

THE FREE LIVING NEMATODES OF THE MEDITERRANEAN

III. THE BALEARIC ISLANDS

by

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In June 1932 my friend Prof. Dr. G. C. Hirsch made some biological studies at the marine biological laboratory of Palma di Mallorca. He was accompanied by Dr. E. Ries, at that time Rockefeller Fellow. Both did collect for me some samples of marine sediments from which I have picked out the freeliving marine nematodes for further study. In the same year Dr. A. Oosterbaan made an excursion to Ibiza together with some other geological students and brought home from there for me some samples of mud with marine nematodes. The result of the 3 mentioned small collections, of which that of Hirsch is the most important, will be given in this paper. Next to a comparatively great number of typical mediterranean marine nematodes, a restricted number has a more cosmopolitic distribution. We may, however, say that in view of the great number of forms, which in their distribution apparently are restricted to the mediterranean and therefore should be considered as typical forms of that region, this intracontinental sea possesses a nemic fauna, which is more or less isolated and as to its composition probably is hardly influenced by foreign intruders from the Atlantic. Of more importance I think are intruders from the Black Sea and eventually from the Red Sea. All three mentioned collections comprise 310 specimens, belonging to 36 species.

Distributed over the orders and families we get the following list:

Enoploidea

Family Leptosomatidae: *Anticoma acuminata* (Eberth).

Family Oxystomatidae: *Halalaimus longicauda* Allgén, *Trefusia filum* nov. spec.

Family Enoplidae: *Enoplus meridionalis* Steiner.

Family Oncholaimidae: *Oncholaimus dujardini* De Man, *Viscosia glabra*

(Bastian), *Viscosia palmae* nov. spec., *Oncholaimellus mediterraneus* nov. spec.

Family Enchelidiidae: *Eurystomatina terricola* (De Man), *Conistomella brevicaudata* nov. spec.

Chromadoroidea

Family Cyatholaimidae: *Cyatholaimus canariensis* Steiner, *Cyatholaimus paragracilis* nov. spec., *Paracyatholaimus choanolaimoides* nov. spec., *Metacyatholaimus hirschi* nov. spec.

Family Desmodoridae: *Metadesmodora amphidiscata* nov. spec., *Acanthopharynx affinis* Marion, *Acanthopharynx micramphis* nov. spec., *Monoposthia costata* (Bastian).

Family Chromadoridae: *Spilophorella euxina* Filipjev, *Dichromadora microdonta* Kreis, *Prochromadorella mediterranea* Micoletzky, *Chromadora brevipapillata* Micoletzky, *Hypodontolaimus ponticus* Filipjev.

Family Comesomidae: *Sabatieria hilarula* De Man.

Araeolaimoidea

Family Ceramonematidae: *Pselionema annulatum* (Filipjev).

Family Halaphanolaimidae: *Halaphanolaimus minutus* nov. spec., *Aegialolaimus tenuicaudatus* Allgén.

Monhysteroidea

Family Linhomoeidae: *Matalinhomoeus effilatus* nov. spec., *Eleuthero-laimus elegans* nov. spec., *Paralinhomoeus amphylabius* nov. spec., *Linhomoeus macramphis* nov. spec.

Family Monhysteridae: *Monhystera capitata* nov. spec., *Monhystera microcephalon* nov. spec.

Family Siphonolaimidae: *Siphonolaimus cylindricaudatus* nov. spec.

Desmoscolecoida

Family Desmoscolecidae: *Tricoma nematoides* (Greeff), *Tricoma septuaginta* nov. spec.

Distributed over the habitats we obtain the following data:

Bay of Mallorca, coral bank, 300 m off the coast, depth 30 m, G. C. Hirsch, June 1932: *Anticoma acuminata* (Eberth), 1 juv.; *Halalaimus longicauda* Allgén, 2 juv.; *Trefusia filum* nov. spec., 1 juv.; *Viscosia palmae* nov. spec., 1 juv.; *Oncholaimellus mediterraneus* nov. spec., 1 ♂, 3 ♀♀, 6 juv.; *Eurystomatina terricola* (De Man), 1 juv.; *Conistomella brevicaudata* nov. spec., 1 ♀, 2 juv.; *Paracyatholaimus choanolaimoides* nov. spec., 2 ♂♂, 3 ♀♀; *Metacyatholaimus hirschi* nov. spec., 1 ♂; *Metadesmodora amphidiscata* nov. spec., 1 juv.; *Acanthopharynx affinis* Marion, 1 ♂; *Spilophorella euxina* Filipjev, 2 ♂♂, 5 ♀♀, 1 juv.; *Dichromadora micro-*

donta Kreis, 3 ♀♀, 2 juv.; *Chromadora brevipapillata* Micoletzky, 1 ♀; *Hypodontolaimus ponticus* Filipjev, 2 ♂♂, 5 ♀♀, 1 juv.; *Sabatieria hilarula* De Man, 1 ♂, 4 juv.; *Pselionema annulatum* (Filipjev), 1 juv.; *Halaphanolaimus minutus* nov. spec., 2 ♀♀, 1 juv.; *Aegialolaimus tenuicaudatus* Allgén, 1 ♀; *Metalinhomoeus effilatus* nov. spec., 1 juv.; *Eleutherolaimus elegans* nov. spec., 1 juv.; *Paralinhomoeus amphibiatus* nov. spec., 1 juv.; *Linhomoeus macramphs* nov. spec., 1 ♀, 2 juv.; *Monhystera capitata* nov. spec., 1 juv.; *Monhystera microcephalon* nov. spec., 1 juv.; *Siphonolaimus cylindricaudatus* nov. spec., 1 juv.; *Tricoma nematoides* (Greeff), 2 specimens; *Tricoma septuaginta* nov. spec., 2 specimens.

Here we find a comparatively large number of species in a sample of some tens of cm³. The fauna is rich in species, but not rich in individuals, as this was often said to be the case for *Amphioxus*-sand and similar habitats in the Mediterranean.

Mallorca, from a colony of *Zoobothryon*, E. Ries, June, 1932: *Anticoma acuminata* (Eberth), 2 juv.; *Oncholaimus dujardini* De Man, 63 ♂♂, 45 ♀♀, 82 juv.; *Cyatholaimus canariensis* Steiner, 1 ♀; *Cyatholaimus paragracilis* nov. spec., 1 ♂; *Prochromadorella mediterranea* Micoletzky, 1 ♂, 1 ♀; *Chomadora brevipapillata* Micoletzky, 1 ♂, 1 ♀.

Ibiza, Cala Cana, 5 km N.E. of San Eulalia, stagnant pools in the estuary of a river, with luxurious vegetation. Sample taken 30 m from the sea coast, A. Oosterbaan, 1932: *Anticoma acuminata* (Eberth), 1 ♀; *Oncholaimus dujardini* De Man, 3 ♀♀, 16 juv.

Ibiza, Cala Cana, East of the Bay, small pool in the tidal zone, July-August, 1932, A. Oosterbaan: *Acanthopharynx micramphs* nov. spec., 1 ♂, 5 juv.; *Enoplus meridionalis* Steiner, 1 juv.; *Monoposthia costata* (Bastian), 1 ♂, 2 juv. The sample further contains colonies of *Sertularia*.

Ibiza, ditch near the harbour of the town Ibiza, A. Oosterbaan, 1932: *Oncholaimus dujardini* De Man, 3 ♂♂, 3 ♀♀, 4 juv.

Ibiza, ditch near the harbour of the town Ibiza, A. Oosterbaan, 1932: *Viscosia glabra* (Bastian), 1 ♀.

Family LEPTOSOMATIDAE

Genus **Anticoma** Bastian 1865

Anticoma acuminata (Eberth)

1 juv., Bay of Mallorca, coral bank.

2 juv., Mallorca, from colony of *Zoobothryon*.

1 ♀, Ibiza, Cala Cana, 5 km N. E. of San Eulalia.

Family OXYSTOMATIDAE

Genus **Halalaimus** De Man 1888**Halalaimus longicauda** Allgén

2 juv., Bay of Mallorca, coral bank.

Dimensions: L. = 1.688 mm; $\alpha = 73$; $\beta = 2.9$; $\gamma = 9.5$.

$$\begin{array}{r} 0 \quad 580 \quad M \quad 1512 \\ 4 \quad 20 \quad 24 \quad 8 \end{array} \quad 1688 \mu.$$

Head end cylindrical, rounded anteriorly, provided with 4 setae, about twice as long as the corresponding cephalic diameter. A second crown seems to be present. No amphids seen. Tail long, ending with a flagelliform end. Length of tail 16.2 anal diameters.

Geographical distribution: North Sea, Mediterranean.

Genus **Trefusia** De Man 1893**Trefusia filum** nov. spec. (fig. 1 A, B)

1 juv. (type), Bay of Mallorca, coral bank.

The species is closely related, if not identical with *Trefusia filicauda* Allgén. One never can tell with species like the forelaying, if not the tail end might be broken off, which is often the case. So this might easily have happened with Allgén's specimen, in which case the relative data do not quite answer to reality. Allgén hardly can be correct concerning the double crown of cephalic setae which are found in his specimen in pairs. In *Trefusia* one finds always unpaired cephalic setae, 6 in number and situated far anterior on the head. Therefore I have given my specimen a new name, *Trefusia filum*.

Head rounded anteriorly, provided with a crown of 6 single setae, each 58 % of cephalic breadth long. These setae of broken appearance. At a level with the cyathiform amphids 4 somewhat shorter setae, not longer than 27 % of the corresponding body diameter. Amphids 20 % of corresponding body diameter, at 1 cephalic diameter from the head end. Tail very long, 117 anal diameters long.

Dimensions: L. 2.58 mm; $\alpha = 138$; $\beta = 13$; $\gamma = 1.87$.

$$\begin{array}{r} 0 \quad 200 \quad 920 \quad 1380 \\ 12 \quad \quad 16 \quad 10 \end{array} \quad 2580 \mu.$$

