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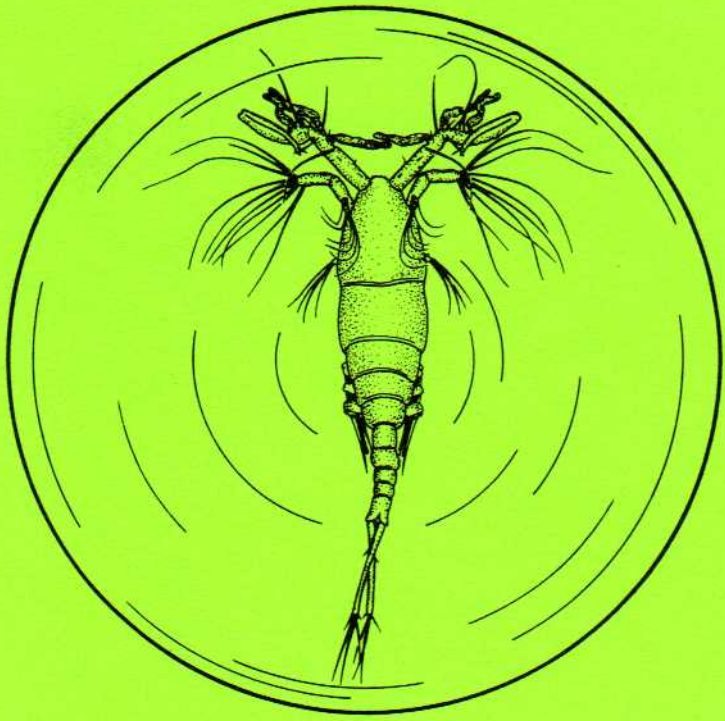
MONOCULUS

Copepod Newsletter



Nr. 24 **September 1992**

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MONOCULUS

Copepod Newsletter

Number 24 September 1992

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This issue has been typed by: Elke Feeken, Arbeitsgruppe Zoomorphologie, Fachbereich 7 (Biologie), Universität Oldenburg.

Died:

Siegfried Husmann (1915 - March 1992)

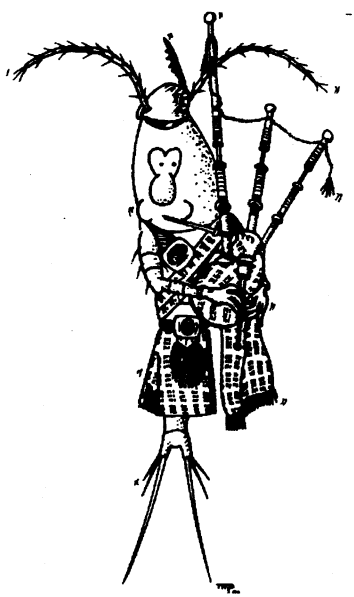
Deadline for the next issue of MONOCULUS: 15th March 1993

Editorial

In MONOCULUS 19(1989) we opened a contest to find a name for Mark Pottek's copepod which appears in ever-changing disguises and which in the meantime has been borrowed also for issues of other newsletters. By now we have received two suggestions, the minimum number for a contest. Brian Bradley came up with "Coco" and Marc Bergmans with "McSilliped".

Some readers have expressed disappointment over the fact that our little copepod has no female companion. Stating the problem is one thing, resolving it quite another. Mark Pottek has pondered over the problem how to indicate the sex. The genital double somite is of no help because in a decent drawing one would expect it to be more or less hidden. As to the sexually dimorphic antennules, these would become a distinctive feature only after our little copepod comes of age. Judging from his antennules, he still is a youngster - in the "Coco-stage" as it were. We have to await his final moult into the adult Mr. McSilliped with prehensile antennules. It would be most appropriate if that transformation took place just in time to celebrate the next issue, which will be the 25th as everyone is aware. We might then have a chance - as also suggested by Marc Bergmans - to finally meet Miss O'Frioid, McSilliped's Irish girlfriend.

Membership of WAC is constantly growing. The new names appear in the Directory but one would like to know a little more. Therefore newcomers since publication of the "Survey of Copepodologists of the World" have been asked for a few words of introduction. We have received 23 responses which are published in this issue. The other contributions are by G. Boxshall, C. Cheng, H.-U. Dahms, D. Defaye, G. Gusev, V. Spiridonow and J.C. von Vaupel Klein. Many thanks to them and to our artists Birgit Schumacher and Mark Pottek.



F. K. M.

J. Schram

Hans-U. Dahms

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Bernard H. Dussart Bernard H. Dussart

Interviewing copepodologists

This year, B. Dussart will celebrate his 70th birthday. I went to visit him at his home, situated in the Dordogne forest, only one kilometre from the world-renowned site La Ferrassie, where the skeletons of the Neanderthal Man were discovered. Now retired, he is still very active and involved in his work. He consecrated his professional life to numerous subjects, but the two most important were limnology and of course copepods, especially freshwater copepods.

With regard to limnology and more generally, the aquatic environment, he is busy writing at the moment a chapter of a book about the Dordogne, the well known river in south-west France, cradle of the Cro-Magnon Man. Now, let's come to copepods. B. Dussart installed microscopes, a library (with more than 6000 references concerning freshwater copepods) in the typical roof-tower of his Dordogne home, where he is nevertheless far from being isolated from the rest of the world! He enjoys communicating and is open to questions and exchanges of ideas, revealing the multifaceted diversification of his career.

He talks with discretion about his university studies at a difficult period for him, from 1941 to 1945, at the Faculty of Sciences of Paris and his professors of that époque: Pérez, Teissier, Drach, Prenant, Piveteau, with whom he began his first study on the middle ear of amphibians. Then, in 1945, he received a proposition to organise a lake research station at Thonon Les Bains (Haute-Savoie). *"Inspired by my youth and the taste of this adventure* (development of a new structure), *I abandoned the subject of my research at that time to consecrate myself entirely to hydrobiology."*

After a training period at Windermere, his research focused first of all, on lake zooplankton, then moved on to physical limnology which explains why his State thesis dealt with lake water movements. Thanks to his enthusiasm, the Thonon station has become a pole of interest for students who come each year to study limnology until then not taught in France. Little by little, a more intensive programme of courses was developed, national and international contacts were made. Finally, in 1957, the Centre de Recherches Géodynamiques de l'Université de Paris was created. These two centres have become, today, a permanent research complex (Institut de Limnologie) with laboratories, harbours, scientifically equipped boats, a library and comfortable accommodation facilities for students and scientists. The book "Limnologie", published in 1966 (and reprinted in 1992) is the only one in French concerning this subject. Since 1955, he organised annual congresses of the French section of SIL, which has since become the Association française de Limnologie (AFL). He was President of AFL from 1975 to 1979.

His expertise in the subject of limnology enabled him to become a consultant to the United Nations and the Comité français des Grands Barrages. He was thus able to participate in the elaboration of ecological recommendations prior to the construction of man-made lakes, as in Ghana and Ivory Coast in Africa as well as James Bay in Canada, where he once saw an aurora borealis which inspired him to write one of his poems and which remains a wonderful life-long souvenir. This particular field of interest drew him also to the other end of the world, to Cambodia and the Mekong where he initiated studies on the dynamics of sediments transported by this big river.

Always present in his baggage, was the ubiquitous plankton net kit! During a population dynamics course which he gave in Antananarivo, he took his first samples for the study of the copepod fauna of Madagascar. The unforgettable memory of his finding of a single male, at the same spot, of a cyclopid species that, 30 years earlier had been described by F. Kiefer from a single male is always with him. *"It was a male of* Bryocyclops mandrakanus. *To rediscover a single specimen of a species, which until then was only known by one specimen - isn't that the proof of the constancy of Nature? And, doesn't that prove that it IS worthwhile describing a species even when you only have a single specimen?"*

Altogether, he published more than 80 papers on freshwater copepods. He described 71 new species - in fact, we counted them together and he was the most surprised of both of us. Without any false modesty, he feels proud that F. Kiefer dedicated a genus in his name (the dedicated photograph of his mentor is on his desk). There is also a genus *Dussartiella* (an amphipod from Madagascar created by Dr. S. Ruffo) and several *dussarti* and *bernardi* species.

His knowledge of fish is another facet of his research. He published ten papers successively on coregones, chars, lake trout. His interest in the biology of the coregone-group led him to study their nutrition and so he came to planktonic micro-crustaceans, particularly copepods and amphipods in mountain lakes.

His frankness and his passion for current ecological problems and for instance, his concept of ecophase and its applications in ecology caused him certain enmity. But, as he says, "*Nobody is a prophet in his own country.*"

His career is of course not exempt from administrative tasks. In Thonon, then in Gif-sur-Yvette where he was Deputy Director of the Centre of Hydrobiological Research from 1963 to 1970. When the latter post was suppressed by the Direction of French Research, he went to the Muséum National d'Histoire Naturelle de Paris and finally, from 1974 to 1987, to the Biological Station of Les Eyzies, which is a field Station of Pierre et Marie Curie University (Paris VI). During the same period, he went to Canada, as a visiting professor, at the Université de Montréal (Québec), then at the University of Waterloo (Ontario). He has always considered teaching as a mission, at the risk of "irritating" his entourage (my own commentary! - but soundly confirmed by his children and grand-children ...!). "*I have always tried to be of help to everyone who asked me, students, colleagues, in my personal and professional life. I did not always succeed!!*"

Q. When and how did you observe your first copepod?

A. *In May 1945, in a sample from Lake Léman. I had just opened the first field station at Thonon with the available material of the époque, - a canoe, a simple plankton net and an old microscope! This station was intended to initiate a programme of limnological studies to improve fishing in Lake Léman. The first copepod I had ever seen was a* Cyclops *of the* abyssorum *group (in fact a* C. a. praealpinus*) and it was then that I discovered these beautiful animals and also the difficulty in identifying them!*

Q. Who, at this time, was working on copepods in France?

A. *In a note published in the Bulletin de la Société Zoologique de France, Dr. Lindberg wrote in 1950 that copepods were almost unknown in France. Jean Roy had just declined the offer to write the Faune de France about freshwater copepods. I had the audacity to propose replacing him and I began to collect information and samples and I contacted Dr. F. Kiefer in Konstanz. It was the beginning of a long correspondence which lasted until his death in 1987.*

Q. Were you encouraged to continue these studies?

A. *No. It was not my Administration's main topic of interest, and, unluckily, when the manuscript of the Faune de France was ready, the series Faune de France was suspended! I had to look for another publisher and that took me eight years, from 1958 to 1966. Then, thanks to Prof. P. P. Grassé's help, I finally found a publisher*

(Boubée) and the first volume of "Les Copépodes des eaux continentales d'Europe occidentale" came off the printing presses in 1966.

Q. You always insist on the necessity of precision in multiplying observations and drawings. How did you start?

A. *My colleague Dragesco gave me the first advises for drawing. Thanks to his help and with perseverance, I published my first drawings in 1957. I hope to have improved them since then....*

Q. Why did you continue on copepods?

A. *Because I was caught up in a chain of events which have never left me. As I was known for the identification of copepods, my colleagues sent me samples... and so, it goes on...*

Q. What do you enjoy most in copepod taxonomy?

A. *The difficulties due to the extreme diversity of their morphology. Not a day goes by when I don't discover some detail which merits a more profound observation and a better drawing. My problem is time - we need to spend so much time, observing, dissecting, drawing, photographing! And, thanks to copepods, I travelled a lot: Africa, Madagascar, South America, North America, South-East Asia and of course, Europe!*

Q. Do you think that today, copepodologists achieve better results than a few decades ago and if so, in what fields?

A. *Yes. On the whole, descriptions are more precise and more comprehensive, and drawings are better. We are not all as proficient as our elders of the beginning of the century like Sars, Giesbrecht, Kiefer, etc... and far too numerous are those who don't even know what to draw!*

Q. Do you think that the role of copepods in nature is sufficiently known and studied?

A. *It is a question of mode and media. It is much easier to publish papers on butterflies, mushrooms, birds or mammals, subjects considered useful to society than to sensitise people and above all, decision makers on the impact of copepods in nature. But imagine a natural catastrophe of the following type: copepods will have completely disappeared! There would not be any fish left in the lakes and oceans. Water purification would be weakened. Pollution would increase. In Africa and a part of Asia, people would no longer suffer from dracunculosis, their mortality rate would decrease. Then, malnutrition would increase, opening the door to famine and ... imagine ... How many politicians, technicians, and even scientists would be concerned?*

Q. I was told that during limnology training courses in the Massif Central (in Lake Pavin), the students prepared a copepod soup, did you taste it?

