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Three new species of free-living marine nematodes from the Bohai Sea and Yellow Sea, China

Z. N. Zhang

^a College of Life Sciences and Technology, Ocean University of China, Qingdao, People's Republic of China

^b College of Life Sciences and Technology, Ocean University of China, 5, Yushan Road, Qingdao 266003, People's Republic of China E-mail:

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Three new species of free-living marine nematodes from the Bohai Sea and Yellow Sea, China

Z. N. ZHANG

College of Life Sciences and Technology, Ocean University of China, Qingdao, People's Republic of China

(Accepted 7 February 2005)

Abstract

Three new species of marine nematodes belonging to the genera *Paranticoma* (family Anticomidae) and *Parodontophora* (family Axonolaimidae) are described from the Bohai Sea and Yellow Sea. *Paranticoma tricerviseta* sp. nov. is similar to *P. bandaense* Micoletzky and Kreis, 1930 in the spicules, but can be distinguished by the presence of a ventral projection on the spicules, three regularly arranged cervical setae in both the male and female, and two distinct ventral setae behind the anus. *Parodontophora deltensis* sp. nov. is close to *P. paragramulifera* (Timm, 1952) in the length of the amphids, with the ventral arm of the amphid extending past the base of the stoma, but can be separated by the ratio of dorsal arm length to ventral arm (0.36–0.55 versus 0.20–0.25) and the position of the excretory pore (at the middle level versus top level of the stoma), distinctive cervical setae arrangement and a longer renette cell. *Parodontophora wuleidaowanensis* sp. nov. is close to *P. danker* Belogurov and Kartavtseva, 1975 in the form of the amphids, but can be distinguished by the longer length of the ventral arm of the amphids and the distinctive arrangement of cervical setae.

Keywords: Bohai Sea, free-living marine Nematoda, new species, *Paranticoma*, *Parodontophora*, Yellow Sea

Introduction

During a Sino-UK Joint “Darwin Initiative” survey in the Bohai Sea from 1997 to 1999, and also a Sino-US Joint Investigation on Sedimentary Dynamics of the Submarine Delta in the Huanghe River Estuary and its adjacent waters from 1985 to 1987, many previously undescribed species were encountered. These were studied both at the Ocean University of China, Qingdao and at the Plymouth Marine Laboratory, UK. A series of papers on the environmental features, macrobenthos and meiobenthos (marine nematodes in particular) of the Bohai Sea have been published (Zhang et al. 1990, 1993, 1994; Guo et al. 2001). Systematic papers on marine nematodes have been published by Zhang (1990, 1991, 1992), Zhang and Platt (1983), Hope and Zhang (1995), Guo and Zhang (2000), and Guo and Warwick (2001). In this paper we describe three new species, *Paranticoma tricerviseta* sp. nov.,

Correspondence: Z. N. Zhang, College of Life Sciences and Technology, Ocean University of China, 5, Yushan Road, Qingdao 266003, People's Republic of China. E-mail: znzhang@ouc.edu.cn

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Parodontophora deltensis sp. nov., and *P. wuleidaowanensis* sp. nov., with a key to the species of *Paranticoma* and a tabular key to the species of *Parodontophora* with longer amphids.

Methods

Specimens of *Paranticoma tricerviseta* sp. nov. were collected from station B9761, the central part of the Bohai Sea during the June/July cruise of the R/V *No.1 Science* in 1997 at a depth of 26 m from a sediment of fine sand-clay, and also from station D5 with R/V *No.2 Dong Fang Hong* during the October/November cruise in 1998. Specimens of *Parodontophora deltensis* sp. nov. were collected from submarine delta stations E2, E10 and T7, and Lai Zhou Bay stations DA2 and DA4 during the July/August cruise of R/V *No.1 Dong Fang Hong*, in 1986, at a depth of 10–16 m and a silt-clay sediment.

Specimens of *Parodontophora wuleidaowanensis* sp. nov. were collected from the inlet channel of the shrimp cultural ground at Wuleidao Bay (36°55'N, 122°00'E) in the Yellow Sea on 23 April 1992. Two specimens were also collected from the branchiae of adult female shrimps cultured at the breeding pond. The environmental features of Wulaeidao Bay and a description of the shrimp culture ponds were given by Zhang et al. (1994).

Specimens were fixed in 5% formalin in seawater, mounted in anhydrous glycerin with coverslip supports and measured using light microscopy (Olympus BHS equipped with differential interference contrast facility). All drawings were made using a drawing tube.