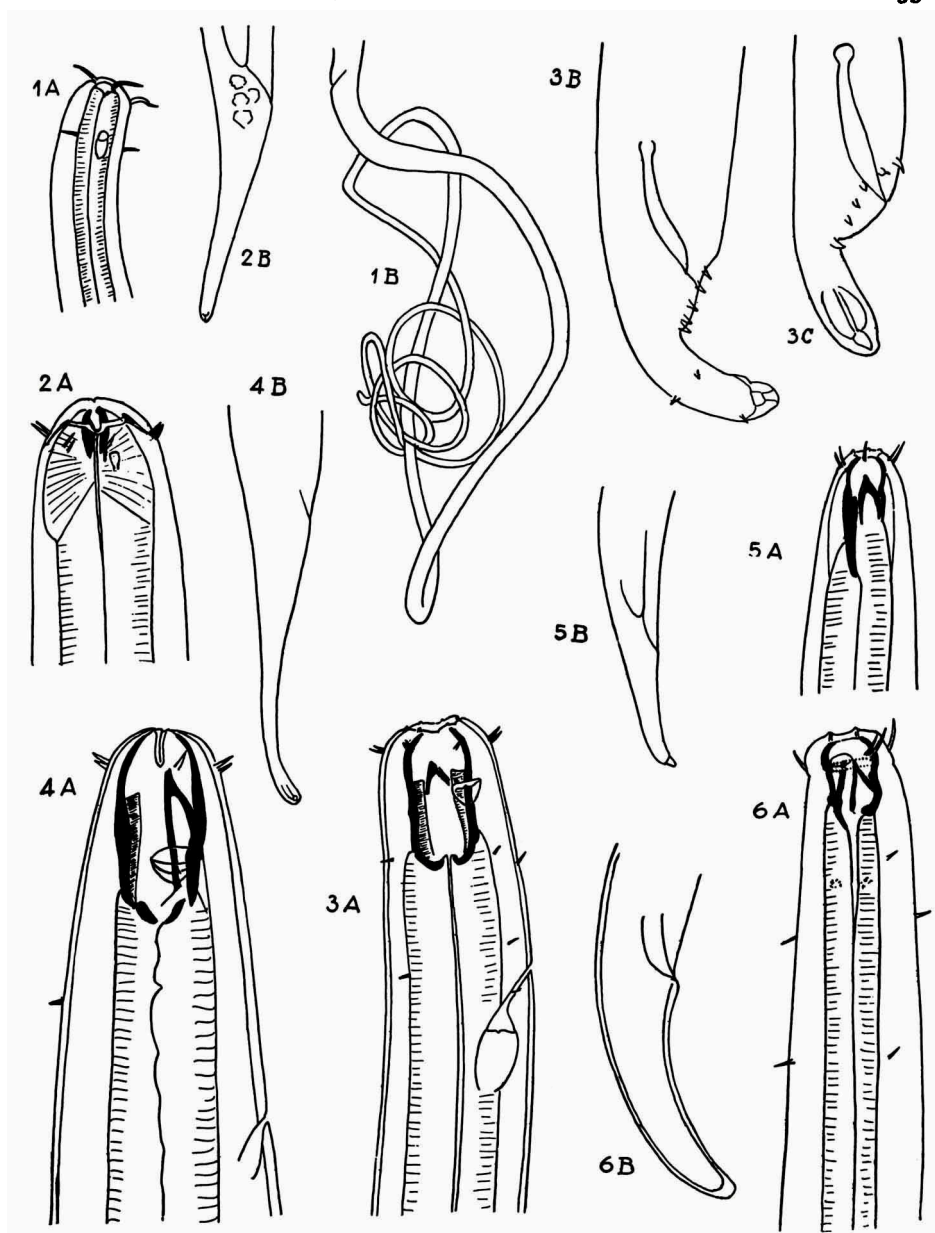


Fig. 1. *Trefusia filum* Schuurmans Stekhoven. A, head end; B, tail end.

Fig. 2. *Enoplus meridionalis* Steiner. A, head end; B, tail end of a juvenile specimen.

Fig. 3. *Oncholaimus dujardini* De Man. A, male head end; B, C, tail end.

Fig. 4. *Viscosia palmae* Schuurmans Stekhoven. A, head end; B, tail.

Fig. 5. *Oncholaimellus mediterraneus* Schuurmans Stekhoven. A, female head end; B, female tail.

Fig. 6. *Eurystomatina terricola* De Man. A, head end; B, tail.

Fig. 4B, $\times 350$; 5A, $\times 625$; 5B, $\times 250$; 6B, $\times 275$; the other figures, $\times 750$.

Family ENOPLIDAE

Genus **Enoplus** Bastian 1865**Enoplus meridionalis** Steiner (fig. 2 A, B)

1 juv., Ibiza, Cala Cana, East of the Bay.

This juvenile specimen most strongly resembles *E. meridionalis*, as studied by me from Villefranche. It is a larval form and therefore I consider the differences in size of tail, indices, amphids and other features as differences due to that circumstance. In order to enable other scientists to recognize the species from Ibiza I give here a figure of head and tail end. Cephalic setae comparatively small, measuring no more than 19 % of the cephalic diameter. Amphidial slit equal to 7.85 % of the corresponding diameter. Tail 4 anal diameters long.

Geographical distribution: Teneriffa, Villefranche, Ibiza.

Family ONCHOLAIMIDAE

Genus **Oncholaimus** Dujardin 1845**Oncholaimus dujardini** De Man (fig. 3 A-C)

3 ♂♂, 3 ♀♀, 4 juv., Ibiza, harbour of town Ibiza.

3 ♀♀, 16 juv., Ibiza, Cala Cana, 5 km N.E. of San Eulalia.

63 ♂♂, 45 ♀♀, 82 juv., Mallorca, from colony of *Zoobothryon*.

This is one of the most common Oncholaims of the mediterranean. It is found almost everywhere, where researches on free living marine nemas are made and is easily recognizable. I give here only head and tail end of both male and female.

Geographical distribution: Cette, Villefranche, Alexandria, Balearic Islands, Naples, Adria at several occasions, Suez, Indian Ocean, Black Sea.

Genus **Viscosia** De Man 1891**Viscosia glabra** (Bastian)

1 ♀, Ibiza, ditch near harbour of town Ibiza.

This species has a wide distribution. In the Mediterranean it is found near Naples, in the Adria, near Villefranche, Alexandria, Sea of Azov, Black Sea.

Viscosia palmae nov. spec. (fig. 4 A, B)

1 juv. (type), Bay of Mallorca, coral bank.

This species could be reckoned as well to the genus *Viscosia* as to the genus *Oncholaimus*, which differ i.a. by the structure of the female genital

apparatus, which is double in *Viscosia*, single in *Oncholaimus*. Since it is a juvenile specimen, it was impossible to solve this question. But the structure of the longer subventral tooth in its relation to the other teeth, as well as the structure of the lips makes me suppose that the species belongs to the genus *Viscosia* De Man. The species reminds me of *Viscosia minor* Filipjev, especially in so far as regards the tail, but there exist differences in the relative length of the teeth, so that I must bring it to a distinct species.

Dimensions: juv. L. 1.588 mm; $\alpha = 30.5$; $\beta = 4.3$; $\gamma = 11.3$.

$$\begin{array}{rcccccc} 0 & 40 & 80 & 200 & 368 & 1448 \\ \hline & & & 48 & 52 & 52 & 24 \end{array} \quad 1588 \mu.$$

Head conical, rounded anteriorly, with more or less fleshy lips. Labial papillae if present, which is very probable, then inconspicuous. Cephalic setae distinct, 10 in number, the lateral ones 21 % of the corresponding diameter, the submedian pairs unequal, the longer ones as long as the lateral setae, the shorter ones 14.2 % of the same diameter. Amphids wide, cup-shaped at a level with the posterior portion of the buccal cavity. Width of the same equal to 34.1 % of the corresponding diameter. Buccal cavity long, 2.83 times as long as its greatest width. The long tooth reaches till the level of the cephalic setae, its length equals 78.4 % of the whole length of the buccal cavity, the dorsal tooth only slightly shorter or 60 % of this length. Oesophageal portion of the body with some small setae only. Excretory pore at a distance from the anterior head end, only slightly more than 2 buccal length. Tail elongate, somewhat conical at base, then constricted and again slightly swollen at its tip. Length of tail equal to 5 anal diameters. Width at the tip 27 % of the width at the anal diameter.

Genus **Oncholaimellus** De Man 1890

Oncholaimellus mediterraneus nov. spec. (fig. 5 A, B)

1 ♂ (type), 1 ♀ (type), 2 ♀♀, 6 juv., Bay of Mallorca, coral bank.

The present species is distinguished from *O. calvadosicus* De Man by its shorter tail.

Dimensions: ♀ (type) L. 1.132 mm; $\alpha = 25.7$; $\beta = 3.7$; $\gamma = 19$;

$$V. = 50.5\% \begin{array}{rcccccc} 0 & 24 & 140 & 300 & 544 & 1072 \\ \hline & 12 & 36 & 44 & 44 & 20 \end{array} \quad 1132 \mu.$$

Head rounded anteriorly, with 6 distinct labial papillae, and 10 cephalic setae. Longer submedian setae 35.8 % of the corresponding diameter, shorter submedian and lateral setae 28.5 % of the corresponding cephalic diameter. Buccal cavity rather long, wide in its anterior portion, the walls in the posterior portion widened. One large subventral tooth, as long as 82 % of

the length of the buccal cavity. Other particulars as in *O. calvadosicus*, to which I had brought the species at first. Tail however distinctly shorter than in that species, elongate conical with a short spinneret, 3.4 anal diameters long.

Geographical distribution: Palma, Camargue, Villefranche.

Family ENCHELIDIIDAE

Genus **Eurystomatina** Filipjev 1918

Eurystomatina terricola (De Man) (fig. 6 A, B)

1 juv., Mallorca, from colony of *Zoobothryon*.

Dimensions: juv. L. 3.224 mm; $\alpha = 73$; $\beta = 5.38$; $\gamma = 31$.

0	16	240	600	M	3120	
16		40	44	44	40	3224 μ .

Head rounded anteriorly, slightly swollen, with distinct, although not very prominent papillae. 10 cephalic setae, the longer submedian and the lateral setae 34.8 % of the corresponding cephalic diameter, the shorter submedian setae 30.5 % of the same diameter. Amphids lentiform, at a level with the buccal constriction, just posterior to the cephalic setae, 30.5 % of the corresponding diameter. Buccal cavity with vestibulum, the remainder subdivided into 2 portions by a constriction bordered by a cuticular band, which presents two rows of cuticular rods. This band is situated at the middle of the buccal cavity. No true eyespots, but some granular pigment at the corresponding place only. The oesophageal portion of the body presents some short setae. Nerve ring at 40 % of the oesophageal length. Tail short, bluntly conical, 2.95 anal diameters long.

Distribution. Netherlands, brackish soil, Denmark, Sweden, Germany, Mediterranean, Alexandria.

The species strongly resembles *E. ornatum indicum* according to Micoletzky, but misses the eyespots. As far as concerns the excretory pore, that I have not observed, I cannot state anything.

Genus **Conistomella** nov. gen.

This new genus at once may be distinguished from the genus *Symplocostoma* by the fact that the caudal portion of the buccal cavity is conical, whereas anterior and posterior portion of the same are separated by a row of cuticular rods. At this level the buccal teeth project into the lumen of the buccal cavity.

Genotype: *Conistomella brevicaudata* Schuurmans Stekhoven.

***Conistomella brevicaudata* nov. spec. (fig. 7 A, B)**

1 ♀ (type), 2 juv., Bay of Mallorca, coral bank.

Dimensions: juv. 1 L. 1.452 mm; $\alpha = 28$; $\beta = 4.3$; $\gamma = 20.2$.

$$\begin{array}{rcccccc} 0 & 12 & 180 & 340 & 1340 & \\ 8 & & 40 & 48 & 52 & 40 \\ \hline & & & & & 1452 \mu. \end{array}$$

1 ♀ L. 2.888 mm; $\alpha = 36.2$; $\beta = 5.7$; $\gamma = 16.4$; V. = 56⁰/₀.

$$\begin{array}{rcccccc} 0 & 20 & 252 & 512 & 1612 & 2712 \\ 14 & & 60 & 76 & 80 & 28 \\ \hline & & & & & 2888 \mu. \end{array}$$

Head rounded anteriorly, set off by a constriction against the rest of the body. 6 cephalic setae, 26.3 % of the corresponding diameter. Buccal cavity cylindroconical with two teeth projecting from the constriction on-wards. Tail short, conical, 2.6 anal diameters long.

Family CYATHOLAIMIDAE

***Cyatholaimus canariensis* Steiner (fig. 8 A, B)**

1 ♀, Mallorca, from colony of *Zoobothryon*.

Dimensions: ♀ L. 1.38 mm; $\alpha = 19.1$; $\beta = 7$; $\gamma = 14$; V. = 60.9⁰/₀.

Steiner's ♀: L. 1.38; $\alpha = 19.8$; $\beta = 6.4$; $\gamma = 10.9$; V. = 52.02⁰/₀.

The female in question is much alike Steiner's *C. canariensis* so that I have brought it to that species. The vulva lies somewhat more backward than in the type. The lips are distinctly set off with prominent papillae and labial setae, the number of which could not be fixed with certainty. The pairs are composed of components, which are subequal in length, the longer ones reaching 26 % of the length of the corresponding body diameter. Buccal capsule with strongly cuticularised longitudinal ribs. No distinct basal tooth. Amphids opposite to the base of the buccal capsule, with 3½ windings, its diameter being 24 % of the corresponding body width. Skin finely punctuated transversely. Tail comparatively short, 2.3 anal diameters long, and broad, elongately conical. Spinneret not effilate, short. Caudal glands 3 in number, filling up almost the whole of the tail. On the tail some short setae.

