

## **BATHYDONTUS MIRUS (ANDRÁSSY, 1956), FIRST RECORD OF A REPRESENTATIVE OF THE SUBORDER BATHYDONTINA (NEMATODA, MONONCHIDA) IN THE IBERIAN FAUNA**

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### **ABSTRACT**

J. Abolafia & R. Peña-Santiago. 2010. *Bathyodontus mirus* (Andrássy, 1956), first record of a representative of the suborder Bathyodontina (Nematoda, Mononchida) in the Iberian fauna. *Graellsia*, 66(2): 157-163.

*Bathyodontus mirus* (Andrássy, 1956) Hopper & Cairns, 1956, collected in sand dunes of SW Iberian peninsula, is studied. Description, measurements and illustrations (LM pictures) are provided. Iberian specimens are briefly compared to other known populations of the species. And a compendium of *Bathyodontus* species, including a key to their identification, is also given. This is the first record of a representative of the nematode suborder Bathyodontina in the Iberian-Balearic range and in the Mediterranean region.

**Key words:** bathyodonts; compendium; description; first record; Iberian peninsula; mononchs; morphology; nematodes; taxonomy.

### **RESUMEN**

J. Abolafia & R. Peña-Santiago. 2010. *Bathyodontus mirus* (Andrássy, 1956), primera cita de un representante del suborden Bathyodontina (Nematoda, Mononchida) en la fauna ibérica. *Graellsia*, 66(2): 157-163 (in English).

Se estudia la especie *Bathyodontus mirus* (Andrássy, 1956) Hopper y Cairns, 1956, recolectada en dunas de arena en el suroeste peninsular. Se presentan una descripción, medidas e ilustraciones (fotografías con microscopía óptica). Los ejemplares ibéricos se comparan brevemente con otras poblaciones conocidas de la misma especie. Y se ofrece un compendio de las especies del género *Bathyodontus*, incluida una clave para su identificación. Se trata de la primera cita de un miembro del suborden Bathyodontina en el ámbito lbero-balear y en la región Mediterránea.

**Palabras clave:** batiodóntidos; compendio; descripción; monónquidos; morfología; nematodos; península Ibérica; primera cita; taxonomía.

## Introduction

Bathyodonts, members of the suborder Bathyodontina Coomans & Loof, 1970, order Mononchida Jairajpuri, 1969, are a very rare nematode taxon, which, according to its very recent revisions (Andrássy, 2009; Ahmad & Jairajpuri, 2010), includes only four valid genera and 12 valid species. From a systematic perspective, however, they represent a highly interesting group, displaying a peculiar morphological pattern that separates them from the true mononchs, *i.e.* the components of the other suborder Mononchina Kirjanova & Krall, 1969 of Mononchida, and raises the question of the true nature of the evolutionary relationship of the two suborders.

Although the mononchid species of the Iberian fauna have been intensively studied in the last decades (see the corresponding monograph of the series *Fauna Iberica* by Jiménez-Guirado *et al.*, 2007), no bathyodont were previously reported from our geographical range. Nevertheless, during a general, nematological survey of free-living

soil nematodes conducted in the Iberian geography a few specimens belonging to the genus *Bathyodontus* Fielding, 1950 (syn. *Mirolaimus* Andrásy, 1956) were collected in Doñana National Park (SW Iberian peninsula). They were identified as *Bathyodontus mirus* (Andrássy, 1956) Hopper & Cairns, 1956, and the results of their morphological and taxonomical study are presented here.

## Material and methods

Nematodes were extracted from soil samples using a somewhat modified method of Baermann (1917) and Flegg (1967) somewhat modified, relaxed and killed by heat, fixed in 4% formaldehyde, and processed to anhydrous glycerine according with Siddiqi (1964). Measurements were taken using an ocular micrometer and a drawing tube attached to a Leica microscope. LM pictures were made with a Nikon Eclipse 80i microscope equipped with a Nikon Digital Sight DS-5M camera.

Table 1.– Morphometrics of *Bathyodontus mirus*. All measurements in  $\mu\text{m}$  and in the form mean  $\pm$  s.d. (range).

Table 1.– Medidas de *Bathyodontus mirus*. Todas las medidas en  $\mu\text{m}$  y en la forma media  $\pm$  desviación estándar (rango).

