

ROUND TABLE DISCUSSIONS

summarized by

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The round table discussions at the end of the meeting were summarized from tape recordings that were not always clear and voices could not always be identified. Therefore we decided to give the main ideas that were expressed and were proposed or accepted by all or a majority of the participants, without reference to any person. We hope that this summary is a true reflection of what was said with many more words.

THE ONTOGENY OF TAXONOMIC CHARACTERS

A list of important characters of which the ontogeny is known or should be known was established. The adult is only one stage in the life cycle and study of juveniles can lead to the establishment of phylogenetical lines; but only a few studies have taken juveniles into account, despite the fact that ontogenetic investigations are necessary to answer questions about homologies, the direction of evolution and the distinction between primitive and advanced characters.

Important taxonomic characters are to be found in : a) the cephalic region with its sense organs and the stoma region ; b) the reproductive system ; c) the tail region. With these are connected the presence and number of cephalic setae, the anterior sense organs and the ontogeny of the mouth cavity. There is little information on the cells that form these structures and much work on ultrastructure remains to be done. The place and form of the amphids may change during ontogeny and even the number of lips. The position of the excretory pore changes as well and is often different in juveniles. The number of cells forming the intestine, the number of body and (if present) adhesive setae and the body annulation may all change during ontogeny. Culture methods will be invaluable in this kind of problems.

Because the spicular apparatus is already developing in the fourth juvenile stage mistakes can be made by describing these as adult males. Moreover, abnormal individuals may occur, hence the danger of descriptions based on one or a few specimens.

HOMOLOGIZATION OF STOMA STRUCTURES

The use of phylogenetically loaded terms poses problems for the practising taxonomist who needs to describe these structures and can not wait until the embryological data are available. For instance, the position of the teeth may be useful but they occur in different regions and in practice it is often difficult to determine exactly in which. It may be necessary to set up specific criteria to designate the cheilostome in each major taxon. The use of descriptive terms instead of terms referring to ontogenesis or phylogenesis is certainly useful in many instances when the origin of a particular structure is uncertain.

The terminology proposed by Steiner in 1933 for the different regions of the stoma in Rhabditida is difficult to use for other groups because of our limited knowledge about homologies and because of several errors made in the past. Homologies should be determined according to Remane's criteria. The most anterior part, immediately behind the oral opening, is lined with a cuticle that is very similar to the body cuticle and has basically the hexaradial symmetry of the lip region. This part could be referred to as cheilostome (as Steiner proposed), or perhaps vestibule or lip cavity. Although originally and still usually confined to the lip region, the cheilostome may extend further backward and on its wall may develop denticles or tooth-like structures of variable shape and number according to the group or species. The cheilostome joins that part of the alimentary channel that is derived from the stomodeum and differentiated as anterior feeding apparatus. The latter part has been given various names, partly because of the very different shape it can have in relation with the feeding habits or with the group, e.g. stoma (then including the cheilostome), buccal cavity (sometimes also including the cheilostome), modified anterior feeding apparatus, oesophastome, oesophagostome (an emendation of the previous name) or simply mouth cavity.

Since embryological and ultrastructural data are still scanty the practising taxonomist often cannot decide for certain what are homologous structures, therefore some practical criteria are needed for each major taxon that enable us, for the time being, to refer to specific parts of the stoma.

PHARYNX OR OESOPHAGUS?

The structure which in nematodes is designated most frequently by the word oesophagus (Gr. oesos = will transport ; phagos = food) is called pharynx in related groups. In the terminology of Remane, a pharynx is a predominantly muscular structure whereas an oesophagus is not. When both structures are present, as in Annelids and Molluscs, the pharynx is the more muscular part whereas the oesophagus is the more glandular part. In a more restrictive sense the word pharynx has been used to designate the anterior area of the oesophagus, a region that might be called also the oesophagostome of modified anterior feeding apparatus, lying between the cheilostome and the oesophagus (see above). Pharynx and oesophagus are both borrowed from the vertebrate literature in which pharynx is used for the upper region of the oesophagus.

It was noted that many nematologists now think that the term pharynx might be more appropriate but that further discussion will be necessary before an agreement will be reached.

SYSTEMATICS AND ECOLOGY

There are still conflicts between those taxonomists that want to base their classification on practical grounds and those that try to base it on phylogenesis. Whatever system is adopted it should be clearly stated. Even in a phylogenetic system the available information may be insufficient for establishing monophyletic groups and hence some taxa may be made for practical reasons, for the time being. A classification that reflects phylogeny as much as possible is to be preferred because it is the most interesting and has a predictive quality. However, this implies careful studies of ontogeny, comparative morphology and others to evaluate the different characters and to trace the homologies.

