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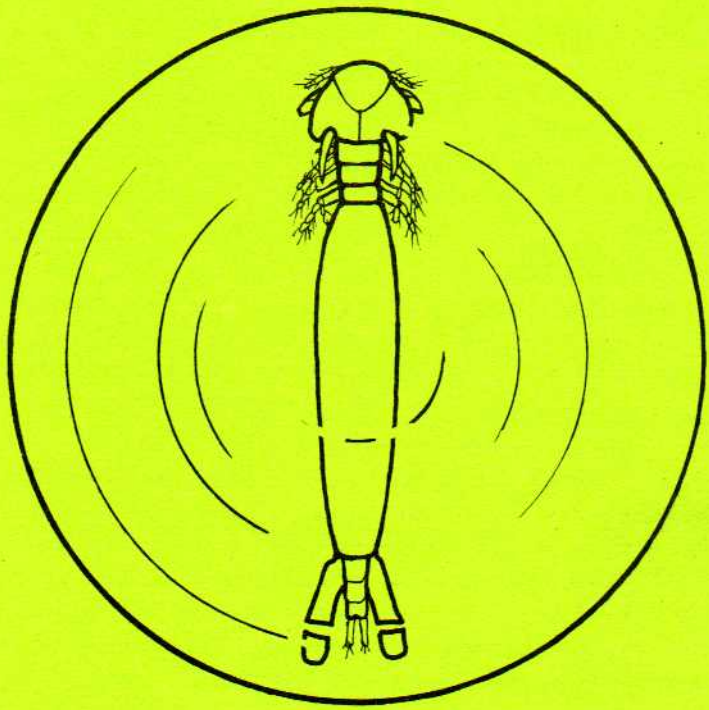
MONOCULUS

Copepod Newsletter



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MONOCULUS

Copepod Newsletter

Number 8 May 1984

Edited by: H. Kurt Schminke, Fachbereich 7 (Biologie), Universität Oldenburg, Postfach 2503, D-2900 Oldenburg, W. Germany.

Gerd Schriever, Zoologisches Museum der Universität Kiel, Hegewischstr. 3, D-2300 Kiel, W. Germany.

Cover by: Georg Siebecke, Zoologisches Museum der Universität Kiel.

Produced by: H. Kurt Schminke and Bibliotheks- und Informationssystem (BIS) der Universität Oldenburg, Ammerländer Heerstr. 67/99, D-2900 Oldenburg, W. Germany.

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This issue has been typed by: Angelika Sievers, Fachbereich 7 (Biologie), Universität Oldenburg.

A HAPPY NEW YEAR

Greetings from
K. Furuhashi,
Hakodate, Japan

Sapphirina salpae ♀

Birthdays:

Paul L. Illg (70)
R.V. Melville (70)

Died:

Bernard L.S. Hardy

ｱ means a rat in Japanese letter,
and 1984 is the year of rat in Japan.

Editorial

"Is there a limit to the number of people on the mailing list of MONOCULUS from the financial point of view?" we were asked. There certainly is, we are afraid. The costs for printing and mailing can only be justified by the reprints which are received in exchange for *MONOCULUS*. As someone remarked: *"Any persons who enjoy working on copepods deserve to receive the newsletter, but persons who are only marginally interested in the subject are not necessary the recipients of MONOCULUS."* 538 people are on our mailing list at present. But growth alone is not a sign of success. We shall eventually have to do some pruning and the receipt of reprints will be one of the criteria in the decision where to cut.

Another criterium, obviously, will be the participation in the activities connected with the newsletter. There is a new questionnaire added to this issue. Last year 92 of them have been returned. Will it be more this time? A number of colleagues have contributed to this issue of *MONOCULUS*. We thank Ch. Corkett, A. Fosshagen, F. Hadel, Z. Kabata, J.B.L. Matthews, J. Reid, C.-T. Shih, V. Thatcher. Special thanks are due to Wolfgang Wägele for his helping out with drawings. He works with Kurt at Oldenburg University on Crustacea. He has nothing to do with copepodology, yet didn't hesitate to venture on this field for *MONOCULUS*.

For New Year we received a number of cards wishing us all the best for 1984. One of them is reproduced on the opposite side. H. Kunz even sent us a biscuit showing on its top the relief of a copepod. We thank for these lovely and unusual gifts.

H.K. K. Schminke

P.S. We are often approached for backnumbers of *MONOCULUS*. There are none except for a few copies left of No. 6 and No. 7. Please send a postcard to Kurt Schminke, if you are interested. First come, first served.

