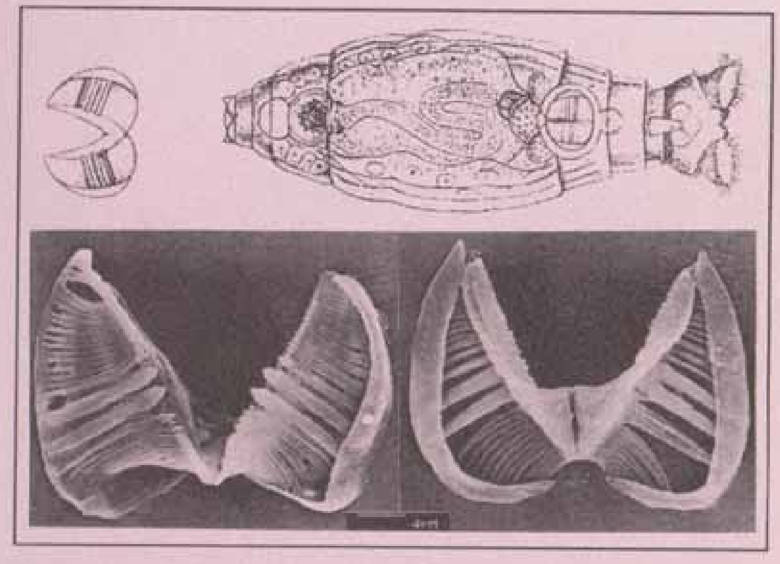
ROTIFER NEWS

A newsletter for rotiferologists throughout the world



Issue 31: June 1998

In this Issue:

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ROTIFER NEWS

Rotifer News is a newsletter for professional and amateur investigators of the Rotifera. The newsletter is not part of the refereed scientific literature (e.g. *Limnol. Oceanogr., Freshw. Biol., Oecologia* etc) and should not be so cited. It is a means of informal communication between widely dispersed workers with a common interest, where news, abstracts, work in progress, requests, recent publications and so on can be advertised or circulated.

Rotifer News is produced at The Murray Darling Freshwater Research Centre once or twice a year, depending on contributions from readers and regional editors. Regional editors are listed below. Back issues of the newsletter are available from Bob Wallace or Russ Shiel on request. Assistance with production and mailing cost is always appreciated!

> If you know of anyone who may wish to receive *Rotifer News* who is not presently on the mailing list, please pass on their address to the nearest regional editor

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***The cover: Rotifer News* is an equal opportunity newsletter - our last bdelloid cover was issue #13 (Fall 1986) - the new (trophi by SEM) courtesy of Giulio Melone, the old (original drawings) courtesy of the late David Bryce - *Macrotrachela habita* Bryce, 1894**

Editorial

This Winter (Gondwanan!) issue of *Rotifer News* has delayed hatching until Spring...profuse apologies to the global readers from the editorial office, but in this publish-or-perish modern world, demands of the Dublin SIL meeting took precedence. SIL was fun, albeit expensive for those of us from places where the currency has fallen over (!) It was particularly enjoyable when an aggregation of rotifer folks could get together. There is a brief report on the rotifer face of SIL (pp. 14-15), and some candid photos in the centrefold (with apologies to the unsuspecting victims...vee haf eyes everyvere!!).

In this issue, plans are afoot for the next meeting (ALREADY?!), a copy of the First Announcement for Rot IX, Khon Kaen 2000, is enclosed. An earlier electronic version which went to the global internet connected had a couple of minor omissions which are corrected in the enclosure. Please note the deadlines and publication requirements for the 2000 meeting. (For a change I won't have to fly for 23 hrs and be completely zonked out at a Rotifer meeting.....Khon Kaen is on the same side of the planet!!)

Otherwise, this issue is slim on contributions from the international rotiferological community. Please try and get interesting snippets for the December issue to me before Christmas...work in progress, publications, requests, anything of interest to the rotifer workers.

Russ Shiel
Production Editor

BELATED BIRTHDAY WISHES - WALTER KOSTE

July 19, 1998 was Dr Walter Koste's 85th birthday - congratulations from the international rotifer group, Onkel Walter! You have impartially and freely helped so many of us, from neophytes to long-established workers, with your unique knowledge of our animals-of-choice. We hope to see you at the next international meetings, if not Khon Kaen in 2000, Austria in 2003, which is not to far from home!! Best wishes from the global rotifer group for many more years of productive rotifer work!!

IXTH INT. ROTIFER SYMPOSIUM -THAILAND 2000

Enclosed with this issue of *Rotifer News* is the First Announcement for the IXth Int. Rotifer Symposium, the electronic version of which has already been sent to those rotifer workers connected to the WWW.

Location: Khon Kaen, Thailand, hosted by Dr La-orsri Sanoamuang.

Updated information, reminders of deadlines, circulars, etc, will appear in coming issues of *Rotifer News*.

The venue for Rotifer Symposium X (2003) will be in Austria, to commemorate the first meeting held at Lunz in 1976

CALLS FOR MATERIAL

HENDRIK SEGERS:

1. For a study on trophi morphology in Flosculariacea, I am desperately seeking material of weird Flosculariacea. What I need most of all at the moment is:

Beauchampia crucigera	*Conochiloides dossuarius*
Octotrocha speciosa	*Horaella* species (whatever)

Any person having 3 to many specimens of any of these taxa is requested (begged!) to provide the material. This will, of course, be acknowledged.

2. For the Guide on Trichocercidae, I seek representatives *of Ascomorphella volvocicola* and *Elosa* (any taxon), for the same (trophi SEM). Material of weird *Trichocerca*'s is equally welcome.

If you can help with any of these, please send material to Hendrik Segers, Lab. of Animal Ecology, R.U.G., K.L. Ledeganckstraat 35, B-9000 Gent, Belgium.

* * * * * * * * *

WALTER KOSTE

Walter Koste, Ludwig-Brill-Strasse 5, Quakenbrück 49620 Germany, would be happy to receive air-dried moss, lichen etc from trees, rocks, littoral margins. He is continuing his rotifer studies on Bdelloidea.

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JENNY SCHMID-ARAYA

Request for material, photos of *Testudinella* (other than the common *T. patina*), *Trichotria* and *Macrochaetus*. Thanks!

Dr J.M.Schmid-Araya, School of Biological Sciences, Queen Mary & Westfield College, Mile End Road, London E1 4NS, UK. Tel: 0171-775-3040, Fax: 0181-983-0973

* * * * * * * * *

RUSS SHIEL

American (both North and South) Brachionidae, all genera - a few specimens for SEM preparation - alcohol or formalin preserved would be fine. PO Box 921, Albury, NSW 2640, Australia.

* * * * * * * * *

News'n'Views

* COMPLETED THESIS *

Ooms-Wilms, Anja. 1998. *On the food uptake and population dynamics of rotifers in a shallow eutrophic lake.* Academisch Proefschrift. Universiteit van Amsterdam. 153 pp.

Congratulations Anja!!

News from Patagonia (Argentina)

The influence of the particular composition of zooplankton assemblage on rotifers is one of the most interesting problems in Patagonia. Watermites and endemic species of calanoid copepods are the main invertebrate predators in the deep Andean lakes, while *Asplanchna* and *Ploesoma* are additionally present in the shallow lakes of the Patagonian steppe. Only recently, the ciliate *Paradileptus elephantinus* has been found to prey on common rotifer species of Andean lakes. The low abundance of predaceous cyclopoid copepods and the absence of *Chaoborus*, *Leptodora* and other common North Hemisphere invertebrate predators is a striking feature. Besides, in Andean lakes, rotifer competitors are small sized copepods and cladocerans. The calanoid *Boeckella gracilipes* and the cladocerans *Bosmina longirostris* and *Ceriodaphnia dubia* can be considered the most important grazers and thus rotifer competitors. Food resource appears as a limiting factor for herbivorous zooplankton and is composed mainly by nanoflagellates cells. The effect of the particular assemblage of predators and competitors on rotifers is still an open question.

The study of the interactions between these kind of predators and competitors may provide a suitable explanation for the observed pattern in rotifer distribution and population dynamics. That is why we are trying to understand interactions within plankton in Patagonian lakes.

Although we are very far from many of the members of the rotifer family, we want to be better connected with all of you. Rotiferology in Argentina has recently been updated in Rotifer News (December 1997) by Susana José de Paggi. In the meanwhile, we have some more news dealing with patagonian rotifers. One is that a PhD thesis on rotifer ecology has been finished here, in Patagonia!!. The objective of the study was to analyse rotifer strategies against invertebrate predation by an experimental approach. Spine development and colony formation were studied in *Keratella cochlearis* and *Conochilus hippocrepis* as defence mechanisms against invertebrate predators of Andean lakes.

This is our first contribution to this informal section of Rotifer News, but in this way we wish to be more in contact with rotifer workers.

Beatriz E. Modenutti
María Diéguez
Centro Regional Universitario Bariloche, Unidad Postal Universidad, 8400 Bariloche Argentina

THREE MONTHS IN AUSTRALIA (*Aussie, or Down Under*)

Hi everybody!. I'm not sure if this will be of interest for the rotiferologist community, but Russell J. Shiel (our Rotifer News Production Editor) invited me to write this note, and the reason for it is a grant I had to visit and work at Russell's lab for three months.

First of all, I must say that in spite of being a rotiferologist, I started my Ph.D. work on ecology as a "theoretician", doing some math's and only using the rotifers as the organisms for my models and computer simulations (you can read my paper on Ecological Modelling, and a new one that is going to be published soon –I hope!– in The American Naturalist). Then, as you can see, my first rotifers were "virtual rotifers" –an unusual way to start as a rotiferologist for a biologist, I think!–.But, after that, my interest was to try to check my theoretical results with "real rotifers" and I started to do some lab and field experiments with *Brachionus plicatilis* in Spain. It was then that I went to Australia to do some field work and check my hypothesis, with other species. *Keratella slacki* was the species I mainly worked with while Down Under.

Working in Australia was a great experience for me. It helped me to improve my English (only a little bit, I know, but what you can expect with the unintelligible Aussie accent?). To see the way people work in other labs and fields was very interesting and formative. And, obviously, it was also very good to make contact with Russ who, unlike myself, is a specialist in taxonomy.