The formulae used for the dimensions are as described in Platt and Zhang (1982) and Zhang (1992). Abbreviations are as follows: a, body length/max. body diameter; a.b.d., anal body diameter; b, body length/oesophagus length; c, body length/tail length; c.d., corresponding body diameter; Sc, spicule length as chord; V, vulva distance from the anterior end of body.

Type material is deposited in the Natural History Museum (London). More paratype male and female specimens are also available in the College of Life Marine Science in the Ocean University of China, Qingdao, China.

Systematic descriptions

The classification follows that given in Gerlach and Riemann (1973/74) and Lorenzen (1994).

Order ENOPLIDA

Family ANTICOMIDAE

Genus *Paranticoma* Micoletzky and Kreis, 1930

Paranticoma tricerviseta sp. nov.

(Figures 1, 2)

Type material

Holotype: one male (Station B9761). Paratypes: six males (Stations B9761, B98D5), four females (Stations B9761), two juveniles (Stations B9761, B9805, B9765).

Type locality

Sublittoral in the Bohai Sea: B9761: 38°29'98"N, 120°29'92"E, water depth 29.8 m, Md₀ 3.15, QD₀ 0.94, silt-clay 27.97%; B9765: 39°59'98"N, 121°21'63"E, water depth 28 m,

Figure 1. *Paranticoma tricerviseta* sp. nov. (a) Lateral view of male head-end; (b) lateral view of female head-end; (c) lateral view of male copulatory apparatus and ventral-middle setae behind anus in the tail; (d) last part of the tail. Scale bar: 20 μm.

Figure 2. *Paranticoma tricerviseta* sp. nov. (a) Lateral view of male anterior end, showing cervical setae (1000 $\times$); (b) lateral view of spicules (400 $\times$); (c) lateral view of male tail (200 $\times$); (d) lateral view of conical part of male tail, showing subventral setae (400 $\times$).

Md ϕ 3.87, QD ϕ 1.67, silt-clay 44.16%; B98D5: 38 $^{\circ}$ 30'00"N, 120 $^{\circ}$ 00'00"E, water depth 35 m, Md ϕ 3.69, QD ϕ 1.82, silt-clay 28.05%.

Measurements

Measurements are given in Table I.

Holotype male 1: $\frac{-}{15} \frac{610}{58} \frac{M}{65} \frac{2440}{40}$ 2730 μ m; a=42, b=4.6, c=9.4, Sc=53

Paratype female 1: $\frac{-}{15} \frac{640}{68} \frac{M}{74} \frac{2420}{37}$ 2732 μ m; a=37, b=4.3, c=8.8, V=53%

Description

Head diameter 15.3 μ m (14–17 μ m) in male, 16.0 μ m (15–18 μ m) in female, equalling about 25.8% and 24.4% of diameter at end of oesophagus respectively. Six papillae distinct. Cephalic setae in one circle, 9.4 μ m (9–11 μ m) in male and 10.5 μ m (9–12 μ m) in females (about 61.4% and 65.6% of head diameter). The buccal cavity is a prominent rounded cup shape with three indistinct weakly sclerotized tooth-like cusps. Amphids indistinct, 5.1 μ m in width (5–6 μ m, 31% of c.d.) in male and 6.5 μ m in width (6–7 μ m, 37.6% of c.d.) in female. Amphids 6.8–7.3 μ m from the anterior. Groups of three lateral cervical setae 56.9 ± 5.0 μ m from anterior in male and 54.3 ± 7.8 μ m in female. Excretory pore situated on a seta-like projection of the cuticle, 22.6 ± 1.6 μ m from anterior in male and 25.3 ± 4.0 μ m in female. Nerve ring situated at $48.9 \pm 2.2\%$ of oesophagus length in

Table I. Measurements of *Paranticoma tricerviseta* sp. nov. (in μm).

