# A NEW SPECIES OF *GONIONCHUS* (NEMATODA: XYALIDAE) FROM THE FIRTH OF CLYDE, WITH A REDESCRIPTION OF *ENOPLOIDES SPICULOHAMATUS* SCHULZ (NEMATODA: ENOPLIDAE).

by

**M.P. Benwcll**

University Marine Biological Station, **Millport (1)**
**Isle** of Cumbrae, Scotland, **KA28 OEG**

**Résumé**

Deux espèces de Nématodes libres marins du sable sublittoral à Tomont End, Ile de Cumbrae, Ecosse, sont décrites, *Gonionchus cumbraensis* est une nouvelle espèce et *Enoploides spiculohamatus* Schulz était jusqu'ici mal décrite. La taxonomie des genres *Gonionchus* et *Xyala* est discutée.

## Introduction

As part of a study of the role of free-living nematodes in the decomposition of kelp, a sample was taken by Scuba diving of the sediment at a depth of 6m off Tomont End, Isle of Cumbrae, Scotland. This sediment is a medium coarse sand containing a large number of broken mollusc shells. Of the eighteen nematode species in the sample, one, *Gonionchus cumbraensis* sp. nov., proved to be new and another, *Enoploides spiculohamatus* Schulz, has previously been only poorly described.

Descriptions have been made from glycerine mounts and the material deposited at the British Museum (Natural History). Measurements have not been assembled into ratios (de Man or Filipjev formulae) as this practice is often unhelpful. Curved structures have been measured as the arc and not the chord.

## *ENOPLOIDES SPICULOHAMATUS* Schulz **1932** (Fig. **1**)

### **Material** studied

2♂♂, 2 juveniles.
B.M. (N.H.) Reg. nos. 1979.2.7. to 1979.2.10.

(1) Present **adress:** Institut für Meeresforschung, **Am** Handelshafen **12,** D-285 Bremerhaven, Federal Republic **of** Germany.

CAHIERS DE BIOLOGIE MARINE
Tome XXII - 1981 - pp. 177-184

Measurements (µm)

| | ♂1 | ♂2 | juv1 | juv2 |
|---|---|---|---|---|
| Body length | 2 682 | 2 840 | 1 725 | 896 |
| Maximum diameter | 78 | 83 | 68 | 40 |
| Head diameter | 47 | 46 | 35 | 26 |
| Labial setae | 20 | 20 | 14 | 9 |
| Long cephalic setae | 48 | 48 | 34 | 25 |
| Short cephalic setae | 24 | 25 | 15 | 11 |
| Anterior end to nerve ring | 151 | 151 | 143 | — |
| Oesophagus length | 578 | 560 | 421 | 267 |
| Diameter at base of oesophagus | 70 | 74 | 65 | 40 |
| Supplement length | 27 | 25 | — | — |
| Supplement to cloaca | 94 | 89 | — | — |
| Spicule length | 335 | 356 | — | — |
| Gubernaculum length | 45 | 42 | — | — |
| Cloacal (anal) diameter | 59 | 54 | 50 | 26 |
| Tail length | 176 | 167 | 170 | 118 |

## Description

Three high lips, with distinct striations on their inner surfaces. Each with two labial setae. Ten cephalic setae: six longer anterior setae and four shorter setae immediately posterior to the dorso-lateral longer setae. Clawed mandibles projecting anterior to the cuticularized plates. Each with two short linear perforations in the anterior part and each bearing a small tooth, these teeth equal in size. Immediately posterior to each mandible is a pair of transverse cuticularized bars. Outside the mandibles are two layers of cuticularized plates. The outer layer consists of six plates of two types, one type in the labial positions, the other in the interlabial positions. The cephalic setae are attached over the spaces between these plates. The anterior margin of the inner layer runs slightly posterior to the anterior margin of the outer layer in the labial positions, and in the interlabial positions runs diagonally posteriorly to a heavily cuticularized crescentic structure. The amphids could not be seen. Oesophagus typically enoploid, three files of glands down its length. Tail with a few scattered setae but no long terminal setae.