Aussie people are very charming, friendly, kind, welcoming, ... (I don't have enough adjectives to express it) and it felt like home during my days on the other side of the world. Someone told me before I left Spain that "Australian people are English in customs, but Mediterranean in character". I don't know if they would

agree with this definition, but I think this is the one that fits best. People at the Murray-Darling Freshwater Research Centre (MDFRC) were like old friends with me from my first day at the centre, my landlady was like my mother (?), and I had Russ as my neighbor (!), this was a great advantage since he invited me to drink a lot of beers at his place, and I had free "taxi service" (thank you again, Russ) to go work in one of his Mini cars (how many do you have now?, may be 17?) or with his old VW Kombi Van (more than 1 million Km and still working!). The MDFRC was located in a nice building (or so it seemed to me), placed on a beautiful hill (in Thurgoona, near Albury –New South Wales–). It was fully equipped, and a lot of people was working there in different fields related to water ecology. All the staff were fantastic, and particularly those responsible for the "social club", this made it very pleasant to work there, mainly because they (as perfect Aussie people) were very careful to make sure that coffee, tea or cool beer never ran out.

On the other hand Australia is very spectacular. It was fantastic going outdoors to take samples and see the billabongs and the rich wildlife they have, mainly birds (parrots, pelicans, swans, ...). When I arrived, the countryside was completely green and full of cows, and if it hadn't been for the eucalyptus trees, I would have sworn we were in Scotland, it was an unexpected image. But, even whether you believe me or not, what I never saw in the three months I was there were the famous Australian Kangaroos (!).

I didn't travel very much across Australia, but I had the opportunity to visit Tasmania (*Tassie, or Under Down Under*), as "field assistant" of Russ, for one week, and it was fantastic. I think it is one of the most beautiful places in the world to visit. The landscapes are fascinating, the woods are amazing, and the changes in vegetation types are as fast as the changes in the weather (completely unpredictable in Tasmania!), the people are even more friendly that in the mainland, and Hobart (the capital city of the island) and Salamanca market (on Saturdays) deserve to be visited. I'm still dreaming about this island. It's incredible.

Then, the only thing I can say after three months in Australia is that I feel it was not enough, and as an aborigine said to me "you will need at least two or three years only to start to see and know this enormous and beautiful country". Then, I can't finish this note in any other way but to say thank you to all the people I met in Australia, and I strongly recommend everybody to visit it. And ... if you want to know in greater depth what I was working on while in Australia, watch out for my future papers.

Cheers,

Eduardo Aparici

NEWS FROM THE U.S. OFFICE

Bob Wallace and Terry Snell are in the process of revising their chapter (chp. 8) of the textbook "Ecology and Classification of North American Freshwater Invertebrates" last published in 1991 by Academic Press. They anticipate that the editors (Jim Thorp and Alan Covich) will have the entire thing ready for a 1999 or 2000 publication date.

Bob also has another review in press to be published by Academic Press: Wallace, R.L. 1998. Phylum Rotifera. In: Encyclopedia of Reproduction, E. Knobil and J.D. Neill (eds.), Academic Press, San Diego, CA.

Bob Wallace is looking to see if there are other researchers who have bothered to analyze the relative effective of different stains on rotifers for light microscopy. If you are interested in this topic you may contact him at the following e-mail address: WallaceR@Ripon.edu or at R.L. Wallace, Department of Biology, Ripon College, 300 Seward Street, Ripon, WI 54971-0248, U.S.A.

BOOK REVIEW

Guides to the Identification of the Microinvertebrates of the Continental Waters of the World

Co-ord. Editor: Henri J. Dumont ISSN 0928-2440

Rotifera Volume 5: The Dicranophoridae (Monogononta) by Willem H. De Smet and The Ituridae(Monogononta) by Roger Pourriot, SPB Academic Publishing bv1997, ISBN90-5103-135-1

This volume includes Family Dicranophoridae and Ituridae. The family Dicranophoridae was given family rank by Voigt in 1957. The species in this group, either illoricate or semi-loricate, are one of the most difficult group to identify. At present , the trophi structure is the main characteristic in the taxonomy of the Dicranophoridae, the external and internal body organization being very similar for the different taxa and probably representing a plesiomorphic state. The author thought the major handicap in attempting this family is almost the complete absence of type material and the restricted availability of specimens for study and scanning electron microscopy.

The dichotomous keys include characters based on structure of trophi, body shape, internal organs and habit. There are 16 genera: *Dorria, Balatro, Pedipartia, Aspelta, Streptonatha, Dicranophorus, Dicranophoroides, Parencentrum, Myersinella, Erignatha, Kostea, Wigrella, Inflatana, Wierzejskiella, Paradicranophorus* and *Albertia*, with about 211 valid species. Descriptions of each species are accompanied by clear figures and some species with S.E.M. plates of trophi. Within 16 genera, the author erected two nov. genera: *Dicranophoroides* and *Kostea*. *Dicranophoroides* nov.gen. is erected by its basal chambers of the rami laterally on external margin of subbasal ones, *Kostea* nov. gen. is just a nov. comb. of *Paradicranophorus wockei*. From material examined by S.E.M., at least 3 subgenera in genus *Encentrum* could be reached: *Encentrum* s.str., *Isoencentrum* nov.subgen., *Pseudencentrum* nov. subgen.. Genus *Parencentrum* Wiszniewski 1953 is erected again by the author on basis of the trophi, not only on basis of the presence of longitudinal and transverse folds in the cuticle according to Wiszniewski. Two species *P. lutetiae* and *P. plicatum* are recognized as belonging to genus *Parencentrum*.

De Smet tells us the present state of knowledge is very incomplete in respect to the distribution and ecology. As a group, the Dicranophoridae are cosmopolitan

and found from sea level to high alpine habits. The great majority of the Dicranophoridae are free-living, some are epizoic, and several are exclusively parasitic species. The free-living representatives mostly display a periphytic, benthic or psammobiotic way of living. Free living Dicranophoridae are carnivorous, herbivorous or omnivorous.

A list of *species inquirendae* and *nomina dubia* follows the section on each genus and a checklist of names and synonyms, and a reference list end this part.

Family Ituridae emended according Markevich 1990 was first erected by Sudzuki in 1964. It is a small family with only one genus *Itura*. The body of *Itura* species is illoricate, the mastax is a specializd form of the virgate type where the pumping action has been lost, and represents a transition to the forcipate type of the genus *Dicranophorus*. There are 7 species. In the text, the author gave a dichotomous key , descriptions and figures of each species, 2 species *incertae sedis* and references. The index completes the whole volume.

The standard, format and style of the key to the Dicranophoridae and Ituridae matches that of the keys of the former volumes. Therefore, I have pleasure in recommending it to everyone who is interested in Rotifera .

Yan Zhuge
Wuhan

E-mail addressing failures

A number of the e-mail addresses supplied to *Rotifer News* and listed in the previous issue have bounced or otherwise failed to connect. Several of these adressees' copies of Rotifer News have been returned, so they appear to have changed postal addresses.

If you know any of the following, please let them know they've dropped through the cracks in the system, and are off the mailing list and/or newsletter mailing list. If anyone has a correct/current e-mail address for them, please let me know <shieln@mdfrc.canberra.edu.au>

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Updated Bibliography *Rotifer News* #31

Ed. note: An electronic copy of this, or any previous bibliography in Rotifer News, can be requested from the Production Editor <shielr@mdfrc.canberra.edu.au>

To maintain a comprehensive list of recent publications- authors should remember to pass on copies, or at least publication details, to one of the regional editors, or directly to Russ Shiel at MDFRC. In the list below, only the address for reprints is included. Every effort has been made to include a summary, however some lists sent by authors did not contain summaries, so these papers remain unseen. Some papers include keywords in lieu of a summary. The major subject areas in each citation are categorized below - many papers include several topics.

Aquaculture: 1, 2, 3, 5, 7, 9, 10, 11, 13, 14, 17, 20, 21, 24, 25, 29, 31, 35, 37, 38, 40, 44, 49, 60, 61, 62, 63, 65, 66, 67,

Anatomy/Morphology/Physiology: 18, 22, 28, 47, 54, 68,

Biochemistry/Genetics/Pharmacology: 17, 20, 26, 31, 32, 55,

Biogeography/Taxonomy: 30, 52, 53, 54, 55, 69,

Ecology/Population dynamics/Food webs: 4, 8, 12, 19, 23, 25, 28, 33, 34, 36, 39, 41, 42, 43, 45, 47, 48, 51, 56, 57, 58, 59,

Reproduction: 17, 18, 19, 27, 46, 48,

Water quality/Toxicology: 6, 15, 16, 50, 58, 59, 64.

1. ABU-REZQ, T., J. AL-SHIMMARI & P. DIAS, 1997. Live food production using batch culture and chemostat systems in Kuwait. *Hydrobiologia* **358**, 173-178. <<Kuwait Inst. Sci. Res., Mariculture & Fisheries Dept, POB 1638, Salmiya 22017, Kuwait.>> Growth rate of rotifers (*Brachionus plicatilis*) treated 24 h with a mixture of marine algal species (*Nannochloropsis, Isochrysis, Tetraselmis, Chlorella*) plus other enrichment media such as Super Selco, Protein Selco and Sanders prior to being supplied to the marine fish larvae is discussed. Rotifer production reached up to 2000 x 10^6 individuals per day. K/W: aquaculture, batch culture, *Brachionus plicatilis*, chemostat, *Chlorella*, culture, *Isochrysis*, marine, mass production, *Nannochloropsis*, rotifers.

2. BALOMPAPUENG, M.D., A. HAGIWARA, Y. NOZAKI & K. HIRAYAMA, 1997. Preservation of resting eggs of the euryhaline rotifer *Brachionus plicatilis* O.F. Müller by canning. *Hydrobiologia* **358**, 163-166. <<A. Hagiwara, Nagasaki Univ., Fac. Fisheries, Bunkyo 1-14, Nagasaki, Japan.>> The problem of bacterial infection of resting eggs was investigated by canning eggs in a dry form, after lyophilization at -40 °C. The resting eggs were packed under various pressures: 21, 34, 48, 61, 75, 88 and 101 kPa. At <88 kPa, percent hatching after 6 months ranged between 16 and 20%, similar to that of uncanned eggs (19% hatching), but significantly lower (9 and 11%, $P<0.01$) at 88 and 101 kpa. Even after 12 months, percent hatching remained at 35% when canning was at 61 kpa. Lyophilization and canning at partial pressure lower than 88 kPa could therefore preserve resting eggs, and hatchability was maintained. Canned eggs that were treated with NaClO (1 mg l^{-1} or NFS-Na (5 mg l^{-1}) showed a significantly higher percent hatching (68% and 80%, respectively, each $P<0.05$) than untreated eggs. K/W: Rotifera, *Brachionus plicatilis*, resting egg, preservation, lyophilization, canning

3. BONOU, C.A. & L SAINT-JEAN, 1998. The regulation mechanisms and yield of brackish water populations of *Moina micrura* reared in tanks. *Aquaculture* **160**, 69-79. <<Ctr Rech. Oceanol.., BP V18, Abidjan, Côte Ivoire.>> *Moina micrura* populations were reared in open air concrete tanks filled with enriched brackish pond water for a period of about 15 days. With no fertilization and no harvesting, the biomass quickly increased showing daily population growth rates from 0.62 to 0.97, before crashing. Fertilization strongly improved the population growth rate, while periodic harvesting and water renewal maintained a productive culture with elevated biomasses for only a few additional days. The authors ask whether or not *M. micrura* and related prolific species are convenient for permanent open culture systems in the tropics, compared to less productive species such as copepods and certain other cladocerans. K/W: *Moina micrura*, brackish water, tropics, fertilization, regulation processes, *Daphnia magna* Straus, Ivory Coast, rotifers, growth, food, recolonization, cladocerans, aquaculture, survival, culture.

