

TWO NEW SPECIES OF THE GENUS *DORYLAIMOPSIS* DITLEVSEN, 1918 (NEMATODA: ADENOPHORA, COMESOMATIDAE) FROM THE BOHAI SEA, CHINA*

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Abstract

Two nematode species of the genus *Dorylaimopsis* (Family Comesomatidae) from the Bohai Sea are described. *Dorylaimopsis rabalaisi* n. sp. similar to *D. punctata* Ditlevsen, 1918 from which it can be separated by the small size, short and simple spicules without ventral apophyses or joint line. *Dorylaimopsis turneri* n. sp. differs from the closest species *Dorylaimopsis angelae* (Inglis, 1967) by its higher values of de Man ratio 'a', much shorter spicules and higher ratio of gubernacular to spicules length. A key to species of the genus based on the key by Jensen (1979) is given.

Key words: marine nematodes; Comesomatidae; *Dorylaimopsis*

INTRODUCTION

The present paper is the second in a series on the taxonomy of free-living marine nematodes from the Bohai Sea. The specimens from stations DA2 and DA4 were collected from Laizhou Bay during the July-August Cruise of the research ship *Dongfanghong* in 1986. The station E2 collections were sampled from the Huanghe submarine delta in the 1987 October Cruise. A series of papers on the environmental features, macrobenthos and meiofauna, free-living marine nematodes in particular, in this part of the Bohai Sea, are given by Zhang et al. (1989, 1990). The materials and methods used herein follow those given by Zhang (1990).

Family Comesomatidae Filipjev, 1918

Dorylaimopsis Ditlevsen, 1918

Diagnosis *Dorylaimopsinae*. Posterior portion of buccal cavity cylindrical, and provided with three thornlike teeth; anterior setae in two separate circles; cuticle with lateral differentiation in the form of longitudinal rows of coarse dots; spicules long, varying from slightly bent or curved to double-jointed, usually well differentiated. Gubernacular apophyses directed caudally or dorsocaudally.

Dorylaimopsis rabalaisi n. sp. (Fig.1)

Material studied: Holotype: ♂ 1 ZB: 871001; Paratypes: ♂ 2-20: ZB871002-20; ♀ 1-20: ZB871021-42; juveniles 1-4: ZB871041-44.

Type locality and habitat: The Huanghe submarine delta station E2.

119°20'E, 37°41'3"N, water depth 10 m, poorly sorted clay-silt with Mdφ 7.86 and QDφ 2.06; Laizhou Bay station DA2, 119°45'2"E,

