:

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Book Reviews

Ecology, Culture and Conservation of a Protected Area: Fathom Five National Marine Park, Canada

Edited by S. Parker and M. Munawar

306 pp., 2001, hardbound

Backhuys Publishers, Leiden, The Netherlands

ISBN 90-5782-098-6, EURO 88.00/US\$ 86.00

In 1987, the Canadian government, in cooperation with the government of the Province of Ontario, set aside Fathom Five National Marine Park at the northern tip of the Bruce Peninsula. The new national park was the first of its kind. Since the establishment of Banff National Park in 1885, Canada's so-called special places had been restricted to terrestrial parks. Fathom Five was created under the new National Marine Conservation Areas [NMCA] initiative—an attempt by Parks Canada to ensure that Canada's rich ecological diversity is represented and protected.

Fathom Five was an excellent candidate for national marine park status. Straddling the Bruce Peninsula, which divides the distinct freshwater ecosystems of Georgian Bay and Lake Huron, the 135 km² marine park features 20 large islands, over 50 km of shoreline, and waters to the depth of 90 m on the east or “Niagara Escarpment” side. It is also complemented by the adjoining Bruce Peninsula National Park, established at the same time as Fathom Five. Unfortunately, there are no colour photographs of the “renowned” scenery described by the co-editors.

The book is a collection of eighteen papers, each devoted to some aspect of the marine park. After providing an overview of National Marine Conservation Areas in general and Fathom Five in particular, the articles examine the archaeological and marine history of the region, the geology and limnology, and the biological life; there are also two brief chapters on rock climbing and diving.

By far the greatest emphasis is on the ecology of the marine park. In fact, the paper on aquatic ecosystem health (the research area of one of the co-editors) represents one-sixth of the book. The chapter, however, would have benefited from a heavier editorial hand. It is also pedestrian in content and argument. There is little analysis of the limnology; the nutrient data is considered separately; and there is no attempt to compare the data to other oligotrophic systems outside the Great Lakes.

Culture and preservation, the other two topics in the book's title, are treated even less satisfactorily. There is no discussion, for example, of the challenges that Parks Canada might have faced in establishing a park in a popular recreational area—how difficult were the negotiations? Nor is there any detailed examination of how the park balances the demand for recreational access and the need to protect the ecological integrity of the region; in other words, how is the park managed? Similarly, there is little material on the late nineteenth/early twentieth century history of the region before the establishment of the park. There is a chapter on the shipping history of the region, but what about native-newcomer relations, logging, fishing, and tourism?

Collectively, the articles provide an introduction to Fathom Five and the reasons for its selection as Canada's first national marine park. They also underline the need for future detailed study.

Bill Waiser

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Freshwater Meiofauna: Biology and Ecology

Edited by S.D. Rundle, A.L. Robertson and
J.M. Schmid-Araya
370 pp., 2002, hardcover
Backhuys Publ., Leiden
ISBN 90-5782-109-5
EURO 96.00/US\$ 92.00

Freshwater meiobenthology has matured. Whereas Olav Giere's (1993) text book on 'meiobenthology' still treated fresh water as one of several 'selected biotopes'; the present editors expand Giere's 13 pages into a full-size book. At last, one should say!

The book consists of 14 chapters, the first seven of which deal with the biology and ecology of several taxonomic groups. These are followed by six chapters on the ecology of freshwater meiofauna. The last chapter is a coda and deals with the Micrognathozoa, a new class or phylum, which was discovered and described while the present book was being prepared.

The taxonomic chapters deal with microturbellarians, rotifers, gastrotriches, nematodes, water mites, microcrustaceans and tardigrades. Two observations need to be made here. First, the list of meiofaunal taxa is far from complete. Where are the Cnidaria, Mollusca, Oligochaeta, non-Cladoceran Branchiopoda and others? Secondly, within the treated taxa, there is a striking imbalance: the chapters on, for example, rotifers and nematodes can be considered comprehensive reviews (30 and 40 pages respectively), but others barely scratch the surface (Ostracoda, embedded in the chapter on microcrustacea, receive a meagre six pages). Already from this first part, it is clear that this volume is not a textbook and this impression is further corroborated by the absence of introductory chapters on study methods, sampling and processing techniques and general biological characteristics of meiofauna. Some of these topics are dealt with in the taxonomic chapters, but I would at least have expected a general overview of, say, available grabs, corers and dredges.

