

THE CYATHOLAIMIDAE (NEMATODA, CHROMADOROIDEA) OFF THE COAST OF NORTHUMBERLAND

by

Richard M. Warwick

Dove Marine Laboratory, Cullercoats, Northumberland, England.

Résumé

L'auteur cite dix espèces de Nématodes libres de la famille des Cyatholaimidae et trouvées en trois stations au large des côtes de Northumberland (Angleterre). Leur distribution dans ces trois stations est précisée. Parmi ces espèces, huit sont nouvelles et sont décrites. Ce sont : *Longicyatholaimus complexus* sp. nov., *Paracanthonchus longicaudatus* sp. nov., *Paralongicyatholaimus minutus* sp. nov., *Neotonchus filiformis* sp. nov., *N. vitius* sp. nov., *N. votadinii* sp. nov., *N. interruptus* sp. nov. et *N. meeki* sp. nov. (1).

INTRODUCTION

Recently, Warwick and Buchanan (1970) described the structure of the nematode communities at three stations off the Northumberland coast. Amongst the material collected during this investigation, and in subsequent samples taken at the offshore station (Warwick and Buchanan, 1970a), ten species belonging to the Cyatholaimidae were found. Eight of these species proved to be new and are described below. The stations sampled were:

Station A; an inshore station 2 miles east of Lynemouth, depth 35 m.

Sediment of "very fine sand" on the Wentworth grade scale, with considerable quantities of coal dust present.

Station B; a middle station 7.5 miles east of the mouth of the River Wansbeck, depth 54 m. Sediment of "fine sand".

Station C; an offshore station 11 miles east of Blyth, depth 80 m. Sediment of "silt".

Further details of the habitats are given by Warwick and Buchanan (1970). The collections are based on small sediment cores of 1 cm internal diameter. Sixteen such cores have been collected from both stations A and B, and 64 from station C. The distribution

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(presence or absence) of species is given in Table 1. Some of the species were given tentative names in the above mentioned papers, and these are listed in Table 2.

Each new species is described from a syntypic series which has been deposited at the British Museum (Natural History). Paratypes have been deposited at the Smithsonian Institution, Washington D.C.

TABLE 1
Presence or absence of species at the three sampling stations

Species	A	B	C
<i>Pomponema multipapillatum</i> (Filipjev, 1922)	0	+	+
<i>Longicyatholaimus complexus</i> sp. nov.	+	+	+
<i>Paracanthonchus longicaudatus</i> sp. nov.	0	+	+
<i>Paralongicyatholaimus minutus</i> sp. nov.	0	+	0
<i>Neotonchus corcunda</i> (Gerlach, 1956)	0	+	+
<i>N. filiformis</i> sp. nov.	0	0	+
<i>N. vilius</i> sp. nov.	0	0	+
<i>N. interruptus</i> sp. nov.	+	+	+
<i>N. votadinii</i> sp. nov.	0	0	+
<i>N. meeki</i> sp. nov.	+	0	+

TABLE 2
Identity of species tentatively named in Warwick and Buchanan (1970)

Tentative designation	Designation in present paper
<i>Pomponema</i> sp.	<i>P. multipapillatum</i> (Filipjev, 1922)
<i>Longicyatholaimus</i> sp.	<i>L. complexus</i> sp. nov.
<i>Paracanthonchus</i> sp.	<i>P. longicaudatus</i> sp. nov.
Cyatholaimidae sp.	<i>Paralongicyatholaimus minutus</i> sp. nov.
<i>Neotonchus</i> sp. 1	<i>N. interruptus</i> sp. nov.

DESCRIPTIVE SECTION

LONGICYATHOLAIMUS COMPLEXUS sp. nov.

(Fig. 1)

Material studied.

Syntypes : 9 ♂♂ and 4 ♀♀, B.M. (N.H.) Reg. Nos. 1970. 207-219.

Paratypes : 5 ♂♂, U.S. National Museum Cat. Nos. 43409-43413.
5 ♀♀, Cat. Nos. 43414-43418.

Body ratios.