Cyatholaimus canariensis was described by Steiner after specimens from Orotava, Teneriffa. It does occur also in the western half of the Mediterranean.

***Cyatholaimus paragracilis* nov. spec. (fig. 9 A, B)**

1 ♂ (type), Mallorca, from colony of *Zoobothryon*.

The specimen was found in the same sample as that of *C. canariensis*.

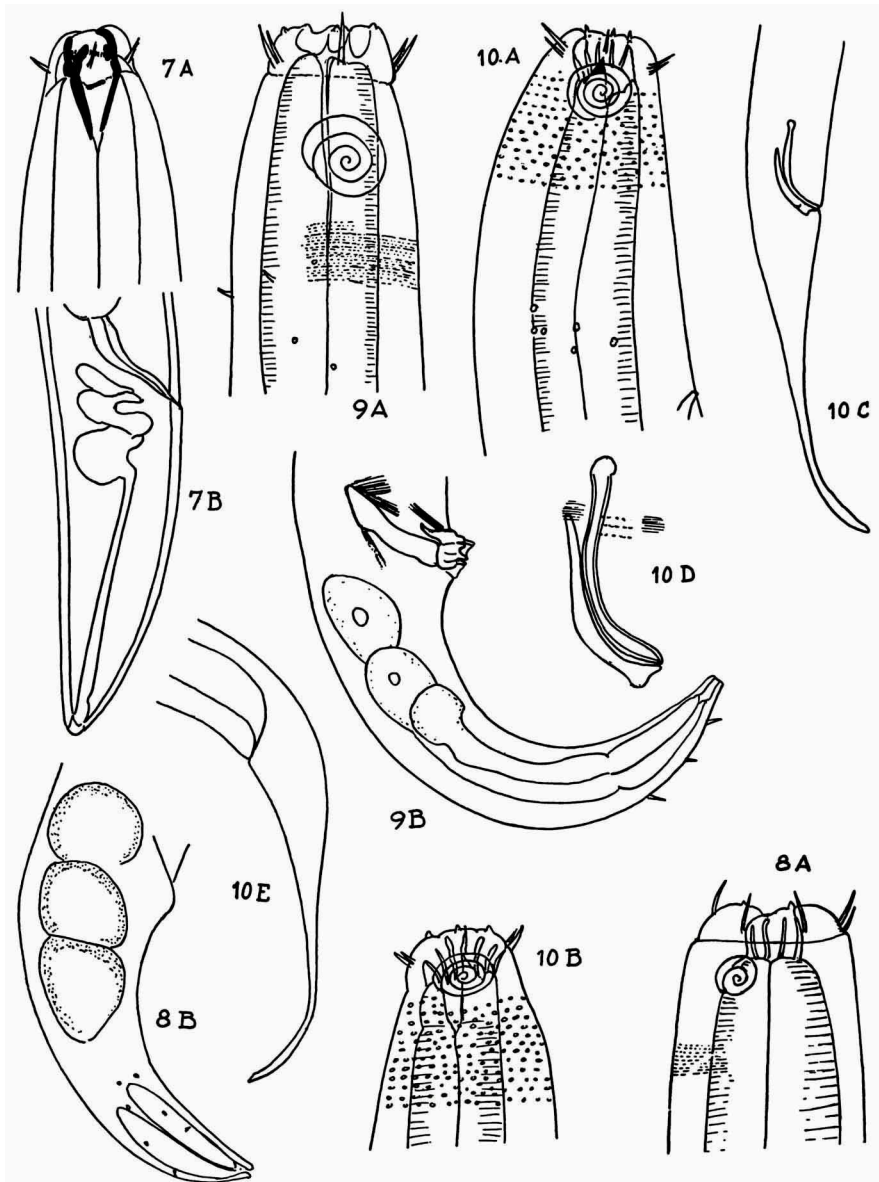


Fig. 7. *Conistomella brevicaudata* Schuurmans Stekhoven. A, head end; B, tail.

Fig. 8. *Cyatholaimus canariensis* Steiner. A, head end; B, tail of a female.

Fig. 9. *Cyatholaimus paragracilis* Schuurmans Stekhoven. A, head end; B, male tail.

Fig. 10. *Paracyatholaimus choanolaimoides* Schuurmans Stekhoven. A, B, head ends; C, male tail; D, spiculum.

Fig. 7B, $\times 625$; 9A, $\times 500$; 9B, $\times 450$; 10C, $\times 312$; the other figures, $\times 750$.

So one might suppose that both should belong to the same species. The male, however, has a distinctly more slender and elongate tail, it has larger amphids, with $4\frac{1}{2}$ windings instead of $3\frac{1}{2}$ ones and a differently structured cyathiform oral capsule with less distinct longitudinal ribs. In this it differs distinctly from Eberth's type of *C. gracilis*. The difference in size and number of windings between the female *C. canariensis* Steiner and the present male might eventually be ascribed to sexual dimorphism, but then there remains the more slender tail and the structure of the buccal capsule. I come to the conclusion that we have to do with the male of a species of which I have found a juvenile specimen in material from Alexandria, which I will here describe as new and closely allied to *C. gracilis* (Eberth).

The juvenile specimen of Alexandria possesses amphids situated at the same spot as in our species, but with $3\frac{1}{2}$ windings. Its tail is slender although not quite so long as in the present male and as for the buccal cavity and the cephalic sense organs the affinity is so close, that I feel justified in bringing this male to the same species as the juvenile specimen from Mallorca. In this case apparently the female and juvenile specimens have amphids with one winding less than the corresponding male.

Dimensions: ♂ (type) L. 2 mm; $\alpha = 33.3$; $\beta = 7.1$; $\gamma = 12.5$.

0	90	200	840	960	
32		64	72	44	1380 μ .

Head distinctly set off, rather truncate. The buccal cavity is fixed whilst the animal was gaping. Labial papillae rather distinct, coniform. 12 cephalic setae arranged in 6 pairs of subequal setae, the shorter ones 27 %, the longer ones 33.3 % of the cephalic diameter at base of the head. Amphids 0.75 cephalic diameter from the anterior border, some distance behind the base of the buccal cavity, their diameter measuring 50 % of the corresponding body diameter. Cuticle finely pointed transversely. Rings bearing in total 4 transverse rows of points. Cuticular pores minute. The cuticle bears scattered small setae. Excretory pore slightly in front of the nerve ring, at 50 % of the oesophageal length. Nerve ring at 53 % of the same length. Male genital apparatus consisting of broad spicula and a gubernaculum with distal denticulate plate with recurved spine. Male tail elongate, slender, 3.9 anal diameters long. Three caudal glands in tandem position. Spinneret tubular, not constricted, but in a line with the rest of the tail.

Geographical distribution: Mallorca, Alexandria.

Genus **Paracyatholaimus** Micoletzky 1921

Paracyatholaimus choanolaimoides nov. spec. (fig. 10 A-E)

1 ♂ (type), 2 ♂♂, 1 ♀ (type), 1 ♀, Bay of Mallorca, coral bank.

The species is characterized by the presence of a long effilate tail, more effilate than in the other hitherto known species of the same genus. In the male I have not found praeanal setae. As for the other characteristics it is a typical *Paracyatholaimus*, confer for instance the amphids which although spiral in structure are more or less elliptical in outline and the genital armature, which is quite as in other species of the genus, confer *P. proximus* (Buetschli).

Dimensions: ♂ (type) L. 1.12 mm; $\alpha = 23.2$; $\beta = 5.6$; $\gamma = 7$.

$$\begin{array}{r} 0 \quad 200 \quad M \quad 960 \\ 20 \quad 44 \quad 50 \quad 32 \end{array} \quad 1120 \mu.$$

♀ (type) L. 1.268 mm; $\alpha = 22.6$; $\beta = 5$; $\gamma = 7.7$; V. = 51.4%.

$$\begin{array}{r} 0 \quad 252 \quad 652 \quad 1084 \\ 20 \quad 52 \quad 64 \quad 36 \end{array} \quad 1268 \mu.$$

Head rounded, lips not very prominent, with conical, labial papillae and 10 cephalic setae, 4 pairs submedian in situation and 2 single ones, at the middle of the amphids. The setae of the pairs are subequal, the longer ones measuring 33 % of the corresponding cephalic diameter, the shorter ones only 20 % of that diameter in the male. In the female the corresponding measurements are 30 % and 20 % of that diameter. Cuticle with coarse punctation, the dots arranged in transverse rows. Amphids spiral, elliptic, situated opposite to the buccal tooth, their diameter just 50 % of the corresponding body diameter in the male sex, 56 % of that diameter in the female sex. In both sexes the amphids show $4\frac{1}{2}$ windings. Buccal cavity deep, with protruding tooth. Vestibulum provided with longitudinal ribs. Excretory pore at 3 cephalic diameters from the head end. Genital armature consisting of comparatively long, curved spicula, with swollen headed proximal ends and blunt distal point; chords of the same 1.38 anal diameters long. Gubernaculum plate-like, with pointed proximal end and a triangular plate at the distal end, which, however, does not bear denticles. Length of the gubernaculum 70 % of the spiculum. Tail at first conical, then, i.e., in its distal half, effilate, pointed at the tip. The female has a similar tail. The shape of the tail reminds of that of *Halichoanolaimus longicauda* Ditlevsen.

Genus *Metacyatholaimus* nov. gen.

This genus is closely allied to *Longicyatholaimus* Micoletzky 1924, but may at once be distinguished from it by the fact that the cuticle presents 3 longitudinal rows of points on the lateral fields, whereas the buccal tooth is indistinct. Amphids transverse, spiral. For the rest consult the species diagnosis.

Genotype: *Metacyatholaimus hirschi* Schuurmans Stekhoven.

Metacyatholaimus hirschi nov. spec. (fig. 11 A-D)

1 ♂ (type), Bay of Mallorca, coral bank.

Dimensions: ♂ L. 1.032 mm; $\alpha = 25.8$; $\beta = 7.8$; $\gamma = 10.1$.

$$\begin{array}{r} 0 \quad 132 \quad M \quad 852 \\ 16 \quad 40 \quad 40 \quad 28 \end{array} 1032 \mu.$$

Head rounded anteriorly. Labial papillae minute. 10 cephalic setae, the longer ones 18 % of the corresponding cephalic diameter. Amphids large, transverse like in *Paracyatholaimus*, spiral, half as wide as the corresponding cephalic diameter. Vestibulum with the usual vestibular folds; tooth indistinct, followed by a cylindrical pharynx. Oesophageal bulb not prominent, oval. Cuticle ringed, lateral fields demarcated by three rows of dots, occupying 25 % of the body diameter. Genital armature consisting of rectangularly curved spicula, truncate at their proximal end, pointed at their distal end, with a distinct chord, the latter 65 % of the anal diameter. Gubernaculum in the shape of a curved plate, $\frac{2}{3}$ as long as the spicula. Tail elongate, conical at base, then tapering and ending in a flagellum just as in *Longicyatholaimus*. Length of tail equal to 6.4 anal diameters.

I have dedicated this species to my friend G. C. Hirsch who has collected for me this material on his trip to Palma in 1932.

Family DESMODORIDAE

Genus **Metadesmodora** nov. gen.

This genus is closely allied to *Desmodora*, differs from the latter that it has no cephalic cuirass like in *Desmodora*. The hoops surrounding the cuticle begin just after the amphids. The head is not distinctly demarcated. Buccal cavity without teeth, more or less like in *Sabatieria*. Amphids more or less cylindrical in outline, composed of two concentric circles, which are placed on a slightly elevated shield. 4 cephalic setae and six setiform cephalic papillae. Oesophagus with a short and broad cardiac bulb.

