www.limnology.org

SIL news

Volume 45 - May 2005

The International Association of Theoretical and Applied Limnology works worldwide, to understand lakes, rivers and wetlands and to use knowledge, gained from research, to manage and protect these diverse, inland aquatic ecosystems.

In this Issue

Material for the September 2005 issue should be sent to the Editor for:

June 1, 2005

Richard D. Robarts, or
Clara A. Fabbro, Assistant Editor
Environment Canada
National Water Research Institute
11 Innovation Blvd., Saskatoon, SK
S7N 3H5 CANADA
clara.fabbro@ec.gc.ca
fax: (306) 975-5143

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

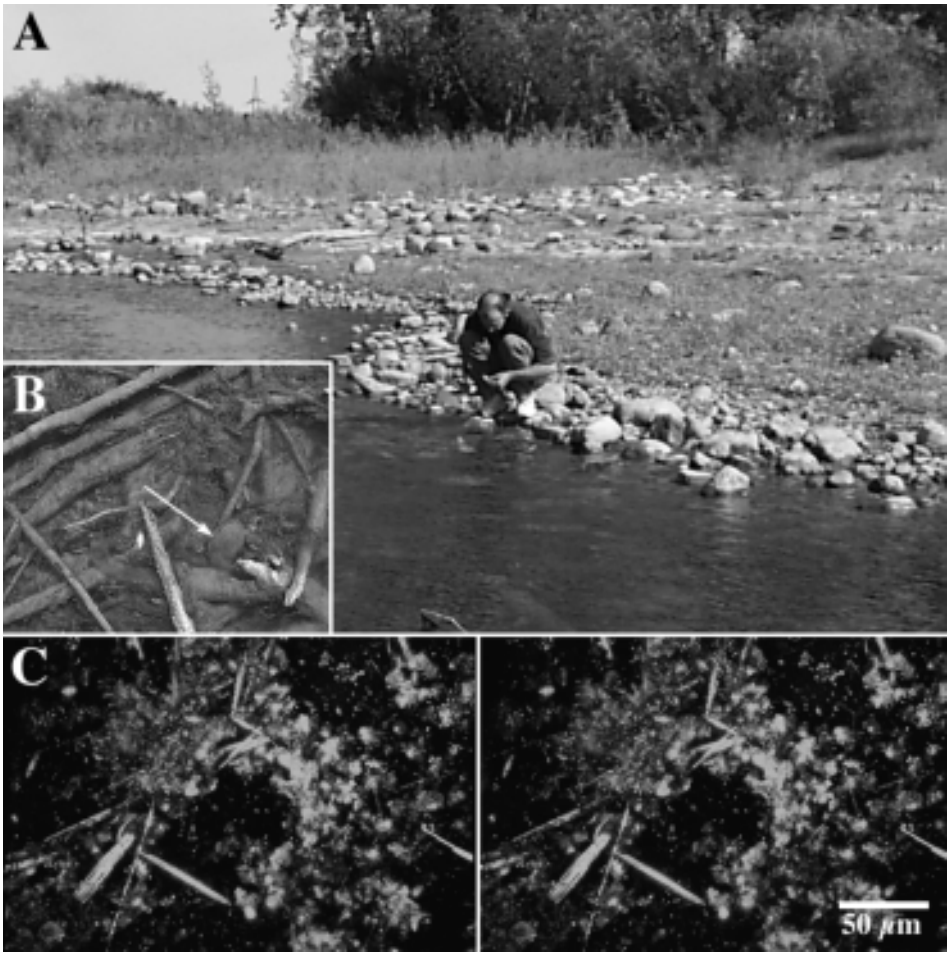


Figure 1. (a) The nature of the South Saskatchewan River bank with technician George D.W. Swerhone observing the river bottom at Saskatoon, Saskatchewan, Canada, 2001, (b) inset shows the river bottom with shells, tree branches and rocks which are typical surfaces for development of biofilm and periphyton communities, (c) is a three channel stereo pair calculated from an image stack taken using one-photon LSM, shown in greyscale illustrating the 3D appearance of the river biofilm at the microscale with diatoms, filamentous algae, bacteria and exopolymeric materials imaged by autofluorescence, nucleic acid staining and lectin staining, respectively (best viewed with stereo glasses).

Modern Microscopic Techniques for Studies in Aquatic Microbial Ecology

by

John R. Lawrence and Thomas R. Neu

continued on next page

Microscopy has played an important role in the development of environmental microbiology and microbial ecology (see for example; reviews by Caldwell *et al.* 1992; Lawrence *et al.* 2002a, Neu and Lawrence 2004). Through the application of microscopy and affiliated techniques it is possible to address major questions in ecology: defining population dynamics in communities, defining the characteristics of the (micro) environment and understanding metabolic processes in the natural habitat. Conventional microscopy has considerable utility for studies of enumeration, taxonomy, morphology etc. However, it is limited to prepared and relatively thin materials for optimum imaging. New microscopies generally are digital in nature and result in images with a higher extractable information content. The development of laser scanning microscopy (LSM) with one-photon and two-photon excitation revolutionized optical imaging resulting in a renewed interest in the application of microscopic approaches in microbial ecology. Indeed it has become apparent that one of the most versatile tools to investigate microbial communities under in situ conditions is laser scanning microscopy (Lawrence *et al.* 2002a). In some laboratories laser scanning microscopy (single-photon excitation) has become a routine investigative tool, and two-photon LSM is increasingly utilized to extract information from microbial systems (Neu *et al.* 2002; Neu *et al.* 2004a,b).

These approaches allow optical sectioning of fully hydrated living microbial biofilms, aggregates, flocs and other complex microbial structures providing a detailed, haze free, three dimensional image of the materials under examination. The user can employ either one-photon or two-photon excitation to assess a wide variety of community and population-specific parameters. When LSM is coupled with environmentally sensitive probes that are commercially available (e.g., Molecular Probes Inc.), direct data may be acquired on diffusion, redox, as well as pH and ion concentrations. Information may be obtained on cell viability, specific enzyme activities, metabolic rates, the nature of expolymeric substances in microbial communities, while fluorescent antibodies or oligonucleotide probes provide information on the taxonomic affiliation and growth rates of microorganisms. Using various imaging options, information on the phototrophic members of the community can be obtained from their autofluorescence and by reflectance signals obtained by LSM. In particular this microscale approach has emphasized the importance of the extensive structural complexity and heterogeneity of microbial communities.

We have outlined a step-by-step strategy for the microscale analyses of unknown environmental samples which takes advantage of the various imaging options of the current LSM systems (Neu and Lawrence 2004). This includes reflectance imaging to detect minerals and other reflective structures; autofluorescence to detect signals of algae and cyanobacteria as well as other specific bacteria, i.e., methanogens; fluorescence imaging with sequential applications of nucleic acid stains to detect bacteria; application of lectins to detect and quantify exopolymeric substances; use of differential live-dead staining to assess metabolic state; application of fluorescent enzyme substrates to localize and measure enzyme activities such as phosphatase, esterase or glucose oxidase; rRNA targeted probes may be used to identify and localize specific bacterial species through fluorescent in situ hybridization (FISH), while microautoradiography in combination with FISH may be used to determine their role in specific metabolic activities (MAR-FISH, Lee *et al.* 1999).

The development of microscopic approaches in microbial ecology is closely paralleled by the development of digital image analyses and three dimensional visualization techniques. These allow the user to obtain quantitative data from LSM images providing for the maximum extraction of information from biological samples. The most common application is simple counting of bacteria in aquatic samples but as indicated above the information content of images can greatly exceed enumeration. A number of commercial and freeware packages allow the analyses of images and image stacks from LSM, for example ImageJ (*http://rsbinfo.nih.gov/ij/*) or commercial packages such as AMIRA (TGS) or IMARIS (Bitplane) which are advanced 3D visualisation packages with many options including deconvolution, a mathematical process which can enhance the clarity of digital images obtained using epi-fluorescence or LSM.

