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## New records of free-living marine nematodes from the Canary Islands (II)

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**ABSTRACT:** The nematodes *Filitonchus filiformis* (Warwick, 1971), *Monoposthia mirabilis* Schulz, 1932, *Araeolaimus elegans* De Man, 1888 are recorded for the first time for the Canary Islands. Measurements and original iconography of the former species are provided. Moreover, morphological variability among specimens from other areas of each species are discussed.

**Key words:** Canary Islands, free-living, Nematodes, *Filitonchus*, *Monoposthia*, *Araeolaimus*.

**RESUMEN:** Se citan por primera vez los nematodos *Filitonchus filiformis* (Warwick, 1971), *Monoposthia mirabilis* Schulz, 1932, *Araeolaimus elegans* De Man, 1888 para las islas Canarias. Se realiza una descripción y se relacionan datos merísticos de las especies anteriores. Además, se discute la variabilidad morfológica existente entre ejemplares de cada una de las especies procedentes de otras áreas geográficas.

**Palabras clave:** Islas Canarias, vida libre, Nematodos, *Filitonchus*, *Monoposthia*, *Araeolaimus*.

### INTRODUCTION

In this study, three species of marine-free living nematodes are recorded: *Filitonchus filiformis* (Warwick, 1971), *Monoposthia mirabilis* Schulz, 1932 and *Araeolaimus elegans* De Mann, 1888.

## MATERIAL AND METHODS

Samples were collected in intertidal and shallow-subtidal (3 m deep) soft-bottoms of Los Cristianos (SW Tenerife) and Los Abrigos (SE Tenerife). PVC cores of 4.5 cm of inner diameter were taken to a depth of 30 cm. These samples were posteriorly fixed with 10% formaldehyde in seawater for one day and decanted through a sieve of 63  $\mu\text{m}$  mesh size, and then preserved in 70% ethanol. Specimens were mounted in gelly glycerine and drawings of these were done using a camera lucida on a Leica DMLB microscope equipped with Nomarski interference contrast. All measurements are in micrometers and curves structures are measured along the arc. The study material is deposited in the collection of the Benthos Laboratory, Department of Animal Biology, University of La Laguna (DBAULL).

Abbreviations used in the text are: **a**, body length divided by maximum body diameter; **b**, body length divided by pharyngeal length; **c**, body length divided by tail length; **c'**, tail length divided by anal body diameter; **cbd**, corresponding body diameter; **s'**, spicule length divided by anal body diameter; **%V**, position of vulva as a percentage of body length from anterior.

## SYSTEMATICS

Order CHROMADORIDA Chitwood, 1933

Family ETHMOLAIMIDAE Filipjev & Schuurmans-Stekhoven, 1941

Genus *Filitonchus* Platt, 1982

*Filitonchus filiformis* (Warwick, 1971)

(Figure 1)

*Filitonchus filiformis* Platt 1982: 244, figs 5 c, 33 d-e, 35; Platt & Warwick (1988): 232, fig. 104; García-Lanciego (1990): 51, fig. 18.

**Meristic data and studied material:** Los Cristianos subtidal (coordinates: 28°02'58"N/16°42'54"W), February 2001, 1 male ( $\sigma$ 1):

**Description:** *Male*. Slender body, tapering slightly towards both ends. Head round and not set off from body (fig. 1A). Cuticle finely striated. Amphids developed (78% of the corresponding body diameter in width) and multispiral with 4.5 turns and located 10  $\mu\text{m}$  from the anterior end. Buccal cavity conical and unarmed. Inner labial setae inconspicuous. Six outer labial setae 0.3 head diameters long, followed by four cephalic setae 1.6

	$\sigma$ 1
Total body length	1271.4
a	27.4
b	7.9
c	10.4
Cephalic diameter	11
Inner labial setae	-
Outer labial setae	4
Cephalic setae	18
Subcephalic setae	8
Buccal cavity diameter	-
Amphid diameter	16
Amphid height	15.7
Amphid from anterior	9.6
Pharynx length	160.7
Pharynx cbd	42.9
Maximum body diameter	46.4
Vulva from anterior	
% V	
Spicule length	20
Gubernaculum length	14
s'	0.6
Tail length	122
Anal body diameter	35.7
c'	3.4
Spicule length/Tail length	0.2

Table I. Measurements of *Filitonchus filiformis* in  $\mu\text{m}$ .