Business ssenisuB

1. Bibliography

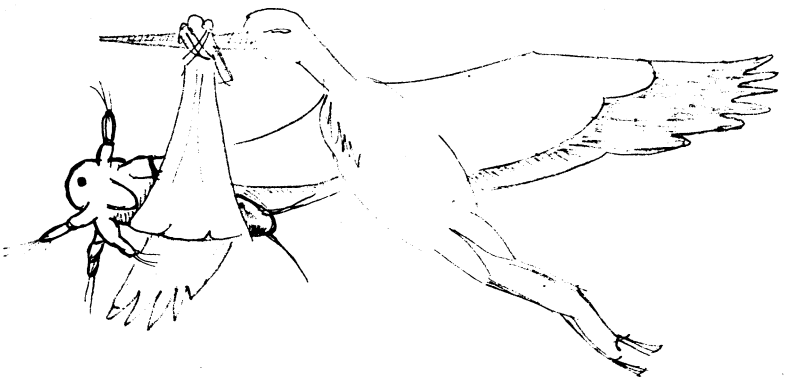
With the Second International Conference on Copepoda approaching we have intensified our efforts to present a computer list of the literature received by the *MONOCULUS*-Library during the last few years. All publications will have been registered and keywords will have been fed for all of them to the computer. The number of reprints received was so great that it was impossible during the time at our disposal for these activities to start already also with entrusting to the computer titles from all the lists of publications which have been delivered to us over the years and which are still being received. There are again a few names of colleagues to be adorned with an asterisk. These are: Elgmork, Gaudy, Hairston, Hart, Haury, Jillet, Morioka, Por.

2. *MONOCULUS*-Library

The number of reprints of recent publications received since the last issue of *MONOCULUS* has dropped considerably as compared with the time before. As a result our list of current literature has slimmed down again visibly. It is our impression that we need another questionnaire to entice you to reveal to us your exact production in 1983. It would be fine, if the success of this campaign from last year could be repeated. So please tear out the questionnaire and sit down immediately and make the necessary statements. Remember what Geoff Boxshall said in the last issue: *The most avidly read sections are the bibliography and the 'current research activities'*. Thank you.

3. *MONOCULUS*-Museum

Something extraordinary has happened. The ice is broken! Through the courtesy of Dr. Joachim Adis Gerd received the first contribution to the *MONOCULUS*-Museum from Brazil on the 22nd of December 1983. It was accompanied by the following letter by Vernon Thatcher from Manaus:



I am sending herewith the following copepods:

on slides:

(1) Ergasilus bryconis Thatcher, 1981
(1) Ergasilus leporinidis Thatcher, 1981
(1) Ergasilus jaraquensis Thatcher & Robertson, 1982
(1) Ergasilus pitalicus Thatcher
(1) Ergasilus callophysus Thatcher & Boeger
(1) Acusicola tucunarense Thatcher
(1) Acusicola lycengraulidis Thatcher & Boeger

in vials:

(19) E. bryconis
(12) E. leporinidis
(10) E. jaraquensis
(3) E. colomesus Thatcher & Boeger
(23) E. hydrolycus Thatcher & Boeger
(5) E. callophysus
(10) Brasergasilus anodus Thatcher & Boeger
(10) B. jaraquensis Thatcher & Boeger
(1) Acusicola lycengraulidis
(6) A. pellonidis Thatcher & Boeger
(10) Vaigamidae; Vaigamus retrobarbatus Thatcher & Robertson

We have held a staff meeting at this laboratory and it was the unanimous decision of the members that you should NOT drink champagne to celebrate the arrival of Brazilian copepods. We feel very strongly that you should celebrate with Brazilian fire-water instead. We therefore send you herewith a bottle of "Pitú" brand cachaca (pronounced Ka-châ-suh). You will be interested to know that "pitú" is the local name of the fresh-water shrimp, Macrobrachium carcinus (L.) - see Holthuis (1952).

Gee, that's a stuff! Gerd and I had a great time. Not that everyone who plans to make a contribution to the *MONOCULUS*-Museum would have from now on to add the appropriate drink but, actually, we wouldn't mind. This would be the start for a bottle museum. There still is ample space on Gerd's shelves. Thank you folks from the Instituto Nacional de Pesquisas da Amazonia!

