PROPOSAL OF A NEW SYSTEMATIC ARRANGEMENT OF NEMATODES OF THE FAMILY CAPILLARIIDAE

F. MORAVEC

Institute of Parasitology, Czechoslovak Academy of Sciences, Prague

Dedicated to Prof. V. Dyk D.Sc. on the occasion of his 70th birthday

Abstract. A new delimitation of genera within the nematode family Capillariidae is proposed on the basis of revaluation of the features used in the taxonomy of these nematodes. The following genera are recognized as valid: Schaulmanella Ivashkin, 1964 (subgenera Schaulmanella Ivashkin, 1964, Plicicapillaria subgen. n. and Amphibocapillaria subgen. n.), Paracapillaria Mendonça, 1963, Capillariostrongylus Freitas et Lent, 1933, Pseudoacapillaria Freitas, 1939 (subgenera Pseudoacapillaria Freitas, 1939 and Ichiyocapillaria subgen. n.), Freitasacapillaria gen. n., Borsacapillaria gen. n., Líniceus Dujardin, 1845, Pearseocapillaria Freitas et Mendonça, 1960, Capillaria Zeder, 1800, Edinocoeus López-Neyra, 1947, Eucodina Dujardin, 1845, Pteracapillaria Freitas, 1959, Aemochoeus López-Neyra, 1947 and Calodium Dujardin, 1845; previously established genera are newly defined. The systematic status of the genera Gossypella Freitas, 1859 and Skryabinacapillaria Skrjabinovich, 1948 has not been so far elucidated. The author newly synonymizes the genus Riabchlossia Freitas, 1959 (= Eucodina), Armacapillaria Gagarin et Nazarova, 1965 (= Pteracapillaria) and Hepaticola Hall, 1918 (= Calodium) and the species Hepaticola hokori Mueller et Van Cleave, 1932 (= Pseudoacapillaria cestadomi Pearse, 1924) and Pseudoacapillaria rubra Mendonça, 1963 (= Freitasacapillaria mescalizea Vas et Pereira, 1934); many new combinations of specific names are given. A key to the genera and subgenera of the family Capillariidae is provided.

From the viewpoint of taxonomy and systematics, nematodes of the family Capillariidae represent at present one of the most difficult groups of helminths. It results mainly from inadequate knowledge of the morphology of individual species whose descriptions are often poor. Moreover, the situation is complicated considerably by substantial differences in the opinions of various authors as to the taxonomic value of various characters in these nematodes and, accordingly, the number of genera in the family Capillariidae.

Although there have been several attempts to make up a system of these nematodes, the most important of which being the papers by Dujardin (1845), Travassos (1915), Yorke and Mapleton (1926), López-Neyra (1947), Skrjabin et al. (1957) and Freitas (1959), the situation in capillariid classification remains very confused. Until now, a total of 19 nominal genera have been established in this family: Capillaria Zeder, 1800 (= Trichosoma Rudolphi, 1819), Trichosomum Creplin, 1829, Líniceus Dujardin, 1845, Thominz Dujardin, 1845, Calodium Dujardin, 1845, Eucodina Dujardin, 1845, Hepaticola Hall, 1918, Capillariostrongylus Freitas et Lent, 1933, Skryabinacapillaria Skrjabinovich, 1948, Aemochoeus López-Neyra, 1947, Gossypella Freitas, 1959, Pteracapillaria Freitas, 1959, Pseudoacapillaria Freitas, 1959, Riabchlossia Freitas, 1959, Pearseocapillaria Freitas et Mendonça, 1960, Orthomizina Freitas et Silva, 1960, Paracapillaria Mendonça, 1963, Schaulmanella Ivashkin, 1964 and Armacapillaria Gagarin et Nazarova, 1966. Many of these genera were, however, based on inconvenient morphological features (length ratios of oesophagus and body, number of eggs in uterus, etc.) or inaccurate observations (alleged absence of spicule), or contingently only on the basis
of different location in the host. Consequently, most of them are not generally recognized and many recent authors (e.g. Yamaguti 1961, Inglis and Coles 1963, Kutzner and Otto 1966, Caballero 1971, Huffman and Bullock 1973, Bell and Beverley-Burton 1981, Butterworth and Beverley-Burton 1980) even share the opinion of Baylis (1931) that the entire group of capillarida is represented by a single genus Capillaria
.

