FREELIVING MARINE NEMATODES FROM STRANGFORD LOUGH, NORTHERN IRELAND.

by

Howard M. Platt

British Antarctic Survey, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, England (1).

Résumé

Nématodes libres marins de Strangford Lough, Irlande du Nord.

Neuf nouvelles espèces de Nématodes libres marins sont décrites de Strangford Lough, Irlande du Nord. Ce sont *Leptolaimus septempapillatus, Theristus longus, Theristus invagiferous, Microlaimus cuanensis, Nudora bipapillata, Prochromadorella septempapillata, Chromadorella duopapillata, Pomponema sedecima* et *Chaetonema riemanni.* Une nouvelle dénomination, *Theristus riemanni,* est proposée pour *Theristus* aff. *curvatus* Riemann 1966. Une clé du genre *Chaetonema* est donnée. *Axonolaimus helgolandicus* Lorenzen 1971 et *Odontophora rectangula* Lorenzen 1971 sont également décrits.

Introduction

The species described in this work were collected during an ecological and taxonomic study of the marine freeliving nematode fauna of an extensive intertidal sandflat in Strangford Lough, Northern Ireland. The ecological data will form the subject of subsequent publications, where a full characterisation of the habitat will be found. For the purposes of this paper, the habitat may be described as fully marine with a relatively large amount of detritus in the sediment. Median grain size 120-200 µm.

The formula adopted in the descriptions is a modification of Filipjev's (1918) formula. The figures above the line represent the distance, measured in micrometres (µm), from the anterior extremity of the body to (i) the base of the oesophagus, (ii) the vulva in the female (in males and juveniles, and also in females where the vulva is not near the mid-point of the body length, the letter "M" designates the mid-point of the body), and (iii) the anus or cloaca. The figures below the line represent the corresponding body diameters, with the first measurement being that of the head diameter. The total length of the animal is placed after the line. The De Man ratios "a", "b" and "c" are used to represent the ratio of the total length of the body to the maximum body diameter, oesophagus length and tail length

(1) Formerly, Department of Zoology, Queen's University, Belfast, Northern Ireland.

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respectively. The spicule length (measured as the chord) or the vulva percentage (the distance of the vulva from the anterior expressed as a percentage of the total body length) is placed after the De Man ratios.

The abbrevation "a.b.d." is used to represent "anal body diameter" in females and "cloacal body diameter" in males. The head diameter was measured level with the cephalic setae. The distance of the amphid from the anterior of the body is measured to the anterior margin of the amphid structure.

All drawings were made with a camera lucida and measurements taken with an eyepiece graticule. The specimens were fixed in formol-acetic and mounted in glycerine.

Type material has been deposited at the British Museum (Natural History) where stated, otherwise in the possession of the author.

DESCRIPTIONS

AXONOLAIMUS HELGOLANDICUS Lorenzen 1971
(Fig. 1)

Material studied

One male.

Body formula and ratios

$$\delta 1: \frac{-\ 216\ M\ 1684}{13\quad 31\ 39\quad 36}\ 1854\,\mu m;\ a=47.5;\ b=8.6;\ c=10.9;\ Spic.=49\,\mu m.$$

Description

Body slender, anteriorly attenuated. Somatic setae 7-9 μm long, sparse (although less so in cervical and caudal regions). Cuticle feintly striated, but annules not particularly narrow - 1.5 μm wide; no longitudinal striations could be seen. Six labial setae, 1 μm long. Four 16 μm cephalic setae situated anterior to the amphid; 1.2 head diameters long. A 13 μm long lateral subcephalic seta is situated 2 μm posterior to the amphids. Approximately level with the subcephalic setae are four additional 7 μm setae. Amphids relatively large, prominant, loop-shaped, 6 μm from anterior, 14 μm long and 8 μm wide. Buccal cavity 23 μm deep, double-conical with six odontia in the anterior part. Oesophagus widens posteriorly but a true bulb is absent. Excretory pore 29 μm from anterior; no ampulla observed. Nerve ring 136 μm from anterior. Conical tail 4.7 a.b.d. long, tapering throughout its length to the tip which bears one 4 μm dorsal and two 8 μm subventral terminal setae. Spinneret does not appear to be trilobed.

Male

Spicules paired, equal and curved; 1.4 a.b.d. long. Gubernaculum bears a pair of 25 μm long slender apophyses. Anterior to the cloaca,

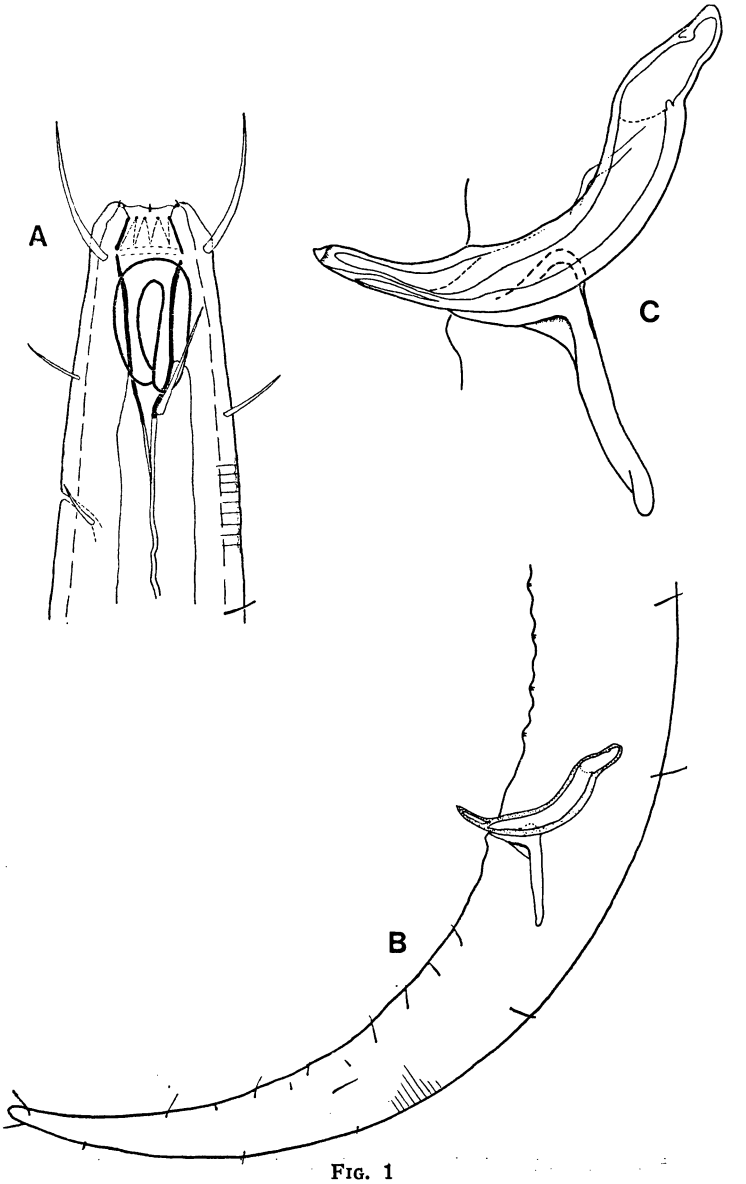

FIG. 1
Axonolaimus helgolandicus
A: male head; B: male tail; C: spicules and gubernaculum.

the ventral cuticle is thrown into a series of transverse folds; each alternate fold bears a minute supplement, 17 in all, becoming spaced further apart anteriorly. Testes appear paired and outstretched.

Female

Not seen.

Discussion

Hopper (1963) distinguishes between the genera *Axonolaimus*, *Synodontium* and *Synodontoides* on the basis of the presence or absence of a lateral subcephalic seta opposite the posterior portion of the buccal cavity and the number of ovaries. *Axonolaimus* is didelphic but lacks a subcephalic seta laterally. *Synodontium* is monodelphic and possesses the seta. *Synodontoides* is didelphic and also possesses the seta. Hopper (1963) also lists "obscured (reduced?) amphids" as a character of *Synodontoides*. However, this feature might prove to be unusual, and when other didelphic species with lateral subcephalic setae are described it might prove necessary to transfer *A. helgolandicus* Lorenzen 1971 to the genus *Synodontoides*.

ODONTOPHORA RECTANGULA Lorenzen 1971
(Fig. 2)

Material studied

One male and one female.

