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Disconema zhangi sp. nov. (Linhomoidae: Nematoda) from the East China Sea

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Abstract: One new free-living marine nematode species is described from the seafloor sediment of East China Sea based on the male specimens. *Disconema zhangi* sp. nov. is characterized by having a small body of less than 1 mm, papilliform cephalic sensilla, oblong amphidial fovea, conical cardia, slender and arcuate spicules, presence of dorso-caudal gubernacular apophyses, conico-cylindrical tail with an enlarged terminal end with terminal setae. The new species is distinguished from the congeners by the combination of following characters: body length, cephalic sensilla length, amphid shape and size, tail shape, reproductive structure and cardia size.

Résumé : Disconema zhangi *sp. nov. (Linhomoidae : Nematoda) en Mer de Chine orientale.* Une nouvelle espèce de nématode marin libre est décrite dans les sédiments de la Mer de Chine orientale à partir de spécimens mâles. *Disconema zhangi* sp. nov est caractérisé par une petit corps de moins de 1 mm, une sensille céphalique papilliforme, une fovea amphidiale oblongue, un cardia conique, des spicules minces et arqués, une présence d'apophyses dorso-caudales gubernaculaires, une extrémité conico-cylindrique avec une extrémité terminale élargie portant des soies terminales. La nouvelle espèce se distingue de ses congénères par la combinaison des caractères suivants : longueur du corps, longueur des sensilles céphaliques, forme et taille de l'amphide, forme de la queue, structure de l'appareil reproducteur et taille du cardia.

Keywords: Free-living marine nematodes ● Taxonomy ● New species ● East China Sea

Introduction

In order to study the biodiversity of free-living marine nematodes in the East China Sea, sediment samples were collected in many sites from the intertidal to the sublittoral region in the past few years. More than 300 species have been found from these habitats (Huang & Gao, 2016; Jiang, 2016; Huang et al., 2017; Sun & Huang, 2017 ; Wang et al., 2017; Huang & Huang, 2018; Sun et al., 2018). Among these species, an unrecorded species was identified and is described here as *Disconema zhangi* sp. nov. It is the first species of *Disconema* recorded from the East China Sea.

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Materials and Methods

In October 2012, seabed sediment samples were obtained using a 0.1 m² improved Gray-O'Hara box from a grid of 33 sampling stations between 25°21′N to 30°0′N, 120°50′E to 126°0′E in the East China Sea (Fig.1) during the Open Research Cruise of National Natural Science Foundation of China by the R/V *Dongfanghong 2*. Sampling, sorting and mounting of nematodes followed those described in Huang et al. (2018 & 2019). The descriptions were made from glycerin mounts using a differential interference contrast microscope (Leica DM 2500). Line drawings were made with the aid of a camera lucida. All measurements were obtained using Leica LAS X version 3.3.3, and all curved structures were measured along the arc or median line. Type specimens were deposited in the Marine Biological Museum of the Chinese Academy of Sciences, Qingdao.

Abbreviations used in the table and key are as follows: a, body length / max. body diameter; abd, body diameter at the cloaca; b, body length / pharynx length; c, body length / tail length; c′, tail length / abd.

Species description

Order Monhysterida Filipjev, 1929
Family Linhomoidae Filipjev, 1922
Genus *Disconema* Filipjev, 1918
***Disconema zhangi* sp. nov.**
(Figs 2 & 3)

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Type material

Three males were collected from Stations DH8-1 and DH4-3 in the East China Sea by Dr. Yong Huang and Zhong Xu in October 2012. Holotype: ♂1 on the slide DH12-8-1-7-6, paratypes: ♂2, ♂3 on slides DH12-8-1-3-11 and DH12-4-3-2-5, respectively.

Type locality and habitat

Seabed in the East China Sea. Station DH8-1: 120º50´E-26º46´N, water depth 51 m, silt sediment; DH4-3: 123º48´E-29º5.6´N, water depth 76 m, clay and sandy sediment.

Etymology

The species is named in honor of Professor Zhinan Zhang for his contributions to nematode taxonomy.

Measurements

Measurements are given in table 1.

