ROTIFER NEWS

A newsletter for rotiferologists throughout the world

Issue 28: DECEMBER 1996

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 relevant regional editor.

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The cover: Keratella slacki (from southern Australia, coll. RJS) and *Notholca walterkostei* (from Bolivia, coll. L. Meneses & M. Del Castillo, sent by Hendrik Segers).
[Scans by RJS on a Hitachi S4100 field emission SEM, thanks to the University of Waikato, Hamilton, and MIRINZ, Ruakura, N.Z.]

Editorial

Issue 28 becomes the first *Rotifer News* to carry an ISSN number. The identifier was sought after several requests from libraries were received at MDFRC. The ISSN does not alter the status of *Rotifer* News - as noted opposite, it remains an informal means of communication between workers with a common interest.

The global assemblage of rotifer workers still seems to be active if publications are an indication, but little has come into the editorial 'office' since Issue 27. That which has appears in News'n'Views on page .

MDFRC had the honour of a visit by Ros Pontin (not AGAIN!?), who rapidly got everybody organized, then disappeared with most of our floodplain rotifers hidden about her person (the application for the permit to do so arrived the week after you left Ros!! A 'flora' version, of course.....)

Finally, a late reminder to attendees at Rotifer VIII that your registration fees should be paid already, and abstracts in.....see p. 2. *Rotifer News* 29 will be distributed at the meeting. Deadline for copy for that issue is the first week of June.

Russ Shiel

Rotifer VIII - Minnesota 1997

Intending participants at the VIIth International Rotifer Symposium, to be held at Collegeville, Minnesota 23-27 June, 1997, are reminded of the **Feb. 1st deadline** for seminar and poster abstracts, and also for payment of registration fees. The deadline for MS submission is June 25.

For further information, contact Dr Elizabeth Wurdak, Biology Dept, St John's University, Colelgeville MN 56231, USA. Tel: (320) 363-3177, Fax (32) 363-3202 e-mail EWurdak@tiny.computing.csbsju.edu

Call for material

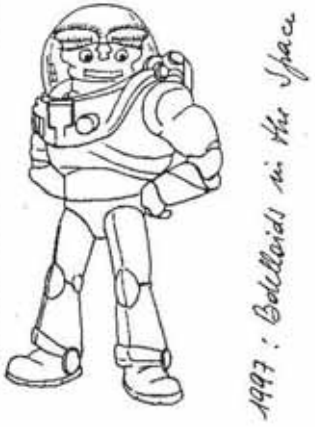
Our resident bdelloidologist seeks global assistance:

"I am asking you to have a very general call in the next (anytime it is) Rotifer News addressed to everybody who is sampling in some part of the earth.

***Henoceros* is wanted!!!**

I need to have alive specimens, but also preserved material may be good. This is because the order Philodinavida is in need of further investigation, in particular for its morphology. Giulio and I have already studied *Abrochtha* and *Philodinavus*, but the third genus is missing. No matter what species of Henoceros is available (two species were described). The preserved material could be useful to study its trophi (Hendrik Segers is part of the team, of course).

[*If you can help, contact Claudia directly: Ed.*]



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Also from Claudia - bdelloids on the shuttle, Jan 12, 1997

e-mail addresses

More of us are connecting to the WWW. Approx. 70 rotifer workers have notified their addresses for inclusion in a coming issue of *Rotifer News*. This represents >1/3 of the newsletter's 200+ mailing list. If you are now connected to the net, but have not notified one of the regional editors, or Russ Shiel directly at <shielr@mdfrc.canberra.edu.au>, please do so. *Rotifer News* in electronic version is becoming a possiblity.

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Full details of this series as supplied by Wil Peters of SPB Academic Publishing, Rotifera and other plankton groups covered to date.

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News'n'Views

1. Eric David Hollowday: Amateur field naturalist with a passion for rotifers

Bob Brain, Transvaal Museum
Pretoria, South Africa

Eric getting organized at Banyoles

Rotifer enthusiasts are bound to be interesting individualists but, to my mind, nobody fits this description better than Eric Hollowday, that unforgettable English enthusiast whose presence cannot be overlooked at international rotifer symposia. He describes himself as "a survivor of the Victorian age of amateur microscopists" and is, indeed, a striking reminder of that bygone era, when amateur naturalists flourished in England and many of them turned their attention to microscopy.

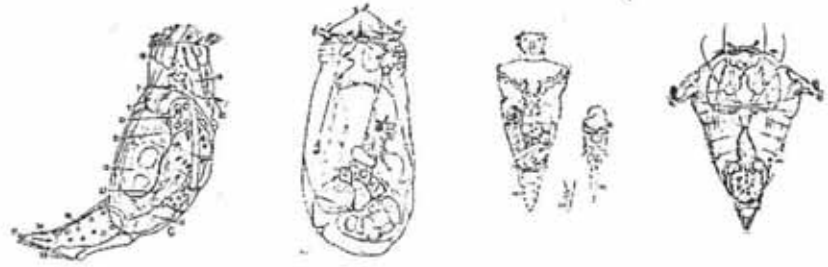
The chances are that they would have been members of the Quekett Microscopical Club that started in London in 1865 to "provide facilities for the friendly exchange of ideas between people interested in microscopy". For Eric, the Quekett has been a haven; he joined the Club (so called to emphasize the informal atmosphere of what is nevertheless a Learned Society) in 1944, became an Honorary Member in 1977, while many of his publications have appeared in its journal, *Microscopy*.

The Victorian era produced a large number of amateur naturalists who took to microscopy as a hobby, searching the water of ponds and ditches for interesting organisms. As is to be expected, rotifers featured largely in their observations and the early history of rotiferology is dominated by the contributions of amateurs such as Gosse, Hudson, Rousselet and Bryce. In our days of specialized, high-technology science, it is refreshing to find so articulate and effective a survivor of a lost Victorian breed, in the person of

Eric Hollowday. As is evident from his publication list, Eric's contribution to the study of rotifers is substantial and it is my objective in this short article to place this contribution in the perspective of Eric's life. I do this with pleasure, as my own appraoch to natural science has always been that of a naturalist.

Eric Hollowday was born on August 26th 1927 in Carlyle, Cumbria. His father was a civil engineer concerned with dock-building. Eric has one brother, Barry, 11 years his senior, who taught him to read during an 18-month illness, prior to his going to school at the age of seven. In 1939 Barry brought Eric a copy of the magazine *Armchair Science*, knowing that two articles in it, on astronomy and the construction of robots, would interest him (Eric had a passion for building robots out of Meccano). This was certainly the case, and Eric made sure of obtaining the next monthly issue, which happened to contain an article that changed the course of his life. The article was entitled "Life through the Microscope", by Peyton Moncure, and was illustrated with photographs of glass models of rotifers made by Herman O. Mueller during the 1920's that are still on display in the American Museum of Natural History in New York. This article so enthused the young Eric that his first priority was to obtain a microscope of his own, which he did at a cost of 15 shillings. So began a lifelong preoccupation with pondlife in general and rotifers in particular.

Eric left school at the age of 13 and took his first job in the accounts department of a printing business in Aylesbury. In 1945 he joined the navy, based in Plymouth, and started the first of a series of 17 parts of his "Introduction to the study of the Rotifera", published in *The Microscope* between 1945 and 1950. His 1949 article on "A preliminary report on the Plymouth marine and brackish water Rotifera" was to lead much later to his revision of the genus *Synchaeta*. As has been the case with so many of the Victorian microscopists, Eric took a keen interest in the illustrating of rotifers, his drawing of *Proales daphnicola* appearing in Libbie Hyman's 1951 volume *The Invertebrates*. Tom Edmondson used his drawings of *Asplanchna priodonta*, *Rhinoglena frontalis* and *Synchaeta pectinata* in the second edition of Ward and Whipple's *Freshwater Biology*, while Walter Koste made use of several of his drawings in his 1978 *Rotatoria* monograph.



An interlude of farming started in 1953, when Eric concentrated on pig-breeding and crop-growing to the virtual exclusion of rotifers. But his move to the Prisons Service in 1968 brought him back into the fold and he was able to identify 19 species of rotifer from fish ponds in the Aylesbury prison

grounds. Although he missed the first two triennial rotifer Symposia, he has been at all the subsequent meetings. He collaborated with H.J.G. Dartnall on a survey of Antarctic rotifers and, as shown by his two 1993 papers on "Recent worldwide studies in rotiferology", his interest has spread far beyond the confines of the British Isles.

Following his retirement from the Prison Service in 1988, Eric has had time to follow a variety of other interests. He serves on the boards of governors of two schools in Aylesbury; is active in the Invertebrate Recording Group, based at the Buckinghamshire County Museum; is an avid gardener and enjoys his 790 tapes of Bach and other baroque composers.

Eric's unfulfilled ambition is to see live specimens of every species of *Synchaeta*; if he had three lives, he would spend the first on rotifers, the second on water-beetles and the third on water-mites. If anything, his unbounded enthusiasm outstrips that of the Victorian microscopists who he admires so much.

