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SHORT REPORT

A new species of *Scaptrella* (Nematoda: Monhysterida) from the continental margin of the southeastern Arabian Sea

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Abstract

A novel species of nematode belonging to the family Xyalidae is described from the continental margin of the southeastern Arabian Sea (1100 m). The new species, *Scaptrella filicaudata* sp. nov., is differentiated from the existing species by the swan-shaped longer spicule (45 µm), gubernaculum with dorsocaudally directed apophysis and long filiform tapering tail. A pictorial key to all the valid species of *Scaptrella* Cobb, 1917 is provided.

Key words: Arabian Sea, continental slope, deep sea, nematode, *Scaptrella*, *Xyalidae*

Introduction

In a recent review of the published literature on nematodes, 638 valid species belonging to 175 genera and 44 families are described from the deep sea alone (Miljutin et al. 2010). The deep-sea bottom contains a surprisingly diverse community of nematodes and at present the true extent of their species diversity is impossible to evaluate. Deep-sea nematodes are known to be very rich in species numbers and most of the species still remain to be described (Fonseca et al. 2006). The major impediments in describing new species from the deep sea are their small size, difficulty of obtaining sufficient specimens for species descriptions and the low proportion of males present in samples. In a sample of 1000 deep sea nematodes, there can be several hundred unknown species but most of them may be represented by only a few or even one specimen (Miljutin et al. 2010).

The free-living marine nematode fauna has been studied in many regions of the world. The Indian Ocean is among the geographic regions which have not been studied extensively. The deep-sea

nematode fauna in the Indian Ocean region, in particular, is very poorly known, with only descriptions from the coast of Kenya covered during the Netherlands Indian Ocean Programme (Muthumbi & Vincx 1996, 1997, 1998, 1999). No new species of free-living nematodes have been described from the northern region of the deep Indian Ocean to date.

Xyalidae Chitwood, 1951 is among the most species-rich and often ecologically dominant families of marine free-living nematodes, which inhabit nearly all types of marine environments. A review by Venekey et al. (2014) recognized 46 valid genera, 450 valid species and 73 *species inquirendae* (descriptions without enough morphological information for identification) from the family Xyalidae. Even though some xyalid genera contain hundreds of species, *Scaptrella* Cobb, 1917 is a rare genus with only two valid species described.

A new species, *Scaptrella filicaudata* sp. nov., is described from the continental margin of the southeastern Arabian Sea. The new species is represented by only two individuals from a single location, despite analysing 288 core samples from an

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extensive survey along the eastern Arabian Sea margin covering 06°57'19"N to 21°30'639"N.

Materials and methods

Adult male specimens of the new species were recovered from the benthic survey on board FORV *Sagar Sampada*. Meiofaunal samples were collected using a Smith McIntyre grab from the continental slope of the southeastern Arabian Sea. Specimens belonging to the genus *Scaptrella* Cobb, 1917 were recovered during FORVSS 225. The site of collection was located on the southwest coast of India (Eastern Arabian Sea), at a depth of 1100 m (Figure 1). The meiofauna were sub-sampled from the grab using a glass corer of diameter 2.5 cm, fixed and preserved in 10% formalin and stained with Rose Bengal. Salinity, temperature and dissolved oxygen in the water column just above the sediment were measured using a Sea Bird CTD (SBE 911), on board FORV *Sagar Sampada*. Sediment texture was analysed using a Particle Size Analyser (Sympatec, Germany). The percentage of organic matter in the sediment was estimated by the wet oxidation method (El Wakeel & Riley 1957). Organic matter is expressed in terms of the percentage of sediment dry weight examined. In the laboratory, meiofauna was sieved using a set of sieves (63 µm and 500 µm), sorted and separated manually under a stereo microscope (Leica EZ4). Nematodes were then processed by the slow evaporation technique (Seinhorst 1959), transferred to pure glycerine and mounted on glass slides for detailed examination and taxonomic identification. Descriptions and drawings were made based on the glycerine mounts, with the aid of a Leica DM 1000 microscope with attached drawing tube. The specimens were identified to genus level following Platt & Warwick (1988) and NeMys, the general taxonomic database on Mysida and Nematoda (Vanaverbeke et al. 2014). Type specimens have been deposited in the FORV Referral Centre (CMLRE: Centre for Marine Living Resources and Ecology, Cochin, Kerala, India).