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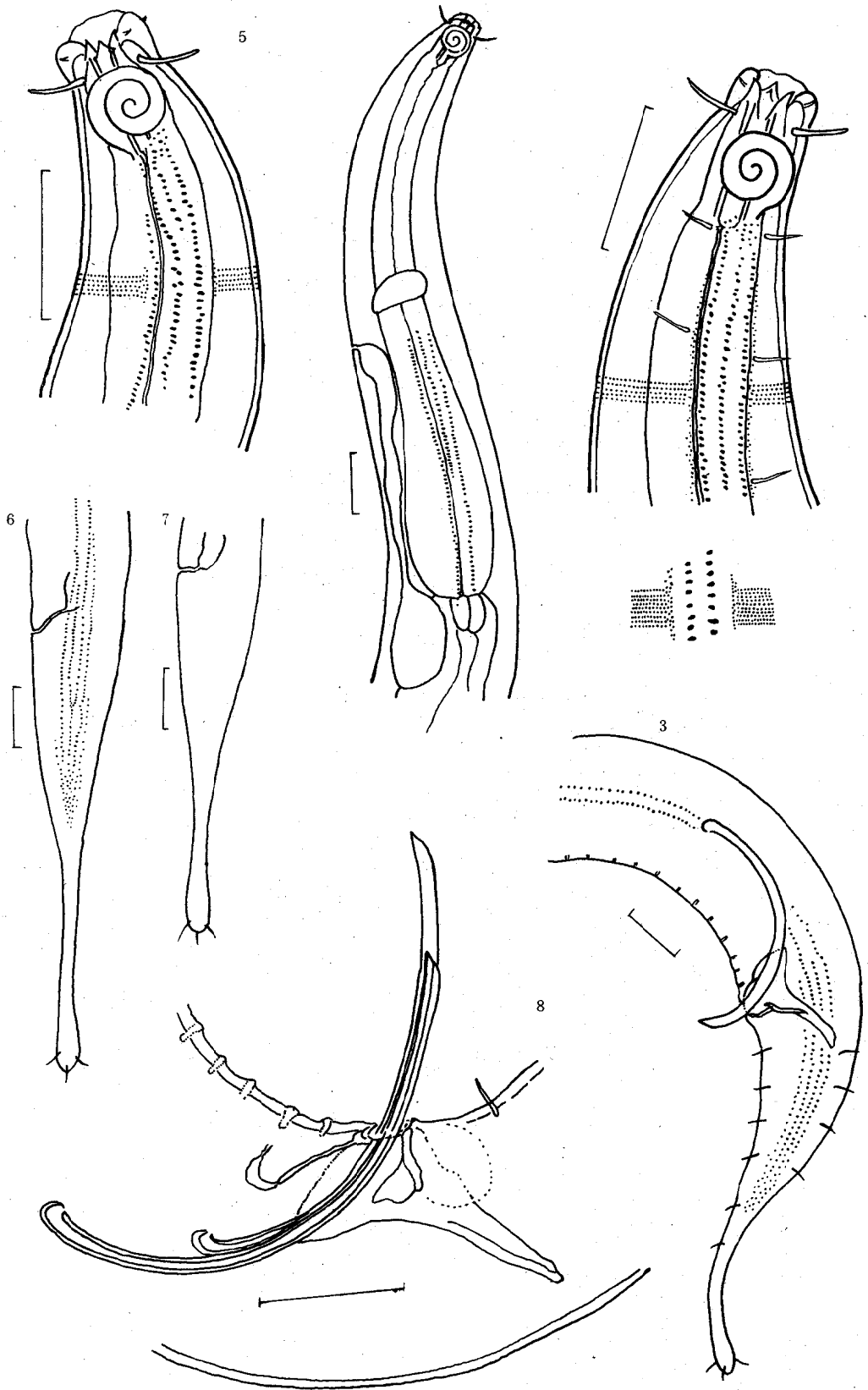


Fig. 1 *Dorylaimopsis rabalaisi* n. sp.

1. male 1, head end; 2. male 1, punctuations at midbody; 3. male 1, tail with copulatory apparatus and punctuations; 4. male 1, anterior region; 5. female 1, head end; 6. female 2, tail; 7. juvenile 1, tail; 8. male 18, copulatory apparatus.

Bar scale: 20 μ m

37°59'8"N, water depth 20 m, poorly sorted clay-silt with $Md\phi$ 5.72 and $QD\phi$ 2.24; Laizhou Bay station DA4, 119°29'5"E, 37°45'7"N, water depth 16 m, coarse silt with $Md\phi$ 4.93 and $QD\phi$ 1.13.

Dimensions (Table 1)

Holotype ♂ 1	$\frac{-}{13}$	$\frac{212}{46}$	$\frac{M}{48}$	$\frac{1417}{39}$	L : 1560 μ m ; a : 33 ; b : 7.4 ; c : 11
Paratype ♀ 1	$\frac{-}{13}$	$\frac{224}{47}$	$\frac{M}{51}$	$\frac{1627}{37}$	L : 1810 μ m ; a : 36 ; b : 8 ; c : 10 ; V : 49 %
Jr. 1	$\frac{-}{10}$	$\frac{176}{32}$	$\frac{M}{34}$	$\frac{1084}{27}$	L : 1204 μ m ; a : 35.4 ; b : 7 ; c : 10

Table 1 Intraspecific variation in a population of *Dorylaimopsis rabalaisi* sp. nov.