Genotype: *Matadesmodora amphidiscata* Schuurmans Stekhoven.

Metadesmodora amphidiscata nov. spec. (fig. 12 A, B)

1 juv. (type), Bay of Mallorca, coral bank.

Dimensions: juv. L. 1.224 mm; $\alpha = 38.2$; $\beta = 8.7$; $\gamma = 14.7$.

$$\begin{array}{r} 0 \quad 120 \quad 1140 \\ 16 \quad 32 \quad 32 \end{array} 1224 \mu.$$

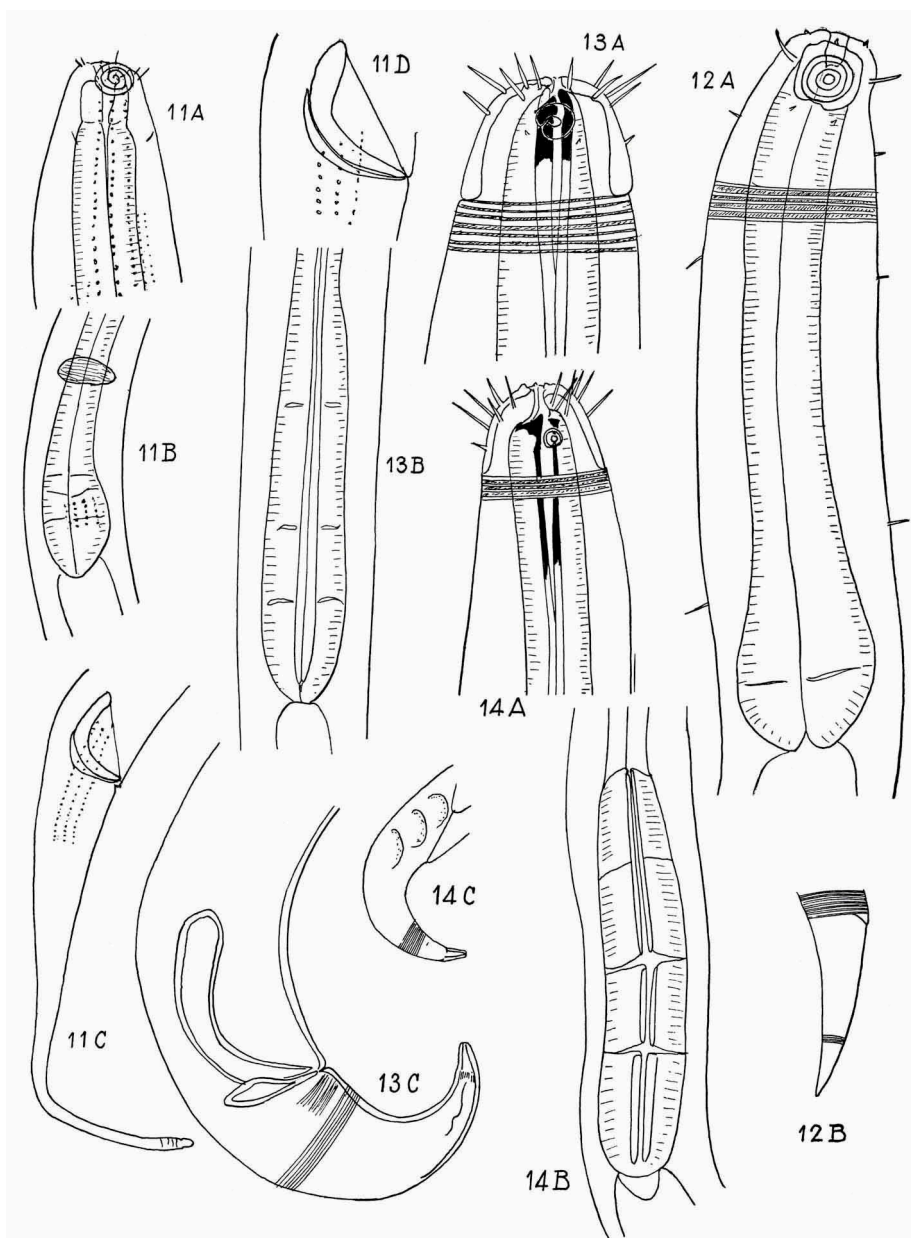


Fig. 11. *Metacyatholaimus hirschi* Schuurmans Stekhoven. A, male head end; B, oesophageal bulb; C, tail; D, spicular apparatus.

Fig. 12. *Metadesmodora amphidiscata* Schuurmans Stekhoven. A, anterior end; B, tail.

Fig. 13. *Acanthopharynx affinis* Marion. A, male head end; B, oesophageal bulb; C, male tail.

Fig. 14. *Acanthopharynx micramphis* Schuurmans Stekhoven. A, male head end; B, oesophageal bulb; C, tail.

Fig. 11A, $\times 625$; 11B, $\times 700$; 11C, $\times 357$; 12B, 14 C, $\times 250$; 13C, D, $\times 500$; 14A, $\times 650$; 14B, $\times 400$; the other figures, $\times 750$.

Head rounded anteriorly, not distinctly set off. The rings begin just after the large amphids and are composed of hoops, separated by shallow grooves just as in *Desmodora*. Lips faintly indicated. 6 cephalic setiform papillae. Labial papillae not seen. Four cephalic setae at a level with the anterior border of the amphids, 33 % of the corresponding cephalic diameter. Amphids large, composed of two concentric circular bands, their diameter being 50 % of the corresponding cephalic diameter. They are situated on a disc-like plate. The skin bears some fine setae more or less arranged in longitudinal rows. Buccal cavity cylindrical, as in *Sabatieria*, but without teeth. Oesophagus vigorous, with proximal cardiac bulbiform swelling. Tail elongate conical, with conical spinneret.

The species has characters in common with representatives of the Comesomidae, confer *Sabatieria* and with the Desmodoridae, confer i.a. the cuticular structure.

Genus *Acanthopharynx* Marion 1870

The genus *Acanthopharynx* belongs to the same group of genera as *Desmodora* and is closely allied to that genus. It may, however, easily be distinguished from the latter by the presence of a complicate cephalic pilosity, found on the head capsule at a level with the buccal tooth, by its spiral amphids, situated opposite the same tooth and by the long elongate oesophageal bulb with its vigorous cuticular lining, which is interrupted at several spots, just as is the case with the oesophageal bulb-musculature at the same spots.

It is open to doubt if *Desmodora merostomacha*, which possesses a similar oesophageal bulb, belongs to *Desmodora*. I have reasons to assume that the head portion of the animal which Steiner has depicted was retracted in part, just as was the case with Filipjev's figure of *Desmodora pontica*. If future researches prove my supposition to be correct, this species should likewise be reckoned to *Acanthopharynx*.

Acanthopharynx affinis Marion (fig. 13 A-C)

1 ♂, Bay of Mallorca, coral bank.

In his studies on the freeliving marine Nematodes from Suez Micoletzky 1924 describes *Acanthopharynx micans* (Eberth) and synonymizes with it *A. affinis* Marion. A comparison of both Eberth's and Marion's measurements learns us, that both species cannot be identical, since Marion's *affinis* measures over 2.1 mm; $\alpha = 27$, whereas a male of Eberth's species did reach a length of 1.25 mm; $\alpha = 96$ only, so that Ebert's species is much slenderer than that of Marion and also of that of Micoletzky. It is not

certain that Micoletzky was correct in taking for granted that Marion's specimens and his were identical; he was certainly wrong in assuming that both should be brought to Eberth's *Acanthopharynx micans*. Marion did not find the praeanal papillae which Micoletzky depicts and of which he says that they are indistinct.

There remains the question if Micoletzky's specimens and ours are identical. The absence of a praeanal papilla, as well as the differences in the structure of the spicula and the gubernaculum make me believe that the two belong to separate species, and that Marion's *affinis* and Micoletzky's so called *A. micans* are not conspecific. Micoletzky's specimens therefore should get a new name, for which I propose **A. marioni** nov. spec.

Dimensions: ♂ L. 2.208 mm; $\alpha = 42.4$; $\beta = 7.2$; $\gamma = 34.5$.

Micoletzky: ♂ L. 1.98 mm; $\alpha = 47$; $\beta = 6.9$; $\gamma = 26.3$ (*micans* Micoletzky nec Eberth).

Marion: L. 2.15 mm; $\alpha = 27$; $\beta = ?$; $\gamma = 25.3$ (*affinis* Marion).

Head dome-shaped, rounded anteriorly, lips not distinct. In front of the spiral amphids one finds 2 crowns of setae, about 20 in total, the anterior one being apparently identical with the cephalic papillae, the posterior one with the cephalic setae. It is also possible that we have to consider the first crown as representatives of the labial, the second as the representatives of the cephalic papillae and that the cephalic setae in this case are represented by the minute setae found behind the amphids. This would include that the amphids have been shifted to a forward position. Amphids spiral, broad-looped, almost 29 % of the corresponding body diameter, opposite to the vigorous buccal tooth. Cuticular cuirass of the head thick. Oral slit narrow, closed, therefore ribs not visible, subventral teeth apparently present. Tooth more or less blunt, falciform. Male genital armature consisting of a triangular plate-like gubernaculum, which has been narrowed to a rather fine point at its distal end, just as in *affinis* Marion, 71 % of the anal diameter. Spicula curved, following an almost rectangular course with a distal point, whereas the proximal end is not distinctly headed. In Marion's *affinis* the spiculum was headed, the difference in question probably is due to the angle under which the spiculum was seen. Length of spicular chord 1.4 anal diameter. No praeanal papillae seen. Male tail curved ventrally, ending in a fine spinneret. Length of tail equal to 2 anal diameters.

Geographical distribution: Mediterranean, Marseilles, Adria, Rovigno, ? Villefranche.

Acanthopharynx micramphis nov. spec. (fig. 14 A-C)

1 ♂ (type), 5 juv., Ibiza, Cala Cana, East of the Bay.

The species in question is closely allied to *A. perarmata* Marion. Unfortunately, however, Micoletzky, who has probably seen that species has never published figures of it. Marion, whose figure is not very natural except perhaps for the tail, has only seen the female. So the literature easily causes confusion. Now fortunately in 1932 I have seen at Naples a male *A. perarmata*, which possesses a single praeanal wart-like elevated papilla. The spiculum is rather broad, curved and possesses no distinct manubrium. The gubernaculum at its proximal end bears a curved hook. On the tail we find 3 subventral almost equidistant papillae and at a level with the ultimate papilla 3 curved setae. Length of tail not quite 1.7 anal diameters. The distinctly spiral amphids are not quite so small as Micoletzky says, but measure 28 % of the corresponding body width, that is more than $\frac{1}{4}$ against $\frac{1}{5}$ in Micoletzky's case. Number of cephalic setae about 32. Head, however, distinctly longer than it is wide at the base of the tooth, which is plump. The present species may be easily distinguished from the true *perarmata* by the smaller amphids, the smaller number of cephalic setae, the more acutely pointed tooth, the male genital armature and the shape and armature of the tail.

It remains possible that Micoletzky has confused two species.