The next six chapters deal with integrated approaches towards ecological patterns and processes of freshwater meiofauna. These deal with temporal and spatial aspects, scaling of ecological processes and trophic and other functional relationships amongst various meiofaunal groups. Again, this is not the classic textbook style, but a subjective selection

of topics. In some of these, refreshingly new approaches are reviewed, such as the surface water- sediment linkages, while other useful viewpoints are confirmed, such as the spatial and temporal scaling of ecosystems and communities (introduced by Giller *et al.* in 1994 and furthered here). The use of the landscape approach to understand small-scale patterns (chapter 8) is a case in point. Temporary habitats are, for once, not forgotten (chapter 10), but the treatment relies nearly exclusively on North American and Australian examples and novel work on Africa and Europe (Brendonck), Israel (Blaustein) and others is ignored. Also other chapters show subjective choices. Exciting phenomena, such as geographical parthenogenesis, are not dealt with, although it would have been a logical consequence of the discussion on the effects of glaciations on microcrustacean distribution. Also, some of the most fascinating non-marine habitats, the long-lived lakes with their high levels of biodiversity and endemism, are all but ignored. Lake Baikal is mentioned once, but this is the only ancient lake out of more than 30 lakes cited. I have also wondered why this book excludes saline continental habitats, and why it is called *meiofauna*, whereas almost all examples refer to meiobenthos, but this was clearly a conscious choice of the editors.

Freshwater meiofauna is not the ultimate treatise on that subject. Rather, it highlights a number of fields in which exciting progress has been made and these are reviewed in stimulating ways. Most of these topics are ecological, but the last chapter on the Micrognathozoa illustrates that novel higher taxa can also still be found in freshwater habitats, not only in seas and oceans. The book has an attractive format and layout, is well-produced and, as we have come to expect from Backhuys, is relatively reasonably priced. I recommend this book to all meiobenthologists, freshwater or other.

References Cited:

- Giere, O. 1993. Meiobenthology. The microscopic fauna in aquatic sediments. Springer Verlag, Berlin, 328 pp.
- Giller, P.S., Hildrew, A.G. and Raffaelli, D.G. 1994. Aquatic ecology: scale, pattern and process. Blackwell sci. Publ., Oxford, 649 pp.

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Sri Lanka Freshwater Fauna and Fisheries

by C.H. Fernando and S.R. Weerewardhena
634 pp. 2002, ISBN 955-97697-0-7
Volumes Publishing, Kitchener, Ontario N2B 2B9, Canada
Contact: chfernan@sciborg.uwaterloo.ca
fax: (519) 746-0614
or zoosrw@kln.ac.lk; fax: 94 1 911 916
or the publisher directly at www.volpub.com
(payment in US funds)
US \$55.00 or 1400 rupees in Sri Lanka (includes postage)

This weighty quarto-sized tome is essentially a collation made from photocopies of many papers published by Herbert Fernando and his associates from 1956 to 2000 on the fauna and fisheries of his birthplace, Sri Lanka (Ceylon). It has two main themes.

The first centres around his original 1962 Guide to the Freshwater Fauna of Ceylon and its several subsequent supplements. These often stress particular groups on which further work had been done; and they have been accompanied by other papers dealing with particular groups, such as rotifers and parasitic copepods. Several of these additions have enrolled the help of international experts in the groups considered. Throughout the text there are identification keys and abundant illustrations to help with identifications, and there are long lists of references. Also, beginning on page 423, there is an index to the invertebrates and vertebrates mentioned throughout the composite text. So the whole compendium is, in effect, an excellent introduction to the freshwater fauna of southern Asia.

The second theme deals with the freshwater fishes and fisheries of Sri Lanka, with particular emphasis on the fisheries of, and the potential provided by, the reservoirs, which in that island of rice fields are abundant and widespread. This section also provides many maps and photographs, although the latter have not reproduced as well as the line and stipple drawings in the invertebrate documents. It also deals with such topics as the feeding of fishes, the introduction of alien species and other concerns involving production of food fishes in the tropics.

Although the reader will have to learn to navigate through the text, the book is a library on the freshwater fauna of the island. It offers an introduction to the fauna of the southern part of Asia, making keys to and access to the literature on

freshwater invertebrates and many aspects of fisheries in a wide area. I anticipate that it will serve as an entry point into much further work. As, for example, did Die Süßwasserfauna Deutschland, the Scientific Publications series of the Freshwater Biological Association, and the book, Australian Freshwater Life by the late W.D. Williams did for Germany, Britain and Australia respectively. It can also provide good information for anyone thinking of moving fish species around the landscape. Here, in North America, there is a tendency to regard any introduction of an alien species as a bad move: viz., the zebra mussel and the so-called Asian carp. Sri Lankan experience seems to be different, and this may have some beneficial effect on the thinking on this continent, where, let's face it, only the turkey among our domestic animals is a native. We, as aliens ourselves including the Amerindians, would be in trouble without most of our food plants and nearly all of our animals.

