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This Newsletter is not part of the scientific literature for taxonomic purposes

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EDITORIAL

The importance of meiofauna?

When I turned 16 years old my parents wanted to throw a birthday party to celebrate the 'big' occasion. I hated the idea. I was scared that no one would come. Ever since then I have been haunted with the notion that 'suppose you gave a party and nobody came.' I now have a new fear. Suppose 'all the meiofauna disappeared and nobody cared.' I ask this question to myself all the time: would it matter if all the meiofauna in the world disappeared tomorrow? Sure, a few baby fish would be unhappy, but I suspect that they would find something else to eat. On a more serious plane, I am asking what is the role of meiofauna in marine systems? We have two basic notions, one relating to trophic dynamics and the other related to diagenesis.

As we all know, meiofauna are small. In fact they are just about the right size to exploit microbial production as food sources. So, we (meiobenthologists, not the royal we) have evolved the idea that meiofauna are important in 'packaging' microbial production so that carbon or energy can be transferred to higher trophic levels. Macrofauna, even deposit feeders, don't seem very good at capturing energy by utilizing microbes. They seem to be too big, and the problem is that microbial matter is too diffuse a resource to exploit efficiently. Meiofauna seem to be about the right size to provide a bridge between very small organisms that produce organic matter and larger organisms that consume organic matter. Technically, only microautotrophs produce organic matter, but microheterotrophs also produce organic matter without consuming other living organisms. So, both bacteria and diatoms are small and are microbial producers of carbon. That is why I still like the word *microbe* even though it is a bit old fashioned. If meiofauna are the primary consumers of microbial carbon then they clearly play a central role in all shallow marine ecosystems where benthic effects regulate water column processes. We have yet to demonstrate that meiofauna play a unique or dominant role in packaging microbial carbon. The critical question is: are meiofauna competitors of macrofauna or are they exploiting different niches?

Some, or perhaps all, meiofauna must also be consuming detritus or particulate organic matter. Therefore, like microheterotrophs, they are mineralizing organic matter. We must question whether the contribution of meiofauna is trivial relative to bacteria, fungi, or deposit-feeding polychaetes. Clearly, meiofauna respire carbon dioxide

and excrete nitrogen and phosphorous. But, how much? Is it significant to any global process? What is the relative or unique contribution by meiofauna? In the deep sea, where small sized organisms dominate, meiofauna could play a central role in nutrient recycling. In shallow ecosystems, the high turnover times of meiofauna could mean that a lot of biomass is mineralized. We have yet to demonstrate that meiofauna actually do have the capability of processing large amounts of material. The critical question is: what is the relative contribution of meiofauna in nutrient recycling?

The two roles for meiofauna in marine ecosystems were proposed back in the 1970's. In this regard meiobenthologists actually came to a major synthesis before microbial ecologists. In the 1980's microbial ecologists realized that the big question was: are bacteria links or sinks in marine ecosystems? This led to the concept of a 'microbial loop' in the water column. (Actually, Lawrence Pomeroy had been suggesting this for over a decade before the phrase was coined.) Meiobenthologists realized that something was going on with small organisms. Even though meiofauna biomass is low, large amounts of organic material can be processed since they have high turnover times. We knew meiofauna must be a link or sink. Unfortunately, progress has been slow for two reasons. There are technical difficulties in measuring the key processes, particularly turnover times and excretion rates, and it is hard to work in sediments. Even the microbiologists all hate working in sediments, that is why most work has been in the water column. (Of course there also is a higher volume of water in the world than benthos.) For our field to be vibrant, make important contributions, and perhaps to just survive, we must not be esoteric. We must focus on why meiofauna are important.



"I don't know why I don't care about the bottom of the ocean, but I don't."