A. *No! but I've heard that it was excellent. We surely underestimate freshwater copepods: they could be used for multiple purposes ... if we knew more about their biology and their physiology.*

Q. After studying copepods for so many years, what do you think about freshwater copepodology progress?

A. *In 1945, the whole world used Gurney's book. Then, in 1959, the book by Wilson & Yeatman edited by Edmondon took over. In 1960, Kiefer gave elements for Europe. Then, there were the two books I published for Western Europe; used everywhere although they were not destined for that purpose. In the meantime, a lot of new species have been described and genera revisions have been numerous. That is why we would need a daily updated data bank to closely follow copepod taxonomy. The World Repertories (in three volumes) for Continental Copepods, listing the species known in the eighties and published by myself together with Danielle Defaye would need to be brought up-to-date, to take into account all recent discoveries (particularly the two first volumes). We need more scientists (and equipment) active on each continent and not all concentrated only in one or two rich countries. We also need a school where beginners from all over the globe could come to learn to identify, draw, and describe their findings in standardised terminology .... we can daydream ...!*

Q. I suspect that you were extremely fond of Thonon. Why did you leave?

A. *Because I was asked to become Deputy Director of the Centre of Hydrobiological Research in Gif-sur-Yvette near Paris. It was an opportunity for me to move nearer to Paris, where I was also engaged in scientific tasks at ORSTOM. Afterwards, I never had the opportunity to return to Thonon. So, after my work at the Museum, fate led me to the Biological Station of the University of Paris in Les Eyzies. And, that is how I became a "perigourdin", mad about cepes, foie gras, the excellent wines of Bergerac and the Dordogne and its history.*

Thus concluded my interview with Dr. B. Dussart, a born communicator, overwhelmingly enthusiastic, but also a good do-it-yourself-man, loving music (he plays violin and flute) and ready to do so much more !!!

Danielle Defaye, Muséum National d'Histoire Naturelle, Laboratoire de Zoologie (Arthropodes), 61, rue de Buffon, F - 75005 Paris

----- Scientists in Russia in Need for Help -------

Dear colleagues,

Surely, you know the difficulties in our country which are likely to continue for another 3 years. Increase of prices up to 20 times for everything (food, clothes, service) results in an increase of people who have to live in poverty. A very difficult situation therefore arises for old people who are retired, including scientists. In St. Petersburg there is a lodging house for veterans of sciences where many old scientists (about 100 persons) have to live. Just now Dr. Bychowskaya-Pavlovskaya, Prof. Rubzov and other parasitologists and zoologists known abroad live there. This lodging house receives financial support from the Russian Academy of Sciences which covers only about 30 % of what is needed. As a result the house was forced to reduce food, service and treatment for sick old people. The same situation prevails in the St. Petersburg hospital of the Academy of Sciences.

All the world is hoping for an irreversibility of our democratic reforms and for a normalisation of life in Russia. We would therefore be very thankful for help for our retired scientists by means of financial support for the lodging house and hospital. Also drugs for medical treatment (of hypertonia, heart attack, arteriosclerosis, diabetes, nephritis, ulcers and others) would be needed as well as food (especially dried milk, flour, butter, cheese, oil, sugar, canned meat, vitamins, tea and others) and other things such as bed-clothes, soap and so on.

Parcels can be sent to the following addresses:
I. Dr. A.I. Yankowskaja, Lodging house of Scientists, town Pushkin (St. Petersburg), Mayakovskogo 93, 189620, Russia.
2. Dr. S.I. Morozova, Hospital of Russian Academy of Sciences, Toresa Avenue 72, St. Petersburg, 194017, Russia.

With many thanks,

Prof. Poljansky, Prof. O.N. Bauer, Prof. A.V. Gusev (Zoological Institute, Academy of Sciences, St. Petersburg)
20.04.1992

Eighth International Meiofauna Conference 1992

The EIMCO '92 took place at the University of Maryland at College Park (Washington D.C.) from 9.-14.08.92. The conference was a great success and was well organised by its convenors Margaret Palmer and Bob Higgins who were assisted by several colleagues and students. There were 120 participants from 18 countries presenting 72 papers.

Fourteen presentations dealt exclusively with the primarily benthic copepod taxon Harpacticoida except for two contributions including the Cyclopoida. One was presented by Janet Reid and entitled "Relative latitudinal diversity of continental cyclopoid and harpacticoid copepods of the Americas", the other by G. R. Lotufo and C. E. F. da Rocha who talked about "Psammic marine copepods from Brazilian beaches". Harpacticoids were the research objects of several environmental bioassay and pollution studies carried out by Bruce Coull and Tom Chandler (together with Andrew Green, Liza Dipinto and E. Blood) and demonstrating a high-density meiofauna culture system for applied studies. Cynthia Decker showed "Field distributions and feeding behaviour of the harpacticoid copepod, Pseudobradya sp.". B. D. Robbins, Susan Bell and M. O. Hall gave a talk on "Harpacticoid abundance at multiple scales of patchiness: relationship to seagrass density and seagrass bed shape". In a special'deep sea session' Gerd Schriever reported on "The influence of an artificial disturbance on the harpacticoid copepod community in the deep Southeast Pacific Ocean" and Hans Dahms demonstrated the "Biodiversity in a harpacticoid taxon from the deep sea" during a `biodiversity session' earlier in the week. David Thistle and M.S. Foy presented a talk "On the vertical distribution of a benthic harpacticoid: field, laboratory, and flume results, plus an overview of ongoing work". Darcy Lonsdale et al. talked on "Changes in physiological rates and gut-cell structure associated with a "reproductive-resting" stage in a harpacticoid copepod". In a 'freshwater/ground water session' Vera Kowarc and K.J. Clauss showed the "Horizontal distribution patterns of a harpacticoid community" and Thomas Glatzel and H. K. Schminke provided new insights into the "Mating behaviour of the ground water copepod Parastenocaris phyllura (Harpacticoida)". Rony Huys talked about "Aspects of zoogeography, phylogeny and feeding biology of Leptastacidae (Copepoda: Harpacticoida)".

Most of the other contributions included harpacticoid Copepoda as one of the most abundant meiofauna taxa. The members and the new chairperson of the IAM (International Association of Meiobenthologists), Paul Montagna, are looking forward to the next meeting in 1995 to be held in southern France.

Hans-Uwe Dahms

Sea Lice Workshop

A specialist workshop on the biology and control of sea lice (Copepoda: Siphonostomatoida: Caligidae) will be held on 3rd and 4th September in Paris during the First European Crustacean Conference (31st August - 5th September). The workshop is organised by Geoff Boxshall (The Natural History Museum, London) and André Raibaut (Université de Montpellier II). The provisional programme comprises 23 oral presentations and 6 posters on caligid sea lice as well as 2 oral papers and 4 posters on other (non-caligid) parasitic copepods and branchiuran fish lice.

The proceedings of the workshop will be published as a hardback book entitled: PATHOGENS OF WILD AND FARMED FISH: SEA LICE by Ellis Horwood Ltd., a subsidiary of Simon & Schuster. It will form part of their existing series on Aquaculture and Fisheries and will be edited by Geoff Boxshall (London) & Danielle Defaye (Paris). The estimated publication date is JULY 1993.

The workshop has been awarded a small grant by the Fisheries Directorate of the European Economic Community (Programme AIR). This will be used primarily to provide assistance with travel for young scientists and to support publication of the proceedings.

G. Boxshall, London

OFFER AND REQUEST CORNER

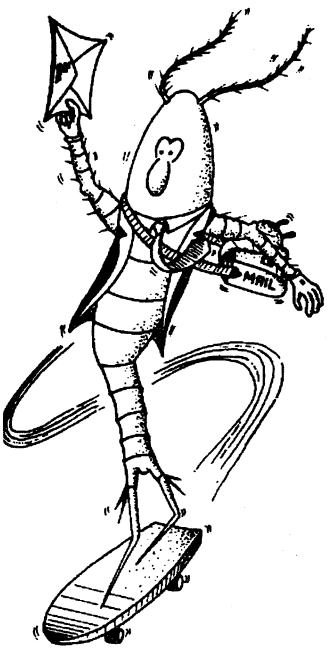
Please send me a xerox-copy of the 1988 paper by the late T. Ito, referred to at the very bottom of page 12 of MONOCULUS no. 23. If you cannot let me have also a xerox-copy of an English, German, or French translation of this paper, could you very kindly advertise my request in the next number of MONOCULUS, in case somebody else has such a translation?

Kindly write to: Dr. R. Hamond, Scaldbeck House, Morsten, Holt, Norfolk, England NR25 7BJ.

Arthropoda Selecta - a new journal

The publication of our journal "Arthropoda Selecta" has been started. The scope of the journal is the morphology, taxonomy, development, life-histories, geography, phylogeny and evolution of Crustacea, Chelicerata, Myriapoda and other arthropods, both recent and fossil, excluding particular papers on insects and mites. The journal is published mostly in English with extended Russian abstracts. Two issues have already been published and the third one should go to the printer in September. However, not everything is going perfectly, since the economic environment in East Europe still does not favour such small enterprises as ours. It has been the easiest way for our publishers to have an account in a Polish bank, but payment through this Polish bank was not convenient for our western subscribers.

So, if you decide to subscribe to "Arthropoda Selecta", you can simply inform us about your intention. You will receive the journal and, as soon, as we have reorganised the financial background, you will also receive a new address for payment. Subscription rates will not be increased. Moreover at least one free supplement per year will be available for our subscribers.



One further problem should be kept in mind. The mailing of foreign correspondence within the former Soviet Union is very slow and this can cause delays. You can use FAX or approach any member of the Editorial Board who is working outside Russia. We will inform our subscribers about such persons. Until Christmas 1992 I am such a person. I will be glad to answer any questions related to "Arthropoda Selecta".

"Arthropoda Selecta" is a chance to build a new bridge between eastern and western zoologists.

Vassily Spiridonov, Alfred-Wegener-Institut für Polar- und Meeresforschung, Am Handelshafen 12, D-2850 Bremerhaven, Germany

Current research activities

Syuhei Ban, Hakodate, Hokkaido, Japan:

I am interested in the ecology of planktonic copepods; especially prey-predator interaction, behavioural response to their predators (e.g., diel vertical migration), and diapause. My recent work is about effects of population density on diapause egg production of *Eurytemora affinis*. I plan to study diapause or reproductive phenology of oceanic large calanoid species (e.g., *Calanus cristatus* or *C. plumchrus*).

Michael Brown, Brisbane, Australia:

At present I am completing my Ph.D thesis under Professors J.G. Greenwood (University of Queensland) and B.H. Kay (Queensland Institute of Medical Research). Under their guidance I have evaluated *Mesocyclops* (Cyclopoida; Cyclopidae) copepods for the biological control of container breeding mosquitoes. Thorough evaluation has necessitated taxonomic, laboratory and field ecological studies.

Leslie A. Chisholm, Guelph, Canada:

From 1985-1988 my copepod research focused on copepod ecology. Under the supervision of Dr. J.C. Roff, I estimated the production of tropical neritic copepods off Kingston, Jamaica. This included the identification of the copepodite stages, generation of length-weight relationships to facilitate biomass estimation and experiments using live copepods to determine development times. From 1988-1989 I shifted my emphasis to freshwater plankton identification with some work on the effects of acidification on zooplankton communities. Since late 1989, I seem to have followed the path of Walter Boeger and have been working on monogenean parasite systematics with Dr. Mary Beverly-Burton at the University of Guelph. I continue my membership in the WAC as the subscription to MONOCULUS keeps me up to date with the recent literature and the comings and goings of colleagues. I hope someday soon to continue my copepod research.