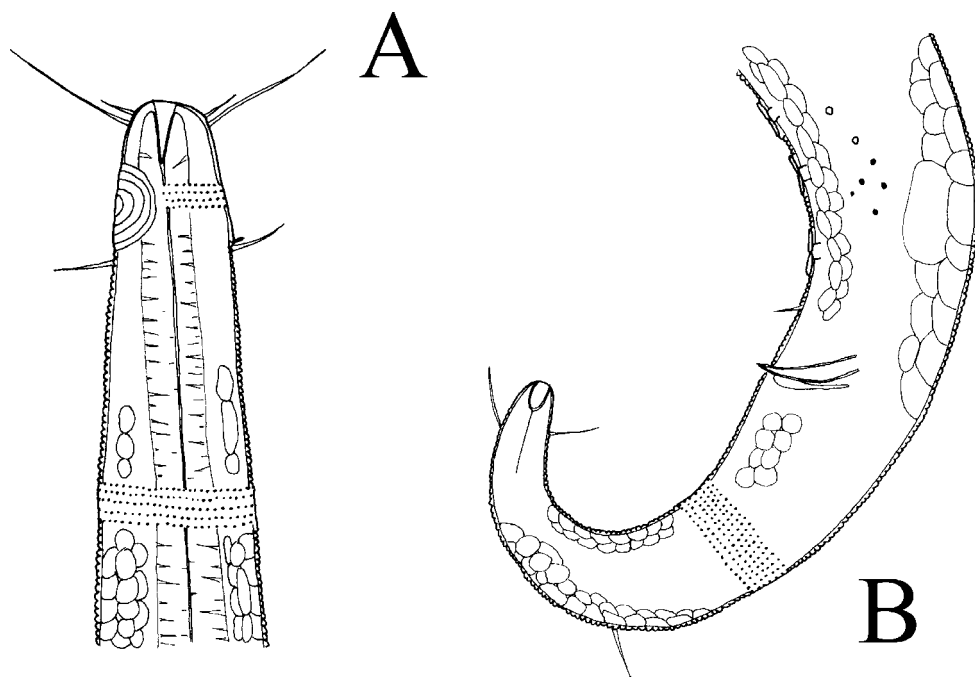


Figure 1. Male of *Filitonchus filiformis*. A: Anterior end. B: Posterior end, showing spicular apparatus. Scale A = 15  $\mu\text{m}$ , B = 22  $\mu\text{m}$ .

head diameters long, situated in the median part of the head. Subcephalic setae 7  $\mu\text{m}$  long, located at 19  $\mu\text{m}$  from anterior end. Pharynx slender and cylindrical. Ventral gland and nerve ring not seen.

The reproductive system is diorchic with two opposed testes. Spicules are 0.6 anal diameters long, curved and without prominent proximal end. Gubernaculum narrow and poorly developed, lacking apophysis. Gubernaculum is 0.4 anal diameters long. Seven small precloacal supplements, 7  $\mu\text{m}$  wide, cup-shaped. The posteriormost situated about 10  $\mu\text{m}$  anterior to the cloaca. Tail 3.4 anal diameters long, cylindrical with posterior end truncated (fig. 1B). Caudal setae 8  $\mu\text{m}$  long, located 7  $\mu\text{m}$  to posterior end. Spinneret developed. No females found.

**Discussion:** *Filitonchus filiformis* is characterized by having a multispiral (> 4 turns) and developed (> 50% corresponding body diameter) amphids, short tail with a truncated posterior end (Platt, 1982). The canarian specimen agreed well with the description of this species, although differences in the value of "a" (Total length/maximum width) that is higher in specimens collected in the British Isles ( $a = 86\text{-}99$ ) compared to our studied material ( $a = 27.4$ ).