Dimensions of a juvenile specimen (type): L. 1.036 mm; $\alpha = 23.5$;

$$\beta = 3.7; \gamma = 17.2. \quad \frac{0 \quad 20 \quad 132 \quad 280}{20 \quad \quad \quad 44 \quad 44} \quad \frac{M \quad 976}{32} \quad 1036 \mu.$$

Head rounded anteriorly, cone-shaped. Lips with labial papillae. Vestibulum with vestibular folds. There are 3 instead of 2 crowns (as in *A. affinis*) of cephalic setae, together about 22 setae in total, the setae of the posterior crown being longer than those of the anterior one, measuring 46 % of the corresponding cephalic diameter. Amphids just posterior to the sockle of the dorsal tooth, circular in outline, in reality a spiral with a large central dot. Diameter of the same 14 % of the corresponding body diameter. Just posterior to the amphids there is a transverse row of shorter setae, apparently 4 setae in total. Buccal tooth large, rather sharply pointed, subventral teeth minute. Oesophageal bulb elongate, its cuticular lining with two, its musculature with 4 protoplasmatic interruptions. Male genital armature consisting of a spiculum without proximal heading. Spiculum curved, wider at its proximal end, possessing a longitudinal crest. Distal end pointed. Gubernaculum peculiar, band-shaped, with anterior and posterior tooth-like projections. There are 2 praeanal spines. Male tail with a row of

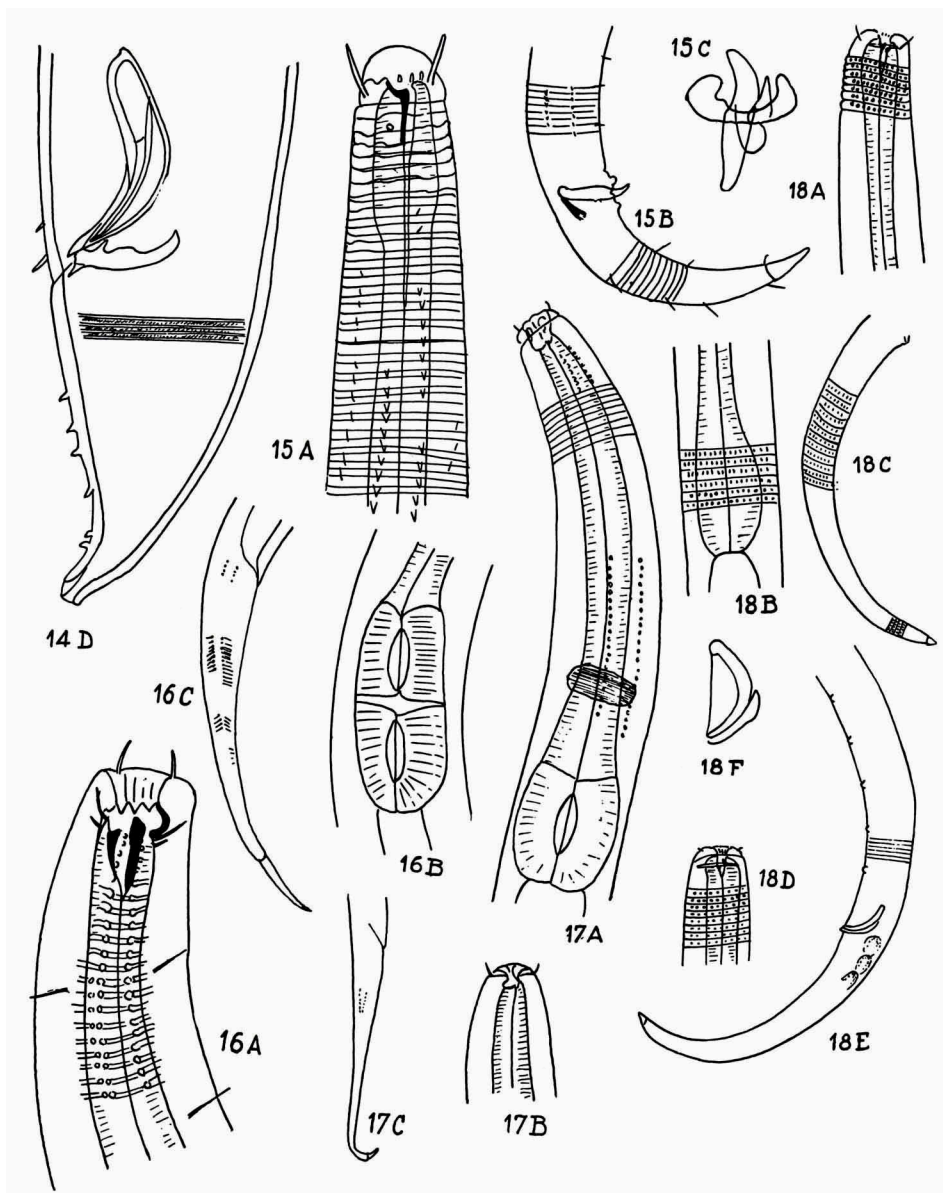


Fig. 14. *Acanthopharynx micramphis* Schuurmans Stekhoven. D, male tail.

Fig. 15. *Monoposthia costata* (Bastian). A, head end; B, male tail; C, spicular apparatus.

Fig. 16. *Spilophorella euxina* Filipjev. A, female head end; B, oesophageal bulb; C, tail.

Fig. 17. *Dichromadora microdonta* Kreis. A, B, female head end; C, tail.

Fig. 18. *Prochromadorella mediterranea* Micoletzky. A, female head end; B, female oesophageal bulb; C, female tail; D, male head end; E, male tail; F, spicular apparatus.

Fig. 15A, B, 18C, $\times 400$; 16B, 18D, $\times 500$; 16C, $\times 250$; 17B, $\times 200$; 18A, B, D, $\times 625$; 18E, $\times 375$; the other figures, $\times 750$.

spines and warts on the distal half, spinneret broad and plump. Length of tail 1.75 anal diameters. In a juvenile specimen the tail was 3.3 anal diameters long, its spinneret still more distinctly set off.

Genus **Monoposthia** De Man 1889

Monoposthia costata (Bastian) (fig. 15 A-C)

1 ♂, 2 juv., Ibiza, Cala Cana, East of the Bay.

Although there are slight differences from the type from more northern seas, so for instance in the shape of the spiculum, which is less s-shaped and more rod-like than in the *M. costata* from the North Sea I have brought the specimens to that species. I give here some figures that may be a base for future research. Buccal tooth blunt, amphid small, smaller than in *costata* from the coasts of the North Sea, pilosity on the tail not so long as in the typical *Monoposthia costata*.

Geographical distribution: North Sea, Baltic, Black Sea, Mediterranean.

Family CHROMADORIDAE

Genus **Spilophorella** Filipjev 1918

Spilophorella euxina Filipjev (fig. 16 A-C)

2 ♂♂, 5 ♀♀, 1 juv., Bay of Mallorca, coral bank.

Dimensions of a female: L. 1.06 mm; $\alpha = 22.5$; $\beta = 4.4$; $\gamma = 6.6$;

$$V. = 50\% \cdot \frac{0}{20} \frac{160}{36} \frac{240}{48} \frac{562}{48} \frac{900}{28} 1060 \mu.$$

The species in question, which I could study at a more ample material from Villefranche, is characterized by a relatively coarse buccal armature, the vestibulum bearing very distinct cuticular folds, the dorsal tooth as well as the ventral being prominent. Cephalic setae rather long as is also the pilosity on the body. Tail elongate with filiform spinneret. Cephalic setae 35 % of corresponding body diameter. Shortly behind the head two pairs of subequal setae. Rings of cuticula interrupted at the lateral fields and ending there in dots, width of lateral fields: 22 % of corresponding body diameter. Oesophageal bulb composed of two consecutive bulbs of almost equal size. Tail slender, 6.6 anal diameters long.

Geographical distribution: Villefranche, Black Sea, Balearic Islands.

Genus **Dichromadora** Kreis 1929

Dichromadora microdonta Kreis

3 ♀♀, 2 juv., Bay of Mallorca, coral bank.

The structure of the head, the structure of the tail with its rather long

filiform spinneret, the structure of the skin as well as the structure of the buccal cavity make me believe that we have here before us the species that Kreis has described for Trébeurden as *Dichromadora microdonta*.

Dimensions of a ♀: L. 652 μ ; $\alpha = 20.3$; $\beta = 5.8$; $\gamma = 6.5$;
 $V. = 47\%$. $\frac{0}{8} \frac{112}{28} \frac{312}{32} \frac{552}{20} 652 \mu$.

Head distinctly set off, cephalic papillae faint, cephalic setae short, 23 % of cephalic diameter at base of the head. Buccal cavity rather deep. Vestibulum with faint folds. Tooth sharp, but not very distinct, its inner border curved anteriorly. Cuticle ringed, on the lateral sides one finds 2 longitudinal rows of points, which occupy 33 % of the corresponding diameter. Bulb large, probably a second anterior bulb is present. Tail slender elongate with filiform spinneret, such as is typical for species of *Spilophorella*.

Geographical distribution: Atlantic Coast of France, Mediterranean, Balearic Islands.

Genus **Prochromadorella** Micoletzky 1924

Prochromadorella mediterranea Micoletzky (fig. 18 A-F)

1 ♂, 1 ♀, Mallorca, from colony of *Zoobothryon*.

The species was found on an earlier date by Micoletzky in the Mediterranean, Adria, Rovigno, Meleda, Ombla Bay, near Ragusa, Bocche di Catarro and in Suez.

Head rounded anteriorly, labial papillae less distinct than in *P. neapolitana*. Cephalic setae 40 % of the corresponding body diameter. Amphids slit-like. Cuticula ringed without differentiations on the lateral fields. Buccal capsule shallow, vestibular folds indistinct. Buccal teeth shorter than in *neapolitana*, not protruding from the buccal capsule. Oesophageal bulb elongate. Female tail rather long and slender, 8 anal diameters long.

In the male I have distinctly seen labial papillae and cephalic papillae, cephalic setae broken off. Buccal teeth as in the female. Anterior portion of oesophagus swollen in both sexes. The male possesses 5 equidistant praeanal papillae, the most anterior one at 5 anal diameters from the anal opening. Spiculum pointed at its distal end, with proximal headed end. It is curved, whereas its chord measures 0.92 anal diameter. Gubernaculum reaching to the spicular bend, slipper-shaped, not longer than half the length of the spiculum. Male tail 5.5 anal diameters long, therefore less slender than that of the female.

Dimensions: ♀ L. 0.872 mm; $\alpha = 33$; $\beta = 7$; $\gamma = 6.6$; V. =
 48.2% . $\frac{0 \quad 120 \quad 212 \quad M \quad 768}{14 \quad 20 \quad 20 \quad 20 \quad 16} 872 \mu$.

♂ L. 0.928 mm; $\alpha = 43.6$; $\beta = 7.2$; $\gamma = 8.3$. $\frac{0 \quad 132 \quad 452 \quad 788}{14 \quad 20 \quad 28 \quad 16} 928 \mu$.

Genus *Chromadora* Bastian 1865

The material of *Chromadora* from Mallorca is scanty. If we consult the literature it is rather evident that a solution of the problems of that genus can only be solved by studying an ample material from different localities on a statistical basis. This is, however, impossible at the present moment. The difficulty is moreover that most authors give no adequate figures. Further the differences between the species in question are small. If I take it for granted that Micoletzky has given a sound base for the identification of the different species, then I am rather sure that the present specimens do belong to Filipjev's species *C. quadrilinea*. For that identification pleads likewise the shape of the tail with its particular bend. At the other hand I have seen specimens from Alexandria which are closely allied to the present species, with a roundish oesophageal bulb, which is certainly no more than $1\frac{1}{2}$ times as long as broad, but which no more than 2 papillae and a slightly different shape of the male tail, which I have brought to *C. brevipapillata* Micoletzky, for reason of the 2 papillae. The difference with the true *C. quadrilinea* Filipjev from the Black Sea is that the latter species generally has 6 praeanal papillae and that the most posterior of that row is situated just opposite the head end of the spicula, which is not the case in our specimen. But this neither is the case in the male from Alexandria although in this male the posterior papilla is situated more close to the head end of the spiculum than in the present specimen. So it remains open to doubt: 1, if Micoletzky's *quadrilinea* is synonymous with Filipjev's *C. quadrilinea*; 2, if the number of papillae is essential for the separation of the species, and 3, if we have not to reckon with the probability, that *brevipapillata* Micoletzky and *quadrilinea* Micoletzky nec Filipjev should belong to one and the same species. At the other hand we should reckon with the possibility that Micoletzky's separation of *C. bipapillata*, *C. tripapillata*, *C. quinquepapillata*, etc., was correct.