Hans G. Dam, Groton, Connecticut, U.S.A.:

My current work with copepods deals with their effect in limiting primary production in the equatorial Pacific ocean. My laboratory is involved in a multidisciplinary study testing the hypothesis that the low standing stock of phytoplankton in the nutrient rich waters of the equatorial Pacific is due to copepod grazing. At the same time, my lab is also examining the role of copepods in the vertical flux of carbon and nitrogen due to fecal pellet production and vertical migration. An ancillary laboratory study is examining the effect of nitrogen limitation in the rates of pellet production and the characteristics of copepod fecal pellets.

Bruno Demeulenaere, Chiredzi, Zimbabwe:

Since September 1991 I am working as a Biology teacher at Hippovalley Highschool in Chiredzi, Zimbabwe. Until then I worked (in the framework of a thesis for my degree Master of Fundamental and Applied Marine Ecology) mainly on marine phytal Harpacticoida from Kenyan mangrove areas. I was mainly focusing on the differences in species assemblages at two sites along the south coast. One site was considered as being "unspoiled" by human (industrial and recreational) activity whereas the other site was clearly influenced by industrial and domestic sewage.

Another part of my work was concerned with the phenotypical peculiarities of phytal Harpacticoida.

If funds become available I would like to extend this work and aim for a PhD.

Ruben Escribano, Antofagasta, Chile:

Although marine copepods have received much attention, mostly to evaluate their impact on phytoplankton populations and contribution to fish production, there is a variety of open questions regarding their role in the marine ecosystem. In this context my work has focused on establishing some general rules of growth and development under various conditions, and the cellular mechanisms that control size variations. At the ~~present time I find~~ myself attempting to elucidate life cycles of calanoid copepods in the well-known, but little understood Chile-Perú current system. It is possible that copepods are not so important in the marine food chains after all, but perhaps their population dynamics could be useful as indicator of perturbed coastal waters due to marine pollution, and this is another topic with which I entertain myself at present.

Taya Evstigneeva, Irkutsk, Russia:

My research is based on the harpacticoid copepods of Lake Baikal and other lakes in the Baikal basin. There are over 65 species and subspecies of harpacticoids in Lake Baikal and I am interested in their feeding preferences and feeding behaviour. I also work on the reproductive behaviour and biology of the harpacticoid Harpacticella inopinata which is abundant in the lake. At present I am involved in a collaborative research project with Dr. Geoff Boxshall, on the evolutionary history of the canthocamptids in Baikal. We are also in the process of describing new interstitial cyclopoids and harpacticoids from a sandy beach in Central Baikal.

Diana M.P. Galassi, L'Aquila, Italy:

At present I work on systematics, biogeography and ecology of freshwater cyclopoid and harpacticoid copepods, with particular regard to groundwater and spring species. particularly, I am now studying morphological differences and systematic value of characters such as the antenna basipodal armature and the presence-absence of exopod in the same, in some stygobiont species (*languidoides* group, *languidus* group, *Speocyclops, Graeteriella, Metacyclops, Hesperocyclops, Neocyclops*). My field of interest includes also the utilisation of the above taxa in bio-

characterisation of habitats such as rheocren and limnocren springs and rivers (hyporheic).

To date I am studying, in collaboration with Prof. G.L. Pesce, material from West Indies, Colombia and Venezuela, as well as material from Italy (phreatic, cave and hyporheic habitat): as regards the former, I am working on the specific diversity-index among the islands, as to the latter, the final purpose is that of compiling a check-list of the inland copepods of Italy.

Moira Galbraith, Sidney, B.C., Canada:

I have been working in the field of marine biology mainly as a taxonomist and ecologist of Pacific north-east zooplankton since I graduated from University of Victoria (just a B.Sc.). Along the way, I met Dr. George Grice, Dr. Thomas Bowman, Dr. John Fulton and many more who encouraged me to continue in this field even though the pay is poor and the work underfinanced. I am in the process of writing up a paper on range extensions for copepods not normally found in this area but that better sampling programs and better gear reveal as a viable community. In this paper I will include some previously undescribed males as well as some new copepods. Right now I am in the exhaustive stage of combing the literature to confirm (deny) my discoveries.

For the past four years I have been working for a small consulting firm, Sy-Tech Research Ltd., taking contracts mainly from the Federal and Provincial governments. Most of this work is community structure, abundances and biomass of zooplankton both inshore and offshore Vancouver Island. Lately I have been involved in an investigation of hot vent plumes and the ecological dynamics of the animals living in and around the plume.

N. Godhantaraman, Porto Novo, Tamil Nadu, India:

For my doctoral programme, I work on the aspects entitled, "Studies on Micro- and Macrozooplankton at different marine environs". These studies include the following aspects:

1. Species composition, distribution, abundance, diversity, richness and evenness of micro- and macrozooplankton from different marine habitats (such as estuary, backwater and mangrove).

2. Totally 47 species of copepods were identified from these environs. Among them , calanoid copepods were more abundant and dominant than the cyclopoid and harpacticoid copepods. Species like Acartia erythraea. A. southwellii, Euterpina acutifrons, Oithona rigida, Paracalanus parvus, Pseudodiaptomus serricaudatus, Microsetella rosea and Corycaeus danae were commonly abundant in these biotopes.

3. Influence of physico-chemical parameters on the distribution and abundance of zooplankton.

4. Seasonal distribution of the major groups of copepods, tintinnids, copepod nauplii, rotifers, etc.

5. Positive food web relationships between copepods and tintinnids were studied in field condition.

Now I am executing the following works with special reference to copepods, tintinnids and other groups:

i) The grazing activity of some commonly abundant copepod species like Acartia erythraea, Euterpina acutifrons, Oithona rigida and Pseudodiaptomus serricaudatus.

ii) The biochemical composition of the copepods and tintinnids is being studied with special reference to seasonal variations.

iii) Food web relationships of copepods and tintinnids and their role in the aquatic environs studied in laboratory condition is also included in my current research activities.

I would be very much interested in hearing from any other copepodologist with similar materials and interests.

A. V. Gusev, St. Petersburg, Russia:

During 1937-39, 1946-51 I had studied the parasitic Copepoda from fishes (taxonomy, fauna), at first from the sea (Gusev, 1951), later from freshwater. But in the main I switched over to the study of freshwater Monogenea, reverted from time to time to Copepoda (Gusev, 1962, in Key of parasites of freshwater fishes of the USSR, 630-680; Kabata, Gusev, 1966 in Linn.Soc.J., 46: 155-207, Gusev 1987 in Key of parasites of the USSR, v. 3: 379-523; Gusev, Kabata, 1991, in Folia Parasitologica, 38: 57-61). Now I continue as before during many years as an advisor of young parasitologists working on Copepoda and Monogenea.

Hiroshi Itoh, Kawaguchi Saitama, Japan:

I am interested in ecology and taxonomy of neritic copepods in general. I am studying *Saphirella*-like copepods from Tokyo Bay and, fortunately, I could observe in the laboratory that they moult into the adult stage of *Hemicyclops* sp. (presented at 4th Internat. Conf. Copepoda). The adult stage of this *Hemicyclops* seems to have a demersal life habit and might be parasitic on polychaetes. I intend to clear up the life history of this species.

William J. Kimmerer, Tiburon, CA, U.S.A.:

My general interest is the ecology of copepods. More specifically I am interested in controls on their abundance and distribution, effects of physical factors, effects of predation by and on copepods, and secondary production. My major long-term interests are how growth and mortality processes combine to control populations, and how predation affects the overall mortality patterns in populations.

At present I am investigating: the effect of an introduced clam on copepod populations in San Francisco Bay; causes of long-term changes in copepod populations in the bay; and the effects of turbulence on feeding and reproduction by copepods.

Sibylle Maas, Gent, Belgium:

I am working on the morphology and taxonomy of freshwater copepods, especially on the tropical calanoid genus *Tropodiaptomus.*

Yutaka Matsuo, Miyagi, Japan:

Now studying:

1) Copepod nauplii distribution as a food for pelagic fish larvae.

2) Fecal pellets of copepods and other macrozooplankton as a fast transport of materials from euphotic zone to deep ocean.

Previously: Neustonic copepod distribution and behaviour.

Maria Luisa Motta Schutze, Rio de Janeiro, Brazil:

The subject of my MSc. thesis is the distribution of plankton and the biological cycle of *Temora stylifera* of the Rio de Janeiro coast, including the description of adult, nauplius and copepodid stages.

Currently I am dedicating myself to the PhD. work in Sao Paulo University where I'm studying the copepodid stages of some species. Dra. Tagea Bjornberg is my thesis tutor.

Shin-ichiro Oka, Kagoshima, Japan:

I am on the PhD. course at national Kagoshima University. At present, my research deals with the ecology of copepods in mangrove estuaries. In Japan, mangroves are distributed at Nansei Islands located at the southwestern tip of the Japanese Archipelago. These studies have been conducted since 1985 in a study area established at the Nakama River of Iriomote Island, Nansei Islands. The data and samples collected from the field are analysed in regard to the ecological aspects of species composition, vertical / horizontal distributions and diurnal migration pertaining to the mangrove aquatic ecosystem. This work is still in its ongoing stage. I hope to conclude it by next year.

Willie Oldewage, Johannesburg, South Africa:

Three of us run a small lab, specialising in parasitic crustaceans. I work on the parasitic copepods and have, for the past two years done as much field work as possible, mostly at sea. The marine copepods have never been systematically worked down here. We are also interested in Africa as a whole and are slowly building up contacts further north. For the moment the work is mainly taxonomic, but we have started on anatomy and histology of a number of interesting genera. It is never dull, however, as just recently we made another new find of a Vanbenedia sp. from a Hydrolagus sp. south of Cape Recife. The only problem here is that there is no one to talk to about copepods, but these animals are so fascinating I couldn't think of working on anything else.

Irina Prusova, Sevastopol, Ukraina:

I study the copepods since 1986. Now my research interests are concentrated on variability of several structure parameters (abundance, individual size, sex ratio) of epipelagic free-swimming copepod populations. I am interested in the variability on different time scales from days to years. The reproduction rhythms in Copepoda as one of the possible causes of diel changes in their abundance are also of interest. My current work involves samples from the Atlantic Ocean and the Black Sea, the main model subjects are *Acartia clausi* and *Euchaeta marina*.

Hiroaki Saito, Kushiro, Hokkaido, Japan:

I'm interested in the role of planktonic copepods as the dominant herbivores in the marine ecosystem. How much do copepods graze? To clarify this question I'm investigating in situ ingestion rate of copepods using gut fluorescence method. Some problems of the method such as chlorophyll degradation and diel change in feeding activity also belong to my interests. I'm also investigating seasonal change in plankton biomass along the survey line off Hokkaido. I hope to reveal which percentage of phytoplankton production passes through copepods at each season in the western subarctic Pacific.

Igor Tamoikin, Sevastopol, Ukraina:

I study marine copepods, Calanoida in particular, of the tropical waters of the Atlantic and Indian Oceans. My special interest is in structure of plankton community and population dynamics of some species of Calanoida. I am the author of six published papers and a co-author of a joint monography.

Atsushi Tanimura, Tokyo, Japan:

I am engaged in the National Institute of Polar Research, Tokyo. I work on Antarctic zooplankton ecology, currently studying the life cycle of the ice-associated copepod, *Paralabidocera antarctica*. My main interest is the interaction between sea ice and zooplankton with particular emphasis on the role of copepods in the Antarctic coastal ecosystem by determining the energetic links between the fast ice subsurface and the sea floor.

Satoshi Yamada, Aichi, Japan:

I have been studying ecology of the Antarctic copepods. I have investigated mainly distribution and species composition of copepods in the Indian sector of the Antarctic Ocean. Currently I study the life cycles of the three major Antarctic copepods, Calanoides acutus, Calanus propinquus and Metridia gerlachei.