Character	M1	M2	M3	M4	M5	M6	M7	F1	F2	F3	F4	J1	J2
Total body length	2730	2614	3300	2724	2472	2488	2498	2732	2748	3326	2496	2030	1990
Head diameter	15	15	15	14	17	16	15	15	15	18	16	14	13
Cephalic setae	9–10	8.5–9.5	10–11	9–10.5	9–9.5	8–9	8.5–9.5	8–10	8–9	9–10	8–9.5	8–9	7–8
Cervical setae from anterior	51	55	63	56	64	52	57	48	54	63	52	46	50
Excretory pore from anterior	20	22	24	21	23	24	24	25	22	31	23	20	18
Amphid from anterior	8	8	7	7	6	7	8	7	7	6	7	6	5
Amphid length/width	6/6	5/6	5/6	5/6	5/6	4/6	6/6	7/5	7/6	6/6	6/5	5/6	5/4
Amphid c.d.	17	16	16	16	17	17	16	17	17	18	17	15	15
Oesophagous length	610	610	700	634	592	638	630	640	640	730	630	580	540
Oesophagus c.d.	58	60	65	60	60	61	52	68	65	72	57	48	52
Maximum body diameter	65	70	82	66	70	70	57	74	69	88	70	51	53
Spicule length as chord	53	50	62	52	47	50	51	–	–	–	–	–	–
Spicule length as arc	?	?	?	?	?	?	?	–	–	–	–	–	–
Gubernaculum length as chord	20	20	22	26	24	20	17	–	–	–	–	–	–
Anal body diameter	40	44	55	40	42	42	38	70	66	79	67	30	31
Tail length	290	304	354	301	290	268	298	312	322	400	314	286	283

M, male; F, female; J, juvenile.

male and $49.5 \pm 1.8\%$ in female. Tail length about 7.1 ± 0.50 times a.b.d. in male and 8.2 ± 0.52 times in female.

Males. Spicules $52.1 \pm 4.4 \mu\text{m}$ (cord) and $57.0 \pm 6.4 \mu\text{m}$ (arc) about 1.12–1.34 times the a.b.d. with ventral side projection. Gubernaculum 20–26 μm long, no apophyses. No supplements. Three cervical setae on each lateral side in all males examined. Two pairs of postanal subventral setae 4.5–6 μm long situated 59 and 69 μm from anus, respectively. Paired short subventral setae on distal half of tail.

Females. Two reflexed ovaries, the length of anterior one 362–382 μm and the posterior one 350–380 μm . Vulva situated at the $52.3 \pm 6.4\%$ of total length.

Discussion

The genus *Paranticoma* was established by Micoletzky and Kreis (1930) with the type species *P. bandaensis*. This genus can be distinguished from the closest genus *Anticomma* by the cup-shaped buccal cavity, excretory pore situated on a seta-like projection of the cuticle, single testis and supplementary organ reduced or vestigial. So far six species have been described by Micoletzky and Kreis (1930), Wieser (1953), Mawson (1956), and Inglis (1967), respectively. All of these species are close to each other and can be distinguished by the structure of the spicules, the presence or absence of cervical setae and the relative position of such setae to the excretory pore, when present.

Differential diagnosis

Paranticoma tricerviseta sp. nov. is characterized by the presence of three cervical setae in male, female and juvenile, the relative position of cervical setae to the excretory pore, the

structure of spicules and gubernacula and the presence of two pairs of post-anal subventral setae in the male. *Paranticoma tricerviseta* is close to *P. bandaense* Micoletzky and Kreis, 1930 and *P. caledoniensis* Inglis, 1967 in body size and spicule structure. However, it differs from *P. bandaense* in having a gubernaculum in the male, the presence of two pairs of post-anal subventral setae and the higher value of De Man ratio “a”, 37–44 versus 31–34 in the female and 39–43 versus 28–33 in the male. The present new species is distinguishable from *P. caledoniensis* in having three cervical setae in the male, the higher “a” value 39–43 versus 32–38 and by not having an enlarged distal end to the spicules.

Key to the species of *Paranticoma*

- 1 Supplement vestigial, cervical setae not far behind excretory pore ca 37 μ m behind anterior end *Paranticoma tubuliphora* Wieser, 1953
- 2 Supplement reduced or absent 3
- 3 Cervical setae absent *P. antarctica* Mawson, 1956
- 4 Cervical setae present 5
- 5 Cervical setae present in female only *P. caledoniensis* Inglis, 1967
- 6 Three or more cervical setae present in both male and female 7
- 7 Cervical setae not far behind excretory pore, ca 36 μ m
. *P. profunda* Micoletzky and Kreis, 1930
- 8 Cervical setae far behind excretory pore 9
- 9 Body length 4–5 mm, female “V” ca 55% (53–59%)
. *P. elegans* Micoletzky and Kreis, 1930
- 10 Body length less than 3.5 mm, female “V” 50–53% 11
- 11 Cervical setae 62–66 μ m from the anterior end, no ventral side projection on spicules and without two ventral setae behind the anus in male
. *P. bandaense* Micoletzky and Kreis, 1930
- 12 Cervical setae 57 μ m (51–63 μ m) in males and 54 μ m (48–63 μ m) in females from the anterior end. With ventral side projection in spicules and two pairs of subventral setae behind the anus in male *P. tricerviseta* nov. sp.