Reference cited:

Mendis, A.S. and Fernando, C.H. 1962. A Guide to the Freshwater Fauna of Ceylon. Bulletin of the Fisheries Station Ceylon **12**:1-160.

H.B.N. Hynes

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World Directory of Crustacea Copepoda of Inland Waters. I. Calaniformes

By B. Dussart and D. Defaye
276 pp., paperbound, 2002
Backhuys Publishers, Leiden, The Netherlands
ISBN 90-5782-108-7
EURO 62.00

French workers Bernard Dussart and Danielle Defaye have done a great service to limnological copepodologists by compiling this very useful directory. The task they set themselves was not for the faint-hearted. They have succeeded in bringing together a huge amount of widely scattered literature and have produced order out of chaos.

This new work is a highly amended and enlarged version of their 1983 “Répertoire Mondial des Crustacés Copépodes des eaux intérieures 1.- Calanoïdes”. Apart from the fact that translation into English will bring this work before a wider audience, accuracy has been greatly improved. In the Centropagidae, for example, I found a significant number of errors in the original French version, but these have all been rectified in this new work.

This monograph is not just for the taxonomist, for it includes references to general biology, ecology and physiology. Also, coverage is not restricted to fresh waters since euryhaline species, characteristic of estuaries and lagoons, in such families as the Pseudodiaptomidae and Acartiidae, are included. The index is comprehensive and highly convenient in that it includes synonyms in differentiated type, thus enabling the reader to establish quickly the current valid name.

There are some 1,800 references (the original version had only 950), and having checked a fair subsample of these, I am happy to say that they have been compiled with much care and are, in general, highly accurate. In a work of this magnitude and complexity perfection is probably unobtainable, and a few small glitches have been detected. For example, the original (1967) description of *Boeckella bispinosa* is cited on page 21 but omitted in the list of references on page 192. Conversely, Ough and Bayly (1989) appears in the references (p.236) but is not cited for *Sulcanus* on page 54.

I strongly recommend the purchase of this volume to all serious students of copepods occurring in inland waters and estuaries. Libraries servicing limnological interests should also have a copy for reference.

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Rotifera, Volume 6: Asplanchnidae, Gastropodidae, Lindiidae, Microcodidae, Synchaetidae, Trochosphaeridae and *Filinia*

Edited by T. Nogrady and H. Segers
264 pp., 2002, paperbound
Backhuys Publishers, Leiden, The Netherlands
ISBN 90-5782-111-7, EURO 66.00/US\$ 63.00

This sixth volume in the series “Guides to the Identification of the Microinvertebrates of the Continental Waters of the World” contributes to the taxonomy of six families of the phylum Rotifera. The volume is a very thorough compilation of the known species in these families and resolves or at least addresses the taxonomic status of synonyms and poorly described species. The contribution by E.D. Hollowday on the Synchaetidae is the most comprehensive taxonomic work of *Synchaeta* (including marine species), *Polyarthra*, and *Ploesoma* that has been done. Likewise, chapters on the Asplanchnidae by S. Jose de Paga, Gastropodidae by S. Radwan and I. Bielanska-Grajner, and of the genus *Filinia* by L. Sanoamuang are also very good and complete. H. Segers provides a framework for the organization and identification of species in the poorly known Family lindiidae. Illustrations and scanning electron microscope (SEM) photomicrographs of the minor families Microcodidae and Trochosphaeridae in chapters by W.H. De Smet and H. Segers, respectively, give a more complete perspective on the taxonomy of these groups than what has been previously available.

The quality of line drawings varied across chapters but the majority of illustrations are quite good and informative. There is ample inclusion of SEM photomicrographs that depict the fine structure of important taxonomic features that otherwise are difficult to interpret using light microscopy. Both numerical and dichotomous keys are presented for most of the families giving the user an option and means to cross validate species identifications. The volume does not include ecological information which can be useful for species identifications nor a glossary of taxonomic terms that would be helpful to non-specialists. Overall, this volume will be a welcome addition to the reference libraries of zooplankton taxonomists and ecologists.