Total length (μ m)	de Man ratios			amph. diam.			cept. set.		spicule		lat. diff.	
	a	b	c	μ m	amph. /c .b .d (%)	μ m	cept /h .d. (%)	L (arc)	L (cord)	L/a .b .d (%)		
Males : n=20												
\bar{X}	1605	37	8	12	10	68	9	69	80	62	2.3	19.1
S.D.	97.2	1.8	0.5	1.2	1.0	6.1	1.0	6.8	8.6	5.2	.17	1.5
C.V.%	6.1	4.8	6.3	10.6	10.3	8.9	12.1	9.9	10.7	8.3	7.5	7.8
X_{max}	1919	40	9	15	11	79	10	83	97	69	2.5	23
X_{min}	1418	33	7	11	8	57	7	54	60	50	1.9	16.3
Females : n=20												
\bar{X}	1677	36	8	11	10	67	9	66	80	62	2.3	19.1
S.D.	172.2	2.4	0.7	0.9	1.2	5.8	1.2	7.9	1.6	5.2	.17	1.5
C.V.%	10.3	6.6	8.8	8.0	11.3	8.7	14.4	12.0	3.2	8.3	7.5	7.8
X_{max}	1960	42	9	13	12	79	11	79	97	69	2.5	23
X_{min}	1310	32	7	10	8	57	7	54	60	50	1.9	16.3

Description

Males Body cylindrical, tapering towards extremities, often curved in formalin-fixed specimens, especially in oesophageal and tail regions. The cuticle is marked by transverse rows of fine punctuations. The lateral differentiation consisting of three rows of slightly irregular dots begins just posterior to amphids, extending down about 40 μ m anterior to the base of oesophagus and then takes the form of a series of coarse dots in two files, terminating at the anal area. The lateral differentiation about 9 μ m wide at midbody, about 19% of c. b. d. (16–23%). The punctuations arranged irregularly on tail, usually are in three rows of dots. There are a pair of post-amphidal setae and many other cervical setae, about 5 μ m long, in males, and also shorter cervical setae irregularly arranged, about 3–4 μ m long, in females. Somatic setae sparse and 4 μ m long, in eight subdorsal, subventral longitudinal rows extending from the middle of oesophagus to the anal area. The head has two circles of six inner labial and six outer labial papillae, about 1.5–2 μ m long. More posteriorly are four stout cephalic setae, 9 μ m long, about 70% of h. d. The amphids are in spirals of 2.5–2.75 turns, 11 μ m in diameter, i.e., 70% of c. b. d. The mouth opens into a cup-shaped anterior portion, followed by a 16 μ m long heavily cuticularized tubular portion, at the anterior end of which

are three strong triangular teeth. The oesophagus widens towards its base, but there is no distinct bulb. The excretory pore is prominent at 59% of oesophageal length (52–61%), and the ventral gland extends well beyond the base of the oesophagus. The tail is about $4 \times a.d.$ ($3-4.6 \times a.d.$) and its conical portion, about two third of tail length, has many subventral and subdorsal setae. It has a distinct enlarged and rounded tip bearing three terminal setae, $6.5-8 \mu\text{m}$ long. Three gland cells are within the tail.

Two testes opposite and outstretched. The spicules are paired, equal and arcuate, $86 \mu\text{m}$ long (arc), about $2.4 \times a.d.$ ($1.9-2.5 \times a.d.$); the proximal ends are slightly cephalate, and there is a ventral opening near the proximal tip; the distal $5 \mu\text{m}$ long ends are slightly bent ventrally. There is no ventral apophyses or joint line at the middle of the spicules. The gubernaculum has caudally-dorsally directed apophyses about $24 \mu\text{m}$ long. Pre-cloacal supplements 14–21, with fine but very indistinct ducts.

Females Two ovaries outstretched, vulva at 49% (46–51%). Females differ from the males only in having slightly longer tail ca. $4.5 \times a.d.$ ($3.7-5.5 \times a.d.$) and lacking subventral setae in conical part of the tail.

Differential diagnosis

Dorylaimopsis rabalaisi n. sp. may be distinguished from the closest species *Dorylaimopsis punctata* Ditlevsen, 1981, by the small size ($\hat{\sigma}$: 1418–1819 μm vs 2484–3221 μm ; $\hat{\sigma}$: 1310–1960 μm vs 2567–3111 μm), much shorter spicules ($60-97 \mu\text{m}$ vs $154-182 \mu\text{m}$), and simple spicule structure without a ventral apophyses and a joint line at the middle of spicules (Fig. 2)

Dorylaimopsis turneri n. sp.

Material studied: Holotype: $\hat{\sigma}$ 1, ZB: 871045. Paratypes: $\hat{\sigma}$ 2–10, ZB: 871046–1054. $\hat{\sigma}$ 1–10, ZB: 871055–64.