Body formulae and ratios

$$\delta 1: \frac{-\ 146\ M\ 2979}{15\ \ 21\ 24\ \ 23}\ 3084\ \mu m;\ a=128.5;\ b=21.1;\ c=29.4;\ Spic.=17\ \mu m.$$

$$♀ 1: \frac{-\ 131\ 1802\ 2706}{15\ \ 22\ \ \ 27\ \ \ 22}\ 2776\ \mu m;\ a=102.5;\ b=21.2;\ c=39.7;\ V=65\ p.\ 100.$$

Description

Body very long and slender. Cuticle feintly striated, although less feint ventrally around the anus; striae 0.8 µm apart in cervical region, 1.5 µm in anal region. Short 3-6 µm somatic setae only in cervical and caudal regions. Six small labial papillae. Four 17 µm cephalic setae anterior to midpoint of the buccal cavity. Eight subcephalic setae, 12 µm long, are situated posterior to the cephalic setae. Behind the subcephalic setae are four longitudinal rows of 5-6 µm cervical setae, the most anterior lying anterior to the base of the buccal cavity. Amphids 9 µm long and 7-8 µm wide. Buccal cavity double-conical, 22-24 µm deep. Six well cuticularised odontia are situated in the anterior portion of the buccal cavity, and alternate with two circles of cuticularised bodies. Oesophagus widens at the base but a true bulb is absent. Nerve ring 80-85 µm from the anterior.

Tail relatively short, 3.0-4.5 a.b.d., conical throughout and typically curved ventrally. Male tail with short 3-4 μm caudal setae, a single 19 μm dorsal subterminal seta and two 25 μm (1.1 a.b.d.) subdorsal terminal setae positioned 8 μm from tail tip. Caudal glands not observed.

Male

Spicules paired, curved and equal, 0.8 a.b.d. Gubernaculum 7 μm, lying between the spicules and bears two 8 μm apophyses. Testes not clear. No supplements observed.

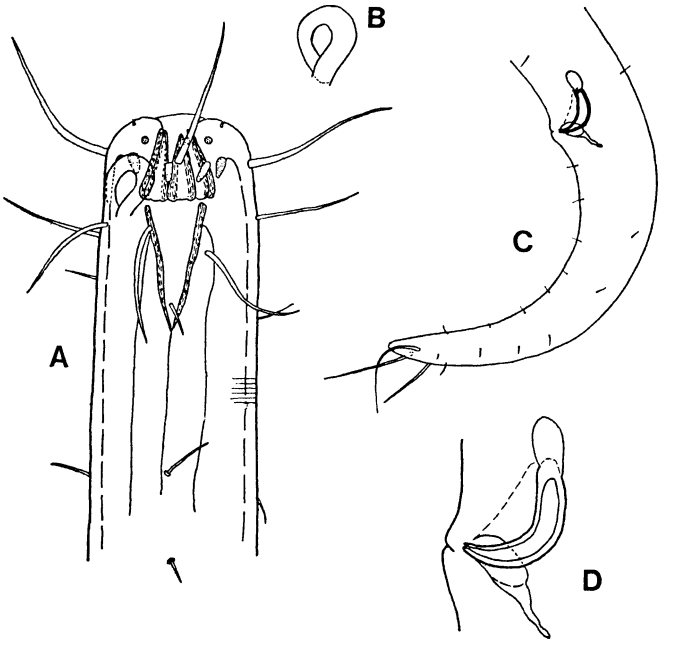

FIG. 2
Odontophora rectangula
A: male head; B: female amphid; C: male tail; D: spicules and gubernaculum.

Female

Ovaries paired, opposed and outstretched. Eggs long and narrow, 140×25 μm.

Discussion

The specimen corresponds closely with *Odontophora rectangula* Lorenzen 1971, although the cephalic setae are slightly shorter in this specimen.

LEPTOLAIMUS SEPTEMPAPILLATUS sp. nov.
(Fig. 3)

Material studied

Holotype - ♂1, B.M. (N.H.) Reg. No. 1971:539.
Allotype - ♀1, B.M. (N.H.) Reg. No. 1971:540.
Paratypes - two males.

Body formulae and ratios

♂1: $\frac{-\ 158\ M\ 850}{6\ \ 19\ 21\ \ 20}$ 935 µm; a=44.5; b=5.9; c=10.0; Spic.=25 µm.

♀1: $\frac{-\ 145\ 458\ 806}{6\ \ 20\ \ 24\ \ 15}$ 896 µm; a=35.8; b=6.2; c=10.0; V=51 p. 100.

Description

Body 789-935 µm in length; anteriorly attenuated. Cuticle coarsely annulated, each "primary" annule is 2 µm wide and is divided into two "secondary" annules (Fig. 3, D). Lateral alae, represented by narrow band of unstriated cuticle, commence about half way along oesophagus and ends just anterior to the anus. Two lateral rows of stout spinose papillae with conspicuous bases are present throughout the body length; other somatic setation absent. Six labial papillae. Four 3 µm cephalic setae. Amphids 4-5 µm wide (60 p. 100 corresponding body diameter), 13-14 µm from anterior. Buccal cavity tubular and 17-20 µm deep, extending beyond the posterior margin of the amphid. Oesophagus narrow with a small posterior bulb, but no other swellings. Tail conico-cylindrical with terminal dilation; 4.9 a.b.d. in male, 6.0 a.b.d. in female.

Male

Spicules paired, equal, only slightly curved, 22-26 µm. Gubernaculum 8 µm, short and rod-like. There are seven precloacal supplements; the most posterior supplement is longest (16 µm), while the others are 12-13 µm. The most anterior supplement is 163 µm from the cloaca. The supplements bear cuticular collars around their distal ends.

Female

Ovaries paired, opposed and reflexed. One large (55×20 µm) egg per uterus.

Discussion

Leptolaimus septempapillatus n. sp. is distinguished by the number of precloacal supplements in the male, the shape of the tail and the size and position of the amphids.

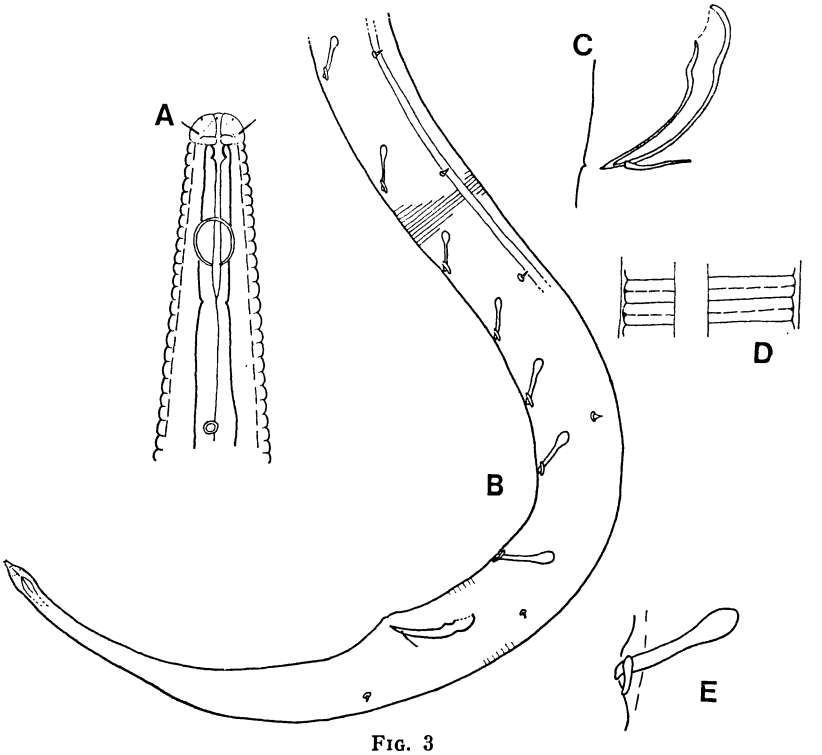

FIG. 3
Leptolaimus septempapillatus
A: male head; B: male tail; C: spicules and gubernaculum; D: cuticle structure; E: a precloacal supplement.

THERISTUS (DAPTONEMA) RIEMANNI nom. nov.
(Fig. 4)

Syn. *Theristus* (*Daptonema*) aff. *curvatus* Riemann 1966
nec Gerlach 1956a.

Material studied

Two males and one female.

