MONOCULUS Copepod Newsletter

The Newsletter of the World Association of Copepodologists

Number 58 **December 2009**

CONTENTS

MONOCULUS Editor: Janet W. Reid
Research Associate, Division of Science & Learning
Virginia Museum of Natural History
21 Starling Avenue, Martinsville, Virginia 24112, U.S.A.
Tel. +1 276 656 6719; Fax. +1 276 656 6701
E-mail janet.w.reid@gmail.com
Deadline for submissions to the next number of MONOCULUS: 30 March 2010

—
ISSN 1543-0731 (On-line version)
ISSN 0722-5741 (Printed version)
—
WAC Homepage
http://www.monoculus.org

Each number of *MONOCULUS* is announced on:
Crust-L crust-l@vims.edu
ALCA alca@ola.icmyl.unam.mx
Planktonnet planktonnet@yahoogroups.com
Copepod List copepods@yahoogroups.com

Message from the President

I am sitting at my desk contemplating a cloudy but bright sky and appreciating warming spring temperatures. Not a moment too soon as our trajectory towards summer has been constantly interrupted by rain storm after rain storm.

I am also contemplating, without being boring, how I tell you about the work that the Executive Council has been undertaking that is aimed at the WAC web site. I became aware of how much was being left to the web master in the past and thought it was high time we brought the work into manageable proportions. One of the objectives of our new treasurer Chad Walter is to his job and that of our secretary Eduardo Suárez easier through the web site. You will have noticed that it is now possible to pay your dues online. Also, I have had a number of recommendations for updating the content of the web site to make it more relevant. All this led to a review of the web site. We agreed on the aims of the review and agreed on the *provisional, underlying objectives of the WAC web site*:

Aims of review:

1. Review the structure
2. Review fitness for purpose
3. Up date material and review for accuracy and completeness
4. Review content for relevance
5. Improve usefulness for Secretary, Treasurer and members
6. Identify the underlying objectives of the web site structure and function

Underlying objectives of the WAC web site:

1. The WAC web site is structured and maintained for members and prospective members of WAC;
2. The objective in any redesign is to structure and provide for the maintenance of the site and its content in a manner that is "easy care" and economises on the time of the webmaster and EC members;
3. To keep the design plain without unnecessary "frills" that are not directly related to functionality;
4. To provide a service to members that includes:
    a. information about WAC and its transparent functioning. That is, it is as a repository of information about the society. This function is especially important for young members joining up,

b. useful and accurate information to members and prospective members,
    i. introductions to the study of Copepoda
    ii. links to literature on the web – especially old taxonomic resources not otherwise with widespread availability
    iii. links to electronic or other keys
    iv. links to specialist web sites with content on Copepoda (with WAC providing some element of quality control)
c. access to *Monoculus*

All this led to *recommendations to improve the basic design and functionality*. The first step was to provide the resources to install a content management system which has been agreed to by the Executive Council.

Another outcome is a list of ways we can *update and improve content*. It is likely that we will need some extra help to do specific jobs so the web master only has to put the content online. One of the larger, more discrete jobs will be to start a new high-level section title "Triennial conferences". The suggestions relating to this section include the following:

1. Link to the current conference web site or previous conference web site,
2. Links to the Table of Contents for the journals in which conference papers were and have been published,
3. Link to a pdf or hyperlinked file of presentation abstracts (we produce these for the conference proceedings anyway - can we make them available online?),
4. Information on the numbers of people who attended,
5. Information on student awards given, travel funds for young members to attend the conference: include information on how to apply for these funds, and who was awarded support at each meeting.
6. The issue of access to the papers contained in our proceedings volumes has been raised. These volumes are part of our WAC patrimonial resources and part of our history as an academic organization. They ideally should be available to all members. The aim would be to find out what we would have to do to have complete access to all these volumes. The reasoning would be to attract more colleagues to the site and provide access to volumes that can't be easily obtained at present. Some of these may not be freely available due to their age. It would be wonderful to be able to retrieve the scientific papers within these journals. This is a longer-term project, maybe containing copyright issues. ***Volunteers*** to scope out this problem please contact me.