All measurements are in micrometres and all curved structures are measured along the arc. Abbreviations are as follows: a: body length divided by maximum body diameter; abd: anal body diameter; aw: amphidial width; b: body length divided by pharyngeal length; c: body length divided by tail length; gub: length of gubernaculum measured along the arc; hw: head width; L: body length; mbd: maximum body diameter; spic: length of spicules; t: tail length.

Taxonomy

Order Monhysterida Filipjev, 1929

Family Xyalidae Chitwood, 1951

Genus *Scaptrella* Cobb, 1917

Diagnosis

Cuticle striated. Buccal cavity deep, armoured with six mandibles or odontia at the anterior end. Circular amphid. Cephalic setae long and thick. Spicules with only faint accessory pieces. Tail cylindrico-conical, with or without terminal setae.

Type species: *Scaptrella cincta* Cobb, 1917

Other valid species: *Scaptrella cincta* Cobb, 1917, *Scaptrella brevicaudata* Gerlach, 1953

Scaptrella filicaudata sp. nov.

(Table I; Figures 2–4)

Material examined

Holotype and one paratype male [Slide No. IO/SS/NEM/00022; deposited at FORV Referral Centre, CMLRE], collected during cruise FORVSS 225 on 14 May 2004. Continental margin of southeastern Arabian Sea. Southeastern Arabian Sea – off Cape Comorin, 06°57'19"N, 77°21'99"E, 1100 m. Sediment texture predominantly sand with low percentages of clay. Organic matter content was 5.70%, bottom temperature 14.49°C, bottom salinity 35.08 psu and bottom dissolved oxygen concentration 0.42 ml/l.

Diagnosis

Cuticle finely striated, amphid circular with thick walls. Non-striated cephalic region with labial setae, lateral setae and submedian setae. Buccal cavity cylindrical and deep, anteriorly armed with jointed mandibles and odontia. Numerous long somatic setae. Spicule curved, with proximal cephalization. Gubernaculum with dorsally directed apophysis. Tail long, filiform, without terminal setae.

Description of holotype (male)

Large, thick cylindrical body. Total body length 1800 µm. Maximum body diameter 55 µm. Head rounded, diameter 26 µm, distinct without striation, 40 µm long and 32 µm wide with a small constriction at the level of cephalic setae. Labial setae 15 µm long and thick. Lateral setae 50 µm and 35 µm long; submedian setae 70 µm and 35 µm long. Subcephalic setae not observed. Buccal cavity 50 µm deep and 16 µm wide, strongly cuticularized and anteriorly armed with six extendable jointed mandibles and odontia. Somatic setae thin, long and numerous.

Table I. Morphometry of valid *Scaptrella* species (abbreviations explained in Materials and methods section).

Characters	<i>S. cincta</i>	<i>S. cincta</i>	<i>S. brevicaudata</i>	<i>S. filicaudata</i> sp. nov.	
	Cobb 1917	Wieser & Hopper 1967	Gerlach 1953	Holotype	Paratype
<i>L</i>	1600–1900	1700	1310–1617	1800	1760
Mbd	41.6–45.6	41	29.94–35.41	55	53
<i>a</i>	38.5–41.6	41.46	37–54	32.7	33.2
<i>b</i>	7.7	7.72	6.7–8.1	6.43	6.54
<i>c</i>	–	4.72	10.4–13.3	1.5	1.4
Labial setae	–	6 to 7	–	15	15
Lateral setae	–	30 + 18	22–25 + 36	50 + 35	50 + 36
Submedian setae	–	50 + 30	22–25 + 36	70 + 35	68 + 35
Buccal cavity length	33.6–36.1	30	25	50	50
Buccal cavity width	30.4	–	18	16	16
hw: head width	–	20	18	32	32
Aw	–	10	8	10	10
Oesophagus length	208–247	220	122–126	280	269
Oesophagus width	–	33	18	34	33
Abd	28.5–30.4	–	–	36	36
Spic	–	34	28	45	43
Gub	–	–	–	20	20
<i>T</i>	–	360	–	1200	1200

Cuticle 3 μm thick, finely striated, striations start posterior to head region; striations are 3 μm wide and visible throughout body. Amphid thick, circular with internal spiral, measures 10 μm in width and located 31 μm away from the anterior region. Oesophagus 280 μm long and 34 μm in width at its posterior base. Posterior end of oesophagus slightly

flattened or swollen, without forming a true bulb. Excretory pore and nerve ring not seen.