Order MONHYSTERIDA

Family AXONOLAIMIDAE (Filipjev, 1918) De Coninck and Stekhoven, 1933

Genus *Parodontophora* Timm, 1963

***Parodontophora deltensis* sp. nov.**

(Figures 3, 4)

Type material

Holotype: one male. Paratypes: 19 males, 10 females and five juveniles.

Figure 3. *Parodontophora deltensis* sp. nov. (a) Lateral view of male head-end; (b) lateral view of male tail; (c) lateral view of male copulatory apparatus; (d) lateral view of female head-end; (e) tail of female. Scale bar: 20 μm (a, c, d); 50 μm (b, e).

Figure 4. *Parodontophora deltensis* sp. nov. (a) Lateral view of male buccal cavity (400 $\times$); (b) lateral view of male anterior end, showing amphids (400 $\times$); (c) lateral view of male tail, showing spicules and gubernacula with apophyses (200 $\times$).

Type locality and habitat

Laizhou Bay stations. DA2, 119°45'02"E, 37°59'08"N, water depth 20 m, poorly sorted clay-silt with Md ϕ 5.72, five males and six females, DA4, 119°29'05"E, 37°45'07"N, water depth 16 m, coarse silt with Md ϕ 4.93, 11 males and four females.

Submarine delta stations of Huanghe Estuary. E9, 119°16'07"E, 37°51'00"N, water depth 14 m, fine silt with Md ϕ 6.4, two males and three juveniles collected during July/August 1986 cruise; E11, 119°07'30"E, 37°38'03"N, water depth 10 m, fine silt with Md ϕ 6.5, one male and two juveniles collected during July/August 1986 cruise; E2, 119°20'00"E, 37°41'03"N, water depth 10 m, very poorly sorted clay-silt, with Md ϕ 7.86, QD ϕ 2.06, one male collected during October 1987 cruise.

Etymology

Parodontophora deltensis is named for its typical habitat, the submarine delta of the Huanghe River Estuary and adjacent Laizhou Bay.

Measurements

Measurements are given in Table II.

Holotype male: $\frac{146}{13} \frac{M}{35} \frac{954}{36} \frac{25}{26}$ 1090 μ m; a=30.3, b=7.5, c=8.0, Sc=41

Paratype female: $\frac{182}{13} \frac{M}{39} \frac{1102}{41} \frac{26}{26}$ 1270 μ m; a=31.0, b=7.0, c=7.6, V=0.51%

Table II. Measurements of *Parodontophora deliensis* sp. nov. presented as the mean and range for all specimens examined (in μm).

	Males ($n=20$)	Females ($n=10$)	Juveniles ($n=5$)
Total length	1308 (1080–1490)	1345 (1166–1486)	948 (860–1190)
a	30.1 (22.9–33.8)	30.5 (22.9–33.6)	28.8 (23.2–35.3)
b	8.0 (6.7–8.9)	8.0 (7.0–8.8)	6.5 (6.0–7.4)
c	9.1 (8.0–10.9)	8.6 (7.5–10.5)	7.9 (7.1–9.1)
Head diameter	12.9 (11.0–14.0)	13.0 (12.5–14.0)	11.6 (10.0–13.0)
Cephalic setae	4.2 (3.5–5.0)	4.2 (4.0–4.5)	3.9 (3.0–4.5)
Maximum body width	44 (36–50)	45 (41–60)	33 (25–39)
Amphid dorsal branch length	14.9 (14–17)	15.5 (14–18)	12.6 (10–14)
Amphid ventral branch length	33.8 (31–42)	34.6 (32–36)	25.2 (17–34)
Dorsal branch length/ventral branch length	0.45 (0.36–0.55)	0.45 (0.41–0.55)	0.51 (0.41–0.59)
Oesophageal length	164 (146–174)	169 (154–182)	146 (138–160)
Oesophagous body diameter	41 (34–53)	41 (38–51)	31 (25–35)
Renette gland length/oesophageal length (%)	0.37 (0.27–0.44)	0.33 (0.29–0.37)	0.34 (0.31–0.38)
Tail length	144 (125–161)	157 (142–168)	123 (97–152)
Anal body diameter	30 (24–33)	30 (27–34)	23 (17–27)
Spicule length (arc)	39 (34–44)		
Vulva from anterior/body length (%)		50 (49–51)	