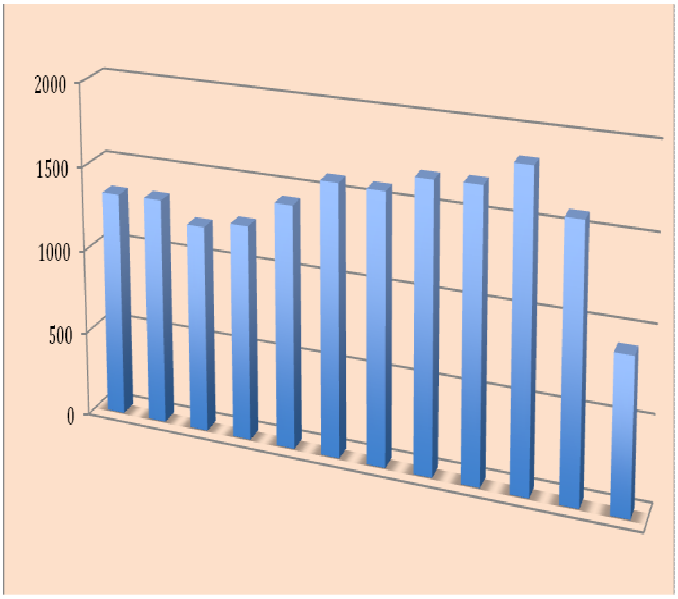
I am hoping to retrospectively put this information together. I would particularly like to have the information about the award winners at the Thailand conference so we can make this information available on the web with photos. ***Any volunteers*** to provide this information?

—Janet Bradford-Grieve, President
National Institute of Water and Atmospheric Research, New Zealand
j.grieve@niwa.co.nz

Copepod research papers, the last decade [1998 - 2009]

Below is a chart representing the number of papers published on copepods from 1998 to the present (left to right). This year, as of 10/20/2009, there have been 904 publications on copepods. 2007 was the most productive year for copepod research with 1,842 papers published, and 2000 the least productive with 1,220 papers published.

From 1998 to October 2009, a total of 17,486 research papers involving copepods have been published in the scientific literature.



— Chad Walter
Treasurer, WAC
NMNH - Smithsonian Institution, Washington, D.C.

Corneliu Plesa at Cluj, 1964.
Photo courtesy of David Damkaer.

Why WAC needs your financial support

Well, 2010 is just around the corner, and your membership dues to the World Association of Copepodologists (WAC) are needed to help in sponsoring the tri-annual conferences on copepod research. The last conference was in Thailand 2008, and the next, 11th conference will be in Mérida, Mexico in 2011. The WAC provides seed money to help the organizers of the conference get the ball rolling in setting up a conference, and this seed money is not returned to the WAC. At these conferences, the WAC also has helped provide financial assistance to researchers from developing nations and students to attend the conferences and pre-conference workshops, and the WAC has given cash awards for best student presentations at the past few conferences. In order to continue providing these valuable sources of financial assistance, we ask our membership to pay their dues at the level at which they feel comfortable. Our current membership categories are Student $20, Member $35, Annual Sponsor $200 or more, lifetime member $1000 or more. If a potential member cannot afford the $20.00 dues payment, he or she may request a waiver from the Executive Council (Art. 11 of the By-laws). Please inform the General Secretary at the time of joining the WAC, or contact him now to request a waiver of dues for 2 years. During 2009, the WAC received a lifetime member, Janet Reid, and 2 annual sponsors, Susumu Ohtsuka and Chad Walter. As a reminder to those in the U.S.A., **the WAC is recognized by the IRS as a 501.c3 non-profit organization, so all who pay taxes in the U.S.A. can legally deduct any contribution to the WAC, if you itemize.**