Body formulae and ratios

$$\delta 1: \frac{-\ 122\ M\ 838}{10\quad 17\quad 18\quad 16}$$ 950 µm; a=51.8; b=7.8; c=8.5; Spic.=49 µm

$\delta 2: \frac{- \quad 136 \quad M \quad 900}{10 \quad 16 \quad 17 \quad 15}$ 1026 µm; a=60.2; b=7.5; c=8.1; Spic.=55 µm

$\varphi 1: \frac{- \quad 129 \quad 721 \quad 1008}{11 \quad 19 \quad 22 \quad 16}$ 1185 µm; a=51.5; b=9.2; c=6.7; V=61 p. 100

Description

Body slender, cuticle distinctly striated. Labial papillae small. Six 6-8 µm cephalic setae, males with four extra 5-6 µm cephalic setae situated about 1.5 µm behind the ring of six cephalic setae.

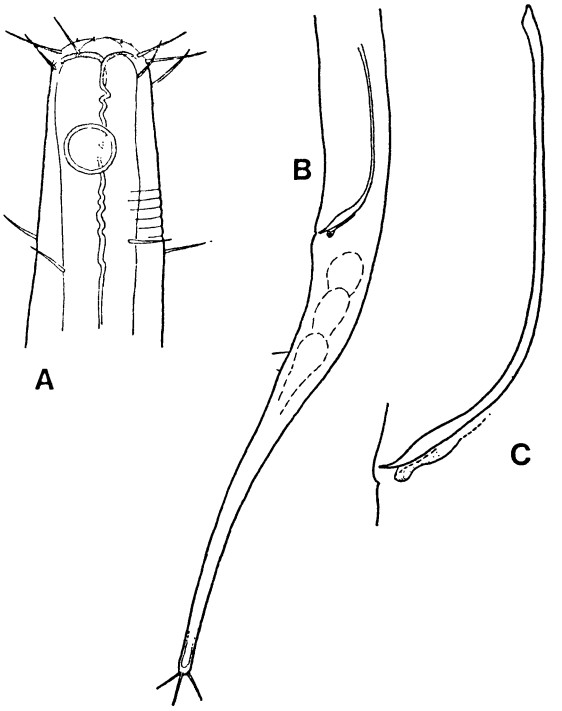

FIG. 4
Theristus riemanni
A: male head; B: male tail; C: spicules and gubernaculum.

About 1 head diameter posterior to the amphids is a circle of 5 µm cervical setae in both sexes. Other somatic setae short and infrequent. Three 7 µm terminal setae. Amphids 9-12 µm from the anterior, 5.0-5.5 µm wide (42-50 p. 100 of corresponding diameter). Nerve ring half way along oesophagus. Tail conical for anterior third, then filiform; 7.0-8.5 a.b.d. in male, 11.0 a.b.d. in female.

Male

Spicules equal, elongate with distal tip characteristically dilated. Gubernaculum reduced and represented by small cuticularised struc-

ture dorsal to the spicules. Two postanal ventral setae; anterior one 5 μm, posterior one 1.5 μm.

Discussion

The specimen corresponds well to Riemann's (1966) description of *Theristus* aff. *curvatus*. Riemann's specimens have equal spicules, while *T. curvatus* Gerlach 1956a bears unequal spicules. There are other differences distinguishing Riemann's specimens from Gerlach's (longer spicules, amphids more anteriorly placed and wider), so the former is renamed *Theristus riemanni*, reserving *T. curvatus* for forms with unequal spicules.

THERISTUS (PENZANCIA) LONGUS sp. nov.

(Fig. 5)

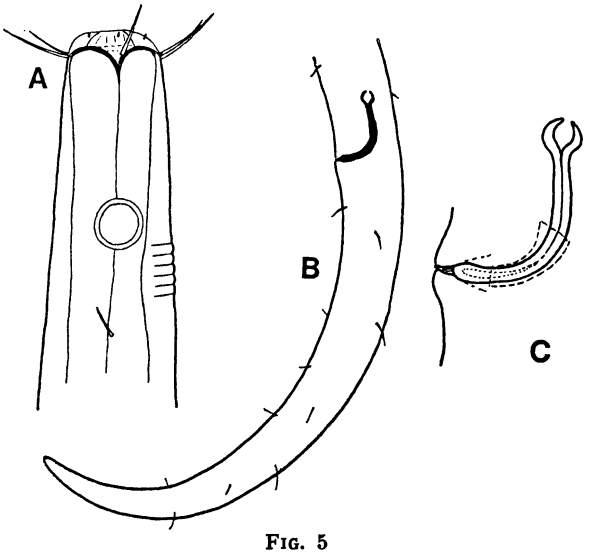

FIG. 5
Theristus longus
A: male head; B: male tail; C: spicules and gubernaculum.

Material studied

Holotype - ♂1, B.M. (N.H.) Reg. No. 1971:541.
Allotype - ♀1, B.M. (N.H.) Reg. No. 1971:542.
Paratypes - two males.

Body formulae and ratios

$$\delta 1: \frac{-\ 156\ M\ 889}{9\ \ 17\ 19\ \ 18}$$ 1023 μm; a=53.9; b=6.6; c=7.7; Spic.=19 μm

♀1: $\frac{-\ 130\ 532\ 780}{10\ 20\ 20\ 15}$ 916 µm; a=43.6; b=7.1; c=6.7; V=58 p. 100

♂2: $\frac{-\ 158\ M\ 938}{9\ 20\ 21\ 19}$ 1084 µm; a=51.6; b=6.9; c=7.4; Spic.=21 µm

♂3: $\frac{-\ 156\ M\ 867}{9\ 17\ 20\ 18}$ 1012 µm; a=50.6; b=6.5; c=7.0; Spic.=19 µm

Description

Body slender, especially the males. Cuticular striations fairly distinct, about 1.0 µm apart in the anterior regions, and 1.5 µm apart in the anal regions. Labial papillae small. Ten cephalic setae; six 7 µm (0.8 head diameters) and four 4-5 µm (0.5 head diameters) long. Somatic setation consists of 4-7 µm setae throughout the body length. Terminal setae absent. Buccal cavity small and cup-shaped ; cheilorhabdions only detected with difficulty. Amphids conspicuous, 15-19 µm (1.7-2.0 head diameters) from anterior and 5 µm (42-46 p. 100 corresponding body diameter in males, 36 p. 100 corresponding diameter in female) wide. Tail tapers throughout its length; 7.5-8.1 a.b.d. in male, up to 9.0 a.b.d. in female.

Male

Spicules equal, curved, strongly cephalate proximally and with a terminal swelling distally. Gubernaculum difficult to distinguish, but apparently tubular. Lateral to the distal ends of the spicules are two terminal hooks; it is difficult to establish a definite connection with either the spicules or gubernaculum. However, since many *Penzancia* species are reported with distal gubernacular hooks, the structures found here are probably homologous.

Female

Ovary single, anterior and outstretched. No eggs seen.

Discussion

Theristus longus sp. nov. is very close to *Theristus blandicor* Rachor 1971 in body shape and size, size of cephalic setation and spicule length. However, the new species may be distinguished by the shape of the spicules, with their well developed cephalisation, and by the slightly smaller amphid size.

Theristus longus sp. nov. may be separated from other members of the subgenus *Penzancia* by its slender body, cephalic setae length, tail length, amphid position and spicule length.

THERISTUS (MESOTHERISTUS) INVAGIFEROUS sp. nov.
(Fig. 6)

Material studied

Holotype - ♂1, B.M. (N.H.) Reg. No. 1971:543.
Allotype - ♀1, B.M. (N.H.) Reg. No. 1971:544.
Paratypes - one female.

