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A new nematode from West Patagonian coasts, *Biarmifer madrynensis* sp. n., with a redefinition of the genus *Biarmifer* Wieser 1954 (Nematoda, Cyatholaimidae)

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Abstract

A new free-living marine nematode *Biarmifer madrynensis* sp. n. (Cyatholaimidae) is described from sediments of the Golfo Nuevo coast (West Patagonia, Argentina). It may be distinguished from the other two species of the genus (*B. cochleatus* and *B. laminatus*) by cephalic setae length, amphid size, flagellate tail and number of precloacal supplementary organs. A redefinition and a key to species of the genus *Biarmifer* is given.

Key words: free-living marine Nematodes, Cyatholaimidae, taxonomy, Patagonia, Argentina.

Résumé

Une nouvelle espèce de nématode libre marin, *Biarmifer madrynensis* sp.n., de la famille des Cyatholaimidae, est décrite. Cette espèce vit dans le sédiments infralitoraux des côtes du Golfo Nuevo (Patagonie occidentale, Argentine). Elle diffère des deux espèces connues dans le genre (*B. cochleatus* et *B. laminatus*) par la longueur des soies céphaliques, la dimension des amphides, la queue 20% conique et le nombre de papilles précloacales. Une redescription et une clé du genre *Biarmifer* sont proposées comme aide à l'identification des trois espéces connues.

Mots-clés: nématodes libres marins, Cyatholaimidae, taxonomie, Patagonie, Argentine.

Introduction

The genus *Biarmifer* created by WIESER (1954) has been found in sublittoral sand and algae of Chilean coasts. Currently only two species have been recorded: *Biarmifer cochleatus* WIESER 1954 and *Biarmifer laminatus* WIESER 1954; *Biarmifer gibber* WIESER 1959 being a synonym of *Paracanthonchus longus* ALLGEN, 1934 and its taxonomic position is discussed. The new species *Biarmifer madrynensis* (Nematoda, Cyatholaimidae), hereby described, extends the distribution of the genus along the South American Atlantic coasts. The new species was collected during an ecological and taxonomic study of the shallow sublittoral nematofauna of a small sandy bay in Golfo Nuevo, Patagonia, Argentina.

The Argentinean species also possesses the typical configuration of the cuticle as drawn by WIESER (1954) for the genus and is herewith included in the emended genus diagnosis.

Material and Methods

The Puerto Madryn bay is located on the West coast of Golfo Nuevo (42° 45' South and 64° 55' West) on the Atlantic coast of South America, Chubut province, Argentina. The bay is 0-40 m deep and presents sediment dominated by fine sand with patches of pebbles (MOUZO *et al.*, 1978). The tidal regime is semi-diurnal and the mean tidal range is 4.62 m. The bottom current dominates in winter and spring, whereas the rest of the year surface currents are the most important (BARROS & KREPPER, 1978). Surface currents near the coast are 10-20 cm. sec^{-1} (LANFREDI, 1974). The bottom currents are more influenced by bottom topography than by the wind effect (RIVAS, 1983). Mean salinity is 33.9 ups and temperature varies between 9.4- 20°C. The mean annual chlorophyll "a" pigment found in the area was 1.18 mg. m^{-3} (PASTOR DE WARD & BALA, 1996).

The study area was situated in the shallow sublittoral zone of Puerto Madryn coastline extending south from Punta Cuevas to Punta Este, off Kaiser beach (Fig. 1). The sampling took place at 8 m depth (low tide), in October 1987.

SAMPLING PROCEDURE

Four sediment cores were collected by SCUBA diving on the sampling site, using 30 cm long PVC tubes, 3.5 cm in diameter, pushed 20 cm into the sediment (sediment volume 200 cm3). The sampling device used was similar to the Haps corer (KANNEWORFF & NICOLAISEN, 1973). The sediment core was cut in 1cm sections and fixed in 5% formalin containing the vital stain Rose Bengal. Fixed nematodes were extracted by a combination of decanting and sieving, using a 60 µm sieve, following HULINGS & GRAY (l97l). All sampled animals were identified. Nematode specimens were transferred to glycerol-alcohol-water (DITLEVSEN, 1911), stained with Blue Nile, counted and identified. They were mounted in glycerol on slides. The drawings were made using a Zeiss microscope-drawing device and photographs were taken with a Zeiss photo microscope equipped with differential in-