Type locality and habitat: The Huanghe submarine delta station E2, and Laizhou Bay stations DA 2 and DA4, Bohai Sea. Sediment characteristics are all same as described before.

Dimensions (Table 2)

Holotype $\hat{\sigma}$ 1	$\frac{-}{10}$	$\frac{180}{32}$	$\frac{M}{38}$	$\frac{1438}{30}$	L: 1552 μm , a:41, b:8.6, c:13.6
Paratype $\hat{\sigma}$ 1	$\frac{-}{12}$	$\frac{193}{32}$	$\frac{M}{33}$	$\frac{1476}{26}$	L: 1610 μm , a:41, b:8.3, c:12.0 V:49%

Description

Males Body cylindrical, tapering towards extremities. Head slightly set off by a narrow neck region. The cuticle is marked by transverse rows of fine punctuations. Lateral differentiation consisting of irregular dots starts just posterior to amphids, extending half way down oesophageal length and then takes the form of a series of dots in five files, terminating at the base of the conical part of the tail. Lateral differentiations about $11 \mu\text{m}$ wide at midbody, i. e., 29% of c. b. d. (ranging 25–33%). There are a few cervical setae, about $3.5-4.5 \mu\text{m}$ long, and many subventral and subdorsal setae, about $5-6 \mu\text{m}$ long, on the conical portion of the tail. Somatic setae $4 \mu\text{m}$ long, in eight subdorsal, subventral and sublateral

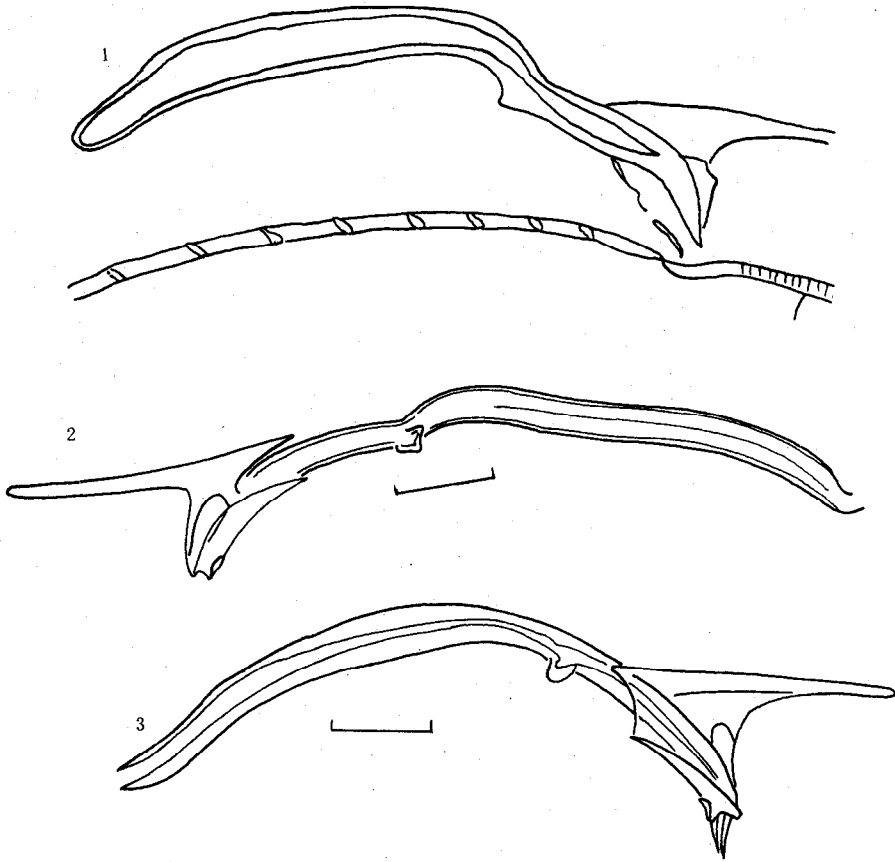


Fig. 2 Spicules of species *D. punctata*
 1. *D. punctata* from Ditlevsen's original drawing; 2 and 3. *D. punctata* from Jensen's (1979) redescription Bar scale: 20 μm for all but 2 (not given in the original figure)

Table 2 Intraspecific variation in a population of *Dorylaimopsis turneri* sp. nov.