4. CAMMARANO, P. & M. MANCA, 1997. Studies on zooplankton in two acidified high mountain lakes in the Alps. *Hydrobiologia* **356**, 97-109. K/W: acidification, cladocera, copepoda, high mountain lakes, Rotifera, seasonality, species composition, succession, zooplankton.

5. CHEBIL, L. & S. YAMASAKI, 1998. Improvement of a rotifer ecosystem culture to promote recycling marine microalga, *Nannochloropsis* sp. *Aquacult. Eng.* **17**, 1-10. << Inst. Natl Sci .& Technol. Mer, 28 Rue 2 Mars 1934, Salammbo 2025, Tunisia.>> In new rotifer waste water, the growth of *Nannochloropsis* was equal to that in enriched sea water with Enriched Sea Water Provasoli (ESP) nutrients. Using aged rotifer waste water, the maximum cellular density was obtained in a waste water with N and P concentrations of 364 and 179 µg at. L^{-1} respectively. This growth was 23% higher than that obtained in enriched sea water with ESP nutrients (control). K/W: rotifer ecosystem, recycling, microalga, *Nannochloropsis*.

6. CLASKA, M.E. & J.J. GILBERT, 1998. The effect of temperature on the response of *Daphnia* to toxic cyanobacteria. *Freshw. Biol.* **39**, 221-232. <<J.J. Gilbert, Dartmouth Coll., Dept Biol. Sci., Hanover, NH 03755 USA >> Comparative toxicological effects of cyanobacterial toxins on rotifers are mentioned in this study on *Daphnia pulex*. The study suggests that increasing water temperatures in natural systems should exacerbate the inhibitory effect of toxic cyanobacteria on daphniid population growth rates. K/W: life-history parameters, *Microcystis aeruginosa*, planktonic rotifers, *Anabaena affinis*, zooplankton, *Daphnia magna*, lake, cladocerans, strain, growth.

7. COMPS, M. & B. MENU, 1997. Infectious diseases affecting mass production of the marine rotifer *Brachionus plicatilis*. *Hydrobiologia* **358**, 179-183. << IFREMER,

GIE, RA, Chemin Maguelone, F-34250 Palavas les Flots, France.>> The first reported infection was caused by an unusual birnavirus referred as rotifer birnavirus (RBV). Viral lesions appeared in cells of gastric glands and spread to other epithelia. Virus particles were also found within ovarian cells. Highly infected rotifers exhibited abnormal behavior and died. The second important pathogen found in *Brachionus plicatilis* has been provisionally related to the Lagenidiaceae. The fungus developed in up to 85% of rotifers and caused sudden, precipitous decrease in animal density. The occurrence of these diseases shows that in the future infectious agents will have to be considered as important factors capable of reducing the productivity of rotifer mass cultures. K/W: aquaculture, birnavirus, *Brachionus plicatilis*, culture, disease, fungus, mass production, rotifers.

8. CONDE-PORCUNA, J.M. & S. DE CLERCK, 1998. Regulation of rotifer species by invertebrate predators in a hypertrophic lake: Selective predation on egg-bearing females and induction of morphological defences. *J. Plankt. Res.* **20**, 605-618. <<Univ Granada, Fac Sci, Dept Anim Biol & Ecol, E-18071 Granada, SPAIN.>> The abundance of herbivorous rotifers was regulated by predation by *Asplanchna brightwelli* and the copepod *Acanthocyclops robustus*. Stomach analyses showed that *Asplanchna* fed selectively on reproductive females of *Keratella cochlearis*, reducing the fecundity of this species. Predators induced longer caudal spines in *K. quadrata*, which were negatively related to the fecundity of this rotifer, suggesting a reproductive cost associated with spine production. In contrast, spine length of *K. cochlearis* was not related to predators, but to temperature. Predators can reduce rotifer densities through increasing mortality and through decreasing rotifer fecundity rates regardless of phytoplankton biomass. K/W: fresh-water zooplankton, *Keratella cochlearis*, community structure, reproductive costs, *Asplanchna girodi*, *Daphnia pulex*, body-size, chaoborus, copepods, populations.

9. DAHRIL, T. 1997. A study of the freshwater rotifer *Brachionus calyciflorus* in Pekanbaru, Riau, Indonesia. Hydrobiologia 358, 211-215. <<Univ. Riau, Jl Pattimura 9, Fac. Fisheries, Pekanbaru, Riau, Indonesia.>> 2.5 x 10^3 ind. L^{-1} *B. calyciflorus* occurred in ponds fertilised with animal wastes. Fecundity of amictic females was higher than that of unfertilized mictic females. Human and animal wastes promoted the growth of phytoplankton as food for rotifers in the pond. The best growth of *B. calyciflorus* at a density of 109 ind. Ml^{-1} was found at 0.5 g l^{-1} of human excreta. A high density of *B. calyciflorus* (542 ind. Ml^{-1}) was also found in semi-continuous culture with chicken excreta. K/W: *Brachionus calyciflorus*, fecundity, population growth, human and animal excreta, ponds.

10. DIAZ, M., F.J. MOYANO, F.L. GARCIA-CARRENO, F.J. ALARCON & M.C. SARASQUETE, 1997. Substrate-SDS-PAGE determination of protease activity through larval development in sea bream. *Aquaculture International* **5**, 461-471. <<Univ Almeria, Escuela Politecn Super, Dpto Biol Aplicada, La Canada S-N, Almeria 04120, Spain.>> The study describes identification of proteases existing in larvae and adults of sea bream (*Sparus aurata*), as well as food items: rotifers, *Brachionus plicatilis*, and *Artemia* nauplii. The results obtained provide information about the role of exogenous enzymes in larval feeding of sea bream. K/W: alkaline

proteases, *Artemia*, chymotrypsin, larval development, proteinase classes, rotifers, trypsin, zymogram, *Scophthalmus maximus*, digestive enzymes, gilthead seabream, gel-electrophoresis, proteins, system, turbot, growth.

11. DOUILLET, P. 1998. Disinfection of rotifer cysts leading to bacteria-free populations. *J. Exp. Mar. Biol. Ecol.* **224**, 183-192. <<Adv. Microbial Syst. Inc, 701 Canterbury Rd, POB 540, Shakopee, MN 55379 USA.>> A reliable method was developed to disinfect cysts of the salt water rotifers *Brachionus plicatilis* Müller and *B. rotundiformis* Tschugunoff. The method leads to the production of axenic populations for both species of rotifers. The technique takes only a few minutes and requires very few manipulations, the possibility of bacterial contamination is reduced. The microbiota that coats rotifer cysts was found to produce no adverse effects on hatching efficiency. K/W: axenic rotifers, *Brachionus plicatilis*, *Brachionus rotundiformis*, cyst disinfection, sodium hypochlorite, oyster *Crassostrea gigas*, toxicity, larvae, reproduction, temperature, aquaculture, organisms, survival, flora.

12. DREBES, G. & E. SCHNEPF, 1998. *Gyrodinium undulans* Hulburt, a marine dinoflagellate feeding on the bloom-forming diatom *Odontella aurita*, and on copepod and rotifer eggs. *Helgol. Meeresunters.* **52**, 1-14. <<Biol. Anstalt Helgoland, Wattenmeerstn Sylt, D-25992 List, Germany.>> The marine dinoflagellate Gyrodinium undulans was discovered as a feeder on copepod and rotifer eggs, at least under culture conditions. When fed with copepod eggs, the dinoflagellate developed into a large trophont, giving rise thereafter by repeated binary fission to 4, 8 or 16 flagellates, as a result of a single feeding.. K/W: fresh-water, food uptake, ultrastructure, phagotrophy

13. EVJEMO, J.O. & Y. OLSEN, 1997. Lipid and fatty acid content in cultivated live feed organisms compared to marine copepods. *Hydrobiologia* **358**, 159-162. K/W: aquaculture, *Artemia franciscana*, *Brachionus plicatilis*, culture, enrichment, fatty acids, food organism, lipid, marine copepods, rotifers.

14. FU, Y., A. HADA, T. YAMASHITA, Y. YOSHIDA & A. HINO, 1997. Development of a continuous culture system for stable mass production of the marine rotifer *Brachionus*. *Hydrobiologia* **358**, 145-151. <<Fuyo Ocean Dev. & Engn. Co. Ltd, Taitou Ku, 1-8-2 Torigoe, Tokyo 111, JAPAN.>> Average production was about 2.1 billion rotifers d^{-1} from a 1-m^3 S-type continuous culture in which high rotifer densities ranging from 3000 to 6000 ind. Ml^{-1} were maintained. About 0.17 billion rotifers d^{-1} on average were obtained from a 500-liter L-type culture, with densities ranging from 1100 to 2200 ind. Ml^{-1}. The longest duration for a continuous culture was over 110 days. Furthermore, experiments utilizing five enrichment techniques indicate that rotifers from the continuous culture system can easily be nutritionally enriched in the same manner as those from common batch culture systems. K/W: aquaculture, brachionus plicatilis, brachionus rotundiformis, culture, food organism, mass production, nutrition, rotifers.

15. GALBRAITH, L. & C.W. BURNS, 1997. The toxic effects of rubber contaminants on microbial food webs and zooplankton of two lakes of different trophic status. *Hydrobiologia* **353**, 29-38. K/W: algae, calanoids, cladocera, microorganisms, protozoa, rotifers, rubber, toxicity, zooplankton.

16. GALLARDO, W., Y. TOMITA, A. HAGIWARA, K. SOYANO & T.W SNELL, 1997. Effect of dimethyl sulfoxide (DMSO), sodium hydroxide (NaOH), acetone, and ethanol on the population growth, mictic female production, and body size of the rotifer *Brachionus plicatilis* Müller. *Bull. Fac. Fish. Nagasaki Univ.* **78**, 15-22. K/W: aquaculture, *Brachionus plicatilis*, hormones, mictic females, population growth, production, rotifers, size composition, solvents, steroids, toxicity, toxicology.