**Ecology:** This species was recorded in shallow subtidal fine sands ( $Q_{50} = 0.18$ ), with a very good selection ( $S_0 = 0.73$ ). Sediments were composed by 55.79% of fine sands, followed by 19.55% of medium ones. The percentage of organic matter and nitrogen were low, 0.33% and 0.013%, respectively and high percentage of carbonates (23.08%) due to organogenic beach origin.

**Distribution:** East Atlantic (Warwick, 1971). This species is first recorded for the Canary Islands.

Family MONOPOSTHIIDAE Filipjev, 1934

Genus *Monoposthia* De Man, 1889

*Monoposthia mirabilis* Schulz, 1932 (Figure 2)

*Monoposthia mirabilis* Schulz (1932): 380, fig. 3; Palacín (1985): 36, fig. 21; Platt & Warwick (1988): 411, fig. 191.

*Monoposthia longiseta* Allgen (1935): 62, fig. 25 a, b.

**Meristic data and studied material:** Los Abrigos intertidal, (coordinates: 28°08'34'N/16°26'11'W), May 2000, 1 female (♀3), december, 1 female (♀4); Los Cristianos intertidal (28°02'58'N/16°42'54'W), August 2000, 1 male (♂2); Los Cristianos subtidal, (28°02'58'N/16°42'54'W), October 2000, 1 male (♂1), November 2000, 3 males (♂3, ♂4, ♂5) and 3 females (♀1, ♀2, ♀5).

**Description:** *Male.* Body short and slender, tapering towards both ends. Head slightly round and set off with a cephalic capsule (fig. 2A). Cuticle homogeneously striated, being larger the first two transverse striations. Cuticle ornamented with triangular marks in longitudinal rows (fig. 2B). Amphids 14% of the corresponding body diameter in width, simple and round, located at 11 µm from the anterior end. Buccal cavity conical and small, with one dorsal tooth and ventral denticles. Inner labial setae lacking. Six outer labial setae in papilla 1 µm long. Four cephalic setae 1.7 head diameters long, situated in the anterior part of the head. Subcephalic setae absent. Pharynx slender and cylindrical, being narrower at 18 µm from the estoma. Posterior oesophageal bulb without plasmatic interruptions.

The reproductive system is diorchic, with two opposed testes. Spicules absent. Gubernaculum (fig. 2C) 0.8 anal diameters long, heavily cuticularised, being narrower at the proximal end. Precloacal papilla with one seta 8 µm long, located at 2 µm from the cloaca. Postcloacal papilla without setae, situated at 6 µm from the cloaca. Precloacal supplements lacking. Tail 2.9 anal diameters long, slender and cylindrical. Caudal setae absent. Spinneret developed.

*Female.* Total body length (0.8-1.1 mm) and caudal length (2.5-3.7 anal diameters) similar to males. Outer labial setae not discernible and cephalic setae (8-13 µm) shorter than in males. Ovaries not seen. Vulva located in the posterior half of the body, at the level of 56.1-64% of total body length.

**Discussion:** Vanreusel & Vincx (1989) differentiated two groups of *Monoposthia mirabilis* Schulz, 1932, "small type" and "big type". The studied material belong to the "small type", characterized by having shorter total body length and with a lower degree of cuticularization of the gubernaculum and cuticle. The only difference with the "small type" is the presence in the canarian specimens of a developed precloacal