Description

Cuticle with faint outer striation discernible in the lateral field. Six outer labial papillae around the lip region. Cephalic setae $4.2\mu\text{m}$ long, $4.2\text{--}5.0\mu\text{m}$ from the anterior end. Cervical setae $3\mu\text{m}$ long, arranged as two subdorsal groups of two longitudinally arranged setae and two subventral (or single) setae, i.e. (2D–2V)2 or (2D–1V)2 for most individuals. Somatic setae scattered. There are five pairs of subventral setae on the conical portion of the tail and several irregular short setae on the cylindrical part of the tail. The mouth opens into a short vestibulum which links the stoma, consisting of a slightly conical anterior part and a cylindrical posterior part with highly cuticularized walls, equal in thickness, $23\text{--}25\mu\text{m}$ long and $4\text{--}5\mu\text{m}$ wide. There are six bifurcate teeth at the tip of the cylindrical stoma. Buccal cavity about $27\text{--}33\mu\text{m}$ long from tip of teeth to the base of stoma. Oesophagus starting at the base of the stoma, widens gradually to the base and forms a bulb in the last fifth of oesophageal length (not illustrated in Figure 2). Amphid semi-looped with the shorter dorsal branch and parallel much longer ventral branch surpassing the base of the stoma. Generally, length of the dorsal branch equals about 0.45 of ventral length (0.36–0.55) and the amphid length is about 1.16 times the buccal cavity length (1.0–1.27 times). The renette cell is elongated oval or rectangular, $61\mu\text{m}$ long ($49\text{--}71\mu\text{m}$), about 0.37 of the oesophageal length (0.27–0.44), situated just behind the small conoid cardia. Nerve ring at the level of about 0.63 of the oesophageal length (0.58–0.67). Excretory pore indistinct at the middle level of buccal cavity.

Males. Slightly smaller than females on average. Testes paired, opposed and outstretched. Anterior testis to the right and posterior testis to the left of the intestine. Spicules paired, equal and arcuate, $38.9\mu\text{m}$ long (1.10–1.76 a.b.d) as arc, pointed distally and enlarged proximal end with a front and dorsal constriction. Gubernaculum with dorsal-caudally directed apophyses, $11\text{--}15\mu\text{m}$ long with the middle of their ventral sides extended into small points.

Females. Ovaries paired opposed and outstretched, anterior to the right and posterior to the left of the intestine, both equally developed with length 402–502 μm . Vulva transverse at the mid-body, vaginal length 11–13 μm , 0.21–0.25 of the corresponding body diameter. A pair of vulval glands present. Female differs from the male in having slightly longer tail (4.9–5.9 versus 4.6–5.3 a.b.d.), fewer subventral setae on the tail and slightly different arrangement of cervical setae. Among 10 female specimens examined, seven specimens had cervical setae formula: (2D-2V)2 and another three specimens had (3D-1V)2.

Differential diagnosis

Parodontophora deltensis sp. nov. is characterized by the position of the posterior end of the amphid extending slightly beyond the base of the stoma (1.0–1.3 times the length of the buccal cavity). Slightly irregular cervical setae arranged as (2D-2V)2 for most males, females and all juveniles, with some exceptions (2D-1V)2 for a small number of males and (3D-1V)2 for some females.

Parodontophora deltensis sp. nov. is close to *P. paragranulifera* (Timm, 1952) in the length of the amphid, with the ventral branch extending past the base of the stoma. However, *P. deltensis* sp. nov. may be separated from that species by the irregularly arranged cervical setae, (2D-2V)2 for the most males, females and juveniles, with some exceptions arranged as (2D-1V)2 for several males and (3D-1V)2 for some females. Cervical setae are arranged more irregularly in *P. paragranulifera*. The new species differs also from *P. paragranulifera* in the ratio of length of dorsal branch to ventral branch (0.36–0.55 versus 0.20–0.25) and anterior one-third of ventral branch running parallel to the dorsal branch, not looping.