TREASURER'S REPORT 1993

INCOME:

Amount transferred from Dr. Mike Gee	
Previous treasurer	£2,255.28

After conversion to US dollars	
(2 February 1993)	\$3,151.68
<i>(Note conversion rate=\$1.3913/pound)</i>	

Receipts (since 1 January 1993)	
Dues (as of 18 Oct. 1993)	\$1,930.00
Swedmark Fund (not yet transferred from	
R. Warwick, UK)	<u>\$(90.00)</u>

Total Receipts	\$5,081.68
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EXPENDITURES:

Check printing charge	\$10.95
<i>Psammonalia</i> #99	<i>free.*</i>
<i>Psammonalia</i> #100	\$480.99
<i>Psammonalia</i> #101	\$382.21
Refund (Faxon subset	
service cancellation)	<u>\$10.00</u>

Total Expenditures	\$879.61
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Balance	\$4,202.07
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*University of Texas donation

MEMBER SERVICES

Position Open

The Academy of Natural Sciences of Philadelphia is pleased to offer a postdoctoral fellowship for research on the systematics of rotifers or other microscopic invertebrates. Position is open until filled; successful candidate may begin as early as Fall '93. Send CV, statement of research interests, description of project to be completed during fellowship period, and names of three references to: Chairman, Gallagher Fellowship Committee, Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, PA, 19103-1195, USA

Buyers guide

There was a great response to my last editorial. I will try to incorporate the many tips and suggestions in this new section. (ed.)

Chlorazol Black E:

Sigma Chemical Co.
P.O. Box 14508
St. Louis, Missouri 63178-9916
1-800-325-3010 (USA & CANADA)
314-771-5750 (outside USA & CANADA)
FAX 800-325-5052 (USA & CANADA)
FAX 314-771-5757 (outside USA & CANADA)

CMC:

Masters Chemical Co.
520 Bonnie Lane
Elk Grove, Illinois 60007 USA
708-439-7676

"Murrayite" Spirit-Proof Cement:

G.B.I. Laboratories LTD.
Shepley Industrial Estate
Audenshaw, Manchester M34 5DW
England
061-336-5418

Tungsten wire:

Polysciences, Inc.
400 Valley Road
Warrington, Pennsylvania 18976-2590 USA
215-343-6484
(orders only) 1-800-523-2575
FAX 215-343-0214

Minuten Pins, Round cover slips, Thin depression slides:

Carolina Biological Supply Co.
2700 York Road
Burlington, North Carolina 27215 USA
919-584-0381

Irwin Loops:

Dr. Mark D. Schram
Dept. of Biology
Arkansas College
Batesville, Arkansas 72501 USA
501-698-4216

Flexible rubber pipet bulbs (2ml capacity, 2 1/4" Length, #14-065B):
Fisher Scientific

711 Forbes Avenue
Pittsburgh, Pennsylvania 15219 USA
412-562-8300
1-800-766-7000

Label paper for wet collections, "Resistall" paper
made by ByronWeston Paper Co.:

University Products, Inc.
517 Main Street
P.O. Box 101
Holyoke, Massachusetts 01041-0101 USA
Customer Service: 1-800-762-1165
Orders only: 1-800-628-1912

Insect forceps 10 cm 18/8 Stainless steel #FST 26029-10:

Fine Science Tools, Inc.
373-G Vintage Park Dr.
Foster City, California 94404 USA
1-800-521-2109

NEWS FROM MEMBERS

Tidbits

Congratulations to Dr. Robert Higgins on his retirement. After 27 years in government service, he retired on April 30th from the Smithsonian Institution. He now has the title of "Emeritus Research Scientist".

As Dr. Higgins writes "retired" is a bit harsh since he has retained all the privileges and support of his former institution in an emeritus status. He just gets less pay each month... He has no intention of giving up any of his research. In fact, he may get more done at his home than he did in his busy Washington office. He has a significant backlog of new taxa to describe as many of his colleagues painfully realize.