*Male:* gubernaculum a pair of plates joined by a process on each at the proximal end. Distal end of each plate grooved, with a claw-shaped projection on the dorsal side of the groove and two equal rounded projections in the ventro-lateral positions. Spicules equal, long, transversely striated, open at proximal end, distal end of each joined by a muscle or ligament to the blunt dorsal process on the respective gubernacular plate. Supplement small, tubular, thickened at the distal end. A pair of S-shaped spines 13µm posterior to the cloaca.

## Discussion

The only definite differences between the specimens described above and Schulz's (1932) description of *E. spiculohamatus* are in the

distance from the supplement to the cloaca and the length of the spicules, and these do not warrant recognition of a separate species. Unfortunately Schulz's description does not show the cuticularized structures of the head or the shape of the gubernaculum very clearly,

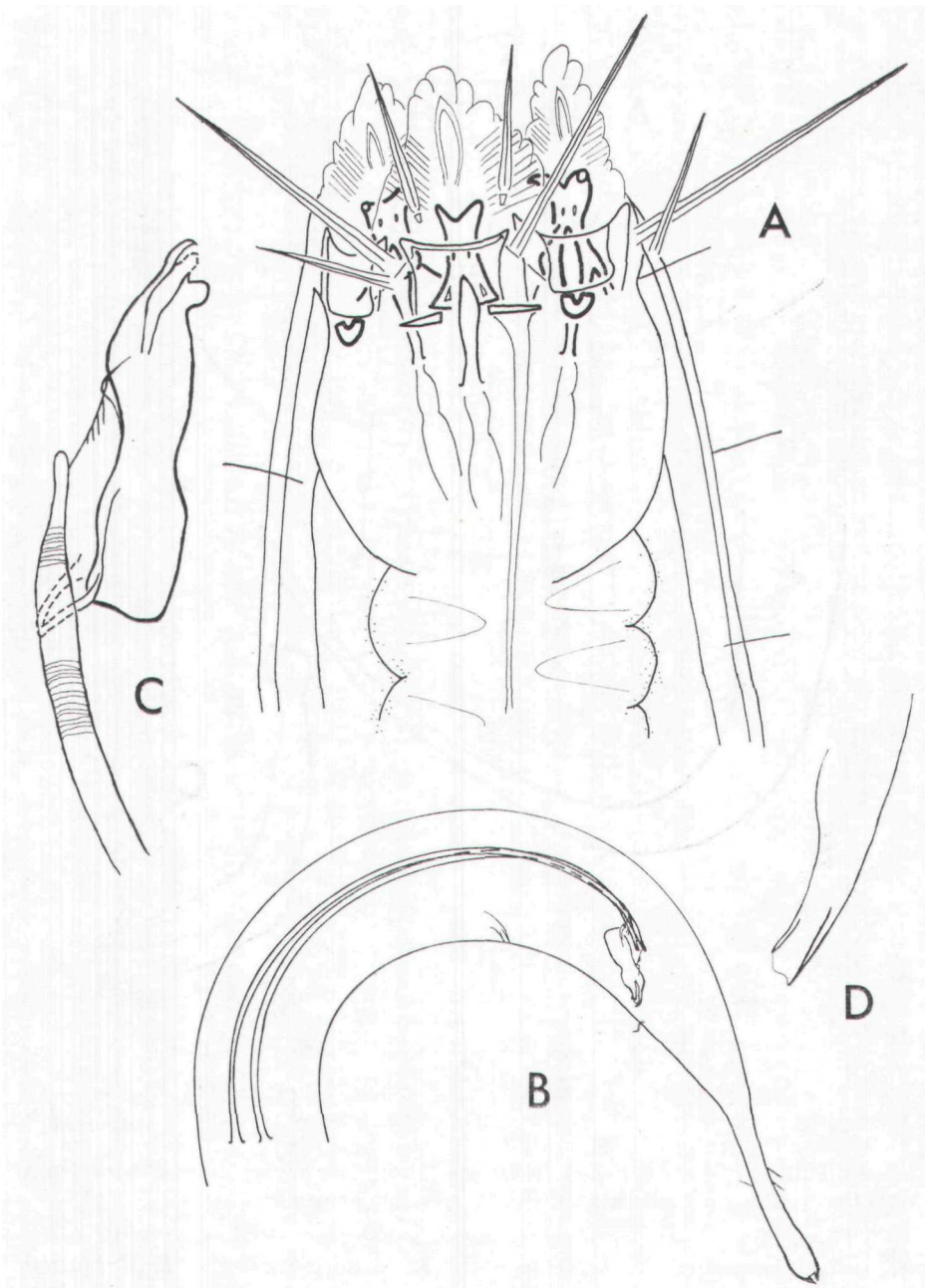


FIG. 1
E*noploides* *spiculohamatus* Schulz
A: male head; B: male tail; C: gubernaculum; D: supplement.
All drawn from $\sigma_1$

and there appear to be no type specimens. For the present the above specimens are assumed to be *E. spiculohamatus,* but collection from Schulz's site might reveal a different species fitting his description, in which case they will have to be renamed. The description and preservation of these specimens is a step towards sorting out the taxonomy of this difficult species group.

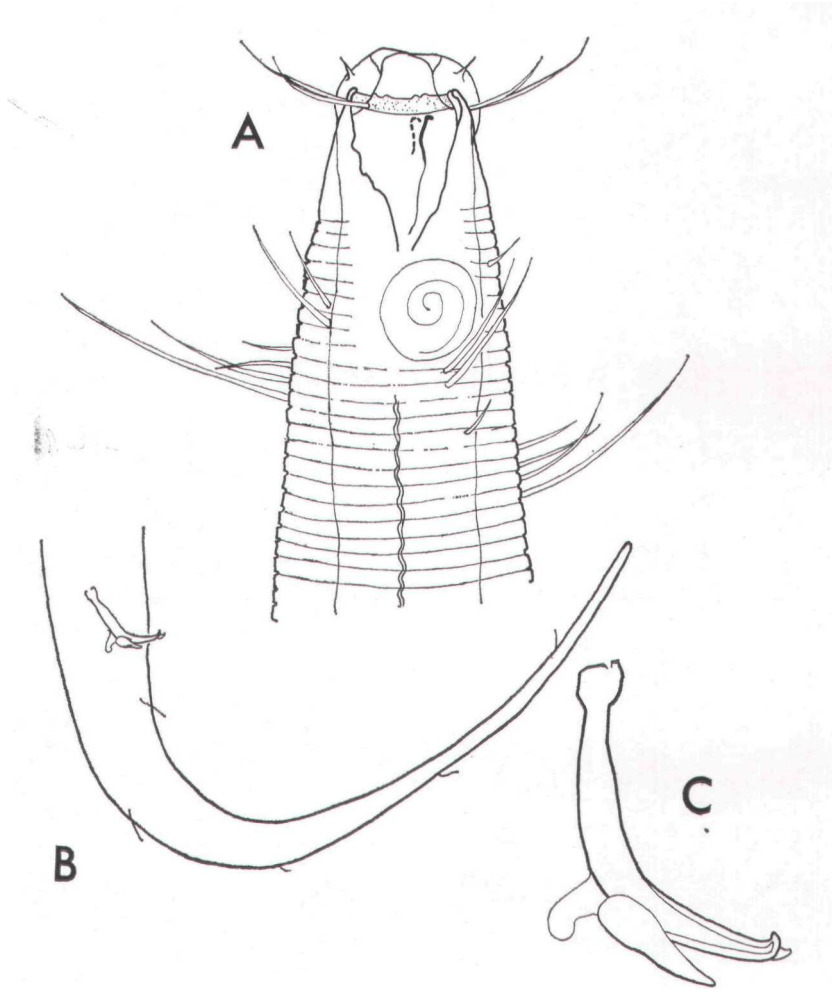


FIG. 2
*Gonionchus cumbraensis* sp. nov.
A: male head; B: spicules and gubernaculum; C: male tail.
Drawn from ♂1, (holotype).