During the last years, the present author could get acquainted with the morphology of a number of capillarids parasitizing blood-colored vertebrates, mainly fishes. During these studies there were often found such interspecific differences, mainly in the structure of the male caudal end, which in other nematode groups are usually taken for the differences amongst genera or even subfamilies. Owing to the chaotic situation in the system of the nematode family Capillaridae, all these species were, however, assigned provisionally to the genus Capillaria Zeder, 1800 with a remark that their true generic appurtenance would be determined only after a new delimitation of genera within this family (see Moravec 1980a, Moravec and McDonald 1981, Moravec et al. 1981, Moravec and Lomakin 1982). Our studies supported the views of Skryabin et al. (1957), Freitas (1959) and some other authors that the morphological features of various capillarid species, their different location and also the heterogeneity of their definitive hosts give evidence for the existence of several genera in the family Capillaridae.

In 1959 Freitas drew attention to the necessity of dividing this nematode group into genera with the use of new generic criteria and creating a new system based on morphological features and phylogeny. The author suggested division of capillarids into ten genera, based on the earlier established ones, mostly considered the synonymy of Capillaria — Capillaria, Thominia, Hepaticola, Capillostrongylidae, Siricabinocephalidae and Ancylobothoce are newly defined and are supplemented by newly established genera Gassypela, Stereostrongylus, Pseudocapillaria and Ritskloosa. In the following years, additional genera, Orthomorina, Paeranema and Paracapillaria were created by Brazilian helminthologists (Freitas and Silva 1960, Freitas and Mendonça 1966, Mendonça 1963) and two genera, Schulmanella and Armoncapillaria, were added by Soviet authors (Ivashkin 1964, Gagarin and Nazarova 1966). Unfortunately, also the above-mentioned genera were often based on inconvenient features, some of them being apparent synonyms of the genera described earlier. When considering the validity of separate genera it is necessary to keep consistently to the principle of type species.

The characteristic feature distinguishing the genera of capillarids seems to be the structure of the posterior end of male (presence or absence and character of caudal papillae, lobes, dorsal cuticular membrane, caudal lateral alae, etc.). The significance of these structures have already been emphasized by e.g. López-Neyra (1947), Freitas (1959), Butterworth and Beverley-Burton (1980), Baranš et al. (1981) and Duben. Unfortunately, in many species the structure of the male caudal region was incompletely described, preventing thus their correct generic listing; the use of scanning electron microscopy may play an important role in this respect. Additional significant features distinguishing the genera of capillarids are, in my opinion, the character of the spicule sheath (spiny or nonspiny), presence or absence of the spicule and probably also the structure of stichosome, number and arrangement of bacillary bands and, in general, the structure of the male caudal region. Other features like the length of body, length ratio of oesophagus and body, position of vulva appendage in gravid females, length of vagina, character and length of spicule, structure of eggs and position of anal opening in females may serve at most for the separation of species.

A prerequisite for creation of a new system of capillarid nematodes, respecting true phylogenetic relationships, is a detailed revision of the entire group. However, due to an enormous number (some 300) of nominal species of capillaridae parasites in all main groups of fishes, amphibians, reptiles, birds, mammals), the accomplishment of such a revision is very problematic and there is no doubt that to gain detailed knowledge on the morphology of most species is the matter of many years. In this situation the author of this paper consider it reasonable to separate capillarids into several genera according to the present state of knowledge, considering that the system of these nematodes will be further elucidated and made more precise gradually with newly obtained knowledge on the morphology, biology, and phylogeny of these parasites.

The author suggests to divide capillarids into the following 16 genera; however, he is aware of the fact that the assignment of many species to certain genera is due to their inadequate descriptions only provisional and some species, sometimes even recently described, cannot be listed in genera at all at the present time. By assigning the species to separate genera the author pursued only the objective documentation of content and extent ofgeneric diagnoses but not a revision of species within the genera; owing to frequently dissimilar opinions of different authors as to the synonymy of some species, also some specific names considered by some authors as junior synonyms are listed; moreover, the list of species is incomplete, because some species inadequately described or exceptionally those whose original descriptions were not available to the present author have not been included. A revision of the species composition of the separate genera will have to be the subject of further studies. Fig. 1 indicates a hypothetical evolution of capillarids.