More material has also been announced. Valeria F. Hadel from Sao Paulo, Brazil, makes the following promise: *I intend also, as soon as possible, to send specimens of the Copepoda Cyclopoida and Harpacticoida, found in the bromeliads, to the MONOCULUS-Museum. I am waiting only for the systematic identification.*

4. *MONOCULUS*-Glossary

J.B.L. Matthews and A. Fosshagen from Blomsterdalen, Norway, summarize their ideas on calanoid terminology as follows:

1. The main body divisions should be Cephalosome, Mesosome, Urosome; cephalosome + mesosome = Prosome. Metasome is an alternative to mesosome, but has unfortunately been too often used, incorrectly, as synonymous with prosome, even by distinguished copepodologists. We recommend the use of these terms for other copepod groups as well, the division between cephalosome and mesosome coming immediately behind the maxillipeds, the division between the mesosome and urosome at the position of the main body articulation. Because the main

divisions of the copepod body are not always homologous with the general arthropod cephalon (head), thorax and body, these terms should not be used except when one is explicitly concerned with comparative crustacean morphology.

2. We prefer 1st and 2nd antenna to antennule and antenna, because it seems misleading to use the diminutive name for the appendage that is by far the larger of the two. 1st and 2nd maxilla are preferable to maxillule and maxilla, again because the 1st is not characteristically smaller than the 2nd, but more importantly because in older (but still standard) literature "maxilla" is used for the 1st maxilla since there were considered to be two pairs of maxillipeds. Using 1st and 2nd for both antennae and maxillae is consistent and is compatible with the widely accepted abbreviations.

3. Use of the word pleopod should be stamped out. It seems to have arisen from a misconception of what P (for Pes) really stands for.

4.a. (Matthews). Use of the word basipodite in the sense recommended by von Vaupel Klein is inconsistent with general carcinological usage, though widespread amongst copepodologists possibly as a result of Giebrecht's promotion of the abbreviations B1 or B2. My understanding of the general terminology relating to a crustacean biramous limb is: proximally, a two-segmented protopodite (cf. Kaestner; Borradaile et al.), the segments called coxopodite (or coxa) and basipodite (or basis) respectively, often abbreviated to B1 and B2 (for obvious reasons P1 and P2 cannot be used though they would be more logical), and sometimes with an undeniable precoxa; distally two rami of which the one nearer to the ventral midline is quite reasonably termed the endopodite and the other the exopodite, conveniently and reasonably abbreviated to Ri and Re respectively, the segments being numbered consecutively starting at the proximal end. Internal and external lobes, e.g. on the maxillae, should be termed endites and exites respectively.

4.b. (Fosshagen). Fosshagen prefers to use the term basipodite instead of protopodite naming the two segments (B1 & B2) coxa

and basis. The term Basipodite is widely used in this sense by copepodologists.

5. Otherwise we concur with von Vaupel Klein's opinions but we would add gnathobase as a useful term to describe the segment bearing the toothed projection on the mandible.

*****

Taking into account the input by a number of colleagues into the discussion on the terminology of body form in copepods C. Corkett and C.-t. Shih come up with the following proposal:

A proposal for a practical nomenclature of the major body divisions and appendages in copepods

Christopher Corkett
Dalhousie University, Halifax, Nova Scotia, Canada, B3H 4J1
Chang-tai Shih
National Museums of Canada, Ottawa, Ontario, Canada, K1A OM8

The primary cause of confusion in copepod morphological terminology is the temptation to make practical descriptions of external body sections reflecting the theoretical origin of various body tagmata. The term cephalothorax, for instance, has been used to designate the body section incorporating the head and the part of the thorax fused with the head; and it has also been used to specify this section and the succeeding free thoracic segments. The term abdomen has been interpreted as the part of the body after the genital segment or complex but others have considered the genital complex a part of the abdomen. We shall not elaborate on the ambiguity in terminology but emphasize the necessity of divorcing practical morphological description from theoretical body segmentation. We shall concentrate on the major body divisions and appendages in the proposal presented below. Hopefully this proposal will form the basis for a discussion in the forthcoming Copepoda Conference and may be expanded to include terms for finer structures. An informal evening gathering for this purpose has

already been arranged. We realize that it is unlikely to have a unified terminology that may be applied to a highly diversified group of animals such as copepods. If you are concerned about the morphological terminology but cannot attend the Conference, please communicate with us your opinion. We will be obliged to make a representation for you.