There has been confusion over specimens hitherto named as *E. spiculohamatus, E. labiatus* and *E. longispiculosus. E. labiatus* Butschli 1874 was described from a female, and is correctly regarded by Wieser and Hopper (1967) as a *species inquirenda.* Stekhoven (1935) and Bresslau and Stekhoven (1940) figure males under the name *E. labiatus* with which they consider *E. spiculohamatus* to be

synonymous. This synonymy cannot be proved and should be abandoned. Bresslau and Stekhoven's species may be *E. spiculohamatus* but the description is poor. Stekhoven's species is not *E. spiculohamatus* but the description is not good enough to serve as a description of a new species.

Riemann (1966) records *E.* aff. *labiatus* which he considers is probably a complex species. Skoolmun and Gerlach (1971) record *E. spiculohamatus.* In neither case is a description given.

Warwick (1971) and Platt (1977,1977a) record *E. spiculohamatus* from the British coast. Examination of specimens provided by Dr. Platt and a description provided by Dr. Warwick has shown that in both cases the species concerned is *E. longispiculosus* Vitiello 1967 rather than *E. spiculohamatus.*

Wieser and Hopper (1967) give a good key to the species of *Enoploides* with long spicules and S-shaped gubernacula. To this must be added *E. longispiculosus* and also *E. delamarei* Boucher 1977. *E. caspersi* Riemann 1966, *E. disparilis* Sergeeva 1974, *E. ponticus* Sergeeva 1974 and *E. alexandrae* Uzunov 1974 do not belong to this species group.

## ***GONIONCHUS*** *CUMBRAENSIS* sp. nov. (Fig. 2)

### Material studied

3♂♂ (Holotype and 2 paratypes), 3 ♀♀ (paratypes).
B.M. (N.H.) Reg. nos. 1979.2.1. (Holotype, ♂1) to 1979.2.6.
Additional specimens in the author's possession.

Measurements (μm)

| | ♂1 | ♂2 | ♂3 | ♀1 | ♀2 | ♀3 |
|---|---|---|---|---|---|---|
| Body length | 1 320 | 1 370 | 1 510 | 1 474 | 1 526 | 1 358 |
| Maximum diameter | 52 | 54 | 58 | 52 | 61 | 54 |
| Head diameter | 17 | 19 | 20 | 20 | 22 | 23 |
| Long cephalic setae | 18 | 18 | 17 | 18 | 17 | 19 |
| Short cephalic setae | 10 | 10 | 11 | 12 | 11 | 13 |
| Amphid distance | 25 | 25 | 28 | 28 | 29 | 27 |
| Amphid diameter | 13 | 12 | 14 | 9 | 11 | 10 |
| Diameter at level of amphid | 23 | 26 | 26 | 22 | 26 | 34 |
| Anterior end to nerve ring | 112 | — | 126 | 140 | — | — |
| Oesophagus length | 297 | 324 | 400 | 386 | 391 | 337 |
| Diameter at base of oesophagus | 44 | 50 | 50 | 50 | 60 | 44 |
| Anterior end to vulva | — | — | — | 1 007 | 1 033 | 957 |
| Spicule length | 40 | 42 | 42 | — | — | — |
| Cloacal (anal) diameter | 33 | 36 | 38 | 34 | 35 | 32 |
| Tail length | 238 | 232 | 281 | 289 | 310 | 280 |

## Description

Cuticle annulated, annules 2.5µm wide. Six highs lips, each with three fine longitudinal striations on its outer surface. The anterior part of each lip forms a delicate flap apparently hinged to the rest of the lip. Short (3am) labial setae prominent. Around the buccal cavity runs a cuticularized band from which a double peg extends anteriorly into the base of each lip. In the buccal cavity are two subventral cuticularized flanges. In the female ten cephalic setae: six longer setae and four shorter setae adjacent to the submedian longer setae. In the male two additional setae just ventral of the lateral long setae. Four short (6µm) subcephalic setae just anterior to the amphids. Amphids indistinct, circular in outline with faint spiral structure. Larger in the male than in the female. Cervical and somatic setae long and numerous. Apart from a few short single setae, cervical setae arranged in groups of three or four. Setae in each group in a longitudinal row, one on each of successive annules of the cuticle. The most conspicuous groups are of four setae, with a progressive increase in length from the anterior (10-15µm) to the posterior (35-40µm). As far as the anus, somatic setae more widely spaced, 10-45µm long. Tail long, tapering in the anterior part, almost cylindrical posteriorly. Caudal setae only sparse and short (5-15µm long). Two 15µm terminal setae in some specimens.