Character	Locality Province Habitat n	Matalascañas Huelva Sand dune 3 ♀♀
Body length		944.7 $\pm$ 77.4 (863-1017)
a		14.4 $\pm$ 1.5 (12.7-15.6)*
b		3.3 $\pm$ 0.1 (3.2-3.4)
c		48.1 $\pm$ 2.7 (45.4-50.9)
c'		0.5 $\pm$ 0.1 (0.5-0.6)
V		58.0 $\pm$ 0.6 (58-59)
Lip region width		23.7 $\pm$ 0.6 (23-24)
Stoma length		63.7 $\pm$ 1.5 (62-65)
Neck length		284.0 $\pm$ 17.3 (269-303)
Body width - neck base		60.7 $\pm$ 4.0 (57-65)*
vulva		65.7 $\pm$ 4.0 (61-68)*
anus		36.0 $\pm$ 2.0 (34-38)*
Vulva-anterior end		548.0 $\pm$ 41.5 (506-589)
Rectum length		32.0 $\pm$ 4.4 (27-35)
Tail length		19.7 $\pm$ 1.5 (18-21)

\* The three specimens became somewhat flattened.

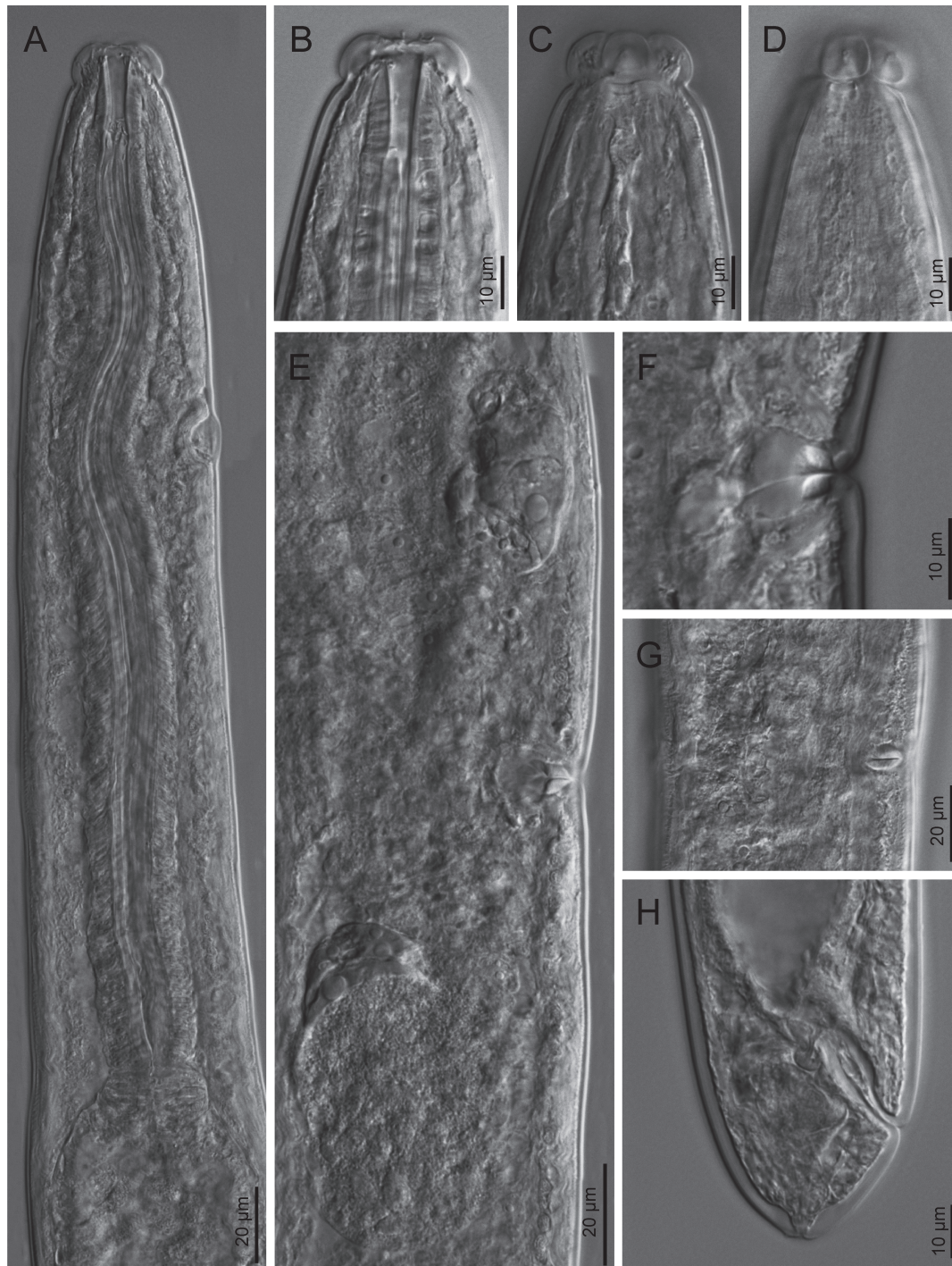


Fig. 1.— *Bathyodontus mirus* (female, LM). A) Neck region. B) Anterior region in median, lateral view. C) Anterior region in lateral, submedian view. D) Anterior region in lateral, surface view. E) Reproductive system. F) Vagina in lateral view. G) Vulva in subventral view. H) Caudal region.