Body formulae and ratios

♂1: $\frac{-\ 228\ \ M\ 950}{16\ \ 28\ \ 30\ \ 26}$ 1120 μm; a=37.3; b=4.9; c=6.6; Spic.=26 μm

♀1: $\frac{-\ 255\ 896\ ?}{21\ \ 39\ \ 41\ ?}$ 1250 μm; a=29.8; b=4.9; c=?; V=approx. 70 p. 100

♀2: $\frac{-\ 287\ 1040\ 1283}{?\ \ 42\ \ 46\ \ 34}$ 1475 μm; a=30.8; b=5.1; c=7.7; V=71 p. 100

Description

Cuticle distinctly striated; lateral alae absent. Labial setae small. Ten cephalic setae; six longer 14-17 μm, four shorter 12 μm. The four shorter cephalic setae are frequently closely applied to the longer ones, thus rendering them difficult to observe in many cases. Eight fine cervical setae in four groups placed a short distance posterior to the cephalic setae; four 28-33 μm and four 5-7 μm. Lateral to the amphids in females are two other long setae, again with short setae associated with them; absent from males. A series of very long 50,70 μm cervical setae, with shorter setae interspersed, extend from just posterior to the amphids to halfway along the oesophagus. Occasional 60-90 μm somatic setae posterior to the oesophagus in most specimens; some specimens lack these somatic setae (probably lost during handling). Caudal setae always short. Long stout 66-110 μm terminal setae; length and number appear to be variable. Amphids in male indistinct and thin-walled, 10-11 μm wide and 1.8 head diameters from anterior; central area in some specimens suggests a spiral structure. Amphids in female distinct, 8 μm wide and probably more anteriorly situated, 1.1 h.d. from anterior; slightly oval in outline. Tail 5.5-6.5 a.b.d.; anterior two-thirds conical, then cylindrical.

Only a few specimens were observed with the head in the condition shown in Fig. 6, A and Fig. 6, B: the head of the majority of specimens was invaginated (Fig. 6, C) so that the amphids were at the anterior of the body and cephalic setae drawn well within the invagination. Thus, measurements of the distance of the amphid from the anterior end should be treated with caution. In addition,

the cylindrical portion of the tail was usually invaginated within the conical portion, thus making total length measurement imprecise. As live specimens of this species were not observed, it is not certain whether this condition occurs in nature or is due to fixation methods. Nevertheless, the invaginated condition of this species is typical,

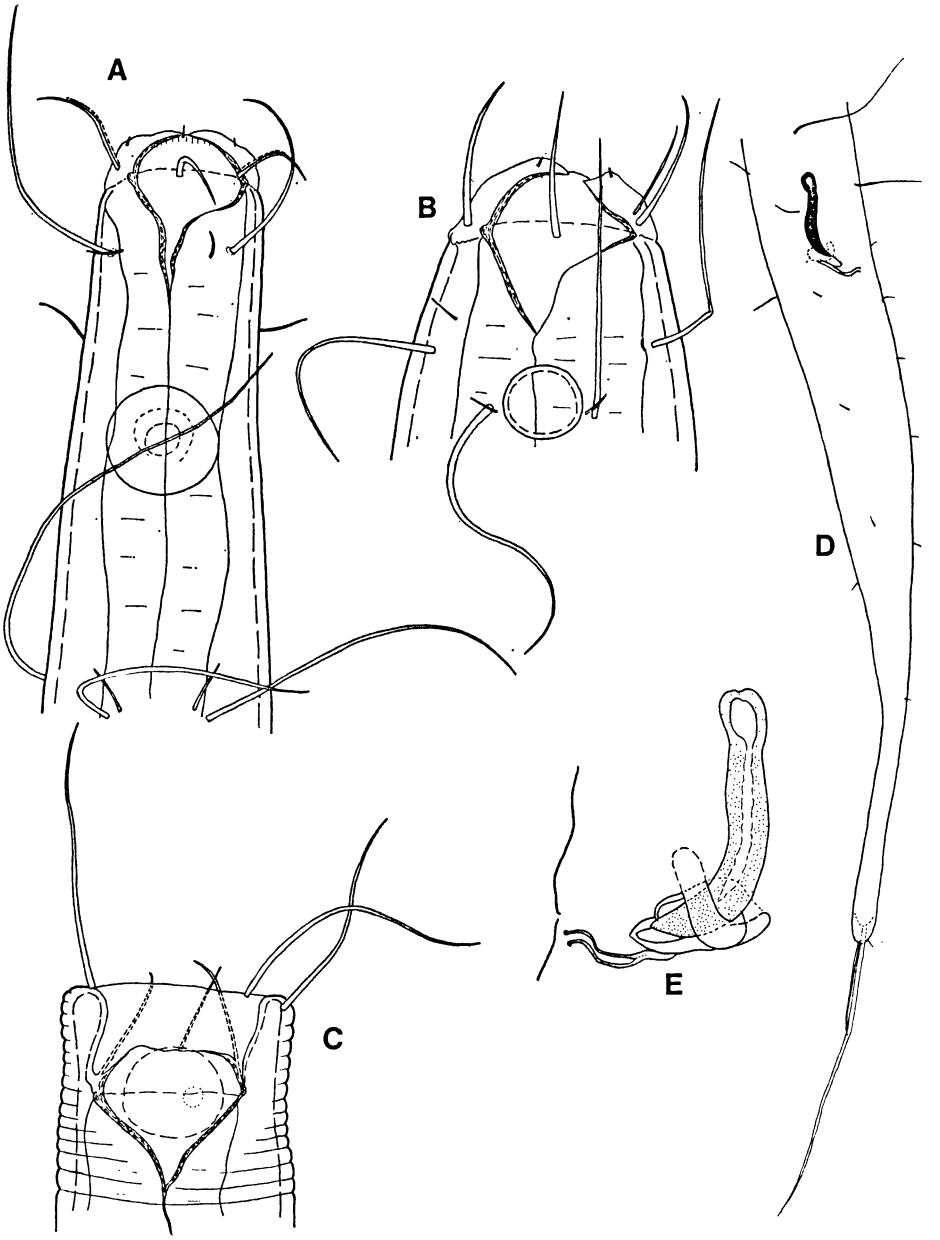

FIG. 6
Theristus invagiferous
A: male head; B: female head; C: male head, invaginated; D: male tail; E: spicules and gubernaculum.

and representatives of other *Theristus* species processed at the same time were never invaginated in this way. Mature specimens of both sexes were found in this condition throughout the year.

Male

Spicules equal and distally curved, 1.0 a.b.d.; very heavily cuticularised and appear solid apart from the proximally cephalised end, although occasional specimens bear a central channel. Typically, the spicules lie in the centre of the body and were never seen near the opening of the cloaca. The complicated gubernaculum is difficult to interpret but appears to consist of a central lightly cuticularised plate (projecting beyond the distal end of the spicules) and bearing two short apophyses. Two wide lateral pieces appear to encircle each spicule. In addition, apparently originating from the gubernaculum, are two cuticularised bow-shaped tubes terminating subcutaneously either side of the anus.

Discussion

Since Hopper (1969) redefined the subgenus *Mesotheristus* Wieser 1956 as having lateral alae, the species described above should not properly belong to this group. However, because of the similarity to *Theristus* (*Mesotheristus*) *setifer* Gerlach 1952 and certain other species (which have not yet been shown to possess lateral alae), *T. invagiferous* will provisionnally be placed in the subgenus *Mesotheristus.*

Theristus invagiferous sp. nov. is closely related to *T. setifer* Gerlach 1952, from which it is distinguished by having larger amphids, longer terminal setae and differently shaped spicules and gubernaculum.

MICROLAIMUS CUANENSIS sp. nov. (1)
(Fig. 7)

Material studied

Holotype - ♂ 1, B.M. (N.H.) Reg. No. 1971:545
Paratypes - three males and four females.

Body formulae and ratios

$$♂1: \frac{— \quad 105 \quad M \quad 1125}{8 \quad 24 \quad 26 \quad 24}$$ 1210 μm; a=46.5; b=11.5; c=14.2; Spic.=25 μm

$$♀1: \frac{— \quad 109 \quad 701 \quad 1386}{9 \quad 25 \quad 30 \quad 23}$$ 1500 μm; a=50.0; b=13.8; c=13.1; V=47 p. 100

(1) Lough Cuan is an old name for Strangford Lough.