The microscale analytical approach combining LSM microscopy, a variety of reporters and digital image analyses and reconstruction has been used successfully by a number of authors examining a variety of habitats. We have used this approach to study biofilms and aggregates from the Saskatchewan River in Canada and the Elbe River in Germany (Lawrence and Neu 2004). Figure 1 shows the nature of the river bank and the inset shows the river bottom with shells, tree branches and rocks, which are typical surfaces for development of biofilm and periphyton communities. Figure 1(c) is a three channel stereo pair calculated from an image stack taken using one-photon LSM, shown in greyscale, illustrating the 3D appearance of the river biofilm at the microscale with diatoms, filamentous algae, bacteria and exopolymeric materials imaged by autofluorescence, nucleic acid staining and lectin staining, respectively. Battin *et al.* (2003) examined the effect of current velocity on the architecture and dynamics of natural, multiphyla, and cross-trophic level biofilms from a forested piedmont stream. They combined laser scanning microscopy with cryosectioning to observe biofilm structure and composition. Consistent with other reports they found that biofilm growth started as bacterial microcolonies embedded in extracellular polymeric substances and transformed into ripple-like structures. They reported, based on LSM analyses, that microstructural heterogeneity was dynamic and biofilms that developed under slower velocities were thicker and had larger surface sinuosity and higher areal densities than their counterparts exposed to higher velocities. They speculated that these changes reduced resistance to the mass transfer of solutes from the water column into the biofilms.

Lawrence *et al.* (2004) examined the effects of nickel, oxygen, and nutrients on the development of river biofilm communities; including biofilm architecture and community composition, at the microscale using LSM, digital image analyses and a panel of fluorescent reporters. The authors indicated that the effects of Ni were apparent in the elimination of cyanobacterial populations and reduced photosynthetic biomass. Fluorescent lectin binding analyses indicated changes in exopolymer abundance and a shift in the glycoconjugate makeup of the community in response to all treatments. The fluorescent live-dead stain (BacLight Live-Dead; Molecular Probes, Eugene, Oreg.) indicated an increase in the ratio of live to dead cells under low-oxygen conditions; the nickel treatments had 50 to 75% fewer 'live' cells than their corresponding controls. These observations were also correlated with other conventional and molecular approaches which supported the overall impact of the treatments on river biofilm development. Figure 2 illustrates the change in the composition of the riverine microbial communities in response to the treatments.

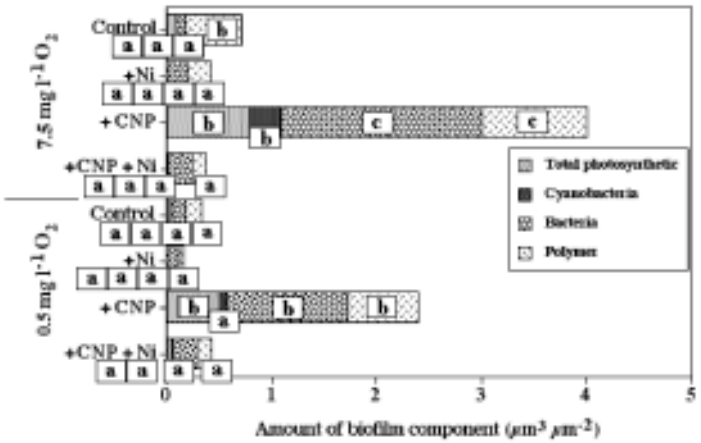


Figure 2. Results of image analyses of confocal laser micrographs illustrating the effects of the treatments on the relative abundance of algae, cyanobacteria, bacteria, and exopolymers in river biofilms by treatment (reprinted from Lawrence et al. *2004. Parameters marked with the same letter are not significantly different $p < 0.05$).*

The microscale approach has proven useful in investigations of the effects of nutrients, seasonal changes, impacts of nickel, hydrocarbons and how grazing influences microbial community development and recovery (Lawrence and Neu 2004). Figure 3 illustrates the changes that occur in a biofilm after grazing by a snail.

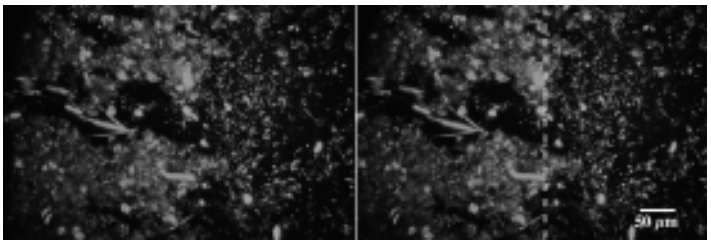


Figure 3. LSM micrographs projected as a stereo pair showing the changes that occur in a biofilm after grazing by a snail (right side of dotted line in image). Note the removal of photosynthetic biomass and exopolymer while a residual bacterial layer is left to initiate regrowth of a more heterotrophic biofilm (best viewed with stereo glasses) (see also, Lawrence et al. *2002b).*

The emergence of new imaging techniques for application in microbial ecology promises enhanced resolution and increased information content. These include fluorescent lifetime imaging (FLIM) an add on to two-photon systems, in this case the life of the fluorescent signal is imaged rather than its intensity as occurs in conventional LSM or fluorescence imaging. Applications for FLIM include: (i) detection of multiple fluorochromes, (ii) measurement of ion concentrations (e.g., pH, calcium), (iii) determination of oxygen concentration without using electrodes, and (iv) additional information on the probing of the microenvironment from the binding status of the fluorochrome. Neu *et al.* (2004a) recently demonstrated this approach to determining the metabolic status of bacteria in microbial communities. Two-photon excitation may also be used for coherent anti-stokes Raman scattering (CARS) microscopy which uses vibrational contrast without fluorescent probes. The CARS signal is also generated in the focal region only allowing the collection of 3D data sets as in two-photon or one-photon LSM. The application of synchrotron radiation; such as soft x-rays in scanning transmission x-ray microscopy, can provide further increases in the information content of images through spectroscopic analyses and the use of known spectra to map distributions of metals, other elements and biomolecules (protein, nucleic acids, lipids, carbohydrates) in living hydrated biofilms as demonstrated by Lawrence *et al.* (2003).

Other microscope techniques to watch for include a number promising enhanced resolution such as second harmonic imaging microscopy; another new technique using two-photon excitation; 4 pi microscopy which increases the numerical aperture and the axial resolution of the microscope by using two opposing lenses (commercial systems are now available); or stimulated emission depletion (STED) which also promises to enhance resolution in microscopy; and, near-field scanning optical microscopy (NSOM) promises a resolution of approximately 50 nm. Typically, optical microscopy has a resolution in the range of half of the wavelength of the light used for imaging, in practical terms this translates into a resolution of about 200 nm laterally and 600 nm axially, thus these new approaches may result in dramatic improvements in this area.

The continuing importance of digital imaging and image analyses in microbial ecology is shown in recent reviews (Neu and Lawrence 2004; Lawrence and Neu 2004; Neu *et al.* 2004a) and a spate of publications that focus on state of the art optical imaging; for example, articles in Nature Biotechnology, 2003, Vol. 21. It may be worthwhile to note that although LSM started as a tool in materials science and was used to examine such items as semi-conductors and mayonnaise, it has become a versatile and valuable tool for research in aquatic microbial ecology. One can anticipate the emergence and contributions of additional imaging technologies in the field.

References cited:

Battin, T.J., Kaplan, L.A., Newbold, J.D., Cheng X. and Hansen, C. 2003. Effects of current velocity on the nascent architecture of stream microbial biofilms. *Appl. Environ. Microbiol.* **69**:5443-5452.

Caldwell, D.E., Korber, D.R. and Lawrence, J.R. 1992. Confocal laser microscopy and computer imaging analysis in microbial ecology. *Advances in Microbial Ecology.* **12**:1-67.

Lawrence, J.R., Chenier, M., Roy, R., Beaumier, D., Fortin, N. Swerhone, G.D.W., Neu, T.R. and Greer, C.W. 2004. Microscale and molecular assessments of the impacts of nickel, nutrients and oxygen level on river biofilm communities. *Appl. Environ. Microbiol.* **70**:4326-4339.

Lawrence, J.R., Korber, D.R., Wolfaardt, G.M., Caldwell, D.E. and Neu, T.R. 2002a. Analytical imaging and microscopy techniques. 2nd Ed. Manual of Environmental Microbiology, Hurst, C.J., Crawford, Ronald L., Knudsen, G.R., McInerney, M. and Stetzenbach, L.D. (eds.) *American Society for Microbiology Press*, Washington, D.C. pp. 39-61.