The publications of Eric David Hollowday

1. 1945a. Introduction to the study of the Rotifera. Part 1. *The Microscope* 5(10): 253-256.
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3. 1945c. Introduction to the study of the Rotifera. Part 3. Habits and collecting methods, 2. *The Microscope* 5(12): 300-306.
4. 1946a. Introduction to the study of the Rotifera. Part 4. Drawing rotifers. *The Microscope* 6(1): 3-9.
5. 1946b. Introduction to the study of the Rotifera. Part 5. Four common littoral rotifers. *The Microscope* 6(2): 31-34.
6. 1946c. Introduction to the study of the Rotifera. Part 6. Four open-water rotifers, 1. *The Microscope* 6(3): 78-82.
7. 1946d. Introduction to the study of the Rotifera. Part 7. Four open-water rotifers, 2. *The Microscope* 6(4): 98-100.
8. 1947a Introduction to the study of the Rotifera. Part 8. *Rhinoglena frontalis* Ehrenberg. *The Microscope* 6(6): 160-164.
9. 1947b Introduction to the study of the Rotifera. Part 9. *Proales daphnicola* Thompson, with reference to commensal and parasitic habits in rotifers. *The Microscope* 6(8): 205-211.
10. 1947c. Introduction to the study of the Rotifera. Part 10. Further common species. *The Microscope* 6(9): 237-244.
11. 1947d. Concerning freshwater Polyzoa. *The Microscope* 6(10): 274-277.
12. 1947e. On the commensal relationship between the amphipod *Hyperia galba* (Mont.) and the scyphomedusa *Rhizostoma pulmo* Agassiz var. *octopus* Oken. *J. Quek. Micr. Cl.* Ser. 4, 2, 187-190.
13. 1947f. A note on the capture of marine rotifers as food by hydroid medusae. *J. Quek. Micr. Cl.* Ser. 4, 2(4), 190-192.
14. 1947g. Internal fungal and sporozoan parasites in Rotifera. *J. Quek. Micr. Cl.* Ser. 4, 2(4), 222-224.
15. 1948a. Introduction to the study of the Rotifera. Part 11. *Philodina roseola* Ehrenberg, 1. *The Microscope* 6(12): 309-311.
16. 1948b. Introduction to the study of the Rotifera. Part 12. *Philodina roseola* Ehrenberg, 2. *The Microscope* 7(1): 2-6.

17. 1948c. Introduction to the study of the Rotifera. Part 13. *Euchlanis dilatata* Ehrenberg, with notes on the genus. *The Microscope* 7(3): 65-68.
18. 1948d. *Spongilla lacustris* (Linn.): a note on the free-swimming larval and early sedentary stages of the freshwater sponge. *J. Quek. Micr. Cl.* Ser. 4, 2(5), 295-298.
19. 1949a. Introduction to the study of the Rotifera. Part 14. The genus *Epiphanes*. *The Microscope* 7(7): 169-174.
20. 1949b. Introduction to the study of the Rotifera. Part 15. The quantitative study of open-water rotifer populations. *The Microscope* 7(8): 197-199.
21. 1949c. A preliminary report on the Plymouth marine and brackish water Rotifera. *J. Mar. Biol. Assoc.* 28, 239-253.
22. 1949d. A further instance of the occurrence of *Cyclops bisetosus* Rehberg in the water filled hollows of tree trunks. *J. Quek. Micr. Cl.* Ser. 4, 2(6), 361-362.
23. 1949e. On the capture of plankton rotifers as food by the heliozoon *Actinosphaerium eichhornii* Ehrenberg. *J. Quek. Micr. Cl.* Ser. 4, 2(6), 362-363.
24. 1950a. Introduction to the study of the Rotifera. Part 16. The genus *Notholca*. *The Microscope* 7(11): 287-290.
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29. 1953. Hydroid medusae. An introduction to the Lepto- and Anthomedusae. *The Microscope* 9(7): 172-182.
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31. 1975b. Some notes on an uncommon colonial peritrichous protozoon, *Ophrydium versatile* O.F. Müller. *Microscopy* 32(12): 502-511.
32. 1979. The capture and ingestion of the plankton rotifer *Asplanchna priodonta* Gosse by the holotrichous ciliate *Trachelius*. *Microscopy* 32(11): 484.
33. 1983. Sartory, P.K. & Hollowday, E.D., On the occurrence of a rarely observed mutation in the sessile rotifer *Stephanoceros fimbriatus* (Goldfuss) and its possible bearing on the identity of *Collotheca monoceros* (Zacharias). *Microscopy* 34(7): 507-510.
34. 1985a. Some hints and tips on the collection and handling of monogonontid Rotifera, Part 1. *Microscopy* 35(3): 208-220.
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38. 1986b. Milestones in micro-natuiral history. *Microscopy* 35(6): 424-440.
39. 1988a. On the occurrence in the British Isles of the sessile rotifer *Cupelopagis vorax* (Leidy, 1857). *Microscopy* 36(2): 163-170.
40. 1988b. Some suggested fields of study for the amateur in rotifer biology. *Microscopy* 36(2): 171-173.
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42. 1989b. Marvels of pondlife in miracels of glass. *Microscopy* 36(4): 307-317.
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44. 1992. Jones, K.R. & Hollowday, E.D., A note on the consumption of a rotifer egg by ciliated protozoa. *Microscopy* 36(9): 718-720.
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46. 1993b. Recent worldwide studies in rotiferology. Part 2, taxonomy and biogeography. *Microscopy* 37(2): 123-134.
47. 1993c. *Cephalodella edax* sp. nov. A rotifer parasitic in the motile colonial alga *Uroglena volvox* Ehrenberg. *Hydrobiologia* 255/256: 445-448.
48. 1993d. Koste, W. & Hollowday, E.D., A short history of western European rotifer research. *Hydrobiologia* 255/256: 557-572.

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2. Report on a recent marine larviculture symposium

A symposium on "Live Food Organisms and Marine Larviculture" was held September 1-4, 1996 at Nagasaki University in Japan, organized by Faculty of Fisheries to honor the career of Professor Kazutsugu Hirayama who is retiring in March 1997. The major focus of this symposium was "Application Meets Fundamental Research" and "East Meets West". The symposium was organized around several topics including: Rearing Environment, Marine Rotifers, and Other Zooplankton Species. There were 154 participants from 24 countries who presented 32 oral and 33 poster papers. Details of symposium program can be seen at the home page of Nagasaki University (http://www.fish.nagasaki-u.ac.jp/).

Three days were filled with many interesting papers and lively discussions. After a rousing introduction by Professor Charles King, Prof. Hirayama delivered a stimulating lecture recalling the highlights of his research career. Other participants from the international rotifer family included Henri Dumont, Esther Lubzens, Yngvar Olsen, Manuel Serra, Peter Starkweather, Minoru Sudzuki, Manuel Yufera and Norbert Walz. These scientists helped the other participants to appreciate the accomplishments of fundamental rotifer research and their significance for marine larviculture. Such meetings may help stimulate communication between scientists using rotifers as models for investigating fundamental principles of aquatic ecology and those using rotifers in marine larviculture.

Future research topics identified in a round-table discussion included: genetic identification of cultured rotifer strains utilizing methods of evolutionary biology, detection of stress in rotifer mass cultures using modern techniques of cell and molecular biology, and mass culture improvements in high density and chemostat cultures. In the Sayonara party, there was a slide show of Professor Hirayama's life from boyhood to age 65. Highlights included Terry Snell joining young faculty of Nagasaki University to perform a Chinese style dragon dance! The proceedings of this symposium will be edited by A. Hagiwara, T.W.Snell, E.Lubzens and C.S.Tamaru and will be published as a special issue of Hydrobiologia next summer.

Atsushi Hagiwara and Terry W. Snell

3. Rotiferology in China

The earliest rotifer studies in China were by visiting foreign naturalists, beginning in the late 1890's. The first publication on rotifers in China was written by V.G. Thorpe in 1893, followed by E. Lemmermann (1907); together they reported a total of 85 rotifer species in basins of the Yangtze River. J. Daday (1906) and E.V. Daday (1908) reported some rotifer species from Inner Mongolia. F. H. Stewart (1909) collected more than 10 rotifers at an altitude of 4000-4270 m in the southern area of Tibet. Of these, he described 5 new species, three of them, *Mastigocerca auchinleckii, Salpina shape, Notholca scaphula*, were later thought to be synonyms of, respectively, *Trichocerca longiseta, Mytilina ventralis brevispina* and *Notholca squamula*.

V. Brehm (1909) and N.G. Gee et al.(1927) investigated some rotifer fauna of China. M. Ueno (1933) contributed to the knowledge of the Cladocera fauna of China and briefly described and illustrated several rotifer taxa. During the 1930's, W.T. Edmondson et.al. (1934) and G.E. Hutchinson(1937) collected dozens of rotifers near the west Tibet border between China and India. Thus, in China, rotiferology originated with foreign visitors. Nearly all of the earlier literature dealing with Chinese rotifers were very brief, or as a part of plankton study.

The earliest rotifer studies by Chinese were published in 1930's, by Lee Laoying (1935, 1937), a professor from Department of Biology, National University of Peking. His studies were based on collections from Peking and on data from the work of foreign visitors mentioned before. Most of the species he described were discovered from the border regions of China and only a small number were recorded from China proper. He gave a systematic arrangement of those species and recorded their occurrence and synonyms.