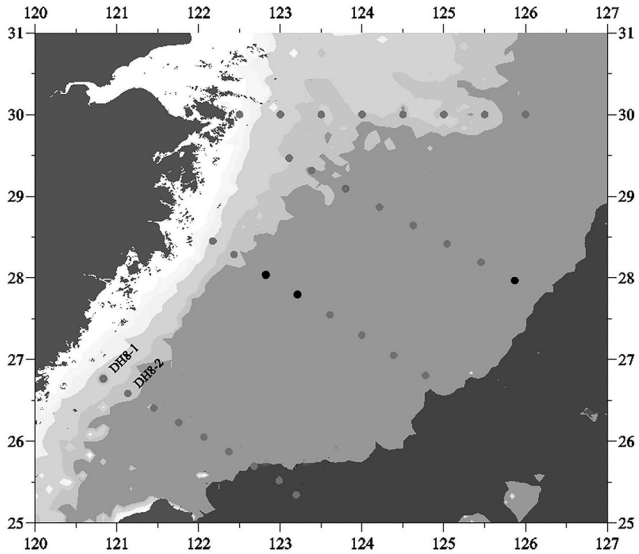

Figure 1. Map of sampling stations in the East China Sea.

Table 1. *Disconema zhangi* sp. nov. Individual measurements (in µm except a, b, c and c′).

	Holotype	Paratypes	
Characters	**♂1**	**♂2**	**♂3**
Total body length	850	786	650
Amphideal fovea length	29	20	16
Pharynx length	106	92	93
Spicule length along arc	37	38	28
Gubernacular apophysis length	9	11	11
Tail length	80	75	57
Head diameter	11	11	7
Maximum body diameter	30	31	20
Amphideal fovea width	10	8	5
Body diameter at base of pharynx	26	27	17
Body diameter at cloaca	22	23	15
a	28.3	25.4	32.5
b	8.0	8.5	7.0
c	10.6	10.5	11.4
c′	3.6	3.3	3.8

Description

Males. Body cylindrical, stubby, tapering towards both extremities, 650-850 µm long. Cuticle finely annulated along the whole body. Head irregularly truncate to rounded. Six outer labial sensilla papilliform and very small. Four cephalic sensilla also papilliform, about 1.5 µm long, located in the middle of the front rim of amphideal fovea