Discussion

The genus *Parodontophora* was erected by Timm (1963) for *Odontophora* species with parallel rather than conical walls of the stoma. *Parodontophora paragranulifera* (Timm, 1952) was chosen as the type species and many other species of *Odontophora* and *Pseudolella* were also included in this genus. Boucher (1973), Zhang (1991), and Smolyanko and Belogurov (1995) constructed a dichotomous and tabular key to the species, based on the following characters: length of ventral branch of amphids, position of the excretory pore from the anterior end, the arrangement of cervical setae, relative length of renette cell and presence or absence of armilliths in the endocapola, which was described as one stomatoidal ring in *Parodontophora repens* (Smolyanko and Belogurov 1995), but it was not found in our specimens. So far 17 species are known in the genus including *P. limnophila* (Wu et al. 2000), the only species found in freshwater habitats, and the present two new species, *P. deltensis* sp. nov. and *P. wuleidaowanensis* sp. nov.

***Parodontophora wuleidaowanensis* sp. nov.**

(Figure 5)

Type material

Holotype: one male. Paratypes: two males, two females.

Type locality and habitat

Wuleidaowan Yellow Sea, 119°59'01"E, 36°58'00"N, water depth 1 m, silt-clay, two males and one female; one male and one female collected from the branchial filaments of mature

Figure 5. *Parodontophora wuleidaowanensis* sp. nov. (a) Lateral view of male head-end; (b) lateral view of female head-end; (c) tail of male; (d) tail of female. Scale bar: 20 μ m.

female prawn *Penaeus (Fenneropenaeus) chinensis* (Osbeck), in the spawning pond, 25 April 1992.

Etymology

Parodontophora waleidaowanensis is named after the sea area where the specimens were collected.

Measurements

Measurements are given in Table III.

Holotype male: $\frac{-}{14} \frac{170}{46} \frac{M}{53} \frac{1364}{36}$ 1553 μm ; a=33.8, b=9.1, c=8.2, Sc=40
Paratype female: $\frac{-}{15} \frac{167}{50} \frac{M}{62} \frac{1536}{39}$ 1768 μm ; a=28.5, b=10.6, c=7.6, V=0.48%

Description

Body cylindrical, tapering toward extremities. Cuticle with faint outer striation discernible in the lateral field. Six outer labial papillae around the lip region. Cephalic setae 4.0–5.0 μm long, 3.0–5.0 μm from the anterior end. Cervical setae 3 μm long, arranged as two subdorsal groups of two longitudinally arranged setae and single subventral seta, i.e. cervical seta formula: (2D-1V)2 both for males and females. There are irregular sublateral setae 3 μm long in the oesophageal region. Somatic setae scattered. There are six pairs of subventral setae on the conical portion of the tail and several irregular short setae on the

Table III. Measurements of *Parodontophora waleidaowanensis* sp. nov. (in μm).

Character	M1	M2	M3	F1	F2
Total body length	1553	1370	1662	1768	1816
a	37.8	26.4	30.2	28.5	31.0
b	9.1	10.0	9.1	10.6	9.3
c	8.2	7.6	8.7	7.6	10.2
Head diameter	14	13	15	15	16
Cephalic setae	4	4	5	5	4
Cervical setae	3	3	3	3	3
Amphid from anterior	3	3	3	5	4
Amphid dorsal branch (d.b.)	8	10	9	8	8
Amphid ventral branch (v.b.)	72	79	72	106	78
d.b./v.b.	9.0	7.9	8.0	13.0	10.0
Amphid width	6	5	6	5	6
Buccal cavity (b.c.)	28.5	31	28.5	34	28.5
v.b./b.c.	2.53	2.55	2.53	3.12	2.74
Nerve ring from anterior end	0.59	0.62	0.60	0.58	0.60
Oesophageal length	170	137	182	170	196
Renette gland length/oesophageal length (%)	0.52	0.63	0.52	0.5	0.41
Tail length	189	180	192	232	178
Anal body diameter	36.5	38	36	39	41
Spicule length (arc)	40.0	49.0	39	–	–
Vulva from anterior/body length (%)	–	–	–	0.48	0.48
Gubernacular apophyses	14	14	14	–	–

M, male; F, female.