The WAC is currently in the process of updating and revising our website, now being hosted at http://www.monoculus.org . Hopefully by the end of this year we will start providing up-to-date information about copepods and copepod research. Currently there are two active database sites for the 'World of Copepods' – one dealing with the taxonomy, and the other the bibliography of copepods. These databases and the researcher database were originally housed at the Smithsonian Institution, on the World of Copepods website (http://invertebrates.si.edu/copepod/index.htm). The researcher database will be soon be hosted at the WAC as the membership website. In 2008, the taxonomic part of the database was migrated into WoRMS (World Register of Marine Species, at http://www.marinespecies.org/copepoda/ hosted in Belgium, by the Flanders Marine Institute (VLIZ, see http://www.vliz.be/En/INTRO).

Both sites are updated regularly. The Bibliographic database currently contains more than 57,500 bibliographic entries.

The oldest entry is *Goedaerdt, J. 1662. Metamorphosis naturalis ofte historische beschrijvinghe van den oirspronk, eygenschappen ende vreemde veranderingen der Wormen, ruspen, maeden, vliegen, witjens, byen, motten ende dierghelijcke dierkens meer; niet uyt eenighe boecken maer alleenelijck door eygen ervarentheyd uytgevonden, beschreven ende na de konst afgeteyckent. Middelburg Volume 1-3. (Copepoda, 3: 42) (about 1662-1669).*

From January to October 2009, 904 new publications and 90 new taxa have been added to the databases. These database websites have been created and maintained to help researchers worldwide find literature and taxonomic information on copepods. Fellow researchers tell us that these two sites provide invaluable aid in the study of copepods, especially for those colleagues who do not have access to extensive library systems. The WAC does not provide any financial support for the maintenance of these websites, and all work on these databases is donated by members as a volunteer service to the WAC. If you use and value these services, then please consider becoming a member or renewing your membership, as a thank-you for all the hours that your colleagues provide to maintain these databases.

We ask all researchers to please continue sending a hard copy or pdf reprint of their publications to each copepod library:

Monoculus Library, Forschungsinstitut Senckenberg – DZMB, Suedstrand 44, Wilhelmshaven, D-6382, Germany, attn: Pedro Martínez Arbizu
Wilson Copepod Library, Smithsonian Institution, Museum Support Center MRC 534, 4210 Silver Hill Road, Suitland, MD 20746, U.S.A., attn: T. Chad Walter

— Chad Walter, Treasurer

The four major species of copepods in the Beaufort Sea all have different sizes, different life cycles, and different prey. L to R: *Metridia longa* (~2.5 millimeters), *Calanus glacialis* (~4 mm), *Calanus hyperboreus* (~7 mm). The smallest, *Oithona similis* (0.5 mm) is below the center. The largest species, *Calanus hyperboreus,* is a critical link in the Arctic food web, eating phytoplankton and microzooplankton when the returning spring light triggers their growth. They are eaten in turn by many larger animals. (Photo by Carin Ashjian, Woods Hole Oceanographic Institution; text and photo ©WHOI.)

Are you interested in becoming an online taxonomic copepod editor?

Is there a family or genus of copepods for which you are willing/interested in cleaning up the taxonomy/ synonomy? Since the new copepod taxonomy database has been hosted at the World Register of Marine Species (WoRMS), which is a relational database, it has become possible to link synonymies, distributional information, hosts, images, literature sources, and specimen data. In addition, it allows for multiple editors to correct and edit data.

In order to provide sufficient expert knowledge for maintaining the list, we have formed an editorial committee which will be editing and improving this database. This database will, hopefully, promote stability in copepod nomenclature and act as a tool for higher taxonomic revisions and regional monographs, and then provide a base link for other online databases that use copepod nomenclature.