During the 1940's, almost nothing was done in rotiferology in this decade. Until the beginning of 1950's, Wang Jiaji (1958,1961), a professor from the Institute of Hydrobiology, Chinese Academy of Sciences , engaged in the fauna studies of Rotifera. Through the accumulation of his ten-year study on Rotifera, he published his guidebook - "Freshwater Rotifera of Chinese Fauna" in 1961. It contains 252 rotifer species, belonging to 79 genera and 15 families. Though the book seems out of date now, considering the rapid development of modern taxonomy, it is still thought to be the best reference for China. During the same decade, E. Bartos (1963) described some Bdelloids from some moors of China. K. Wulfert (1968) also identified some rotifers from North or Northeast of China.

Brachionus lmangi

In the 1970's, Gong Xunju, also a professor from Institute of Hydrobiology, Chinese Academy of Sciences, investigated rotifer composition in the high plateau of Tibet. After summarizing his work for many years, in 1983 , he published his study of Rotifera. All together 208 species were recorded and the rotifer fauna of the Tibet plateau was analysed.

Since the 1980's, studies dealing with rotifers focused on ecology, such as abundance, biomass, production and their role in zooplankton (Huang Xiangfei 1984, 1985, 1988, 1989). Taxonomic works were rare (Wu Zhuotian, 1981).

By the beginning of the 1990's, the need for Chinese rotifer taxonomy specialists became evident, because the rotifer fauna is relatively insufficiently studied . Itogether about 300 rotifers were recorded till then, which is very few in comparison with the better-researched countries and especielly for China which is such a vast and geological compex country. Huang Xiangfei suggested his student (Zhuge Yan) who was interested in this field to do the taxonomical study on rotifers. Under the guidance of Huang X. F. and lots of help from Walter Koste , Minoru Sudzuki and many warm-hearted international colleagues, Zhuge Y. made her first steps in the field of rotiferology and is now carrying on the rotifer study of China .

This is the short history of Rotiferology in China. Although we still lag behind in the study of Rotifera comparing with the developed countries, as Chinese rotifer researchers, we feel confident to make great progress through our own efforts, and with the help of international rotiferologists in the near future.

Zhuge Yan. Institute of Hydrobiology. Chinese Academy of Sciences. Wuhan. Hubei 30072 P.R. China

4. Notes on some rotifers from Hawaii

The rotifers of the Hawaiian Islands have not been actively investigated for over fifty years. Weber 1906 was the first to record rotifers on the Islands. He identified three loricate rotifers found in the saltwaters off the island of Oahu, and this short list remains the only record of saltwater rotifers from the Islands. The next investigation of rotifers from the region was by Richters. He identified two bdelloid rotifers from moss samples taken from Oahu in 1908. A few years later, James Murray identified twenty-five bdelloid rotifers in the moss found on trees and rocks around Honolulu. An additional single bdelloid rotifer from Hawaii was mentioned by Murray 1911b in a paper on South African rotifers, but without specific location reference other than known also in Australia and Hawaii. Finally, Josef Hauer identified a single rotifer found in collections taken on an Expedition to the region in 1937/38. Hope 1987 and Turner 1996 reviewed the rotifers of the Islands, but neither added new records. This is the first documentation of Hawaiian rotifers in 55 years.

Materials and Methods

Water samples were taken by a friend of mine, Laura Berry, while visiting Hawaii. The sample she took was from the grass-laden sides of the slow-moving, gravel and mud bottom Kamananui Stream, located on the north side of the Hawaiian island of Oahu. The stream is laden with many small, boulder size rocks on the shore and in the stream itself, and flows through the privately owned Waimea Valley botanical garden, which is open to the public and contains a variety of tropical plants from all over the world. The sample

site was located approximately 2 km upstream from the ocean. The weather and temperatures were expectedly warm.

Grasses and other semi-submerged vegetation were pulled up out of the stream and held over the collection bottle and 'stripped' of clinging water by pinching the fingers and sliding down the length of the blades of grass, allowing the water to drip and flow into the bottle. After this technique was repeated many times, the resultant grass was then tossed into the collection bottle and filled with ambient water to the top for transport. The collection bottle contained approximately 20% by volume of 10% formalin, so all collected water was preserved immediately.

Results and Discussion

Twenty-one different rotifer species were identified from the sample. The highest relative number of species found was for *Trichotria tetractis* (Ehrenberg, 1830), *Euchlanis dilatata* Ehrenberg, 1832 and *Cephalodella eva* (Gosse, 1886), all three being cosmopolitan and relatively common in littoral assemblages in slowly moving or still waters.

Thirty-one rotifer species have been described previously from the island of Oahu, Hawaii (Turner 1996). Of the 21 rotifers identified in this venture, only *Lecane lunaris* (Ehrenberg, 1832) is recorded for the second time, leaving 51 rotifer species now known from the Hawaiian Islands. Bdelloid rotifers are notoriously difficult to identify under this kind of preservation technique, and as such they are considerably undercounted in this effort.

Notes on selected species

Aspelta angusta Harring & Myers 1928 is not a common rotifer. Known records include only Sweden (Berzins & Pejler 1987), a Wisconsin creek (Harring & Myers 1928) and Goose Creek Virginia (Turner & Palmer 1996b). This rotifer possesses a ventral ciliated corona, moderately large forcipate trophi, a tubular body and relatively short, straight toes. It feeds on other rotifers, and its stomach contents may often indicate the presence of other rotifer species not separately identified in the survey. This record may indicate it's preference for running waters and/or high oxygen content. The only available figure for comparison is the original description of Harring & Myers 1928. Contracted body = 110 um, toes 35 um, trophi = 35 um.

Henoceros falcatus (Milne, 1916) is the only bdelloid rotifer identified to species in this sample. It has two vitellarium (as do all bdelloid rotifers) and modified ramate trophi, with 4 permanently protruding toes, and a non-retractable 'tail' appendage or spur. This rotifer was originally described from swiftly running waters of South Africa (Milne 1916), and though to be rare and endemic due to the 70 year laps of encounter in the field and citation in the literature. However, It has relatively recently been found in a stream near Dusseldorf, Germany (Bendt 1984), the Lelia river in Ecuador (Koste & Bottger 1989; 1992), in Burma (Koste & Tobias 1990), in an Austrian gravel stream (Schmid-Araya 1995), and now this stream in Hawaii. This encounter, in conjunction with previous records, clearly indicates this rotifer is not rare. Contracted body = 120 µm.

References

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Richters, F. 1908. Moosfauna Australiens. *Zool. Jahrb. Abt. Syst.* 26: 196.

Schmid-Araya, J. 1995. New records of rare Bdelloidea and Monogononta Rotifers in gravel streams. *Arch. Hydrobiol.* 135: 129-143.

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Turner, P. & Palmer, M. 1996 Notes on the species composition of the rotifer community inhabiting the interstitial sands of Goose Creek, Virginia with comments on habitat preferences. *J. Quek. Micr. Soc.*

Weber, E. 1906. Rotateurs. (Voyage du Dr. W. Volz.). *Zool. Jahrb. Abt. Syst.* 24: 207-226.

Paul Turner

5. The Ecology of Rotifers from North Island, New Zealand

Diverse assemblages of rotifers are known to exist within New Zealand, though most studies to date have been incidental to work on larger zooplankton, inappropriate sampling methods have been used, and many species have hence been overlooked or undersampled. A detailed study with appropriate methods has recently been made on the distribution of rotifers over a variety of South Island lakes and the population ecology in Lake Grasmere, though no similar knowledge exists for North Island lakes. I am therefore undertaking a study for my PhD looking at the distribution of rotifer species over a number of North Island lakes, sampling species by use of nets

and through the hatching of bottom sediments, and also examining community composition and population dynamics of limnetic rotifers from local lakes. Multivariate techniques will be used to infer relationships between distribution of species (within North Island and within lake) with measured environmental variables.

Ian Duggan. Univ. of Waikato

6. News from South Africa

Bob Brain has rather reluctantly put his rotifer work on one side for the time being, while he concentrates on his fossil micro-invertebrate project from 550 million-year-old limestones in south western Africa. This is proving to be a very labour-intensive effort and does not leave much time for anything else, but very intriguing results are now coming to light. They will lead to some publications before long.

In the meanwhile, there is a newcomer to the South African rotifer scene. She is Dr Anne Drummond, a Lecturer in the Department of Zoology at the University of Natal, in Pietermaritzburg, (Private Bag X01, Scottsville 3209. E-mail: drummond@zoology.unp.ac.za). She is working on bdelloids from Antarctica, particularly those living in moss and water close to the nests of snow petrels. These birds fly up to 250 kms inland to nest on isolated rocky outcrops in the ice (nunataks) and their droppings support a growth a moss. Anne reports as follows:

"A survey of the rotifer fauna comprised part of a project managed by the Percy FitzPatrick Institute for African Ornithology (University of Capetown), and designed to investigate the effects of ornithogenic products on ecosystem structure and functioning in Antarctica. During the 94/95 SANAP (South African National Antarctic Programme) expedition to western Dronning Maud Land, a range of waterbodies associated with the Robertskollen nunataks were sampled. 10 species of bdelloid rotifer were distinguished, but no monogononts were present. All species found have been reported from previous Antarctic collections, and abundances were for the most part similar to those previously reported. While the species list held no surprises, the distribution patterns of species among the range of waterbodies sampled, revealed some points of interest. Firstly, *Philodina gregaria* and *Adineta grandis* were restricted to the larger, deeper pools with well-developed algal communities. While the most temporary pool, which contained melt water for only eight days, contained a single species, *Adineta vaga*. And thirdly, no species were common to both stream and pool habitats.