Total length (μm)	de Man ratios			amph.		cept. set.		spicule			gub/spi iat.		
	a	b	c	diam. (μm)	diam/c.b.d (%)	L (μm)	L/H.D. (%)	L (arc) (μm)	L (cord) (μm)	L/a.b.d	(%)	diff. (%)	
Males: n = 10													
\bar{X}	1514	43	9	14	91	64	8	67	62	52	2.1	35.1	30.
S.D.	79.4	4.1	0.8	1.1	1.0	7.3	1.3	10.3	3.7	3.2	0.2	2.5	2.5
C.V.%	5.3	9.6	9.5	8.1	11.2	11.3	16.3	15.3	5.9	6.2	8.1	7.0	8.3
X_{max}	1630	49	9.6	15.1	11	79	10	83	67	56	2.3	39	33
X_{min}	1328	37	6.9	12.3	7.5	53	6	52	57	47	1.9	32	25
Females: n = 10													
\bar{X}	1658	42	9	13	9	61	8	66	V (%)			49 (%)	29
S.D.	122.3	2.9	0.7	0.9	0.6	5.9	0.8	5.3				0.9	1.0
C.V.%	7.4	6.9	8.3	6.5	6.4	9.6	9.6	8.0				1.9	4.9
X_{max}	1810	50	11	14	10	71	10	72				50	31
X_{min}	1465	40	8	12	9	51	8	59				47	27