Drawings, pictures, distribution maps, or other information resources can be linked to each species page. For example, if you now search on *Pseudodiaptomus* or *Pontellopsis*, you will see that each species page has at least one set of line drawings showing the morphology of the taxon. An unlimited number of photographs (jpg's) can be added.

Also, on most genera pages there is a recently added link to the 3x5 taxonomic cards of the C.B. Wilson Library or Ju-Shey Ho, which provide valuable references to existing publications on the taxa. These are files of the 3x5 card collections of these two researchers, which have been scanned and saved as pdf files. The Wilson cards were started by Charles B. Wilson in the 1890s, when he began to record all copepod taxa and any publications that mentioned each one. These cards were kept up to date until about 1999 by staff and volunteers at the Smithsonian Institution, until the advent of the various web-based information services. These cards are an invaluable resource, because they record all the sources of literature that mention a specific taxon within a genus. The cards by Ju-Shey Ho are based primarily on the taxonomy of parasitic copepods, and include the synonymies of the taxa.

Both of these data sources can be found under 'Links' on the genus page of the copepod taxa. Just search on a genus and then click on the 3x5 taxonomic card link, and a pdf will appear providing you with all known publications referring to the particular copepod genus.

Contact Chad [walterc@si.edu] or Geoff [g.boxshall@nhm.ac.uk] if you are interested in joining the editorial board, and let us know which group you would like to work on.

Currently, there are 10 taxonomic editors who are working on standardization and providing synonymies for copepod taxa under their responsibility, and are keeping up

to date with new taxa as they are created. The present members of the Editorial board are:

Editors

T. Chad Walter
Smithsonian Institution; Department of Invertebrate Zoology
Geoff Boxshall
Natural History Museum; Department of Zoology

Associate Editors

Ruth Böttger-Schnack, Family Oncaeidae
Frank D. Ferrari, Families Diaixidae, Parkiidae, Phaennidae, Scolecitrichidae, and Tharybidae
Ju-shey Ho, Parasitic copepods
Slava Ivanenko, Families Asterocheridae and Dirivultidae
Tomislav Karanovic, Families Canthocamptidae and Ameiridae
Juliana H.M. Kouwenberg, Distribution of planktonic/hyperbenthic copepods
Eduardo Suárez-Morales, Order Monstrilloida
Danny Tang, Family Taeniacanthidae

— Chad Walter

Mouthparts of the predatory marine calanoid *Euchaeta elongata*, scanning electron micrograph by Jeannette Yen (1985. Selective predation by the carnivorous marine copepod *Euchaeta elongata*: laboratory measurements of predation rates verified by field observations of temporal and spatial feeding patterns. Limnology and Oceanography 30(3):577-597.).

New Books and Websites: Reviews

Plankton. A guide to their ecology and monitoring for water quality

I. M. Suthers & D. Rissik (eds.)

2009. CSIRO, Collingswood, Victoria, Australia. 256 pp.

Aimed at water quality managers and students of invertebrate biology and environmental studies, *Plankton. A guide to their ecology and monitoring for water quality* offers suggestions for using plankton in water quality assessment and a general introduction to plankton. Use of both phyto- and zooplankton in monitoring studies appear in the literature since the 1940s (at least) but their use seems to be increasing globally. The most familiar studies search for harmful algal blooms (HAB) in coastal areas and in rivers, lakes, and reservoirs. Increasingly, alterations in zooplankton composition are employed to detect subtle changes in trophic structure resulting from adverse water quality. In some cases, plankton offer low cost alternatives to expensive chemical tests. Aquaculture provides new applications for plankton monitoring both within enclosures and in receiving waters that may be impacted.

This book endeavors to "demonstrate the utility of plankton studies for water quality management" and to offer a more rigorous methodology for implementing and analyzing these investigations. The primary audience is environmental managers at all levels of government, students of environmental studies, and perhaps citizens groups who are increasingly involved in local water monitoring. The editors prudently assume the readers will have little technical background and few resources at their disposal. Both editors and fourteen of seventeen contributors are Australian, so most examples and references are from down under.