Interaction between life histories and habitat stability are suggested as possible explanations for these patterns.Analysis of the nutrient status of the Robertskollen waterbodies provided no real evidence for ornithogenic enrichment of the pools or stream. In contrast, samples collected from Svarthameren waterbodies, where bird densities are orders of magnitude higher, over the same time period showed extreme levels of ornithogenic enrichment. Only one Svarthameren sample contained rotifers, a few (literally) *Adineta* sp.. So it seems likely that excessively high levels of nitrate or ammonium nitrogen serve to exclude rotifers, and tardigrades."

Bob Brain. Transvaal Museum

Book Reviews

Continuing the book reviews commenced by Ramesh Gulati in Issue 26 (1995), how could we miss the visit to Oz of a rotiferologically-inclined reviewing person in the form of Ros Pontin? She was jet-lagged so her resistance was low.....chained her to the word-processor, and there ya go....! GoodonyaRos!! Read on .....

Guides to the Identification of the Microinvertebrates of the Continental Waters of the World
Co-ord. Ed: H.J. Dumont ISSN 0928-2440

ROTIFERA Volume 2: The Lecanidae (Monogononta) by Hendrik Segers
SPB Academic Publishing ISBN 90-5103-091-6

The Lecanids include some of my favourite rotifers, beautiful and elegant animals that they are, though not always easy to identify. I was therefore pleased to welcome Hendrik Segers' key to *The Lecanidae*. The family contains only one genus, *Lecane*, with 163 species treated as valid in this work, and more are expected to be discovered. Most species are cosmopolitan though some are more restricted in range. Some species, like *L.lunaris*, are among the most common of all rotifers.

The dichotomous key is based upon characters of the lorica, foot and toe, and the structures to look for are explained in the section on morphology and beautifully illustrated by S.E.M. photographs. The trophi also are shown but are not used in this key.The author warns of the high intraspecific variability in this genus and also of the distortion effects of inadequate fixation.

Hendrik Segers takes a strict approach to the taxonomy and nomenclature of the species. He argues that we should avoid the use of super- or sub-species names and groupings (e.g.species groups, trinary nomenclature) and adhere to the basic taxon, the species. While I may have been guilty in the past of using some of these inadvisable supernumeries, I am persuaded by the author to follow his recommendations, even to the extent of omitting the subgeneric names *Monostyla* and *Lecane*. It is, however, sometimes useful to know of ecological varieties, and these are included by the author in some cases.

The key itself is based upon a completely fresh look at the genus; it is clear and straightforward to work. Wherever material was available to the author, he has provided his own excellent drawings,accompanied by scale bars and clearly labelled on the same or facing page. The species, in numbered order, are provided with information on type locality and specimens, differential diagnosis, description and distribution, with extra comments and notes where appropriate.

A list of *species inquirendae*, where the original descriptions or material are too poor to allow of safe identification, is given at the end of the key, together with a check list of synonyms. A literature list and good index complete the work.

All in all, this is a work of very high standard and I congratulate the author. I have pleasure in recommending it to everyone who encounters *Lecane* species.

And while I am in reviewing mode - programmed so by your editor, of course - here is another must for your library or bookshelf. The next in the series of definitive rotifer keys is:

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 4: The Proalidae (Monogononta) by Willem de Smet
1996 SPB Academic Publishing ISBN 90-5103-119-X

The family *Proalidae* was only given family rank by Bartos in 1959. The members of this group are either illoricate or semi-loricate, hence do not retain their shape well after preservation.The cuticle is thin and flexible and many species have a variable body outline. It is also difficult to rely on morphology of body shape, foot and toes because these tend to be similar in many species. Partly because of these problems, as Willem de Smet tells us in his Introduction, there is a lack of adequate descriptions and very little type material. Most of the species are also rare: some are epizoic or epiphytic or parasites of algae or invertebrates. The thorough revision of the family has clearly, therefore, not been an easy task. The author has concluded that only S.E.M. study of the trophi will allow proper identification of the species and has himself undertaken to learn the art to provide the splendid plates of trophi which appear in this key.The trophi of some genera, e.g. *Proales*, are extremely small (10-20 µm) and must have been very difficult to study even by this method.

Fortunately for those of us without easy access to S.E.M., the dichotomous keys include characters based not only on structure of trophi, but also body shape and proportions, internal organs and habit. The keys are clearly set out and comprehensible.There are 4 genera, *Bryceella, Wulfertia, Proalinopsis* and *Proales*, with about 54 valid species in all, about 43 of them in *Proales*. Descriptions of each species are accompanied by clear, numbered and labelled figures, supplied with scale bars, many taken from the literature but some presumably drawn by the author.

A list of *species inquirendae* and *nomina dubia* follows the section on each genus and a check-list of synonyms, a reference list and index end the work .

De Smet tells us that zoogeographic observations on this group are very limited and that data on species composition, feeding habits and ecology are still very limited even for N. America and W. Europe. The males also are insufficiently known. Perhaps, armed with this clearly presented and well thought-out key, identification of these species may be improved and these gaps in our knowledge of the group filled.

The standard, format and style of the key to *The Proalidae* matches that of the key to *The Lecanidae*. I must, therefore, strongly suggest that you will not be content with only one of these, but must immediately purchase, and enjoy, both.

Ros Pontin
On loan to MDFRC

Errata

Hendrik Segers has advised of the following corrections required to his *Guides to the Microinverebrates* Lecanidae volume:

p. 3 Abbreviations: add 'Lo. l.: lorica length';
p. 64 read: f. *pycina* : see figs 152-153;
p. 97 Note: read 'attributed to Murray...';
p. 132 bibliography of *L. braziliensis*: read 'Segers *in* Segers *et al.* 1993b. p. 114-116, Figs. 1a-c;
p. 144 Comments second para: read 'cannot be attributed...';
p. 160 Comments last line, read: '...although it has equal claws';
p. 165 Differential diagnosis first line, read: ' differs by lacking longitudinal folds...';
p. 178 Distribution, read: '(Ahlstrom, 1938)';
p. 178 Comments, read: 'erroneously attributed...';
p. 215 Berzins 1959: 'Französisch';
p. 222 Segers, Emir & Mertens, 1992 '...north and northeast...'

New taxa reported

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

BDELLOIDEA
Dissotrocha decembullata Koste, 1996 - Sth Africa, #24
Dissotrocha hertzogi aculeata Koste, 1996 - Sth Africa, #24
Macrotrachela herzigiana Koste, 1996 - Madagascar, #25
Otostephanos jersabeki Koste, 1996 - Sth Africa, #24
Philodina foissneri Koste, 1996 - Sth Africa, #24

MONOGONONTA
Brachionus huangi Zhuge & Koste, 1996 - China, #55
Lecane chinesensis Zhuge & Koste, 1996 - China, #55
Lecane tanganyikae Segers, 1996 - Burundi, #45
Mytilina lobata Pourriot, 1996 - French Guyana, #35
Scaridium elongatum Segers, 1996 - Brazil, #44

Updated Bibliography

Ed. note: 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: 11, 33, 37, 53, 54;

Anatomy/Morphology/Physiology: 16, 20, 33;

Biochemistry/Genetics/Pharmacology: 2, 17, 36;

Biogeography/Taxonomy: 4, 5, 7, 8, 18, 24, 25, 26, 27, 28, 29, 34, 35, 41, 42, 43, 44, 45, 46, 47, 48, 55;

Biomanipulation/Eutrophication/Perturbation/Water quality: 9, 10, 19, 22, 32, 48;

Ecology/Population dynamics/Food webs: 1, 3, 5, 7, 9, 10, 14, 15, 21, 23, 28, 29, 30, 31, 32, 35, 38, 39, 40, 52

Methods: 49, 50, 51;

Reproduction: 16, 36;

Toxicology: 12, 13.

1. AESCHT, E. & W. FOISSNER, 1995. Effects of organically enriched magnesite fertilizers on soil organisms of the Bohemian forest in upper Austria. *Forst. Schrift., Univ. Bodenkult. Wien* 9, 107-146.<<Biologiezentr. Oberöst. Landesmus., J.-W.-Klein-Strasse 73, A-4040 Linz, Austria.>> Primarily describing the changes in soil protist communities in an organically enriched soil, this report notes that rotifers signicantly increased in abundance in some treatments. Keywords include: fertilizers, macrofauna, microfauna, rotifers, soil, soil enzymes, soil fauna, spruce forest, testates.

2. APARICI, E., M.J. CARMONA & M. SERRA, 1995. Polymorphism in bisexual reproductive patterns of cyclical parthenogens. A simulation approach using a rotifer growth model. *Ecol. Modelling* 88, 133-142. <<Dept. Microbiol. & Ecol., Univ. València, E46100-Burjassot, Valencia, Spain.>>Computer simulation was used to explore the evolution of genotypes determining mixis ratio and the timing of mixis induction. Mixis ratios equal to one were selected, a high degree of polymorphism was maintained for the genes determining timing of induciton, and the population as a whole showed a steep increase of the mixis ratio during the sexual phase.