Fig. 1.— *Bathyodontus mirus* (hembra, MO). A) Cuello. B) Región anterior en vista lateral media. C) Región anterior en vista lateral submedia. D) Región anterior en vista lateral superficial. E) Sistema reproductor. F) Vagina en vista lateral. G) Vulva en vista subventral. H) Región caudal.

Table 2.- Morphometrics of *Bathydontus* species.Tabla 2.- Medidas de las especies de *Bathydontus*.

Species	Sex	L	a	b	c	c'	Stoma	Excretory pore	Pharynx	Tail	V/ spicules	Tail shape/ Ventromedian supplements	Country	Reference
<i>cylindricus</i>	1 ♀	1.1	23.0	3.4	47	0.8	79*	?	389*	28*	55	almost rounded	USA-California	1
	3 ♀♀	0.97-1.06	22.6-23.1	2.0-3.2	38.0-48.6	0.5-0.7	60-73	?	?	28*	55-57	conoid	India	2
	1 ♀	0.97	19.0	3.6	42.1	0.8	61*	?	?	32*	55	conoid	United Kingdom	3
	3 ♀♀	?	?	?	?	?	66	?	280, 294	?	?	?	Several	4
	15 ♀♀	0.83-1.02	15.9-21.7	3.1-3.5	33-52	0.6-0.8	52-69	?	247-300	18-26	52-57	conoid	Senegal	5
	1 ♂	0.88	19.1	3.5	42	0.6	61*	92*	253	21	34	conoid	=	=
	1 ♂	?	?	?	?	?	?	?	?	?	38	at least 32	Sudan	=
<i>indicus</i> (as <i>Mirolaimus</i> )	10 ♀♀	0.63-0.87	15.0-25.0	3.2-5.1	38.7-45.5	0.6-0.7	49-57	?	?	20*	44-46	conoid	India	2
	4 ♀♀	0.79-0.88	14.1-16.8	3.0-3.2	35-55	0.5-0.7	58-60	?	265-274	16-24	42-45	?	Senegal	5
<i>mirus</i>	5 ♀♀	0.75-0.86	16.3-18.6	3.1-3.2	33.1-48.9	0.5-0.7	?	?	?	?	57-60	rounded to conoid	Hungary	6
	19 ♀♀	0.77-1.20	15.9-20.4	2.8-3.2	39.1-49.8	0.8*	54-62	100*	306*	26*	57-61	?	United Kingdom	3
	19 ♂♂	0.87-0.90	12.0-13.7	2.7-3.0	32.4-33.6	0.7*	?	?	?	28*	50	13-17	=	=
	4 ♀♀	?	?	?	?	0.7*	63-71*	?	306-331	18*	?	almost rounded	The Netherlands	4
	?	?	?	?	?	?	61-71	90	341	?	?	?	Senegal	5
?	?	?	?	?	?	?	?	?	?	48-54	?	=	=	
3 ♀♀	0.86-1.02	12.7-15.6	3.2-3.4	45.4-50.9	0.5-0.6	62-65	100-104	269-303	18-21	58-59	almost rounded	Spain	7	

\* Calculated from drawings and/or other measurements.

References: 1: Fielding, 1950; 2: Khan, 1972; 3: s'Jacob &amp; Loof, 1962; 4: Coomans &amp; Loof, 1970; 5: De Ley &amp; Coomans, 1989; 6: Andrassy, 1956; 7: Present paper

## Description

*Bathyodontus mirus* (Andrássy, 1956) Hopper & Cairns, 1956

(Figures 1 & 2)

MATERIAL EXAMINED: Three females and four juveniles, in acceptable condition.

MEASUREMENTS: Are listed in Table 1.