MODEL DESCRIPTION ***CALANOIDA*** **MODEL DESCRIPTION**

An Example

On two previous occasions (MONOCULUS 21: 32-35; ibid., 22: 34-45) I have explained my general attitude with respect to model descriptions and next presented an outline of my idea of a model description of a calanoid. Thus, in the following I have prepared an earlier treatise (cf. Crustaceana 57: 145-170) according to these standards, as an example of how to put theory to practice. Before going through this text, please do (re)read those two papers quoted above, then follow the lines below with the "Minimal List" alongside, and see if you can find some inconsequences!

[Minimally required information to be incorporated into "Introduction" and/or "Material and Methods":]

".....This description primarily serves to establish the identity of the [new] copepod. Therefore, as well general as repeated specific reference is being made to the morphology of the type-species, Euchirella messinensis (Claus, 1863) (cf. Zool. Verh., Leiden, 198). As a consequence, various intricate structures that are not in regular use as diagnostic features have been omitted from this description: these comprise the oral field, the genital operculum, most integumental structures, and several chaetotaxic characters. Likewise, the complete integumental pore pattern will be reported upon separately; at present, only the large, conspicuous hair-sensilla are being mentioned....."

"....Preparative procedures and observation techniques are the same as outlined previously [....references....]. Abbreviations used: RMNH - Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands; USNM - United States National Museum (= National Museum of Natural History, NMNH), Washington, D.C., U.S.A.; C - cephalon; CTh - cephalothorax; Ur - urosome; Th1, 2, 3, 4 + 5 - thoracic somites 1, 2, 3, 4 + 5; Gnsom (= Ur1+2) - genital somite; Ur3, 4 - urosomal somites 3,4; Ur5 - anal somite; A1 - antennula; A2 - antenna; Md - manibula; Mx1 - maxillula; Max - maxilla; Mxp - maxillipes; P1, 2, 3, 4 - natatory legs pairs 1, 2, 3, 4; Ba -basipodite; Ba1, 2 - basipodal segments 1, 2; Re - exopodite; Re1, 2, 3 - exopodal segments 1,

2, 3; Ri - endopodite; Ri1, 2, 3 - endopodal segments 1, 2, 3; E - endite; s - [with attached] spermatophore; TL - total length. ....."

[Next, the minimal requirements for the "Description" have been implemented. However, for the sake of keeping this paper as concise as possible, where "...etc." has been inserted, reference is being made to the full text, as published in 1989 in Crustaceana 57: 145-170.]

"....

Description

Euchirella lisettae Von Vaupel Klein, 1989 (figs. 1-5)

Synonymy.-

Euchirella bella, Wilson, 1950: 218-219, pl. 9 figs. 92-94, pl. 19 figs. 248, 261-265 [female only].

Euchirella spec. C, von Vaupel Klein, 1984: 37, 49, figs. 41, 10i, 16u.

Material examined.-

7 ♀♀ (4 s), 3.90-4.20 mm TL; "Albatross" coll. sta. 4700, 20°29' S 103°26' W, btw. Easter and Galapagos Is., 25-xii-1904; depth 2200 fms (approx. 4000 m), fishing depth of gear 300-0 fms (c. 550-0 m). Ex USNM 67073; holotype and six paratypes; det.G.O. Sars previously as Euchirella bella.

1 ♀ , 4.20 mm; "Albatross" coll. sta. 4700, ... etc."

Types. - Holotype: ♀ spm., 4.20 mm TL, with two attached spermatophores; from "Albatross" coll. sta. 4700, 20°29'S 103°26'W, 25-xii-1904. The specimen has been partly dissected: the body (CTh + Ur) is preserved in toto and the appendages have been mounted on ten slides. The holotype has been deposited in the NMNH under no. USNM 234044.

Paratypes: 6 ♀♀ (3 s), 3.90-4.10 mm TL, from same locality and same sample as the holotype. One specimen (spm. no. 1, 23-viii-1982) has been completely dissected and mounted on 14 slides; this one, along with two specimens in toto, will be deposited in RMNH under no. Crust. F 804. The remaining three paratypes (including spm. no. 1,00-oo-1975, of which a slide preparation of the right P4 has been made) have been deposited in NMNH under no. USNM 23405.

Diagnosis. - Female: a medium-sized Euchirella with a robust, obovoid cephalothorax and a short, compressed urosome. Head smoothly rounded, without a crest. Genital somite asymmetrical, with a smooth but pronounced swelling on the left side, accommodating both left and right receptacula seminis. Antennules reaching to halfway the anal somite, when completely stretched backwards. A2,

Ri/Re ratio c. 0.25; Ba2 with a single seta at basis Ri; Ri2 + 3 with 5 + 5 setae on proximal and terminal lobes, respectively, vestige of supporting pedestal of appendicular (7th) seta on terminal lobe distinct, and this lobe equipped with 4-6 accessory spinules. Mxl, Ba1 1st inner lobe with 2 setae on posterior face, inserting at close range; Ba1 2nd inner lobe with 3 terminal setae; Ba2 with 1 large and 2 small setae at basis Ri; Ba2 endite with one or two strongly reduced terminal seta(e); Re with 10 normally developed setae, 11th seta markedly reduced, almost rudimentary. P1Ri with 17-22 subterminal spinules on tubercle and 4-6 central hairs, c. 0.13 the length of the segment. P4Ba1 usually with 5 (range 4-6) strong and heavily chitinized spines which originate from one common base.

Male: unknown.

[In the following description, parts of text that are "superfluous" according to the "Minimal List" have been placed between square brackets. I could have left these (original) phrases out for the purpose of the present Model Description. On the other hand, however, I consider it illustrative to show the flexible way in which, in my opinion, the framework of the "model" may be interpreted.]

Description of the female. - The following description has been based on the type-material, i.e., 7 ♀♀ from "Albatross" collection sta. 4700 in the eastern Pacific.

Body (fig. 1 a, b) robust and strongly built, with a well-chitinized integument. Total length 3.90-4.20 mm; greatest width 1.50-1.60 mm, and greatest height 1.25-1.30 mm, both occuring slightly anterior to the line of fusion of C and Th1, at the level of the insertion of the Mxp. Length ratio CTh/Ur = 3.76 (or 79 + 21 = 100). These measurements all exclude the furcal setae which measure c. 0.90 mm in length.

Cephalothorax (fig. 1a, b) obovoid, with broadly rounded front and smoothly tapering sides. Head proper (fig. 1b, c) rounded and smooth, without any trace of a crest. Frontal organ (fig. 1a, c) just visible in dorsal aspect and of the same structure as in the type-species. The relatively short rostrum (fig. 1c) is single-pointed, acute, and hardly curved. C and Th1 are almost completely fused, the line of fusion (fig. 1a, b) being very faint in both dorsal and lateral aspect, and then only apparent in the middorsal region. Th2 and Th3 are free, with broadly curved ventro-lateral margins. Th4 + 5 forms an entirely coalesced complex with rounded caudo-lateral corners (fig. 1a, b, e). Th2, 3, and 4 + 5 are equipped with 1, 4, and 5 (= 1 + 4) hair-sensilla, respectively, on either side (fig. 1a, b). The relative lengths of the cephalothoracic somites, measured along the middorsal line, are as follows:

C + Th1	Th2	Th3	Th4 + 5
69	9	9	13

= 100

The urosome (fig. 1d, e) comprises four free somites and the furcal rami. The relative lengths of these are:

1 + 2	3	4	5	furca
45	18	15	12	10

= 100

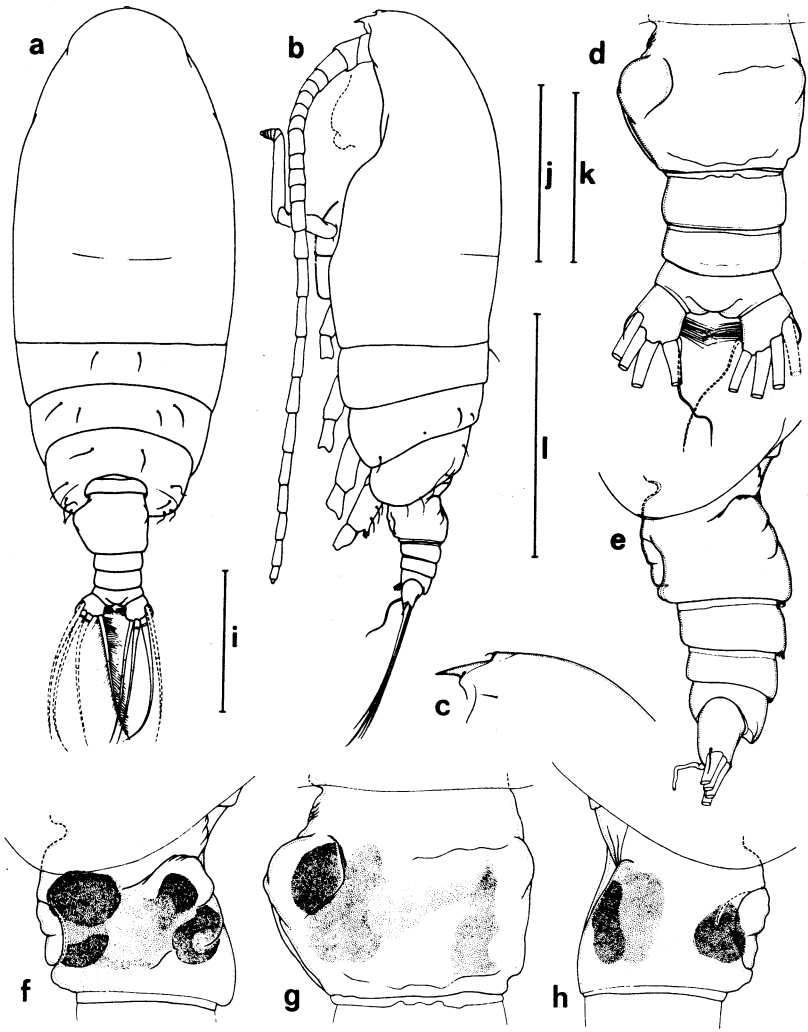


Fig. 1. *Euchirella lisettae,* holotype ♀. a, habitus, dorsal view; b, do., left lateral aspect; c, anterior part of head with rostrum, from left; d, urosome, dorsal; e, do., left lateral; [f, genital somite from left lateral, with internal structures for sperm storage indicated as far as filled in this specimen; g, do., dorsal; h, do., right lateral]. Scale i=1.0 mm for a, b; j=0,5 mm for c, e; k=0,5 mm for d; l=0,5 mm for f, g, h.

The genital somite (fig. 1d-h) is asymmetrical in its dorsal half. On the right there is a small dorso-lateral swelling, more or less in the form of a slightly protruding ridge (e.g., fig. 1g, h). The left margin is strongly vaulted by the presence of an antero-laterally directed outgrowth [which accommodates both left and right seminal receptacles]. This outgrowth is also distinct in lateral aspect (fig. 1f) but it hardly protrudes dorsally. [Apparently, the right receptacle has moved via a latero-dorsal track to the left, where it has settled in a dorso-medial position relative to the left receptacle, which is situated more ventro-laterally (cf. also fig. 7)]. The dorsal outline of the Gnsom does not show many particulars: it is smoothly curved, with a shallow depression midanteriorly and a slightly arched section posteriorly. The ventral outline is rather straight, with the genital prominence hardly protruding. The presence of hairs on the genital somite, other than the caudo-dorsal fringe along its hind margin (fig. 1e) has not been observed. The shape of the Gnsom is highly characteristic and forms the prime diagnostic feature of the [new] species.

Urosomites 3 and 4 are smooth, annular sclerites, no. 3 slightly longer than somite 4. In both, the dorsal section of their caudal edge is fringed with short, contiguous hairs. The anal somite is of the usual shape, i.e., short and compressed, and bears a broadly rounded anal operculum (fig. 1d, e).