3. ARUMUGAM, P.T. & M.C. GEDDES, 1996. Effects of Golden Perch (*Macquaria ambigua* (Richardson)) larvae, fry and fingerlings on zooplankton communities in larval-rearing ponds: an enclosure study. *Mar. Freshwater Res.* 47, 837-844. <<Dept Zool., Univ. of Adelaide, Box 498 GPO Adelaide, S.A. 5001, Australia.>> In the absence of fish, the plankton community in enclosures showed a successional pattern from rotifers and *Moina* to copepod and the *Daphnia*-calanoid dominance. 33 spp. of rotifers were identified, some size ranges are tabulated. redation by fish induced shifts in size distributions and mean sizes of zooplankters, even when no

effect on their density was observed, suggesting that they are sensitive indicators of fish predation.

4. BAYLY, I.A.E. 1995. Distinctive aspects of the zooplankton of large lakes in Australasia, Antarctica and South America. *Mar. Freshwater Res.* 46, 1109-1120. <<Dept of Ecol. & Evol. Biol., Monash univ., Clayton, Vic. 3168, Australia.>> This review of the zooplankton assemblages of large lakes in the stated southern continents includes an overview of rotifer communities, with dominant species noted, and also comments on apparent endemism and Gondwanan affinities. Species-level cosmopolitanism has been considerably overestimated.

5. BONECKER, C.C. & F.A. LANSAC-TOHA, 1996. Community structure of rotifers in two environments of the upper River Parana floodplain (MS) - Brazil. *Hydrobiologia* 325, 137-150. <<Univ. Estadual Maringa, Nupelia, Postgrad Course Ecol, Continental Aquat. Environm., Av Colombo 5790, BR-87020900 Maringa, Parana, Brazil.>> Densities of rotifers and a range of phys/chem. parameters were measured in Lake Guarana and River Baia. Highest densities of rotifers were found at the lake littoral. Canonical correlation analysis related environmental variables with the densities of the most abundant rotifers. The strongest relationship was with chlorophyll a, dissolved oxygen, hydrological level and water temperature. Diversity of rotifers at each station was mainly explained by fluctuations in hydrological level. Results of grouping analysis suggested the formation of groups according to phases of the hydrological cycle.

6. BRAIONI, M.G. & C. RICCI, 1995. 8. Rotifera. In: *Checklist delle specie della fauna Italiana.* (Eds: A. Minelli, S. Ruffo & S. La Posta) Ministerio dell'Ambiente Servizio Conservazione della Natura, Bologna, 1-11. <<Inst. Biol.. Anim. dellÚniversità, Padova, Italy.>>Provide a systematic list of all rotifers known from Italy, with brief taxonomic notes for some, and a brief bibliography.

7. DABÉS, M.B.G.S. 1995. Composição e descrição do zooplâncton de 5 (cinco) lagoas marginais do Rio São Francisco, Pirapora/ Três Marias/ Minas Gerais/ Brasil. *Rev. Brasil Biol.* 55, 831-845. <<Keratella Estudos e Projetos Ambientais Ltda, Av. N. Senhor de Fatima, 144, Montes Claros, MG, 39402-369, Brazil.>> In this study of the zooplankton of five floodplain lakes, 108 taxa of Rotifera were recorded. The biology and distribution of some species receives comment.

8. DE SMET, W.H. 1996. Rotifera Volume 4: The Proalidae (Monogononta). *Guides to the Identification of the Microinvertebrates of the Continental Waters of the World.* SPB Academic Publishing. 102 pp. << Dept Biol., Univ. Antwerpen, RUCA campus, Groenenborgerlaan 171, B-202 Antwerpen, Belgium.>> Reviewed above.

9. ENGLE, D. & J.M. MELACK, 1995. Zooplankton of high elevation lakes of the Sierra Nevada, California: potential effects of chronic and episodic acidification. *Arch. Hydrobiol.* 133, 1-21. <<Dept. Biol. Sci. & Mar. Sci.

Inst., Univ. Calif., Santa Barbara, CA 93106, USA.>> This 3-6 year study reports on the zooplankton, including rotifers, and community responses to acifidication. Seasonal variation in species diversity is noted, but no long-term trends were observed.

10. FABBRO, L.D. & L.J. DUIVENVOORDEN, 1996: Profile of a bloom of the cyanobacterium *Cylindrospermopsis raciborskii* (Woloszynska) Seenaya and Subba Raju in the Fitzroy River in tropical central Queensland. *Mar. Freshwater Res.* 47, 685-694. <<Freshw. Ecol. Gr., Centre for Land & Water. Res., CQU, Rockhampton, Qld 4702, Australia.>> ca. 16 rotifer species dominated the zooplankton during blooms of this cyanobacterium. *Brachionus calyciflorus* and *B. angularis* were observed to ingest entire straight trichomes of *C. raciborskii.*

11. FERNANDEZ-REIRIZ, M.J. & U. LABARTA, 1996. Lipid classes and fatty acid composition of rotifers (*Brachionus plicatilis*) fed two algal diets. *Hydrobiologia* 330, 73-79. << Csic, Inst Invest Marinas, Eduardo Cabello 6, Vigo 36208, Spain.>> *Brachionus plicatilis* maintained on baker's yeast, were fed for 24h upon *Isochyrsis galbana* (diet A) and *Isochrysis galbana* + *Nannochloropsis gaditana* (diet B). The total lipid content increased after feeding upon both diets but no significant differences were found between the two types. The mixed diet, *I. galbana* + *N. gaditana*. enhanced substantially the composition of lipid classes i.e. neutral lipids and of n-3 PUFA of rotifers in comparison with *Isochrysis* or yeast diets.

12. FERRANDO, M.D., E. SANCHO & E. ANDREU-MOLINER, 1966. Chronic toxicity of fenitrothion to an algae (*Nannochloris oculata*), a *rotifer (Brachionus calyciflorus*), and the Cladoceran (*Daphnia magna*). *Ecotoxicol. Environm. Safety* 35, 112-120. <<Univ Valencia, Dept Anim. Biol. Anim. Physiol., Fac. Biol. Sci., Dr Moliner 50, E-46100 Burjassot, Valencia, Spain.>> The cladoceran *D. magna* was the most sensitive of the three species, The no observed effect concentrations (NOECs) for the study with the algae (1.0 mg/liter) and for the rotifer (1.0 mg/liter) were higher than the NOEC (0.009 mu g/liter) and the LC(50) of 24 hr (0.067 mu g/liter) for *D. magna*,

13. FLIEDNER, A. & W. KLEIN, 1996. Effects of lindane on the planktonic community in freshwater microcosms. *Ecotoxicol. Environm. Safety* 33, 228-235. <<Fraunhofer Inst Umweltchem & Okotoxikol, D-57392 Schmallenberg, Germany.>> Zooplankton was severely affected by lindane. The most sensitive organisms were nauplii of copepods which were affected at all treatment levels greater than or equal to 6 mu g/liter during exposure (Days 2-14). Comparison of microcosm results with data obtained in complex outdoor systems demonstrates the practicability and sensitivity of indoor microcosms and emphasizes the importance of long-term testing and assessment of recovery processes for prediction of environmental effects.

14. FUSSMANN, G. 1996. The importance of crustacean zooplankton in structuring rotifer and phytoplankton communities: An enclosure study. *J.*

Plankt. Res. 18, 1897-1915.<<Max Planck Inst Limnol, Postfach 165, D-24302 Plön, Germany.>> *Conochilus unicornis* was not affected by crustacean plankton. *Synchaeta pectinata* and *Keratella cochlearis* increased exponentially when macrozooplankton had been excluded from the enclosures, but did not increase when crustaceans were present. Birth and death rates of K. *cochlearis* could be reliably determined in this field experiment, suggesting that this rotifer species was mainly controlled by exploitative competition rather than by mechanical interference or predation. Daphnia 'longispina' generally grazed selectively on the smaller ciliates and algae, thus depriving the rotifers of their phytoplankton resources.

15. GILBERT, J.J. 1996. Effect of temperature on the response of planktonic rotifers to a toxic cyanobacterium. *Ecology* 77, 1174-1180 <<Dartmouth Coll., Dept. Biol. Sci., Hanover, NH 03755 USA.>> A reproductive-rate assay assessed the effect of temperature on the response of *B. calyciflorus* and *A. girodi* to *Anabaena flos-aquae* and its endotoxin, anatoxin-a. In rotifers acclimated for many generations to low (12 °-14 °C), intermediate (19 °C), and high (25 °- 26 °C) temperatures, susceptibility to the cyanobacterium and its toxin increased significantly with temperature; ratios of lambda values were 1.5-2 times greater at the low than at the high temperatures. The results indicate that seasonal increases in water temperature, and climate warming, may exacerbate the impact of toxic cyanobacteria on rotifers and perhaps other zooplankton taxa.

16. GILBERT, J.J. 1995. Structure, development and induction of a new diapause stage in rotifers. Freshwater Biol. 34, 263-270. <<Address above.>> *Synchaeta pectinata* females produce two distinct kinds of amictic eggs - a thin-shelled subitaneous egg that develops without arrest, and a thicker-shelled diapausing egg. The latter may be a strategy to increase the ability of clones to survive food limitation.