Another centennial: Formaldehyde in Biology. Franz Riemann's plea for more live observations on meiofauna. On September 1st in 1893 the Frankfurt medical doctor F. Blum submitted a short preliminary communication with the title "Der Formaldehyde als Haertungsmittel" to the German "Zeitschrift fuer wissenschaftliche Midroskopie und fuer mikroskopische Technik" (Vol. 10, pages 314-315, issued 1893). During previous disinfection experiments with diluted formaldehyde Blum had noticed that his own fingers got a hardened epidermis and subsequent experiments with various animal tissues resulted in his recommendation of 4% formaldehyde solution (= 10% commercial "formalin") as an effective fixation agent.

Now that we have a century of research behind us, using formalin fixed and preserved material. I wonder what would have happened if the careless gentleman from Frankfurt had not got hardened fingers. Perhaps biologists would have continued with the use of alcohol as a preservative, as colleagues on board the "Challenger" did. But perhaps they would have converted to more "life science" *sensu stricto*. And that is my point here. I feel a need for more live observations, at least in my special field, the nematodes. By far most of all ecological data on aquatic nematodes are based on preserved material. Of course, with sand samples, we make occasional live observations on the classic interstitial fauna and we do so in student's courses while we report on meiofauna research history. But what about observations of living meiofauna in soft mud samples? In the past years I have elicited the attention of students by simple demonstrations of nematodes in mud from an estuarine intertidal mud flat, and I should like to describe my procedure.

During ebb tide I collect a spoonful of the mud from surface along the mid tide line in a brackish water estuarine region and put the moist sample (not submerged, because in this case the following experiments won't work) into a clear polystyrene petri dish. I then keep the covered sample 1-2 days before starting the observations. Then you can see under the dissection microscope how a few nematodes (monhysteroids and chromadoroids) protrude with their anterior ends out of the exposed sediment and browse the surface film for diatoms. The next demonstration shows the attraction of large scavenging nematodes. Just place a squeezed portion of the oligochaete *Tubifex* on the surface, wait 10 minutes or so and observe how some large oncholaimid nematodes appear over the surface, sometimes lifting the water film with their heads. They have their meal until the bait is consumed after 30 minutes, after which time they disappear: an example of patchiness and episodic events. Then turn the petri dish upside down and see through the clear bottom the intricate system of burrows in which the nematodes move at high speed. The structuring of soft sediments is an important aspect of the nematodes' activity.

I hope you will find a suitable shore (stocked with the right nematodes) to excite your students. Or, you must resort to your centuries-old formalin samples.

Anton McLachlan writes he and Johan Furstenberg have four graduate students looking at meiofauna: Cornelia Garner is studying the epifauna of shallow subtidal seaweeds; Olivia Brazzale is investigating meiofauna colonization of dune sand along a subtropical

dune gradient from the backbeach to climax forest; Michelle Roberts is looking at sublittoral meiofauna community response to organic enrichment from aquaculture (mussel rafts) in Algoa Bay; and Marianne Forsyth is doing experimental analysis of the effects of plastic litter on meiofauna in coastal dune slacks. Anton is participating in the study coordinated by Dr. Gee on ~~meiofauna colonization of artificial substrates and will~~ be deploying the equipment in Algoa Bay in November. He has recently been doing some very interesting work on the sandy beach macrofauna of the diamond mining areas on the Nambian coast, the scale of mining is impressive - they push 50m wide sand walls hundreds of meters out to sea and then mine the beaches and surf zones behind these walls down to bedrock, up to 20m below sea level. Some of the beaches consist of coarse sand (including diamonds!) supporting exceptionally rich meiofauna of large forms (oligochaets, archannelids, etc.). Maybe someone would be interested in looking at these?

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Kim Dongsung
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Kim graduated from Inha Univ. and is studying marine meiobenthic ecology with Dr. Yoshihisa Shirayama at Ori University of Tokyo. His special interest is in autecology of some nematode species from northeastern Japanese waters.