Description

Body slender; some specimens slightly pink in colour. Cuticle very feintly striated; striae less than 1 µm wide. Labial papillae and anterior cephalic papillae small, frequently indistinguishable. Posterior circle of four 4.5-5.0 µm (0.5 head diameters) rather fine cephalic setae, situated posterior to the cephalic capsule. Somatic setae absent. Amphids 11 µm (1.4 head diameters) from the anterior; 6 µm (50 p. 100 corresponding diameter) wide; some appear spiral. Buccal cavity generally narrow, making analysis of dentition difficult. In specimens with wider buccal cavity, a small dorsal tooth can be distinguished

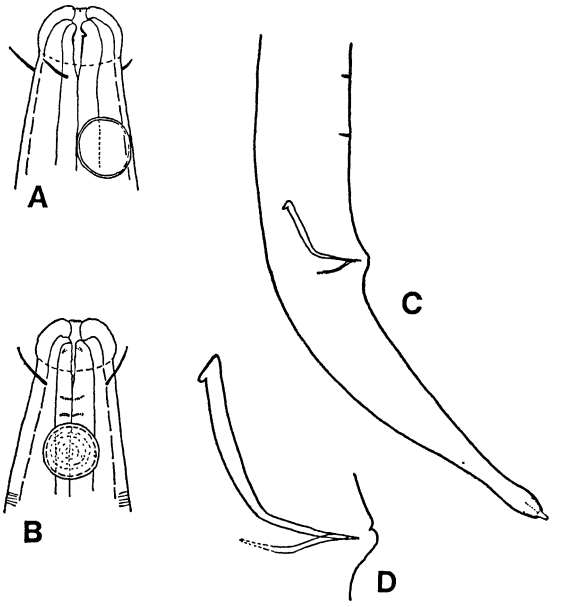

FIG. 7
Microlaimus cuanensis
A: male head; B: female head; C: male tail; D: spicules and gubernaculum.

and, in one specimen, a minute ventral tooth was observed opposite the dorsal tooth (Fig. 7, A). Buccal cavity walls only lightly cuticularised; peribuccal tissue not developed. Posterior oesophageal bulb well developed with a cuticularised internal lining. Excretory pore not observed. Tail in all specimens conical in the first three-quarters, then cylindrical with a terminal swelling; 3.5-5.0 a.b.d. long.

Male

Spicules paired, equal, slender, with slightly cephalised proximal end; 1.0 a.b.d. long. Gubernaculum slender; proximal end in all specimens studied was only lightly cuticularised. Two small precloacal papillate supplements.

Female

Ovaries paired, opposed and reflexed.

Discussion

The poorly developed buccal cavity and tail shape separates this species from most *Microlaimus* species. *M. texianus* Chitwood 1951, as redescribed by Wieser (1954) is probably closest to this species on the basis of buccal cavity and tail structure, but it is less slender, smaller, has relatively longer spicules, smaller amphids and probably more conspicuously striated cuticle.

Crassolaimus Kreis 1929 has a poorly developed buccal cavity with one very small tooth. However, the only two known species have conical tails and a characteristic peribuccal structure, lacking in these specimens.

NUDORA BIPAPILLATA sp. nov.
(Fig. 8)

Material studied

Holotype - ♂ 1
Allotype - ♀ 1
Paratypes - four males and one female, B.M. (N.H.) Reg. No. 1971:546

Body formulae and ratios

$$♂1: \frac{— \quad 185 \quad M \quad 1071}{17 \quad 45 \quad 46 \quad 35}$$ 1183 μm; a=25.8; b=6.4; c=10.5; Spic.=28 μm

$$♀1: \frac{— \quad 204 \quad 1011 \quad 1067}{18 \quad 43 \quad 36 \quad 25}$$ 1145 μm; a=24.4; b=5.6; c=14.7; V=88 p. 100

Description

Cuticle coarsely annulated, bearing twelve longitudinal rows of V-shaped spines. The spines can first be detected on the fourth or fifth annule and extend to level with the anus. The lateral row is continuous throughout the body. The most anterior annule is less heavily cuticularised than the subsequent annules. None of the anterior annules are elongated. Spine direction reversal occurs level with the middle or posterior margin of the oesophageal bulb. Cephalic setae 9-12 μm (0.5-0.7 head diameters); slightly longer in males. Short

somatic setae present. Amphids in males 4-5 μm (30 p. 100 corresponding diameter) and females 3.5-4.0 μm (20 p. 100 corresponding diameter) wide. Most of the amphid structure lies on the third annule but, in most specimens, it extends onto the fourth annule and sometimes onto the second annule also. In two specimens, the amphid lay between the second and third annule only. Buccal cavity with a large dorsal tooth opposed by a smaller ventral tooth. Oesophageal bulb well developed; 55-60 × 32-35 μm. Tail conical, 3.0-3.5 a.b.d., terminal 20-35 μm portion unstriated.

Male

Spicules paired, equal, slender and sigmoid; 28-34 μm (0.8 a.b.d.) long. Gubernaculum single, well cuticularised, proximally dilated and rounded distally. Precloacal cuticle devoid of striation. In all specimens there are two large characteristic cylindrical papillae with a conical tip and a central pore.

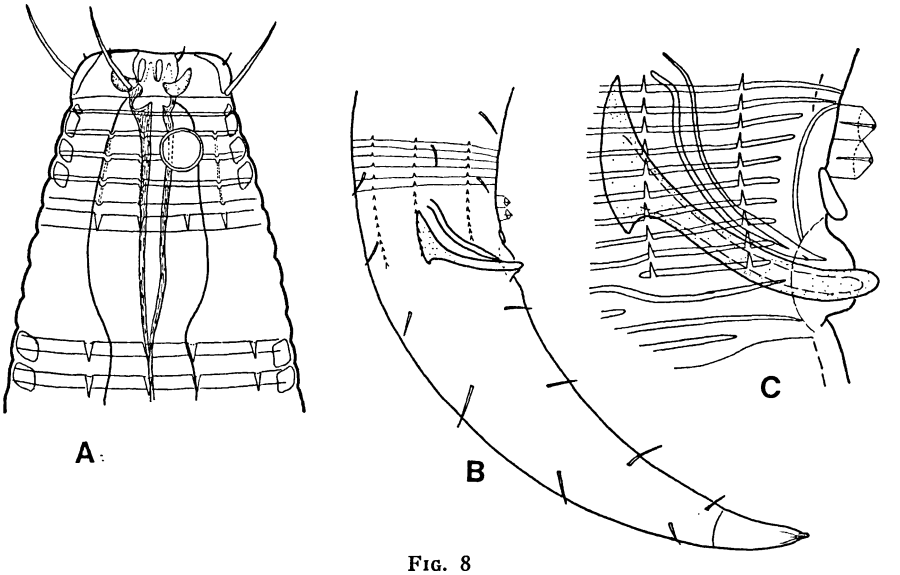

FIG. 8
Nudora bipapillata
A: male head; B: male tail; C: spicules, gubernaculum and precloacal papillae.

Female

Ovary single, anterior. Eggs 130 ×25 μm.

Discussion

Nudora bipapillata sp. nov. is characterised by the characteristic precloacal papillae, amphid position and relative size of the spicules and gubernaculum.

PROCHROMADORELLA SEPTEMPAPILLATA sp. nov.
(Fig. 9)

Material studied

Holotype - ♂ 1, B.M. (N.H.) Reg. No. 1971:547
Allotype - ♀ 1
Paratypes - three males and three females.

Body formulae and ratios

♂1: $\frac{\text{—}\ \ 165\ \ \text{M}\ \ 1266}{15\ \ 27\ \ 29\ \ \ \ 28}$ 1431 μm; a=49.4; b=8.7; c=8.7; Spic.=33 μm

♂2: $\frac{\text{—}\ \ 163\ \ \text{M}\ \ 1067}{14\ \ 25\ \ 27\ \ \ \ 25}$ 1218 μm; a=45.1; b=7.5; c=8.1; Spic.=29 μm

♀1: $\frac{\text{—}\ \ 168\ \ 653\ \ 1282}{15\ \ 26\ \ 33\ \ \ \ 23}$ 1481 μm; a=45.0; b=8.8; c=7.5; V=44 p. 100

♀2: $\frac{\text{—}\ \ 173\ \ 637\ \ 1191}{16\ \ 27\ \ 35\ \ \ \ 23}$ 1361 μm; a=40.0; b=7.9; c=8.0; V=47 p. 100

Description

Slender body. Cuticle ornamentation heterogeneous but devoid of lateral differentiation. The first annule is elongated, about 11 μm long and bears only a few lightly cuticularised punctations. The remainder of the annules are 2.0-2.5 μm wide. In the lateral region, extending to about 45 p. 100 of the oesophageal length, there are transverse rows of large round dots. Posterior to the large dots, the cuticle ornamentation consists of transverse rows of rods which can be resolved into battlement-like structures (Fig. 9, B). If the depth of focus is arranged so that the battlements point anteriorly in the anterior part of the body then, in the posterior part of the body, they point posteriorly; the point of reversal occurs near the middle of the body. Labial or anterior cephalic papillae were not seen. There are four very fine 5.5-6.5 μm (0.4 head diameters) cephalic setae. A few short cervical and caudal setae, about 5 μm long, were observed, but setae appear to be absent from the rest of the body. The transversely oval amphids are indistinct and lie between the cephalic setae; 5-8 μm wide (40-50 p. 100 corresponding diameter). The buccal cavity is short and conical with twelve rugae anteriorly. There is a dorsal tooth which, although well cuticularised in some specimens it looks hollow while in others it appears solid. Opposite the dorsal tooth are two small subventral teeth. Oesophagus widens posteriorly to an

elongated bulb which is not differentiated from the rest of the oesophageal tissue. Tail elongate, 6.0 a.b.d. in males and 7.4-8.7 a.b.d. in female, with a characteristic unstriated recurved tip.