17. GOMEZ, A. & T.W. SNELL, 1996. Sibling species and cryptic speciation in the *Brachionus plicatilis* species complex (Rotifera). *J. Evol. Biol.* 9, 953-964. <<Univ. Valencia, Dept Microbiol. Ecol., E-46100 Burjassot, Spain.>> Allozyme and morphological data for nine strains from all over the world are provided. Although the analysis of morphological data classified individuals from nine strains into two groups, cluster analysis using genetic distance data obtained from allozyme data revealed at least three groups. A male choice design is described for the first time in rotifers and was used to test for male mating preferences among sympatric strains belonging to three distinct species. The results suggest that the *B. plicatilis* complex is actually composed of more than three sibling species.

18. GREEN, J., S.A. CORBET, E. WATTS & O.B. LAN, 1996. Comparative studies on Indonesian lakes. *In* F. Schiemer & K.T. Boland (Eds) *Perspectives in Tropical Limnology*. SPB Acad. Publ., Amsterdam: 101-111. <<17 King Edward Gve, Teddington, Middx, TW11 9LY, England.>> Rotifers are mentioned as a component of the zooplankton in this study. Rotifers

were more diverse than microcrustacea, with *Keratella tropica* and species of the *Brachionus caudatus-angularis* group most frequent.

19. HABERMAN, J. 1995. Estimation of the trophic state of Lake Võrtsjärv on the basis of rotifers (Rotatoria). *Proc. Estonian Acad. Sci. Biol.*44, 92-105. << Võrtsjärv Limnol. Stn, EE-2454 Rannu, Tartumaa, Estonia.>>Rotifers form 71% of the zooplankton of this highly eutrophic lake, with 150 taxa recorded. Seasonality, biomass, production and relative contributions of grazers and predators are described.

20. HAGIWARA, A. 1996. Appearance of floating resting eggs in the rotifers *Brachionus plicatilis* and *B. rotundiformis*. *Bull. Fac. Fish. Nagasaki Univ.* 77, 111-115. <<Fac. Fisheries, Nagasaki Univ., Bunkyo 1-14, Nagasaaki 852, Japan.>>In laboratory exeriments, floating eggs were found only when resting eggs were exposed to air. It is suggested that flotation may not be due to a biological process in the normal life cycle of the rotifer, but rather is an artifact derived from handling mud samples or managing rotifer cultures.

21. HAIRSTON, N.G. Jr, 1996. Zooplankton egg banks as biotic reservoirs in changing environments. *Limnol. Oceanogr.* 41, 1087-1092. <<Sect. Ecol. Syst., Cornell Univ., Ithaca, N.Y 14853, USA.>> Rotifers are included in a tabulation of densities of diapausing eggs from a variety of freshwater and nearshore marine sediments. Diapausing eggs can survive in aquatic sediments for decades or longer. The interaction between environmental variation and generation overlap (produced by prolonged diapause) results in the maintenance of biotic diversity (both species richness and genetic variation), which forms he foundation for response to future environmental change.

22. JENKINS, K. 1995. Growing crops on the land of the fairy shrimps. *Rur. Res.* 166, 7-10. <<NSW Nat. Parks & Wildlife Service, C/ CSIRO, PO Box 84, Lyneham, ACT, 2602, Australia.>> Ephemeral lakes in inland Australia have been used extensively for cropping. This study suggests that rotifer resting aggs are more susceptibe to the detrimental effects of lakebed cropping than are ephippia of cladocera. Lakes with different flood frequencies have different spatial patterns of resting stage deposition.

23. KOBAYASHI, T., P. GIBBS, P.I. DIXON & R.J. SHIEL, 1996. Grazing by a river zooplankton community: Importance of microzooplankton. *Mar. Freshwater Res.* 47, 1025-1036. <<NSW EPA, Locked Bag 1502, Bankstown, NSW 2200, Australia.>> Grazing attained rates (overall average 0.2 day^{-1}, range 0.01-0.59 day^{-1}, expressed as instantaneous mortality rates of algal cells) comparable to those reported for lentic zooplankton communities. The measured community grazing rates were predictable largely as a function of total biomass or rotifer biomass and surface temperature for 1 m depth, and as a function of total biomass or juvenile copepod biomass and surface temperature for 4 m depth, with all-positive regression coefficients in the models. Owing to the predominance of microzooplankton in the river, the impact of zooplankton community grazing appears likely to be linked to a small-size fraction of the

phytoplankton community all year. Management strategies for river water quality may need to take account of possible functional demarcation of grazing by river zooplankton.

24. KOSTE, W. 1996. On soil rotatoria from a lithotelma near Halali Lodge in Etosha National Park in N-Namibia, South Africa. *Int. Rev. ges. Hydrobiol.* 81, 353-365. <<Ludwig Brill Str 5, D-49610 Quakenbrück, Germany.>> A soil sample out of a dried rockpool (lithotelma) on a dolomite hill in the Etosha National Park, Namibia, was investigated for possible occurence of rotifers. Besides a numerous and rich microfaunae, e.g. Zooflagellata, Rhizopoda, Acari, Nematoda, Tardigrada and Copepoda. 24 rotifers were found. Until today, four so far unknown Bdelloidea could be described. *Dissotrocha decembullata* n. sp., *Dissotrocha hertzogi aculeata* n. ssp., *Otostephanos jersabeki* n. sp. and *Philodina foissneri* n. sp.

25. KOSTE, W. 1996. Über die moosbewohnende Rotatorienfauna Madagaskars. *Osnabr. Naturwiss. Mitt.* 22, 235-253. <<Address above.>> Nine monogononts and 25 bdelloid species are recorded from Madagascar. *Macrotrachela herzigiana* is described as new, with 25 species first records for the island.

26. KOSTE, W. & Y. ZHUGE, 1996. A preliminary report on the occurrence of Rotifera in Hainan. *Quek. J. Microsc.* 37, 666-683.<<Address above.>> Eight samples from Hainan provided 128 taxa of rotifers, most littoral in affinity. All taxa are listed, many of interest are figured, and comments made on their distribution and ecology. Most species recorded are cosmopolitan or widely distributed in the tropics.

27. KOSTE, W., W. JANETZKY & E. VARESCHI, 1995. Zur Kenntnis der limnischen Rotatorienfauna Jamaikas (Rotifera). Teil II. *Osnabr. Nat. Mitt.* 20/21, 399-433. <<Address above.>> 135 rotifer species are reported from 39 samples collected on Jamaica; 61 are first records for the island. Interesting taxa are figured, along with comments on their taxonomy, biogeography and ecology.

28. KUCZYNSKI, D. 1996. Distribucion temporal del zooplancton en el Rio Reconquista (Argentina), con particular referencia su fauna de Rotiferos. *Rev. Fac. Cienc. Ex. Quim. Nat., Univ. Morón* 1, 69-93. The potamoplankton, and particurly the rotifers, of this Argentinian river are described. A checklist of rotifers is provided and [population dynamics discussed.

29. KUTIKOVA, L.A. & L.A. FOLIAN, 1996. Rotifera of Issyyk-Kul Lake. *Proc. Zool. Inst. Russ. Acad. Sci., St Petersb.* 267, 1-167. <<Zool. Inst. RAS, Saint Petersburg 199034, Russia.>> This brackish lake in the Tien Shan Mts has a peculiar rotifer fauna. 94 taxa in 30 genera are recorded from the lake, with a comprehensive taxonomic treatment and details of rotifer population dynamics.

30. LAIR, N., H. TALEB & P. REYES-MARCHANT, 1996. Horizontal distribution of the rotifer plankton of Lake Aydat (France). *Aquatic Sciences* 58, 253-268. <<Univ. Clermont-Ferrand, Upres A1562, F-63177 Clermont-Ferrand, France.>> A normalised PCA was used to analyse the spatio-temporal distribution of 18 rotifer species. They are more numerous in the littoral zone, but seasonal changes remain higher than spatial changes. Results illustrate the capability of rotifers to take advantage of available space and food. The digestive tracts of fry and juvenile roach also were analysed and the Ivlev Index used to determine prey selection. Fish predation occurs in the nearshore zone and the interactions between invertebrate predators and their prey are illustrated by the quantitative changes in community dynamics. Among the complex cascade of events varying in the course of the year, and despite resource partitioning, predator-prey interactions as well as the exploitative competition between rotifers and crustaceans produce gradients exhibited in the horizontal distribution of rotifers in Lake Aydat.

31. MODENUTTI, B.E. & M DEL. C. DIEGUEZ, 1995. Population dynamics of *Collotheca mutabilis* (Rotifera, Monogononta) in two Argentine Andean lakes with different thermal regimes. <<Centr. Reg. Univ. Bariloche, Univ. Nac. Comahue, Unid. Post. Universidad, 8400 Bariloche, Argentina.>>*C. mutabilis* was studied in a monomictic lake and a shallow lake without spring-summer stratification. The rotifer had a longer population cycle in the monomictic lake, where the epilimnion offered a thermal refuge.

32. MOORE, M.V., C.L. FOLT & R.S. STEMBERGER, 1996. Consequences of elevated temperatures for zooplankton assemblages in temperate lakes. *Arch. Hydrobiol.* 135, 289-319. <<Dept of Biol. Sci., Wellesley Coll., Wellesley, Mass. 02181-8283, USA.>> Rotifers are mentioned in this review of temp. effects on (largely) crustacean zooplankton. Elevated temperatures can produce a reduction in body size. It is posisble that late summer heating events may cause local extinction of cold-water zooplankton. Higher temperatures also can change algal community structure and food quality, affecting zooplankton interspecific competition. Size-selective predation rates by planktivores also are likely to increase with increasing temperature.