17. GALLARDO, W.G., A. HAGIWARA, Y. TOMITA, K. SOYANO & T.W. SNELL, 1997. Effect of some vertebrate and invertebrate hormones on the population growth, mictic female production, and body size of the marine *rotifer Brachionus plicatilis* Müller. *Hydrobiologia* **358**, 113-120. <<Nagasaki Univ., Grad. Sch. Marine Sci. & Engn., Bunkyo Machi 1-14, Nagasaki 852, Japan.>> Eight vertebrate and invertebrate hormones were screened for their effect on population growth, mictic female production, and body size of the marine rotifer *Brachionus plicatilis*. Population growth was significantly higher in treatments exposed to gamma-aminobutyric acid (GABA) (50 mg l(-1)), growth hormone (GH) (0.0025 and 0.025 I.U. Ml(-1)), human chorionic gonadotropin (HCG) (0.25 and 2.5 I.U. Ml(-1)), and 5-hydroxytryptamine (5-MT] (5 mg l(-1). estradiol-17 beta (E-2] caused a decrease in population growth, whereas juvenile hormone (JH), 20-hydroxyecdysone (20-HE), and triiodothyronine (T-3] had no effect. K/W: Rotifera, Brachionus plicatilis, hormonal regulation, population growth, sexual reproduction, body size, resting eggs, reproduction, induction, behavior, insulin

18. GILBERT, J.J. & D.K. SCHREIBER, 1998. Asexual diapause induced by food limitation in the rotifer *Synchaeta pectinata*. *Ecology* **79**, 1371-1381. <<Dartmouth Coll., Dept Biol. Sci., Hanover, NH 03755 USA.>> In some clones of *Synchaeta pectinata*, females parthenogenetically produce two types of eggs: thin-shelled, subitaneous eggs and thicker-shelled eggs that undergo a brief diapause. The stimulus for producing diapausing eggs is food limitation, either throughout the life-span or for short intervals during early adult life. Production of both types of eggs may be a risk-spreading strategy: diapausing eggs provide a refuge from short periods of very low food availability, and subitaneous eggs permit some population growth as long as food availability remains above the threshold food concentration. The mechanism by which food limitation is assessed by the rotifer is not known. While diapause induced by food limitation is common in microorganisms, it has rarely been reported in aquatic invertebrates. K/W: *Anabaena flos-aquae*, cyanobacteria, diapause, food limitation, rotifers, *Synchaeta pectinata*, fresh-water copepod, planktonic rotifers, *Daphnia magna*, sexual reproduction, population-density, body size, egg bank, induction, temperature, dormancy.

19. HANSSON, L.-A., E. BERGMAN & G. CRONBERG, 1998. Size structure and succession in phytoplankton communities: the impact of interactions between herbivory and predation. *Oikos* **81**, 337-345. K/W: grazing, macrozooplankton, phytoplankton, predation, rotifers, size distribution, succession.

20. HARA, K., H. PANGKEY, K. OSATOMI, K. YATSUDA, A. HAGIWARA, K. TACHIBANA & T. ISHIHARA, 1997. Some properties of beta-1,3-glucan hydrolyzing enzymes from the rotifer *Brachionus plicatilis*. *Hydrobiologia* **358**, 89-94. <<Nagasaki Univ., Fac. Fisheries, 1-14 Bunkyo Machi, Nagasaki 852, Japan.>> We examined some characteristics of hydrolytic enzymes, especially beta-1,3-glucanase, to obtain the information of cell wall lytic enzymes for rotifers. Crude enzyme (ammonium sulfate fraction) of rotifers hydrolyzed starch, beta-1,3-glucan, glycol chitin and CM-cellulose. Optimum pH for hydrolysis of starch and CM-cellulose was 6.5, and that for beta-1,3 glucan and glycol chitin was pH 6.0. Pectic acid, xylan and agarose were not hydrolyzed at pH 3-10. beta-1,3 glucanase was purified about 73-fold from crude enzyme by ion-exchange chromatography and gel filtration. Optimum pH and temperature of the enzyme were 6 and 60 °C, respectively. The molecular weight of the enzyme was estimated about 260 kDa by gel filtration. The enzyme was inhibited by $HgCl_2$ and $MnCl_2$. K/W: beta-1,3-glucanase, rotifer, polysaccharide, purification, *Bacillus circulans, Trichoderma pseudokoningii*, purification, protease.

21. HARZEVILI, A., H. VANDUFFEL, P. DHERT, J. SWINGS & P. SORGELOOS, 1998. Use of a potential probiotic *Lactococcus lactis* AR21 strain for the enhancement of growth in the rotifer *Brachionus plicatilis* (Müller). *Aquaculture Research* **29**, 411-417. << State Univ Ghent, Lab Aquaculture, Rozier 44, B-9000 Ghent, BELGIUM.>> Probiotic strain AR21 had no significant observable effect on the growth rate of rotifers under optimal culture conditions in three consecutive experiments, In the first and second experiments, the AR21 strain exhibited an inhibitory effect against the *V. anguillarum* strain when rotifer cultures were maintained at a suboptimal feeding regime. The growth rate of the rotifers in suboptimal feeding conditions was significantly higher in the treatment receiving AR21 and *V. anguillarum* than in the treatment where only *V. Anguillarum* was added. K/W: *Vibrio anguillarum, Scophthalmus maximus, Tetraselmis suecica*, turbot larvae, bacteria, inhibition, flora.

22. HEGGEMANN, F., R. SCHMELTER & W. KLEINOW, 1998. Ribosomes of *Brachionus plicatilis* (Rotifera) - Distribution in homogenate fractions and general properties. *Hydrobiologia* **361**, 11- 24. <<Zoologisches Institut der Universität zu Köln, Weyertal 119, D - 50923 Köln, Germany.>> Ribosomal proteins have molecular masses of between 11 000 and 56 000 Da, while the molecular mass of the total protein content of *Brachionus* ribosomes was estimated to be 1.8 (+/- 0.5) * 106 Da. K/W: Brachionus, homogenate fractions, influence of ions, ribosomes

The rotifer face of SIL, Dublin, August 1998

Top row: Norbert W. & Linda M.; Celia J.-J.; Alois H.; Jolanta E.-K.
Middle row: Gregor H.; John G.; Esteban B. & Beatriz M.;
anonymous (she was blinking, really....!)
Bottom row: Linda M. & Lor-Wai T. cruising...; Giulio;
'wait till I get you home!!'; Ramesh, just missed....

23. HECKMAN, C.W. 1998. The seasonal succession of biotic communities in wetlands of the tropical wet-and-dry climatic zone: V. Aquatic invertebrate communities in the Pantanal of Mato Grosso, Brazil. *Int. Rev. Hydrobiol.* **83**, 31-63. <<Inst Hydrobiol & Fischereiwissensch, Zeiseweg 9, D-22765 Hamburg, Germany.>> The results of a 3 1/2 year study in the Pantanal of Mate Grosso revealed that the life cycles of the invertebrates are profoundly influenced by the annual alternations between a period of very heavy rainfall and several months during which almost no rain falls. The general effect of the seasonal changes on the aquatic community of the wetland is to greatly reduce species diversity but to allow the production of vast numbers of those species that have successfully adapted to the conditions. The invertebrate fauna includes several taxa represented overwhelmingly by cosmopolitan and circumtropical species, including Rotifera and Gastrotricha, but the great majority of the species are endemic to South America. K/W: floodplains, aestivation, Arthropoda, Mollusca, Rotifera, Platyhelminthes, Gastrotricha.

24. HINO, A, S. AOKI, & M. USHIRO, 1997. Nitrogen-flow in the rotifer *Brachionus rotundiformis* and its significance in mass cultures. *Hydrobiologia* **358**, 77-82. <<Univ Tokyo, Fisheries Lab, 2971-4 Maisaka, Shizuoka 43102, JAPAN.>> The nitrogen budget in the rotifer Brachionus rotundiformis was measured by the stable-isotope technique. Where 77% of the ingested nitrogen was egested, and of the assimilated 23%, 18% were devoted to growth and 5% to excretion. As for the unassimilated nitrogen egested as faeces, it recycled to the rotifer through bacteriovory. The rapid and large nitrogen outflow from rotifers accelerated the propagation of edible bacteria and can explain the strange paradox observed in the culture, daily supply of foods did not cover the sum of growth and excretion. It is not too exaggerated to state that the rotifer mass culture is supported by bacteria. The future strategy for maintenance of mass cultures should consider this aspect. K.W: ^{15}N, bacteriovory, *Brachionus*, food efficiency, nitrogen.

25. JUNG, M.M., A. HAGIWARA & K. HIRAYAMA, 1997. Interspecific interactions in the marine rotifer microcosm. *Hydrobiologia* **358**, 121-126. << Nagasaki Univ., Grad. Sch. Marine Sci. & Engn., Bunkyo 1-14, Nagasaki 852, Japan.>> Copepods and protozoans often co-exist in marine rotifer mass cultures. Interspecific interaction between the rotifer *Brachionus rotundiformis* Tschugunoff and eight other zooplankton species which were investigated in the laboratory are described. Four types of interspecific interactions were seen (1) both species declined, (2) one species is promoted while the other is not influenced, (3) one species is declined while the other is not,influenced and (4) one species is promoted while the other declined. K/W: microcosm, interspecific interaction, *Brachionus rotundiformis*, contaminating species, *Brachionus plicatilis*, Rotifera, behaviour, reproduction, culture.

26. KELLY, L.S. & T.W. SNELL, 1998. Role of surface glycoproteins in mate-guarding of the marine harpacticoid *Tigriopus japonicus*. *Marine Biology* 130, 605-612. <<Georgia Inst. Technol., Sch. Biol., Atlanta, GA 30332 USA.>> Surface glycoproteins serve as mate-and gamete-recognition molecules in some marine animals such as rotifers and sea urchins. The role of contact chemoreception of surface glycoproteins in mate recognition, mate-guarding, and spermatophore transfer in the marine harpacticoid *Tigriopus japonicus* Mori is described. K/W: *Brachionus plicatilis, Callinectes sapidus*, mating behaviour, lectin binding, sex pheromone, copepods, rotifer, fertilization, location, protein.

27. KING, C.E. & P. MURTAUGH, 1997. Effects of asexual reproduction on the neighbourhood area of cyclical parthenogens. *Hydrobiologia* **358**, 55-62. <<Oregon State Univ, Dept Zool, Corvallis,OR 97331 USA.>> The habitat occupied by a subpopulation and within which there is random mating is known as its neighborhood area'. Neighborhood area is dependent on dispersal rates and organisms with low rates of dispersal are expected to have small neighborhood areas. Because rotifers typically have low dispersal rates spatial genetic discontinuities may develop that divide the population into genetically distinct subpopulations. Countering this tendency is the increased neighborhood area produced by dispersal during the parthenogenetic phase. Thus cyclical parthenogenesis in organisms like rotifers may have important and previously unreported effects on the population's genetic structure. K/W: aquaculture, gene flow, genetic structure, parthenogenesis, population size, rotifers, sexual reproduction, effective population size, neighborhood area, monogonont rotifers, cyclical parthenogens, *Brachionus plicatilis*, swimming behaviour.