RECENT LITERATURE

- Ansari, Z.A. & Parulekar, A.H. 1993. Distribution, abundance and ecology of the meiofauna in a tropical estuary along the west coast of India. *Hydrobiologia*. 262(2):115-116.
- Austen, M.C., Warwick, R.M., & Ryan, K.P. 1993. *Astomonema southwardorum* sp. nov., a gutless nematode dominant in a methane seep area in the North Sea. *Journal of the Marine Biological Association in the UK*. 73:627-634.
- Ayress, M.A., Corrège, T. & Whatley, R.C. 1993. Glyphidocythere, a new deep marine, paradoxostomatid (Ostracoda) from the Quaternary

- and Recent of the Indo-Pacific. *Journal of Micropalaeontology*. 12(1):77-79.
- Bartsch, I. 1992. 2 new species of the genus *Bradyagauae* (Halocaroida, Acari) from the southern Indian Ocean. *Cahiers de Biologie Marine*. 33(4):433-440.
- Chernyshev, A.V. 1993. *Ototyphlonemertes martynovi* sp. n. (Ototyphlonemertidae) - A new interstitial nemertean from the Sea of Japan. *Zoologicheskyy Zhurnal*. 72(7):5-8 (In Russian)
- Dahms, H.U. 1993. Pictorial keys for the identification of crustacean nauplii from the marine meiobenthos. *Journal of Crustacean Biology*. 13(3):609-.
- Dahms, H.U. 1993. Internal anatomy of *Paramphiascella fulvofasciata* (Copepoda, Harpacticoida). *Canadian Journal of Zoology*. 71(6):1242-1250.
- Dahms, H.U. & Schminke, H.K. 1993. Mate guarding in *Tisbe bulbisetosa* (Copepoda, Harpacticoida). *Crustaceana*. 65(1):8-12.
- Dando, P.R., Fenchel, T., Jensen, P., O'Hare, S.C.M., Niven, S.J. & Schuster, U. 1993. Ecology of grassy, organic-rich sediment in a shallow subtidal area on the Kattegat coast of Denmark. *Marine Ecology Progress Series*. 100:265-271.
- Darocho, C.E.F. & Hakenkamp, C.C. 1993. New species of Halicyclops (Copepoda, Cyclopoida) from the United States of America. *Hydrobiologia*. 259(3):145-156.
- DeBovee, F. & Labat, J.P. 1993. A simulation model of a deep meiobenthic compartment - a preliminary approach. *Marine Ecology PZNI*. 14(2):159-174.
- Denne, R.A. & Sen Gupta, B.K. 1993. Matching of benthic foraminiferal depth limits and water-mass boundaries in the northwestern Gulf of Mexico; an investigation of species occurrences. *Journal of Foraminiferal Research*. 23(2):109-117.
- Dingle, R.V. & Giraudeau, J. 1993. Benthic ostracoda in the Benguela System (SE Atlantic): a multivariate analysis. *Marine Micropaleontology*. 22:71-92.
- DiPinto, L.M., Coull, B.C. & Chandler, G.T. 1993. Lethal and sublethal effects of the sediment associated PCB Aroclor 1254 on a meiobenthic copepod. *Environmental Toxicology and Chemistry*. 12(10):1909-1918.
- Donkin, S.G. & Dusenbery, D.B. 1993. A soil toxicity test using the nematode *Caenorhabditis elegans* and an effective method of recovery. *Archives of Environmental Contamination and Toxicology*. 25(2):145-151.