	Males	Females
a	27.6-29.0	19.6-22.9
b	6.4-6.7	6.6-6.8
c	6.3-6.7	6.5-6.7
V p. 100	—	43.6-45.2

Body length, males 1.51-1.55 mm, females 1.49-1.67 mm ; greatest width, males 52-55 μ , females 73-78 μ . Cuticle marked with transverse rows of fine punctations, very thick on anterior third of oesophagus. Lateral differentiation irregular, of larger and more widely spaced punctations. Lateral pores of two types present; simple small rounded

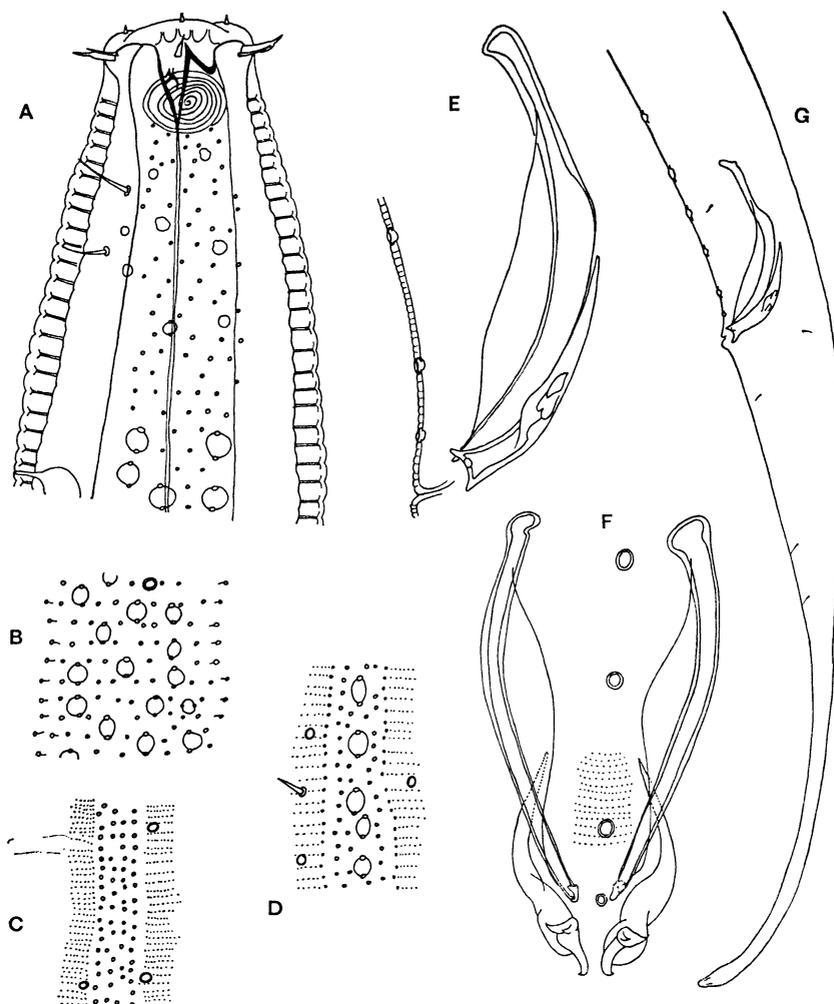


FIG. 1

Longicyatholaimus complexus sp. nov.

A: male head; B: lateral cuticular pattern (mid-oesophagus); C: lateral cuticular pattern (mid-body); D: lateral cuticular pattern (cloacal region); E: lateral view of spicules and gubernaculum; F: ventral view of spicules, gubernaculum and supplements; G: male tail.

pores, which will hereafter be called type-a, and larger elongate elliptical pores bounded anteriorly and posteriorly by a small rounded punctation (type-b). Type-b commence just anterior to the excretory pore and extend two-thirds of the way down the length of the oesophagus. In the middle of the oesophagus they are quite dense

(Fig. 1, B). None of this type are present in the middle region of the body (Fig. 1, C), but a single file of them commences a short distance anterior to the anus or cloaca and extends a short way down the length of the tail (Fig. 1, D). Type-a pores are scattered irregularly just behind the amphids and mingle with the anterior group of type-b. After type-b terminate, type-a sort themselves into two files bordering the lateral differentiation of cuticular punctations and extending to the base of the conical portion of the tail. The positions of some of these pores are occupied by short setae.

Head diameter 18-21 μ . Mouth surrounded by six rounded lips each bearing a conical labial papilla about 1 μ long. Six longer cephalic setae 6.5-7 μ , basal two thirds broad, distal third slender. Four shorter setae 4-5 μ , uniformly slender. Buccal cavity with large pointed dorsal tooth opposed by two much smaller subventral teeth. Amphids 10-11 μ wide, corresponding body width 23 μ , 6.5-7.5 turns in male, 6-7.5 in female. Oesophagus 0.22-0.25 mm long, broadening gradually towards the posterior end but with no bulb. Excretory pore 50-58 μ from anterior, nerve ring in one of the males 0.102 mm from anterior.

Tail 0.23-0.25 mm long, proximal half conical, distal half cylindrical. Cloacal or anal diameter 36-38 μ .

Male.