28. KLEINOW, W., N. LINDEMANN & S. KÖHLER, 1997. Untersuchung der Nahrungsaufnahme von *Brachionus plicatilis* (Rotatoria) mit Hilfe von Erythrozyten-Suspensionen. *Verh. Dtsch. Zool. Ges.* **90.1**, 112. <<Zoologisches Institut der Universität zu Köln, Weyertal 119, D-50923 Köln, Germany.>> Describes food uptake in *Brachionus plicatilis* (Rotatoria) by means of suspended erythrocytes. K/W: feeding, rotifer, ultrastructure, erythrocytes, visual observation.

29. KOGANE, T., A. HAGIWARA & K. IMAIZUMI, 1997. Temperature conditions enhancing resting egg production of the euryhaline rotifer *Brachionus plicatilis* O. F. Müller (Kamiura strain). *Hydrobiologia* **358**, 167-171. << Japan Sea Farming Assoc, Kamiura Stn, Oita 57926, Japan.>> Our results suggest that low temperature stimulated mictic female production and the transfer to the high temperature accelerated resting egg formation. This method may be useful for producing resting eggs of rotifer strains that lack sexual reproduction in the common culture condition at larval rearing facilities. K/W: *Brachionus plicatilis*, resting egg, temperature regulation, preservation, live food, fertilized-eggs, reproduction.

30. KOSTE, W. & Y. ZHUGE, 1998. Zur Kenntnis der Rotatorienfauna (Rotifera) der Insel Hainan, China. Teil II. *Osnabr. Nat. Mitt.* **24**, 183-222. K/W: *Cephalodella qionghaensis*, checklist, China, rotifers, taxonomy, zoogeography.

31. KUROKAWA, T., M. SHIRAISHI & T. SUZUKI, 1998. Quantification of exogenous protease derived from zooplankton in the intestine of Japanese sardine (*Sardinops melanotictus*) larvae. *Aquaculture* **161**, 491-499. <<Natl Res. Inst. Aquaculture, Fisheries Agcy, Nansei, MIE 51601, Japan.>> In this study, the contribution of exogenous protease to digestion in sardine larvae appears to be insignificant. K/W: sardine, larva, exogenous protease, zooplankton, rotifer, flounder, *Paralichthys olivaceus*, *Dicentrarchus labrax*, *Clupea-harengus*, sea bass, proteolytic enzymes, exocrine pancreas, digestive enzymes, trypsin, assimilation.

32. KOTANI, T., A. HAGIWARA & T.W. SNELL, 1997. Genetic variation among marine *Brachionus* strains and function of mate recognition pheromone (MRP). *Hydrobiologia* **358**, 105-112. << Nagasaki Univ., Grad. Sch. Marine Sci. & Engn., Bunkyo 1-14, Nagasaki 852, Japan.>> Differences in the glycoprotein structure of a mate recognition pheromone (MRP) probably have a primary role in maintaining species boundaries among *Brachionus* species. This study examined factors involved in mating to clarify their relation with genetic variability. Mating frequency and anti-MRP binding significantly correlated with genetic distance obtained from isozyme analysis. K/W: *Brachionus* strains, mating attempts, copulation, mate recognition pheromone, antibody, genetic distance, correlation behavioral reproductive isolation, l-type rotifers, s-type, mating behaviour.

33. LAIR, N. & P. REYES-MARCHANT, 1997. The potamoplankton of the middle Loire and the role of the 'moving littoral' in downstream transfer of algae and rotifers. *Hydrobiologia* **356**, 33-52. K/W: algae, downstream transfer, inoculates, local pulse, potamoplankton, rotifers, storage zones.

34. LAIR, N., P. REYES-MARCHANT & V. JACQUET, 1998. Phytoplankton, ciliate and rotifer development at two stations in the Middle Loire river (France), during a period of low water flow. *Ann. Limnol.* **34**, 35-48. <<Univ. Clermont Ferrand, Upres a 6042, Equipe Hydrosyst. & Bassins Versants, F-63177 Clermont Ferra, France.>> Dynamics of riverine rotifers are included in this study. In contrast to previous studies, rotifer density decreased downstream, a consequence of excavation works. As in standing waters, the enrichment in organic matter is responsible for the increase in algae and bacteria consumers. The ratio of total heterotrophic to autotrophic biomass (WA ratio) decreased from 0.34 upstream to 0.17 downstream. Rotifer carbon biomass was globally higher than that of the ciliates, but from the end of summer, ciliates played an important role in the functioning of this lowland river. K/W: potamoplankton, microalgae, ciliates, rotifers, large river, plankton, seasonal succession, Seine river, lake, protozoa, communities, populations, abundance, diversity, dynamics.

35. LIM, L.C. & C.C. WONG, 1997. Use of the rotifer, *Brachionus calyciflorus* Pallas, in freshwater ornamental fish larviculture. *Hydrobiologia* **358**, 269-273. <<Primary Prod. Dept. Sembawang Field Expt. Stn. Ornamental Fish Sect., 17 km Sembawang Rd, Singapore 769194, Singapore.>> We observed that Brown Discus larvae could be raised in the absence of the parent fish by using rotifers as starter food followed by *Artemia* nauplii. The use of rotifers would enable freshwater larviculture to improve larval performance, increase yield, and facilitate breeding of new fish species with small larvae. K/W: *Brachionus calyciflorus*, ornamental fish, larviculture, Gourami, Discus.

36. LOUGHEED, V.L. & P. CHOW-FRASER, 1998. Factors that regulate the zooplankton community structure of a turbid, hypereutrophic Great Lakes wetland. *Can. J. Fish. Aquat. Sci.* **55**, 150-161. << McMaster Univ., Dept Biol., 1280 Main St W, Hamilton, ON L8S 4K1, CANADA.>> Describes communities at a range of sites. The high levels of inorganic suspended solids in the marsh appeared to select against large filter feeders such as *Daphnia* and allowed smaller zooplankton to dominate. Multivariate analyses indicated that the zooplankton distribution was related to flow rate, extent of macrophyte cover, and level of site degradation. If the forthcoming carp (*Cyprinus carpio*) exclusion from Cootes Paradise Marsh results in increased macrophyte growth, we predict that zooplankton biomass will increase and that the zooplankton community may shift to larger forms. K/W: canonical correlation analysis, planktonic rotifers, dry-weight, sediment resuspension, coastal wetlands, eutrophic lake, phytoplankton, fish, dynamics, biomanipulation.

37. LUBZENS, E., G. MINKOFF, Y. BARR & O. ZMORA, 1997. Mariculture in Israel - past achievements and future directions in raising rotifers as food for marine fish larvae. *Hydrobiologia* **358**, 13-20. <<Israel Oceanog. & Limnol. Res. Natl Inst. Oceanog., Haifa, Israel.>> Reviews mariculture in Israel. The local commercial scale production of rotifers relies on several batch or semi-continuous cultures that supply daily 0.6-4 billion rotifers in each hatchery. Originally a relatively large *local Brachionus plicatilis* strain was used, but later smaller *B. rotundiformis* strains were introduced, resulting in a mixture of undefined strains. The current dependable supply of live cultures reduces the need for preserved stocks of rotifers, either as resting eggs or kept alive at low temperatures. To the fish grower, rotifers are live food capsules that deliver essential nutrients (e.g. long chain unsaturated fatty acids) for growth and survival of fish larvae. Research aimed at replacing live food with chemically defined microdiets could reveal physiological principles in prey recognition and digestion of food by marine fish larvae. K/W: mass rotifer production, mariculture, Israel, resting eggs, seabream, *Sparus aurata*, *Brachionus-plicatilis*, *Nannochloropsis* sp., survival, quality, algae.

38. MARUYAMA, I., T. NAKAO, I. SHIGENO, Y. ANDO & K. HIRAYAMA, 1997. Application of unicellular algae *Chlorella vulgaris* for the mass-culture of marine rotifer *Brachionus*. *Hydrobiologia* **358**, 83-87. <<Chlorella Ind. Co. Ltd, 1343 Hisatomi, Fukuoka 833, Japan.>> This report describes the characteristics of *C. vulgaris* as a rotifer food in comparison with *N. oculata* and the present status of this field. Use of the condensed suspension of *C. vulgaris* makes it possible to significantly increase rotifer density at harvest. Application of condensed *C. vulgaris* has made rotifer culture quite easy because the culture of *N. oculata* is no longer required, and intensive rotifer production in aquaculture can now be realized. K/W: aquaculture, *Brachionus plicatilis*, *Brachionus rotundiformis*, *Chlorella vulgaris*, food organism, larval rearing, rotifers, *Nannochloropsis oculata*, growth.

39. MATHES, J. & H. ARNDT, 1995. Annual cycle of protozooplankton (ciliates, flagellates and sarcodines) in relation to phyto- and metazooplankton in Lake Neumühler See (Mecklenburg, Germany). *Arch. Hydrobiol.* **134**, 337-358. K/W: biomass, biovolume, ciliates, flagellates, metazoa, protists, rhizopoda, rotifers, sarcodines, seasonality, testates.

40. OIE, G. & Y. OLSEN, 1997. Protein and lipid content of the *rotifer Brachionus plicatilis* during variable growth and feeding condition. *Hydrobiologia* **358**, 251-258. <<Norwegian Univ. Sci. & Technol., Brattora Res. Ctr., N-7034 Trondheim, Norway.>> Our experiments show that the amount of protein was quite variable in rotifers, and that feeding and growth condition were decisive factors affecting it. The range of variation was large enough to be an important factor during first feeding of marine larvae, and should therefore be considered in feeding larvae. K/W: *Brachionus plicatilis*, nutrition, growth rate, protein content, lipid content, larvae, fish, food.

41. OOMS-WILMS, A. 1998. On the food uptake and population dynamics of rotifers in a shallow eutrophic lake. Ph.D. Dissertation, University of Amsterdam, Amsterdam. 153 p. K/W: *Anuraeopsis fissa*, bacteriovory, eutrophic lake, *Filinia longiseta*, food webs, *Keratella cochlearis*, population dynamics, rotifers, seasonality.

42. ORSENIGO, S. & C. RICCI, 1997. Crescere o riprodursi: cosa scelgono i Rotiferi Bdelloidei. *S. It. E. Atti* **18**, 139-142. <<Dip. Biol., Sezione Zoologia Scienze Naturali, Univ. Milano, Via Celoria 26-20133, Milan, Italy.>> K/W: Bdelloidea, clonal population, growth, life cycle, *Macrotrachela quadricornifera*, reproduction, rotifer, trade-off.