The furcal rami are dorso-ventrally flattened and more or less squarish in dorsal aspect. Both rami bear a ventro-medially projecting brush of long hairs on their medial face, and both are equipped with six setae: the curved, strongly feathered ventro-medial seta; the markedly reduced, almost spiniform smooth lateral seta; and the four large, articulating caudal setae. Of these, the second seta from lateral is slightly longer than the other three, which are of subequal length. [Both intermediate setae show a proximal fracture plane, which ist not apparent in either the lateralmost or the medialmost seta. All four large setae exhibit the presence of a distal articulation site, viz., at c. 0.30 the length of the inner- and outermost seta, while in the intermediate ones this site is situated at c. 0.40 along their length.] All large setae are setulose, either completely or at least to a large extent. Compare fig. 1a,b.

The antennulae (figs. 1b, 2a, a') are of moderate length: when completely stretched backwards they reach halfway the anal somite. The A1 comprises 24 free segments, the nos. 8 and 9 as well as 25 and 26 are fully coalesced, with remnants of former sutures being only faintly indicated. Segment no. 2 represents the usual complex of three previously independent segments. The relative lengths of the segments of the A1 are:

1	2	3	4	5	6	7	8+9	10	11
66	43	24	22	24	24	23	42	25	28

12	13	14	15	16	17	18	19	20	21
25	50	48	65	62	66	61	67	57	44

22	23	24	25+26
44	39	37	14

= 1000

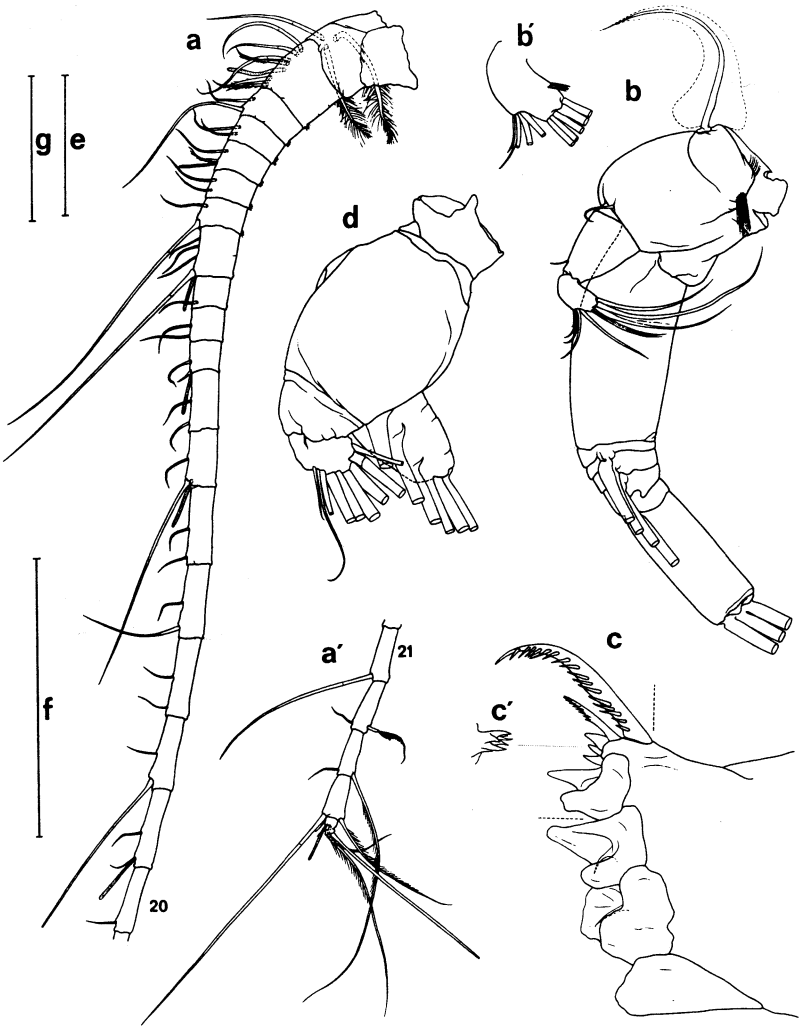


Fig. 2. *Euchirella lisettae*, holotype ♀. a, a ', left A1 in lateral view (aesthetascs on segments 5 and 8 + 9 drawn from right A1 of same spm.); b, right A2 in medial aspect; b', do., detail of Ri2+3; c, masticatory edge of right Md in posterior view: the dorso-medial section (dashed lines) has been drawn from paratype ♀ spm. no. 1, 23-viii-1982; c', do., detail of multicuspidate molariform complex of left Md, posterior view; d, palp of right Md, posterior aspect. Scale e=0,5 mm for a, a'; f=0,5 mm for b, 0,25 mm for b', 0,2 mm for c, c'; g=0,2 mm for d.

The setal armature of the antennula corresponds to that of *Euchirella messinensis*, i.e., large, articulating setae are present on segments nos. 2, 7, 8 + 9, 14, 16, 18, 21 (one each, in antero-distal position), on 22 (one disto-caudally), 23 (one caudally), 24 (one frontally and one caudally), and on 26 (two terminal large setae). Typology, relative lengths, and plumosity are all directly comparable to the conditions described earlier for the type-species. The same applies to distribution, number, and typology of the small setae of the A1, which means, i.a., that they complete, in general, the basic number of two setae per (original) segment, relative to the large setae. The usual exceptions are: segment 1 (three setae), 10 (one small seta only), and 21 (one large seta in all). The particular structure of the distal seta on segment 5 and the distal one on 12, respectively, twisted and hairy, and short and spiniform, is also apparent in the present species. A single aesthetasc is found on each of the segments nos. 2, 5, 8 + 9, 12, 14, 19, and 25 + 26 (fig. 2a, a'). Finally, a tuft of short and thin integumental hairs is present in the postero-distal corner of segments 1 to 7 inclusive. Segment 24, moreover, bears a hair-sensillum along its frontal edge, inserting distad to the frontal seta.

The antennae (fig. 2b, b') show the characteristic, strongly reduced endopodite, the Ri/Re ratio being c. 0.25. The two segments of the Ba are largely fused; this complex bears one large, plumose seta, a dense brush of long hairs, and one short, weakly developed hairbrush. At the base of the Ri, a single short seta is present. The Ri is composed of two free segments, the first of which bears one small seta in the subapical position. Ri2 + 3 is equipped with 5 + 5 setae on the proximal and terminal lobes, respectively. Those on the proximal lobe consecutively increase in length to distad, the larger ones are sparsely plumose, while there is no indication of the remnants of a former seta "no. 9". The setae on the terminal lobe are much longer than those on the proximal lobe; of these, the penultimate one is the strongest. All setae of the terminal lobe are finely plumose; the lobular outgrowth which marks the former insertion of an accessory seta "no. 7" is dinstinct (fig. 2b'). The terminal lobe of Ri2 + 3 is also equipped with a subapical row of 4-6 well developed spinules (fig.2b'). The Re comprises six free segments. The nos. 1 and 2 are coalesced to form a long, cylindrical structure; remnants of a suture Re1-2 are hardly discernible. This segment bears no setae and there are no lobular outgrowths along its anterior margin. Segments 3 to 6 are free, even the medial sectors of their boundaries showing no signs of fusion; each of these segments is armed with one large, plumose seta. The seventh segment of the Re is again long and cylindrical; three large, plumose setae insert terminally and there is a small lobular outgrowth situated medially, in front of their bases (fig. 2b). There is no appendicular seta halfway the segment. The annular sclerite around the apical part of Re7 is distinct but small, and hardly separate.

The gnathobasis of the mandible (fig. 2c, c') is a heavily chitinized structure with a wide proximal and a narrower distal part. The field of spinules on the steep sloping medial face (not figured) is not very extensive and composed of small spinules only. The masticatory edge is composed of five groups of teeth: there is a multicuspidate molariform complex proximally, which includes a large, spinulose setiform tooth and a smaller, serrate setiform tooth. Next, there are three bicuspidate molariform teeth of about equal size [at least two of which show a setiform projection in their central depression]. A large, monocuspidate molariform tooth terminates the masticatory

edge distally. No accessory hairs of spinules have been observed along this edge of the gnathobasis. The palp (fig. 2d) comprises the distal segments, including the annular sclerite that forms the junction with the gnathal part. Ba2 is smooth, without setae or spinules. The connection of Ba2 with Ri1 is intimate, the sclerites being fused to a considerable extent. The articulation between the two segments of the Ri appears to be largely free. Ri1 may show the vestige of a seta (fig. 2d) but this structure is not apparent in every specimen. Ri2 bears an apical row of nine setae, the nos. 1-3 consecutively stronger, 4-7 all well developed, no. 8 situated on a distinct pedestal, and seta no. 9 slender and more weakly developed. All setae of Ri2 are plumose. The Re apparently articulates freely with Ba2. This originally six-segmented ramus has largely fused to form a single complex bearing six strong, plumose setae, inserting along the postero-medial edges of its former segments.

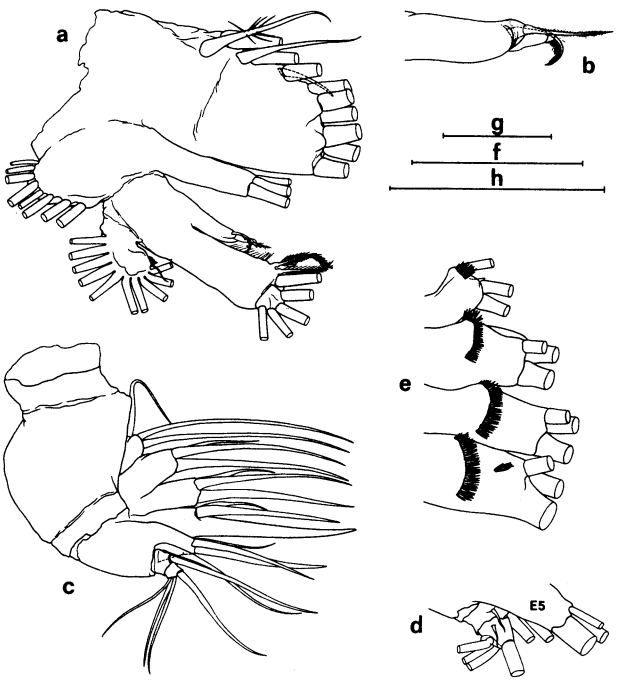


Fig. 3. *Euchirella lisettae*, holotype ♀. a, left Mxl, posterior face; b, right Mxl, detail of endite of Ba2, anterior aspect (hairbrush not shown); c, right Max, antero-ventral view; d, left Max, postero-medial view, detail of pectines on endites 1-4 (E2-4 drawn in situ from slide, E1 reconstructed from right Max of same spm.); e, do., detail of E5 and terminal part of appendage. Scale f=0,2 mm for a; g=0,05 mm for b, 0,2 mm for c; h=0,2 mm for d, e.

The maxillule (fig. 3a) is of the usual *Euchirella* type. The first inner lobe of Ba1 has seven heavy, bipectinate/spinulose setae along its edge, plus two long, spinulose ones. There is one small appendicular seta, submarginally on the anterior face. The posterior side is equipped with two setae, inserting at close range: these are the nos. 1 and 2 of the original complement of four setae. The second inner lobe has three apical setae, the two posterior ones combined bipectinate and spinulose, the single anterior seta spinulose only. Thus, of the original complement of four setae, the bipectinate/spinulose one in the anterodistal position is absent here. Though the chaetotaxy of this lobe is less extensive than that found in the type-species, it has not yet been subjected to a detailed study. A full account of this complex of features is planned to be presented in a future paper. The first outer lobe of Ba1 has a marginal row of eight plumose setae, the no. 5 from proximal being weakly developed, the second outer lobe is absent, as in all *Euchirella* species. Ba2 bears one large and two small setae subapically, the large one finely bipectinate and coarsely spinulose, the small setae finely plumose only. The proximal edge of this segment is fringed with a sparse row of hairs. The armature of the endite of Ba2 (fig. 3b) is strongly reduced, though the terminal, blunt tooth with its pore-like apex is normally developed. Of the original complement of three, the seta in the proximal position has disappeared, while both the central and the distal one are very short and weakly developed; the latter may even be absent altogether in some specimens. The apical half of the endite is furnished with an extensive patch of long hairs. The well-delimited Ri bears four normally developed setae, all combined bipectinate and spinulose. The Re, partly fused to Ba2, bears a marginal row of ten slender, plumose setae. The seta in the distalmost position, no. 11, though strongly reduced, appears to have been retained in most cases in an almost vestigial form; its presence, however, could not be ascertained in all specimens examined. There is a small brush of short hairs on the distal edge of this segment.