Richard S. Stemberger
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Calendar of Events

5th International Conference on Environmental Future: The Future of Aquatic Ecosystems. 23 - 27 March, 2003
Zurich, Switzerland
Contact: Christiane Rapin
EAWAG
8600, Dubendorf, Switzerland
icef@eawag.ch
www.icef.eawag.ch

The 3rd International Limnogeology Congress (ILIC).
29 March - 2 April 2003
Tucson, Arizona, USA
Contacts:
Theme session information:
Andrew Cohen, General Chair of the Congress
Dept. of Geosciences
University of Arizona
Tucson, AZ 85721 USA
ILIC3@geo.arizona.edu
Phone: 1 (520) 621-4691
Fax: 1 (520) 621-2672
Field trip information:
David Dettman
Field Trip Coordinator for the Congress
dettman@geo.arizona.edu
<http://w3.arizona.edu/~uaextend/ilic3/>

River Basin Management 2003 - Second International Conference on River Basin Management - all aspects of Hydrology, Ecology, Environmental Management of Rivers, Flood Plains and Wetlands.
28 - 30 April 2003
Las Palmas, Gran Canaria
Contact: Conference Secretariat - River Basin03, Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA, UK
shobbs@wessex.ac.uk
Telephone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
<http://www.wessex.ac.uk/conferences/2003/riverbasin03/>

The 7th International Symposium on Fish Physiology, Toxicology, and Water Quality.
12 - 16 May 2003
Tallinn, Estonia
Contact: Michelle White
Montana Water Center
101 Huffman, MSU
Bozeman, MT 59717 USA
mdwhite@montana.edu
Phone: (406) 994-6690
<http://water.montana.edu/symposium/>

2nd International Symposium on Contaminated Sediments: Characterisation, Evaluation, Mitigation/Restoration, Management Strategy Performance.
26 - 28 May 2003
Quebec City, Quebec, Canada
Contact: H  l  ne Tremblay
Secretariat of the Symposium on Contaminated Sediments
D  partement de g  ologie et de g  nie g  ologique
Universit   Laval
Qu  bec, QC
G1K 7P4
Canada
htrembla@ggl.ulaval.ca
Phone: 1 (418) 656-2193
Fax: 1 (418) 656-7339
<http://www.SCS2003.ggl.ulaval.ca>

51st Annual Meeting
North American Benthological Society.
27-31 May 2003
Athens, Georgia, USA
<http://www.benthos.org/>

ECOSUD 2003 - Fourth International Conference on Ecosystems and Sustainable Development.
4 - 6 June 2003
Siena, Italy
Contact: Conference Secretariat, Ecosud03
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton SO40 7AA, UK
gcosutta@wessex.ac.uk
Phone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
www.wessex.ac.uk/conferences/2003/ecosud03/index.html

Water Pollution 2003 - Seventh International Conference on Modelling, Measuring and Prediction of Water Pollution.
18 - 20 June 2003
Cadiz, Spain
Contact: Conference Secretariat - Water Pollution03
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA, UK
rgreen@wessex.ac.uk
Telephone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
<http://www.wessex.ac.uk/conferences/2003/water03/>

Lake Shores 2003 - Ecology - Quality Assessment - Sustainable Development.
19 - 21 June 2003
University of Constance
Konstanz/Lake Constance
Constance, Germany
Contact:
Conference Bureau LAKESHORES 2003
PDDr. Wolfgang Ostendorp
Limnologisches Institut
Universit  t Konstanz
D-78457 Konstanz
GERMANY
seeufer2003@uni-konstanz.de
lakeshores2003@uni-konstanz.de
www.uni-konstanz.de/lakeshores2003

ILEC's upcoming 10th World Lake Conference - Global Threats to Large Lakes: Managing in an Environment of Instability and Unpredictability. Co-hosted by ILEC and the International Association of Great Lakes Research (IAGLR).
22 - 26 June 2003
Shores of Lake Michigan, Chicago, Illinois, USA
Contact: (ILEC)
International Lake Environment Committee
10th World Lake Conference Secretariat
1091 Oroshimo-cho
Kusatsu-shi, Shiga 525-0001
JAPAN
chicago2003@ilec.or.jp
Phone: +(81-77) 568-4567
Fax: +(81-77) 568-4568
<http://www.iaglr.org/conference/conference.html>
<http://www.ilec.or.jp/eg/wlc.html>

Symposium for European Freshwater Sciences (SEFS3) (co-ordinated by the FBA, in collaboration with other European freshwater and limnological Associations).
13 - 18 July 2003
University of Edinburgh
Scotland, UK
Contact: Freshwater Biological Association (FBA), SEFS Office, The Ferry House, Far Sawrey, Ambleside, Cumbria, LA22 0LP, U.K.
sefs3@fba.org.uk
Tel: +44 (0) 15394 42468
Fax: +44 (0) 15394 88541
www.fba.org.uk

CILEF Congress 2003
7th International Conference of French-speaking
Limnologists (CILEF-2003) CILEF: Conférence
Internationale des Limnologues d'Expression
Française.