cylindrical part of the tail. The mouth opens into a short vestibulum which links with the stoma, which has a slightly conical anterior part and a long posterior part with parallel highly cuticularized walls, equal in thickness, 21–25 µm long and 5.5–6.0 µm wide. There are six bifurcate teeth at the tip of the cylindrical stoma. Buccal cavity about 28.5–34 µm long from tip of teeth to the base of stoma. Oesophagus starting at the base of the stoma, widens gradually to the base and forms a bulb in the last quarter of oesophageal length. Amphids shaped like a shepherd's crook, with a short dorsal arm, 8–10 µm, and a much longer ventral arm extending past the stoma, 72–106 µm long. Amphid length about 2.53–3.12 times length of the buccal cavity. The renette cell is a long-oval 84–94 µm long, about 0.41–0.63 of the oesophageal length, just behind the small round cardia. Nerve ring is at 0.58–0.62 of the oesophageal length from the anterior. Excretory pore at middle level of the buccal cavity. Tail shape similar in both sexes, with the first half conical and the other half cylindrical. Three caudal gland cells open to the spinneret.

Males. Slightly smaller than females on average. Testes opposed and outstretched. Anterior testis to the right and posterior one to the left of the intestine. Spicules paired, arched with rounded proximal end and a slightly swollen sub-proximal part, about 9–10 µm from the proximal end. Spicules 39–49 µm long (arc). Gubernaculum with dorso-caudal directed apophysis 14 µm long, with the middle of its ventral side thickened. Caudal setae six pairs subventrally and a few unpaired dorsally.

Females. Two ovaries outstretched. Anterior ovary 398 µm long to the right and posterior one 368 µm long to the left of the intestine. Vulva slightly anterior to the mid-body. A pair of vulval glands present. Amphid ventral arm widens in the middle part, 4.5–5.5 µm wide, with fine striation. A few irregular setae on the tail.

Differential diagnosis

Parodontophora wuleidaowanensis sp. nov. may be separated from the close species *P. danka* Belogurov and Kartavtseva, 1975, by regularly arranged cervical setae (2D-1V)2 in both males and females (no description of cervical setae in *P. danka*), much longer amphid, ventral arm 72–106 µm versus 59 µm, about 2.5–3.1 times versus 2.0 times the length of buccal cavity, and the distinct structure of the proximal ends of the spicules with no invaginated hole in the present new species.

Discussion

Since the establishment of the genus *Parodontophora* by Timm (1963), a total of 18 species are known in the genus, including the present two new species, *P. deltensis* and *P. wuleidaowanensis*. Among them there are six species in which the amphid length extends past the level of the base of the buccal cavity, which can be divided into three groups: (1) amphids 1.1–1.5 times as long as buccal cavity, *P. paragranelifera* (Timm, 1952), *P. deltensis* sp. nov.; (2) amphids about two times as long as buccal cavity, *P. danka* (Belogurov and Kartavtseva, 1975); (3) amphids more than two and half times as long as buccal cavity, including *P. cobbi* (Timm, 1952), length of amphids 80–28 µm, buccal cavity 19–22 µm, *P. polita* (Gerlach, 1955), length of amphids 125–150 µm, buccal cavity 35 µm. Length of amphids 72–106 µm and buccal cavity 29–34 µm in *P. wuleidaowanensis* sp. nov. A tabular key to the species of this last group is given in Table IV.

Table IV. Comparison of *Parodontophora wuleidaowanensis* sp. nov. with allied species^a

	<i>P.</i> <i>paragramulifera</i>	<i>P. deltensis</i>	<i>P. danka</i>	<i>P.</i> <i>wuleidaowanensis</i>	<i>P. cobbi</i>
Total body length					
Male	1100–1330	1080–1490	1580	1370–1662	1400–1500
Female	1300–1400	1166–1486			
Cervical setae formula	Irregularly disposed	(2D-2V)2 or (2D-2V) 2	No cervical setae?	(2D-1V)2	No cervical setae?
Amphidial dorsal arm length/amphidial ventral arm length (%)	21–26	45	19	11	9
Amphidial ventral arm length	32–40	34–35	59	72–106	80–83
Amphidial ventral arm length/buccal cavity (%)	1.2	1.2	1.9	2.5–3.1	3.2–3.3
Position of excretory pore	At anterior part of buccal cavity	At middle level of buccal cavity	At middle level of buccal cavity	At middle level of buccal cavity	–
Renette gland length/oesophageal length (%)	–	33–37	–	41–63	45–60
Reference	Timm 1952	Present sp. nov.	Belogurov and Kartavtseva 1975	Present sp. nov.	Timm 1952

^a*P. polita* (Gerlach, 1955) with amphidial ventral arm length 125–150 µm is not listed in this table because of significantly longer amphids than their allied species. –, no data.

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