Lawrence, J.R. and Neu, T.R. 2004. Microscale analyses of the formation and nature of microbial biofilm communities in river systems. Reviews in *Environmental Science and Biotechnology*. **2**(2-4):85-97.

Lawrence, J.R., Scharf, B., Packroff, G. and Neu, T.R. 2002b. Microscale evaluation of the effects of grazing by invertebrates with contrasting feeding modes on river biofilm architecture and composition. *Microbial Ecology.* **44**:199-207.

Lawrence, J.R., Swerhone, G.D.W., Leppard, G.G., Araki, T., Zhang, X., West, M.M. and Hitchcock, A.P. 2003. Scanning transmission x-ray, laser scanning and transmission electron microscopy mapping of the exopolymeric matrix of microbial biofilms. *Appl. Environ. Microbiol.* **69**:5543-5554.

Lee, N., Nielsen, P.H., Adreasen, K.H., Juretschko, S., Nielsen, J.L., Schleifer, K.-H. and Wagner, M. 1999. Combination of fluorescent in situ hybridization and microautoradiography - a new tool for structure function analyses in microbial ecology. *Appl. Environ. Microbiol.* **65**:1289-1297.

Neu, Thomas R., Kuhlicke, Ute and Lawrence, John R. 2002. Assessment of fluorochromes for 2-Photon Laser Scanning Microscopy (2-PLSM) of biofilms. *Appl. Environ. Microbiol.* **68**:901-999.

Neu, T.R. and Lawrence, J.R. 2004. One-photon versus Two-photon Laser Scanning Microscopy and Digital Image Analysis of Microbial Biofilms. Chapter 4, In: Microbial Imaging, *Methods in Microbiology*. **34**:87-104.

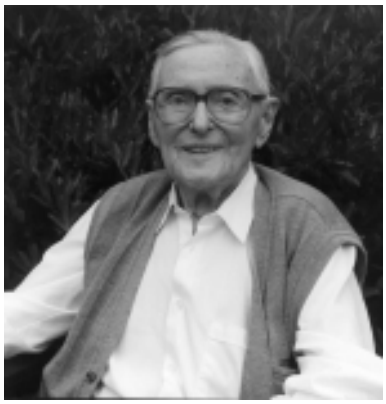
Neu, T.R., Walczysko, P. and Lawrence, J.R. 2004a. Two-photo imaging for studying the microbial ecology of biofilm systems. *Microbes and Environments.* **19**:1-6.

Neu, T.R., Wölfl, S. and Lawrence, J.R. 2004b. 3-dimensional differentaition of phototrophic biofilm constituents by mult-channel confocal and 2-Photon laser scanning microscopy. *Journal of Microbiological Methods.* **56**:161-172.

John R. Lawrence
National Water Research Institute
Canada
John.Lawrence@ec.gc.ca

Thomas R. Neu
UFZ Centre for Environmental Research Leipzig-Halle
Germany
Thomas.Neu@ufz.de

Prof. Dr. Harald Sioli 1910-2004



Prof. Sioli at his senior's residence in Ruhleben, Plön in July 2004.

On 14 October 2004 Prof. Dr. Harald Sioli passed away in Plön. His professional life was strongly focussed on the Amazon region. In 1934, before the beginning of the Second World War, he went to Brazil to initiate and conduct ecophysiological studies on toads in the dry northeastern part of the country. His studies were interrupted by the war. In 1945, after the release from war-related internment, he started the first limnological investigations in Amazonia. But he looked at the Amazon region not as a limnologist but in the sense of Bluntschli as a unit of land, water, and forest, as a landscape-ecologist, a term first used by Troll.

Based on the local terminology of white-water, black-water, and clear-water used by the local population and first mentioned by Wallace in scientific literature in the middle of the last century, Sioli applied hydrochemical and physical parameters to elaborate a scientific classification system of Amazonian rivers. He studied the relationship between water quality and soil conditions and was a pioneer in describing the large scale hydrogeochemical structure of the Amazon basin.

He explained the existence of the large fringing floodplains of the Amazon River and its major tributaries with sea level oscillations during glacial and interglacial periods. He related the various types of floodplains and their specific structures to differences in the sediment load of the rivers, which he explained by geological and geomorphological differences in the respective catchment areas and variations of vegetation cover. Some decades later his considerations were confirmed by his collaborator, the mineralogist, Georg Irion.

The extreme nutrient poverty of many Amazonian streams and rivers led to Sioli's statements about the poverty of soils in the catchment areas. He contradicted public opinion about the high fertility of Amazonian soils and pointed to the low agricultural potential of Central Amazonia during a period when the Brazilian government began to initiate plans for large scale agro-industrial development of the region. Therefore, in the middle of the 1970s, he was often heavily criticized by Brazilian development planners. Today we know that these critics were wrong.

The strong recognition of Sioli's work resulted in his appointment in 1957 by the Max-Planck-Society as Director of the Plöner Hydrobiologische Anstalt, known as Max-Planck-Institute for Limnology (MPIL). From Plön he continued his work in the Amazon region in collaboration with Djalma Batista, at that time Director of the National Institute for Amazonian Research (INPA) at Manaus. In 1965, they co-founded the international scientific journal AMAZONIANA that publishes limnological and landscape-ecological articles about the Neotropis. In 1966, the Max-Planck-Institute for Limnology was divided into two departments. Sioli became Director of the Department for Tropical Ecology and focussed his activities on studies of the Amazon. In 1969 a contract for scientific collaboration was signed between the Brazilian Research Council (CNPq) and the Max-Planck-Society (MPG). The contract was renewed and amplified in 1984.

After his retirement in 1978, the collaboration between INPA and MPIL Plön continued as did Sioli's engagement with tropical ecology. His landscape-ecological research approach, that he presented at many international congresses, was of interest to many ecologists, not only those in the tropics. With more than 150 publications in scientific journals and his book which was edited in 1984 and entitled, "The Amazon: Limnology and Landscape Ecology of a Mighty Tropical River and its Basin" he has made a fundamental and everlasting contribution to tropical ecology.

The impact of Sioli's activities reached far beyond the impact of his scientific publications. His very early warnings about the destruction of the Amazon rain forest and his appeals to protect the area for the benefit of nature and the local population including the Amerindian tribes, were heavily criticized by some politicians and development planners, but received endorsement from Brazilian scientists and were enthusiastically accepted by Brazilian students. This development fortified the ideas for the need of environmental protection in Brazil. Some of the students, influenced by his ideas during the sixties and seventies, are today leading scientists and administrators in Brazilian state and governmental organizations and have introduced ecological aspects into politics, planning and administration.

He dedicated the last years of his life to writing his memoirs. This impressive document shows the transition of science from pre-war travel documents of natural historians to modern natural sciences accompanied by profound changes in the political and socio-economic conditions of the Brazilian society.

Harald Sioli held many positions in international associations and working groups such as: membership in the Sectional Committee for Productivity of Freshwater (International Biological Project 1962-1969), membership in the Commission on Ecology (International Union for Conservation of Nature and Natural Resources 1963-1974) and was President of the Association of Tropical Biology (1971-1973). He was also a corresponding member of the Brazilian Academy of Sciences and a honorary member of the Society for Tropical Ecology. He received many awards such as: the Brazilian Order of the Southern Cross Officers Rank (1967), the Science for Amazonia medal from the Brazilian National Institute for Amazon Research (1977), a Medal from the Foundation La Salle of Natural Sciences First Class (1990) and Gran Cruz, the highest Brazilian award for scientific work (2000). In 1990, the first International Symposium on the Great Rivers of Latin America was dedicated to Harold Sioli as the "Father of South American River-Limnology".

With Harald Sioli we have lost a great tropical ecologist.

Reference cited:

Sioli, H. (ed.) 1984. The Amazon: Limnology and landscape ecology of a mighty tropical river and its basin.- Dr. W. Junk Publishers, Kluwer Academic Publishers Group, Dordrecht, Boston, Lancaster. 763 pp.