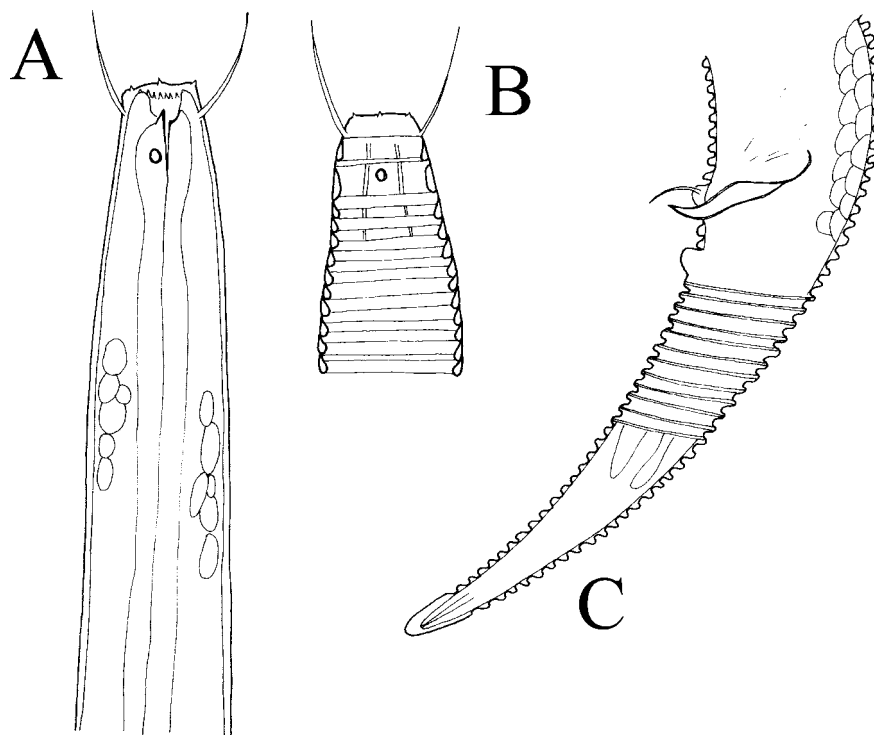


Figure 2. Male of *Monoposthia mirabilis*. A: Anterior end. B: Cuticle ornamentation of the head. C: Posterior end and gubernaculum. Scale = 15  $\mu$ m.

papilla with a seta, however, Luc & De Coninck (1959) reported a precloacal papilla but without seta.

**Ecology:** In Los Abrigos intertidal this species was recorded in medium sands ( $Q_{50} = 0.34$ ), with a very good selection ( $S_0 = 0.83$ ). The organic matter content was 1.3% and 5.30% of carbonates percentage. In Los Cristianos intertidal was collected in fine sands ( $Q_{50} = 0.15$ ), with a very good selection ( $S_0 = 0.56$ ). The organic matter percentage was 0.39% and 25.13% of carbonates content. In Los Cristianos subtidal was recorded in fine sands ( $Q_{50} = 0.15$ ), with a very good selection ( $S_0 = 0.54$ ). The organic matter content was 0.006% and 19.32% of carbonates percentage.

**Distribution:** Amphiatlantic (Wieser & Hopper, 1967; Platt & Warwick, 1988). Mediterranean sea (Palacín, 1985). This species is first recorded for the Canary Islands.

	♂1	♂2	♂3	♂4	♂5	♀1	♀2	♀3	♀4	♀5
Total body length	785.7	1385.7	1114.3	1112.5	989.7	971.4	1071.4	1171.4	886	1071.4
a	18.3	21.6	26	24.4	21.3	19.4	18.8	17.8	18.5	20
b	5.9	8.8	9.2	8.2	7.6	5.7	5.8	5.8	6.5	6.3
c	12.7	14.9	17.3	12.7	14.9	6.5	7	9.4	8.9	80
Cephalic diameter	10	12.9	12.9	12.3	11.8	15.7	21.4	25	23	19
Inner labial setae	-	-	-	-	-	-	-	-	-	-
Outer labial setae	1	1.6	1.6	1	1.6	-	-	-	-	-
Cephalic setae	18.6	22.9	20	21.1	19.8	8.6	10	13	13	11.4
Subcephalic setae	-	-	-	-	-	-	-	-	-	-
Buccal cavity diameter	7.1	8.6	8.6	8.2	8.4	5.6	7.2	7.4	5.7	6
Amphid diameter	2.9	2.9	2.9	2.9	2.9	5.7	5	5	4.3	4
Amphid height	2.9	2.9	2.9	2.9	2.9	7.1	5	6	4.3	4
Amphid from anterior	12	11.4	10	10.6	10.9	8.7	10.2	9.4	9.7	8.9
Pharynx length	132.1	157.1	121.4	135.4	129.8	171.4	185.7	200.9	135.7	171.4
Pharynx cbd	38.9	57.1	35.7	36.8	34.9	35.7	42.9	62.3	39.3	46.4
Maximum body diameter	42.9	64.3	42.9	45.6	46.5	50	57.1	65.8	48	53.6
Vulva from anterior						570	650	657.1	500	685.7
% V						58.7	60.7	56.1	56.4	64
Spicule length	-	-	-	-	-					
Gubernaculum length	22.9	27.1	24.3	23.9	23.4					
s'	-	-	-	-	-					
Tail length	62.1	93	64.3	87.9	66.3	150	153.6	125	100	134
Anal body diameter	28.6	32.1	35.7	30.5	30.4	39.9	46.9	43.6	39.3	39.3
c'	2.2	2.9	1.8	2.9	2.2	3.7	3.2	2.9	2.5	3.4
Spicule length/Tail length	-	-	-	-	-					