For the present moment I will bring the specimens from Mallorca to *Chromadora brevipapillata* although I am aware that there are almost as many arguments for the opinion that it should belong to *C. quadrilinea*. I have brought the specimens in question to *C. brevipapillata* because the possession of only one more praeanal papilla according to my idea is not

sufficient to separate the species from Alexandria and the Balearic Islands, whereas the true *quadrilinea* from the Black Sea is in the possession of 6 papillae.

***Chromadora brevipapillata* Micoletzky (fig. 19 A-C)**

1 ♂, 1 ♀, Mallorca, from colony of *Zoobothryon*.

1 ♀, Bay of Mallorca, coral bank.

Dimensions: ♂ L. 0.824 mm; $\alpha = 5.8$; $\gamma = 7.8$.

♀ 1 L. 0.8 mm; $\alpha = 25$; $\beta = 6.2$; $\gamma = 7$; V. = 48 $^{\circ}$ / $_{10}$.

$$\begin{array}{rcccccc} 0 & 96 & 128 & 188 & 384 & 684 \\ 12 & & 28 & & 32 & 20 \end{array} \quad 800 \mu.$$

♀ 2 L. 0.860 mm; $\alpha = 30.7$; $\beta = 5.8$; $\gamma = 7.4$; V. = 47 $^{\circ}$ / $_{10}$.

$$\begin{array}{rcccccc} 0 & 44 & 120 & 148 & 204 & 404 & 744 \\ 12 & 20 & & 24 & & 28 & 20 \end{array} \quad 860 \mu.$$

Length of oesophageal bulb 25 % of oesophageal length.

Male with a tail, that is not quite as in *quadrilinea*, since it has not the peculiar bend, which however is present in the male from Alexandria, so that this feature should not suffice to separate *brevipapillata* and *quadrilinea*. In stead of 2 praeanal papillae we find 3 of these. They are equidistant, the most anterior is separated from the anus by a distance equal to 3.1 anal diameters. Third papilla in front of the head of the spiculum. The latter is distinctly headed, more so than in the corresponding male of *C. quadrilinea*. Spiculum pointed at its distal end. Length of the same equal to 1 anal diameter. Gubernaculum sinuous at its anterior border, pointed at its proximal end. Tail curved ventrally with distinctly set off spinneret, 4 anal diameters long.

Female 1 slightly differing from female 2, the first with distinct cephalic papillae and cephalic setae, labial papillae not seen, since the anterior head end is slightly retracted. In the other female no cephalic sense organs are to be seen except the faint cephalic papillae, the cephalic setae apparently have been broken off. The latter measure 43 % of the corresponding cephalic diameter. They are shorter than in Filipjev's *quadrilinea*. Buccal cavity with folded vestibulum. Buccal teeth distinct. Oesophagus with circular to oval bulb, 18-25 % of the oesophageal length. Cuticle with 4 rows of dots in the lateral fields, the inner rows more distinct and more widely separated than the lateral rows which are composed of finer dots. A few setae are present. Tail shaped as in *C. quadrilinea*, with a peculiar bend, in female 1: 5.33 anal diameters long, in female 2: 6.5 anal diameters long.

Geographical distribution: Mediterranean, Alexandria, Balearic Islands, Suez.

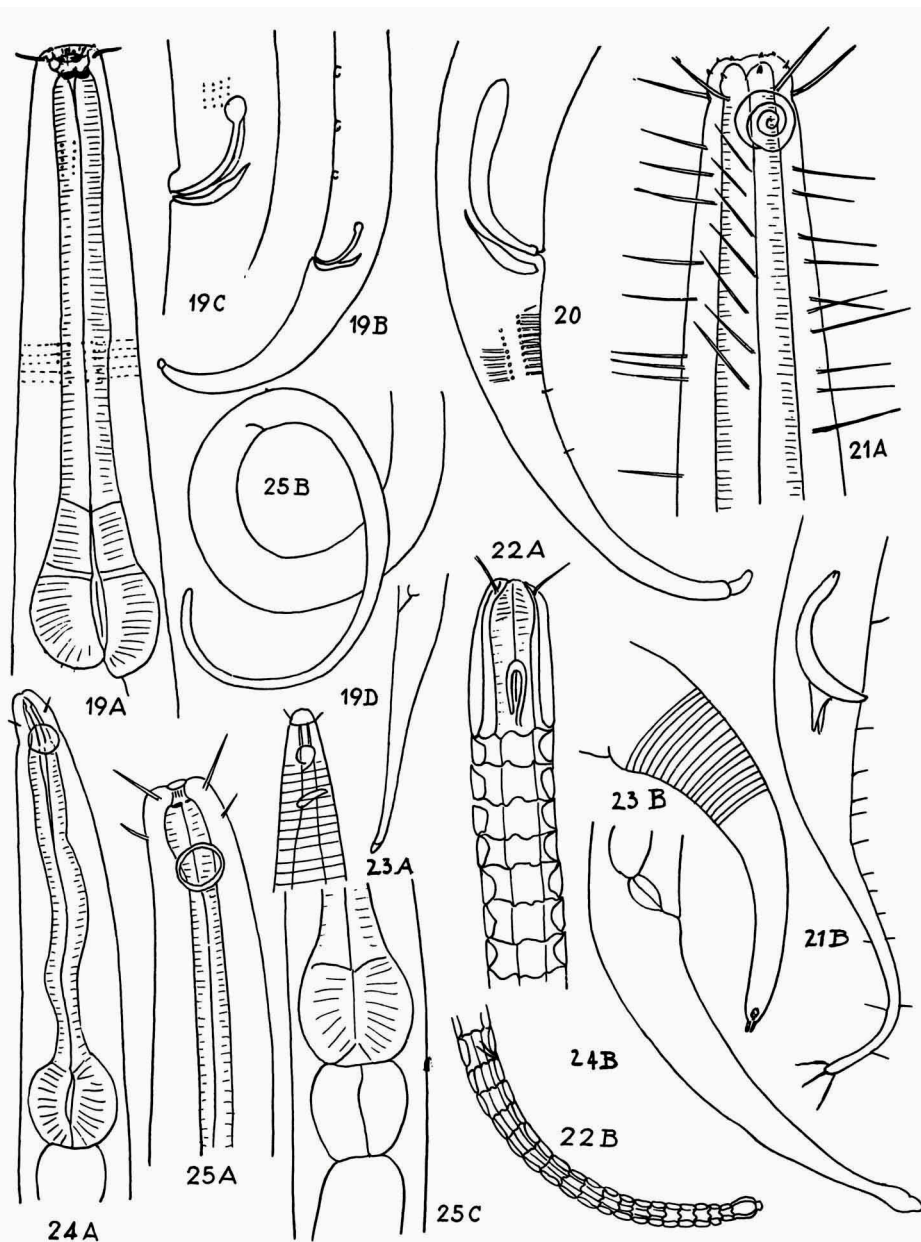


Fig. 19. *Chromadora brevipapillata* Micoletzky. A, male head end; B, male tail; C, spicular apparatus; D, female head end.

Fig. 20. *Hypodontolaimus ponticus* Filipjev. Male tail.

Fig. 21. *Sabatieria hilarula* De Man. A, male head end; B, male tail.

Fig. 22. *Pselionema annulatum* (Filipjev). A, head end; B, tail.

Fig. 23. *Halaphanolaimus minutus* Schuurmans Stekhoven. A, female head end; B, female tail.

Fig. 24. *Aegialolaimus tenuicaudatus* Allgén. A, female head end; B, tail.

Fig. 25. *Metalinhomoeus effilatus* Schuurmans Stekhoven. A, head end; B, tail; C, oesophageal bulb.

Fig. 19A, 20, $\times 650$; 19B, $\times 400$; 21B, $\times 500$; 23A, 24B, $\times 600$; 23B, $\times 550$; 25A, $\times 575$; 25B, $\times 625$; the other figures, $\times 750$

Genus **Hypodontolaimus** De Man 1888

The genus *Hypodontolaimus* has got its name after the structure of the buccal cavity. The majority of the species has a single oesophageal bulb with the exception of *Hypodontolaimus ponticus* of the Black Sea. This species has a double bulb just as *Spilophorella*.

Hypodontolaimus ponticus Filipjev (fig. 20)

2 ♂♂, 5 ♀♀, 1 juv., Bay of Mallorca, coral bank.

I have compared my specimens with those observed at Villefranche. There is in my specimens from Villefranche just as in those of Mallorca a double oesophageal bulb. The specimens are, however, somewhat shorter as one may see from the dimensions of the male I have measured.

Dimensions: ♂ L. 0.648 mm; $\alpha = 27$; $\beta = 4.05$; $\gamma = 8.5$.

$$\begin{array}{rcccccc} 0 & 100 & 160 & 280 & 572 & \\ \hline 20 & & 24 & 24 & 20 & 648 \mu. \end{array}$$

Male tail almost 5 anal diameters long, with some short setae. Dots of the lateral rows 25 % of the corresponding diameter apart. Gubernaculum shovel-shaped, with filiform posterior prolongation. Spicula blunt at tip, broader at their proximal end, curved, this chord 1.8 anal diameters long. The gubernaculum not reaching further than the hook of the spicula.

Geographical distribution: Mediterranean, Balearic Islands, Black Sea.

Family COMESOMIDAE

Genus **Sabatieria** De Rouville 1903**Sabatieria hilarula** De Man (fig. 21 A-C)

1 ♂, 4 juv., Bay of Mallorca, coral bank.

Dimensions: ♂ L. 1.776 mm; $\alpha = 30$; $\beta = 8.2$; $\gamma = 8.8$.

$$\begin{array}{rcccccc} 0 & 216 & M & 1576 & \\ \hline 16 & 40 & 60 & 44 & 1776 \mu. \end{array}$$

Head with the usual cephalic sense organs. Cephalic setae long, as long as the corresponding body diameter. Amphids spiral, $3\frac{1}{2}$ windings, their diameter 66 % of the corresponding body diameter. Along the oesophagus longitudinal rows of very long setae, about as long as the corresponding body diameter. Male genital armature consisting of curved spicula, almost equal in width over their whole length. Spicular chord 1.5 anal diameters long. Gubernaculum with forked dorsal apophysis, the latter short. Tail slender, its distal half filiform. The tail bears numerous short setae especially on the ventral side. Tail length equal to 5 anal diameters.

Geographical distribution: North Sea, Atlantic coast of France, Mediterranean, Villefranche.

Family CERAMONEMATIDAE

Genus **Pselionema** Cobb 1933

Syn. *Steineria* Filipjev 1922

The Genus *Pselionema* Cobb is closely allied to *Ceramonema* Cobb 1920. It differs from the latter in the number of cephalic setae (4 in *Pselionema*, 6 in the anterior row in *Ceramonema*). The amphids are loop-shaped in *Pselionema*, have the shape of a shepherd's crook in *Ceramonema*. In both there is a distinct cephalic cuirass, which apparently has induced Filipjev, Cobb and Chitwood to place them in the affinity of the *Desmodoridae*. Both possess also roof-tile-shaped annules on the skin. The shape of the amphids, the possession of 4 cephalic setae cause me to believe that the genera in question belong to the Araeolaimoidea and should be brought in a family close to the Axonolaimidae.

Pselionema annulatum (Filipjev) (fig. 22 A, B)

1 juv., Bay of Mallorca, coral bank.