1. genus Schulmanella Ivashkin, 1964

Diagnosis: Caudal lateral alae in male absent; posterior end of male with small membranous bursa supported by pair of dorso lateral digital projections (rays), bent along margin of bursa to dorsal side; dorsal caudal projection present or absent; pair of large round adanal papillae present; spicule medium-sized, well sclerotized, often with superficial transverse grooves at its middle part; spicular sheath spiny; vulvar appendage in females present or absent; parasites of intestine and liver of fishes and amphibians.

Type species: S. petruschevskii (Shulman, 1948) Ivashkin, 1964

i) subgenus Schulmanella (Schulmanella) Ivashkin, 1964

Diagnosis: Stichosome consisting of three longitudinal rows of stichocytes; bursa of male without dorso caudal projection; parasites of liver of fishes.

Type species: S. (S.) petruschevskii (Shulman, 1948) Ivashkin, 1964

Other species: Iw. (S.) crypiconemica (Huffman & Bullock, 1973) comb. n.

ii) subgenus Schulmanella (Pisciocapillaria) subgen. n.

Diagnosis: Stichosome consisting of single row of stichocytes; bursa of male with dorsal caudal projection; intestinal parasites of fishes.

Type species: S. (P.) freemani (Moravec, Margolis & McDonald, 1981) comb. n.

Other species: S. (P.) tuberculata (Liston, 1914) comb. n.

iii) subgenus Schulmanella (Amphibiocapillaria) subgen. n.

Diagnosis: Stichosome consisting of single row of stichocytes, only some of stichocytes of its posterior end may be doubled; bursa of male without dorso caudal projection; parasites of intestine and liver of amphibians.

Type species: S. (A.) tridentispinulata (Diesing, 1851) comb. n.

Comments: The genus Schalmanella was established by Ivashkin (1964) on the basis of an inadequate original description of the type species, S. petrushevecki; later Ivashkin and Shmytova (1969) synonymized it with the genus Hystericola, 1916 (= Calodium Dujardin, 1845). However, in contrast to Schalmanella, the latter genus is characterized by the presence of caudal lateral alae and by absence of a dorsal membrane on the male tail and by a nonspiny spicular sheath.

2. genus Paracapillaria Mendonça, 1963

Diagnosis: Caudal lateral alae in male absent; membraneous bursa well developed, supported by two dorsolateral digital projections (rays), bent along margin of bursa to dorsal side; one pair of large sessile adanal or postanal papillae present; spiculé medium-sized, well sclerotized; spicular sheath nonspiny; vulvar appendage absent; parasites of digestive tract of fishes, amphibians and reptiles.

Type species: P. pisicola (Travassos, Artigas and Pereira, 1928) Mendonça, 1963


3. genus Capillostrongyloides Freitas et Lent, 1935

Diagnosis: Caudal lateral alae in male absent; membraneous bursa well developed, considerably exceeding posterior end of body, supported by two short, wide, rounded subventral lobes located below cloacal opening; spiculé moderately sclerotized, relatively short; spicular sheath nonspiny; vulvar appendage absent; parasites of stomach of freshwater fishes.

Type species: C. seter Freitas et Lent, 1935

Other species: C. frischi (Travassos, 1914) comb. n.; C. minima (Travassos, Artigas and Pereira, 1928) Freitas et Lent, 1935; C. sononis (Travassos, 1927) comb. n.

Comments: Freitas and Lent (1935) erected this genus to accommodate the species C. seter and C. minima and they characterized it by the generally small measurements of the body and a small number of eggs in the uterus of females; however, the given characters cannot be taken for generic criteria.

4. genus Pseudocapillaria Freitas, 1959

Diagnosis: Caudal lateral alae in male absent; posterior end of male rounded, provided with two large round subventral lobes located below cloacal opening; dorsal, cuticular membrane absent or reduced to narrow band practically not exceeding posteriorly both subventral caudal lobes; spiculé medium-sized, well sclerotized; spicular sheath nonspiny; vulvar appendage absent; parasites of intestine and stomach of fishes, reptiles, birds and mammals.

Type species: P. cotostomi (Pearse, 1924) comb. n.

i) subgenus Pseudocapillaria (Pseudocapillaria) Freitas, 1959

Diagnosis: Dorsal cuticular membrane on male tail absent.