Spicules generally equal, 58-73 μ long. Aberrant specimens occasionally occur with slightly unequal spicules, and one exceptional specimen had a right spicule of 54 μ and a left one of 74 μ . The proximal third is more heavily cuticularised than the remainder, and there are broad ventral alae (Fig. 1, E and F). The proximal tip is cephalate and the distal tip pointed. The dorsal edge is most sharply bent at the junction of the strongly and weakly cuticularised portions. Gubernaculum in two separate halves, each crescentic with the distal half swollen and tipped with three laterally curving teeth. Six small but distinct cup-shaped supplements spaced as in Fig. 1 G, the anterior-most 76-89 μ pre-cloacal.

Female.

Ovaries paired, symmetrical, opposed, reflexed. Eggs roughly spherical, 58-61 μ diameter, only one or two per uterus.

Discussion.

This species belongs to "Group A" of Wieser and Hopper (1967), which contains the species with supplements. It may be distinguished from other members of the group by the relative lengths of the cephalic setae, the form and size of the amphids, the form of the gubernaculum and spicules, the length and shape of the tail, and above all the complex arrangement of lateral pores. Judging by the distribution of these

pores it would seem that type-a and type-b correspond respectively with the type-1 and type-2 "campaniform" organs described by Inglis (1963). However, they both differ somewhat in structure from Inglis's descriptions.

PARACANTHONCHUS LONGICAUDATUS sp. nov.

(Fig. 2)

Material studied.

Syntypes : 4 ♂♂ and 4 ♀♀, B.M. (N.H.) Reg. Nos. 1970. 220-227.

Paratypes : 2 ♂♂, U.S. National Museum Cat. Nos. 43419-43420.
2 ♀♀, Cat. Nos. 43421-43422.

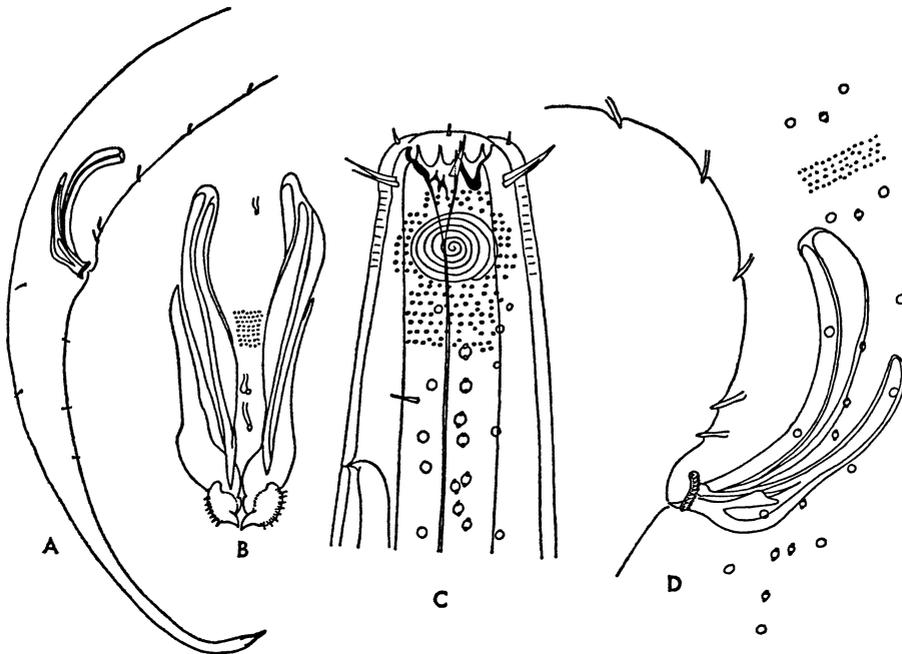


FIG. 2

Paracanthonchus longicaudatus sp. nov.

A: male tail; B: ventral view of spicules and gubernaculum; C: male head;
D: lateral view of male cloacal region.

Body ratios.

	Males	Females
a	36.3-38.0	42.4-46.6
b	5.8-6.3	6.5-6.9
c	8.2-8.4	8.5-9.1
V p. 100	—	48.6-49.2

Body length, males 1.33-1.51 mm, females 1.57-1.79 mm; greatest width, males 35-41 μ , females 37-39 μ . Cuticle marked with transverse rows of small punctations, with no marked lateral differentiation. Type-a pores in two sublateral files down each side of body. Type-b pores in a single lateral file, largest and most dense on the anterior third of the oesophagus. Both types only extend half way down the length of the tail.