A practical guide for using plankton as water quality indicators would be both timely and of global interest since there are no books now filling this niche. Thus, I find it frustrating that this book only partially fulfills its potential. In many edited books, the coverage is often disjointed, uneven, and redundant. Unfortunately, these shortcomings are prevalent here. Instructions for using plankton for water quality monitoring and many fine examples of actual studies are the strengths of *Plankton*, but much of this information is scattered among chapters including four that comprise an introduction and identification guide to Australian phyto- and zooplankton.

Organization within chapters is also uneven. For example, the first chapter first makes a nice case for using plankton in monitoring studies followed by a confusing treatment of eutrophication, which is neither defined nor are

its consequences explained except in a "Box" devoted to seagrasses, not plankton. Next we find a general section on monitoring plans with many excellent points that might have been more useful if incorporated in the very nice chapter on sampling. This rapid switching of topics is symptomatic of many, but not all, chapters. Some boxes enclosing specific examples work well when they are directly related to the surrounding text. Other boxes, often with excellent information, seem misplaced and distracting.

Plankton is at its best when describing sampling design and methodology. Chapter 4 emphasizes both attention to the goals of the study and statistical considerations in designing studies: excellent advice since many studies are doomed by omitting these steps. A solid treatment of sampling methods and data analysis follows. I would have preferred integration of actual studies that illustrate how these design criteria function in practice. Such examples appear elsewhere, if you search for them. The last chapter on ecological modeling as a management tool introduces two detailed models to demonstrate different approaches and applications of modeling. A coupled hydrologic and ecological model provides a fine example of how models using plankton can affect management decisions. A Bayesian Decision Network explores the complexities of decision-making involving multiple stakeholders, but plankton are not part of this model.

Four chapters on plankton ecology and diversity contain excellent information and many fine examples of monitoring using plankton. Chapters 5 and 6 devoted to freshwater and marine phytoplankton, respectively, are well written if somewhat redundant. Both chapters outline the distinctive features of each group treated along with photographs of representative groups. Because of their diversity, coverage of the marine zooplankton groups is often reduced to a rapid succession of snippets on each. A reader not already familiar with these groups might emerge dazed and confused. Many of the keys used to identify zooplankton contain specialized terms that would make them difficult for novices (preopercular spines, malleoramate). The drawings and photographs are very small, which greatly diminishes their effectiveness. Lastly, most of the keys go only to family or order. Surely, water quality surveys would require much more taxonomic detail. Perhaps a simple introduction to selected groups, which is nicely done here, would suffice in lieu of keys or other attempts at identification.

Based on its sound advice on monitoring design and examples of actual monitoring studies *Plankton. A guide to their ecology and monitoring for water quality* might appeal to groups considering using plankton as part of a freshwater or coastal monitoring program including government agencies, citizen monitoring groups, and environmental consultants. While most of the examples are Australian, the biological principles and monitoring suggestions are broadly applicable. The sections on phyto- and zooplankton contain will be more useful in Australia, especially for those with a background in biology or practical experience with plankton.

— William S. Johnson
Biological Sciences, Emeritus
Goucher College
Towson, MD 21204 U.S.A.

A Mechanistic Approach to Plankton Ecology

Thomas Kiørboe

2008. Princeton University Press, Woodstock. 228 pp.
ISBN13: 978-0-691-13422-2. $39.50 or £28.95

From the publisher's website:

"The three main missions of any organism--growing, reproducing, and surviving--depend on encounters with food and mates, and on avoiding encounters with predators. Through natural selection, the behavior and ecology of plankton organisms have evolved to optimize these tasks. This book offers a mechanistic approach to the study of ocean ecology by exploring biological interactions in plankton at the individual level. The book focuses on encounter mechanisms, since the pace of life in the ocean intimately relates to the rate at which encounters happen.