Taxonomists describing new taxa should be aware of the fact that their findings are not only useful for the practising nematologist but that their descriptions should also deal with characters that may be important for a phylogenetical study later on, rather than just deal with the diagnostic features of new species. On the other hand, the practical problems should also be kept in mind and when e.g. new taxa are based on characters that can only be observed with an electron microscope, this will give problems to most practicing nematologists. It was nevertheless generally agreed upon that descriptions of new taxa should give as much information as possible in order to be useful for different disciplines. Furthermore, it was stressed that also the ecologist is better off with a natural classification than with an artificial one, since the evolution of the animal groups parallels that of the ecosystems.

Comprehensive books have inspired nematological work in the past and will continue to do so. Keys are necessary and very helpful if well made. Dichotomous ones are most widespread and can lead to quick identifications. Tabular keys are more elaborate and give more information. Pictorial keys are attractive also to non specialists and help to avoid confusion about the correct interpretation of the terminology. Here again one can try to follow the different steps of the phylogenetic classification or try to make the easiest and most practical key based on the most obvious characters. In the latter case however, the result has always to be verified with the relevant literature.

It was felt very useful especially for beginners to establish a guide with data to be considered when a new species is described or when a poorly known species is redescribed (see Addendum II). Of course a list of such data has to be adapted to each group and whenever new things are discerned. In using a guide, list or table attention will be given to many details that would otherwise be overlooked. It would be a great help for all taxonomists if at least one species of each genus would be described in as much detail as possible. This could serve as a reference and then only the difference with that species would have to be considered in other descriptions of species belonging to that genus.

Since the meiofauna is considered more and more as composed of key environmental indicators, more and more people will become involved with identification of nematodes, but only few are real specialists now. Good pictorial keys might be a help for those less trained people, but identification up to generic and certainly up to specific level is difficult even for specialists. The problem is that governmental agencies sponsoring such research want us to detect changes in faunal composition and that they require quick answers. This is nearly impossible. Under these circumstances the identification up to the genus level is useful. Unfortunately, nematodes have not attracted many people because of the difficulties in identifying them and this is distressing since they are the dominant group in the marine benthos.

THE TERMINOLOGY OF BODY REGIONS

The terminology of body regions proposed by De Coninck in 1942 and 1965 (Fig. 1) could be a basis for a discussion. Whereas axes can be readily defined, this is not so for areas and here opinions differ. The terms subventral and subdorsal are used in a very general way by many nematologists for an area somewhere between lateral and ventral resp. lateral and dorsal. In this general sense a subventral or subdorsal position is not clearly defined as it is in De Coninck's scheme. It may be easy for such structures that shift in position throughout the body length and for those where the exact position cannot be defined. The use of unprecise terms may

however lead to confusion and whenever the position of structures can be exactly defined, precise terms are necessary to enable detailed comparisons. Areas could be delimited by the axes that border them, e.g. the ventral-subventral area (left and right), the ventral-lateroventral area..., or the median axis of the structure could be used for the whole area; however, the fact that nematodes are bilaterally symmetrical in general and tri- or hexaradially symmetrical in the anterior region complicates the story. The bilateral symmetry and the triradial one should not be confused with each other. The main problem seems to be the term subventral, which is often used in a very general way for structures situated somewhere between lateral and ventral. It is commonly used because it is a short term, but since it is used for positions « not exactly » ventral or « almost » ventral, it is not a very precise term in this sense. In the scheme of De Coninck it is clearly defined (Fig. 1). It was suggested that a proposition should be worked out and then further discussed and amended by practising nematologists until a general agreement can be reached (see addendum I).