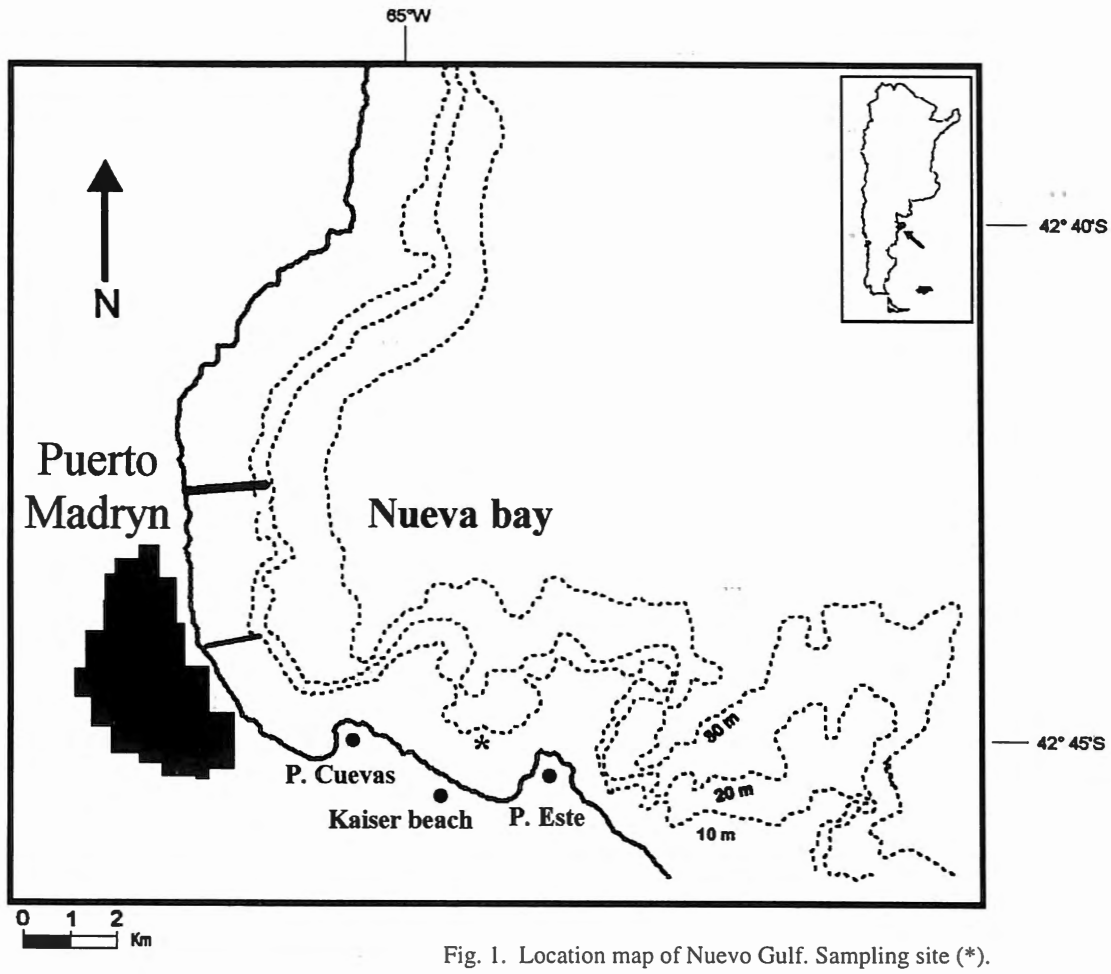

Fig. 1. Location map of Nuevo Gulf. Sampling site (*).

terference contrast (DIC). The type specimens and five paratypes are deposited in Museo Bernardino Rivadavia, Buenos Aires, Argentina, two paratypes will be deposited at the Natural History Museum of London, United Kingdom and two paratypes in the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium.

Abbreviations

The abbreviations used in the text are: bdc = body diameter at level of cephalic setae; bdav = anal/cloacal body diameter; bdnr = Body diameter at level of nerve ring; bdph = body diameter at level of pharingeal end; daa = distance from anterior end to anus; danr = distance from anterior end to nerve ring; daph = distance from anterior end to pharingeal end; dav = distance from anterior end to vulva; mbd = maximum body diameter; spic = spicular length in microns, along the arc; spic% = spicule chord length as proportion of cloacal body diameter; gub = gubernaculum length in microns; guv% = gubernaculum length as proportion of cloacal body diameter V% = distance from the anterior end to the vulva opening in percentage of the total length; HD = head diameter as percentage of posterior esophagus body diameter; A% = amphid diameter as percentage of corresponding body diameter; R3 = sensilla length as percentage of head diameter; ps = precloacal supplements number; t = tail length; tan = tail length in cloacal diameters; tcp% = % conical portion of tail; L = Total Length; De Man's ratios used in this paper are explained as follows: a = L/maximum width (at the middle of the body in males and on the vulva level in females); b = L/esophageal length; c = L/tail length.

Historical review and remarks on taxonomic position of *Biarmifer* WIESER 1954

WIESER 1954 presented a key to the genera of Cyatholaiminae MICOLETZKY 1922, he erected the genus *Biarmifer* and described two new species belonging to it. WIESER (1959) created a new species, for this genus, *Biarmifer gibber,* which was synonymised with *Paracanthonchus longus* ALLGEN 1934 by LORENZEN (1972). WIESER & HOPPER (1967) proposed some additions and emendations to the key given by WIESER (1954), based on the presence or absence of pre-cloacal supplements.

DE CONINCK (1965) created a new Cyatholaimidae subfamily, the Paracanthonchinae, using precloacal supplements structure. So the family Cyatholaimidae was split in two subfamilies: Cyatholaiminae FILIPJEV, 1918 (males without tubular pre-cloacal supplements;. buccal cavity with or without teeth) and Paracanthonchinae DE CONINCK, 1965 (males with tubular pre-cloacal supplements; buccal cavity with a prominent dorsal tooth). He included the genus *Biarmifer* in

the subfamily Cyatholaiminae according to its cup-shaped supplements.

GERLACH & RIEMANN (1973) added two new subfamilies in their checklist. So the family Cyatholaimidae was split in: Cyatholaiminae FILIPJEV, 1918, Paracanthonchinae DE CONINCK, 1965, Pomponematinae GERLACH & RIEMANN, 1973 and Xenocyatholaiminae GERLACH & RIEMANN, 1973. They did not include any remarks about these new groups. They included te genus *Biarmifer* in the Paracanthonchinae DE CONINCK, 1965. LORENZEN, 1981 accepted the subfamilies of GERLACH & RIEMANN (1973) and also the position of *Biarmifer.*

After careful examination of the literature on the subfamilies of Cyatholaiminae and Paracanthonchinae (Table 1) and of *Biarmifer* specimens I conclude the following.

- In the Cyatholaimidae there are five genera with cup-shaped precloacal supplements *Marylynnia, Xyzzors* and *Longicyatholaimus* (Cyatholaiminae FILIPJEV, 1918), *Biarmifer* and *Paracanthonchus* (Paracanthonchinae DE CONINCK, 1965) and all genera of the Pomponematinae GERLACH & RIEMANN,1973.
- Pomponematinae GERLACH & RIEMANN, 1973 have elaborate supplements and a particular teeth configuration not found in *Biarmifer.*
- All *Paracanthonchus*, except one, have tubular pre-cloacal supplements. The exception is *Biarmifer gibber* WIESER, 1954 which was synonimized with *Paracanthonchus longus* (ALLGEN, 1934) by LORENZEN (1972).
- *Acanthonchus, Paracanthonchus, Paracyatholaimus, Paracyatholaimoides* differ from the genus *Biarmifer* in having simple spicules (without inner septa) and conical tails.
- The inclusion of the genus *Biarmifer* in the Paracanthonchinae DE CONINCK, 1965, by GERLACH & RIEMANN (1973), does not correspond with the subfamily diagnosis given by DE CONINCK (1965) because the genus *Biarmifer* does not have tubular pre-cloacal supplements (see Table 1).