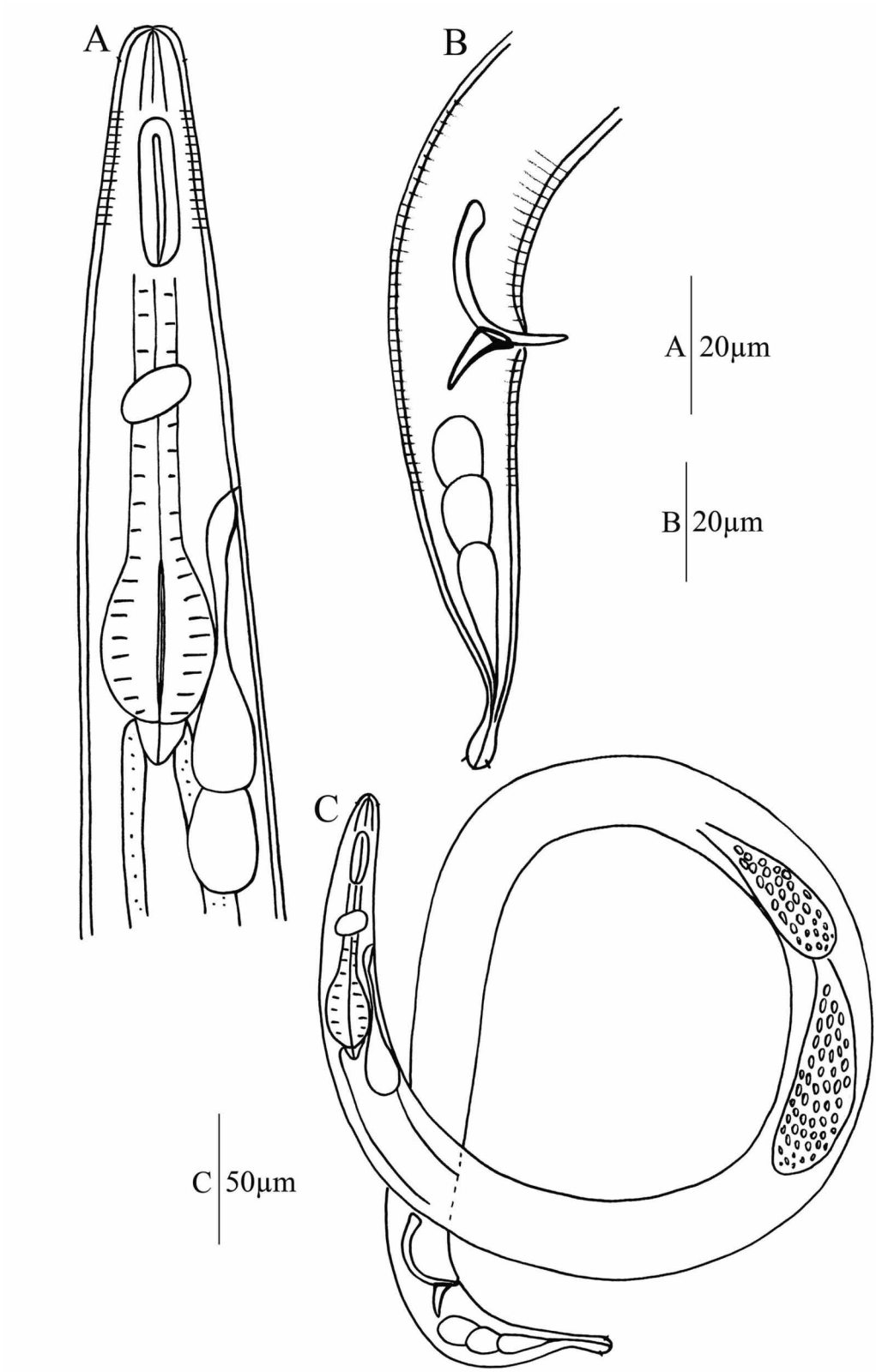

Figure 2. *Disconema zhangi* sp. nov. **A.** Showing amphideal fovea, pharyngeal bulb and secretory-excretory system. **B.** Showing tail, spicules and gubernacular apophysis. **C.** Entire view of male, showing reproductive system.