Wolfgang J. Junk
Max-Planck Institute for Limnology, Germany
wjj@mpil-ploen.mpg.de

Working Groups of SIL and Contact Persons as of February 2005

Ancient Lakes
Dr. Oleg A. Timoshkin, Chairperson
Limnological Institute
Siberian Branch
Russian Academy of Sciences
Ulan-Batorskaya, 3
P.O. Box 4199
664033 Irkutsk, RUSSIA
Phone: 3952 42 82 18; Fax: 3952 46 54 05
tim@lin.irk.ru

Aquatic Birds
Dr. Joseph J. Kerekes, Chairperson
Environment Canada
Canadian Wildlife Service
45 Alderney Drive
Dartmouth, N.S. B2Y 2N6, CANADA
Phone: 902 426-6356; Fax: 902 426-4557
joe.kerkes@ec.gc.ca

Aquatic Invasive Species
Dr. David Reid, Chairperson
NOAA/Great Lakes Environmental Research Laboratory
2205 Commonwealth Blvd.
Ann Arbor, Michigan 48105-2945 USA
Phone: 743 741-2019; Fax: 743 741-2003
reid@glerl.noaa.gov

Aquatic Microbial Ecology
(Formerly: Microbial Activities and the Carbon Cycle in Fresh Waters)
Dr. Meinhard Simon, Chairperson
Inst. of Chem. & Biol. of the Marine Env.
University of Oldenburg
P.O. Box 2503
D-26111 Oldenburg, GERMANY
Phone: 49 441 970 6361; Fax: 49 441 798 3438
m.simon@icbm.uni-oldenburg.de

Aquatic Primary Productivity (GAP)
Dr. Richard D. Robarts, Chairperson
National Water Research Institute
11 Innovation Blvd.
Saskatoon, SK S7N 3H5, CANADA
Phone: 306 975-6047; Fax: 306 975-5143
richard.robarts@ec.gc.ca

Biodiversity
Dr. Hiroya Kawanabe, Chairperson
Lake Biwa Museum
1091 Oroshimo
Kusatsu
Shiga 525-0001, JAPAN
Phone: 81 775 68 4812; Fax: 81 775 68 4848
kawanabe@LBM.GO.JP

Biological Monitoring
Dr. Wolfgang Schmitz, Chairperson
Kirchbergstr. 32
D-76356 Weingarten, GERMANY
Phone: 49 7244 8464; Fax: 49 7244 722867
w.schmitz-weingarten@t-online.de

Conservation and Management of Running Waters
Dr. Philip J. Boon, Chairperson
Scottish Heritage Council
2/5 Anderson Place
Edinburgh EH6 5NP, Scotland
UNITED KINGDOM
Phone: 44 131 447 4784; Fax: 44 131 446 2405
pboon@compuserve.com

Ecohydrology
Prof. Maciej Zalewski, Co-Chairperson
International Centre for Ecology
Polish Academy of Sciences
90-364 Lodz Tylna St.3, POLAND
Phone/Fax: (+ 48 42) 681 70 07
sekretariat@mcepan.lodz.pl

Dr. Richard D. Robarts, Co-Chairperson
National Water Research Institute
11 Innovation Blvd.
Saskatoon, SK S7N 3H5, CANADA
Phone: 306 975-6047; Fax: 306 975-5143
richard.robarts@ec.gc.ca

Macrophytes
Prof. Jacques Haury, Chairperson
Agrocampus Rennes
Lab. Ecology and Crop Protection Unit
UMR INRA-Agrocampus Rennes
Biology, Ecology & Quality of Inland Water Bodies
65, rue de Saint-Brieuc, CS 84215
F-35042 Rennes Cedex, FRANCE
Phone: 02 23 48 55 39; Fax: 02 23 48 51 70
From abroad: Phone: +33 2 23 48 55 39; Fax: +33 2 23 48 51 70
Jacques.Haury@agrocampus-rennes.fr or
Jacques.Haury@rennes.inra.fr

Periphyton of Freshwater Ecosystems
Dr. Robert G. Wetzel, Chairperson
Environmental Sciences and Engineering
University of North Carolina at Chapel Hill
Chapel Hill, North Carolina 27599-7431 USA
Phone: 919 843-4916; Fax: 919 966-7911
rwetzel@unc.edu

Physical Limnology
Dr. Sally MacIntyre, Chairperson
University of California-Santa Barbara
Marine Science Institute
Santa Barbara, CA 93106-6150
Phone: 805 893-3951; Fax: 805 893-8062
sally@icess.ucsb.edu

Plankton Ecology (PEG)
Dr. Ellen Van Donk, Chairperson
NIOO/Centre of Limnology
P.O. Box 1299
3600 BG Maarssen, THE NETHERLANDS
Phone: 31 294 23 93 53; Fax: 31 294 23 22 24
VanDonk@cl.nioo.knaw.nl

Saline Inland Waters
Dr. Brian V. Timms, Chairperson
School of Environmental and Life Sciences
University of Newcastle
Callaghan, NSW 2308, AUSTRALIA
Phone: 61 2 4921 7229; Fax: 61 2 4921 6914
brian.timms@newcastle.edu.au

Wetlands
Dr. Brij Gopal, Chairperson
School of Environmental Sciences
Jawaharlal Nehru University
New Delhi 110067, INDIA
Phone: 91 11 617 2438; Fax: 91 11 616 5886
brij@jnuniv.ernet.in

Announcements

SIL elects new Executive Vice-President

10 January 2005

The election results for the new SIL Executive Vice-President position from a developing country is now complete as reported by non-member teller, Ms. Denise Johnson. The result was 30 votes for Approval and 2 votes Abstain.

Therefore, the Executive Committee has approved Professor Chris Gordon of the University of Ghana for the position of Executive Vice-President during this triennium and until the Montreal Congress in 2007.

Professor Chris Gordon can be contacted at:

Department of Zoology
University of Ghana
Legon, Accra
GHANA
cgordon@ug.edu.gh

****

Autobiography - Still Searching

Ralph Brinkhurst, a former member and Council Officer of SIL, has published his autobiography, titled "Still Searching". From his early work on polymorphism, population dynamics and anatomical adaptations of pond skaters, Brinkhurst took up the ecology of deep water benthos in soft sediments. He is probably best known for his work on the ecology and systematics of aquatic oligochaetes, a study that was, at first, a diversion to allow identification of this element of the benthos. His benthic studies extended into applied environmental work, and the exploration of the Pacific Ocean in deep sea submersibles. This outspoken autobiography gives the reader a window into the life of a biological scientist in university, government, the private sector and the environmental movement. He includes a complete bibliography of his work, as well as more personal insights, such as a small selection of his poems. Details can be found at *www.Trafford.com/robots/04-2110.html*

Book Reviews

Freshwater Ecology: A Scientific Introduction

by Gerry Closs, Barbara Downes and Andrew Boulton
221 pp., 2004, softbound
Blackwell Publishing, Oxford, UK
ISBN 0-632-05266-X
US $60.00

This is an introductory textbook aimed at the generalist who wishes to understand the basic concepts of freshwater ecology and how they are applied to current issues from both fundamental and applied aspects. The target audiences are students or practitioners new to the field of freshwater ecology and management who require a text with an accessible introduction to the key questions while still providing background on the fundamentals of scientific thought and process. A key feature of this text is its easy-to-follow approach of illustrating how the basics of freshwater ecology have been applied to investigate different questions important to the field.

The text is organized into three primary sections: *Part 1*: The Tools of Freshwater Ecological Science, *Part 2*: Fundamental Ecological Questions and *Part 3*: Applied Freshwater Ecology. *Part 1* is divided into five chapters that present the basics including a description of ecological science and the scientific method (Ch. 1), a discussion of the influence of scale (Ch. 2), an overview of the properties of water (Ch. 3), and an introduction to lentic (Ch. 4), and lotic (Ch. 5) systems. *Part 2* discusses fundamental ecological questions including the effect of dispersal on populations (Ch. 6), habitat preferences of different organisms (Ch. 7), recovery of freshwater systems from disturbance (Ch. 8), and the impact of predators (Ch. 9). *Part 3* covers four relevant and topical aspects of applied freshwater ecology including the effects of changing water regimes Ch.10), measuring the impacts of pollution (Ch. 11), eutrophication (Ch. 12), and the impact of introduced species (Ch. 13).