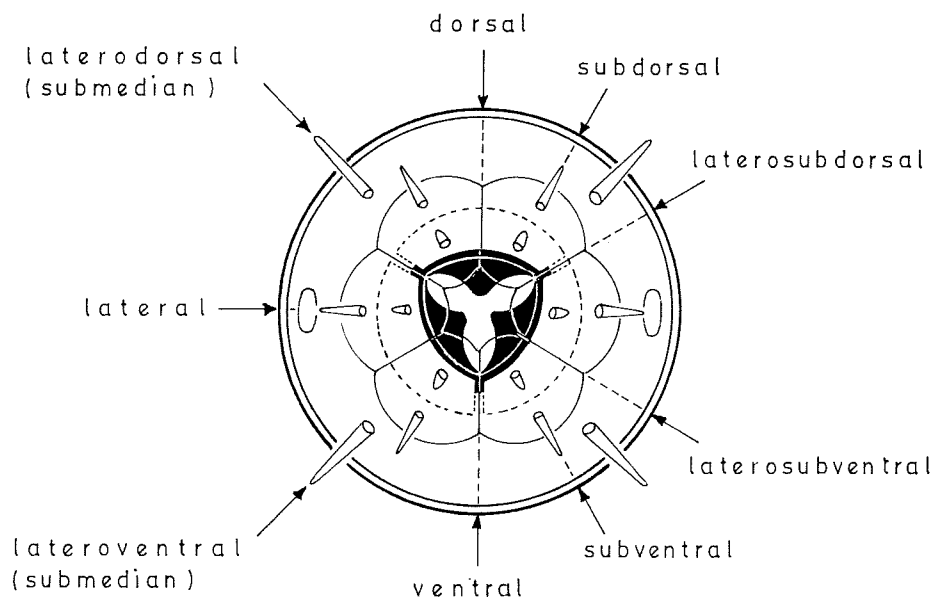


Fig. 1. — Terminology of body regions (after De Coninck, 1942, 1965).

Several other terms were discussed as well. The following terms were considered as synonyms for the region between the anterior end of the body and the cardia or oesophago-intestinal junction: « *neck-region* », « *cervical region* », « *oesophageal region* » and « *pharyngeal region* ».

Male nematodes have a cloaca, whereas in females this is exceptional. Hence, females generally have an anus whereas males have a cloacal opening. Most participants were nevertheless in favour of the use of terms as « *anal diameter* », « *pre-anal* », « *ad-anal* », « *postanal* », etc. for males as well.

The secondary sexual characters that are often present in the posterior region of males are variously called papillae, genital papillae, supplements or supplementary organs. Although they may be of different origin, they can be commonly called

« *supplements* » or « *supplementary organs* » when also their position is indicated, e.g. preanal, adanal, postanal, medioventral, subventral, etc.

The term *lateral field* is sometimes used in two different meanings; it should be restricted to the differentiated cuticular region above the lateral chord; the latter term should only be used for the epidermal (hypodermal) chord.

Although *hypodermis* is widely used in nematology, *epidermis* is more correct. Also entomologists more and more use epidermis instead of hypodermis for the cellular layer underneath the cuticle.

The terminology of the cephalic sense organs was also discussed and De Coninck's terminology was generally accepted. According to this there are: a first circlet of six inner labial papillae, a second circlet of six outer labial papillae or setae and a third circlet of four cephalic papillae or setae; the second and third circlet may unite and form a single circlet of ten papillae or setae.

COLLECTIONS

The establishment of reference collections deposited at musea and other public institutions with type and/or other specimens was emphasized. This allows future revisions and corrections.

Private collections should be transferred to public institutions where they are cared for and available to those interested. Type specimens belong to science, not to persons! The rules of zoological nomenclature should make it obligatory to deposit type specimens in public institutions. Acceptance of a paper describing new species by a journal should depend on deposition of type specimens in at least one major public collection.

The exchange of identified material is also very important and should be stimulated. It was felt useful that a circular should be sent to all taxonomists in order to know where the collections of practising as well as retired or deceased nematologists are.

A discussion was held about what should be done about the species described by Allgén, whether they should be redescribed on the base of the slides from his collection and new material from the type localities, or whether they should be ignored. Bad descriptions of new species are a nuisance to all people that have to deal with them afterwards. Many of Allgén's species are in that position. A number of these can not be identified and were or will have to be put under « *species inquirendae* », so that they no longer will confuse anybody. However, when it is possible to redescribe such species with the aid of topotypes and a neotype can be selected, it was considered preferable to do this rather than discounting the older species as « *inquirenda* ». Even if there is still some doubt about the identity of topotypes and the original species it is still better to validate the older name rather than adding a new name to the list.

Since Allgén described many new species from many different families it seems impossible for one man to revise them. For this but also for other revisions cooperation should be encouraged. Agreements should be made amongst specialists to avoid that some groups would be revised several times and others not at all, so that everybody could benefit from it and there would be no competition. In this respect it would also be useful to organize a workshop where specialists and other interested people could come together with material, study it and discuss about it. Higher groupings and overall classification of nematodes should also be done by a group of specialists that cooperate and no longer by one individual.