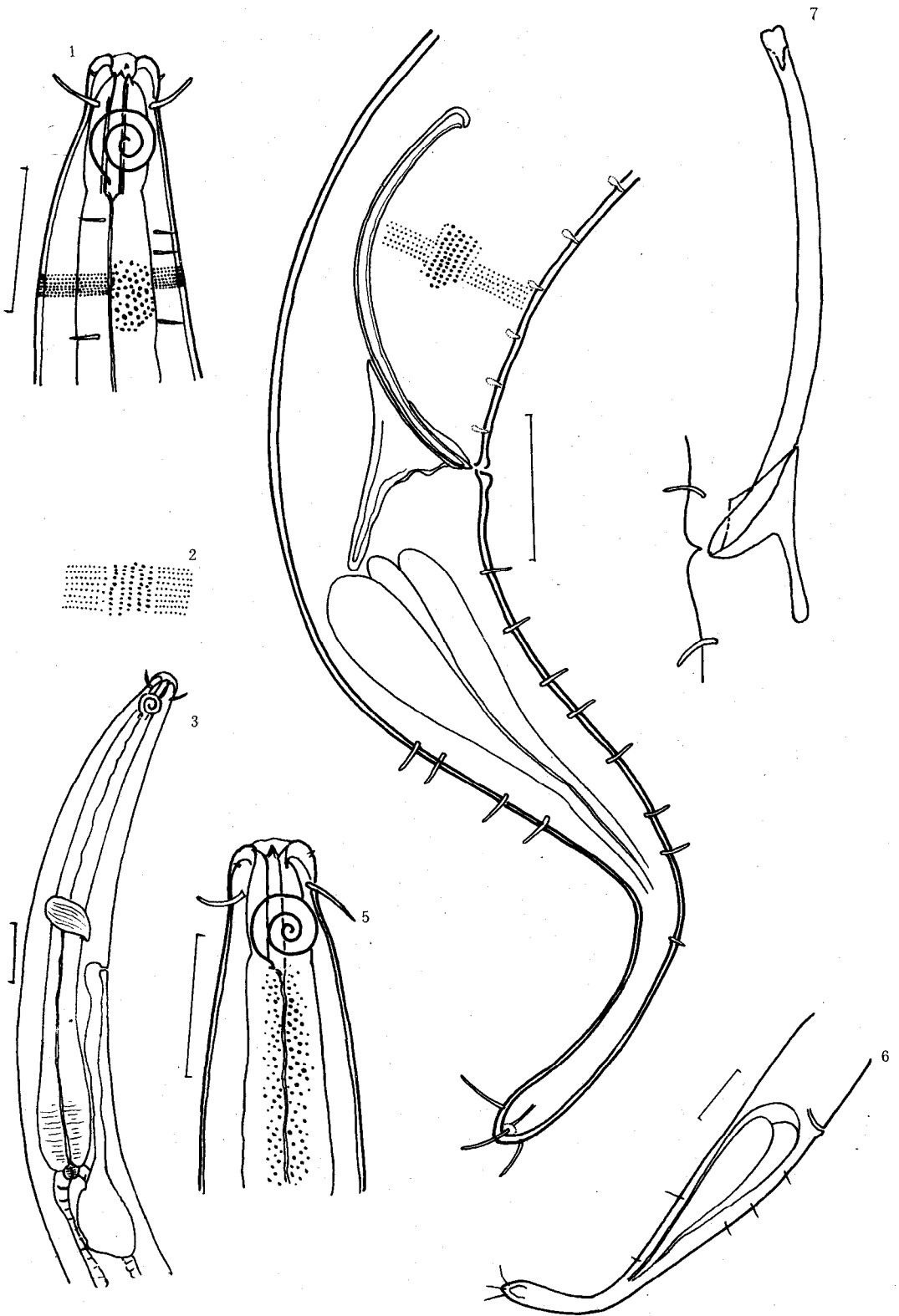


Fig. 3 *Dorylaimopsis turneri* n. sp.

1. male 1, head end; 2. male 1, punctuations at midbody; 3. male 1, anterior region; 4. male 1, tail and copulatory apparatus; 5. female 1, head end; 6. female tail; 7. *D. angelae*

Bar scale: 20 μ m for all but 7 (not given in the original figure)

longitudinal rows extending from the middle of oesophagus to the anal area. The head bears two circles of six inner labial and six outer labial papillae. More posteriorly are four stout cephalic setae, $7\mu\text{m}$ long, about 70% of h.d. (52–83%). The amphids describe a spiral of 2.5–2.75 turns, $8\mu\text{m}$ in diameter, i.e., 70 of c. b. d. (53–79%). The mouth opens into a cup-shaped anterior portion, followed by a $16\mu\text{m}$ long heavily cuticularized tubular portion, at the anterior end of which are three triangular teeth. The oesophagus widens posteriorly, but there is no distinct bulb. Excretory pore at 57% (57–70%) of oesophageal length. Nerve ring at 53 (48–58%) of oesophageal length. Cardial small. Tail $3.8 \times \text{a.d.}$ ($3.3\text{--}4.3 \times \text{a.d.}$) long; anterior two third of the tail conical; with many subventral and subdorsal setae; posterior one third cylindrical. It has a slightly enlarged and rounded tip bearing three terminal setae $7\text{--}8\mu\text{m}$ long. Three caudal gland cells visible in the tail.

Spicules are paired, equal and arcuate, $62\mu\text{m}$ long (arc), about $2 \times \text{a.d.}$ ($1.9\text{--}2.3 \times \text{a.d.}$). They are cephalated proximally and have a blunt distal end. The gubernaculum bears caudodorsally apophyses, $20\mu\text{m}$ long, i.e., 34% of the spicules (arc) (32–39%). There is a short ventral seta just anterior to the anus. There are 11–17 small tubuloid supplements which are often hard to count exactly.

Females Two ovaries are opposed and outstretched. Vulva at 49% of body length. Females have most features in common with males, but are slightly larger (Table 2), and have a longer tail, averaging $4.4 \times \text{a.d.}$ (vs $3.8 \times \text{a.d.}$ in males).

Differential diagnosis

Dorylaimopsis turneri n. sp. differs from the similar species *D. angelae* (Inglis, 1967) by its much shorter spicules, $62\mu\text{m}$ ($57\text{--}67\mu\text{m}$) vs $88\text{--}89\mu\text{m}$, i.e., $2 \times$ ($1.9\text{--}2.3 \times$) of a.d. vs $3 \times \text{a.d.}$, and higher ratio of gubernaculum length to spicules length, 35 (32–39%) vs 25–28%. Moreover, the new species has a higher value of de Man's ratio 'a', 43 (37–49) vs 29–32 in males and 42 (40–50) vs ? in females (no females were reported in Inglis, 1967).

Etymology Two new species are named after Drs Rabalais, N.N. and Turner, U.E. from the Louisiana Universities Marine Consortium and the Louisiana State University, U.S., co-workers engaged in the Sino-US joint project on the study of sedimentary dynamics of the Huanghe submarine delta and its adjacent waters.