Type species: P. (P.) cotostomi (Pearse, 1924) comb. n.
Other species: P. (P.) amundi (Freitas et Lent, 1934) comb. n.; P. (P.) americana (Road, 1949) comb. n.; P. (P.) balloni (Lomakina, 1979) comb. n.; P. (P.) carrai (Parukhin, 1971) comb. n.; P. (P.) cerasina (Freitas et Lent, 1934) comb. n.; P. (P.) cooperi (Johnston and Mawson, 1945) comb. n.; P. (P.) dactylogynha (Parukhin, 1967) comb. n.; P. (P.) falciola (Goeze, 1782) comb. n.; P. (P.) gelonca (Lomakina, 1971) comb. n.; P. (P.) mertysi (Madsen, 1945) comb. n.; P. (P.) micropalata (Mamay, Parukhin and Beeva, 1953) comb. n.; P. (P.) plicaria (Rudolphi, 1819) comb. n.; P. (P.) psammia (Travassos, 1914) comb. n.; P. (P.) phalerata (Parukhin, 1971) comb. n.; P. (P.) pseudocellulosa (Calliléê and Cavallero, 1943) comb. n.

ii) subgenus Pseudocapillaria (Ichthyocapillaria) subgen. n.

Diagnosis: Dorsal cuticular membrane connecting subventral lobes of male tail present.

Type species: P. (I.) salveini (Polyansky, 1952) comb. n.


Comments: Freitas (1959) established this genus for the species described under the name Hepatopota bakeri Mueller and Van Cleave, 1932 from the intestine of several species of North American freshwater fishes. Although the original description and drawings of this species are very incomplete and evidently erroneous in some respects, it is obvious that this species is identical with the species described as Capillaria catostomi Pearse, 1924, which has recently been redescribed by Bell and Beverley-Burton (1981) and Moravec (1980b); hence, this species is a type species of Pseudocapillaria and it is therefore, characterized by presence of the spicule in the male. For the other species described in the genus Pseudocapillaria, P. nuda Mendonça, 1963, a new genus Freitasacapillaria gen. n. is now proposed; the latter is characterized by absence of the spicule.

It is probable that subsequent studies on the species parasitic in reptiles, birds and mammals, now being tentatively assigned to Pseudocapillaria, will prove apartness of these species to other genera.

5. genus Freitasacapillaria gen. n.

Diagnosis: Caudal lateral alae in male absent; posterior end of male rounded, distinctly laterally expanded, with terminal cloacal opening; spicule absent; spicular sheath nonspinny; vulvar appendage present on anterior vulvar lip; parasites of stomach and pyloric caeca of freshwater fishes.

Type and the only species: F. maxillola (Vaz and Pereira, 1934) comb. n.

Examplar: Mendonça (1963) described under the name Pseudocapillaria nuda a new species of capillarids from the pyloric caeca of the Brazilian fish Salminus maxillosus. This species is evidently identical with the species described from the stomach of the same fish in Brazil as Capillaria maxillosa (Vaz and Pereira, 1934), that is the type of the genus Freitasacapillaria; accordingly, P. nuda Mendonça, 1963 becomes a junior synonym of F. maxillola (Vaz and Pereira, 1934).

6. genus Baruscoperaia gen. n.

Diagnosis: Caudal lateral alae in male absent; membraneous bursa well developed, lobular or nonlobular, supported on either side by mostly one or sometimes two small rounded lobes, often narrowed at base; each lobe provided with minute projection, usually bent ventrally; spicule well sclerotized, relatively long; spicular sheath nonspinny; vulvar appendage present or absent; parasites of intestine and stomach of birds and amphipods (Linstow, 1973) comb. n.

Type species: B. obrinogena (Madsen, 1945) comb. n.

Other species: B. appendiculata (Freitas, 1934) comb. n.; B. balloni (Lomakina, 1946) comb. n.; B. cesalpinia (Sood, 1972) comb. n.; B. caudata (Yamaguti, 1941) comb. n.; B. carolina (Rudolphi, 1819) comb. n.; B. celadon (Yamaguti, 1941) comb. n.; B. david (Boyd, 1866) comb. n.; B. efusus (Rudolphi, 1819) comb. n.; B. insensibilis (Johnstone and Mawson, 1945) comb. n.; B. kibatus (Rudolphi, 1819) comb. n.; B. montevidensis (Calejas, 1937) comb. n.; B. multilocularis (Yamaguti, 1941) comb. n.; B. oucopunctata (Linstow, 1973) comb. n.; B. paracentropoda (Wedel, 1884) comb. n.; B. pachykeraini (Rudolphi, 1980) comb. n.; B. plicatus (Walein, Schmidt and Kunts, 1971) comb. n.; B. piscipus (Yamaguti, 1941) comb. n.; B. porschii (Boko and Bhol, 1942) comb. n.; B. quiescul (Road, 1949) comb. n.; B. ranomin (Barker and Noyes, 1916) comb. n.; B. rytikii (Bergström and Dalym, 1972) comb. n.; B. spiculata (Freitas, 1934) comb. n.; B. transversa (Ash, 1962) comb. n.