Male

Spicules paired, equal, 29-34 μm (1.2 a.b.d.) long. The distal tip appears to be double, cephalate proximally and with a ventral ala.

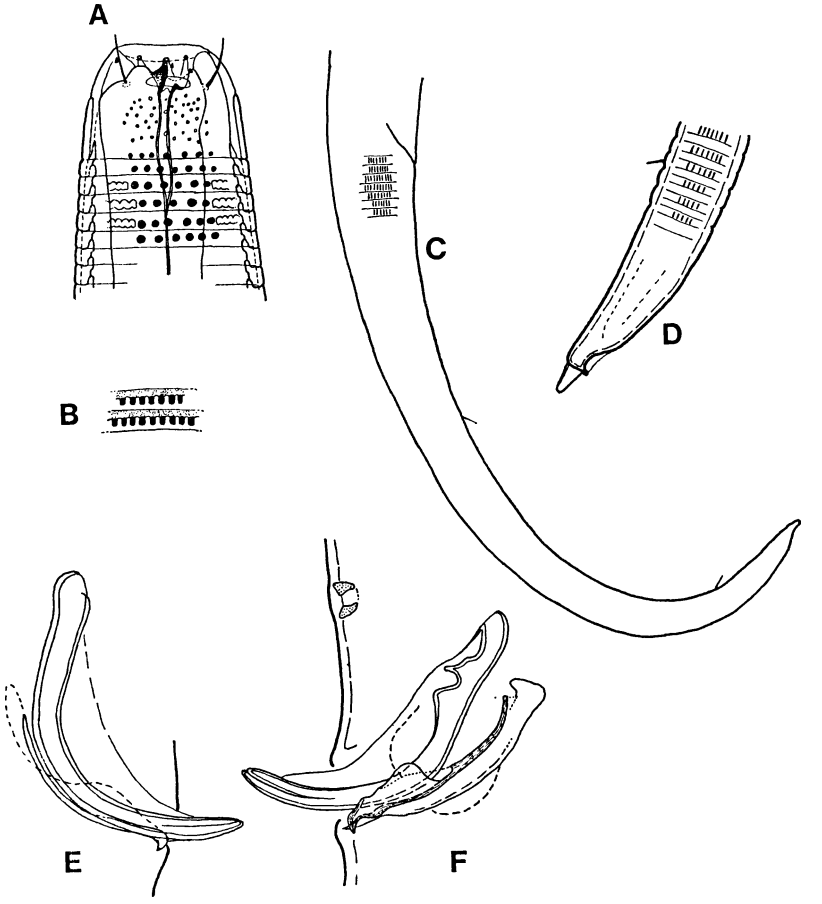

FIG. 9
Prochromadorella septempapillata

A: male head; B: lateral cuticular pattern in mid-body region; C: female tail; D: tail tip; E: spicules and gubernaculum, typical form; F: spicules, gubernaculum and first precloacal supplement of another specimen.

The gubernaculum, in most specimens, is weakly cuticularised but there are two prominent 18-21 μm lateral pieces, which bear outwardly curved spines distally. In one specimen, the genital armament was more strongly cuticularised and the gubernaculum was distinguished as a proximally cephalate structure (Fig. 9, F), while the proximal part of the spicules was more complicated ventrally. The spicules,

in most specimens, protrude from the cloaca; perhaps a fixation characteristic. There are seven well developed chromadoroid precloacal supplements.

Female

The vulva is a prominent structure. Ovaries, opposed and reflexed. Eggs large and long, 70 × 30 µm; one per uterus.

Discussion

The only other species of the genus *Prochromadorella* to bear seven precloacal supplements are *P. macro-ocellata* Wieser 1951 and *P. actuaria* Vitiello 1970. *P. septempapillata* sp. nov. lacks the large red ocelli of *P. macro-ocellata* and is longer, more slender, bears a relatively longer tail, shows differences in cuticular ornamentation and possesses a more complex genital apparatus than *P. actuaria.*

CHROMADORELLA DUOPAPILLATA sp. nov.
(Fig. 10)

Material studied

Holotype - ♂ 1, B.M. (N.H.) Reg. No. 1971:548
Allotype - ♀ 1, B.M. (N.H.) Reg. No. 1971:549
Paratype - one male.

Body formulae and ratios

♂1: $\frac{-\ 129\ \ M\ \ 871}{11\ \ 23\ \ 30\ \ 27}$ 995 µm; a=33.2; b=7.7; c=8.0; Spic.=28 µm.

♂2: $\frac{-\ 124\ \ M\ \ 872}{12\ \ 24\ \ 32\ \ 28}$ 994 µm; a=31.0; b=8.0; c=8.1; Spic.=29 µm.

♀1: $\frac{-\ 131\ 452\ 851}{12\ \ 25\ \ 36\ \ 20}$ 988 µm; a=27.4; b=7.5; c=6.7; V=46 p. 100.

Description

Cuticle annulated with heterogeneous ornamentation and lateral differentiation. The lateral differentiation, which consists of two longitudinal rows of large dots (Fig. 10, Bd and Be), begins a short distance behind the end of the oesophagus and is absent from the last third of the tail.

The longitudinal rows are 2.5 µm (7.8-8.5 p. 100 of corresponding body diameter) apart in the middle regions of the body. The cuticular ornamentation in the anterior cervical region appears to consist of

transverse rows of punctations connected posteriorly by a narrow line (Fig. 10, Ba) but, in other areas, there appears to be two rows of punctations per annule (Fig. 10, Bb). In the mid-cervical regions, the bands are continuous with smaller anterior and larger posterior battlement-like structures (Fig. 10, Bc). In the majority of the middle regions, the solid bands have smaller crenulations (Fig. 10, Bd). The

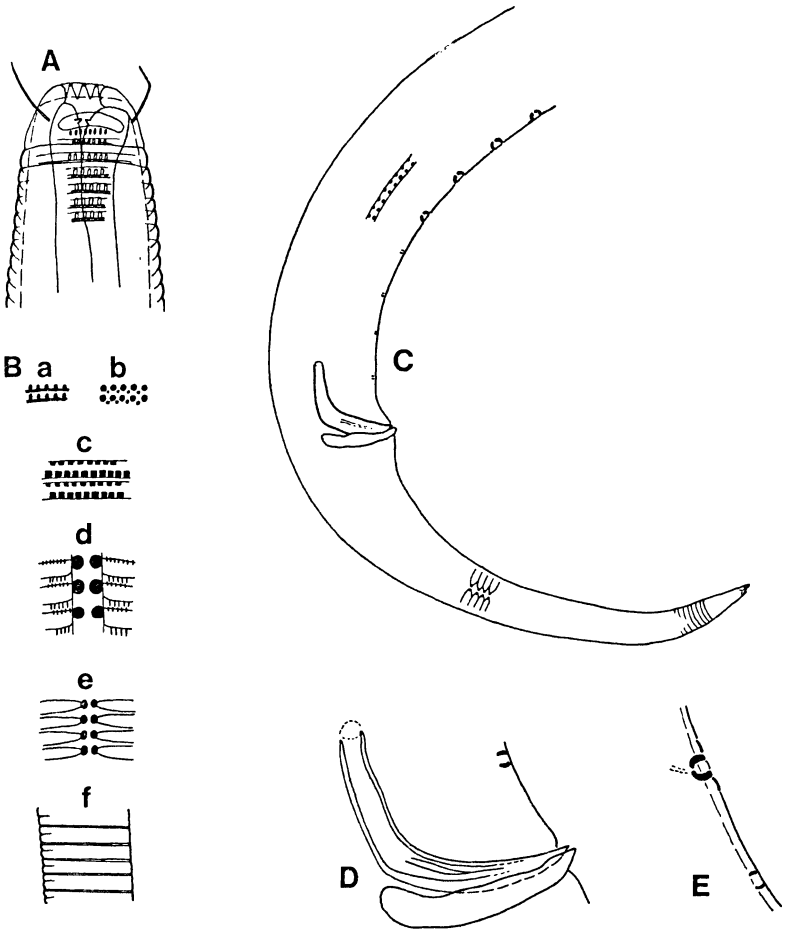

FIG. 10
Chromadorella duopapillata

A: male head; B: lateral cuticular ornamentation in; Ba and Bb: anterior cervical; Bc: mid-cervical; Bd: mid-body; Be: anterior caudal and; Bf: posterior caudal regions; C: male tail; D: spicules, gubernaculum and first precloacal supplement; E: last smaller and first larger precloacal supplement.