For practical descriptive purposes we divide a whole copepod body into two major divisions: prosome and urosome. The prosome is the part of body anterior to the body articulation or genital complex in the absence of a body articulation. There are two subdivisions: the cephalosome or the first segment of the prosome, consisting of the head, and part of the thorax fused with the head, and the metasome, including one to five free segments, each usually bearing one pair of legs, but sometimes two. The urosome is the posterior part of the body after the body articulation or starting from the genital complex if an apparent body articulation is absent. In the urosome there are 0-1 segment anterior to and 2-5 segments posterior to the genital complex. The genital complex is also counted as a segment of the urosome. The urosome is terminated by a pair of caudal rami. We recommend not replacing caudal ramus with uropod because there is still no general agreement on the origin of this structure. The term somite is a theoretical unit of the body that may or may not coincide with a segment as it appears on the animal. For instance, the last metasomal segment in calanoids may be the sixth or the fusion of the fifth and sixth thoracic somites.

Genital complex is not a new term and has been used by some contemporary copepodologists (eg, Vervoort, Kabata). It is a neutral term and appropriate for a part of the body which is composed of a number of somites possibly of different origins (ie, thorax and abdomen) and bears, externally and internally, some complicated structures of the reproductive system. We avoid use of terms such as head, thorax, and abdomen because these terms are related to the theoretical tagmata of the animal, and may be difficult to use for descriptive purposes when the theoretical origin of the structure de-

scribed is uncertain. Of course an author, if he or she so wishes, may elaborate on the relationship between the descriptive terms and theoretical ones, eg, the second urosomal segment is the first abdominal somite.

The above proposal of major body divisions in copepods is, in fact, not an innovation. Sars used the terms cephalosome, metasome, and urosome in the Copepoda volumes of his monograph, An Account of the Crustacea of Norway. These terms are frequently used by present-day copepodologists but sometimes the definitions may differ, for instance, prosome is a synonym of cephalosome to some authors. The proposed terminology of body divisions can apply to all free-living copepods as well as some but not all parasitic groups. Kabata in his monograph, Parasitic Copepods of British Fishes, divided the copepod body into these sections: cephalothorax, free thoracic segments, genital complex, and abdomen. The first two of these sections are equivalent to the proposed cephalosome and metasome, and the last two sections combined are the same as the urosome defined here.

We propose these names be used for morphological description of the six pairs of cephalic appendages: first antenna, second antenna, mandible, first maxilla, second maxilla, and maxilliped (first thoracic appendage). These names are widely used in current copepodological literature. In copepods, the first pair of antennae (antennules) are usually much larger in size than the second pair (antennae). When comparing copepod anatomy with that of other crustaceans, the terms antennule and antenna are more appropriate but in morphological description these terms are misleading since they imply a false size relationship between these two appendages. First and second maxillae are preferred over maxillule and maxilla for the same reason and also because in old literature they were sometimes referred to as maxilla and first maxilliped respectively. All appendages after the cephalic appendages are named legs. Several terms have been used for these appendages in the literature, for instance, swimming legs, swimming feet, natatory legs, pereiopods, thoracopods, etc. For practical de-

scriptive purposes, we recommend leg because it is a simple term without too much emphasis on a specific function, eg, swimming.

We are grateful to A. Fosshagen and J.B.L. Matthews of Norway, G. Gardner of Canada, R. Hamond of U.K., K. Hulsemann of F.R. Germany, B. Jones of New Zealand, and J.C. von Vaupel Klein of the Netherlands who have sent us their suggestions. We also thank our colleagues Ian Sutherland and Georges Merinfeld who have read our draft and made constructive comments. The French equivalents and suggested abbreviations of these terms are tabulated below:

Proposed Term	French Equivalent	Abbreviation
Prosome	Prosome	
Cephalosome	Cephalosome	
Metasome	Mêtasome	
First metasomal segment, etc.	Premier segment du mêtasome, etc.	M1, etc.
Urosome	Urosome	
Genital complex	Complexe génital	
Second urosomal segment, etc.	Deuxième segment de l'urosome, etc.	Us2, etc.
Caudal ramus	Furca caudale	
First antenna	Première antenne	A1
Second antenna	Deuxième antenne	A2
Mandible	Mandibule	Md
First maxilla	Première maxille	Mx1
Second maxilla	Deuxième maxille	Mx2
Maxilliped	Maxillipède	Mxp
First leg, etc.	Première patte, etc.	P1, etc.