"Thomas Kiørboe examines the life and interactions of plankton organisms with the larger aim of understanding marine pelagic food webs. He looks at plankton ecology and behavior in the context of the organisms' immediate physical and chemical habitats. He shows that the nutrient uptake, feeding rates, motility patterns, signal transmissions, and perception of plankton are all constrained by nonintuitive interactions between organism biology and small-scale physical and chemical characteristics of the three-dimensional fluid environment.

"Most of the book's chapters consist of a theoretical introduction followed by examples of how the theory might be applied to real-world problems. In the final chapters, mechanistic insights of individual-level processes help to describe broader population dynamics and pelagic food web structure and function."

The pontellid copepod *Pontella securifer*. Various parts glow fluorescent green when viewed under blue light. TOP: Note the male's specialized antenna and claw on its last leg (on the right) for grabbing females. BOTTOM: The female has an oblong sperm packet attached at her tail. Image courtesy of Dr. Mikhail Matz of the University of Texas at Austin. Text and photo from: NOAA Ocean Explorer
http://oceanexplorer.noaa.gov/explorations/05deepscope/logs/aug26/media/horned_copepod_mf_600.jpg

---

Illustrated Encyclopedia of Fauna and Flora of Korea. Vol. 42. Inland-water Copepoda

Cheon Young Chang

2009. Ministry of Education, Seoul. 687 pp. ISBN 978-89-88154-67-0-06490

Among the delights of recent decades has been the appearance of monographs dealing with the continental copepod faunas of various countries, in the local languages. The latest nova in this galaxy is the monograph on Inland-water Copepoda of Korea by Prof. Cheon Young Chang of Daegu University. Although the main text is in Korean, the volume is made easily accessible to non-speakers by an extensive summary in English that provides for each species, an extensive list of references to Asian works, previously published and new geographical records within the Korean peninsula, and notes on the ecology, general distribution and distribution within Korea, morphological variation, and taxonomic questions. General range maps show the locations of species records within Korea. Detailed maps of each province show each of the 734 sampling localities. with the name of each locality given in both Korean and in English. The plates of very fine-quality line drawings are for the most part beautifully reproduced from the original sources; some are original to this volume. The figure legends are given in both Korean and English, and the references to the sources of the figures easily lead the reader to the respective original publication. This work is drawn largely from the 42 publications by Chang, his mentor Prof. Hoon Soo Kim, and their associates, reflecting some two decades of intensive study. Chang himself gives much of the credit for helping to complete this volume to his longtime associate Dr. Ji Min Lee.

A novel and helpful feature is the 18 color plates of light-microscope photomicrographs showing the dorsal or lateral habituses of 55 species, in many cases of both sexes, and apparently taken from living or freshly preserved specimens. The subsequent 14 plates of SEM photographs show the habituses of 33 species, again of both sexes in some cases, and are printed finely enough to, in a few instances, illustrate species characters.

The introductory section includes ample illustrations of the morphology and terminology for body parts of calanoids, cyclopoids, and harpacticoids, and copepodid stages of cyclopoids. There is also an extensive section on the tools used for collecting and dissecting copepods. The 363 references cover the essential literature on northern Asian copepods, and include additional works on the biology and ecology of the groups and species. The extensive taxonomic index gives the main page number of each taxon in boldface, and includes all other pages where it is mentioned; it appears to be free of errors or omissions. The physical volume is handsomely produced, with a strong binding, resilient paper, ribbon bookmark, and book jacket, and should stand the test of time and regular use.

This book will be of great benefit to copepodologists and aquatic biologists in general, across northern Asia and indeed throughout Europe and North America, where many of the species will be familiar. The volume joins Il-Hoi Kim's monumental earlier work on the symbiotic copepods, cirripeds, and pycnogonids (Kim, 1998) to provide a firm foundation for future students of these fascinating crustacean groups. Notwithstanding, we are apparently to regard this work, however excellent, as only interim; in his Preface, Chang promises to continue working through taxonomic problems and still-unpublished species, so we should look forward to an expanded work sometime in the future.