- Erseus, Christer. 1992. Hong Kong's Marine Oligochaeta: A supplement. Proceedings of the Fourth International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong, 11-29 April 1989, Hong Kong.
- Erseus, Christer. 1993. A new marine species of *Smithsonidrilus* (Oligochaeta: Tubificidae) from the Florida Keys. *Proceedings of the Biological Society of Washington*. 106(3):587-590.
- Erseus, Christer. 1992. The marine flora and fauna of Hong Kong and southern China III. (Ed. B. Morton) Proceedings of the Fourth International Marine Biological Workshop: The Marine Flora and Fauna of Hong Kong and Southern China, Hong Kong, 11-29 April 1989, Hong Kong.
- Fan, Men, Zhihu, Ding, Jing, Zhao, & Baolin, Wu. 1993. A preliminary study on small syllides from the Huanghai Sea (Yellow Sea). *Journal of Oceanography of Huanghai and Bohai Seas*. 11(1):19-36. (In Chinese with English Abstract)
- Fenchel, T. 1992. What can ecologists learn from microbes: life beneath a square centimetre of sediment surface. *Functional Ecology*. 6:499-507.
- Goldstein, S.T. & Harben, E.B. 1993. Taphofacies implications of infaunal foraminiferal assemblages in a Georgia salt marsh, Sapelo Island. *Micropaleontology*. 39(1):53-62.
- Green, A.S., Chandler, G.T. & Blood, E.R. 1993. Aqueous-phase, pore-water, and sediment-phase cadmium toxicity relationships for a meiobenthic copepod. *Environmental Toxicology and Chemistry*. 12(8):1497-1506.
- He, Hao-ming. 1993. Foraminiferal taphocoenoses from some strong tidal environments near Jianggang of Jiangsu Province and their geological significance. *Acta Micropalaeontologica Sinica*. 10(2):113-130. (In Chinese with English Abstract)
- Hohenegger, J., Piller, W.E. & Baal, C. 1993. Horizontal and vertical spatial microdistribution of foraminifers in the shallow subtidal Gulf of Trieste, Northern Adriatic Sea. *Journal of Foraminiferal Research*. 23(2):79-101.
- Huys, R. & Gee, J.M. 1993. A revision of *Danielssenia* Boeck and Psammis *Sars* with the establishment of two new genera *Archisenia* and *Bathypsammis* (Harpacticoida: Paranannopidae). *Bulletin of the Natural History Museum, Zoology*. 59(1):45-81.
- Huys, R. & Ohtsuka, S. 1993. A new species of *Syrticola* Willems & Claeys, 1982 (Copepoda: Harpacticoida) from Japan with notes on the types species. *Bulletin of the Natural History Museum, Zoology*. 59(1):83-94.
- Jensen, P. 1992. Description of the marine nematode *Hopperia australis* sp. n. (Comesomatidae) from mangroves in Darwin, Australia, with a pictorial key to *Hopperia* species. *Cahiers de Biologie Marine*.