Reproductive system monorchic. Sperm cells not observed. Spicules paired, equal and arcuate or swan-shaped (45 μm long), with proximal cephalization open. Gubernaculum 20 μm long, simple, with long dorsal apophysis. Three caudal glands located posterior to spicules. Tail tapering or filiform, with striations, 1.2 mm long, without terminal setae.

Females and juveniles were not found.

Etymology

The species name *filicaudata* refers to the characteristic filiform tail of this species.

Remarks and comparisons

The genus *Scaptrella* was erected by Cobb, based on *Scaptrella cincta* Cobb, 1917 from California. Subsequently, *Scaptrella brevicaudata* was described by Gerlach in 1953 from the Mediterranean. There are only two valid species of the genus, *Scaptrella cincta* Cobb, 1917 and *S. brevicaudata* Gerlach, 1953. Although a third species, *Scaptrella tenuicaudata*, was described by Gerlach (1956) from Germany, it is considered a *species inquirenda* here since the description was based on a single female.

Scaptrella filicaudata sp. nov. differs from *S. cincta* in having longer labial setae (15 vs 6–7 μm), lateral setae (50 + 36 vs 30 + 18 μm) and submedian setae (68–70 + 35 vs 50 + 30 μm), deeper buccal cavity (50 vs 30–36 μm), lesser *a* value (32.7–33.2 vs 38.5–41.6) and a swan-shaped, longer spicule (43–45 vs 34 μm).

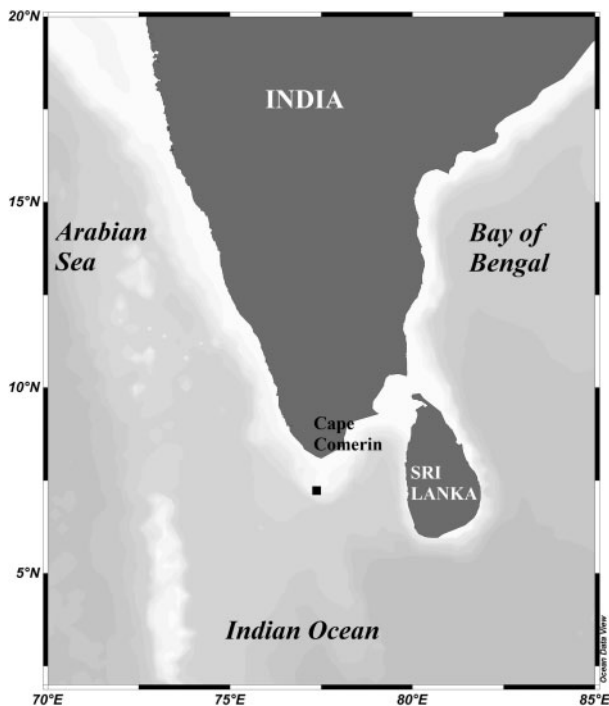


Figure 1. Map of southeastern Arabian Sea showing area of collection.