Head diameter 18-21 μ in male, 16-17 μ in female. Six small conical labial papillae about 1.5 μ long. Six longer cephalic setae 7-8 μ , four shorter setae 5-6 μ . Buccal cavity with large pointed dorsal tooth and four smaller subventral teeth. Amphids 9-10 μ wide, corresponding body diameter 20-22 μ . Describe 6-6.25 turns in male, 5.3-6 turns in female. Oesophagus 0.23-0.27 mm long, gradually broadening towards its posterior end with no bulb. Tail the same shape in both sexes, 0.162-0.196 mm long, only distal third cylindrical. Cloacal diameter in males 28-33 μ , anal diameter of females 22-28 μ .

Male.

Spicules equal, arcuate, 43-51 μ long, broadly rounded proximally and pointed distally, weakly cuticularised along their ventral edge and with a central list (Fig. 2, B, D). Gubernaculum 40-42 μ , paired, distal half swollen. Each half terminates distally in a plate bearing lateral rows of fine denticles, and a median inwardly curving tooth. Five rather small but distinctly tubular supplements have a 3 + 2 arrangement (Fig. 2, A, D), the anteriormost being 62-82 μ pre-cloacal.

Female.

Ovaries paired, symmetrical, opposed, reflexed. Eggs 54-58 μ long and 31-33 μ broad, only one per uterus.

Discussion.

The form of the supplements and shape of the gubernaculum in these specimens place them unquestionably in the genus *Paracanthochus*, in spite of the fact that the tail is longer than would normally be considered consistent with this genus. This species is closest to *P. heterodontus* (Schulz, 1932), which has a similarly shaped gubernaculum, a 3 + 2 arrangement of supplements, and four subventral teeth in the buccal cavity. However, *P. heterodontus* has a larger body size and shorter tail (deduced from c values of 13.2-13.8 for adult males) than the present species, and the spicules are differently shaped.

PARALONGICYATHOLAIMUS MINUTUS sp. nov.

(Fig. 3)

Material studied.

Syntypes: 5 ♂♂ (only 2 with unbroken tails), B.M. (N.H.) Reg. Nos. 1970. 228-232.

Body ratios.

a	26.7-37.6
b	8.3-8.6
c	3.0-3.1

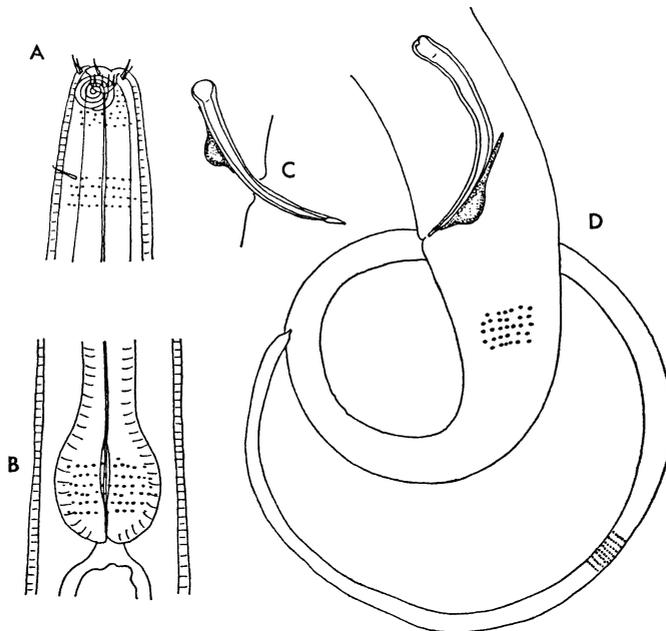


FIG. 3

Paralongicyatholaimus minutus sp. nov.

A: male head; B: oesophageal bulb; C: lateral view of spicules and gubernaculum; D: tail of another male.

cyathiform with the usual 12 buccal rugae, but with no discernable teeth. Amphids 5 μ diameter, corresponding body diameter 9-10 μ . Coiling of amphids indistinct, but probably 4.5 turns. Oesophagus

Body length (intact specimens) 0.72-0.79 mm; greatest width 21-27 μ . Cuticular pattern of transverse rows of small punctations, no lateral differentiation. Head diameter 7 μ . Labial papillae indistinct. Six longer cephalic setae 3-4 μ , four shorter setae 2-2.5 μ . Buccal cavity

87-92 μ long, terminating in a rounded bulb 15-18 μ long and 11-14 μ broad (Fig. 3, B). Tail elongate, 0.23-0.26 mm, distal seven eights filiform. Cloacal diameter 17-20 μ .

Male.

Spicules 29-32 μ long, equal, arcuate, simple, cephalated proximally and pointed distally. Gubernaculum 14-17 μ , pointed at both ends, with a subterminal distal swelling. Supplements absent.

Discussion.