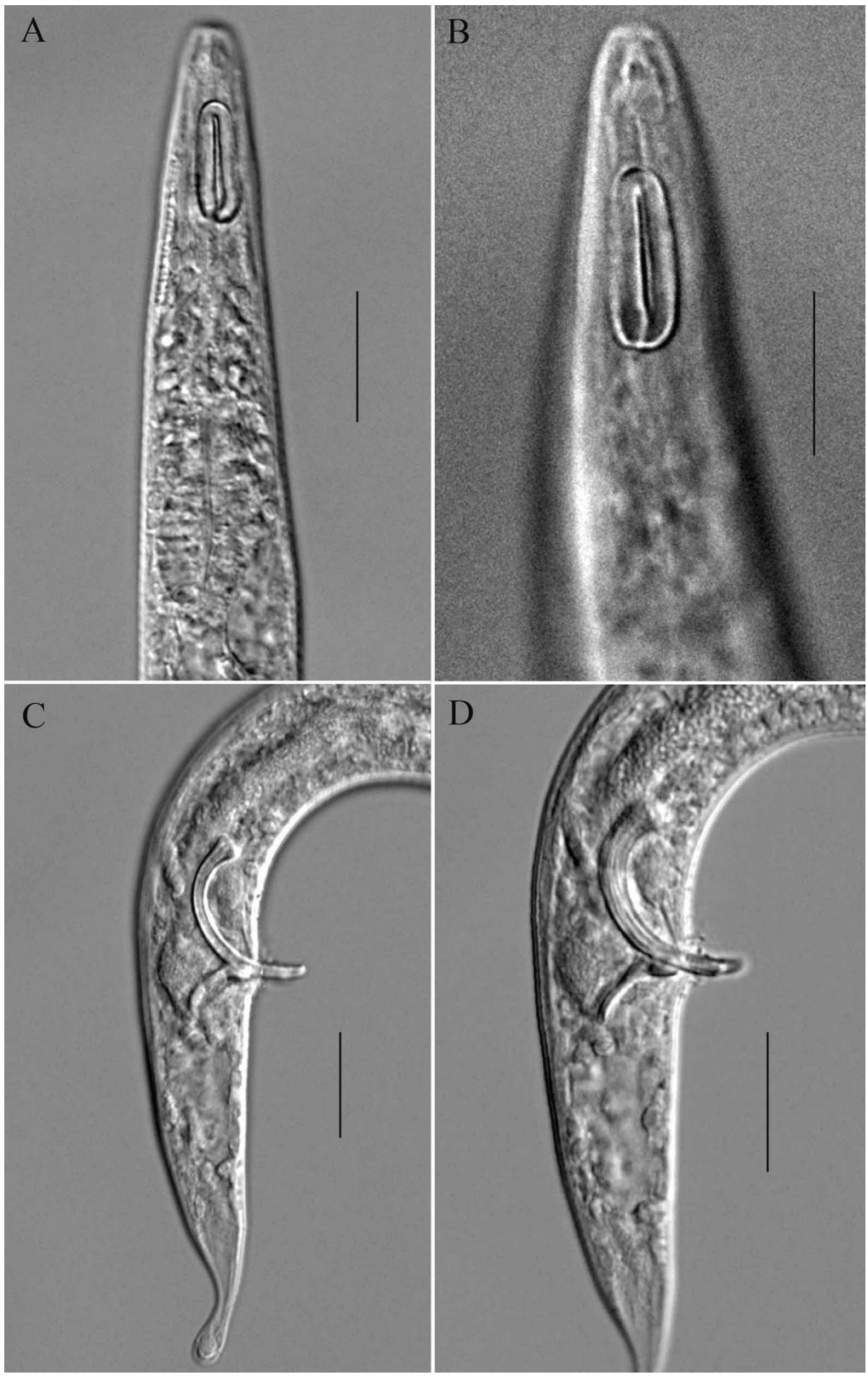

Figure 3. *Disconema zhangi* sp. nov. **A.** Lateral view of male anterior end, showing amphideal fovea and pharyngeal bulb. **B.** Lateral view ofmale anterior end, showing amphideal fovea. **C.** Lateral view of male tail end, showing spicules. **D.** Lateral view of male cloacal region, showing spicules and gubernacular apophysis. (Scale: A, B, C and D 20 μm).

and the head end. Amphidial fovea oval-shaped, elongated, 16-29 µm long and 5-11 µm wide, located at a distance of 13-15 µm from the head end. Buccal cavity minute. Pharynx short, cylindrical with an oval posterior bulb. Cardia conical and embedded in intestine. Nerve ring situated at the middle of pharynx, 48 µm from the anterior end. Secretory-excretory system obvious. Excretory pore posterior to nerve ring, 71-88 µm from the anterior end. Cellular body of ventral gland just below the pharyngeal bulb. Tail short, conico-cylindrical with one fifth of posterior cylindrical portion. The end of tail clavate and having two 3 µm terminal setae on enlarged end. Three caudal glands present.

Reproductive system diorchic with two testes in tandem. Spicules slender and strongly arcuate, cephalate proximal end and tapered distal end, 1.7-1.9 cloacal body diameter long. Gubernaculum cuticularized with dorso-caudally apophyses, 9-11 µm long. Precloacal supplements absent.

Female not found.

Diagnosis and discussion

The genus *Disconema* was described by Filipjev (1918) with the type species *Disconema alaima* Filipjev, 1918 which only the female was known. Only six species are presently known from all around the world (Fonseca & Bezerra, 2014; Bezerra et al., 2019), and mainly from Europe. Diagnosis of the genus were emended by Vitiello (1969). Cuticle striated. Head sensilla papilliform or setiform. Outer labial and cephalic sensilla in one circle at the anterior-most end. Additional four subcephalic setae or papilla at the level of amphids. Amphideal fovea mostly oval with an inner oval lining. Buccal cavity minute. Pharynx cylindrical and enlarging at the posterior end. Cardia large and usually elongated. Female with two outstretched ovaries. Spicules short and arcuate. Gubernacular apophyses mostly present, oriented caudally. Tail conical or conico-cylindrical with the cylindrical portion short or filiform (Fonseca & Bezerra, 2014). List of six known species of the genus is as follows (Gerlach & Riemann, 1973):

Disconema alaima Filipjev, 1918 (only female. Type locality: Black Sea)

Disconema falklandiae Allgén, 1959 (only female. Type locality: Falkland Islands)

Disconema longamphida Vitiello, 1969 (Type locality: West Mediterranean)

Disconema longicaudatum Vitiello, 1969 (Type locality: West Mediterranean)

Disconema minutum Vitiello, 1969 (only female. Type locality: West Mediterranean)

Disconema suecicum Allgén, 1935 (Type locality: Oresund Strait)

Disconema zhangi sp. nov. is characterized by relatively little body, papilliform outer labial sensilla and cephalic sensilla, oblong amphidial fovea, conical cardia small, slender and arcuate spicules, relatively long dorso-caudal gubernacular apophyses (9-11 µm), conico-cylindrical tail with an enlarged terminal end. Compared with the three recorded specie which males known, the present species most closely resembles *Disconema suecicum* Allgén, 1935 in the body shape. Nevertheless, the latter having longer body length (2.7-3.4 µm), setiform cephalic sensilla, 11-13 µm long, shorter spicules (shorter than 1 cloacal body diameter). The new species differs from *Disconema longamphida* Vitiello, 1969 in having shorter amphideal fovea and tail length, papilliform cephalic sensilla. In the latter species, amphids 4.7-5.5 head diameter long, tail 7.5 cloacal body diameter, setiform cephalic sesilla 6 µm long and lacking of gubernacular apophysis. *Disconema zhangi* sp. nov. differs from *Disconema longicaudatum* Vitiello, 1969 by longer amphideal fovea, shorter body and tail length, papilliform cephalic sensilla. In the latter species, amphideal fovea suborbicular (11 × 8.5 µm), body length 1700 µm, long tail 26 cloacal diameter with long flagelliform portion, setiform cephalic sesilla 9.7 µm long.

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