Reference: Kim, I.-H. 1998. Cirripedia, Symbiotic Copepoda, Pycnogonida. Illustrated Encyclopedia of Fauna and Flora of Korea. Vol. 38. Ministry of Education, Seoul. 1038 pp.

— Jan Reid

News from or about Members

You can download the most of articles of my colleague Dr Apostol Apostolov from the following web site: http://hydrobiology-bg.com/component/option,com_remository/Itemid,32/func,select/id,24/orderby,2/page,7/lang,bg/

With my best wishes,
Ivan Pandourski

Copepods (4 mm in panel) with large reciprocating cephalic appendages leave a distinctive hydrodynamic signal in the sea, visualized here as a ladder-like wake using Schlieren imaging. Images taken by Jeannette Yen (Georgia Tech) and J. Rudi Strickler (U. Wisconsin-Milwaukee).

Copepods in Drinking Water (continued)

Hartford, Connecticut, U.S.A. (22 April 2009) –

"The State of Connecticut Public Health Department is requesting that Metropolitan District (MDC) consumers in the towns of Bloomfield, Glastonbury, Portland, Windsor, Hartford, East Hartford, West Hartford, South Windsor and parts of East Granby and Windsor Locks, boil their drinking water for one minute until further notice. This notification is a precautionary measure.

"The Metropolitan District Commission (MDC) is conducting an intensive study to determine the cause of microscopic aquatic organisms called "copepods" and "rotifers" that have been identified in the drinking water distribution system coming through the District's Reservoir No. 6 Water Treatment Facility in Bloomfield. These organisms are commonly present in the raw water supplied to the treatment facility and are not harmful to humans and do not cause any known health effects in drinking water.

"The MDC is thoroughly investigating this matter and is taking a number of immediate actions including the isolation of East Hartford, Glastonbury, Portland and South Windsor from the Reservoir No. 6 service area, to ensure safety of the public drinking water supply. The MDC will advise consumers through the local media when they no longer need to boil water."

See also: 'Little polliwogs' found in Conn. drinking water: Thousands told to boil water as officials look for micro-organisms' source - http://www.msnbc.msn.com/id/30374958/

Editor's Notes

For their contributions and assistance for this number, I am grateful to David Damkaer for providing the photo of Corneliu Plesa, and to Bill Johnson for the thorough review of *Plankton. A guide to their ecology and monitoring for water quality*. Thanks for permission to reproduce images, to Erin Koenig, Media Relations Office, Woods Hole Oceanographic Institution, for the photo of copepods from the Beaufort Sea; to Jeannette Yen for her images of *Euchaeta elongata* and a calanoid wake, and the captions; and to Misha Matz for his photo of *Pontella securifer*.

From the primordial line drawings produced by observations with the light microscope, to the many modern photographic and computerized imaging techniques, readers will perceive a common theme in the illustrations in this number. Many beautiful representations of copepods have become available; some are easily located on web pages, but others are seen briefly at meetings, in publications, on office walls, or are even still in the camera or computer. Readers are welcome to send me their favorite images for inclusion in future numbers of *Monoculus*.

I believe that the photo of the harpacticoid in the last newsletter is of *Elaphoidella bidens* (Schmeil, 1894). Agreeing with me is Danny Tang, the only person who had an opinion. Thanks Danny!

— Jan Reid
Martinsville, U.S.A.