Table 1: Diagnostic features in **Cyatholaiminae** and **Paracanthonchinae** from actual literature

	BPC (*)	Cuticle (**)	Tooth (***)	Spicule (****)	Gubernaculum	Supplements	Tail
Cyatholaiminae							
Marylynnia HOPPER, 1977	12	homog./ stellate	big	double/simple	simple or "L" with denticles	cup-shaped	1/3 conical
Xyzzors INGLIS, 1963	8	homog./ dots	big	double/simple	"L" with denticles	cup-shaped	conical
Longicyatholaimus MICOLETZKY, 1924	4	homog./ stellate	small	double/serrated	triangle or spoon with denticles	cup-shaped	>1/6 conical
Phyllolaimus MURPHY, 1964	4	homog./ dots	big	simple/simple	spoon with horns	setose	conical
Praeacanthonchus MICOLETZKY, 1924	4	heterog./ dots	small	double/simple	spoon with horns	setose	conical
Cyatholaimus BASTIAN, 1865	4	homog./ dots	small	simple/simple	spoon with horns	—	conical
Metacyatholaimus STEKHOVEN, 1942	0	heterog./ dots	small	double?/serrated	spoon with horns	—	1/3conical
Paralongicyatholaimus MICOLETZKY, 1924	?	homog./ dots	—	simple/simple	simple	—	1/6conical
Paracanthonchinae							
Biarmifer WIESER, 1954	2 – 4	heterog./ hexagons	small	double/simple	simple or "L" with denticles	cup-shaped	1-1/6 conical
Acanthonchus COBB, 1920	4	heterog./ dots	small to big	simple/simple	triangle	tubular	conical
Paracanthonchus MICOLETZKY, 1924	4-8	homog./ dots	big	simple/simple	triangle with denticles	tubular	conical
P. longus (ALLGEN 1934)	4	homog./dots	medium	double/two tips	"L"	cup-shaped	1/2conical
Paracyatholaimoidea GERLACH, 1953	?	homog./ dots	medium	simple/simple	simple or "L"	tubular or setose	conical
Paracyatholaimus MICOLETZKY, 1922	8	homog./ dots	big	simple/simple	simple or "L"	tubular or setose	conical

* Body porus complex. Longitudinal rows;
** On head. Homogeneous= all punctuations of equal size; Heterogeneous= lateral differentiations/ Other features;
*** Dorsal;
**** Spicules type. Double, with internal septa; simple, without internal septa./ spicules tip. Simple; two tips; serrated.

- *Paracanthonchus longus* (ALLGEN, 1934) sensu WIESER, 1954 and RIEMANN, 1966 does not correspond with the subfamily diagnosis given by DE CONINCK, 1965 and with the diagnosis of the genus *Paracanthonchus* given by WIESER, 1954, because it does not have pre-cloacal supplements. Furthermore, it has double spicules and 1/2 cilindro-conical tail (see Table 1).
- The cuticle configuration of *Biarmifer* is unique in the genera of the Paracanthonchinae and Cyatholaiminae. The presence of double spicules and the tail configuration are two characters which relate *Biarmifer* to *Marylynnia, Longicyatholaimus* and *Metacyatholaimus*, and also to *Paracanthonchus longus* (ALLGEN, 1934) (see Table 1).
- From these considerations I conclude that the genus *Biarmifer* should probably be included in the subfamily Cyatholaiminae. However, more detailed research on the family Cyatholaimidae is necessary to clarify the real position of *Biarmifer*. The subdivision of the family Cyatholaimidae, using diagnostic features based mainly on male characteristics, should be reviewed.

Diagnosis of the Genus *Biarmifer* (emended)

CYATHOLAIMIDAE

Cuticle heterogeneous, with enlarged hexagonal punctuations in transverse rows from anterior end to the nerve ring (alternate hooking with anterior or posterior processes, PASTOR DE WARD, 1985) and transverse rows of simple punctuations on the rest of the body. In the lateral field punctuations are smaller than in dorsal and ventral areas and are more widely spaced; anterior punctuations without stellate processes. Body pore complexes arranged in two longitudinal lateral rows. Pore aperture variable, at or near 0-30° angles to longitudinal body axis. One median sized dorsal tooth and two small sub-ventral teeth present. Spicules with inner processes (double spicule) and simple distal end, gubernaculum corpus with two lateral pieces, distally expanded or not. Cup-shaped non-sclerotized pre-cloacal supplementary organs. Tail conical with or without flagellate portion.

DIFFERENTIAL DIAGNOSIS

On the basis of the cup-shaped non-sclerotized pre-cloacal supplementary organs, the tail shape and spicule, *Biarmifer* is similar to *Marilynia* HOPPER, 1972, *Longicyatholaimus* MICOLETZKY, 1924, *Xyzzors* INGLIS, 1963, *Praeacanthonchus* MICOLETZKY, 1924 and *Metacyatholaimus* STEKHOVEN, 1942 (see Table 1). From those genera it can be separated by the configuration of the anterior end cuticle (WIESER's figures 96b and 97c; in this paper Fig. 2B; Fig. 4C, D). From *Longicyatholaimus* it can be distinguished by the number and arrangement of lateral modified punctuations, the absence of stellate processes around the cuticle punctuations and the simple spicule tip. From *Marilynia* it differs by the number of longitudinal rows of body pore complexes, their angle and teeth size, from *Xyzzors* by teeth size, tail shape and number of longitudinal rows of body pore complexes, and from *Praeacanthonchus* and *Metacyatholaimus* by the shape of the gubernaculum.

Description of the species

Biarmifer madrynensis sp. n.
(Fig. 2 A-E; Fig. 3 A-J; Fig. 4 A-H)

MATERIAL

Specimens examined: Holotype MACN N° 34696; Allotype MACN N° 34697; Paratypes MACN N° 34698-34711, BMNH, male paratype N° 2001.6913; female paratype N° 2001.6914; Paratypes KBIN N° 29391a, b.