Table II. Measurements of *Monoposthia mirabilis* in  $\mu\text{m}$ .

Order MONHYSTERIDA Filipjev, 1929

Family DIPLOPELTIDAE De Coninck & Schuumars-Stekhoven, 1933

Genus *Araeolaimus* De Man, 1888

*Araeolaimus elegans* De Man, 1888 (Figure 3)

*Araeolaimus elegans* De Man (1888); 16, fig. 9; Wieser (1956): 12, fig. 185; Warwick, Platt & Somerfield (1998): 262, fig. 120.

*Araeolaimus punctatus* Allgen (1932): 188.

**Meristic data and studied material:** Los Cristianos intertidal (coordinates: 28°02'58'N/16°42'54'W), August 2000, 1 male ( $\sigma$ 1) and 1 female ( $\rho$ 1), December 2000, 1 female ( $\rho$ 2).

**Description:** *Male.* Slender body, tapering towards both ends. Head round and not set off from body (fig. 3A). Cuticle finely striated. Amphids are 35% of the corresponding body diameter in width, round and unispiral, located at 16  $\mu\text{m}$  from anterior end. Buccal cavity very narrow and unarmed. Lacking inner labial setae. Six outer labial setae 0.8 head

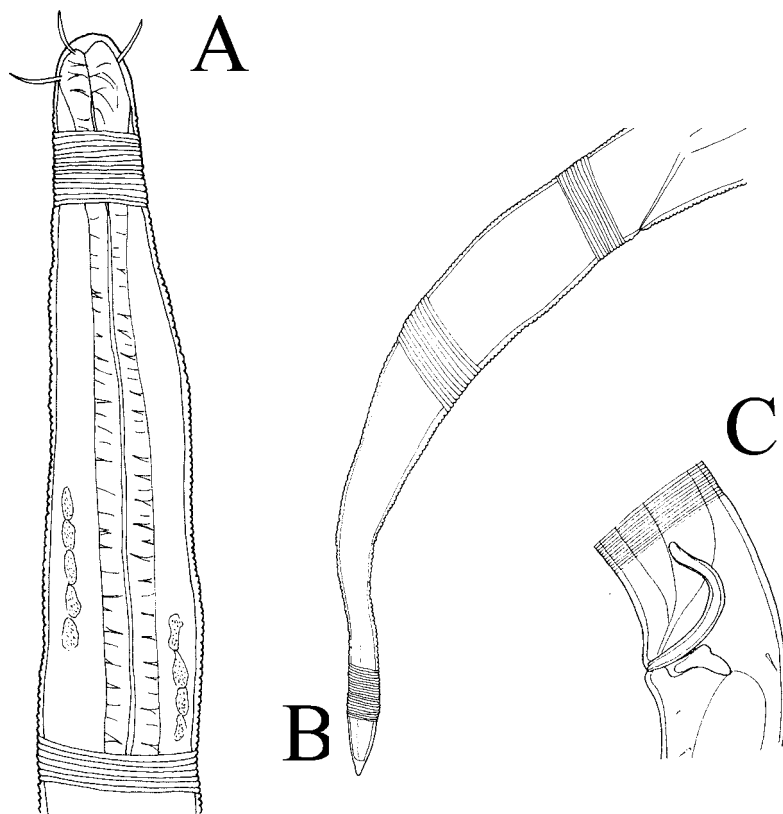


Figure 3. Female of *Araeolaimus elegans*. A: Anterior end. B: Posterior end. C: Male. Spicule and gubernaculum. Scale A = 15  $\mu$ m, B = 35  $\mu$ m, C = 28  $\mu$ m.

diameters long, followed by four cephalic setae 0.9 head diameters long. Subcephalic setae not seen. Pharynx slender and cylindrical. Ventral gland and nerve ring inconspicuous.

The reproductive system is dioecious with two opposed testes, difficult to discern. The spicules are one anal diameter long. Gubernaculum (fig. 3C) 0.4 anal diameter long, with a caudal apophysis. Tail 2.7 anal diameters long (fig. 3B), conical and gradually tapering to a blunt tip. Lacking caudal setae and preloacal supplements. Spinneret developed.

*Female*. Total length slightly shorter than in males (1.1-1.3 mm) and tail longer (5.2-6.2 anal diameters). Amphids inconspicuous. Head diameter more developed than in males (16-21  $\mu$ m). The reproductive system is didelphic, with two opposed and reflexed ovaries. Vulva located in the posterior half of the body, at 66.7% of the total length.