- 33(4):495-500.
- Jing, Zhao, Westheide, W. & Baoling, Wu. 1993. A new species of Euchone from Yellow Sea (Polychaeta: Sabellidae). *Acta Zootaxonomica Sinica*. 18(3):257-261. (In Chinese with English Abstract)
- Joffe, B.I. & Reuter, M. 1993. The nervous system of *Bothriomolus balticus* (Proseriata) - a contribution to the knowledge of the Orthogaon in the platyhelminthes. *Zoomorphology*. 113(2):113-128.
- Kitazato, H. 1992. Pseudopodia of benthic foraminifera and their relationship to the test morphology. In: (ed.), Studies of benthic foraminifera. BENTHOS '90, Sendai 1990. : Tokai University Press, pp. 103-109.
- Kitazato, H. & Ohga, T. 1992. In situ observation of sediment-water interface and culture experiment of benthic foraminifera at Sagami Bay. *Proc JAMSTES Symp Deep Sea Res.* :199-208.
- Langer, M.R., Lipps, J.H. & Piller, W.E. 1993. Molecular paleobiology of protists: amplification and direct sequencing of foraminiferal DNA. *Micropaleontology*. 39(1):63-88.
- Lexy, A., Matheiu, R., Poignant, A., Rosset-Moulinier, M., Ubaldo, M.d.e.l. & Ambrose, D. 1993. Recent foraminifera from the continental margin off Portugal. *Micropaleontology*. 39(1):75-87.
- Lorenzen, S. 1992. Epsilonematidae, marine nematodes, from a sandy salt marsh in France. *Cahiers de Biologie Marine*. 33(4):441-446.
- Lotufo, G.R. & Darocha, C.E.F. 1993. Intertidal interstitial Halicyuclops from the Brazilian coast (Copepoda, Cyclopoida). *Hydrobiologia*. 264(3):175-184
- Mackensen, A., Fatterer, D.K., Grobe, H. & Schmiel, G. 1993. Benthic foraminifera assemblages from the eastern South Atlantic Polar Front region between 35S: distribution, ecology and fossilization potential. *Marine Micropaleontology*. 22:39-69.
- Martens, K. 1993. On the taxonomy and zoogeography of the genus Gomphocythere Sars, 1924 (Crustacea, Ostracoda), with a description of a new species from the Hahal Dan (Israel). *Belgian Journal of Zoology*. 123(1):39-54.
- Maybury, C. & Gwynn A.P. I. 1993. Wet processing of recent calcareous foraminifera: methods for preventing dissolution. *Journal of Micropalaeontology*. 12(1):67-69.
- Medeiros, L. R. A. 1992. Meiofauna de praia arenosa da Ilha Anchieta, sao Paulo. 1. Factores fisicos. *Bolm Inst. Oceanogr., S. Paulo*. 40:27-38.
- Metaxas, A., & Scheibling, R.E. 1993. Community structure and organization of tidepools. *Marine Ecology Progress Series*. 98:187-198.
- Miao, Q. & Thunell, R.C. 1993. Recent deep-sea benthic foraminiferal distributions in the South China and Sulu Sea. *Marine Micropaleontology*. 22:1-32.
- Murray, J.W. & Alve, E. 1993. The habitat of the foraminifer *Paratrochammina* (*Lepidoparatrochammina*) *haynesi*. *Journal of Micropaleontology*. 12(1):34.
- Naiqin, W. 1993. Characteristics of low-marineness foraminiferal faunas in modern and quaternary deposits and their geological implication. *Quaternary Sciences*. 1993. 3:267-280. (In Chinese with English Abstract)
- Nicholas, W.L. & Stewart, A.C. 1993. The nematode fauna of two estuarine mangrove mud-flats on the south coast of New South Wales. *Wetland (Australia)*. 12:16-28.
- Norenburg, J. L. 1993. *Riserius pugetensis* gen n. sp. n (Nemertina, Anopla), a new mesopsammic species, and comments on phylogenetics of some Anoplan characteristics. *Hydrobiologia*. 266(1-3):203-218.
- Pfannkuche, O. 1993. Benthic standing stock and metabolic activity in the bathyal Red Sea from 17N. *PSNI: Marine Ecology*. 14(1):67-79.
- Por, F.D. 1993. Copepods from shore springs of the Dead Sea (Israel) and description of *Schizopera dimentmanin* sp. (Harpacticoida). *Crustaceana*. 65(1):62-70.
- Prejs, Krystyna & Prejs, Andrzej. 1992. Importance of predation in regulating density of meio- and macrofauna in seasonal tropical waters. *Hydrobiologia*. 247:77-86.
- Purschke, G. & Jountoulmond, C. 1993. Ultrastructure of presumed ocelli in *Parenterodrillus taenioides* (Polychaeta, Protodrilidae) and their phylogenetic significance. *Acta Zoologica*. 74(3):247-256.
- Radashevsky, V.I. 1993. Revision of the genus Polydora and related genera from the North West Pacific (Polychaeta: Spionidae). *Publications of the Seto Marine Biological Laboratory*. 36(1/2):1-60.
- Raghukumar, F. & Schaumann, K. 1993. An epifluorescence microscopy method from direct detection and enumeration of the fungilike marine protist, the thraustochytrids. *Limnology and Oceanography*. 38(1):182-187.
- Revs, S.A. 1993. The revision of the genus *Buliminellita* Cushman and Stainforth, 1947, and *Eubuliminella* gen. nov. *Journal of Foraminiferal Research*. 23(2):141-151.
- Sarka, J. 1993. Diversity of meiofauna in the lacustrine profundal zone: Bathymetric differences and influence of environmental factors. *Aquatic Sciences*. 55(3):197-205.
- Shirayama, Y. 1991. Preliminary studies on the energy budget of a deep-sea nematode. *Société*