Head with distinct head capsule, 4 cephalic setae as long as the corresponding cephalic diameter. Lateral fields broad, half as wide as the corresponding diameter. Oesophagus reaching to the anterior end and enveloping the narrow oral slit. Amphid an open loop, near the posterior head end, its width equal to 22 % of the corresponding cephalic diameter. Tail slender, 12.5 anal diameters long, almost as wide throughout its whole length with slightly swollen spinneret.

Geographical distribution: Black Sea, Crimea, Mediterranean, Balearic Islands.

Family HALAPHANOLAIMIDAE

Halaphanolaimus Southern 1914

Halaphanolaimus minutus nov. spec. (fig. 23 A-C)

1 ♀ (type), 1 ♀, 1 juv., Bay of Mallorca, coral bank.

The species most closely resembles *Halaphanolaimus pellucidus*, Southern, but differs from the latter species in its size, in the absence of tubuli in the female sex and in the shape of the buccal cavity, which was said to be absent in the only known species *Halaphanolaimus pellucidus*, but is cylindrical in the present species and resembles to that of *Dermatolaimus*. The anterior head end at the other hand is shaped like in *Halaphanolaimus*,

as are the amphids, so that I feel justified in bringing this species to the genus *Halaphanolaimus* Southern.

Dimensions: ♀ (type) L. 0.78 mm; $\alpha = 19.9$; $\beta = 3.4$; $\gamma = 12.1$;
 $V. = 55.1\%$. $\frac{0}{6} \frac{208}{32} \frac{428}{36} \frac{716}{28} 780 \mu$.

Head end conical, distinctly set off against the body, beset with 4 setae half as long as the cephalic diameter. Vestibulum seemingly absent. Buccal cavity cylindrical, short, with distinct cuticular lining. Amphid spiral consisting of $1\frac{1}{2}$ winding, 45 % of corresponding body diameter. Oesophagus at first narrow, soon widening, more or less cylindrical, ending in an indistinctly set off bulb. The oesophagus is accompanied by large cells. Skin ringed. Tail rather broad at base, soon narrower, distal half cylindrical, with spinneret. Length of tail equal to 3.5 anal diameters.

Genus **Aegialolaimus** De Man 1907

Among the material collected by G. C. Hirsch there is a specimen closely resembling the genus *Aegialolaimus* De Man. Opposite to what we find in the typical *Aegialolaimus elegans* De Man the cuticularisation of the oesophagus does not run throughout the whole oesophagus till the beginning of the oesophageal bulb. The oesophagus is neither tripartite like in that species. So I am not quite sure that we have here to do with a representative of that genus, the more not since I have no male to my disposition. In all essential characters, however, the specimen resembles *Aegialolaimus tenuicaudatus* Allgén, so that I am inclined to bring it to that species, which was formerly found near the island Herdla, from the Trondhjemsfjord and the Oeresund.

Aegialolaimus tenuicaudatus Allgén (fig. 24 A, B)

1 ♀, Bay of Mallorca, coral bank.

Dimensions: ♀ L. 0.72 mm; $\alpha = 36$; $\beta = 7.5$; $\gamma = 9$; $V. = 47\%$.
 $\frac{0}{6} \frac{96}{20} \frac{332}{20} \frac{640}{20} 720 \mu$.

Head rounded, conical, not distinctly set off, 4 cephalic setae, no longer than 36 % of the corresponding body diameter. Amphids circular, 66 % of the corresponding body diameter, at 1 cephalic diameter from the anterior end. Buccal cavity cylindrical, running to about the level of the middle of the amphids. From here the oesophagus begins, ending with a prominent bulb. Tail elongately conical, clavate at its tip. Last $\frac{1}{3}$ flagelliform. Length of tail equal to 5 anal diameters.

Geographical distribution: Norwegian coast, Mediterranean.

Family LINHOMOEIDAE

Genus *Metalinhomoeus* De Man 1907*Metalinhomoeus effilatus* nov. spec. (fig. 25 A-C)

1 juv. (type), Bay of Mallorca, coral bank.

The species is closely allied to *M. tenuicaudatus* but may easily be distinguished from the latter by the longer cephalic setae and the more regularly narrowing of the tail.

Dimensions: (type) L. 2.348 mm; $\alpha = 84$; $\beta = 15.9$; $\gamma = 9.78$.

$$\begin{array}{r} 0 \quad 148 \quad 2108 \\ 16 \quad 28 \quad 28 \quad 18 \quad 2348 \mu. \end{array}$$

Head truncated anteriorly. Cephalic setae at the anterior end, 83 % of the corresponding body width. Subcephalic setae hardly 33 % of the corresponding body diameter, halfway between head end and amphids. Amphids circular at 1 body diameter at a level with the cephalic setae from the anterior end, measuring 52 % of the corresponding body width. Buccal cavity more or less hourglass-shaped. Beginning of oesophagus with cuticular thickenings. Longitudinal ribs present. Anterior end of oesophagus slightly swollen. Posterior bulb and cardia present. Tail gradually narrowing towards the filiform, blunt end. Length of tail equal to 15.2 anal diameters.

Genus *Eleutherolaimus* Filipjev 1922*Eleutherolaimus elegans* nov. spec. (fig. 26 A-C)

1 juv. (type), Bay of Mallorca, coral bank.

I have hesitated to bring the juvenile specimen for which I have created the foregoing name to the genus *Eleutherolaimus*, since it did show great resemblance to *Metalinhomoeus effilatus* Schuurmans Stekhoven. The buccal cavity of the present species, however, did not possess the characteristic cuticularisations at the entrance of the oesophagus. Moreover there is no oesophageal bulb present. At the other hand there is no distinctly set off vestibulum oris like this is present in the typical *Eleutherolaimus* species. So the true position of the species remains more or less open to discussion. The tail is relatively spoken distinctly longer than in *Metalinhomoeus effilatus*. This points against an identity of the present species with *Metalinhomoeus effilatus*. So I have brought the specimen provisionally in the genus *Eleutherolaimus*, although I am quite aware, that it may have to change its position if we know all essential characteristics, which may be studied only in fullgrown sexually ripe specimens.

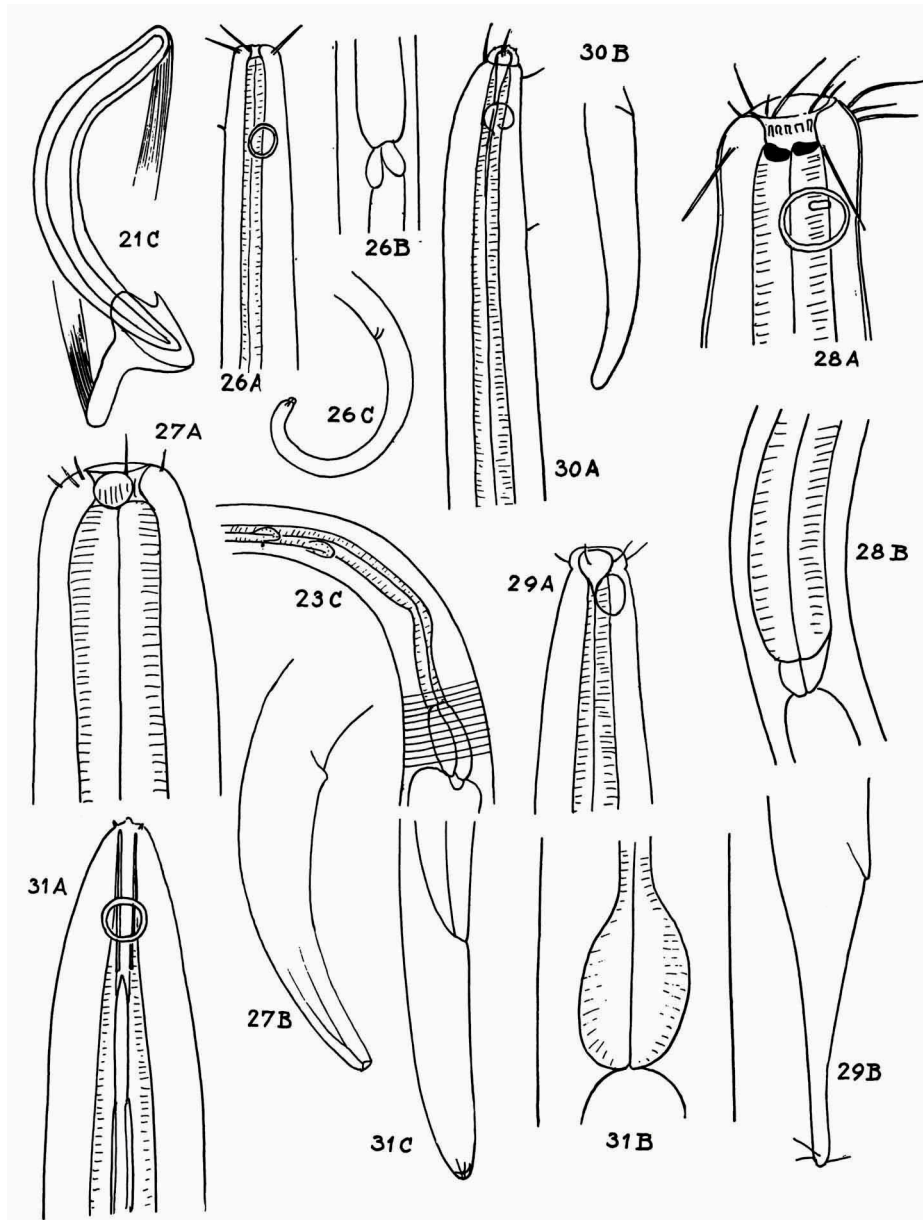


Fig. 21. *Sabatieria hilarula* De Man. C, spicular apparatus.

Fig. 23. *Halaphanolaimus minutus* Schuurmans Stekhoven. C, oesophageal bulb.

Fig. 26. *Eleutherolaimus elegans* Schuurmans Stekhoven. A, head end; B, oesophagus, posterior end; C, tail.

Fig. 27. *Paralinhomoeus amphilabiatu*s Schuurmans Stekhoven. A, head end; B, tail.

Fig. 28. *Linhomoeus macramphis* Schuurmans Stekhoven. A, head end; B, oesophagus, posterior end.

Fig. 29. *Monhystera capitata* Schuurmans Stekhoven. A, head end; B, tail.

Fig. 30. *Monhystera microcephalon* Schuurmans Stekhoven. A, head end; B, tail.

Fig. 31. *Siphonolaimus cylindricaudatus* Schuurmans Stekhoven. A, head end; B, oesophageal bulb; C, tail end.

Fig. 23C, $\times 360$; 26B, $\times 700$; 26C, $\times 290$; 27A, 29B, $\times 575$; 27B, $\times 300$; 28B, $\times 375$; 29A, $\times 625$; 30A, $\times 500$; 30B, $\times 325$; 31A, $\times 350$; 31C, $\times 280$; the other figures, $\times 750$.

Dimensions: (type) L. 1.588 mm; $\alpha = 74$; $\beta = 8$; $\gamma = 9$. Tail length equal to 11 anal diameters. $\frac{0}{6} \frac{148}{16} \frac{1056}{16} \frac{1588}{12} \mu$.

Head end stunted. 4 cephalic setae, 98 % of corresponding cephalic diameter. Moreover short setae at a level with the amphids. The latter almost twice the cephalic diameter from the anterior end. Diameter of the same 41 % of the corresponding body diameter. Oesophagus enlarged posteriorly, with cardia, but without bulb. Tail cylindrical, narrow, ending bluntly, 11 anal diameters long.

Genus **Paralinhomoeus** De Man 1907

Paralinhomoeus amphilabiatatus nov. spec. (fig. 27 A, B)

1 juv. (type), Bay of Mallorca, coral bank.