*Male:* spicules paired, equal, proximally cephalate. Walls very thick distally, becoming progressively thinner proximally. Spicules distally bifid, each with an outwardly turned lateral process and a slightly narrower median process. Gubernaculum with weakly cuticularized, paired, 6µm long, dorsocaudal apophyses. Two testes, the anterior larger and lying to the left of the gut, the posterior, much smaller, lying to the right of and dorsal to the gut. Seminal vesicle conspicuous, 10-130µm anterior to the cloaca. Immediately anterior to the cloaca lies a pair of glands, 20-30µm long, one on either side of the vas deferens, each with a duct leading to the cloaca.

*Female:* ovary single, anterior, lying to the left of the gut.

## Discussion

*G. cumbraensis* sp. nov. is close to the type species, *G. villosus* Cobb 1920, and to *G. inaequalis* Warwick and Platt 1973. It can be distinguished from both of these by the bifid spicules, and also from *G. villosus* by the possession of gubernacular apophyses and from *G. inaequalis* by the shorter body setae and equal spicules. These three species form a homogeneous group.

The species remaining in *Xyala* after Lorenzen's (1977) revision of the Xyalidae are *X. striata* Cobb 1920, *X. ricmanni* Boucher and Helleouet 1977, and *X. imparis* Boucher and Helleouct 1977. These species form a second homogeneous group.

The problem in the taxonomy of these two genera is the placing of *G. longicaudatus* (Ward 1972), which Lorenzen transferred to

*Gonionchus* from *Xyala,* and *G. sensibilis* Lorenzen 1977. These species resemble each other closely. They have neither teeth within the buccal cavity nor a cutcularized band around it. Their cuticles have longitudinal ridges as well as transverse annulation. The body setae are not exceptionally long. In all these respects these species resemble *Xyala* rather than *Gonionchus.* Lorenzen places them in *Gonionchus* because he considers that they have high lips of a type otherwise found only in the other *Gonionchus* species and that these lips characterize a monophyletic group.

Examination of specimens of *G. cumbraensis, G. inaequalis, G. longicaudatus, X. striata* and X, *riemanni* has shown that the lips of all these species have the same basic structure. There is a terminal flap, often longitudinally striated, separated from the posterior part of the lip by a septum anterior to the labial setae. This is best shown, for the three species groups, in the descriptions of *G. cumbraensis* above, G. *sensibilis* in Lorenzen (1977) and *X. riemanni* in Lorenzen (1978). The lips of the three species groups do differ, but there is no strong reason to classify *G. longicandatus* and G. *sensibilis* with *Gonionchus* rather than with *Xyala.* It seems preferable to use a classification based on several characters any of which can reasonably be given more weight than can the structure of the lips : the leeth, the cuticularized band, and the cuticular ornamentation.

It is therefore proposed that G. *longicaudatus* be returned to, and G. *sensibilis* transferred to, *Xyala,* as *X. longicaudata* Ward 1972 and X'. *sensibilis* (Lorenzen 1977) respectively. An alternative would be to erect a separate genus for these two species. This seems to be unnecessary at the present but could be done later, particularly if additional species are discovered.

Acknowledgements

Thanks are due to my supervisor, Dr. P.G. Moore, also to Dr. R.M. Warwick, Dr. H.M. Platt and Mr. P.J. Schemhri. The work was supported by a N.E.R.C. Research Studentship.

**Summary**

Two species of free-living marine nematode from a sublittoral sand at Tomont End, Isle of Cumbrae, Scotland are described. One of these, *Gonionchus cumbraensis* sp. nov. is new to science, the other *Enoploides spiculohamatus* Schulz was previously only poorly described. The taxonomy of the genera *Gnnionchus* and *Xyala* is discussed.