33. MUNUSWAMY, N.; A. HAGIWARA, G. MURUGAN, K. HIRAYAMA & H.J. DUMONT, 1996. Structural differences between the resting eggs of *Brachionus plicatilis* and *Brachionus rotundiformis* (Rotifera, Brachionidae): an electron microscopic study. *Hydrobiologia* 318, 219-223. <<Fac. Fisheries, Nagasaki Univ., Bunkyo 1-14, Nagasaki 852, Japan.>> SEM and TEM are used to demonstrate that each species' resting egg has a characteristic surface and membrane architecture.

34. NOGRADY, T., R. POURRIOT & H. SEGERS, 1995. Rotifera Volume 3: The Notommatidae and The Scaridiidae. *Guides to the Identification of the Microinvertebrates of the Continental Waters of the World* 8, 1-248. <<SPB Academic Publishers, see above listing.>> The third of the proposed rotifer

volumes of this systematic series, covers the known genera and species of these two families.

35. POURRIOT, R. 1996. Rotifers from Petit Saut reservoir (French Guyana), with the description of a new taxon. *Hydrobiologia* 331: 43-52. << Univ. Paris 06, Lab. Geol. Appl., Ura 1367, 4 Pl Jussieu, B 123, F-75252 Paris 05, France.>> 87 taxa of Rotifera from 62 zooplankton samples collected from March to October 1994 are reported. Remarks on interesting or rare species, together with the description of a new species, *Mytilina lobata*, are given.

36. RICO-MARTINEZ, R., B. DINGMANN & T.W. SNELL, 1996. Surface glycoproteins potentially involved in mate recognition in nine freshwater rotifer species. *Arch. Hydrobiol.* 138, 1-10. <<Univ Autonoma Aguascalientes, Ctr Basico, Dept Quim, Blvd Univ 940, Aguascalientes 20100, Mexico.>> A surface glycoprotein in the marine rotifer *Brachionus plicatilis* functions as a contact mate recognition pheromone (MRP). A polyclonal antibody to this glycoprotein (anti-MRP) binds to the body surface of nine freshwater rotifer species at sites important in mating behavior of the species studied. Binding among brachionid species was concentrated in the corona and foot as expected from previous observations of mating behavior. In non-brachionid species other than bdelloids, binding occurred in areas where males contacted females and initiated mating. Although the antibody bound to female *Brachionus calyciflorus* is, it did not decrease the number of male mating attempts. These results are discussed in light of other research on anti-MRP blockage of male mating in *B. plicatilis* and *B. rotundiformis* strains.

37. SAKAMOTO, K., E. OKIMASU & A. AMEMURA, 1996. Isolation of a microalga, Synechocystis sp SY-4, potentially useful as a rotifer feed. *J. Ferment. Bioeng.* 82, 157-160. <<A. Amemura, Fukuyama Univ, Res Inst Marine Bioresources, Ohama CHO, Innoshima, Hiroshima 72221, Japan.>> An algal strain, SY-4, that grows between 25 °C and 35 °C was isolated from coastal seawater by enrichment culture, and identified as a blue-green alga (cyanobacterium) of the *Synechocystis* species. This microorganism was found to be a potentially useful feed for rotifer culture.

38. SARMA, S.S.S., N. IYER & H.J. DUMONT, 1996. Competitive interactions between herbivorous rotifers: Importance of food concentration and initial population density. *Hydrobiologia* 331: 1-7. <<Univ NaCl Autonoma Mexico, Zool Lab, Campus Iztacala, Ap 314, Los Reyes 54090, Tlalnepantla, Mexico.>> At lower food concentrations, *A. fissa* displaced *B. calyciflorus* and vice versa at higher food concentrations. At the intermediate food concentrations of 4.5 x 10(6) cells ml(-1), B. calyciflorus outcompeted A. fissa only if its initial population density was three times higher.. When both species were introduced together, low food levels favoured higher abundance of *A. fissa* than *B. calyciflorus*, suggesting, in nature, it is likely that small *Anuraeo*psis colonize oligotrophic water bodies more successfully than larger *Brachionus*. The results also suggest that the outcome of

competition depends not only on the size of the competing species and food availability but also on their colonizing density.

39. SCHMID-ARAYA, J.M. & P.E. SCHMID, 1995. The invertebrate species of a gravel stream. *Jber. Biol. Stn Lunz* 15, 11-21. <<c/ School of Biological Sciences, Queen Mary & Westfield College, Mile End Rd, London E1 4NS, UK.>> ca. 100 species of Rotifera are included in a list of 569 invertebrate species recorded from the gravel bed of Oberer Seebach. Habitat heterogeneity is a major factor permitting high species diversity.

40. SCHMID-ARAYA, J.M. & P.E. SCHMID, 1995. Preliminary results on diet of stream invertebrate species: the meiofaunal assemblages. *Jber. Biol. Stn Lunz* 15, 23-31. <<Address above.>> Rotifers were both predators and prey in this study of meiofaunal gut contents (32 predator species examined) and feeding habits (video techniques used). Meio- and macroinvertebrate predators feed on a wider range of prey species than previously reported.

41. SEGERS, H. 1995. Rotifera Volume 2: The Lecanidae (Monogononta). *Guides to the Microinvertebrates of the Continental Waters of the World* 6, 1-226. <<SPB Academic Publishers, see above listing.>> Reviewed in this issue, see pp. 9-10.

42. SEGERS, H.H. 1995. World records of Lecanidae (Rotifera, Monogononta). *Studiedocumenten van het K.B.I.N.* 81, 1-114. << RUG, Dept Mse, Zoogeog. & Nat. Conservat., Lab. Anim. Ecol., B-9000 Ghent, Belgium.>> Lists all published and verified records of *Lecane* species worldwide, provides a complete bibliography, and 62 species' distribution maps.

43. SEGERS, H. 1995. Zoogeography of littoral Rotifera, with special reference to the Lecanidae. Ph.D. Dissertation, Universiteit Gent, Fakulteit van de Wetenschappen, Gent. 198 p. (Part 1. Part 2 is the Family Lecanidae volume of the *Guides to the Identification of the microinvertebrates of the continental waters of the world* (1995, SPB Academic Publishers)0. Detailed global review of the distribution of lecanid species, by species with country records, plus full bibliography and distribution maps.

44. SEGERS, H. 1996. *Scaridium elongatum* n sp, a new monogonont rotifer from Brazil. Belgian Journal of Zoology 126: 57-63. <<Address above.>> A new species of *Scaridium*, *S. elongatum* n. sp., is described from Broa reservoir, São Paulo, Brazil. The species is probably a neotropical vicariant of the palaeotropical *S. grande* Segers, 1995.

45. SEGERS, H.H. & D. BARIBWEGURE, 1996. On *Lecane tanganyikae* new species (Rotifera: Monogononta: Lecanidae), *Hydrobiologia* 324, 179-182. Description of this new rotifer from Burundi.

46. SEGERS, H., W. KOSTE & S.M. YUSSEF, 1996. Contribution to the knowledge of the monogonont Rotifera of Zanzibar, with a note on *Filinia novaezealandiae* Shiel & Sanoamuang, 1993. *Int. Rev. ges. Hydrobiol.* 96, 597-603. <<Address above.>> 34 rotifer species are reported for the first time from Zanzibar. *F. novaezealandiae* is reported for the first time since

its description. It is likely that the abundant tropical records of the cold stenotherm *F. terminalis* could well be confusion with *F. novaezealandiae*.

47. SONG, M.O. & W. KIM, 1996. Taxonomic study on the digonont rotifers of Korea. *Kor. J. Syst. Zool.* 12, 53-59. <<Dept Biol., Kangnung Nati. Univ., Kangnung 210-702, Korea.>>This first study of bdelloid rotifers from Korea reports five species in the genera *Adineta, Rotaria* and *Macrotrachela* from terrestrial habitats and temporary pools, all first records from the region.

48. STEMBERGER, R.S., A.T. HERLIHY, D.L. KUGLER & S.G. PAULSEN, 1996. Climatic forcing on zooplankton richness in lakes of the northeastern United States. *Limnol.Oceanogr.* 41, 1093-1101.<<Dartmouth Coll., Dept Biol, Hanover, NH 03755 USA.>> The June 1991 eruption of Mt. Pinatubo had a marked cooling on global climate that was evident in the regional air temperatures of the northeastern U.S. 323 randomly selected survey lakes had 2-10 additional species of zooplankton per lake in 1992 than in the warmer years of 1991, 1993, or 1994. ANOVA showed that total zooplankton richness had a highly significant year effect, suggesting a response to annual climatic differences. The difference in total richness in 1992 was attributed primarily to richness of rotifers and small cladocerans. The responses of large cladocerans and copepods did not show significant year effects - these may occur at time scales longer than the temporal scale of this 4-yr survey. Results indicate that local zooplankton richness can be extrapolated to regional scales for monitoring responses of lakes to climate change.