Recognizing that this text is intended for a general audience is critical to the reader. As pointed out by the authors, the goal was to provide basic ecological information and show how this information is used by freshwater ecologists to answer key fundamental and applied questions. Citations are provided throughout if the reader is interested in more detailed information. The text is a pleasure to read. It is well organized, easy-to-follow, and the realistic and relevant case studies are presented in an interesting and captivating manner. The text is very much lecture oriented in presentation and would be an obvious resource for undergraduate teaching. It would also be a valuable resource to non-ecologist managers interested in gaining an overall context of the discipline.

Monique Dubé
National Water Research Institute, Canada
Monique.Dube@ec.gc.ca

Ecology of a glacial flood plain

J.V.Ward and U.Uehlinger (eds.)
320 pp., 2003
Kluwer Academic Publishers
ISBN 1-4020-1792-8
Euro 90.00/ US $99.00

This volume comprises and presents the major findings from a comprehensive long-term study of a glacial flood plain – the Roseg Valley in the Bernina Massiv in Switzerland. It is drained by the Roseg River which joins the Bernina River near Pontresina within the upper Inn Valley region and at a distance of about 12 km and a discharge of less than 3 $m^3 s^{-1}$ (1955 - 2000).

The Editors, Professors J.V. Ward (ETH and EAWAG, Dübendorf) and U. Uehlinger (EAWAG) have succeeded with a clear and lucid editing of this volume with more than 300 pages. Apart from the main contributors to the 16 chapters of the volume, taxonomists, field assistants, chemists and even volunteers from the nearby tourist hotel occasionally participated during the nineties in the project. According to rough estimates the "working group" often exceeded 50 people. Details of the organisational activities during the research and field work periods, such as the aerial survey and meteorological monitoring could have been included as some readers would have found them interesting.

About 65% of the Roseg catchment is covered by glaciers, bedrock and grassland whereas the contribution of the river corridor and a proglacial lake are relatively small or at least comprise less than 10%. **Chapter 1** presents a map (Fig. 5, page 6) with additional details such as landslides and rock glaciers. The Bernina region is the most densely glaciated mountain range in the eastern Swiss Alps. Glaciation is especially dense in the north facing valleys of the Bernina Massiv (e.g., Val Roseg, Val Morteratsch) and declines towards the outer edges. The glacier inventories of 1850 (end of the Little Ice Age) and 1973 (reference year of the next glacier inventory) both listed 87 glaciers located in the Bernina Massiv. However the glaciated area since 1850 had decreased by 34 km^2. During the climax of the last glacial advance in 1850 Roseg and Tschierva formed a single spectacular ice front. Only in 1934, after 80 years of continuous recession, did the Roseg Glacier began to separate from the Tschierva glacier. The glacier foreland of the Tschierva glacier is rapidly growing. The receding glacier each year exposes an area of 3,000-5,000m^2.

After 1934, the Roseg Glacier receded behind the left lateral moraine of the Tschierva Glacier. This moraine reduced the export of glacial sediments and gave rise to an unusual low-gradient glacier foreland, where a lake was formed in 1977 (z_{max}:7m). Since then the lake area increased from 0.22 to about 0.36 km^2 in 1988. According to Chapter 1, the glacial melt water from Tschierca and Roseg glaciers is the primary water source of the Roseg River with 40% and 60%, respectively.

In **Chapter 2** on glacial history the authors stress that the Roseg Valley was shaped by glaciers and that glacial activity is still the dominant force altering the flood plain landscape. Due to response to climatic change on flood plain dynamics it is expected to increase. To our present knowledge the ice stream network of the Alps retreated very quickly after the end of the last glacial maximum of the Würmian Ice-Age (LGM: last glacial maximum). The overall recession of glaciers followed the main trend of the warming process that began about 18,000 years ago and can be divided and subdivided into various steps and stages (stadials or interstadials). The late-glacial ice decay in and around the Bernina region formed remarkable systems near Cinuos-chel (Clavadel-stadial), Samedan (Daun-stadial) and Pontresina (Egesen-stadial). Sediment cores taken in the lakes of Sils; Silvaplana, Champfèr and St. Moritz record detailed environmental changes due to distinct climatic variations. Most parts of the Engadin seem to have been deglaciated after the Clavadel-stadial at around 14,000 BP. With the beginning of the Holocene period about 10,000 years ago and the final melting back of the Alpine glaciers far into the upper reaches of the mountains, there appears evidence of an extraordinary steady climate and glacial development with only minimal fluctuations. This general pattern can be revealed because glaciers of Holocene age passed over soils and organic layers and they overrode living trees that emerged during the ice-free period.

Compared with the late-glacial epoch, it is now possible to document a much "higher", that is, warmer, climate level. Eight clearly substantiated cycles can be compared with the same number of phases with minimal glacial extent similar to that found today. The maximum extent period of 1850 with its huge morainic systems thus represents a dimension of glacial history which is not only typical for that period of the Little Ice Age (1350 - 1850), but also for almost all older maxima extent periods of the Holocene (Patzelt 1973). However, there is much more uncertainty in the knowledge about the "warm" minimum extents than about the geomorphological-stratigraphic periods of advance, for which clear proof can usually be given. With these results obtained the chapter on glacial history and flood plain evolution appears to be one of the most informative sections of the book, well supported by Figures 1-3 (pp. 18, 20 and especially p. 21). Since Roseg and Tschierva were part of the 121 glaciers of the Swiss observation network for a century, it seems safe to say that the current situation is still within the "normal" Holocene variation. Seasonal variation, extent of channel network and surface water chemistry depend on the contribution of different hydrologic reservoirs and flow paths of water (**Chapter 3**). Based on the correspondence between hydrological connectivity and physico-chemical attributes six distinct channel types have been identified (**Chapters 4 & 5**) within the flood plain ecosystem.

Chapters 7 - 11 present an account of the organisms of the Roseg Valley including the terrestrial vegetation of the flood plain which even within the oldest sites does not go beyond dwarf-shrub heath (**7**).

The occurrence of hyphomycetes (stream fungi) gives evidence for glacial streams as suitable habitats for this group discovered in the mid-twentieth of the last century (**8**). The highest number of algal taxa (**9**) was observed in the main channel of the flood plain, which is at least partly due to a most recent generated proglacial lake. The diversity of zoobenthic assemblages of the Val Rosey Plain is dominated by chironomids, followed by *Hydrachnellae* and oligochaeta (**10**).

Chapter 11 demonstrates the complex distribution pattern of the interstirial fauna and **Chapters 12 - 14** deal with litter decomposition, detritus and relevant consequences for nutrient conditions which are - as already stated (**Chapter 6**) - also strongly influenced (phosphorus) by the glaciers. Drift ecology is given special attention resulting in three essential hypotheses (**15**).

In the concluding **Chapter 16** the findings of the huge and well elaborated project set a new standard for flood plain and glacial research; even with a chapter missing on terrestrial flood plain fauna and a more comprehensive presentation on nutrient cycles, this book is a milestone for relevant research.

Reference cited:

Patzelt, G. 1973. Die postglazialen Gletscher- und Klimaschwenkungen in der Venedigergrupe (Hohe Tauern, Ostalpen) *Z. Geomorph. Suppl.* **16**:25-72.

Heinz Löffler
Universität Wien
Austria
aon.912496777@aon.at

Freshwater Management
Global Versus Local Perspectives

M. Kumagai and W.F. Vincent (eds.)
233 pp., 2003
Springer-Verlag, Tokyo
ISBN 4 431 00488 2
US $99.00

This book represents a follow-up to scientific discussions held at a symposium ("The Lake Debate") at the World Lakes Conference, held in Otsu, Japan in October 2001, being conceived as a forum to explore global versus local strategies for lake, river and reservoir management. Papers were invited from scientists or research groups to emphasize either global or local approaches towards specific types of water issues, with the goal of presenting a series of contrasting perspectives on each topic in a point/counterpoint mode. The book's editors also attempted to integrate these perspectives in its final chapter, identifying strengths, weaknesses and complementarities of global versus local approaches in order to help refine future strategies for the sustainable use of global freshwater resources.