transverse bands of the anterior third of the tail have no crenulations or punctations (Fig. 10, Be). In the posterior parts of the tail, the annules consist only of solid bands, which are double ventrally but only single dorsally (Fig. 10, Bf). Anterior cephalic papillae not seen. The four 8 μm (0.7 head diameters) cephalic setae are rather fine. Short, fine cervical and caudal setae are present, but otherwise the

somatic setae are scarce. The conical buccal cavity has twelve rugae anteriorly. Teeth small and difficult to analyse; apparently one small solid dorsal tooth and two slightly smaller solid subventral teeth. Fairly well developed posterior oesophageal bulb, but not sharply separated from the rest of the oesophagus. Amphids transversely oval, situated between the cephalic setae; 6-7 μm (0.5-0.6 head diameters) wide. Tail tapers throughout its length, 4.4-4.5 a.b.d. in male, 7.3 a.b.d. in female, terminal part unstriated. Spinneret asymmetrical.

Male

Spicules paired equal, 28-29 μm (1.0-a.b.d.) in length. Gubernaculum 20 μm. Eight precloacal cup-shaped supplements; anterior four larger than the posterior four. Anterior supplement about 100 μm from cloaca.

Female

Ovaries paired, opposed and reflexed. Egg 45 × 23 μm, one per uterus.

Discussion

Chromadorella duopapillata sp. nov. is characterised by the length of the cervical region without lateral differentiation and the number and form of the supplements.

Because of the difficulty in deciding whether the rather inconspicuous teeth of the specimens are definitely solid, it is necessary to consider the analogous genus with hollow teeth, *Neochromadora C. duopapillata* sp. nov. differs from *Neochromadora* species on the combination of small teeth, developed oesophageal bulb, position of commencement of lateral differentiation and the form and number of supplements.

POMPONEMA SEDECIMA sp. nov.
(Fig. 11)

Material studied

Holotype - ♂ 1, B.M. (N.H.) Reg. No. 1971:550
Allotype - ♀ 1, B.M. (N.H.) Reg. No. 1971:551
Paratypes - two males and one female.

Body formulae and ratios

$$\text{♂ 1: } \frac{\text{— 187 M 1276}}{\text{19 27 28 24}} \text{ 1383 μm; a=49.5; b=7.4; c=12.9; Spic.=30 μm}$$

$\delta 2: \frac{— \quad 199 \quad M \quad 1279}{20 \quad 28 \quad 29 \quad 27}$ 1393 µm; a=48.1; b=7.0; c=12.2; Spic.=32 µm

$♀1: \frac{— \quad 197 \quad 692 \quad 1154}{23 \quad 30 \quad 34 \quad 24}$ 1276 µm; a=37.5; b=6.5; c=10.4; V=54 p. 100

Description

Cuticle ornamentation consists of fine punctations, irregularly arranged in the cervical region, but arranged in transverse rows in

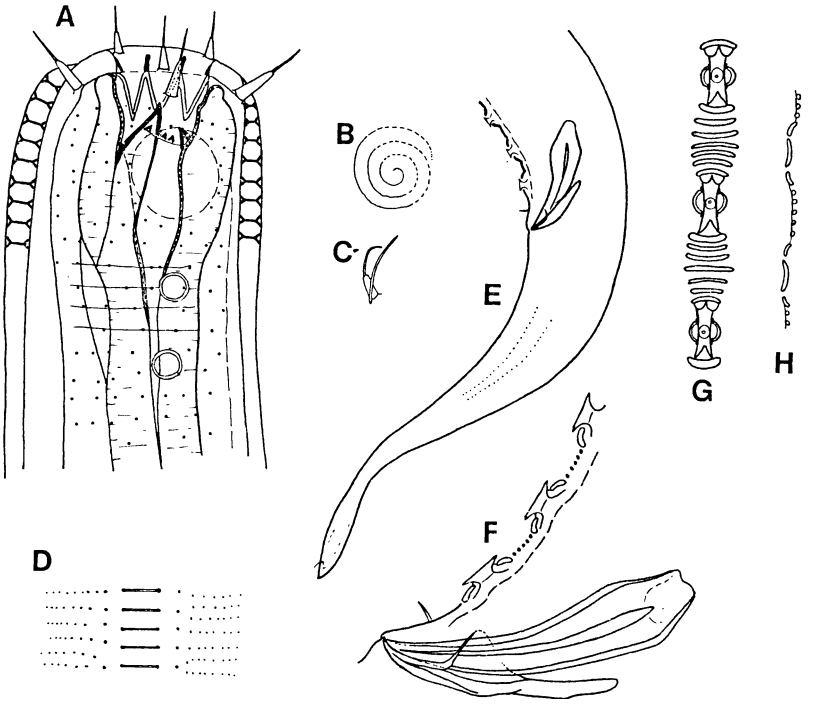

FIG. 11
Pomponema sedecima

A: male head; B: amphid of another male; C: lateral setae of a female; D: lateral cuticular ornamentation in mid-body region; E: male tail; F: spicules, gubernaculum and three precloacal supplements; G: ventral view of supplements; H: lateral view of supplements of another specimen.

posterior regions. Lateral differentiation, consisting of two longitudinal rows of larger punctations flanked by two rows of intermediate size punctations (Fig. 11, D), begins at about 80 p. 100 of the oesophageal length. The two lateral rows are about 15 p. 100 of the corresponding body diameter apart in the middle of the body. There is a row of large 3.5 µm diameter campaniform-type organs present laterally. The cephalic sense organs consist of an anterior circle of six 5-6 µm labial setae and a posterior circle of six 9-10 µm cephalic setae. Both the labial and cephalic setae are jointed. A circle of four other

cephalic setae was absent, although in one female specimen a very fine seta (?) was found associated with one of the lateral cephalic setae (Fig. 11, C). Anterior 10 μm cervical setae are sparse, becoming shorter posteriorly. Short (5 μm), fine and irregular somatic setae are present. Amphids in all specimens indistinct; in one male, the amphid described 3½ turns (Fig. 11, B). Amphids 8-9 μm (32-35 p. 100 corresponding diameter) wide. Prominent hollow dorsal tooth opposed by two smaller subventral teeth. Laterally, there is a single row of 3-4 small denticles. The oesophagus widens slightly posteriorly, but there is no definite bulb. Tail conical in anterior three-quarters then cylindrical with a terminal dilation; 3.9-4.9 a.b.d.

Male

Spicules paired, equal and expanded proximally; 1.2-1.3 a.b.d. Gubernaculum bears two lateral spines distally. There is a short 2.5 μm precloacal spine. Precloacal supplements are large and extend 175-200 μm anteriorly; 16 present in most males, but one individual observed had 15 and another had 17. Occasional specimens have the supplements standing out from the surface (Fig. 11, F) but, in most, they lie flush with the cuticle (Fig. 11, H). The number of bars between each supplement is 5 in the more posterior ones, but increases to 7 in the more anterior ones. The ventral appearance is shown (Fig. 11, G).

Female

Ovaries paired, opposed and reflexed.

Discussion

A recent key to the genus is given by Lorenzen (1972). On the basis of the number of cephalic setae, the form of the cuticle ornamentation and the shape of the genital armature, *Pomponema sedecima* sp. nov. bears most similarity to Lorenzen's (1972) species *P. compactum*. However, the new species may be distinguished on the size and structure of the cephalic setae, the size and the number of turns of the amphid, and the most frequent number of precloacal supplements.

CHAETONEMA RIEMANNI sp. nov.
(Fig. 12)

Syn. *Chaetonema* sp. Riemann 1966

Material studied

Holotype - ♂1, B.M. (N.H.) Reg. No. 1971:552
Allotype - ♀1, B.M. (N.H.) Reg. No. 1971:553
Paratype - one male and one female.