The maxilla (fig. 3c-e) is short and compressed; the corpus of its Ba1 is smooth, without warts adjacent to the arched lateral margin. This segment bears the usual four endites, each equipped with three setae, the typology of which matches the conditions in the type-species. So, E1 has one curved and two straight slender setae; E2 and E3 one short, thick seta and two long setae of unequal thickness; and E4 has the same complement as E2 and 3, but with the larger seta fused to its corpus. Pectinations and spinulosity of all these setae are as in *E. messinensis*. Ba2 is produced into an E5 which bears three setae of unequal development; the two smaller ones correspond in structure to those of the type-species. The same applies for the heavy, multipectinate seta, though the exact structure and extension of its pectines might eventually prove to exhibit some minor differences, when studied in more detail. The small and largely fused Ri bears three moderately large setae corresponding to its former segments 1-3, three slender apical setae referable to Ri4, and two small vestigial setae on its corpus (fig. 3c, d). The hook-shaped outgrowth on E1 (fig. 3e) appears rather blunt in this [new] species but is otherwise normally developed. The endites 1-4 of the Max bear spinular pectines on their posteromedial faces, composed of, respectively, c. 9 (range 8-10), c. 35 (27-43), c. 30 (28-33), and c. 38 (35-40) elements. On E4, there often is a small accessory patch of c. 7 (range 6-14) spinules, inserting in a single, close brush, situated between the regular comb and the basis of the short and thick seta on that lobe. The small patch of spinules on the E5 appears to be absent in this species.

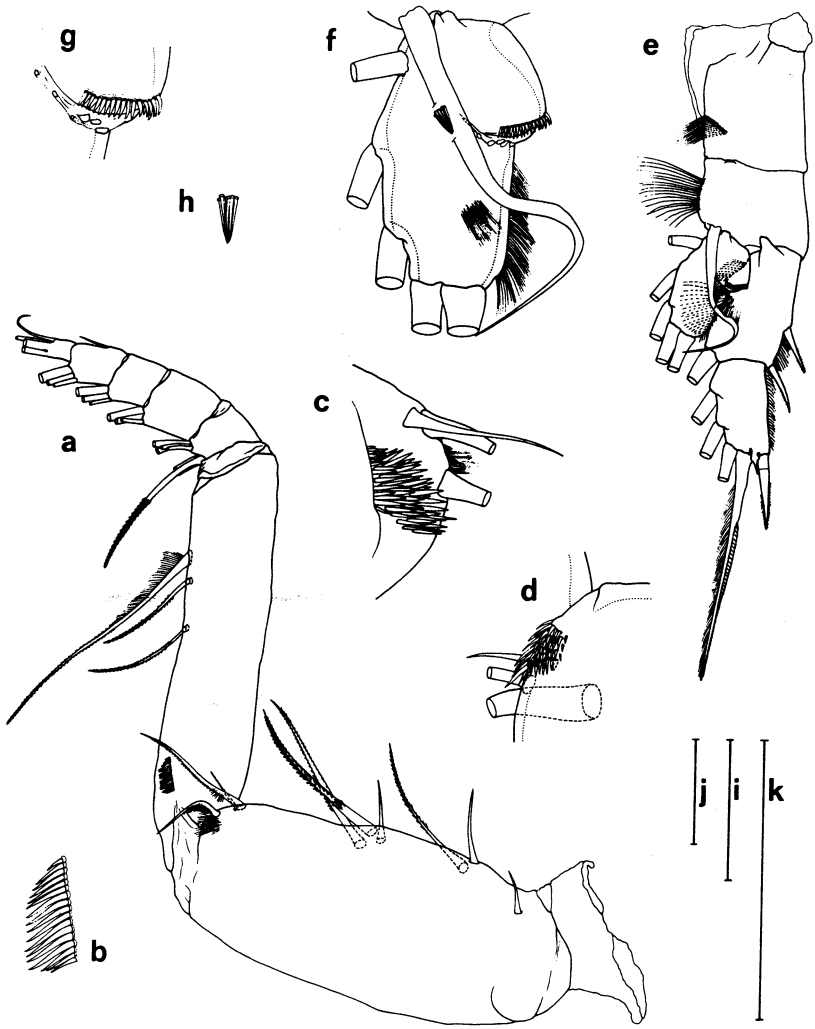


Fig. 4. *Euchirella lisettae*, holotype ♀. a, right Mxp in medial view (Ba1 partly reconstructed from left appendage of same spm.); b, do., detail of comb of spinules on Ba2; c, do., patch of spinules on disto-medial corner of Ba1, lateral aspect; d, same detail as in (c), left appendage, lateral view; e, left P1 in anterior view; f, do., detail of Ri and curved seta of Ba2; g, do., detail of subapical row of spinules on tubercle, showing also adjacent region with thin integument and large pores; h, do., detail of brush of six central hairs. Scale i=0,2 mm for a, 0,1 mm for f; j=0,05 mm for b,c,d,g,h; k=0,5 mm for e.

The characteristically curved maxillipeds (fig. 4a-d) comprise two basipodal and five endopodal segments, with relative lengths as follows:

Ba1	Ba2	Ri1	Ri2	Ri3	Ri4	Ri5	
38	+ 42 +	3 +	6 +	4 +	5 +	2	= 100

On the relatively heavy segment Ba1, all four groups of seta along the anterior edge are normally developed (fig. 4a): group I, a single short, smooth seta; group II, one short, smooth and one longer, bi- c.q. multipectinate seta; group III, one short, smooth, and two longer setae, slightly unequal in development, the larger multipectinate, the smaller bipectinate only; and, group IV, one reduced, smooth seta, one slender, thin-walled bipectinate seta with some plumosity basally, and another thin-walled seta which is partly plumose only. The antero-distal corner of Ba1 bears a brush of thin hairs apico-medially, and a field of short, stout spinules apico-laterally (fig. 4c-d), comprising c. 40-60 elements. Ba2 is long and slender; along its posterior edge are three slender setae, one long, combined bipectinate and spinulose, and two shorter ones which are bipectinate only. Distally, the segment bears two more setae, one long, combined multipectinate/plumose, the other being the short and relatively blunt, specialized bipectinate seta usually present at this site in *Euchirella*. The proximal comb of spinules on the medial face of this segment is composed of c. 16 (15-17) rather long and slender elements (fig. 4b), placed in a single, contiguous row. The setal arrangement of the Ri includes four setae in the postero-distal corner of Ri1, three on both Ri2 and Ri3 as well as on Ri4; this last segment also bears the small and smooth appendicular seta inserting at the anterior edge; finally, Ri5 has four terminal setae, the appendicular one in this case inserting directly adjacent to the regular arrangement of three. Relative lengths, pectinations, plumosity, [and] [the sites of the fracture-planes] of the setae of the Ri all closely correspond to the conditions encountered in *E. messinensis*.

The four pairs of swimming legs have the following proportional lengths and composition of free segments:

	Relative length with terminal spine/seta:		Segments of Ba	Segments of Re	Segments of Ri
	excluded	included			
P1	45	(69)	2	2	1
P2	63	(88)	2	3	1
P3	72	(100)	2	3	3
P4	71	(97)	2	3	3

The external anatomy of the legs is closely similar to that of the type-species, *Euchirella messinensis*, to which is referred for typology and detailed morphology of setae and spines. The gross particulars of the segments of the legs are:

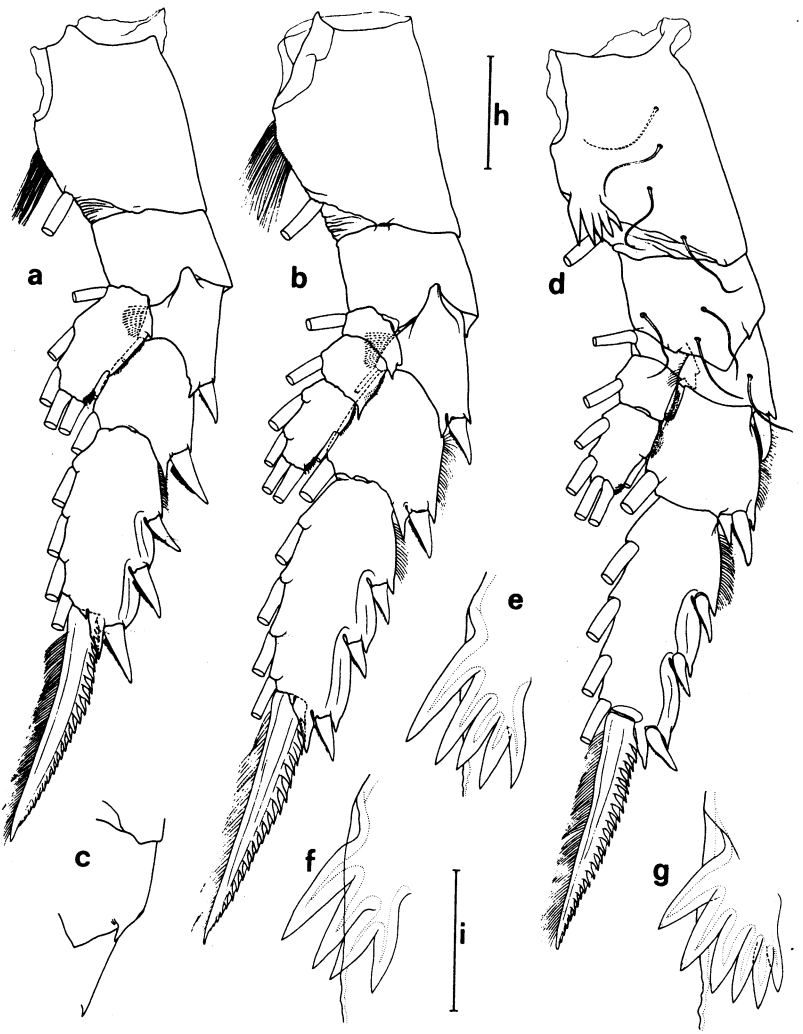


Fig. 5. *Euchirella lisettae*, holotype ♀. a, left P2, anterior aspect; b, left P3, anterior; c, do., detail of right appendage, posterior view, showing disto-lateral spinular outgrowth on Ba2; d, right P4, posterior; e, do., detail of (five) spines on Ba1; f, same (four) spines on left appendage of same spm., anterior view; g. paratype ♀ spm. no. 1, 23-viii-1982, with six spines on Ba1 of right P4, posterior aspect (the left P4 of this spm. has five spines). Scale h=0,2 mm for a-d; i=0,1 mm for e-g.

P1 (fig. 4e), with Ba1 bearing one medial brush of hairs; Ba2 with one medial row of long hairs and the specialized, S-curved seta inserting at the basis of the Ri. Re1 and 2 completely fused, laterally with two short spines between which the margin is hairy; the spines are largely smooth though occasionally a few scattered, spinuliform outgrowths may be observed on their surface. The biconvex medial margin of Re1+2 bears two separate fringes of hairs as well as one apico-medial, plumose seta. Re3 has its lateral margin hairy, one apico-lateral spine bearing scattered spinules which are not defined at their base, three plumose setae medially, and a terminal seta fringed with setules medially and with c. 70 denticles along its lateral side. Ri (fig. 4f) with well developed antero-lateral tubercle which bears a single contiguous, slightly alternating row of c. 20 (17-22) short, almost straight spinules (fig. 4f, g). The integument in the adjacent depression is thin and exhibits various large pores. There are 4-6 straight and slender central hairs, c. 0.13 the length of the segment (fig. 4f, h). A distal hairbrush is present, not connected to the lateral fringe of hairs. The segment is equipped with three medial and two (sub-)terminal plumose setae.