TYPE LOCALITY AND COLLECTION DATA

Ten males and ten females collected off Kaiser beach, Puerto Madryn bay, collected October, 1987, by C.T. PASTOR DE WARD.
Specimens examined (males) (n=10): Holotype MACN N° 34696; paratypes, MACN N° 34698-34704.; paratype BMNH N° 2001.6913; paratype KBIN N° 29391a.
Specimens examined (females) (n=10): Allotype, MACN N° 34697; paratypes, MACN N° 34705-34711; paratype BMNH N° 2001.6914 (1 female); paratype KBIN N° 29391b.

ETYMOLOGY

With reference to the type locality, Puerto Madryn bay.

DESCRIPTION

Males
Measurements: see Table 2

Body largely cylindrical, anterior body end truncate (Fig. 2 B, C), posterior end tapering abruptly. Tail 20% conical, continuing with a long (Fig. 3D; 4E) flagellate end portion. Cuticle heterogeneous. From head to nerve ring, transverse rows of hexagonal punctuations, with alternate punctuation between rings, with anterior or posterior processes. On the rest of the body transverse rows of punctuations slightly smaller and widely spaced on lateral bands. Stellate processes not observed; dots less than 1µm apart; rows 2 µm apart. Body pores complexes occurring in 4 longitudinal rows, two ventro-sublateral (VSL) and two dorso-sublateral (DSL). In front of the nerve ring about 2-5 (3.9 ± 1.1) VSL and 3-6 (5.2 ± 1.2) DSL pores occur on two rows starting 50-55 (53.7 ± 4.3) µm from the head end. On the tail 2-4 (3.0 ± 0.8) DSL and 2-3 (2.5 ± 0.5) VSL pores were observed. Aperture of body pore complexes variable oriented 30° from longitudinal axis, on esophagus and tail and 0° on the middle of the body. Lateral modified punctuations (LMP) occur throughout the body, but they are most prominent on the tail region. In front of the nerve ring about 3-4 (3.7 ± 0.4) LMP occur on one lateral row starting 70-125 (83 ± 15.7) µm from the head end. On the tail 1-2 (1.5 ± 0.5) LMP were observed in one row.
Sensilla on head region arranged in two crowns: 6 + 10 (Fig. 2 A, B). Inner labial sensilla setiform 4-6 (4.8 ± 0.7) µm long;

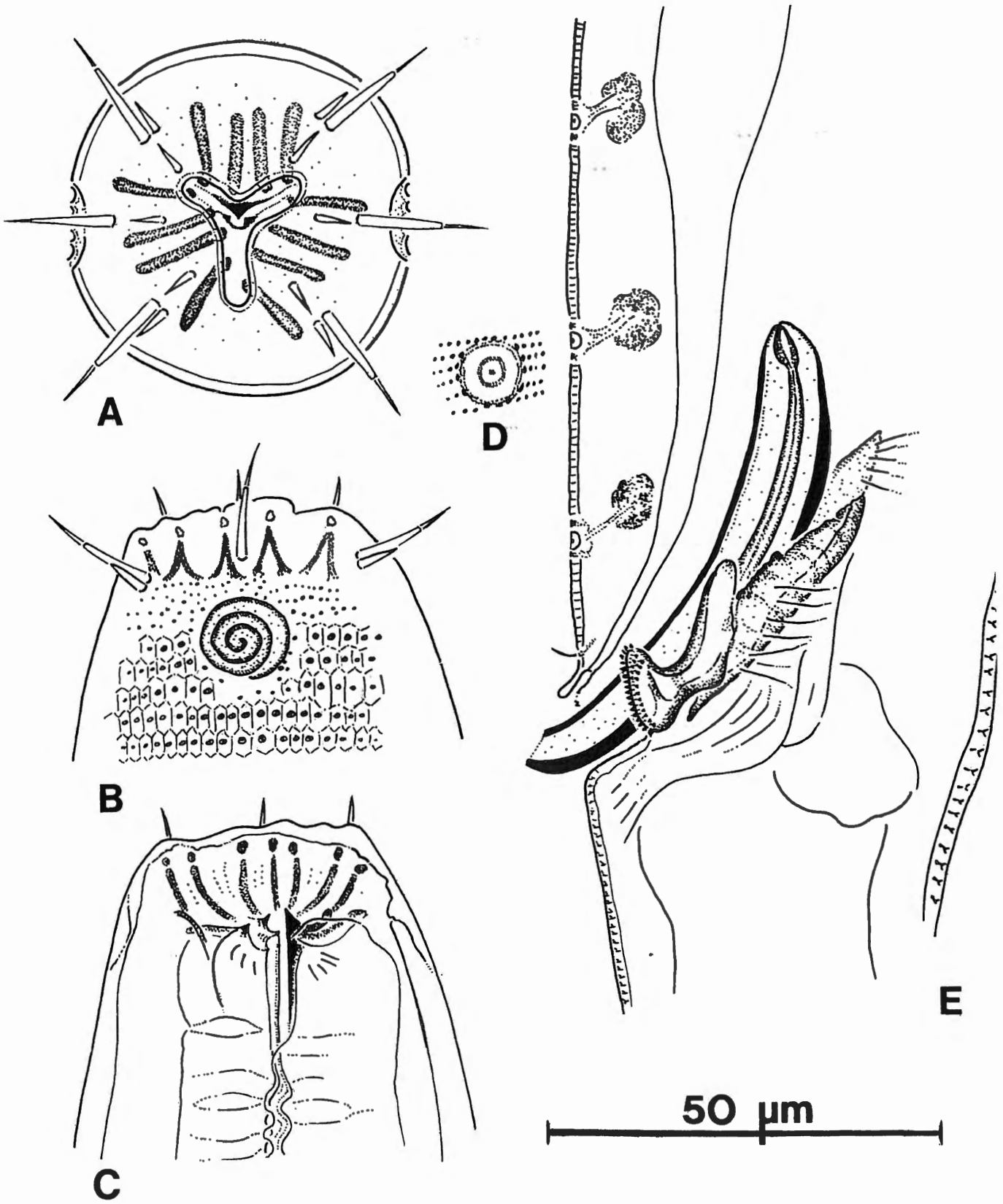

Fig. 2. *Biarmifer madrynensis* sp. n., A. Head, en face view. B. Male head, left lateral view. C. Dorsal onchium and subventral teeth, left lateral view. D. Precloacal supplement, ventral view. E. Copulatory apparatus and precloacal supplements.