43. PAGE, M.L., J.J. COLE & S.R. CARPENTER, 1997. Trophic cascades and compensation: Differential responses of microzooplankton in whole-lake experiments. *Ecology* **79**, 138-152. << Inst. Ecosyst. Studies, Box Ab, Millbrook, N.Y. 12545 USA.>> Head webs in three lake basins were manipulated by altering fish communities to either reduce or increase the abundance of *Daphnia*. These basins were subsequently fertilized with nitrogen and phosphorus for two years. The experiments indicated that small-scale, short-term experiments and larger-scale comparative analyses may be inadequate for assessing the strength of trophic interactions. The potential for community-level responses, not well assessed except at the ecosystem scale, may alternatively dampen or enhance the impacts of trophic cascades in food webs. K/W: ciliates, *Daphnia*, ecosystem experiments, flagellates, lakes, rotifers, trophic cascades, zooplankton, community structure, bottom-up regulation, top-down, heterotrophic nanoplankton, crustacean zooplankton, bacterial production, interaction strength, natural-populations, fish predation, *Daphnia-pulex*.

44. PECHMANEE, T. Status of marine larviculture in Thailand. *Hydrobiologia*, **358**, 41-43. <<Natl Inst. Coastal Aquaculture, Kao Sean SOI 1, Muang Dist, Songkhla 90000, Thailand.>> Describes development of aquaculture in Thailand. Rotifers are an important larval food. K/W: marine larviculture, live food, grouper, seabass, tiger shrimp, rotifer, *Brachionus rotundiformis*.

45. PETERSEN, R.L., L. HANEY, E. WALSH, H. HUNT & R.M. DUFFIELD, 1997. Occurrence of the rotifer *Habrotrocha* cf. *rosa* Donner, in the purple pitcher plant, *Sarracenia purpurea* L., (Sarraceniaceae) along the eastern seaboard of North

America. *Hydrobiologia* **356**, 63-66. K/W: *Habrotrocha* cf. *rosa*, inhabitants, pitcher plant, ranges, rotifer, *Sarracenia purpurea*, zoogeography.

46. RICCI, C. & M. PAGANI, 1997. Desiccation of *Panagrolaimus rigidus* (Nematoda): survival, reproduction and the influence of the internal clock. *Hydrobiologia* **347**, 1-13. K/W: anhydrobiosis, desiccation, fecundity, life cycle, nematodes, recovery.

47. RICO-MARTINEZ, R. & T.W. SNELL, 1997. Mating behavior in eight rotifer species: using cross-mating tests to study species boundaries. *Hydrobiologia* **356**, 165-173. K/W: behaviour, encounters, interspecific interactions, intraspecific interactions, mating, rotifers.

48. RICO-MARTINEZ, R. & T.W. SNELL, 1997. Comparative binding of antibody to a mate recognition pheromone on female *Brachionus plicatilis* and *Brachionus rotundiformis* (Rotifera). *Hydrobiologia* 358, 71-76. <<Georgia Inst. Technol., Sch. Biol., Atlanta, GA 30332 USA.>> The MRP of both species has a similar molecular weight, but the differential binding suggests that the mate recognition pheromone on females has differentiated in *B. plicatilis* and *B. rotundiformis*. K/W: antibody, mate recognition, pheromones, reproductive isolation, rotifers, behavioral reproductive isolation, genetic-divergence, rotifera, s-type, strains

49. ROBIN, J.H. 1998. Use of borage oil in rotifer production and *Artemia* enrichment: effect on growth and survival of turbot (*Scophthalmus maximus*) larvae. *Aquaculture* **161**, 323-331. <<IFREMER, INRA, Unite Mixte Nutr Poissons, Ctr Brest, F-29280 Plouzane, FRANCE.>> Three oils were used together with baker's yeast to enrich rotifers (long-term enrichment) and Artemia (24-h enrichment). These oils were: (A) cod liver oil, (B) an n - 3HUFA concentrate, (C) a mixture (2:1) of the same n - 3HUFA concentrate and borage oil. Results suggest that n - 6 fatty acids and probably dihomo-gamma-linolenic acid have a beneficial effect on survival of larvae during the critical early life stages. (C) 1998 Elsevier Science B.V. turbot, larvae, n - 6 fatty acids, rotifer, Artemia, unsaturated fatty-acids, gamma-linolenic acid, eicosapentaenoic acid, docosahexaenoic acid, diets, fish, requirement, culture.

50. SARMA, S.S.S., S. NANDINI & M.A.F. ARAIZA, 1998. Effect of methyl parathion-treated prey (*Brachionus calyciflorus*) on the population growth of the predator *Asplanchna sieboldi* (Rotifera). *Bull. Env. Contam. Toxicol.* **61**, 135-142. <<Natl Autonomous Univ. Mexico, Div. Res., Campus Iztacala, Ap 314, Tlalnepantla 54000, Mexico.>> K/W: chronic toxicity, rotifera, survival, *Daphnia*.

51. SARMA, S.S.S., N. SARMA & H.J. DUMONT, 1998. Feeding preference and population growth of *Asplanchna brightwelli* (Rotifera) offered two non-evasive prey rotifers. *Hydrobiologia* **361**, 77-87. <<State Univ. Ghent, Lab. Anim. Ecol., Ledeganckstr 35, B-9000 Ghent, Belgium.>> Population growth rates of the predatory rotifer *Asplanchna brightwelli* were determined using a large (*Brachionus calyciflorus*) and a small (*Anuraeopsis fissa*) rotifer prey species. Regardless of prey type, the population growth of Asplanchna increased with increasing food density.

Gut content analysis of A. Brightwelli revealed that the number of prey ingested increased with increasing prey densities. K/W: Asplanchna brightwelli, biomass, handling time, population growth, predation, rotifer.

52. SEGERS, H. 1997. The littoral rotifer fauna (Rotifera, Monogononta) of Glubokoe Lake, Russia. *Trudy Gidrobiol. Stat. Glubokoe Oz.* **7**, 40-46. << State Univ. Ghent, Dept Biol., Lab. Anim. Ecol. Zoogeog. & Nat. Conservat., Kl Ledeganckstr 35, B-9000 Ghent, Belgium.>> K/W: checklist, lake, littoral, rotifers, Russia, taxonomy.

53. SEGERS, H. 1998. Notes on the taxonomy and distribution of the interstitial Rotifera from a dune pool. *Belg. J. Zool.* **128**, 35-47. <<Address above.>> A preliminary study of the interstitial Rotifera from a dune pool at the Belgian coast yielded several rare and insufficiently known species, namely *Colurella salina* Althaus, *Encentrum? villosum* Harring & Myers and *Lecane psammophila* (Wiszniewski). Brief accounts are presented on these and on *Colurella hindenburgi* Steinecke (new synonym: *C. geophila* Donner) and *Trichocerca taurocephala* (Hauer). Of the twenty-five morphotaxa recorded, nine, all of which are psammobionts, are new to the Belgian fauna. Since the rotifers inhabiting the psammon have not been studied sufficiently, their contribution to species diversity in freshwater habitats is not recognised. K/W: psammon Rotifera, taxonomy, distribution, new records.

54. SEGERS, H. & G. MELONE, 1998. A comparative study of trophi morphology in Seisonidea (Rotifera). *J. Zool. Lond.* **244**, 201-207. << Address above.>> We report on a comparative SEM study of trophi morphology of the two species making up the Class Seisonidea. The trophi of *Seison nebaliae* are adapted to particle-feeding, that of *Seison annulatus* probably functions by piercing the integument of the host using the fulcrum tip, and subsequently sucking out haemolymph. This difference in feeding ecology is believed to contribute to the co-occurrence of both species on the same host. A new hypothesis on the evolution of rotifer trophi is proposed. K/W: commensal, epizoite, marine, phylogeny, rotifer, *Seison annulatus, Seison nebaliae*, Seisonidea, SEM, taxonomy, trophus morphology, comparative morphology, trophi structure, phylogenetic-relationships, Acanthocephala.

55. SERRA, M., A. GALIANA & A. GÓMEZ, 1997. Speciation in monogonont rotifers. *Hydrobiologia* **358**, 63-70.<<Univ. Valencia, Dept Microbiol. & Ecol., E-46100 Burjassot, SPAIN.>> We analyze the structure of the diversity in monogonont rotifers using several data sets: taxonomic and intraspecific diversity as reported in identification keys, morphological variation reported in ecological studies, and allozyme and mating behavior patterns. Our analysis suggests that sibling species may be frequent in rotifers. Monogonont rotifers seem to meet conditions for an active speciation, which might be particularly promoted by seasonal specialization and timing of bisexual reproduction. K/W: aquaculture, biodiversity, intraspecific variation, parthenogenesis, sibling species, speciation, variation, zooplankton, cyclical parthenogenesis, intraspecific variation, cryptic speciation, biodiversity, aquaculture, *Brachionus plicatilis*, behavioral reproductive

isolation, ecological genetics, *Daphnia*, crustacea, species complex, strains, patterns, taxonomy, parthenogenesis, biogeography.

56. SHIEL, R.J. 1998. Should we care about microfauna? *Water - Australian Water & Wastewater Association* 25, 11-12. <<MDFRC, PO Box 921, Albury, NSW 2640, Australia>> Comments on microfaunal diversity, including importance of rotifers in aquatic food webs, their rapid population dynamics, importance of the floodplain seedbank, rapid responses to flooding, etc. Aimed at the wastewater industry.

57. STELZER, C.-P. 1998. Feeding behaviour of the rotifer *Ascomopha ovalis*: functional response, handling time and exploitation of individual *Ceratium* cells. *J. Plankt. Res.* **20**, 1131-1144. << Max Planck Inst. Limnol., Postfach 165, D-24302 Plon, Germany.>> The feeding behaviour of laboratory-cultured *Ascomorpha* with *Ceratium furcoides* as food algae is reported. The mean handling time (time for capturing and extracting one *Ceratium* cell) was 3 min. At low food concentrations, encounter rates with prey seemed to limit the feeding rates of *Ascomorpha*, whereas at medium to high food concentrations, satiation effects (lower attack rates) seemed to set limits on the feeding rates. *Ascomorpha* showed a significant decrease in the exploitation of single *Ceratium* cells at high prey concentrations. This decrease could be explained by a saturation effect in which the partly filled guts of *Ascomorpha* did not permit the total extraction of the contents of a *Ceratium* cell. K/W: *Ascomorpha ovalis, Ceratium*, feeding response, food web, grazing, interaction, rotifer.

58. STEMBERGER, R.S. & C.Y. CHEN, 1998. Fish tissue metals and zooplankton assemblages of northeastern US lakes. *Can. J. Fish. Aquat. Sci.* **53**, 339-352. <<Dartmouth Coll., Dept Biol., Hanover, NH 03755 USA.>> This study suggests that the high variability of metals in fish observed between adjacent lakes (38 were studied) and across the region is explained in part by the structural features of the zooplankton web.