The genus *Paralongicyatholaimus* was erected by Schuurmans Stekhoven (1950) to accommodate his new species *P. mastigodes*. It was considered separate from *Longicyatholaimus* because of the absence of lateral differentiation of the cuticle and of teeth in the buccal cavity. Since only females of *P. mastigodes* were found, subsequent authors (Wieser, 1954; Wieser and Hopper, 1967) have regarded the genus as doubtful. The finding of males now makes it possible to resurrect this genus, which may be defined thus:

Cyatholaimidae, buccal cavity without teeth, cuticle without lateral differentiation, oesophagus with posterior bulb, spicules simple, gubernaculum not dentate, supplements absent, tail filiform.

Schuurmans Stekhoven (1950) makes no mention of the oesophageal bulb, but its presence puts *Paralongicyatholaimus* closest to *Metacyatholaimus* (Schuurmans Stekhoven, 1942), the latter genus having well defined lateral differentiation of the cuticle in the form of four files of large punctations.

P. mastigodes is more than three times as long as the present species and has distinct type-b cuticular pores, at least on the anterior end, which are absent in *P. minutus*. The two species may further be separated by the relatively smaller amphids of *P. mastigodes*, and the presence in this species of distinct setiform labial sense organs.

NEOTONCHUS FILIFORMIS sp. nov.

(Fig. 4)

Material studied.

Syntypes: 3 ♂♂, B.M. (N.H.) Reg. Nos. 1970. 233-235.

Body ratios.

a	86.4-99.2
b	11.5-12.4
c	15.7-16.1

Body length 1.19-1.30 mm; greatest width 12-15 μ . Cuticle marked with transverse rows of small rounded punctations, no lateral differentiation. Head diameter 6-7 μ . Labial sense organs not visible. Anterior circle of six cephalic setae 5-6 μ . Four posterior cephalic setae level with anterior border of amphids, 9 μ long. A long sublateral seta present just posterior to amphids (Fig. 4, A). Buccal cavity slender, probably collapsed, but a small pointed dorsal tooth visible in one specimen. Amphids 6-7 μ in diameter, corresponding body width 8-10 μ , 4.5 turns. Oesophagus 0.102-0.105 mm long, pyriform posterior bulb 15-16 μ long and 10-11 μ wide. Tail 74-83 μ long, evenly tapering. Cloacal diameter 12-14 μ .

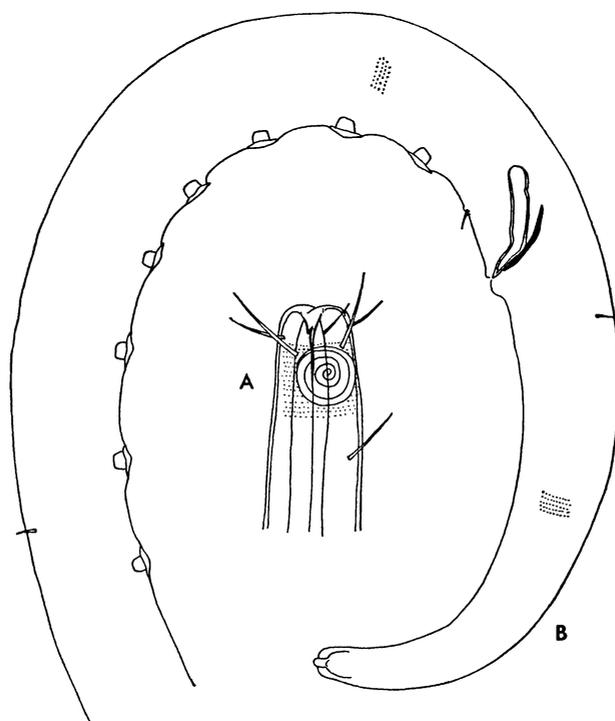


FIG. 4
Neotonchus filiformis sp. nov.

A: male head; B: posterior end of male.

Male.

Spicules 15-16 μ long, equal, L-shaped, very weakly cephalate proximally, sides of the proximal two thirds parallel. Gubernaculum plate-like, 9 μ long. One mid-ventral pre-cloacal seta and 8-9 cup shaped supplements. The anteriormost supplement is situated 97-148 μ in front of the cloaca.

Discussion.

This species is immediately distinguished from all others by the elongate, slender body form. The a-value is more than twice as great

as that of any other species. On the basis of the shape of the buccal cavity and the relative lengths of cephalic setae, *N. filiformis* is probably closest to *N. phaleratus* Wieser and Hopper, 1966. It differs from this species in the smaller absolute size of all structures (except body length), and in having differently shaped spicules.

NEOTONCHUS VITIUS sp. nov.

(Fig. 5)

Material studied.

Syntypes : 3 ♂♂, B.M. (N.H.) Reg. Nos. 1970. 236-238.