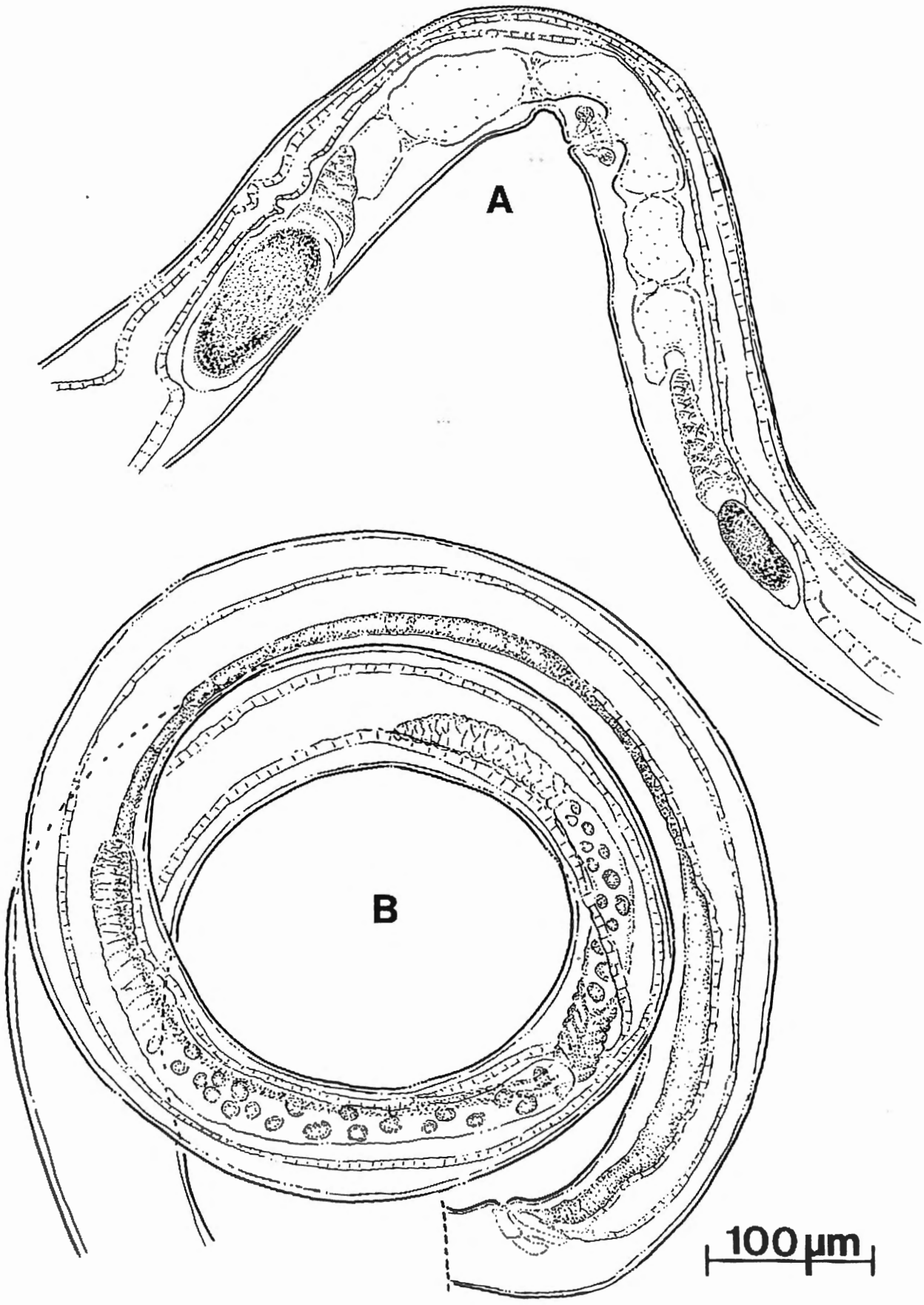

Fig. 3. *Biarmifer madrynensis* sp. n., reproductive system, A. Female; B. Male.

Table 2. Measurements of *Biarmifer madrynensis sp. nov.*

	HOLOTYPE ♂	PARATYPE ♂♂ N = 10(*)	ALLOTYPE PARATYPE ♀	PARATYPE ♀♀ N = 10(*)
L	2900.0	2280-3060 (2629 ± 269.6)	2900.0	1900-3050 (2486 ± 356.4)
danr	275.0	140-280 (201.5 ± 17.3)	265.0	170-265 (208.5 ± 35.0)
daph	470.0	370-500 (447.8 ± 51.9)	470.0	330-520 (449 ± 53.4)
daa	2450.0	1880-2400 (2145 ± 241.7)	2480.0	1700-2500 (2075.0 ± 291.7)
bdc	28.0	23-40 (28.9 ± 4.4)	30.0	20-38 (31.8 ± 5.1)
bdnr	55.0	50-72 (57.7 ± 6.0)	65.0	40-80 (60 ± 13.6)
bdph	58.0	53-75 (63.6 ± 7.4)	70.0	50-88 (66.5 ± 13.9)
mbd	70.0	60-90 (72.7 ± 7.6)	75.0	55-95 (73.5 ± 14.5)
bdav	50.0	50-65 (52 ± 4.6)	50.0	40-55 (49.3 ± 4.2)
dav	—	—	1480.0	930-1550 (1286.0 ± 195.8)
V%	—	—	51.0	46.5-57.1 (51.7 ± 2.8)
a	41.4	28.1-45.3 (36.5 ± 5.3)	38.7	27.2-39.5 (34.4 ± 3.8)
b	6.2	5.4-6.3 (5.9 ± 0.3)	6.2	4.7-6.2 (5.5 ± 0.4)
c	6.4	5.4-8.0 (6.5 ± 0.7)	6.9	5.3-6.9 (6.1 ± 0.5)
HD	48.3	33.3-66.7 (46.2 ± 9.4)	42.9	26.7-76.0 (51.2 ± 17.5)
A%	30.0	20.0-32.5 (25.5 ± 4.4)	29.1	20.0-29.1 (23.1 ± 2.1)
R3	53.6	35.0-60.0 (51.2 ± 6.9)	56.7	42.9-75.0 (50.7 ± 9.1)
t	450.0	320-520 (411 ± 55.4)	420.0	300-550 (411 ± 74.9)
tan	9.0	6.4-9.0 (7.9 ± 0.8)	8.4	6.6-11.0 (8.3 ± 1.3)
tpc%	17.0	16.6-25.6 (20.5 ± 2.8)	21.4	17.1-27.1 (22.0 ± 3.0)