Comments: The newly erected genus Baruscoperaia includes principally the parasites of birds; the species from mammals and also some from birds are assigned to this genus only provisionally. This genus is named in honour of the distinguished Czechoslovak helminthologist Academician V. Burda, D.Sc., who contributed greatly to the knowledge of a number of capillarid species.

7. genus Liniscus Dujardin, 1845

Diagnosis: Caudal lateral alae in male absent; small membraneous bursa present, being supported by two short, simple dorso lateral projections; spicule thin, long; spicular sheath nonspinny; vulvar appendage present or absent; parasites of urinary bladder and kidneys of small mammals (insectivores, rodents).

Type species: L. incrassatus Dising, 1851


Comments: Regarding inadequate descriptions of the species listed in this genus, particularly as to the structure of the male caudal end, in future, when new data are available, it will be necessary to define the genus Liniscus more precisely.

8. genus Pearsonema Freitas and Mendonsa, 1960

Diagnosis: Caudal lateral alae in male absent; small membraneous bursa present; posterior end of male provided with two minute dorso lateral lobes or rounded; two narrow, fairly long digital projections present, originating dorsolaterally and bent ventrally to and median line, supporting thus margin of membraneous bursa; spicule thin, very long; spicular sheath nonspinny; vulvar appendage absent or present; parasites of urinary bladder of mammals (carnivores).

Type species: P. pearsoni Freitas and Mendonsa, 1960

Other species: P. cameroni (Gupta, Pandi and Kala, 1963) comb. n.; P. fel-catii (Dising, 1851) Freitas and Mendonsa, 1960; P. lini (Freitas and Lent, 1935) Freitas and Mendonsa, 1960; P. macronota (Molin, 1858) comb. n.; P. pelvis (Rudolphi, 1819) comb. n.

Comments: Freitas and Mendonsa (1960) assigned to Pearsonema two additional species, viz. P. inames and P. ramosa, which are now considered members of the genus Baruscoperaia.
9. genus Echinococcus López-Neyra, 1947

Diagnosis: Caudal lateral alae in male absent; posterior end of male provided with small membranous bursa, often two lobed, supported on either side by one short, round or more elongate lobular dorsolateral projection; dorsal caudal projection absent; spicule well sclerotized, medium-sized; spicular sheath spiny; vulvar appendage absent or present; intestinal parasites of birds and mammals.

Type species: E. cypripodis López-Neyra, 1947


10. genus Capillaria Zeder, 1800

(Syn.: Trichostrongylus Rudolphi, 1819, partim; Trichostrongyllum Creplin, 1829; Thimmesch Dujardin, 1845; Drechmeria Fretas et Silva, 1960)

Diagnosis: Caudal lateral alae in male end of posterior rounded, with two lateral, ventrolateral or dorsolateral lobes; membranous bursa absent; two minute preanal sessile papillae often present; spicule well sclerotized; spicular sheath spiny; vulvar appendage present or absent; intestinal parasites of fishes, amphibians, reptiles, birds and mammals.

Type species: C. anatis (Schrank, 1790) Travassos, 1915


Comments: Skryabin et al. (1954, 1957) determined a new type species for the genus Capillaria, C. anatis (Schrank, 1790); this proceeding was, however, in contradiction with the international rules (ICZN) (see Mourave 1981). The species listed now in this genus represent a considerably heterogeneous group, this being reflected also by a wide range of their hosts. Future studies will apparently result in breaking up this group into additional independent genera.

11. genus Ecuococcus Dujardin, 1845

(Syn.: Rhipidococxus Freitas, 1959)

Diagnosis: Caudal lateral alae in male absent; posterior end of male narrowly, with rudimentary pseudobursa formed by two minute, rounded, posteriorly directed lateral lobes connected between each other by reduced dorsal cuticular membrane; spicule slender, moderately sclerotized and, accordingly, little distinct; somatic sheath long, densely covered by cuticular spines; vulva not elevated; parasites of respiratory system and mucous cover of oesophagus, oral cavity and stomach of birds and mammals.