Paratypes : 3 ♂♂, U.S. National Museum Cat. Nos. 43423-43425.

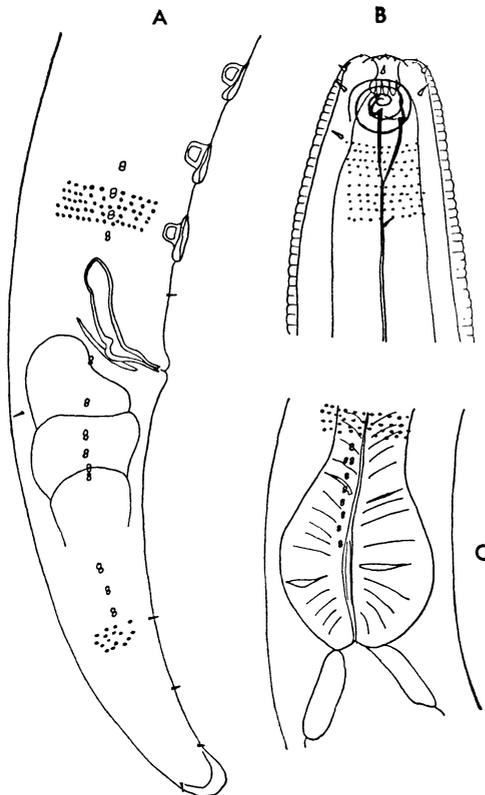


FIG. 5
Neotonchus vitius sp. nov.
A: male tail; B: male head;
C: oesophageal bulb.

Body ratios.

a	23.0-28.9
b	6.3-6.8
c	11.9-12.0

Body length 0.69-0.78 mm; greatest width 27-30 μ . Cuticle marked with transverse rows of small punctations. There is a single lateral

file of larger punctations, each of which is just resolvable into a pair of rounded punctations possibly representing a type-b cuticular pore. These commence about half way down the length of the oesophagus, and are most numerous in the region of the oesophageal bulb and cloaca. Head diameter 8-9 μ . Mouth surrounded by six rounded lips, each with a minute labial papilla. Anterior circle of six cephalic setae 1 μ , posterior circle of four setae 2 μ . Buccal cavity deep, posterior portion conical, contains medium sized hollow dorsal tooth and a pair of much smaller subventral teeth (Fig. 5, B). Amphids 6-6.5 μ wide, 3.25 turns; corresponding body width 12-12.5 μ . Oesophagus 0.110-0.114 mm long, posterior bulb pyriform, 22-23 μ long and 21 μ wide (Fig. 5, C). Tail conical, 58-65 μ long. Cloacal diameter 21-23 μ .

Male.

Spicules 17.5-19 μ long, weakly cephalate proximally, with an angular inflection between the proximal and distal portions. Just proximal to the inflection there is a pronounced ventral kink (Fig. 5, A). Gubernaculum plate-like, 8-9 μ long. One pre-cloacal seta and usually 11 large cup-shaped supplements, rarely 10 or 12. Anterior supplement 0.120-0.155 mm pre-cloacal.

Discussion.

The only other species with angularly bent spicules are *N. punctatus* Cobb, 1933 (redescribed from type specimen by Wieser and Hopper, 1966) and *N. corcunda* (Gerlach, 1956) Wieser and Hopper, 1966. Neither of these species have the ventral kink in the spicules, and furthermore they both have the second circle of cephalic setae elongate.

NEOTONCHUS VOTADINII sp. nov.

(Fig. 6)

Material studied.

Syntypes: 1 δ and 1 ♀ , B.M. (N.H.) Reg. Nos. 1970. 239-240.

Body ratios.

	Male	Female
a	32.8	23.4
b	6.9	7.1
c	10.9	10.4
V p. 100	—	51.2

Body length 0.82 mm in both sexes; greatest width, male 25 μ , female 35 μ . Cuticular punctation in transverse rows, no marked lateral differentiation. Head diameter 6 μ . Mouth surrounded by six rounded lips, with six minute labial papillae. Cephalic setae with usual 6 + 4 arrangement, both sets 1.5 μ long. Buccal cavity collapsed in

both sexes, but a large hollow dorsal tooth is prominent (Fig. 6, A). Amphids 6.5 μ wide, almost 4.5 turns, corresponding body diameter 9 μ . Oesophagus 0.115-0.118 mm long, posterior bulb distinctly angular (Fig. 6, B) with large plasmatic interruptions, 21 μ long and 22-24 μ wide. Tail conical, 75-79 μ long. Cloacal diameter of male 23 μ , anal diameter of female 26 μ .