WAC Sponsoring Members

Sponsors
Susumu Ohtsuka
T. Chad Walter

Life Member
Janet W. Reid

WAC Executive Committee
2008-2011 Term

***President*:**
Janet Bradford-Grieve
National Institute of Water & Atmospheric Research
Box 14901, Kilbirnie, Wellington 6241, New Zealand
j.grieve@niwa.co.nz

***Past-President*:**
Shin-ichi Uye
Graduate School of Biosphere Sciences
Hiroshima University
1-4-4 Kagamiyama, Higashi-Hiroshima 739-8528, Japan
suye@hiroshima-u.ac.jp

***Vice-President*:**
Rony Huys
Department of Zoology, Natural History Museum
Cromwell Road, London SW7 5BD, United Kingdom
rjh@nhm.ac.uk

***General Secretary*:**
Eduardo Suárez-Morales
ECOSUR, El Colegio de la Frontera Sur - Unidad Chetumal
Apartado Postal 424
Chetumal, Q. Roo 77000, Mexico
esuarez@ecosur.mx

***Treasurer*:**
T. Chad Walter
Smithsonian Institution
Museum Support Center, MRC 534
4210 Silver Hill Road
Suitland, MD 20746, U.S.A.
walterc@si.edu

***Executive Council*:**

Victor R. Alekseev
Zoological Institute of the Russian Academy of Sciences
Universitetskaya nab. 1
199034 St. Petersburg, Russia
victor@zoology.spb.ru or valekseev@yahoo.com

James E. Bron
Institute of Aquaculture, University of Stirling
Stirling, Stirlingshire, PH4 1PY, Scotland
jeb1@stir.ac.uk

Dagmar Frisch
Biological Station, University of Oklahoma
HC-71, Box 205, Kingston, Oklahoma, U.S.A.
dfrisch@sistern.net

Erica Goetze
Dept. of Oceanography, University of Hawaii at Manoa
1000 Pope Road, Marine Sciences Building
Honolulu, Hawaii 96822, U.S.A.
egoetze@hawaii.edu

La-orsri Sanoamuang
Applied Taxonomic Research Center (ATRC)
Faculty of Science, Khon Kaen University
Khon Kaen 40002, Thailand
la_orsri@kku.ac.th

***Local Secretary, 11th ICOC*:**
Eduardo Suárez-Morales
ECOSUR, El Colegio de la Frontera Sur - Unidad Chetumal
Apartado Postal 424, Chetumal, Q. Roo 77000, Mexico
esuarez@ecosur.mx

Appointed Positions:

***MONOCULUS Editor*:**
Janet W. Reid
Research Associate, Virginia Museum of Natural History
Martinsville, Virginia 24112, U.S.A.
janet.w.reid@gmail.com

***Webmaster*:**
Prof. Dr. Pedro Martínez Arbizu
DZMB-Forschungsinstitut Senckenberg
Suedstrand 44
D-26382 Wilhelmshaven, Germany
pmartinez@senckenberg.de

Membership in the WAC: Any person interested in any aspect of the study of Copepoda is eligible for membership in the WAC. Contact the General Secretary for an application form and other information.
Dues: Dues of US $20.00 per annum are payable by students & researchers from less-developed countries; $35 for Standard Members; $200 for Sponsors; and $1000 for Life Members. Members who have difficulty paying dues may apply to the President and the Executive Council for a waiver or reduction. Dues may be paid in advance. Contributions to the WAC are tax-deductible in the U.S.A. WAC accepts personal checks issued in local currencies, made payable to WAC. Checks should be sent by mail to the Treasurer of the WAC. Dues may also be paid in person at WAC conferences. Members who are more than two years in arrears will automatically have their membership terminated.
Newsletter: All members receive the newsletter *MONOCULUS*, which appears at least once a year.
Copepod Libraries: Monoculus-Library: C/o Prof. Dr. Pedro Martínez Arbizu, Forschungsinstitut Senckenberg, DZMB-Forschungsinstitut Senckenberg, Monoculus-Library, Suedstrand 44, D-26382 Wilhelmshaven, Germany. **C. B. Wilson Library:** C/o Mr. T. Chad Walter, Smithsonian Institution, Museum Support Center, MRC 534, 4210 Silver Hill Road, Suitland, MD 20746, U.S.A.