Type species: E. aerophilus (Creplin, 1839) Dujardin, 1845


Comments: The morphology of the type species of Rhipidococxus, R. penai (Freitas et Almeida, 1935), indicates its apperances to the genus Ecuococcus and consequently, Rhipidococxus Freitas, 1959 becomes a synonym of the genus Ecuococcus Dujardin, 1845.

12. genus Pterothornis Freitas, 1959

(Syn.: Armococcilia Gagarin et Nazarova, 1966)

Diagnosis: Caudal lateral alae in male present, well developed; posterior end of male provided with fairly large membranous bursa supported on either side by two or three narrow lateral projections; spicule well sclerotized; spicular sheath covered by minute spines or sclerotized protuberances; vulvar appendage present or absent; parasites of intestine and stomach of birds and mammals.

Type species: P. melanirupillus (Barrie, 1912) Freitas, 1959

Other species: P. angustis (Freitas, 1934) comb. n.; P. crinatae (Andreik, 1939) comb. n.; P. damascensis (Webster, 1915) comb. n.; P. moisani (Gagarin et Nazarova, 1966) comb. n.; P. neoloparca (Babos, 1964) comb. n.; P. pulchra (Freitas, 1934) comb. n.; P. sadozirki (Skryabin, Shikhalovskaya et Orlov, 1967) comb. n.

Comments: This genus seems to include clean-cut morphological groups of species associated with the type of their hosts; accordingly, subsequent research might lead to separation of the genus Armococcilia Gagarin et Nazarova, 1966, now considered a synonym of Pterothornis, or, contingently, to erection of one or more additional genera.

13. genus Acoelothco Lopez-Neyra, 1947

Diagnosis: Caudal lateral alae in male present, well developed; posterior end of male provided with membranous bursa supported by one or more pairs of narrow, elongate, often ventrally bent lateral projections; spicule present, sometimes indistinct due to insufficient development; spicual sheath nonsquiny; vulvar appendage absent or present; parasites of digestive tract of mammals, less frequently birds and amphibians.

Type species: A. putorii (Rudolphi, 1819) López-Neyra, 1947
14. genus Calodium Dujardin, 1845
(Syn.: Hepaticola Hall, 1916)

Diagnosis: Caudal lateral alae in male present, well developed; posterior end of male rounded, provided with two small lobular lateral papillae; dorsal cuticular membrane absent; spicular medium-sized, spherical in transverse section, sometimes little selerotized; spicular sheath nonepy; vulvar appendage present or absent; tissue parasites (spine, liver) of mammals.

Type species: C. eplecanum (Dujardin, 1843) Dujardin, 1845

Other species: C. cholicola (Solys, 1953) comb. n.; C. hepaticum (Banerch, 1893) comb. n.; C. netocida (Yokogawa in Nachigori, 1924) comb. n.

15. genus Gessyella Freitas, 1959

This genus was established by Freitas (1959) for Capillaria latridopsis Johnston et Mawson, 1945 from Australian fishes and it should differ from other genera mainly

Table 1. Distribution of genera of Capillarididae in various classes of the host vertebrates

<table>
<thead>
<tr>
<th>Genus</th>
<th>Fishes</th>
<th>Amphibia</th>
<th>Reptilia</th>
<th>Aves</th>
<th>Mammalia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gessyella</td>
<td>+</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Prestacapillaria</td>
<td>+</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Capillaria</td>
<td>+</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Schmuckena</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Paramesostoma</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Capillaria</td>
<td>+</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Pseudocapillaria</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Baroscapillaria</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ectocinclus</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ruvoleus</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Paracolostoma</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ruvoleus</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Linosea</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Pisoneuma</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Calodium</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>S. latridopsis</td>
<td>+</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

in having caudal lateral alae in the male and eggs enclosed in special capsules. The description of G. latridopsis is, however, very poor and probably erroneous in some respects and, accordingly the existence of the genus Gessyella is considerably doubtful.

16. genus Skrjabinocapillaria Skrabinovich, 1946

The genus Skrjabinocapillaria was established by Skrabinovich (1946) for the species S. eubursata Skrabinovich, 1946 from bats in the USSR; it is characterized mainly by the absence of spicule, by nonepy spicular sheath and by the presence of caudal lateral alae in the male. However, due to inadequate description of S. eubursata, which is probably erroneous in some respects (absence of spicule), the systematic position of Skrjabinocapillaria remains hitherto unclear. Further studies may prove identity of this genus with Aonchoeta.