27 July - 1 August 2003
Montréal, Québec, Canada
Contacts: Bernadette Pinel-Alloul, CILEF-2003
Conference Coordinator
bernadette.pinel-alloul@umontreal.ca
CILEF-2003 Secretary, Claudette Blanchard
claudette.blanchard@umontreal.ca
GRIL, Département de sciences biologiques
Université de Montréal
C.P. 6128, Succ. Centre ville
Montréal, QC
H3C 3J7
Canada
Tel: +01-514-343-6190
Fax: +01-514-343-6216
<http://mapageweb.umontreal.ca/pinelb/CILEF2003.htm>

The 4th Conference of SIL Working Group on
Aquatic Birds - Limnology and Waterbirds 2003.
4 - 9 August 2003
Sackville, New Brunswick, Canada
Contact: Joseph Kerekes
Environment Canada
45 Alderney Drive
Dartmouth, Nova Scotia
B2Y 2N6
Canada
joe.kerekes@ec.gc.ca
Phone: (902) 426-6356
Fax: (902) 426-4457
<http://www.links.umoncton.ca/lw/>

4th International Symposium of Phosphate in
Sediments.
9 - 12 September 2003
Sevilla, Spain
Contact: Laura Serrano
Dep. Plant Biology and Ecology
University of Sevilla
P.O. Box 1095
Sevilla 41080, Spain
serrano@us.es or golterman@wanadoo.fr
Phone: (34) 954 55 70 63
Fax: (34) 954 62 63 08
www.uv.es/ael

International Conference on Remediation of
Contaminated Sediments.

30 September - 3 October 2003
Venice, Italy
Contact: Marco Pellei
Battelle-Geneva Research Centre
Geneva, Switzerland
sedimentscon@battelle.org
Fax: 41 22 827-2094
Abstracts can be submitted to:
www.battelle.org/sedimentscon

Ninth International Symposium on Aquatic
Oligochaete Biology. This symposium is being
sponsored and organized by Alterra, Green Word
Research (Department of Ecology &
Environment), and Wageningen University
(Department of Environmental Technology).
6 - 10 October 2003
Wageningen, The Netherlands
For additional information, please contact:
Piet Verdonschot or Rebi Nijboer
Alterra, Green Word Research
Team of Freshwater Ecology
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7700 AA Wageningen
The Netherlands
oligochaeta@alterra.wag-ur.nl
Phone: +31 317 477933/ +31 317 47837
Fax: +31 317 424988

Symposium on Urbanization and Stream Ecology.
8 - 9 December 2003
Melbourne, Victoria, Australia
Contact: Chris Walsh
CRC for Freshwater Ecology
Water Studies Centre
Monash University
Clayton 3800 AUSTRALIA
Chris.Walsh@sci.monash.edu.au
Phone: +61 3 9905 4091
Fax: +61 3 9905 4196

2004

52nd Annual Meeting
North American Benthological Society.
May/June 2004
Vancouver, British Columbia, Canada
<http://www.benthos.org/>

SIL XXIX Congress.
8 - 14 August 2004
Lahti, Finland
Contact: Congress Management Office,
University of Helsinki
Palmenia Centre
for Research and Continuing Education
Kirkkokatu 16
15140 Lahti
Finland
sil2004@latkk.helsinki.fi
Phone: + 358 3 892 11
Fax: + 358 3 892 20219
www.palmenia.helsinki.fi/congress/SIL2004

2005

53rd Annual Meeting
North American Benthological Society.
Although previously planned as a joint meeting
with the Council of Aquatic Sciences, for June/
July 2005 (Portland, Oregon, USA), this joint
meeting concept has been postponed. NABS will
meet as usual, in May/June 2005; venue not yet
chosen.
<http://www.benthos.org/>

2006

The Tenth International Symposium on Aquatic
Oligochaete Biology.
2006
Tentatively scheduled to convene at:
The Institute of Hydrobiology
Chinese Academy of Sciences
Wuhan Hubei, People's Republic of China
Contact: Hongzhu Wang
Chair of the symposium organizing committee
State Key Laboratory of Freshwater Ecology and
Biotechnology Institute of Hydrobiology
Chinese Academy of Sciences
Wuhan Hubei 430072
People's Republic of China
wanghz@ihb.ac.cn or hongzhu.wang@nrm.se
Phone: (86) 27 8764-7719
Fax: (86) 27 8764-7664

The Fourth World Water Forum.
19 - 25 March 2006
Montreal, Quebec
Canada

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Submissions for the SIL web site should be sent by e-mail to webmaster@limnology.org or by fax to the attention of Gordon Goldsborough at: +1 (204) 474-7650.