(Measurements are in µm. (*): Range, followed by mean ± standard deviation values, between brackets)

cephalic sensilla setiform; cephalic sensilla length 13-15 (14.5 ± 0.7) + outer labial setae 5-10 (7.2 ± 1.7) µm, cervical and somatic sensilla not observed. Amphids multispiraled, with circular outline (Figs. 2 B; 3 A; 4 A, B), three and one-half turns; distance from amphid to labial surface10-15 (12.3 ± 2.0) µm, diameter of amphid 10-13 (11.4 ± 1.1) µm or 20-32.5 (25.5 ± 4.4) % of corresponding head width.

Stoma with 12 cheilorabdia anteriorly and three teeth posteriorly, one dorsal tooth and two subventral teeth.

Reproductive system diorchic with two testes opposed in anterior right - posterior left position to the intestine (Fig. 5) The anterior testis with a triangular tip and posterior round tip. Spicule slightly curved with inner septa (Figs. 2 E; 3 F, H); length of spiculum along the arc 62-78 (73.1 ± 4.4) µm or 1.2-1.6 (1.4 ± 0.1) cloacal-body diameters. Gubernaculum parallel to spicula formed by three pieces: the corpus and two ventro-laterally oriented pieces, enlarged distally and ornamented with denticles; length of ventro-lateral pieces 20-35 (26.3 ± 4.6) µm or 0.4-0.6 (0.51 ± 0.1) % of cloacal-body diameter; length of dorso-caudal piece 30-40 µm (36.9 ± 3.1) or 0.54-0.80 (0.71 ± 0.1) % of cloacal-body diameter. Three pre-cloacal supplements, cup-shaped and one setae 2-5 (3.4 ± 1.1) µm long near cloacal opening. Distance of precloacal supplements from cloacal opening, 12-24 (19.5 ± 4.0), 24-40 (32.9 ± 4.9) and 35-60 (49.0 ± 10.9) µm; in ventral view the supplements appear as two concentric circles (Fig. 2 E).

Females

Measurements: see Table 2.

Females similar to males. Body pores complexes occurring in 4 longitudinal rows. In front of the nerve ring about 2-5 (3.8 ± 1.1) DSL and 3-4 (3.7 ± 0.4) VSL pores occur on two rows. On the tail 4 -5 (4.7 ± 0.4) DSL and 3 (3 ± 0.0) VSL pores were observed. Aperture of body pore complexes variably oriented: 30° from longitudinal axe at level of esophagus and on tail and 0° at mid-body. In front of the nerve ring about 2-5 (3.3 ± 1.2) LMP occur on one lateral row starting 50-65 (57 ± 6) µm from the head end. On the tail 0-1 (0.3 ± 0.4) were observed in one row.

Inner labial sensilla setiform 4-6 (5.5 ± 0.7) µm long; cephalic sensilla and outer labial sensilla setiform; respectively 14-17 (15.7 ± 1.1) and 8-10 (9.1 ± 0.8) µm long. Diameter of amphid 10-14 (11.5 ± 1.2) µm or 20-26.4 (23.1 ± 2.1) % of corresponding head width; distance from amphid to labial surface 5-11 (9.4 ± 2.1) µm. Distance from anterior margin of nerve ring to labial surface 170-265 (208.5 ± 35.1); length of the esophagus 330-520 (449 ± 53.4) µm.

Reproductive system didelphic, amphidelphic with antidromously reflexed ovaries (Fig. 5). Anterior genital branch in position right and posterior branch left to the intestine. Four sack-like seminal receptacles between the vagina and the uterus and two small glands near the opening of the vagina.