59. STEMBERGER, R.S. & E.K. MILLER, 1998. A Zooplankton- N:P Ratio Indicator for Lakes. *Env. Monit. & Assessment*, **51**, 29-51. <<Address above.>> The N:P ratio of lake water can serve as a potentially useful and inexpensively obtained proxy measure for assessing changes or shifts in the biological-and nutrient status of lakes. K/W: Northeastern United-States, uv-b penetration, nutrient limitation, fresh-water, atmospheric deposition, rotifer assemblages, Whiteface Mountain, area lakes, nitrogen, ecosystems.

60. SU, H.M., M.S. SU & I.C. LIAO, 1997. Collection and culture of live foods for aquaculture in Taiwan. *Hydrobiologia* **358**, 37-40. <<Taiwan Fisheries Res. Inst., Tungkang Marine Lab, Tungkang 928, Taiwan.>> Review of collection and culture of live foods to be used in studies of feeds for rearing finfish and shellfish larvae in Taiwan. 31 species (49 strains) of microalgae, three species (nine strains) of rotifers, one cladoceran and one copepod are held as start cultures. Studies of Live foods including their morphology, culture techniques, fatty acid composition and nutritional value as feeds have been undertaken. K/W: microalgae, rotifers, copepods, aquaculture, Taiwan

61. TACHIBANA, K., M. YAGI, K. HARA, T. MISHIMA & M. TSUCHIMOTO, 1997. Effects of feeding of beta-carotene-supplemented rotifers on survival and lymphocyte proliferation reaction of fish larvae (Japanese parrotfish (*Oplegnathus fasciatus*) and spotted parrotfish (*Oplegnathus punctatus*)): Preliminary trials. *Hydrobiologia* **358**, 313-316. <<Nagasaki Univ., Fac. Fisheries, Dept Fishery Food Sci., Lab. Nutr., Nagasaki 852, Japan.>> Results show that survival rates of beta-carotene supplemented larvae were higher than that of control groups. Results suggest that the supplementation of beta-carotene to rotifers, might be of benefit in production of healthy, resistive larvae against infectious disease. K/W: beta-carotene, rotifer, larvae, survival, lymphocytes proliferation, viral nervous necrosis, vitamin-a, blood, interferon, gamma.

62. TAKEUCHI, T., Y. ISHIZAKI, T. WATANABE, K. IMAIZUMI & K. SHIMIZU, 1998. Effect of different DHA content in rotifers on the DHA requirement of larval yellowtail during *Artemia* feeding stage. *Nippon Suisan Gakkaishi* **64**, 270-275. <<Tokyo Univ. Fisheries, Dept Aquat. Biosci., Tokyo 1068477, Japan.>> As DHA content in rotifers increased, the DHA requirement of lanae during *Artemia* feeding stages decreased from 2.6 to 1.6%. When larvae were fed rotifers containing 1.3% DI-IA followed by *Artemia* containing 1.6% or 2.6% DHA, healthy larvae were obtained. The survival and vitality of larvae fed on rotifers having a low level of DHA improved by feeding them with *Artemia* containing 2.6% DHA. The results indicate that the DHA content in rotifers influences the DHA requirement of larval yellowtail during the *Artemia* feeding stages. K/W: eicosapentaenoic acid, docosahexaenoic acid, striped jack, fatty-acids, nauplii.

63. WALZ, N., T. HINTZE & R. RUSCHE, 1997. Algae and rotifer turbidostats: studies on stability of live feed cultures. *Hydrobiologia* **358**, 127-132. << Inst. Freshwater Ecol. & Inland Fisheries, Dept Lowland Rivers & Shallow Lakes, Muggelseedamm 260, D-12562 Berlin, Germany.>> A two stage turbidostat was developed according to Boraas & Bennet (1988), but with highly improved turbidity sensors. The first stage was an algal turbidostat where algal density was regulated by turbidity measurements. Algal density was also held constant in the second stage (rotifer production) according to turbidity measurements. Additionally, the growth rates were monitored. The regulation system allowed an effective on-line process control. Initially, the production of rotifers in long-time studies was variable. However, after further improvements of the turbidity measurement, fluctuations in the rotifer turbidostat decreased significantly. K/W: chemostat, turbidostat, growth rates, process stability, *Brachionus calyciflorus*, chemostat experiments, growth-rate, aquaculture, food, stage

64. WOLFE, M.F., J.A. SCHLOSSER, G.J.B. SCHWARTZ, S. SINGARAM, E.E. MIELBRECHT, R.S. TJEERDEMA & M.L. SOWBY, 1998. Influence of dispersants on the bioavailability and trophic transfer of petroleum hydrocarbons to primary levels of a marine food chain. *Aquatic Toxicology* **42**, 211-227. <<Univ. Calif. Santa Cruz, Dept Chem. & Biochem., 254-A, Santa Cruz,CA 95064 USA.>> The model food chain consisted of *Isochrysis galbana*, a primary producer, *and Brachionus plicatilis*, a primary consumer. The study demonstrated that dispersants altered uptake and depuration processes of naphthalene, independent of concentration, in representative species of primary trophic levels of the marine food chain which may in turn modify bioavailability and bioaccumulation at higher trophic levels. K/W: marine oil spill, naphthalene, dispersant, bioavailability, trophic transfer, rotifer, polycyclic aromatic-hydrocarbons, oil dispersants, crude-oil, accumulation, toxicity, phytoplankton, mussels, release, fresh.

65. YOSHIMATSU, T., H. IMOTO, M. HAYASHI, K. TODA & K. YOSHIMURA, 1997. Preliminary results in improving essential fatty acids enrichment of rotifer cultured in high density. *Hydrobiologia* **358**, 153-157. << Kyushu Univ, Fish Res Lab, Fukuoka 81133, Japan.>> High density cultured marine *rotifer (Brachionus rotundiformis*) fed on freshwater *Chlorella* was cultured secondarily with an emulsion of ethyl esters (65% DHA, 15% EPA) for EFA-enrichment, with or without freshwater *Chlorella*. The results from the experiment indicate that the presence of *Chlorella* cells greatly affect the HUFA intake of rotifers during the secondary culture process. Also the supply of high-purity oxygen gas was effective for preventing a culture crash of rotifers during EFA enrichment. K/W: aquaculture, Brachionus plicatilis, Chlorella, culture, efa enrichment, freshwater, marine, mass production, rotifers, EFA enrichment, high density culture, fish, cultivation, ammonia, growth, Japan.

66. YOSHIMURA, K., K. USUKI, T. YOSHIMATSU, C. KITAJIMA & A. HAGIWARA, 1997. Recent development of a high density mass culture system for the rotifer *Brachionus rotundiformis* Tschugunoff. *Hydrobiologia* **358**, 139-144. <<Fukuoka Mariculture Corp., Fukuoka 81135, Japan.>> Resolution of problems in improved mass culture systems included: (1) Filtering equipment for removing particulate debris in the culture media: Filtering equipment made of a nylon mat and a stainless steel frame was developed to increase the surface area for debris removal. Using this filter, the harvest of high density culture at 10^4 rotifers ml^{-1} was possible without clogging of the collection net. (2) Quantitative determination of rotifers by a centrifugation method: We determined the abundance of rotifers by centrifuging samples and measuring their packed volume (PV, mi l^{-1}). PV of rotifers was easier to and more accurate to measure (coefficient of variation, 4%) than a direct count of the density (coefficient of variation, 15%). Organic wastes in rotifer cultures made the measurement of rotifer PV difficult. By placing a filter in the mass culture tank, however, the boundary between rotifers and other organic wastes in a centrifuge tube was easily visualized. K/W: *Brachionus rotundiformis*, live food, high density mass culture, packed volume, filtering equipment

67. YUFERA, M., G. PARRA & E. PASCUAL, 1997. Energy content of rotifers (*Brachionus plicatilis* and *Brachionus rotundiformis*) in relation to temperature. *Hydrobiologia* **358**, 83-87.. <<CSIC, Inst Ciencias Marinas Andalucia, Apartado Oficial, Puerto Real 11510, Cadiz, Spain.>> Dry weight and carbon, nitrogen and hydrogen content remained practically unchanged in the 20-35 °C range *in B. rotundiformis*, while in *B. plicatilis* the dry weight decreased slightly with increasing temperature from 15 ° to 35 °C. Nevertheless, the major source of variation was the fecundity status of the populations. On the other hand, *B. rotundiformis* showed higher energy content (joules per mg of dry matter) than *B. plicatilis*. This difference in energy content was due to the different ash content because the organic matter of both species had the same energy content, as well as the same basic biomass composition. K/W: *Brachionus plicatilis, Brachionus rotundiformis*, chemical composition, energy content, rotifers, temperature.

68. YU, J.P. & S.J. CUI, 1997. Ultrastructure of the rotifer *Brachionus plicatilis*. *Hydrobiologia* **358**, 95-103. <<Japan NUS, Environm. Survey Dept, Minato Ku, Kaigan 3-9-15, Tokyo 108, Japan.>> The ultrastructural study of digestive organs and integument of the rotifer, Brachionus plicatilis, was performed by transmission of electron microscopy to elucidate the relationship between their structure and function. The integument of the rotifer is composed of a thick external and a thin internal layer, in which many pores are regularly distributed. The contents of secretory bulb are excreted through those pores to the external surface. The inner surface of the digestive tract is lined with relatively dense and regularly spaced cilia for propelling food along. The cells of stomach and the intestine contains many endocytotic vesicles, digestive vacuoles, and lipid inclusions, indicating its active endocytotic function. The gastric gland cells have abundant rough endoplasmic reticulum, Golgi complexes and secretory granules for producing digestive enzymes. This ultrastructural study clarifies the morphological characters of the integument and the digestive organs that are closely related to its function

69. ZHUGE, Y., X.F. HUANG & W. KOSTE, 1998. Rotifera recorded from China, 1893-1997, with remarks on their composition and distribution. *Int. Rev. Hydrobiol.* **83**, 217-232. << Chinese Acad. Sci., Inst. Hydrobiol., Wuhan 430072, Hubei, Peoples Rep. China.>> A search of the literature on rotifers recorded from China, includes today 477 valid species names and 42 subspecies or infrasubspecific variants in 84 genera and 28 families recorded since 1893. Chinese rotifera research is reviewed, and all recorded species are listed with current taxonomic status and their first localities in China. Most of the named taxa are widely distributed or cosmopolitan, with only a small number (about 3%) possibly restricted to China. This fauna exhibits 15 endemic taxa. The composition and distribution of Chinese Rotifera are briefly analyzed. It is likely that considerably more rotifers remain to be described from China with further study and as taxonomic resolution improves. K/W: China, Rotifera, taxonomy, species list, composition, distribution.