DISCUSSION

Dorylaimopsis was established by Ditlevsen (1918), the type species being *Dorylaimopsis punctata* based on three males and two females. Since then another three new members of the genus have been added: *D. mediterranea* de Zio, 1968, *D. metatypica* Chitwood, 1937 and *D. peculiaris* Platonova, 1971. In the revision of the Family Comesometidae Jensen (1979) considered *Mesonchium* Cobb, 1920 synonymous with *Dorylaimopsis* and transferred six species in the former to the genus in the later, based on the structure of the buccal cavity and the shape of the spicules. *Mesonchium punctatum* Timm, 1961 was also replaced by the new name *Dorylaimopsis timmi* Jensen, 1979 for the same reason. In the same paper Jensen also redescribed the type species *D. punctata* Ditlevsen, 1918, based on the reexamination of the type material and specimens from the same area.

Most characters of the two new species show little intraspecific variation, with CV (%) mostly less than 10% (Tables 1 and 2), except for the length of cephalic setae both in males and females in *D. rabalaisi* and also in males in *D. turneri*, which, however, is not an important character in the genus *Dorylaimopsis*.

Key to the species of *Dorylaimopsis* (based on Jensen, 1979)

1. Cuticle laterally with 2 longitudinal rows of coarse dots in both sexes2
Cuticle laterally with more than 2 longitudinal rows of dots in at least one of the sexes8
2. Lateral differentiation of cuticle 1/5–1/6 of the body diameter3
Lateral differentiation of cuticle 1/3 of the body diameter4
3. Body length 2.5–3.2 mm, spicules with a ventral apophysis and a joint line in the middle
.....*Dorylaimopsis punctata* Ditlevsen, 1918
Body length 1.3–1.9 mm, spicules without a ventral apophysis or joint line.....
.....*Dorylaimopsis rabalaisi* n. sp.
4. Few caudal setae; spicules with a ventral or a jointed apophysis but not both5
Many caudal setae; spicules jointed and irregularly sclerotized
.....*Dorylaimopsis mediterranea* Grimaldi-de Zio, 1968
5. Spicules with a ventral apophysis *Dorylaimopsis metatypica* chitwood, 1939
Spicules jointed*Dorylaimopsis perfecta* (Cobb, 1920)
Spicules otherwise6
6. Copulatory apparatus without modifications*Dorylaimopsis peculiaris* Platonova, 1971
Copulatory apparatus modified7
7. Spicules distally with a subterminal hook; gubernaculum with lateral modifications; amphids with 2.5 turns
.....*Dorylaimopsis pellucida* (Cobb, 1920)
Spicules unmodified; gubernaculum complicated; amphids with 3.3–3.8 turns
.....*Dorylaimopsis nini* (Inglis, 1961)
8. Cuticle with 2 rows of coarse dots in males and 3 in females9
Cuticle with more than 2 rows of coarse dots in male.....10
9. Spicules distally acute.....*Dorylaimopsis porifera* (Cobb, 1920)
Spicules distally with a subterminal hook*Dorylaimopsis tinmi* Jensen, 1979
10. Cuticle with 3 rather irregular rows of coarse dots; spicules distally with a subterminal hook; amphids with 2.8 turns
.....*Dorylaimopsis janeta* (Inglis, 1963)
Cuticle with 5 rows of coarse dots11
11. Spicules distally with a subterminal hook; spicule length $3 \times a.b.d.$, de Man ratio 'a' 29–32 in males
.....*Dorylaimopsis angela* (Inglis, 1967)
Spicules distally without subterminal hook; spicule length $2 \times a.b.d.$; de Man ratio 'a' 37–49 in males
.....*Dorylaimopsis turneri* n. sp.

Abbreviations

a :	body length/max. body diameter
a .b .d . :	anal body diameter
amph. diam . :	amphids diameter
b :	body length/oesophagus length
c :	body length/tail length
c .b .d . :	corresponding body diameter
cep . set . :	cephalic setae
CV % :	coefficient of variation
h .d . :	head diameter
L :	body length in μm
lat .diff . :	lateral differentiation
S .D . :	standard deviation
spi . :	spicules
X :	arithmetic mean
X _{max} X _{min} :	highest and lowest values observed

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