The particulars of P2 (fig. 5 a) include a Ba1 with a brush of long hairs and a single plumose seta; Ba2 is smooth and unarmed. Re1 has one subapical, pectinate spine laterally and a fringe of hairs plus one slender, apical seta medially. Re2 laterally with one subapical, pectinate spine, medially with a subapical plumose seta. Re3 with three pectinate spines along its lateral margin, the proximal part of which is fringed with short hairs. Four large, plumose setae insert along the medial edge of this segment. The strong terminal spine is plumose along its medial side, while the lateral edge is serrate with 21-22 denticles. The completely coalesced segment of the Ri has its lateral margin produced proximally into a single, acute point. There is one slender, plumose seta inserting in the distal half of this edge; the margin is sparsely fringed with small hairs between the proximal acute point and this seta, while there is a small but dense tuft of hairs antero-laterally. The Ri is equipped with three medial and two (sub-)terminal plumose setae.

In P3 (fig. 5b, c), the details of the Ba and Re are directly comparable to those of P2, with the exception of the presence of a disto-lateral spinular outgrowth on the anterior face of Ba2 (fig. 5c); of the lateral margin of Re2, which is fringed with hairs here (smooth in P2); and of the number of denticles along the serrate edge of the terminal spine of Re3, which comprises 20-22 elements in the third swimming leg. The three segments of the Ri are completely free. Ri1 has one plumose seta medially, while the lateral margin of this segment is produced into the double points, so characteristic of *Euchirella* and *Undeuchaeta*. Ri2 with one medial plumose seta, the lateral margin hairy and produced into a single, acute apical point. Ri3 with one lateral, two medial, and two (sub-)terminal setae, all plumose, as well as with a fringe of hairs proximally along its lateral margin; there also is a small antero-lateral tuft of hairs.

P4 (fig. 5d-g) is largely identical in structure to P3 but differs in the following points. Ba1 without medial hairbrush; this segment bears a complement of usually 5 (range: 4-6) stout, heavily chitinized spines on its posterior face, which share a common stalk and which are situated adjacent to the medial margin (fig. 5d-g). The caudal face of segments Ba1, Ba2, and Re1 is equipped with a number of well-developed hair-sensilla, viz., 4,3, and 1, respectively (fig. 5d); on Ri1, no such structure could

be located. Finally, the serrate lateral edge of the terminal spine of Re3 is composed of 22-24 denticles.

Spermatophore placement. - The site of attachment of the spermatophore has been examined in 7 specimens and appears to show little variation. The adhesive coupler at the end of the stalk was always found to be positioned in front of the atrium, on the antero-ventral face of the Gnosom, and then either in the midline or slightly to the left, i.e., partly under the left lateral outgrowth of the somite. Apparently, this site is sufficiently neutral with respect to the symmetry of the somite to allow spermatophores to emerge dorsally as frequently along the left as along the right side of the complex.

Description of the spermatophore is not relevant here as the morphology hardly varies within the genus: all species have the simple, smooth, `unspecialized' looking *Euchirella* spermatophore. Detailed morphology of this structure, possibly allowing to dinstinguish species-specific differences in this genus, evidently has yet to be established.

Remarks on intraspecific variation.- Variation in diagnostic and other descriptive morphological characters has been checked for the material studied .....etc.

Geographical distribution.- The present material originates from a limited area in the eastern Pacific .....etc.

Vertical distribution.- The localities from which the species has been collected show, that it is a pelagic form .....
.....etc.

Etymology. - I name this new species in honour of our daughter Lisette. Her Christian name was latinized to form Lisetta, whereby the epitheton specificum becomes a noun in the genitive singular, gender feminine.

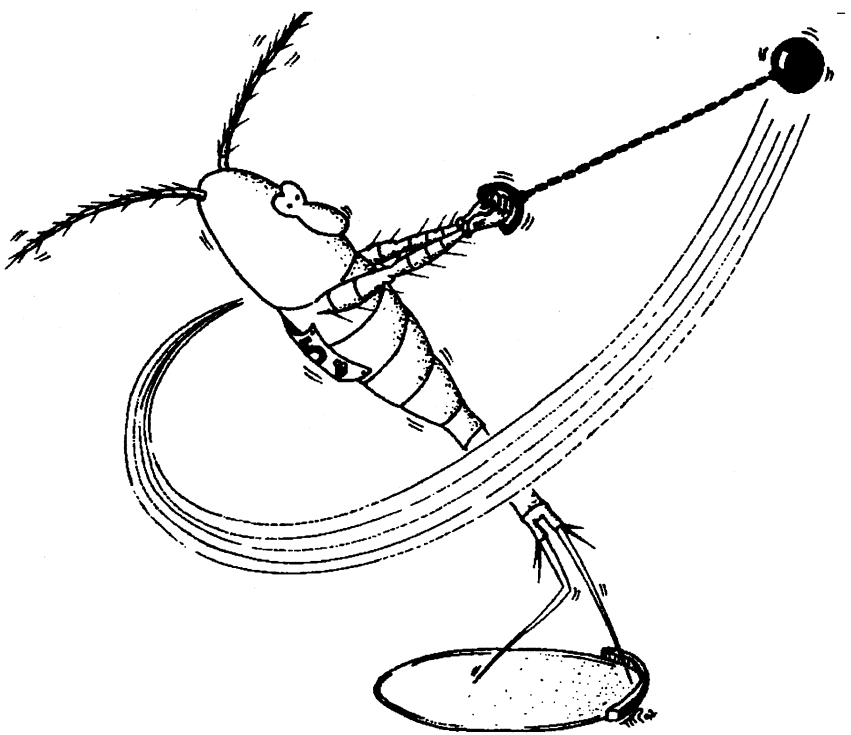
" ....and then follows the Discussion on the species' place in current taxonomy, etc., etc.

So, this is my concept of what a "Model Description" should look like. I must admit that, though this did not come really unexpectedly, I was all the same quite surprised to find my "Minimal List" matching so closely my own latest description. In fact, I had to add only very little and I had to skip just a couple of lines (see phrases between square brackets) to meet my own, theoretical, demands.

Yet, there remain a number of items I'd like to comment upon. First, I am not really happy with the still rather uncommittal way in which the spermatophore has been dealt with, although the place of its description looks more appropriate to me than that advocated earlier. Then, you will notice I have not ventured to redraw the figures for this occasion: thus, in fig. 1b, the A1 does not show the complement of large setae as required according to the minimal list. Next time I won't omit these. Also, the appendages are shown in toto from a single aspect only: not two, as was demanded in MONOCULUS 22: 34-45. Moreover, long setae have been depicted invariably as

mere stubs only, never drawn to their full lengths. As regards these setae: I obviously have made (implicit) reference to the description of E. messinensis. So, I know this does suffice: but does the reader/user knows as well? Anyway, I'll try to force myself always depicting full setae in the future, or to make proper reference to an existing description. With respect to depicting a single aspect of the appendages only: the need for a complementary view has, in my opinion, been largely obviated by indicating underlying structures with dashed lines, as well as by giving, as deemed necessary, details of the other aspect in addition. So I think, in all, the above comes rather close to what I had in mind when writing down the minimal list of requirements. Thus, I hope to have contributed towards a higher standard and especially towards a greater universality, of calanoid descriptions in the years to come : without, however, discouraging people to even start describing a new species! Good luck!

J. Carel von Vaupel Klein (Leyden University, The Netherlands)



REID, J.W., J.A.M. AREVALO & M.M. FUKUSHIMA - 1990: *Metacyclops leptopus totaensis*, new subspecies (Crustacea: Copepoda) from Lago de Tota, Colombia. Proc. Biol. Soc. Wash. 103 (3): 674-680.

1991

AVDEEV, G.V. & V.V. AVDEEV - 1991: *Neomenicola gibber* gen. et sp. n. (Lichomolgidae), an endoparasitic copepod of Aplacophora from the Japanese Pacific. Zool. Zh. 1991 (2): 142-147. (In Russian with English summary).

AVDEEV, G.V. & B.I. SIRENKO - 1991: Chitonophilidae fam. n., a new family of parasitic copepods from the chitons of the North-Western Pacific. Parasitogija 25 (4): 370-374. (In Russian with English summary).

BLADES-ECKELBARGER, P.I. - 1991: Comparative ultrastructure of lipid storage sites in female *Euchaeta marina* and *Pleuromamma xiphias* (Copepoda: Calanoida). Mar. Biol. 108: 49-58.

BLADES-ECKELBARGER, P. - 1991: Functional morphology of spermatophores and sperm transfer in calanoid copepods. In BAUER, R.T. & J.W. MARTIN (eds.), Crustacean sexual biology, pp. 246-270, Columbia University Press.

CHANDRAN, A. & P. NATARAJAN - 1991: Record of new hosts for *Peniculisa wilsoni* Radhakrishnan, 1977 (Copepoda, Pennellidae). Crustaceana 61 (1): 107-108.

DANIELPOOL, D.L. & R. ROUCH - 1991: L'adaptation des organismes au milieu aquatique souterrain. Réflexions sur l'apport des recherches écologiques récentes. Stygologia 6 (3): 129-142.

DEETS, G.B. & Z. KABATA - 1991: *Lernanthropus corteziensis* n.sp. (Copepoda: Lernanthropidae), parasitic on the gills of a teleost fish in Mexican waters. Syst. Parasitol. 18: 77-80.

DORMAN, J.A. & J.M.C. HOLMES - 1991: Crustacean ectoparasites of the Garfish *Belone belone* (L.) from Courtmacsherry Bay, Co Cork. Ir.Nat.J. 23 (10): 419-423.

ECKMANN, J.E. & D. THISTLE - 1991: Effects of flow about a biologically produced structure on harpacticoid copepods in San Diego Trough. Deep Sea Res. 38 (11): 1397-1416.

EVSTIGNEEVA, T., P.F. CLARK & G.A. BOXSHALL - 1991: Nocturnal emergence behaviour of the fauna of Lake Baikal, Siberia. Prog. Underwater Sci. 16: 85-91.

GUÉRIN, J.-P. & M. RIEPER-KIRCHNER - 1991: Influence of three bacteria strains on the population dynamics of *Tisbe holothuriae* (Copepoda, Harpacticoida). Helgoländer Meeresunters. 45: 493-511.

GUSEV, A.V. & Z. KABATA - 1991: Redescription of, and comments on, *Caligus lacustris* Steenstrup et Lütken, 1861 (Copepoda, Caligidae), a parasite of freshwater fishes. Folia Parasitologica 38: 57-61.

HO, J.-S. & I-H. KIM - 1991: Copepod parasites of commercial bivalves in Korea. II. Copepods from cultured bivalves. Bull.Korean Fish.Soc. 24 (6): 369-396.

HOLMES, J.M.C. - 1991: Crustacean records from Lough Hyne (Ine), Co. Cork, Ireland: Part V. Bull.Ir.biogeog.Soc. 14: 73-83.

HOLMES, J.M.C. & J.P. O'CONNOR - 1991: Collecting marine crustaceans with a light trap. In MYERS, A.A., C. LITTLE, M.J. COSTELLO & J. C. PARTRIDGE (eds.), The ecology of Lough Hyne, pp. 43-50. Royal Irish Academy, Dublin.

HUMES, G.A. - 1991: *Manobius regalis* gen. et sp. n. (Copepoda: Poecilostomatoida: Lichomologidae) associated with the coral *Pectinia lactuca* in New Caledonia. Zool. Scr. 20 (3): 277-282.

HUMES, A.G. - 1991: Copepoda associated with scleractinian corals on the Great Barrier Reef, northeastern Australia, with a key to the genera of the Lichomolgidae. J. Nat. Hist. 25: 1171-1231.

HUMES, A.G. - 1991: Siphonostomatoid copepods from a deep-water hydrothermal zone in the Lau Basin, South Pacific. Bull. Mus. natl. Hist. nat. Paris, 4e sér., 13 (1-2): 121-134.

KABATA, Z. - 1991: Copepoda parasitic on Australian fishes, XIII: family Hatschekiidae. J. Nat. Hist. 25: 91-121.

KABATA, Z. - 1991: *Jusheyhoea moseri* n.sp. (Copepoda: Chondracanthidae), a parasite of macrourid fishes in Hawaiian waters. Syst. Parasitol. 20: 155-159.