**REFERENCES**

BOUCHER, G., 1977. — Nématodes des sables fins infralittoraux de la Pierre Noire (Manche occidentale) IV. Enoplida. *Bull. Mus. natn. Hist, nat., Paris,* (3) 468 Zool. 325.

BOUCHER, G., and HELLEOUËT, M., 1977. — Nématodes des sables fins infralittoraux de la Pierre Noire (Manche occidentale) III. Araeolaimida et Monhysterida. *Bull. Mus. natn. Hist, nat.,* Paris, (3) 427 Zool. 297.

BÜTSCHELI, O., 1874. — Zur kenntnis der freilebenden Nematoden, insbesondere der des Kieler Hafens. *Abh. senckenb. naturforsch. Ges.,* 9, *pp.* 236-292.

COBB, N.A., 1920. — One hundred new nemas. (Type species of 100 new genera). *Contr. Sci. Nematol.,* 9, pp. 217-343.

LORENZEN, S., 1977. — Revision der Xyalidae (freilebende Nematoden) auf der Grundlage einer kritischen Analyse von 56 Arten aus Nord- und Ostsee. *Veroff. Inst. Meeresforsch. Bremerh., 1*6, *pp.* 197-261.

LORENZEN, S., 1978. — The system of the Monhysteroidea (Nematodes) — A New Approach. *Zool. Jb. (syst.), 1*05, *pp.* 515-536.

PLATT, H.M., 1977. — Vertical and horizontal distribution of free living marine Nematodes from Strangford Lough, Northern Ireland. *Cah. Biol. Mar.,* 18, *pp.* 261-273.

PLATT, H.M., 1977a. — Ecology of Free-living Marine Nematodes from an Intertidal Sandflat in Strangford Lough, Northern Ireland. *Estuar, and Coast. Mar. Sci.,* 5, *pp.* 685-693.

RIEMANN, F., 1966. — Die interstitielle Fauna im Elbe-Aestuar. Verbreitung und Systematik. *Arch. Hydrobiol.,* Suppl. 31, *pp.* 1-279.

SCHULZ, E., 1932. — Beitrage zur Kenntnis mariner Nematoden ans der Kieler Bucht. *Zool. Jb. (Syst.),* 62, *pp.* 331-430.

SERGEEVA, N.G., 1974. — New free living nematodes (Enoplida) from the Black Sea. *Zool. Zh.,* 53 (1), *pp.* 120-125.

SKOOLMUN, P. und GERLACH, S.A., 1971. — Jahrezeitlich Fluktuationen der Nematodenfauna im Gezeitenbereich des Weser — Ästuars. *Veroff. Inst. Meeresforsch. Bremerh.,* 13, *pp.* 119-138.

STEKHOUVEN, J.H. SCHUURMANS, 1935. — Nematoda : Systematischer Teil, Nematoda errantia. *In:* GRIMPE, O. und WAGLER, E., Die Tierwelt der Nord- und Ostsee. (Leipzig, 1935), 5b, *pp.* 1-173.

UZUNOV, J., 1974. — Two new interstitial nemic species from the Bulgarian Black Sea. *C.R. Acad. bulg. Sci.,* 27 (6), *pp.* 843-845.

VITIELLO, P., 1967. — Nématodes libres marins de Roscoff. I. Description de cinq espèces nouvelles. *Cah. Biol. Mar.,* 8, *pp.* 403-416.

WARD, A.R, 1972. — Two new species of *Xyala* (Nematoda, Monhysteroidea) from sublittoral sediments in Liverpool Bay. *Mar. Biol.,* 13 (2), *pp.* 176-178.

WARWICK, R.M., 1971. — Nematode associations in the Exe Estuary. *J. mar. biol. Ass. U.K.,* 51, *pp.* 439-454.

WARWICK, R.M. and PLATT, H.M., 1973. — New and little known marine Nematodes from a Scottish sandy beach. *Cah. Biol. Mar.,* 14, *pp.* 135-158.

WIESER, W. and HOPPER, B.E., 1967. — Marine nematodes of the east coast of North America. I. Florida. *Bull. Mus. comp. Zool. Harv.,* 135, *pp.* 239-344.