New taxa reported

New rotifers described since the last issue of the newsletter, their geographical region, and the reference in which they are cited, are listed below:

MONOGONONTA

Cephalodella qionghaiensis Koste & Zhuge, 1998: Hainan, China. **#30**

SIL, DUBLIN (continued)

The triennial Societas Internationalis Limnologiae meetings are BIG..>1000 papers and posters were presented at the Dublin meeting, August 08-14 1998...but clearly the most interesting and important were those given by the international rotifer workers, some of whom are pictured on pp 14-15 and 28. Apologies to the many rotifer workers our travelling videocam couldn't catch...you were just too quick (!)

The following listed presentations included 'rotifers' in title or abstract. 'Zooplankton' papers which mentioned only microcrustacea are not included

Raião, C. & M.J. Boavida. Vertical distribution of rotifers in the Meimoa reservoir, Portugal. <<*Dept Zool., Fac. Ciencias, Univ. Lisboa, Campo Grande C2, 1700 Lisbon, Portugal.*>>

Bledzki, L.A. & A.M. Ellison. Effect of water flow rate on zooplankton of shallow rheolimnic reservoirs. <<*Dept. Biol. Sci., Mt Holyoke College, South Hadley, Mass. U.S.A.*>>

Branco, C.W.C., F.A. Esteves & B. Kozlowsky-Suzuki. Zooplankton of a disturbed Brazilian coastal lagoon: relations with limnological parameters, temporal and spatial variations. <<*Dept. Nat. Sciences, UNI-RIO, Rio de Janiero, Brazil.*>>

Chauhan, S., J. Arora, P. Kaur & N.K. Mehra. Biodiversity of freshwater microzooplankton in NCT, Delhi. <<Dept. Zool., Univ. Delhi, Delhi 110007, India.>>

Diéguez, M. & E. Balseiro. Predation of *Parabroteas elephantinus* on rotifers. <<*Centro Reg. Uni. Bariloche, Unid. Post. Univ., 8400, Bariloche, Argentina.*>>

Duggan, I.C. , J.D. Green & K. Thomasson. Do rotifers have potential as bio-indicators of lake trophic states? <<*Dept of Biol. Sci., Univ. of Waikato, Hamilton, N.Z.*>>

Elias-Gutierrez, M., E. Suarez-Morales & S.S.S. Sarma. Freshwater zooplankton diversity in the Neotropics: the case of Mexico <<*El Colegio de la Frontera Sur, Carretera Chetumal-Bacalar Km 2, Zona Industrial #2, Chetumal, Q. Roo, Mexico.*>>

Ejsmont-Karabin, J. Psammon rotifers in two lakes of different trophy - their abundance, species structure and the role in phosphorus cycling. <<*Hydrobiol. Stn. Inst. Ecol., Polish Academy of Sciences, Mikolajki, Poland.*>>

Erben, R., R. Peternel, I. Maguire, G. Klobucar & J. Lajtner. Rotifer fauna in the dam reservoir Modrac, Bosnia & Herzegovina.<<*Dept. Zool., Univ. Zagreb, Rooseveltov trg6, 1000 Zagreb, Croatia.*>>

Fussmann, G., S. Ellner & N.G. Hairston. Evaluating complex dynamics and chaos in natural ecological systems: a rotifer chemostat project. <<*Cornell University, Sect. Ecol. Systematics, Ithaca, N.Y. U.S.A.*>>

Garrido, A.V. & R.L. Bozelli. The study of zooplankton during the filling of the Serra Da Mesa Reservoir, Tocantins River (Brazil). <<*Lab. Ecol. Plancton, Univ. Fed. do Rio de Janiero, Rio de Janiero, Brazil.*>>

Gilbert, J.J. & C.W. Burns. day and night vertical distribution of an undescribed Conochilus and other zooplankton in a New Zealand reservoir. <<*Dept Biol. Sci.,* [illegible]

Green, J.D. & R.J. Shiel. Predation by the centropagid copepod, *Boeckella major*, structuring macroinvertebrate communities in the absence of fish.<<*Dept Biol. Sci., Univ. of Waikato, Hamilton, N.Z.*>>

Grossnickle, N.E. Predation and herbivory of the opossum shrimp, *Mysis relicta*, in Trout Lake, Wisconsin, U.S.A. <<*Univ. of Wisconsin-Marathon County, Wausau WI, U.S.A.*>>

Hairston, N.G. Jr, A.-M. Hansen & W.R. Schaffner. Seasonal timing of emergence from diapause of a zooplankton community. <<*Cornell University, Sect. Ecol. Systematics, Ithaca, N.Y. U.S.A.*>>

Hammer, A., R. Burckhardt & R. Heerkloß. Diurnal feeding rhythms in zooplankton based on measurements of *in situ* ingestion of fluorescent particles. <<*Univ. Rostock, Dept Biol., Freiligrathstr. 7-8, 18051 Rostock, Germany.*>>

Hillman, T.J. & R.J. Shiel. Micro- and macro-invertebrate communities in temporary and permanent billabongs in a floodplain forest: response to inundation.<<*MDFRC, PO Box 921, Albury, NSW 2640, Australia.*>>

Jankowski, T. The influence of the freshwater jellyfish *Craspedacusta sowerbii* (Cnidaria: Hydrozoa) on the zooplankton community. <<*Inst. Biol. V, RWTH-Aachen, Aachenm, Germany.*>>

Kuczynska-Kippen, N. Seasonal changes of the rotifer community in the littoral of a polymictic lake.<<*Dept Hydrobiol., Adam Mickiewicz University, Poznan, Poland.*>>

Morales-Baquero, R. & J.M. Conde-Porcuna. Effect of catchment areas on the abundance of zooplankters in high mountain lakes. <<*Inst. Agua, Dept. Biol. Anim. Ecol., Univ. Granada, Spain.*>>

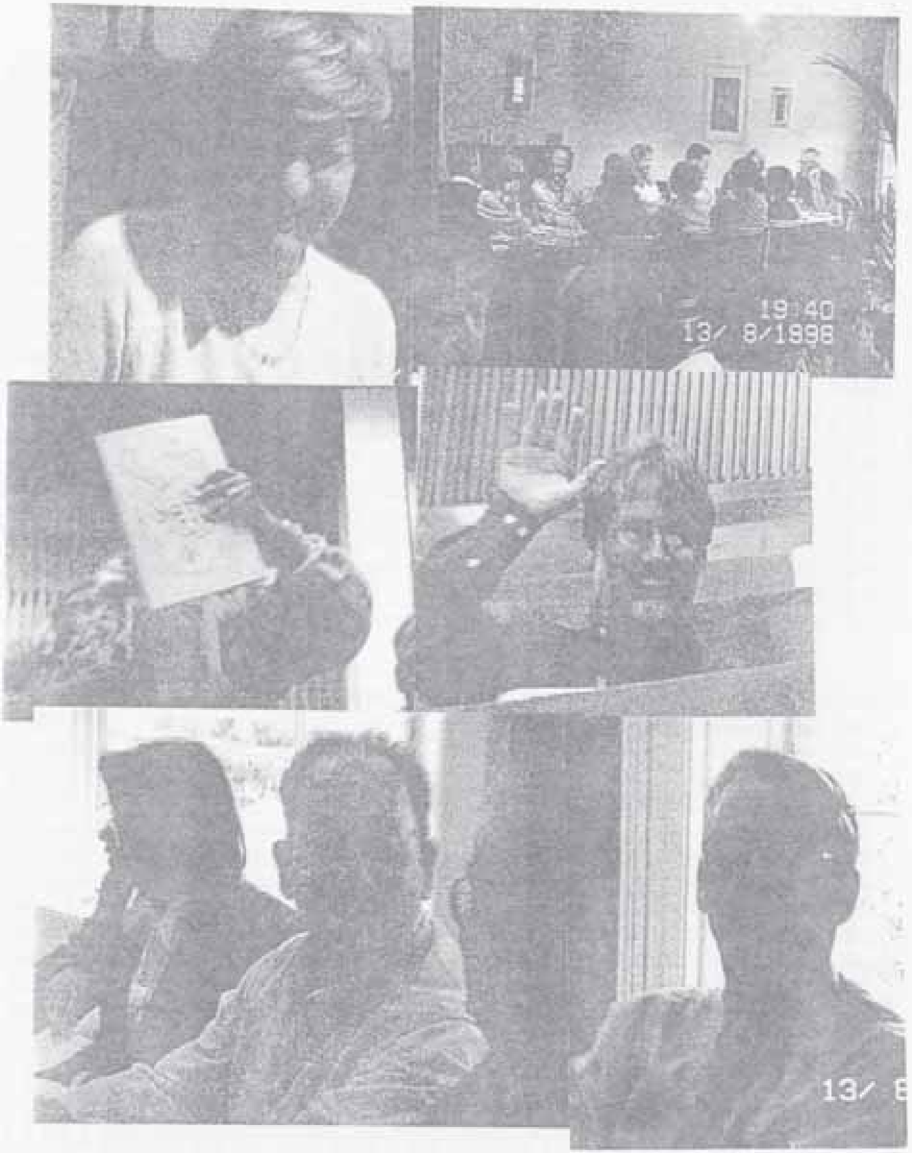
Ricci, C. & M. Caprioli. Anhydrobiosis as a fast response to environmental stress.<<*Dept Biol., Univ. Milan, Milan, Italy.*>>

Serafim, M., F.A. Lansac-Tôha, L.M. Bini & R.M. Lopes. Zooplankton variability in lentic and lotic environments of the upper Parana River floodplain, Brazil. <<*Univ. Estad. Maringá, Maringa, PR, Brazil.*>>

Shiel, R.J. & J.D. Green. Flood-drought extremes: how floodplain microfauna cope with habitat ephemerality and heterogeneity.<<*MDFRC, PO Box 921, Albury, NSW 2640, Australia.*>>

Viroux, L. An attempt to evaluate longitudinal zooplankton dynamics in a lowland river using a small, still-standing, "potamocorral" enclosure.<<*Unit of Freshwater Ecology, Univ. Notre-Dame de la Paix, Namur, Belgium.*>>

Zagarese, H.E., M. Diaz, F. Pedrozo & C. Uheda. Mountain lakes in northwestern Patagonia. <<*Centr. Reg. Univ. Bariloche, Unid. Post. Univ., 8400, Bariloche, Argentina.*>>



Top left: Claudi R. ('just another tiny glass of chianti?'); **right:** a rotifery get-together in Dublin
Middle left: a very unusual view of Claudia being shy (??); **right:** Him again!! Hi Norbert!
Bottom left: Celia J.-J., Rafael M.-B, Cally G.; **right:** Jim G., in the dark....

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