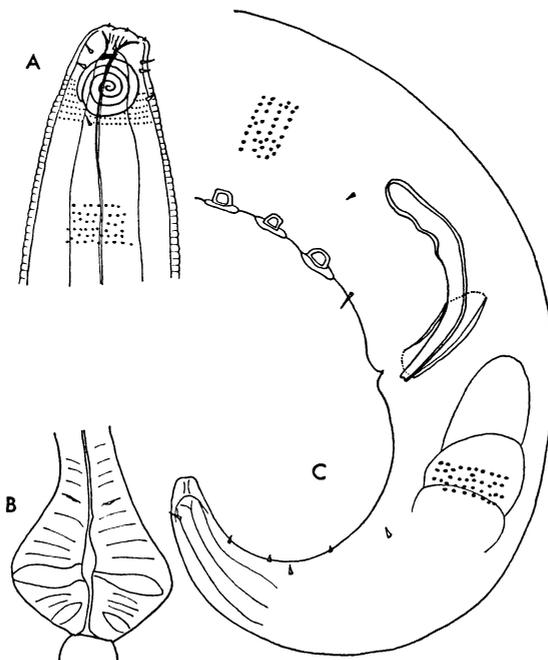


FIG. 6

Neotonchus votadinii sp. nov.

A: male head; B: oesophageal bulb; C: male tail.

Male.

Spicules equal, 34 μ long, arcuate, two ventral undulations in proximal third, very weakly cephalate (Fig. 6, C). Gubernaculum 14 μ long, appears to form a tube round the distal third of the spicules. One median pre-claocal seta and 14 closely spaced cup-shaped supplements, the anteriormost 0.138 mm pre-claocal.

Female.

Ovaries paired, symmetrical, opposed, reflexed.

Discussion.

On the basis of head structure this species is probably closest to *N. lutosa* Wieser and Hopper, 1966. It differs from *N. lutosa* chiefly in the shape of the spicules, gubernaculum and posterior oesophageal bulb, and in the number of supplements in the male (20 in *N. lutosa*).

NEOTONCHUS INTERRUPTUS sp. nov.

(Fig. 7)

Material studied.

Syntypes : 3 ♂♂, B.M. (N.H.) Reg. Nos. 1970. 241-243.

Paratypes : 5 ♂♂, U.S. National Museum Cat. Nos. 43426-43430.

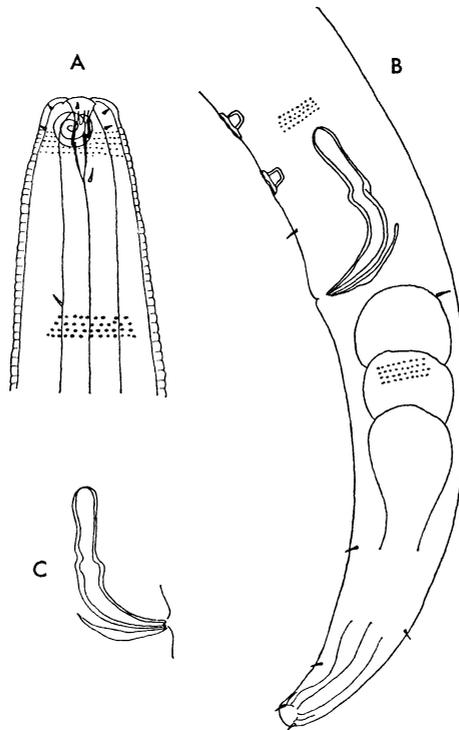


FIG. 7

Neotonchus interruptus sp. nov.

A: male head; B: male tail; C: lateral view of spicules and gubernaculum of another male.

Body ratios.

a	29.6-30.0
b	6.9-7.5
c	10.0-11.1

Body length 0.63-0.68 mm; greatest width 21-23 μ . Rows of cuticular punctations with no lateral differentiation. Head diameter 7.5-8 μ . Labial sense organs not visible. Cephalic setae with the usual 6 + 4 arrangement, all 1 μ long. Buccal cavity narrow, single relative

vely small dorsal tooth opposed by two even smaller subventral projections (Fig. 7, A). Amphids 5μ wide, describing 3 turns; corresponding body width 8μ . Oesophagus $91-95\mu$ long; posterior bulb rounded, $16-17\mu$ long and $15-16\mu$ wide. Tail conical, $61-67\mu$ long; cloacal diameter $18-19\mu$.

Male.

Spicules $27-28\mu$ long, equal, proximal half straight and distal half arcuate, with a distinctive kink between the two halves; weakly cephalate proximally (Fig. 7, B, C). Gubernaculum plate-like, $10-12\mu$ long. One mid-ventral pre-cloacal seta and 8-10 cup-shaped supplements, 9 being the commonest number. The anteriormost supplement is $82-104\mu$ pre-cloacal.