KIKUCHI, Y. - 1991: A new species of the terrestrial Harpacticoida (Copepoda) from forest litter in northern Japan. Edaphologia 47: 25-31.

KIKUCHI, Y. - 1991: A new species of terrestrial harpacticoid copepods from forest litter in central Japan. Publ.Itako Hydrobiol.Stn. 5: 27-34.

KODAMA, K. & T. KUBOTA - 1991: Vertical distribution and its diel changes of twenty species of large size planktonic copepods in Suruga Bay, Central Japan. Bull. Inst. Oceanic Res. & Develop., Tokai Univ. 11/12: 9-28. (In Japanese with English abstract).

LOTUFO, G.R. & C.E.F. da ROCHA - 1991: Copepods from intertidal interstitial water of Salvador, Brazil. I. *Cuipora janaina* gen.n., sp.n. & *Cyclopina caiala* sp.n. (Cyclopoida: Cyclopinidae). Bijdr. Dierk. 61 (2): 107-118.

NATARAJAN, P., A. CHANDRAN, B. UNNIKRISHNAN NAIR & V.S. BEENA - 1991: Bibliography of associates, parasites, diseases and toxicology of shellfishes of India. Aquatic Biol. Spec. Publ. 1: 1-57.

OHTSUKA, S. & T. ONBÉ - 1991: Relationship between mouthpart structures and in situ feeding habits of species of the family Pontellidae (Copepoda: Calanoida). Mar. Biol. 111: 213-225.

PIASECKI, W., N.R. KHAMEES, & F.T. MHAISEN - 1991: A new species of *Mugilicola* Tripathi, 1960 (Crustacea, Copepoda, Therodamasidae) parasitic on Iraqi fish. Acta Ichthyol. Piscat. 21 (2): 143-151.

REID, J.W. - 1991: The genus *Metacyclops* (Copepoda: Cyclopoida) present in North America: *M. cushae*, new species, from Louisiana. J. Crust. Biol. 11 (4): 639-646.

REID, J.W. - 1991: The Stillman Wright collection of Copepoda (Crustacea) from South America in the National Museum of Natural History, Smithsonian Institution. Proc. Biol. Soc. Wash. 104 (4): 736-741.

REID, J.W. - 1991: Use of fine morphological structures in interpreting the taxonomy and ecology of continental cyclopoid copepods (Crustacea). Anais do IV Econtro Brasileiro de Plancton, Recife 1991: 261-282.

REID, J.W. - 1991: Some species of *Tropocyclops* (Crustacea, Copepoda) from Brazil, with a key to the American species. Bijdr. Dierk. 61 (1): 3-15.

REID, J.W. - 1991: The neotropical genus *Potamocaris* Dussart (Copepoda: Harpacticoida: Parastenocarididae), with descriptions of two new species. J. Crust. Biol. 11 (3): 463-472.

REID, J.W., E.B. REED, J.V. WARD, N.J. VOELZ & J.A. STANFORD - 1991: *Diacyclops languidoides* (Lilljeborg, 1901) s.l. and *Acanthocyclops montana*, new species (Copepoda, Cyclopoida), from groundwater in Montana, USA. Hydrobiologia 218: 133-149.

ROCHA, C.E.F. da - 1991: A new species of *Halicyclops* (Copepoda, Cyclopidae) from California, and a revision of some *Halicyclops* material in the collections of the US Museum of Natural History. Hydrobiologia 226: 29-37.

ROCHA, C.E.F. da & T.M. ILIFFE - 1991: Speleoithonidae, a new family of Copepoda (Cyclopoida) from anchialine caves on the Bahama Islands. Sarsia 76: 167-175.

ROMERO, R.C. & H.B. KUROKI - 1991: Two new species of *Eudactylina* van Beneden, 1853 (Copepoda: Eudactylinidae) and a new record of *E. acanthii* A. Scott, 1901, from Chilean waters. J. Nat. Hist. 25: 1429-1438.

ROUCH, R - 1991: Structure du peuplement des Harpacticides dans le milieu hyporhéique d'un ruisseau des Pyrénées. Annls Limnol. 27 (3): 227-241.

SUAREZ-MORALES, E. & J.W. REID - 1991: Ampliación del ámbito de *Macrochiron sargassi* G.O. Sars (Copepoda: Lichomolgidae) en el Atlántico noroccidental. Rev. Biol. Trop. 39 (2): 315-316.

YAMADA, S., A. TANIMURA & T. MINODA - 1991: Copepods collected along 13° E longitude of the Antarctic Ocean in the 1973 summer. Nankyoku Shiryô 35 (2): 155-160.

WEBER, D. - 1991: Die Evertebratenfauna der Höhlen und künstlichen Hohlräume des Katastergebietes Westfalen einschließlich der Quellen- und Grundwasserfauna. Abh. Karst- u. Höhlenkunde 25: 1-701.

1992

BAN, S. & T. MINODA - 1992: Hatching of diapause eggs of *Eurytemora affinis* (Copepoda: Calanoida) collected from lake-bottom sediments. J. Crust. Biol. 12 (1): 51-56.

BLADES-ECKELBARGER & N.H. MARCUS - 1992: The origin of cortical vesicles and their role in egg envelope formation in the "spiny" eggs of a calanoid copepod, *Centropages velificatus*. Biol. Bull. 182: 41-53.

BUSCH, A. & U. BRENNING - 1992: Studies on the status of *Eurytemora affinis* (Poppe, 1880) (Copepoda, Calanoida). Crustaceana 62 (1):13-38.

DAHMS, H.-U. - 1992: Metamorphosis between naupliar and copepodid phases in the Harpacticoida. Phil. Trans. R. Soc. Lond. B 335: 221-236.

DAHMS, H.-U. - 1992: Metamorphose bei den Ruderfußkrebsen. Mikrokosmos 81 (3): 82-89.

FERRARI, F. D. - 1992: The antennal exopod of *Noodtorthopsyllus* and the next evolutionary synthesis (Copepoda). Crustaceana 62 (2): 128-132.

FERRARI, F. D. - 1992: Development of copepod swimming legs with unequal numbers of ramal segments. J. Crust. Biol. 12 (3): 392-396.

FERRARI, F.D. & J.W. AMBLER - 1992: Nauplii and copepodids of the cyclopoid copepod *Dioithona oculata* (Farran, 1913) (Oithonidae) from a mangrove cay in Belize. Proc.Biol.Soc.Wash. 105 (2): 275-298.

GLATZEL, T. - 1992: Beschreibung der sechs Nauplius-Stadien von *Parastenocaris phyllura* Kiefer, 1938 im Vergleich mit *P. vicesima* Klie, 1935 (Copepoda, Harpacticoida). Bijdr.Dierk. 61 (3): 185-191.

HUMES, A.G. - 1992: *Euryte verecunda*, new species (Copepoda: Cyclopoida) associated with the coral *Porites lobata* on the Pacific coast of Panama. Proc. Biol. Soc. Wash. 105 (2): 268-274.

HUMES, A.G. - 1992: Copepods (Poecilostomatoida: Lichomolgidae) associated with the scleractinian coral *Gardineroseris planulata* in the Moluccas. Invertebr. Taxon. 6: 303-335.

HUMES, A.G. - 1992: Copepoda associated with the coral *Gardineroseris planulata* (Dana) on the Great Barrier Reef, northeastern Australia. Hydrobiologia 234: 41-57.

HO, J.-S. - 1992: Does *Sphyrion lumpi* (Kryøer) (Copepoda, Sphyriidae) occur in the Sea of Japan? With discussion on the origin and dispersal of *Sphyrion* Cuvier, 1830. Rep. Sado Mar. Biol.Stat.,Niigata Univ. 22: 37-48.

HO, J.-S. & I.-H. KIM - 1992: Copepod parasites of Gastropoda from Korea. Korean J. Zool. 35: 240-255.

HO, J.-S. & I.H. KIM - 1992: A new genus of poecilostome copepod of the family Myicolidae parasitic in a commercial clam from Malaysia. J. Nat. Hist. 26: 303-309.

ISHIDA, T. - 1992: Cyclopoid and harpacticoid copepods (Crustacea) from southeastern Alaska, U.S.A. Proc. Biol. Soc. Wash. 105 (2): 249-254.

ISHIDA, T. & T. KOBAYASHI - 1992: Copepods from waters around Pilenga and Monetka hatcheries in Sakhalin. Sci. Rep. Hokkaido Salmon Hatchery 46: 205-208. (In Japanese with English abstract)

KABATA, Z. - 1992: Copepoda parasitic on Australian fishes XIV. An assemblage of bathypelagic species. J. Nat. Hist. 26: 9-45.

KABATA, Z. - 1992: Copepoda parasitic on Australian fishes, XV. Family Ergasilidae (Poecilostomatoida). J. Nat. Hist. 26: 47-66.

MAIER, G. - 1992: The reproductive biology fo *Cyclops vicinus*. J. Plankton Res. 14 (1): 127-135.

MARKHASEVA, E.L. - 1992: Konstantin A. Brodsky. Arthropoda Selecta 1 (1): 97-98.

MacKINNON, B.M. & W. PIASECKI - 1992: Reproduction in Caligus elongatus: How sea lice become so numerous. Annual Meeting of the Aquaculture Association of Canada. Abstracts

MacKINNON, B.M. & W. PIASECKI - 1992: Playing the numbers game: Reproduction of sea lice on Atlantic salmon. Second Annual Atlantic Universities Aquaculture Conference, Sydney, Nova Scotia. Abstracts.

McKINNON, A.D., W.J. KIMMERER & J.A.H. BENZIE - 1992: Sympatric sibling species within the genus *Acartia* (Copepoda: Calanoida): A case study from Westernport and Port Phillip Bays, Australia. J. Crust. Biol.12 (2): 239-259.

NAGASAWA, K. & F. YANAGISAWA - 1992: The salmon louse, *Lepeophtheirus salmonis*, found on a chinook salmon, *Oncorhynchus tshawytscha*, from central Honshu, Japan, with the southernmost records of their distribution. Nankiseibutu 34 (1): 49-50. (In Japanese with English summary).

PALMER, M.A., A.E. BELY, & K.E. BERG - 1992: Response of invertebrates to lotic disturbance: a test of the hyporheic refuge hypothesis. Oecologia 89: 182-194.

RANGA REDDY,Y. - 1992: *Eodiaptomus shihi* n.sp. (Copepoda, Calanoida) from central India. Hydrobiologia 231: 1-11.

RANGA REDDY, Y. & P.V. SUBBA REDDY - 1992: A note on the synonymy of some *Neodiaptomus* spp. (Copepoda, Calanoida) of the Indian subcontinent. Hydrobiologia 231: 125-129.

ROUCH, R. - 1992: Caractéristiques et conditions hydrodynamiques des écoulements dans les sédiments d'un ruisseau des Pyrénées. Implications écologiques. Stygologia 7 (1): 13-25.

SCHRIEVER, G., C.BUSSAU & H. THIEL - 1992: Discol-Precautionary Environmental Impact Studies for future manganese nodule mining and first results on meiofauna abundance. Pro.Adv.Mar.Tech.Conf. 4: 47-57.

YAMADA,S., A. TANIMURA & T. MINODA - 1992: Copepods collected along 33.5°E longitude of the Antarctic Ocean in the 1976 summer. Nankyoku Shiryô 36 (1): 60-64.

New book on planktonic Copepoda

I would like to inform you of my forthcoming book on "The Biology of marine planktonic Copepoda", which is expected to be published by Xiamen Univ. Press in september this year. This book consists of the following contents: 1. Introduction, 2. Morphology, 3. Taxonomy, 4. Distribution in time and space with a special account of diurnal vertical migration, 5. Population and community ecology, 6. Feeding ecology, 7. Growth and size, 8. Reproduction and sex with a detailed account of fecundity, 9. Development and longevity, 10. Physiology and biochemistry, 11. Bioluminescence and parasitism, 12. Economic importance, 13. References, 14. Appendix: Copepod culture, 15. Index.

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