True to its stated goal, the book does present a range of papers addressing different aspects of important freshwater issues, including: environmental monitoring and restoration, ecological modeling strategies, eutrophication recovery and lake management requirements. In attempting to set the stage, its initial chapter (1) focuses on historic changes in Lake Biwa (Japan), including joint work of the Lake Biwa Research Institute and the University of Western Australia on the biogeochemical responses of the lake to typhoon-induced mixing. This is followed by chapters that discuss first the value of general strategies applicable to sites throughout the world, followed by chapters that discuss the importance of local circumstances in lake rehabilitation efforts.

Using this approach, the first section of the book is a three-chapter collection of papers dealing with environmental monitoring. The first chapter (2-1) focuses on the worldwide monitoring and assessment activities of the Global Environmental Monitoring System (GEMS), focusing on the GEMS/Water Programme of UNEP. The next chapter (2-2) presents an informative application of bio-optical analyses to the littoral zones of Lakes Biwa and Saint-Pierre (Canada), including the implications for water quality monitoring. The final chapter (2-3) in this section is probably the most interesting, highlighting the use of paleolimnology, including fossil diatoms and geochemical analyses for assessing natural variability and baseline water chemistry conditions for eutrophication research and management.

The next section is a two-chapter section dealing with environmental restoration approaches. The first (3-1) argues that some lake restoration problems are clearly global, with local treatments having little chance of success. The second chapter (3-2) is more informative in regard to restoration approaches, discussing how wetland plants and algae can be used to clean up environmental contaminants either alone or in combination with more conventional treatment technologies. Although informative in their own right, it was difficult to clearly see how either chapter clearly illustrated local versus global perspectives regarding the sustainable use of aquatic resources.

The third section in the book is a two-chapter discussion of ecological modeling approaches. The first (4-1) focuses on the use of specific versus generic numerical models, noting that the former requires more intensive efforts at the local level, while the latter (4-2) can be used in a more conceptual sense, although the two approaches can be combined to obtain rapid preliminary answers to site-specific questions. Unfortunately, it is somewhat sparse in detail, in contrast to the second chapter, which focuses on more site-specific models, including the importance of benthic-pelagic coupling in lake functioning. Interestingly, it notes that site-specific models can have advantages over more generic models. The latter may be so general that they deviate from local conditions, thereby losing their value as a tool for management strategies.

Although admittedly reflecting some of the professional interests of this reviewer, the next section comprises two chapters dealing with eutrophication recovery efforts, from both a global and local perspective. Although the first chapter (5-1) focuses on the global perspective, it nevertheless correctly cautions that restoration methods useful for temperate-zone lakes cannot readily be transferred to subtropical and tropical lakes, even though the eutrophication problems in the latter are going to be greatest in the future. It highlights eutrophication recovery experiences from a number of lakes around the world, drawing informative conclusions from these global experiences. The second chapter (5-2) of this section highlights the need for local emphasis in lake restoration efforts, including discussing factors influencing the applicability of general eutrophication models. An interesting conclusion is that the notion of a "restored lake" is inherently local in nature, depending on factors such as the lake community's cultural background, its economic capabilities regarding restoration efforts, and its plans for future lake use. It also is interesting in that there are no significant differences in the take-home lessons to be derived from these two chapters, even though they approach the same problem from different perspectives.

The next section is a two-chapter section on lake management requirements. Although the title of the first (6-1) suggests a relatively global perspective, much of the detailed information focuses on Lake Tahoe. The extent to which this ultra-oligotrophic lake represents the global situation can be debated, although the nature of its eutrophication problems is certainly global in concept. Reference also is made to a potential role of the United Nations Development Program (UNDP) as a potential global surface and groundwater monitoring agency, although the GEMS/Water Programme of UNEP discussed in Chapter 2-1 previously undertook this task. The second chapter (6-2) of this section focuses largely on the role of lake stakeholders in identifying problems and developing strategies, including highlighting several case studies.

The final chapter (7) attempts to integrate the take-home lessons from all of the above, highlighting first the need for an improved understanding of the function and structure of lake ecosystems in regard to lake rehabilitation, based on sharing global experiences, as a sound basis for lake rehabilitation efforts. The chapter also discusses the necessity for more site-specific assessment and remediation, however, based on more detailed understanding of local conditions, perspectives and possibilities, noting that water quality is typically of most importance to the local community that uses it and is most directly impacted by the positive and negative consequences of environmental management decisions. Compelling arguments are offered for both perspectives.

Overall, this book represents an interesting collection of papers that jump between global versus local experiences in regard to monitoring, assessment and modeling of lakes, rivers and reservoirs. Unfortunately, however, some of the chapters are sufficiently lacking in data to the point that their value is limited, particularly for the chapters dealing with ecological modeling. Further, although the Preface appropriately introduces the book as a collection of individual papers on various water-related topics, the 'stand-alone' nature of the chapters are nevertheless somewhat frustrating when trying to compare global and local approaches for the various topics. Thus, consistent with the fundamental linkages that water facilitates in the natural environment, as well as its role in supporting human life and socioeconomic development, this reviewer would have appreciated a greater effort on the part of the editors to better link the various topics and the chapters comprising them.

Nevertheless, those interested in comparing and contrasting global perspectives with local experiences, as they apply to sustainable use of lakes, rivers and reservoirs, should find this a useful reference book. It contains interesting data and information on a range of topics relevant to freshwater management and represents a contribution to our continuing efforts to better manage freshwater resources for their sustainable use, against the background of the ongoing deterioration of aquatic ecosystems around the world. As noted by the editors in their closing sentence, "Future management strategies will benefit from an openness to global protocols, accords and information sharing, while addressing the need to fine-tune to local circumstances". It is difficult to disagree with this conclusion.

Walter Rast
Texas State University
USA
wr10@txstate.edu

The Upper Paraná River and its Floodplain

Edited by S.M. Thomaz, A.A. Agostinho and N.S. Hahn
394 pp., 2004, hardbound
Backhuys Publishers, The Netherlands
ISBN 90-5782-146-X, Euro 140.00

The large number of existing scientific publications makes it increasingly difficult for students and scientists to obtain a comprehensive view of specific ecosystems. This is especially true for tropical ecosystems because a considerable part of the information is dispersed in local journals and grey literature, often written in the language of the specific country and therefore not accessible to the large majority of non-native readers.

The Paraná River is the tenth largest river in the world. Its headwaters and the middle reach are located in Brazil. The entire Brazilian part of the river and its tributaries have been modified by man. About 60 hydroelectric power plants control the main drainage system. Only one major stretch between the Itaipú Reservoir downriver and the Porto Primavera Dam upriver still contains large floodplain areas that are periodically flooded by the river. The flood pulse has diminished in amplitude because of reservoir construction, but the timing of the floods still nearly follows natural conditions. For more than 17 years, many scientists have worked at the Núcleo de Pesquisas em Limnologia, Ictiologia e Aquicultura (Nupélia) at the University of Maringá, in the state of Paraná, studying a large variety of limnological problems, vegetation cover, geology and geomorphology, and the paleoclimate and fishery of this part of the river and its floodplain. In a laudable effort, the authors summarized this knowledge in the book reviewed here and made this knowledge accessible to the international scientific community by publishing it in English.

The 393-page book is divided in two parts. The first part, consisting of four chapters, describes geology and geomorphology, quaternary history, effects of the Porto Primavera Dam on the physical environment of the downstream floodplain, and the limnological characterization of the aquatic environment. The second part, consisting of 14 chapters, deals with phytoplankton, periphyton, zooplankton, benthos, benthic chironomid larvae, and fish assemblages, their trophic and reproductive ecology, temporal and spatial dynamics of fish eggs and larvae, helminth fauna of fishes, aquatic macrophytes, and riparian vegetation and their spatial characterization. A summary chapter characterizes the upper Paraná River and its floodplain and includes perspectives for management and conservation.

The chapters are well written and summarize the available literature on the specific subjects. Several chapters of the book address the impact of reservoirs on the Paraná River floodplain system that can serve as an example of the impact of man-made hydrological changes on tropical and sub-tropical river floodplain systems in general. Therefore, the book is not only of interest for local students, scientists and planners. It adds another valuable volume to the still very small series of monographs on large tropical and subtropical river systems and will facilitate comparative studies, improve the possibilities of predicting human impacts, and help to elaborate and test methods for sustainable management and protection of the remaining near-pristine river–floodplain areas.