The species apparently belongs to the genus *Paralinhomoeus* and may be distinguished from allied species by the anterior position of the amphids.

Dimensions. L. 2.424 mm; $\alpha = 50.5$; $\beta = 10.01$; $\gamma = 16.8$.

$$\frac{0}{28} \frac{240}{52} \frac{2280}{48} \frac{2424}{36} \mu.$$

Head truncated anteriorly, apparently with 10 cephalic setae, situated near the rim of the lips. Oral cavity wide with wide opening, the sides of the cavity presenting longitudinal folds. Amphids circular, $\frac{1}{3}$ of corresponding diameter. Setae 25 % of cephalic diameter. Tail short, elongately conical, 4 anal diameters long.

Genus **Linhomoeus** Bastian 1865

Linhomoeus macramphis nov. spec. (fig. 28 A, B)

1 ♀, fragment (type), 2 juv., Bay of Mallorca, coral bank.

Since the tail was broken off no exact data about this species as to the dimensions are available. The specimen in question was certainly longer than 1740 μ . Vulva apparently about in the middle of the body at 1080 μ from anterior end. Ovaries double, bipartite.

Length of fragment 1.740 mm; α greater than 40; β greater than 10. $\frac{0}{24} \frac{160}{40} \frac{1080}{40} 1740 \mu$.

Head rounded anteriorly. No distinct lips. Anterior border with apparently 10 setae, the lateral ones unpaired, the submedian ones paired, the latter pairs composed of 1 long and 1 short seta. The longer setae measure 60 %, the shorter 21 % of the corresponding cephalic diameter. A third crown of setae, situated more caudad, is composed of 4 long elements, these

measuring 64 % of the corresponding body diameter. The mentioned setae are situated halfway the anterior head end and the amphids. The amphids are circular with an excentral dot. Diameter of the amphids equal to 47 % of the corresponding body diameter. Oral opening wide. The buccal cavity is rather shallow, it is provided with longitudinal cuticularized ribs, especially in the vestibulum. At the beginning of the oesophagus we find distinct cuticularisations in the shape of blunt teeth. Oesophagus cylindrical, slightly widening to the posterior end, where a cardia is found at the junction with the intestine.

The species resembles *Linhomoeus ilenensis* Allgén from the Trondhjemsfjord.

Family MONHYSTERIDAE

Genus **Monhystera** Bastian 1865

Monhystera capitata nov. spec. (fig. 29 A, B)

1 juv. (type), Bay of Mallorca, coral bank.

Dimensions: juv. L. 0.762 mm; $\alpha = 27$; $\beta = 5.1$; $\gamma = 12$.

$$\frac{0 \quad 8 \quad 144 \quad M \quad 692}{12 \quad 28 \quad 28 \quad 20} 762 \mu.$$

Head distinctly set off, with 6 cephalic setae, 46 % of cephalic diameter long. Amphids comparatively large, their diameter half the width of the corresponding body diameter. Buccal cavity wide. Tail elongately conical with distal half effilate. Round the tip some setae. Length of tail equal to 3.3 anal diameters.

This species is closely related to *Monhystera attenuata* Filipjev from the Sea of Azov but differs from it in the size of the amphids, in the more forward position of the latter and in the shorter length of the tail.

Monhystera microcephalon nov. spec. (fig. 30 A, B)

1 juv. (type), Bay of Mallorca, coral bank.

Dimensions: L. 1.16 mm; $\alpha = 48$; $\beta = 2.9$; $\gamma = 8.2$.

$$\frac{0 \quad 220 \quad 400 \quad 1020}{8 \quad 20 \quad 24 \quad 24 \quad 20} 1160 \mu.$$

Head distinctly set off, cap-shaped, with rather long setae at its base, measuring 1.5 anal diameters. Lips with distinct papillae. Buccal cavity rather wide. Amphids spiral, open, their diameter half the diameter of the corresponding body diameter. Tail elongately cylindrical, 6 anal diameters long.

Family SIPHONOLAIMIDAE

Genus **Siphonolaimus** De Man 1893**Siphonolaimus cylindricaudatus** nov. spec. (fig. 31 A-C)

1 juv. (type), Bay of Mallorca, coral bank.

Dimensions: L. 1.212 mm; $\alpha = 30.4$; $\beta = 7$; $\gamma = 10.1$.

$$\begin{array}{rccccccc} 0 & 116 & 176 & & 1096 & & \\ 14 & & 36 & 40 & 32 & & 1212 \mu. \end{array}$$

Head conical, surrounded by 4 short setiform papillae. Amphids circular, 40 % of corresponding body diameter. Buccal cavity cylindrical, apparently provided with a spear, which is retracted. Oesophagus ending with a bulbar swelling. Nerve ring at 66 % of oesophageal length. Tail elongately cylindrical, rounded posteriorly, its length equal to 3.6 anal diameters.

Family DESMOSCOLECIDAE

Genus **Tricoma** Cobb 1894**Tricoma nematoides** (Greeff) (fig. 32 A-D)

2 specimens, Bay of Mallorca, coral bank.

In the material collected by my friend G. C. Hirsch 4 *Tricomas* in total were present. As far as I may conclude at present these belong to two species, which may be distinguished by means of the terminal portion of the body. The species *nematoides* possesses a fine stylet at its tail tip, whereas the tail tip of the second species is bluntly rounded. The specimens of *nematoides* have 36 rings, those of the second species 68 and 69 rings respectively, to which must be added the head and the tail tip. In length the specimens of both species do not differ very much. *Tricoma nematoides* measures about 800 μ . It is composed apart from head and tail tip of 36 rings. The head is conical in shape, broad at base, narrowing in front. In contradistinction to what Greeff mentions there are comparatively long and slender cephalic setae, that are almost as long as the corresponding cephalic diameter. Outstanding rings as broad as or even narrower than the intermediate parts. Setae unequally distributed over the sides. At the right side setae were observed on the annuli 2, 4, 6, 8, 10, 12, 14, 17, 20, 29, 31, 36, at the left side on 2, 5, 9, 11, 19, 31, 34. The tail tip is provided with a long pointed mucro.

Geographical distribution: North Sea, Ireland, Mediterranean, Naples, Mallorca.

The chaetotaxy of the species strongly resembles that of *Desmoscolex greeffi* Reinhard, which species according to Stammer belongs to the genus

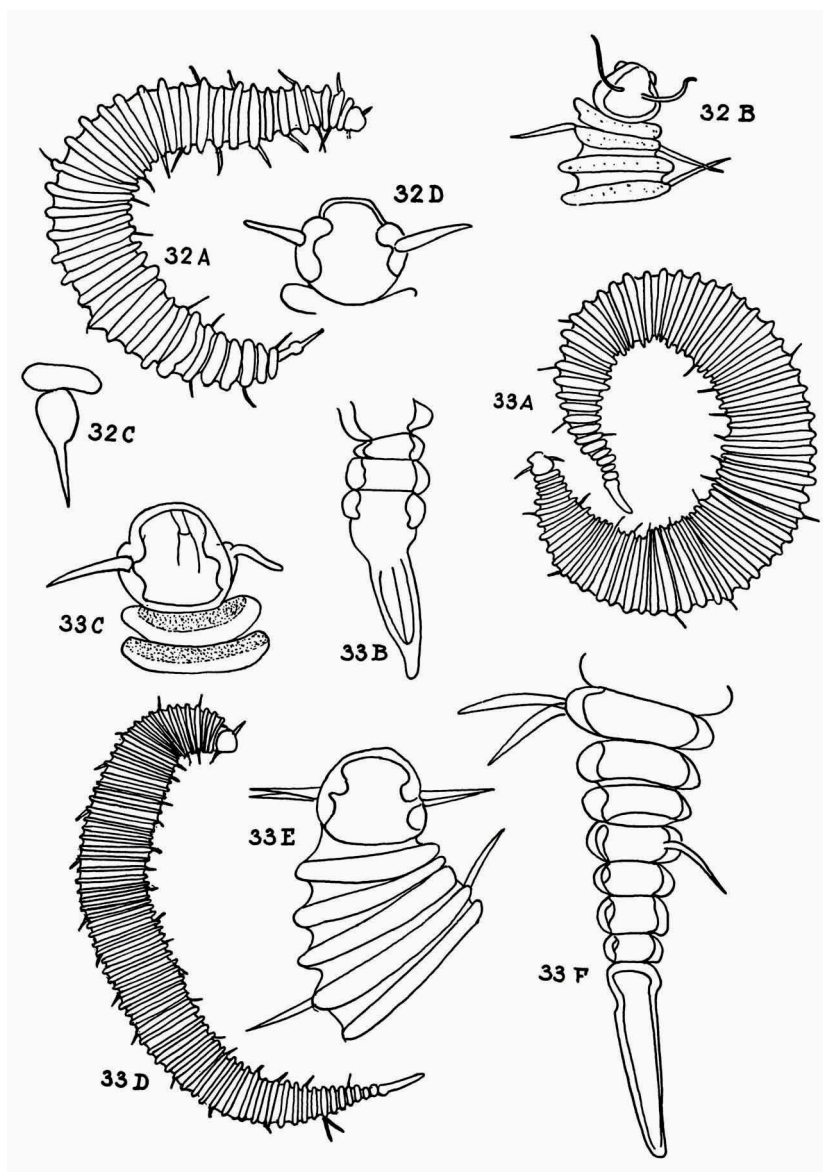


Fig. 32. *Tricoma nematoides* (Greeff). A, total view; B, D, head ends; C, tail tip.

Fig. 33. *Tricoma septuaginta* Schuurmans Stekhoven. A, D, two specimens; C, E, head ends; B, F, tail ends.

Fig. 32A, 33A, D, $\times 200$; the other figures, $\times 750$.

Tricoma and should be named *Tr. greeffi* (Reinhard). The figures which Filipjev (1922) has given of that species allow us to say that it is not identical with that species.

***Tricoma septuaginta* nov. spec. (fig. 33 A-F)**

2 specimens, Bay of Mallorca, coral bank.

Since these specimens cannot be brought with certainty to one of the already known species it is necessary to bring them to a new species, although further and more intimate research of the species in question, especially if we have an ample material before us, might lead to a synonymisation of several of the many species of *Tricoma* hitherto described. About the larval stages of the different species we do not possess any data, nor do we know if the number of rings increases during growth, as might be expected.

Dimensions: L. 0.68 mm; $\alpha = 10.6$; $\beta = 5.6$. $\frac{0 \quad 120}{24 \quad 60 \quad 64} 680 \mu$.

The species may be distinguished from the former by the greater number of rings, 68 and 69 respectively, and by the more blunt and elongate terminal tail ring. Head blunt and truncate anteriorly with 4 cephalic setae, 80 % of the corresponding cephalic diameter long. Cephalic capsule broken. Outstanding annuli as broad as or slightly narrower than the intermediate parts of the rings. The setae have the following disposition:

Specimen 1: right side 6, 13, 15, 18, 21, 25, 28, 30, 33, 36, 39, 43, 63; left side 5, 10, 19, 23, 30, 40, 54, 57, 61.

Specimen 2: right side: 4, 7, 12, 14, 18, 20, 25, 27, 30, 35, 38, 41, 45, 49, 52, 56, 58, 61, 66; left side 4, 8, 12, 16, 21, 26, 32, 36, 41, 45, 50, 54, 59, 64 (2 setae).

The presence of the 2 setae on the 64th ring make me suppose that these 2 setae have something to do with the carrying of the eggs, so that this side should be the dorsal side. I have not seen the anal opening in any of the studied *Tricoma*-specimens. The right side should then be the ventral surface. The second specimen should then be a female. The oesophagus ends in a kind of bulb on a level with the 18th ring. Terminal mucro long and elongate.

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