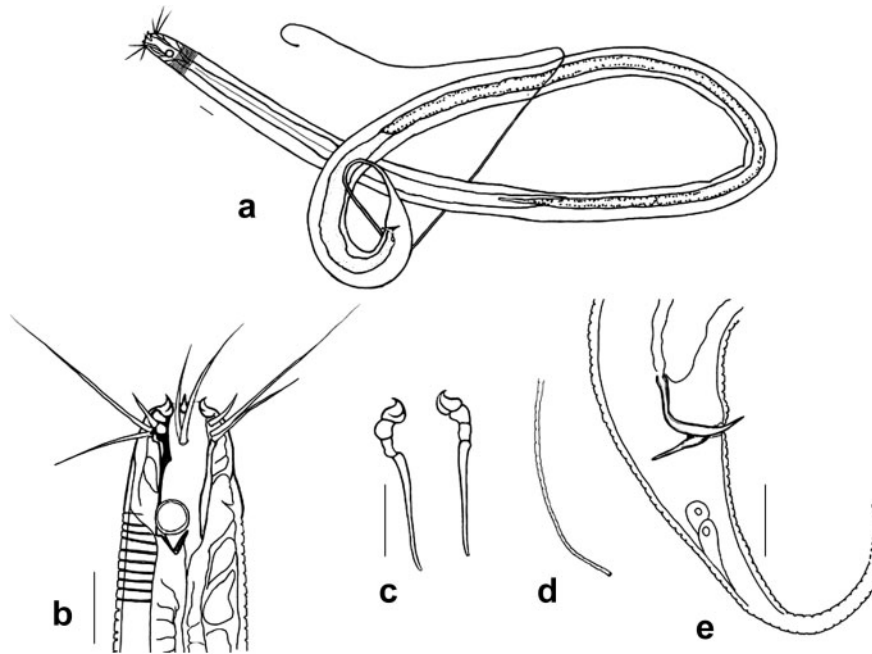


Figure 2. *Scaptrella filicaudata* sp. nov. (a) Holotype full specimen, (b) Cephalic region, (c) Jointed mandibles, (d) Tail tip, (e) Caudal region showing spicular apparatus. Scale bar 20 μ m.

The gubernaculum in *S. filicaudata* sp. nov. is simple, with a dorsally directed long apophysis, but in the case of *S. cincta* it is mentioned as a faint accessory organ. However, from the redescription of *S. cincta* by Wieser & Hopper (1967), the gubernaculum has a

bidentate lateral guiding piece. Similarly, the long blunt tail (360 μ m) of *S. cincta* possesses numerous caudal setae and a pair of 20 μ m long terminal setae, whereas the long filiform tapering tail (1.2 mm) of *S. filicaudata* sp. nov. bears no terminal setae.

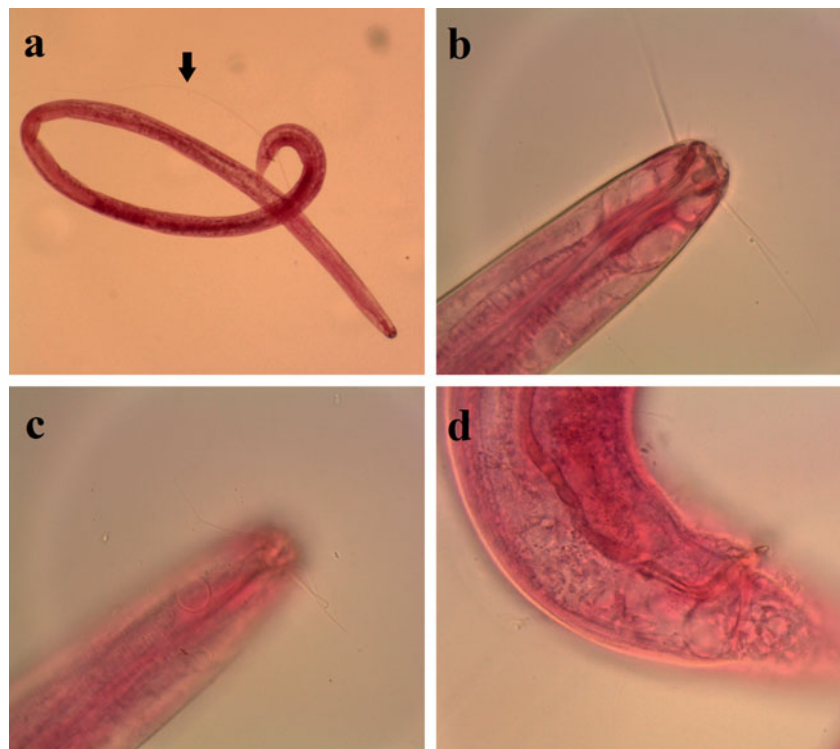


Figure 3. *Scaptrella filicaudata* sp. nov. (a) Holotype, entire organism, (b) Cephalic region, (c) Amphid, (d) Caudal region. Arrow mark indicates filiform tail.