Wolfgang Junk
Max-Planck-Institute for Limnology, Germany
wjj@mpil-ploen.mpg.de

Between Hazards of Starvation and Risk of Predation: The Ecology of Offshore Animals

by Z. Maciej Gliwicz
379 pp., 2003, ISSN 0932-2205, EURO 54.00
International Ecology Institute, Oldendorf/Luhe, Germany

The colourful tapestry of modern freshwater zooplankton ecology integrates dynamic forces from predators with those from resources. It is a fascinating subject, rich with detail and which shows how a predictive ecological framework can be made (historians and philosophers please take note) from firm rooting in natural history and rigorous, repeatable experimental findings. In the study of the ecology of freshwater zooplankton, a synthetic approach to competition and predation gelled early while ecologists working on other systems continued an ultimately rather fruitless debate over whether competition or predation structured communities. In this new volume by Maciej Gliwicz, part of the International Ecology Institute's series, Excellence in Ecology, we have the first comprehensive treatment of that literature. Covering 600+ publications and emphasizing the freshwater zooplankton literature from the 1970s to the 1990s, this 380-page account should be required reading for any serious student of freshwater or marine zooplankton. Most limnologists in fact should have a copy close at hand for reference purposes. Not that this is an easy read, mind you, but those making the investment are likely to feel rewarded in the end. The author has spent a lifetime studying freshwater zooplankton across the globe: Panama, Poland, Germany and the United States and he has undertaken some of the finest laboratory-based zooplankton growth studies of recent years. This is a unique vantage point from which to take stock of this field.

The book also looks forward. Perhaps its greatest asset is this books's exploration of a big new idea on population regulation and community structure. Gliwicz's view is that individual species hover around characteristic density in spite of highly dynamic shifts in birth and death rates. Birth and death rates, Gliwicz proposes, often change in opposing lock step so that net change in population abundance is far less then one would expect from highly dynamic predators or resources. The evidence marshaled in support of this view is somewhat anecdotal. For example, this remarkable assertion "the boring pattern of never-ending density fluctuations through the seasons are to be found in the overwhelming majority of data accumulated in years of field studies on zooplankton" (p. 171) is not directly backed up by graphs, tables, or citations! However, if the reader is pulled along by the several examples Gliwicz reviews in support of his idea, in its dramatic departure from conventional thought, this view demands attention. The mechanism proposed involves the frequency dependence of foraging by fish: "Therefore, the availability of resources controls the rate of each population increase, but that – regardless of this rate – the density of each species population is fixed by a mortality rate that results from fish predation and fish switching from one prey to another depending on relative density levels" (p. 183). In other words, frequency dependence is a great deal more important in freshwater food webs than we have given it credit.

Gliwicz warns us right in the Preface that his book is "a personal view on a way of life, rather than a state-of-the-art review that has been critically evaluated and corrected under the watchful eye of a demanding editor". A major and unfortunate weakness of the book indeed is its almost relentless redundancy on several major points. At certain crucial points, it is hard to connect assertions with the evidence supporting them. Some recent topics in zooplankton ecology (multiple stable states, stoichiometry, even the microbial loop) are essentially missing. Nevertheless, I enjoyed this book immensely and I cannot wait to give it to my graduate students to read to get Gliwicz's perspectives both backwards and forwards from now.

Robert W. Sterner
University of Minnesota, USA
stern007@umn.edu

Iconographica Diatomologica: Annotated Diatom Micrograph (Diatoms of Sardinia) Volume 12: Biogeography - Ecology - Taxonomy

By Horst Lange-Bertalot, Paolo Cavacini, Nadia Tagliaventi and Silvia Alfinito
Edited by Horst Lange-Bertalot
438 pp., 2003, hardcover
A.R.A. Gantner Verlag K.-G.
ISBN 3-906166-01-5
EURO 180.00

In the world of diatom taxonomy and ecology, detailed books including many SEM and LM-micrographs (1,369 in this case) are always welcome. With a taxonomy based on the morphological structures of the frustule, there can never be too many pictures or too many descriptions. Some might argue that there are already too many new names and groupings, however, I would say that as long as we have micrographs to refer to, this is not necessarily a problem.

This imposing book is composed of an English and an Italian abstract, followed by a "Quickfinder" for plates where new taxa from Sardinia (76) and other locations (5) are shown. The environment of Sardinia and its related diatom communities are then presented (in both English and in Italian) as well as a short "Material and Methods" section (in English only). The heart of this book is the description of new and problematic taxa accompanied by 137 photographic plates. Previously established taxa are not described. A new genus and 81 new species are described in Latin, with the "Typus" and the "Locus typicus", followed by a description in English including the distribution of the taxa and occasionally interesting supplementary remarks. When available, basionyms and synonyms are also provided. A detailed index of all taxa is included at the end of the book.

This book is for the initiated taxonomist having a basic knowledge of diatom identification and vocabulary. It sheds new light on some endemic diatoms from an island where diatoms were previously poorly known. It is well documented, however, it seems to lack a clear critical peer-review process. On the other hand, one could argue that not many scientists have the knowledge to review such a work but the editor himself!

As for the plates, the SEM micrographs are of excellent quality, and show fine structures that are difficult to resolve on LM-micrographs. Nevertheless, many LM-micrographs lack contrast (e.g., Plate 77, Figs. 1-7, 12-14, 16-19; for comparison, Fig. 15 of this plate has a more acceptable contrast). This lack of contrast can jeopardise the identification of some species where subtle details need to be identified. Furthermore, at least eight pairs of pictures are obviously from the same frustule (two different halves) or from the same picture (two different contrasts), with no information referring to this in the text (e.g., Plate 78, Figs. 8-9). These details can become very important if some features appear only on one of the valves.

Overall, this book will be an essential addition for any diatom studies in Sardinia and the region, and is of a great help for diatom taxonomy in general, not only in the Sardinia area, but on a global scale. As always, Dr. Lange-Bertalot and his co-authors produced a high quality, well-illustrated, and clearly described taxonomic volume.

Marie-Andrée Fallu
Université du Québec à Trois-Rivières, Canada
marie-andrée_fallu@uqtr.ca

Floating Islands: A Global Bibliography with an Edition and Translation of G.C. Munz's *Exerciatio academica de insulis natanibus* (1711)

by Chet Van Duzer
428 pp., 2004, hardcover
Cantor Press, Los Altos Hills, California - *editorial@cantorpress.com*
ISBN: 0-9755424-0-0; Price $44.95 US

This book is about bizarre features in water bodies - freely floating islands, instead of islands rising from the bottom. This phenomenon has been questioned for a long time and the book by Chet Van Duzer gives us a good overview of the topic from various aspects and time periods.

The book consists of two major parts plus illustrations. It opens with the reproduction of G.C. Munz's dissertation *Exerciatio academica de insulis natanibus* (1711). Without doubt the translation from Latin into English will enormously increase the number of readers of this magnificent work. One can realize how multifarious and accurate the understanding of the phenomenon almost 300 years ago was and how different the scientific language of that time was from the present. Dissertation is followed by detailed comments and notes from C.V. Duzer that shed some light on the difficulties of translating old scientific text and allowing readers to be able to better understand the dissertation in its time.

The second, but for some readers definitely the most important part, consists of over 1,500 citations from around the world on various aspects of floating islands, ranging from their descriptions and origin to holy floating islands and their legal aspects. By creating this multi-national and multi-lingual bibliography C.V. Duzer has compiled a really magnificent work that helps others to get a better overview of floating islands, especially since citations are grouped according to the main topics.

The third part of the book consists of 24 illustrations which help to visualize the topic of the book and, hopefully, they lead even more people to become interested in floating islands which will be made easier by having this good guide book.

When I heard about the compiling of this book I thought that it would be nice to see a modern, well-illustrated overview of floating islands from their formation to reasons for their buoyancy and other features. However, one book cannot fulfil all expectations and sometimes it is even better to raise interest and questions instead of providing all the answers. Therefore, the absence of the "text book" style is not a weakness after all. The book by Chet Van Duzer is a valuable source of information about every feature of floating islands and will be of great interest to a wide range of readers.

Reference cited:

Munz, G.C. 1711. *Exerciatio academica de insulis natanibus*. Altdorf, Germany: Typis Kohlesii, (22 pp., praeses Johannes. Müller.