FEMALE: Stout nematodes of small to medium size, 0.86-1.02 mm long. Habitus almost straight after fixation, somewhat curved ventral or slightly sigmoid. Cuticle bearing fine transverse striation, practically smooth under LM; 1.5-2.0  $\mu\text{m}$  thick in anterior region, 1.5-2.5  $\mu\text{m}$  at mid-body, and 2.5-3.0  $\mu\text{m}$  on tail. Lateral chord 8-14  $\mu\text{m}$  wide. Body pores inconspicuous. Lip region offset by deep constriction, about 2.3 times as wide as high; lips rounded, distinct although moderately separate, with their inner portion forming small, perioral flaps surrounding the oral aperture; labial papillae low, hardly protruding over lip region contour. Amphid fovea small, funnel-shaped, opening into a small oval orifice which is about 5  $\mu\text{m}$  wide and occupies about one-fifth of lip region diameter. Stoma of intricate structure, as described in detail by Coomans & Loof (1970), 2.6-2.8 times the lip region width long: vestibule very short, 2.5-3.0  $\mu\text{m}$  long; anterior, tubular section 18-20  $\mu\text{m}$  long or as long as lip region width, and with wide lumen; and posterior section 37-39  $\mu\text{m}$  long and with narrower lumen. Pharynx typical of the group, cylindrical, its anterior end surrounding the whole stoma. Nerve ring located at 80-108  $\mu\text{m}$  or 29-40% of neck length from anterior end. Excretory pore at 100-104  $\mu\text{m}$  or 34-41% of total neck length from anterior end, slightly posterior to nerve ring. Hemizonid very distinct, situated at level of excretory pore. Cardia short and rounded, 14-18 x 12-17  $\mu\text{m}$ ; three cardiac cells present at the junction between pharyngeal base and cardia. Intestine tube-like, lacking any specialization. Reproductive system didelphic-amphidelphic, with both branches of similar length but scarcely developed, the anterior 78-100  $\mu\text{m}$ , the posterior 80-90  $\mu\text{m}$  long; ovaries very small, 44-60  $\mu\text{m}$  long; genital tract poorly differentiated, with no distinct sphincter, but a weak narrowing: oviduct 46-60  $\mu\text{m}$  long and uterus 28-46  $\mu\text{m}$  long; vagina 14-17  $\mu\text{m}$  long: *pars proximalis* 7-10 x 9-11  $\mu\text{m}$ , *pars refringens* with two close together pieces measuring about 3 x 2

$\mu\text{m}$  and with a combined width of 5-6  $\mu\text{m}$ , and *pars distalis* about 3  $\mu\text{m}$  long; vulva a post-equatorial transverse slit, 7  $\mu\text{m}$  long. Rectum 0.8-0.9 times the anal body diameter long. Tail short and rounded; caudal glands leading to a terminal spinneret.

MALE: Not found.

JUVENILES: General morphology similar to females.

DISTRIBUTION: The material studied was collected in sand dunes, Matalascañas Beach, Almonte, province of Huelva (Spain), where it was associated to rhizosphere of *Ammophila arenaria* (L.) Link.

REMARKS: *Bathyodontus mirus* is a rare but apparently widely spread species, having been previously reported from Hungary (Andrássy, 1956 - original description as *Mirolaimus mirus*), United Kingdom (s'Jacob & Loof, 1962), the Netherlands (s'Jacob & Loof, 1962 -re-description as *M. mirus*; Coomans & Loof, 1970 -detailed morphological study), and Senegal (De Ley & Coomans, 1989 -fine taxonomical analysis). Its finding in Andalusian soils is the first record for the Iberian-Balearic range and in the Mediterranean region.

Above description fits very well in general the original one as well as the subsequent re-description and additional studies, although some few and minor morphometric differences have been noted (Table 2), which should be interpreted as geographical variations, for instance shorter pharynx (269-303 vs 306-341  $\mu\text{m}$ ,  $b = 3.2-3.4$  vs  $b = 2.8-3.2$ ) and excretory pore slightly more posterior (at 100-104 vs 90-100  $\mu\text{m}$  from anterior end). In general, Iberian specimens are more similar to the material described from the Netherlands by s'Jacob & Loof (1962), and somewhat more different from the Senegalese population studied by De Ley & Coomans (1989).

The genus *Bathyodontus* hitherto contains three species, namely *B. cylindricus* Fielding, 1950 (type species), *B. indicus* (Khan, 1972) Jairajpuri & Khan, 1982 (syn. *Mirolaimus indicus* Khan, 1972) and *B. mirus* (Andrássy, 1956) Hopper & Cairns, 1959 (syn. *Mirolaimus mirus* Andrássy, 1956). These species are very similar in their morphometrics (see Table 2), but they can be easily distinguished by other significant features following this key:

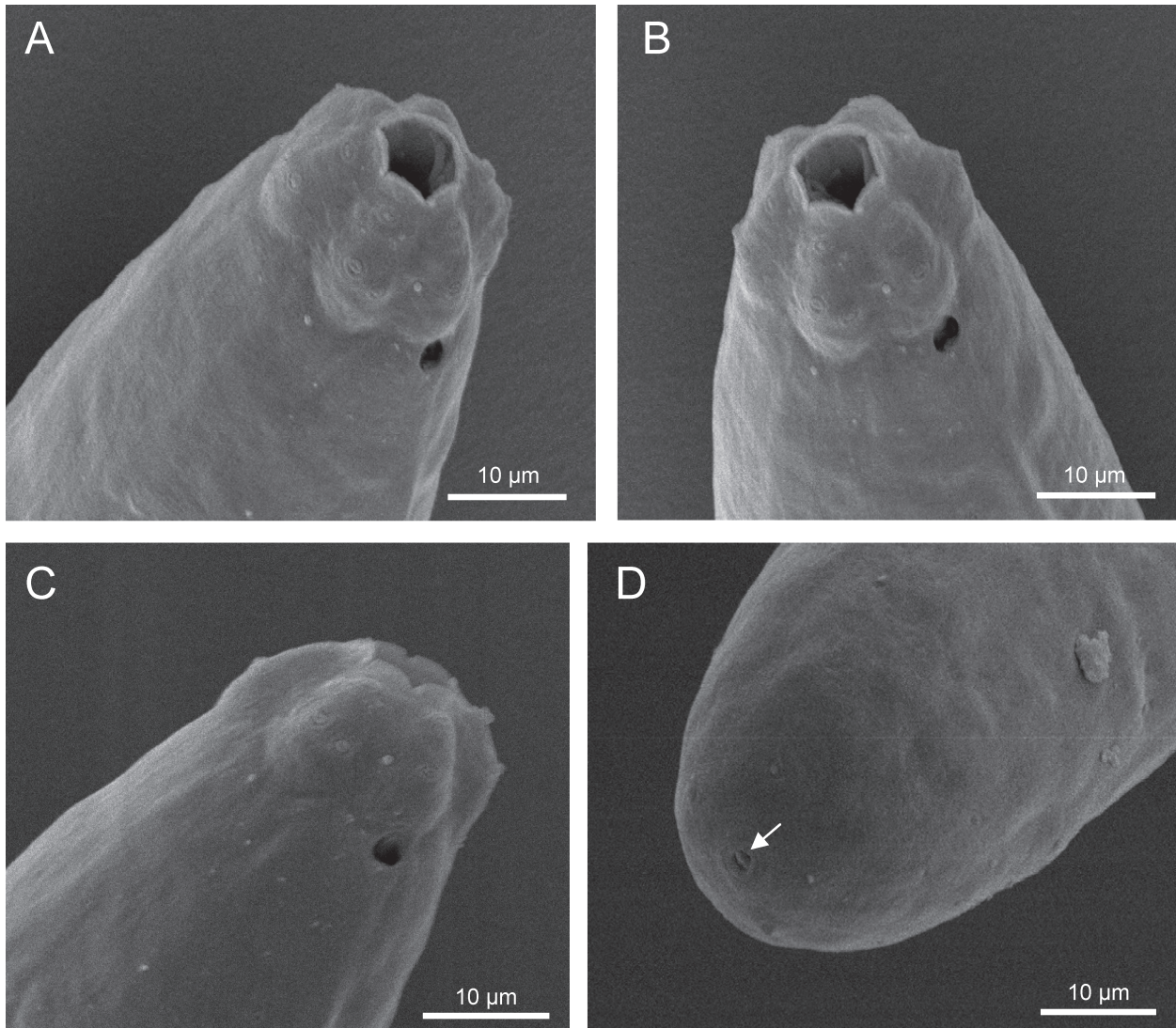


Fig. 2.— *Bathyodontus mirus* (juvenil, SEM). A-B) Anterior region in nearly frontal view. C) Anterior region in lateral view. D) Caudal region, head arrow pointing the opening of the terminal spinneret.

Fig. 2.— *Bathyodontus mirus* (juvenil, MEB). A-B) Región anterior en vista casi frontal. C) Región anterior en vista lateral. D) Región caudal, extremo de la flecha señalando el orificio de la espinereta terminal.

#### Key to species of *Bathyodontus*

- 1 Lip region almost continuous with the adjacent body; lips amalgamated ..... *cylindricus*
- Lip region offset by deep constriction; lips moderately separate ..... 2
- 2 Vulva more anterior ( $V = 42-46$ ); female posterior genital branch very reduced or absent; spinneret subdorsal ..... *indicus*
- Vulva more posterior ( $V = 48-61$ ); female with both genital branches with similar development; spinneret terminal ..... *mirus*

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