KEY TO GENERA AND SUBGENERA OF CAPILLARIIDAE

1. Eggs enclosed in special capsules .............................................. Gessyella
   - Eggs without special capsules .............................................. 2

2. Lateral caudal alae in male present ........................................ 3
   - Lateral caudal alae in male absent ...................................... 6

3. Posterior end of male provided with two lateral papillae; dorsal cuticular membrane absent; spicular sheath nonepy; tissue parasites (spine, liver) of mammals ........................................ 4
   - Posterior end of male provided with two or more pairs of elongate lobular projections; spicular sheath nonepy or spiny; parasites of digestive tract of birds and mammals ........................................ 7

4. Spicular sheath covered by minute spicules or spicules elongate and spicules ptyalinic; spicular sheath nonepy ........................................ 8
   - Spicular sheath smooth .................................................. 5

5. Spicular sheath smooth .................................................. 5
   - Spicular sheath nonepy .................................................. 8

6. Spicular sheath nonepy; posterior end of male laterally expanded; eyes, without membrane bud, papillae or lobes; parasites of digestive tract of fishes ........................................ 10
   - Spicular sheath nonepy or spiny; posterior end of male provided with membraneous bud, papillae or lobes ........................................ 11

7. Posterior end of male rounded, provided with two lateral, dorsoventral or lateral lobes; membraneous bud absent ........................................ 9
   - Posterior end of male with membraneous bud; sometimes reduced to narrow membrane connecting dorsally two lateral lobes of posterior body end ........................................ 12

8. Spicular sheath nonepy .................................................. 9
   - Spicular sheath spiny .................................................. 10

9. Spicular sheath spiny .................................................. 10
   - Spicular sheath spiny .................................................. 11

10. Posterior end of male provided with small membraneous bud supported by either two small round dorsoventral projections or two slender digitate dorsoventral projections bent to ventral side; parasites of urinary bladder and kidneys of mammals ........................................ 11
    - Membraneous bud of male provided with two large spherical ventrolateral lobes connected between each other by short cuticular membrane, not exceeding or only slightly exceeding posterior border of lobes ........................................ 12

11. Membraneous bud of male well developed, considerably exceeding posterior margin of body; posterior body end of male of other type ........................................ 13
ПРЕДЛОЖЕНИЕ НОВОГО СИСТЕМАТИЧЕСКОГО ПОСТРОЕНИЯ НЕМАТОД, ОТНОСЯЩИХСЯ К СЕМЕЙСТВУ CAPILLARIIDAE

Ф. Моравец

Резюме. Предлагается новое построение рода внутри семейства Capillariidae на основе периностальных признаков. Предложена новая классификация, основанная на периодических признаках. Изучение этих признаков позволило выделить новые виды и подвиды внутри рода.

Библиографический список:
E. V. Grozdev (Ed.): Parazity – komponenty vodných i nazerennykh biotenosov Kazakhstan. (Parasites as components of water and ground biocenoses of Kazakhstan.)

The volume edited by a group of editors, Panin, Belyakova and Sidorov, headed by Academician Grozdev includes 16 original scientific papers written by 20 authors. There are the results of parasitological research of both purely theoretical and practical orientation. Only one paper deals with protozoans. Fedoseenko and Romanova found in Bkmhangu opimus an interesting species of the genus Sarcozystis and though they did not give it a new name, obviously a new species is involved. A majority of papers (9) deal with the systematics, morphology and ecology of trematode species. Most of them are devoted to the complex of biocenological data from Kargalidim Lake system of Central Kazakhstan. Many years' investigations concern the following subjects: the ways of formation of metacercariae fauna of fishes (Sidorov), cercariae of lakes (Belyakova), dynamics of interaction between the larvae of trematodes, mollusks and factors of the environment (Belyakova), leeches and their significance in the circulation of Schistosoma (Zhadkhabaeva, Akhmetova), biology and dynamics of the larval population of Prochlamopisma caseostus in the water reservoirs (Kukshnev, Belyakova), ecological characteristics and spreading of Lymphocystis – intermediate hosts of Orientobilharzia (Uvalieva, Lavrov). Other papers on trematodes deal with ultrastructure of the intestine of Corigia trematodes, comparative histology of sporocysts of Leuchochordium paradoxum and L. problematicum (Nashch, Soboleva, Osipovskaya and others) and they concentrate their attention to the question of fine structure of the tegument of sporocyst and cercariae of Dicrocoelium.