Edgar Karofeld
Institute of Ecology at Tallinn University
Estonia
edgar@eco.edu.ee

Are you moving? Please send your change of address to:

William M. Lewis, Jr.
c/o Ms. Denise Johnson
The University of North Carolina at Chapel Hill
School of Public Health
Department of Environmental Sciences & Engineering
CB# 7431, 124 Rosenau Hall
Chapel Hill, NC 27599-7431 USA
denisej@email.unc.edu
Phone: 919 843-4580; Fax: 919 843-4072

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.

Calendar of Events

International Symposium on Wetland Pollutant Dynamics and Control Conference.
4 - 8 September 2005
Ghent, Belgium
Contact: ir. Gijs Du Laing
Laboratory of Analytical Chemistry and Applied Ecochemistry
Coupure Links 653
9000 Gen, Belgium
Phone: +32 9 264 59 95
Fax: +32 9 264 62 32
wetpol@biomath.ugent.be
http://biomath.ugent.be/~wetpol

The World Conference on Ecological Restoration "*Ecological Restoration: A Global Challenge*".
12 - 18 September 2005
Zaragoza, Spain
Contact: Conference Secretariat: di&co
Paseo de Sagasta, 19, Entlo dcha
50008 Zaragoza, Spain
Phone: +34 976 211 748
Fax: +34 976 212 959
secretariat@ecologicalrestoration.net
Http://www.ecologicalrestoration.net

6th River Bottom Symposium.
19 - 25 September 2005
Brno, Czech Republic
Contact: Dr. Svetlana Zahradkova and/or Dr. Jana Schenkova
Masaryk University
Faculty of Sciences
Kotlarská 2, 611 37 Brno, Czech Republic
zahr@sci.muni.cz
schenk@sci.muni.cz
Phone: +42 0 549 498174
Fax: +42 0 541 211214
http://www.sci.muni.cz/zoolecol/hydrobio/rivbot6

9th Conference - International Society for Salt Lake Research (ISSLR).
26 - 30 September 2005
Perth, Western Australia
Contact: Jacob John
Chair ISSLR 9th Conference
Department of Environmental Biology
Curtin University of Technology
GPO Box U1987 Perth WA 6845, Australia
Phone: +61 8 9266 7327
Fax: +61 8 9266 2495
j.john@curtin.edu.au
http://www.isslr.org

11th International Conference on the Conservation and Management of Lakes - *Towards sustainable management of African Lake Basins.*
31 October - 4 November 2005
Nairobi, Kenya
Contact: Permanent Secretary
Ministry of Water Resources Management and Development
Maji House, Ngong Road
P.O. Box 49720
Nairobi, Kenya
nilesec@wananchi.com and simeonochieng@yahoo.com
Phone: +254 20 716103
Fax: +254 20 727622
or
International Lake Environment Committee
Attn: 11th World Lake Conference Secretariat
1091 Oroshimo-cho,
Kusatsu-city, Shiga 525-0001
Japan
kenya2005@ilec.or.jp
Phone: +(81-77) 568-4567
Fax: +(81-77) 568-4568
Website: http://www.ilec.or.jp/eg/wlc.html

5th International Rhine Symposium - *Up- and Downstream Fish Migration.*
2 - 4 November 2005
Bonn, Germany
Contact:
Postfach 200253
56002 Koblenz, Germany
anita.thome@iksr.de
Phone: +49 (0) 261-94252-0
Fax: +49 (0) 261-94252-52
http://www.iksr.org

2005 International Symposium of the North American Lake Management Society - *Lake Effects: People/Water Exploring the Relationship.*
9 - 11 November 2005
Madison, Wisconsin
USA
Contact: Dr. Jeffrey A. Thornton, Chair
Host Committee in Waukesha, Wisconsin
jthornton@sewrpc.org or *iems@aol.com*
Phone: +1 262 547-6721 x 237
Fax: +1 262 547-1103
www.nalms.org

Fourth Conference International Water History Association (IWHA) - *Water and Civilization.*
1 - 4 December 2005
Paris, France
Contact:
post@iwha.net
http://www.iwha.net

2006

The Tenth International Symposium on Aquatic Oligochaete.
The Institute of Hydrobiology
Chinese Academy of Sciences, Wuhan, China
Contact:
Dr. Hongzhu Wang, D.Sc., Associate Professor
Institute of Hydrobiology, Chinese Academy of Sciences
Hubei, Wuhan 430072
People's Republic of China
wanghz@ihb.ac.cn
Tel: +86 27 87647719
Fax: +86 27 87647664
Inquiries requesting additional symposium information should be sent to both of the following email addresses: *ISAO2006@ihb.ac.cn* and *ISAO2006@yahoo.com.cn*
Official symposium website:
http://www.ihb.ac.cn/isao2006/index.htm
Symposium information is also presented here:
http://www.inhs.uiuc.edu:80/~mjwetzel/ISAOBdir.html

Speciation in Ancient Lakes - 4 (SIAL - 4).
September 2006
Berlin, Germany
Contact: Chairman and organizer -
Prof. Dr. Frank Riedel
paleobio@zedat.fu-berlin.de
Phone: +49-30-838-70-283

2007

SIL2007 in Montréal
Preparations for the next SIL Congress in Montreal are continuing. The local organizing committee is working towards an exciting scientific program with several special sessions as well as a series of excursions. Please visit the congress' website for more complete information and updates at *http://www.uqam.ca/SIL2007*.

SIL Officers

President
Gene Likens
Institute of Ecosystem Studies
Box AB
Millbrook, New York 12545
USA
likensg@ecostudies.org

Executive Vice-Presidents
Winfried Lampert
Max-Planck-Institut für Limnologie
Postfach 165
D-24302 Plön
Germany
lampert@mpil-ploen.mpg.de

Brian Moss
School of Biological Sciences
Derby Building
The University of Liverpool
P.O. Box 147
Liverpool L69 3BX
Great Britain
brmoss@liverpool.ac.uk

Chris Gordon
Department of Zoology
University of Ghana
Legon, Accra
Ghana
cgordon@ug.edu.gh

General Secretary and Treasurer
Robert G. Wetzel
Dept. of Environmental Sciences and Engineering
School of Public Health
The University of North Carolina
Chapel Hill, North Carolina 27599-7431
USA
rwetzel@unc.edu

Acting General Secretary and Treasurer
William M. Lewis, Jr.
Professor and Director
Center for Limnology
216 UCB, CIRES
Boulder, CO 80309-0216
USA
lewis@spot.colorado.edu

Editor-in-Chief
John R. Jones
Fisheries and Wildlife Sciences
School of Natural Resources
302 Natural Resources Building
University of Missouri
Columbia, Missouri 65211-7240
USA
jonesj@missouri.edu

Attention:
Manufacturers of Limnological Equipment and Publishers

SILnews accepts *advertisements* for equipment and publications that will be of interest to SIL members.

SILnews is distributed three times a year to more than 3,000 members and libraries world-wide. If your company is interested in acquiring advertising space in SILnews, please contact the Editorial office for rates at *clara.fabbro@ec.gc.ca* or use the mailing address indicated on the front page.

A complimentary copy of SILnews, in which your advertisement appears, will be sent to you once it has been published. SILnews is posted on the SIL web site at *www.limnology.org* after it has been published and your advertisement will appear there.

Limnology Job and Studentship Notices

Notices on the availability of limnologically-oriented jobs and graduate student opportunities are now accepted for publication in SILnews and displayed on the SIL web site at *www.limnology.org*. There is no charge for the service at this time, which is available to SIL members and non-members.

Persons submitting notices should note the four month lead-time for the print edition of SILnews; those advertisements with short deadlines should be directed to the web site only.

Submissions should include:

- a short title describing the position (job or studentship);
- location and duration of the position;
- closing date for applications;
- a short paragraph describing the position, including any citizenship, educational or employment prerequisites; and,
- information on where potential applicants may obtain further information, including names of contact persons, telephone numbers, fax numbers, e-mail addresses, and web site addresses, where appropriate.

Submissions may be edited for length and clarity. Those deemed inappropriate to the SIL mandate will be rejected at the discretion of the SILnews Editor or the Webmaster. Submissions for the print edition of SILnews should be sent to the editor at the address on the cover of this issue.

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) 474-7618.