- franco-japonaise d'océanographie, Tokyo.* 29:170-173.
- Shirayama, Y. 1992. Studies of meiofauna collected from the Iheya Ridge during the dive 541 of the "Shinkai 2000". *Proc. JAMSTEC Symp. Deep Sea Res.* 287-290.
- Shirayama, Y., Kaku, T. & Higgins, R.P. 1993. Double-sided microscopic observation of meiofauna using an HS-Slide. *Benthos Research.* 44:41-44.
- Sicinski, J. & Janowska, E. 1993. Polychaetes of the shallow sublittoral of Admiralty Bay, King George Island, South Shetland Islands. *Antarctic Science.* 5(2):161-167.
- Svavarsson, J., Gudmundsson, G. & Brattegard, T. 1993. Feeding by asellote isopods (Crustacea) on foraminifers (Protozoa) in the deep sea. *Deep-Sea Research.* 40(6):1225-1239.
- Song, Weibo. 1993. Studies on the morphology and systematic status of *Loxophyllum* Cohn 1866 (Ciliophora, Pleurostomatida). *Journal of Oceanography of Huanghai and Bohai Seas.* 11(1):44-49. (In Chinese with English Abstract)
- Stewart, A.C. & Nicholas, W.L. 1992. Structure of the cuticle of *Ceramonema carinatum* (Chromadorida: Ceramonematidae). *Journal of Nematology.* 24:560-570.
- Villoraa-Moreno, S., & de Zio Grimaldi, S. 1993. Redescription and ecology of *Batillipes phreaticus* Renaud-Debyser, 1959 (Arthotardigrada, Batillipedidae) in the Gulf of Valencia (Western Mediterranean). *Cahiers de Biologie Marine.* 34:387-399.
- Webb, D.G. & Montagna, P.A. 1993. Reproductive patterns in meiobenthic Harpacticoida (Crustacea, Copepoda) of the California continental shelf (Santa-Maria Basin. *Continental Shelf Research.* 13(7):723-740.
- Westphalen, D. 1993. Stromatolitoid microbial nodules from Bermuda - a special micro habitat for meiofauna. *Marine Biology.* 117:145-157.
- Williams, D.D. 1993. Changes in freshwater meiofauna communities along the groundwater hyporheic water ectone. *Transactions of the American Microscopical Society.* 112(3):181-194.
- Wray, C.G., Lee, J.J. & DeSalle, R. 1993. Extraction and enzymatic characterisation of foraminiferal DNA. *Micropaleontology.* 39(1):19-73.
- Weilin, Zhang. 1990. Distribution and its controlling factors of Foraminifera from surface sediment in Daya Bay. In: Collections of papers on marine ecology in the Daya Bay (II):42-51 by Third Institute of Oceanography State Oceanic Administration, Ocean Press 1990. (In Chinese with English Abstract)
- Zhang, X. & Pratt, B. R. 1993. Early Cambrian ostracode larvae with a univalved carapace. *Science.* 262:93-94.
- Zhang, Q. & Uhlig, G. 1993. Dry weight and chemical composition (CHN) in relation to population density of cultivated *Tisbe holothuriae* (Copepoda, Harpacticoida). *Helgolander Meeresunters.* 47(2):221-228.
- Zhang, Q. & Uhlig, G. 1993. Effect of density on larval development and female productivity of *Tisbe holothuriae* (Copepoda, Harpacticoida) under laboratory conditions. *Helgolander Meeresunters.* 47(2):229-.
- Zhao, Q. & Whatley, R. 1993. New species of the ostracod genus *Neosinocythere* Huang (12985) from the Indo-West Pacific Region. *Journal of Micropalaeontology.* 12(1):1-8.

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