Discussion.

This species is characterised by the distinctive shape of the spicules, the small amphids and the short cephalic setae.

NEOTONCHUS MEEKI sp. nov.

(Fig. 8)

Material studied.

Syntypes : 3 ♂ and 1 ♀, B.M. (N.H.) Reg. Nos. 1970. 244-247.
Paratypes : 6 ♂, U.S. National Museum Cat. Nos. 43431-43436.

Ratios.

	Males	Female
a	25.4-28.8	25.0
b	6.2-6.8	6.5
c	8.9-9.4	8.9
V p. 100	—	49.3

Body length $0.71-0.75$ mm; greatest width $26-28\mu$ in males, 30μ in female. Rows of cuticular punctations with lateral dots slightly larger and more widely spaced. Head diameter $10-12.5\mu$. Labial papillae minute. Anterior circle of six cephalic setae $2-2.5\mu$; posterior circle of four setae $6-7\mu$. Buccal cavity large. Dorsal tooth in the form of a small point mounted on a massive cuticular ridge, opposed by two small subventral teeth. Amphids $7-8\mu$ wide, 4.5 turns; corresponding body width 13μ . Oesophagus $0.108-0.115$ mm long; posterior bulb small and rounded, $17-19\mu$ in diameter with plasmatic interruption in the middle. A long sublateral seta positioned some distance posterior to the amphids (Fig. 8, A) is characteristic. Tail conical, $78-84\mu$ long; cloacal or anal diameter $20-22\mu$.

Male.

Spicules 18-21 μ long, equal, relatively straight, not cephalate proximally (Fig. 8, B, C). A single pre-cloacal seta and 6-8 cup-shaped supplements, 7 being by far the commonest number. The anterior supplement is 70-110 μ pre-cloacal.

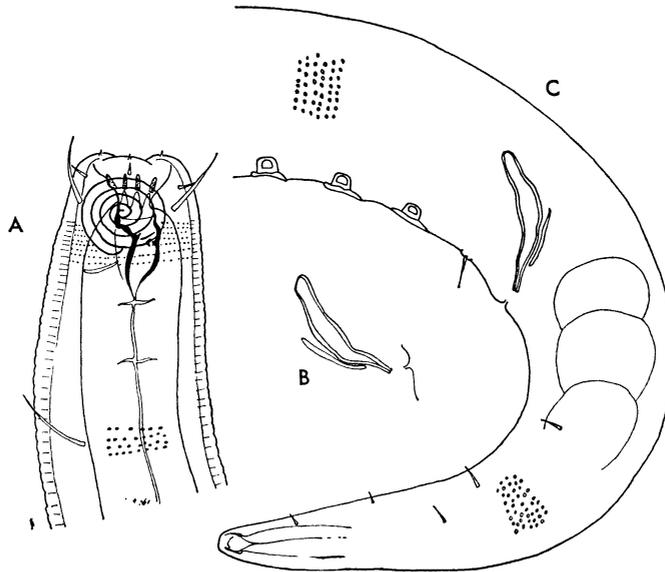


FIG. 8
Neotonchus meeki sp. nov.

A: male head; B: lateral view of spicules and gubernaculum; C: tail of another male.

Female.

Ovaries paired, symmetrical, opposed, reflexed.

Discussion.

The spicules of this species most closely resemble those of *N. chamberlaini* Wieser and Hopper, 1966, but in this species both circles of cephalic setae are elongate.

Summary

Ten species of freeliving marine nematodes belonging to the family Cyatholaimidae are reported from three stations off the coast of Northumberland (England). Their distribution at these three stations is indicated. Eight species are new, and are described as *Longicyatholaimus complexus* sp. nov., *Paracanthonus longicaudatus* sp. nov., *Paralongicyatholaimus minutus* sp. nov., *Neotonchus filiformis* sp. nov., *N. vitius* sp. nov., *N. votadinii* sp. nov., *N. interruptus* sp. nov. and *N. meeki* sp. nov.

Zusammenfassung

Zehn Arten von freilebenden Meeres-Nematoden aus der Familie der Cyatholaimidae worden von drei Orstellen an der Küste von Northumberland (England) berichtet. Ihre Verbreitung an diesem Fundstellen sind gezeigt. Die folgenden Arten sind hier als neu beschrieben worden: *Longicyatholaimus complexus* sp. nov., *Paracanthonus longicaudatus* sp. nov., *Paralongicyatholaimus minutus* sp. nov., *Neotonchus filiformis* sp. nov., *N. vitius* sp. nov., *N. votadinii* sp. nov., *N. interruptus* sp. nov. und *N. meeki* sp. nov.

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