**Distribution:** Amphiatlantic (Cobb, 1920; Warwick *et al.*, 1998). Mediterranean Sea (Gadea, 1960). Indian Ocean (Timm, 1963). This species is first recorded for the Canary Islands.

**Ecology:** *Araeolaimus elegans* was recorded in intertidal fine sands ( $Q_{50} = 0.15-0.17$ ), with a very good selection ( $S_0 = 0.56-0.70$ ). Fine sand percentage ranged from 55.69% to 81.32%. The percentage of organic matter varied between 0.39% and 0.99% and nitrogen was homogeneous (0.009%-0.046%). Carbonates were less variable (15.90%-25.13%).

**Discussion:** *Araeolaimus elegans* is characterized by the presence of cephalic setae less than one head diameter. Subcephalic setae poorly developed or inconspicuous and gubernaculum with a dorsal apophysis. Examined specimens agreed well with those described by Warwick *et al.* (1998) based upon material from the British Isles. However, some minor differences were noticed in the total length, being larger canarian males specimens (1.6 mm) and lacking subcephalic setae. Japanese male specimens were shorter (0.6-0.9 mm) as well as female tail length (3.4-3.7 anal diameters), being the gubernacular apophysis more developed and dorsocaudally directed (Kito, 1976).

	♂1	♀1	♀2
Total body length	1685.7	1157.1	1285.7
a	42.1	26.9	30.6
b	6	4.7	4.9
c	19.7	7.8	6.9
Cephalic diameter	11	15.7	21.4
Inner labial setae	-	-	-
Outer labial setae	9	8	7.8
Cephalic setae	10	8.6	8.6
Subcephalic setae	-	-	-
Buccal cavity diameter	7.1	5.7	4.3
Amphid diameter	7.1	-	-
Amphid height	8.6	-	-
Amphid from anterior	15.7	-	-
Pharynx length	282.1	246.4	260.7
Pharynx cbd	35.7	39.3	39.3
Maximum body diameter	40	43	42
Vulva from anterior		771.4	nd
% V		66.7	nd
Spicule length	32.4		
Gubernaculum length	13.6		
s'	1		
Tail length	85.7	148	185.7
Anal body diameter	32.1	24	35.7
c'	2.7	6.2	5.2
Spicule length/Tail length	0.4		

Table III. Measurements of *Araeolaimus elegans* in  $\mu\text{m}$ .

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