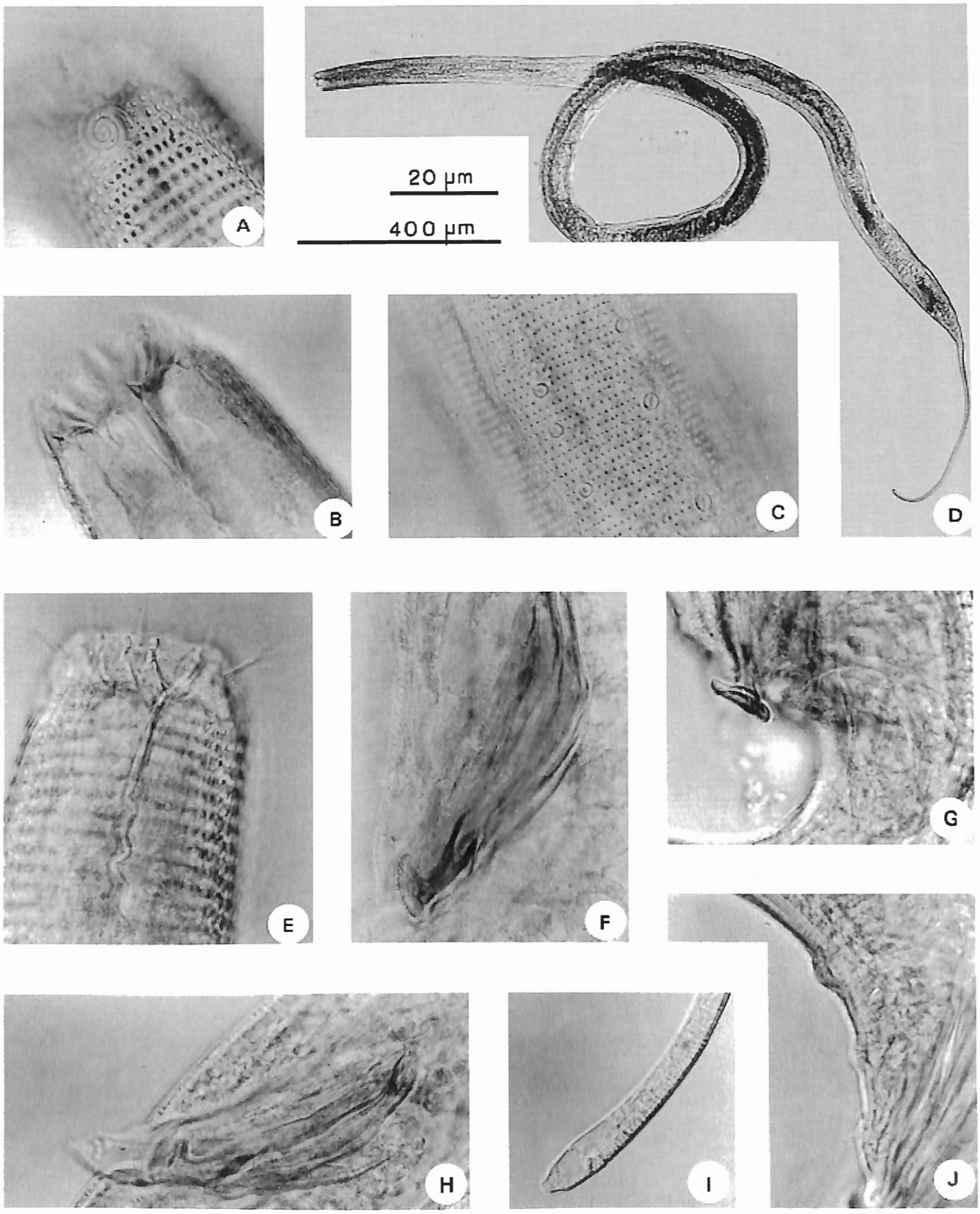

Fig. 4. *Biarmifer madrynensis* sp. n., A. Male head, left lateral view. B. Male head, dorsal onchia, left lateral view. C. Cuticle and pores at level of esophagus. D. Entire male. E. Cephalic setae, left lateral view. F. Copulatory apparatus. G. Tip of gubernaculum. H. Copulatory apparatus. I. Tip of the tail. J. Setae and pre-cloacal supplements.

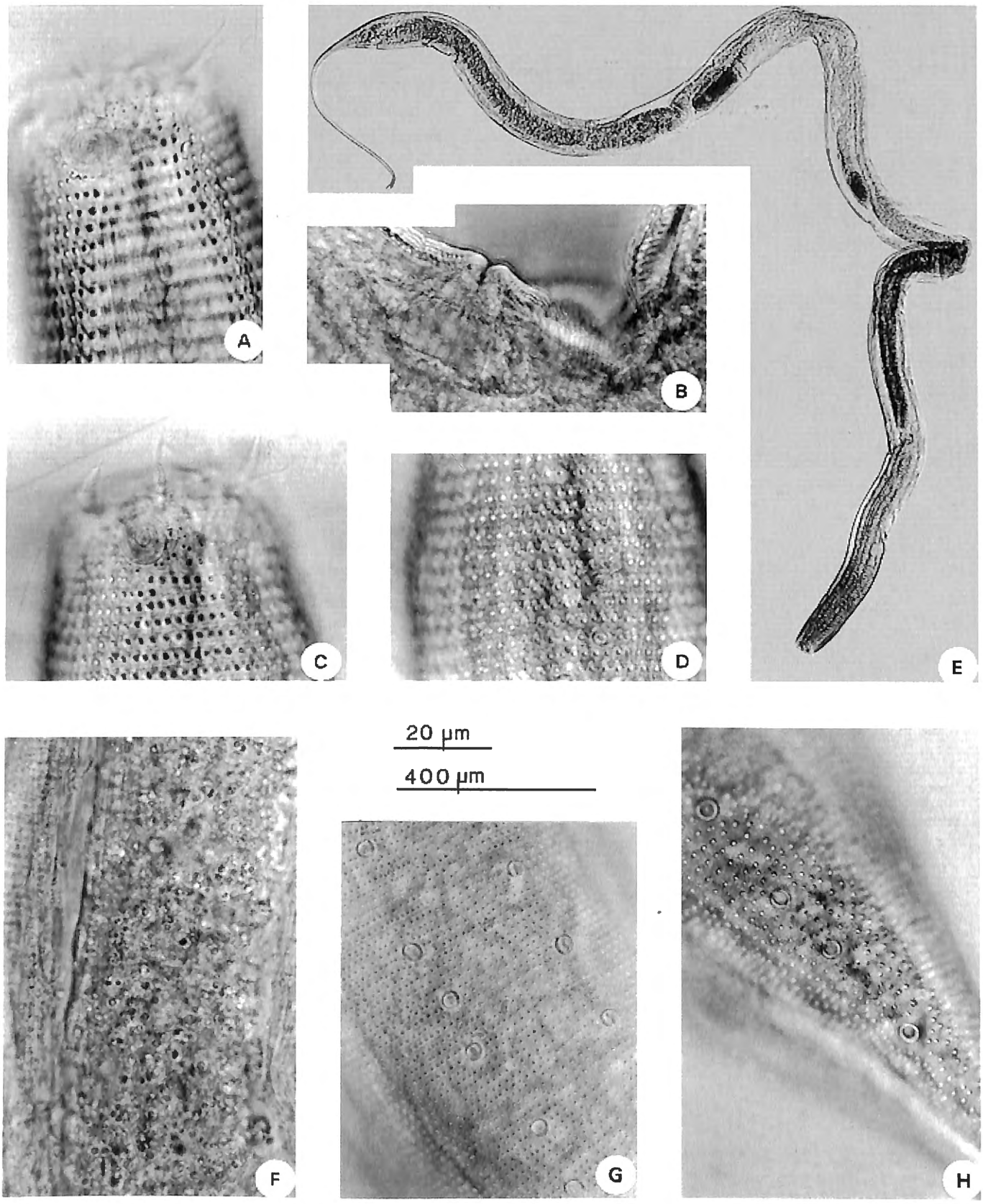

Fig. 5. *Biarmifer madrynensis* sp. n. A. Female head, left lateral view. B. Vulva, lateral view. C. Cephalic setae, lateral view. D. Cuticle at anterior end. E. Entire female. F. Intestine inclusions. G. Cuticle and pores on esophagus. H. Cuticle on tail.