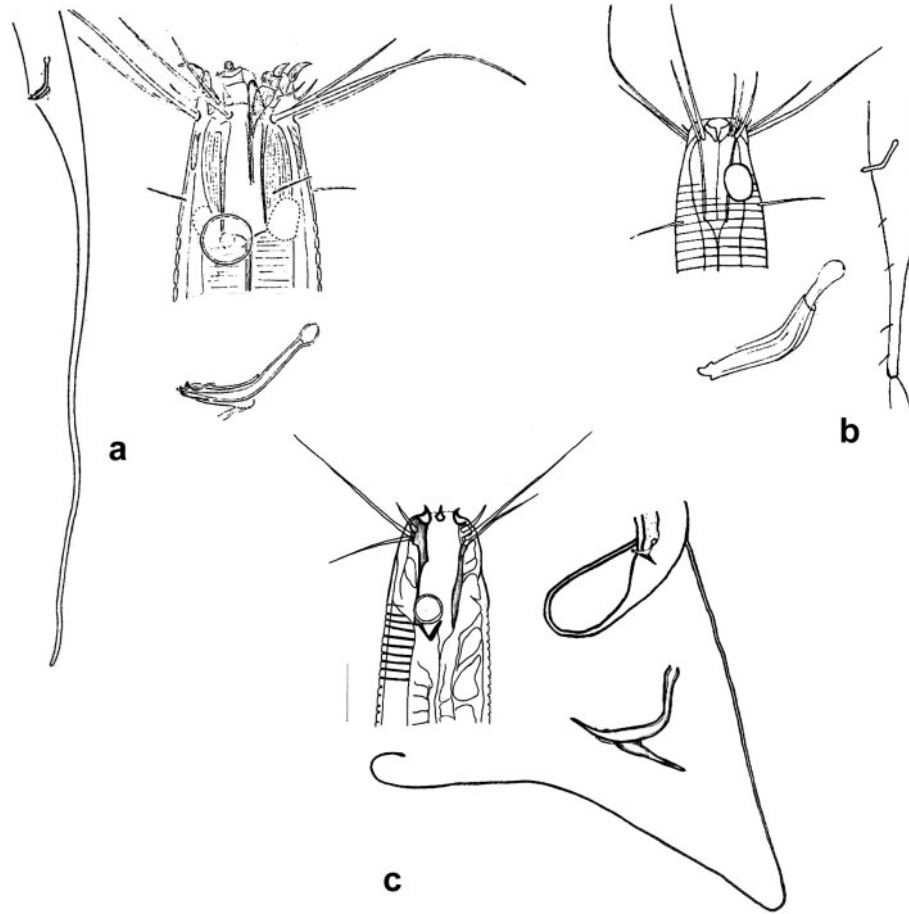


Figure 4. Pictorial key to *Scaptrella* species. Holotype: anterior and posterior body region, and gubernaculum. (a) *Scaptrella cincta* Cobb, 1917, (b) *Scaptrella brevicaudata* Gerlach, 1953, (c) *Scaptrella filicaudata* sp. nov.

Scaptrella brevicaudata Gerlach, 1953 can easily be distinguished from *S. filicaudata* sp. nov. by the smaller amphid (8 vs 10 μm), shallower buccal cavity (25 vs 50 μm), smaller lateral setae (22–25 + 36 vs 50 + 35–36 μm), smaller submedian setae (22–25 + 36 vs 68–70 + 35 μm), higher *a* value (37–54 vs 32.7–33.2) and *c* value (10.4–13.3 vs 1.4–1.5) and smaller spicule (28 vs 45 μm). The spicule in *S. brevicaudata* is slightly curved, with rounded capitulum at the proximal end and two tooth-like projections at the distal end, whereas in *S. filicaudata* sp. nov., proximal cephalization is open and the distal end tapering without any projection. The gubernaculum in *S. brevicaudata* encircles the spicule but in *S. filicaudata* sp. nov. the gubernaculum is simple, with a dorsally directed apophysis. The tail in *S. brevicaudata* is short and with terminal setae, whereas in *S. filicaudata* sp. nov. the tail is long, filiform and tapering to its end without any setae, as its name depicts.

The differentiation of *S. filicaudata* sp. nov. from the other two valid species is straightforward (Figures 2–4; Table I), based on the size and shape of spicular apparatus and tail.

Pictorial key to species of the genus *Scaptrella*

A key based on pictures (Figure 4) of the species of *Scaptrella* is provided. In Table I, the most important metric characters of all the species of the genus *Scaptrella* are summarized on the basis of currently available species descriptions.

- 1a. Tail long, filiform 2
- 1b. Tail short (Figure 4b)
..... *Scaptrella brevicaudata*
- 2a. Terminal setae present and gubernacular apophysis absent (Figure 4a) *Scaptrella cincta*
- 2b. Terminal setae absent and gubernacular apophysis present (Figure 4c)
..... *Scaptrella filicaudata* sp. nov.

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