49. TAYLOR, H.L. 1995. The Taylor diaphram pipette. *Microscope* 43, 65-67.<<1812 Wood Hollow Court, Sarasota, FL 34235 USA.>> Describes a micromanipulative diaphragm pipette for handling small organisms such as rotifers. The contribution of the original Frank Myers micropipette is acknowledged.

50. TAYLOR, H.L. 1995. Using the Taylor diaphram pipette. *Microscope* 43, 68-70. <<Address above.>> Techniques using the above pipette are described, e.g. waxing the tip to prevent attachment by rotifers to the inside bore, preparation and use of narcotics, maintaining the pipette.

51. TAYLOR, H.L. 1996. The Taylor Microcompressor Mk III variable volumetric counting version. *Microscope* 44, 137-140. <<Address above.>> The modified microcompressor is described. It can be used for volumetry as well as for restricting the motion of living organisms as small as 5 µm, and for rolling live specimens for observation and photomicrography.

52. TURNER, P.N. & D.A. DISTLER, 1995. Notes on the hyporheic Rotifera of the Ninnescah River, Kansas, USA. *Trans. Kans. Acad. Sci.* 98, 92-101. Rotifers of the interstitial of North American lotic habitats are not well known. This study gives a list of 24 spp. identified from cores in the submerged bed of the study river, and gives notes on some of them.

53. YAMASAKI, S. & K. TANAKA, 1996. Possibility of utilizing sterile mutant *Ulva pertusa* as a bio-filter in a closed culture system of the rotifer *Brachionus plicatilis* Source *Fisheries Science* 62, 323-324 <<Kagoshima Univ, Fac Fisheries, Kagoshima 890, Japan.>> Paper not seen.

54. YOSHIMURA, K., A. HAGIWARA, T. YOSHIMATSU & C. KITAJIMA, 1996. Culture technology of marine rotifers and the implications for intensive culture of marine fish in Japan. *Mar. Freshw. Res.* 47, 217-222.<<Fukuoka Maricult. Corp., Fukuoka 811-35, Japan.>>High density culture of *Brachionus rotundiformis* enables 100X more efficient production at lower cost than by conventional methods. Highly concentrated *Chlorella* is supplied to sustain rotifer cultures of 10,000-30,000 ind. ml^{-1}.

55. ZHUGE, Y. & W. KOSTE, 1996. Two new species of Rotifera from China. *Int. Rev. ges. Hydrobiol.* 81, 605-609. <<Inst. Hydrobiol., Chinese Acad. Sci., Wuhan, Hubei 430072, P.R. China.>>*Brachionus huangi* n. sp. and *Lecane chinesensis*. n. sp. are described and illustrated from different areas of China.

SECOND ANNOUNCEMENT

VIII International
Rotifer Symposium

23-27 June, 1997
Collegeville, Minnesota USA

Organized by
The Joint Biology Department of
Saint John's University
&
The College of Saint Benedict

INTRODUCTION

Begun in 1976, the tradition of bringing the family of rotiferologists together every three years for a week of scientific exchange will continue at Saint John's University in Collegeville, Minnesota, U.S.A. on 23-27 June, 1997. All students of rotifers are welcome to attend.

Saint John's University was founded by monks of the Order of Saint Benedict in 1857. It offers graduate courses in theology and, in conjunction with the College of Saint Benedict, a liberal arts curriculum leading to a BA degree. The campus is surrounded by a wildlife sanctuary which includes a diverse array of natural and restored habitats. The nearest city, St. Cloud (pop. 50,000), is located 12 miles to the southeast.

The language of the conference will be English and the general format will be similar to that of previous conferences.

MAIN TOPICS

Within the main theme "Rotifer Biology: A Comparative Approach" the following topics will be considered:

1. Aging and Development
2. Behavior and Ecology
3. Biogeography, Systematics and Taxonomy
4. Biotechnology and Culture
5. Cellular Biology
6. Genetics, Biochemistry and Physiology
7. History of Rotifer Research
8. Parasites
9. Phylogeny
10. Population Biology

TENTATIVE PROGRAMME

Sunday, 22	Arrival; registration; informal mixer
Monday, 23	Opening ceremony; oral sessions; evening workshop
Tuesday, 24	Oral sessions; workshop; socializing at Br. Willie's Pub
Wednesday, 25	Oral sessions in the AM, Mississippi Riverboat cruise, barbecue, line dancing in the PM

Thursday, 26	Oral sessions in the AM, poster session and vendor displays in the PM
Friday, 27	Oral sessions, banquet, closing remarks, dance
Saturday, 28	Post conference trip to Lake Itasca State Park or the Science Museum and Mall of America in the Twin Cities

ORAL SESSIONS

Reviews will be 30 minutes in duration with an additional 10 minutes allotted for questions. *Contributions* will be limited to 15 minutes, followed by a 5 minute question period. Please note on the abstract the topic number under which you wish to have your paper listed.

Contributions of a purely descriptive character dealing with zooplankton seasonal dynamics or aquaculture productivity, if devoid of a broader view or a meaningful exploration of the biology of rotifers, are not acceptable. Potential participants are reminded to please take this into account when preparing abstracts and presentations.

Slide and overhead projectors and video players for VHS format cassettes will be available on a regular basis. Other video, audio, and computer presentation aids must be requested in advance.

POSTER SESSIONS

Posters are not to exceed 175cm x 85 cm in length and width!

WORKSHOPS

The duration and format for workshops will vary according to the limitations inherent in the topic and presentation style. However, the formal aspects of the workshop should not exceed 2 hours.

ABSTRACTS & MANUSCRIPTS

Seminar and poster abstracts received before February 1,1997 will be printed and supplied to participants at no charge. Abstracts should be typed and cannot exceed 250 words; title, author name(s) and address included.

The deadline for manuscript submission is June 25, 1997. Manuscripts will be limited to a final length of 8 pages for contributed papers and 10 pages for invited reviews (plates, figures, tables, references, appendices included) as printed in the journal *Hydrobiologia*. See Volume *144* for specific instructions.

Registration Fee

Registration fee for conference participants is 150 US$ (students 100 US$). Accompanying person fee is 50 US$. Fees should be paid in US or the equivalent in Canadian dollars by personal or cashier's check made out to **VIII Rotifer Symposium** and addressed to Elizabeth Wurdak, Department of Biology, Saint John's University, Collegeville, MN 56321. Direct bank transfers should be made to the VIII Rotifer Symposium Account at ZAPP Bank, P.O. Box 887, St. Cloud, MN 56302-0887 USA. The fees cover local transport and all activities except the post-conference tour. The deadline for payment of fees is February 1,1997.

ACCOMODATION

Dormitory housing on campus will be available to both men and women at a cost of $21/night single occupancy or $15/night double occupancy. Bathrooms and showers are shared in the dormitories. Area hotels range in price from $40 - $180/night. They are listed on a separate sheet. You are requested to make your own reservation. If you need assistance please contact one of the organizers:
Holly Adrian HAdrian@tiny.computing.CSBSJU.edu)
or Elizabeth Wurdak
(EWurdak@tiny.computing.CSBSJU.edu)

MEALS

A meal plan at the college dining hall will be offered to all those who wish to take advantage of it at an approximate cost of $20/person/day. It covers breakfast, lunch and dinner.

TRAVEL

Northwest Airlines, the preferred/official airline for the 8th International Rotifer Symposium, is pleased to offer discounted airfares. To take advantage of these savings, please call All Aboard Travel Agency in St. Paul at 1-800-423-0396 and ask for Marcia Grant. You can also make your hotel reservations and reservations for ground transportation from Minneapolis to St. Cloud through the travel agency. This applies to all domestic travel and travel from Canada. International travelers are advised to approach a travel agency in their respective countries as a group and negotiate for reduced fares.

EXCURSIONS

The mid-conference break will feature a cocktail cruise on the Mississippi River north of St. Cloud. For the post conference trip there will be two options: a trip to Lake Itasca State Park and a trip to the Twin Cities.

Lake Itasca State Park is a 4-hour drive from Collegeville. It is the site of the headwaters of the Mississipi River. While there, we shall explore the natural and cultural landmarks of the park, tour the biological station and dine at the historic Douglas Lodge. Approximate cost including meals is $40-50. The Twin Cities excursion will include both the Science Museum in St. Paul and the Mall of America in Minneapolis. The Science Museum has innovative anthropology, natural history, paleontology, physics and technology exhibits and an Omni Theater. The Mall of America is the largest indoor shopping center in the US. In addition to innumerable shops and restaurants it boasts of a self contained amusement park and a large underwater exhibit. The approximate cost is $30-40. This does not include the evening meal.

ACCOMPANYING PERSON PROGRAM

There will be daily sightseeing tours and other activities for accompanying persons. Depending on the weather and your level of interest, we shall tour: the museum, parks and gardens in St. Cloud; Indian Museum, casino and state park at Mille Lacs Lake; and take guided walks of the woods, ponds, wetlands and restored prairie around St. John's University campus. Some of these activities will be offered at no charge. Please indicate your desire to participate in these activities on the registration form.

THIRD ANNOUNCEMENT & MEETING UPDATES

To subscribe to Rotifer News:

Send US$10.00/yr or equivalent, in currency if you can, in international postal order, draft, etc if you cannot to one of the regional editors listed inside the front cover. Preferably, the nearest of Lindy May (U.K.), Bob Wallace (U.S.A.) or Russ Shiel (Australia), where accounts are held for subscription.