Body formulae and ratios

$$\delta 1: \frac{-\ 221\ M\ 1134}{10\ \ 23\ 25\ \ 16}$$ 1229 µm; a=49.1; b=5.6; c=13.0; Spic.=40 µm

$$\delta 2: \frac{-\ 220\ M\ 1140}{10\ \ 23\ 25\ \ 16}$$ 1237 µm; a=49.5; b=5.6; c=12.4; Spic.=38 µm

$$♀1: \frac{-\ 241\ 585\ 998}{11\ \ 28\ \ 33\ \ 17}$$ 1325 µm; a=40.2; b=5.5; c=9.7; V=44 p. 100

Description

Cuticle smooth. Three lips, each with two distinct triangular papillae. Ten cephalic setae in six groups; six 30-33 µm (the lateral setae about the same length as the longer submedian setae) and four 10-11 µm long. Somatic setae absent. Amphids are indistinct hoop-shaped structures, 3.5-4.0 µm wide, situated on the cephalic capsule between the lateral and submedial cephalic setae. Just behind the amphid is a small feintly coloured pigment area. In the male, "Steiner's organ" (Wieser 1953) consists of a distinct lateral horse-shoe shaped structure, 135-155 µm from the anterior, preceeded by an approximately 100 µm long lateral groove (Fig. 12, A and 12, B). The organ is not well developed in the female and only a feint oval structure can be detected in the position equivalent to the horse-shoe shaped structure of the male (Fig. 12, C); a longitudinal groove is absent. Buccal cavity flask-shaped. Teeth and mandibles absent but three semi-circular bars surrounding the buccal cavity. Tail conical anteriorly, then cylindrical with a terminal swelling; 6.0 a.b.d. in male, 8.0 a.b.d. in female.

Male

Spicules paired, equal, bent in the proximal quarter, cephalate proximally and with a feint ala for a short distance; 2.5 a.b.d. long. Gubernaculum, 16 µm; a reduced rod. Precloacal supplement not seen, but there is a single ventral precloacal spine and two pairs of subventral post cloacal spines (Fig. 12, E.).

Female

Ovaries paired, opposed and apparently reflexed. Vulva with prominent lips.

Discussion

The description of a single female specimen by Riemann (1966) agrees in all essential details with the females described above. *Chae-*

tonema riemanni sp. nov. is characterised by the absence of a precloacal supplementary organ in the male and can be distinguished from other species by use of the following key. The structure of "Steiner's organ" is similar to that described by Gerlach (1956b) for *C. cancellatum*, but probably too little is yet known of this structure for it to be used with certainty as a distinguishing character. In *C. cancellatum*, the structure is shorter than in *C. riemanni* (36 µm vs. 100 µm).

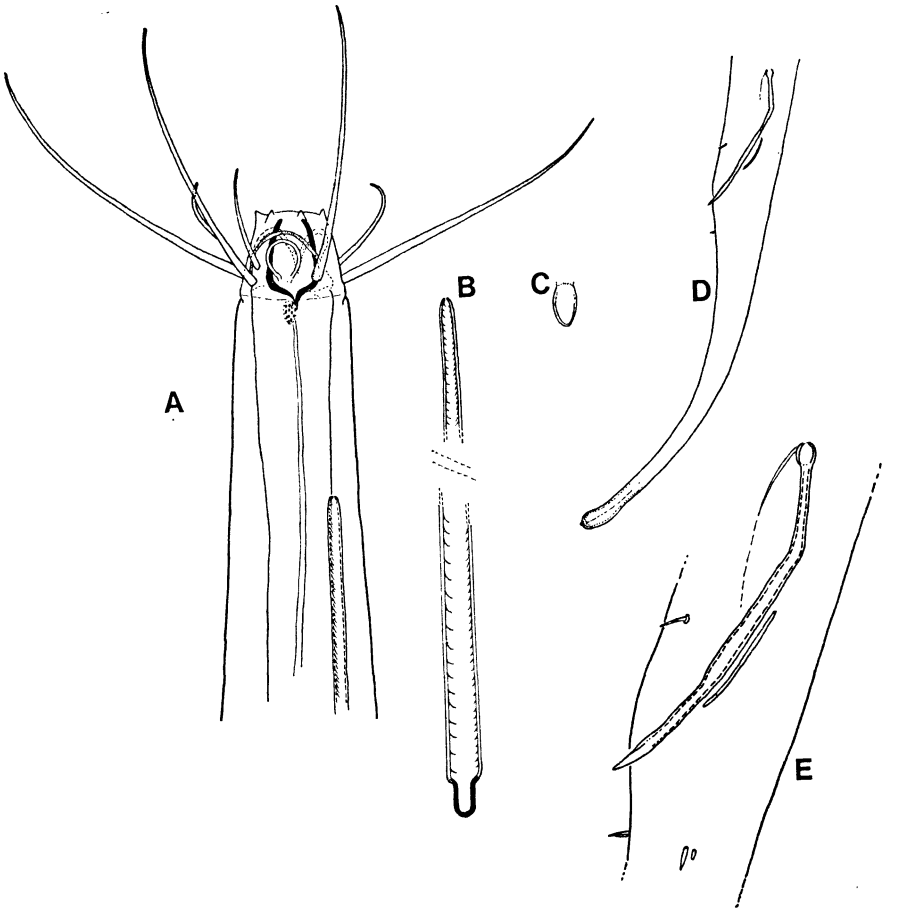

FIG. 12
Chaetonema riemanni
A: male head; B: 'Steiner's organ' of a male; C: 'Steiner's organ' of a female; D: male tail; E: spicules and gubernaculum.

The genus *Chaetonema* Filipjev 1925 was related by Wieser (1953) to the Enoplidae on presence of a cephalic capsule, large labial sense organs and shape of the male genital armature. The genus contains five "good" species (including this one), and two doubtful species (*C. longisetum* Steiner 1916 and *C. vicinum* Gerlach 1954, based only on female and juvenile characters respectively).

Key to the genus *Chaetonema*

1. Longest cephalic setae 4 h.d. (60 μm) long - *C. steineri* Filipjev 1925.
   Longest cephalic setae 3 h.d. long or less - 2.
2. Precloacal supplement absent, (cephalic setae 3.0 h.d. (30-33 μm) long; spicule 40 μm, 2.5 a.b.d. long) - *C. riemanni* sp. nov.
   Precloacal supplement present - 3.
3. Precloacal supplement a narrow, rod-like structure; spicule 30 μm. 1.3. a.b.d. long - *C. amphora* Wieser 1953.
   Precloacal supplement well cuticularised, complicated "clasping" structure - 4.
4. Longest cephalic setae 17 μm, 2 h.d. long; L = 1168 - 1292 μm - *C. cancellatum* Gerlach 1956b.
   Longest cephalic setae 30 μm, 3 h.d. long; L = 1820 - 1940 μm - *C. captator* Wieser 1953.

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Summary

Nine new species of freeliving marine nematodes are described from Strangford Lough, Northern Ireland. They are *Leptolaimus septempapillatus, Theristus longus, Theristus invagiferous, Microlaimus cuanensis, Nudora bipapillata, Prochromadorella septempapillata, Chromadorella duopapillata, Pomponema sedecima* and *Chaetonema riemanni.* A new name, *Theristus riemanni,* is proposed for *Theristus* aff. *curvatus* Riemann 1966. A key to the genus Chaetonema is given. *Axonolaimus helgolandicus* Lorenzen 1971 and *Odontophora rectangula* Lorenzen 1971 are also described.

Zusammenfassung

Neun neue Arten sind von freilebenden Meeres - Nematoden aus Strangford Lough, Nord Ireland beschrieben. Sie sind *Leptolaimus septempapillatus, Theristus longus, Theristus invagiferous, Microlaimus cuanensis, Nudora bipapillata, Prochromadorella septempapillata, Chromadorella duopapillata, Pomponema sedecima* und *Chaetonema riemanni.* Man schlägt für *Theristus* aff. *curvatus* Riemann 1966 eine neue Name *Theristus riemanni* vor. Ein Schlüssel wird für die Gattung *Chaetonema* ausgearbeitet. *Axonolaimus helgolandicus* Lorenzen 1971 und *Odontophora rectangula* Lorenzen 1971 sind auch beschrieben worden.

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