5. Current research activities

Geoff Boxshall's pioneer jump has not yet had the effect we were hoping for. The only reaction we received was by Valeria F. Hadel from Sao Paulo. She writes: *My research work changed since the first time I received MONOCULUS. I am now studying the relations between species of Copepoda and of Bromeliaceae, the "tank plants", in an ecological station, the "Ecological Station of Jureia", a tropical rain forest area, located in the south of the state of Sao Paulo. This work will be used in order to obtain the degree of master in ecological sciences as*

a thesis in my post-graduation course. I am sending with this letter the bibliographic references that quote the Copepoda in association with plants that store water in tanks. More references in this field are very welcome.

Bibliography:

PICADO, C. 1913. Les Bromeliacées Epiphites Considerées comme Milieu Biologique. Bull. Scient. France et Belg., 47:215-360.

MAGUIRE, Jr. B. 1971. Community Structure of Protozoans and Algae with Particular Emphasis on Recently Colonized Bodies of Water. From: Symposium of the American Microscopical Society. The Structure and Function of Fresh-Water Communities. John Cairns Jr, Ed.

MAGUIRE, Jr. B. 1971. Phytotelmata: Biota and Community Structure Determination in Plant-Held Waters. Ann. Rev. Ecol. Syst., 2:439-464.

BENZING, D.H.; DERR, J.A. & TITUS, J.E. 1972. The Water Chemistry of Microcosms Associated with the Bromeliad Aechmea bracteata. Amer. Midl. Natur. 87:60-70.

FRYER, G. 1980. Acidity and Species Diversity in Freshwater Crustacean Faunas. Freshwater Biol. 10(1):41-45.

LAESSLE, A.M. 1981. A Micro-Limnological Study of Jamaican Bromeliads. Ecology, 42:499-517.

Can anyone help with further references?

Remember what Geoff Boxshall said in the last issue: *The most avidly read sections are the bibliography and the 'current research activities'*. The questionnaire added to this issue gives you the opportunity for a short report on your ongoing research. Don't let the chance pass by to help stimulate communication among copepodologists.

6. Mailing

There are cases where several members of the same institution are receivers of *MONOCULUS*. Air mail rates in Germany are rather high. So we have selected quite arbitrarily one colleague in each of these institutions who receives his copy air mail. We hope he/she will circulate this copy among the others while they have to wait for their copies to arrive by surface mail. We hope nobody minds and we apologize for any possible violation of social hierarchies.

The l e t t e r box

Georges Merinfeld's article in the last issue aroused one commentary so far. Janet Reid from Washington remarks:

Merinfeld's article on proper zoological nomenclature in the recent MONOCULUS was both stimulating and irritating. The latter, because I wrote to the International Trust about 1981 and was told that the 2nd edition of the International Code is no longer available, and that a 3rd edition is being prepared, to be published in 1982. Since then I have heard nothing ... There was not then a copy of the International Code available in Brasilia. When the 3rd edition is published, will there be some funding for dissemination of copies to developing countries whose university libraries' budgets are inadequate to afford extensive purchases of foreign literature?

Computerized search facilities are also not available in developing countries, and the costs of such searches are still prohibitive for most researchers' budgets. I am afraid most of us will have to remain in the 19th century a little longer. I do, however, wholeheartedly agree with Dr. Merinfeld as to the absolute necessity of careful attention to the literature.

Vernon Thatcher from Manaus is teasing us with our letter sent out to recruit new adherents to the *MONOCULUS*-community, among

'living' copepodologists, a letter also reproduced on the back cover of the last issue of *MONOCULUS:*

I have recently received your letter concerning the census of copepodologists and the MONOCULUS newsletter. I am happy to report that we have a group of 7 such persons working feverishly in the Amazon. I have checked my associates and all appear to be "living" - at least they were breathing when last examined. I am therefore enclosing herewith a facsimile card for each person. We would all like to be "active", although we have no time for gymnastics. As some indication of our activity, I will be sending reprints of 4 publications to Dr. Schminke, and we have an additional 10 papers "in press".

B O O K Book review R E V I E W

In the epilogue of his recent little handbook on "The parasitic Copepoda and Branchiura of British freshwater fishes" Geoffrey Fryer remarks: "While the biology of crustacean parasites as a whole, a group whose existence has been known since the time of Aristotle, offers much scope for study, the subject often receives scant treatment in even the parasitological literature. Thus some recent, well-received and otherwise excellent textbooks on parasitic biology do not even mention either parasitic copepods or branchiurans - though the number of existing species of the former group is extremely large - and give no indication of the fact that Crustacea has been one of the most successful of all the major groups of animals in the exploitation of parasitism as defined in the classical manner".

When K. Rohde's book on "Ecology of marine parasites" became available, we asked Z. Kabata to look at it from the point of view of the copepodological content.