HABITAT

Biarmifer madrynensis sp. n. is a common species in Puerto Madryn bay. It can be found from 1-12 cm in sublittoral medium sand (220 µm); the highest densities (up to 7000 ind./m^2) are in 2-3 cm deep oxybiotic sediment. Laboratory observations revealed that the nematode attaches the flagellate tail to grains and uses it as a jumping mechanism to move. This species is an epistrate feeder. Taking into account its teeth configuration and the absence of diatom frustules in the intestine, the nematode probably behaves as a «diatom cracker» (JENSEN, 1984).

DIAGNOSIS AND DISCUSSION

Biarmifer madrynensis sp. n. is most closely related to type species *B. cochleatus* WIESER, 1954. The diagnostic features, which separate the new species, are: the shorter cephalic setae length; the shorter amphid size; the presence of a flagellate tail and the lower number of pre-cloacal supplements. Additional diagnostic characteristics are found in the longer body length, de Man's index a and longer spicules.

KEY TO SPECIES OF *Biarmifer*
(Based on male characteristics)

1. • Spicule length less or equal to 1 anal body diameter (abd) ..... *B. laminatus* WIESER, 1954.
   • Spicule length more than one anal body diameter 2
2. • Cephalic setae shorter than 20 µm; amphids 25,5 % of corresponding diameter; tail filiform (8 abd); 3 precloacal supplementary organs ..... *B. madrynensis* sp. n.
   • Cephalic setae more than 20 um long; amphids 37% of corresponding diameter; conical tail (4-4,5 abd); 5 precloacal supplementary organs ..... *B. cochleatus* WIESER, 1954.

Acknowledgments

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References

BARROS, V. & KREPPER, C., 1978. Evolución anual de las características oceanográficas del Golfo Nuevo. *Contribución del Centro Nacional Patagónico,* 16:1-40.

DE CONINCK, L., 1965. Classe des Nématodes- Généralités. Traité de Zoologie (E. GRASSÉ, Ed.), 4(2): 1-217.

DITLEVSEN, H., 1911. Danish free-living nematode. *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening,* 63; 213-256.

FILIPJEV, I., 1918. Free-living marine Nematodes of the Sebastopol area. *Trudy Osoboi zoologicheskoi laboratorii i Sebastopolskoi biologicheskoi stantsii*, (2)4: 1-350.

GERLACH, S. & RIEMANN, F., 1973. The Bremerhaven checklist. *Veröffentlichungen des Instituts für Meeresforschung in Bremerhaven, Supplement,* 4(1): 1-404.

INGLIS, W.G., 1963. New marine nematodes from off the coast of South Africa. *Bulletin British Museum (Natural History) Zoology*, 10: 531-552.

HOPPER, B.E., 1972. Freeliving marine nematodes from Biscayne Bay, Florida. IV. Cyatholaimidae: On the occurrence of *Marilynia* n. gen. and *Longicyatholaimus* Micoletzky, 1924 in Biscaye Bay, with a description of *Longicaudatus* (de Man, 1876) from the type locality. *Zoologischer Anzeiger,* 189: 64-88.

HULINGS, N.C. & GRAY, J.S., 1971. A manual for the study of meiofauna. *Smithsonian Contributions to Zoology*, 78: 1-84.

JENSEN, P., 1984. Ecology of benthic and epiphytic nematodes in brackish waters. *Hydrobiologia*, 108: 201-217.

KANNEWORFF, E. & NICOLAISEN, W., 1973. The "'Haps". A frame-supported bottom corer. *Ophelia*, 10, 199-129.

LANFREDI, N.W., 1974. Corrientes superficiales en aguas costeras del Golfo Nuevo. *Serie de Informes científicos*, N° 1: 1-15.

LORENZEN, S., 1972. Die Nematodenfauna im Verklappungsgebeit für Industrieabwässer nordwestlich von Helgoland III. Cyatholaimidae, mit einer Revisión von *Pomponema* Cobb, 1917. *Veröffentlichungen des Instituts für Meeresforschungen Bremerhaven*, 13: 285-306.

LORENZEN, S., 1981. Entwurf eines phylogenetischen Systems der freilebenden Nematoden. *Veröffentlichungen des Instituts für Meeresforschungen Bremerhaven, Supplement*, 7: 1-472.

MICOLETZKY, H., 1922. Die freilebenden Erdnematoden. *Archiv für Naturgeschichte*, 87A: 1-650.

MICOLETZKY, H., 1924. Letzter Bericht über freilebende Nematoden aus Suez. *Sitzungsberichte der Akademie der Wissenschaften Wien, Abteilung I*, 133: 137-139.

MOUZO, F.H., GARZA, M.I., IZQUIERDO, J.F. & ZIBECCHI, R.O. 1978. Rasgos de la geología submarina del Golfo Nuevo (Chubut). *Acta Oceanográfica Argentina*, 2(1): 69-93.

PASTOR DE WARD, C.T., 1985. Free-living marine nematodes of the Deseado river estuary (Chromadoridea: Chromadoridae, Ethmolaimidae, Cyatholaimidae and Choniolaimidae) Santa Cruz, Argentina. 5. *Centro Nacional Patagónico. Publicaciones Especiales*, N° 6: 1-83.

PASTOR DE WARD, C. & BALA, L., 1996. Estudios de base en la bahía de Puerto Madryn (Golfo Nuevo, Chubut): Pigmentos fotosintéticos. *Naturalia Patagónica, Ciencias Biológicas*, 4: 121-137.

RIVAS, A., 1983. Análisis de la circulación costera en Golfo Nuevo. *Acta Oceanográfica Argentina*, 3(2): 49-66.

WIESER, W., 1954. Free-living marine nematodes II. Chromadoroidea. *Acta Universitets Lunds (N.F.Avd. 2)*, 50(16): 1-148.

WIESER, W., 1959. Free-living nematodes and other small invertebrates of Puget Sounds beaches. Seattle (University of Washington Press): 1-179.

WIESER, W. & HOPPER, B.E., 1967. Marine nematodes of the East coast of South America. I Florida. *Bulletin Museum Comparative Zoology*, 135(5): 239-344.

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