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SHORT REPORT

A new species of *Setosabatieria* Platt, 1985 (Nematoda: Comesomatidae) from Chek Jawa, Singapore, with a key to valid species of the genus

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Abstract
A new species of Comesomatidae Filipjev, 1918 is described from an intertidal sandy–muddy beach at Chek Jawa, Singapore. *Setosabatieria singaporensis* sp. nov. is characterized by having an amphideal fovea with 2.75–3.0 turns, 14–17 cervical setae per row, 17–20 small precloacal supplements, arcuate spicules with a central cuticularized strip, a leaf-like cuticle extension and gubernacular apophyses bent ventrally in the distal portion. A key to all valid species of *Setosabatieria* is provided.

Key words: *Identification key, intertidal, Monhysterida, new species,* Setosabatieria*, taxonomy*

Introduction

Studies related to free-living marine nematodes in Singapore waters are still limited and consequently no records on marine nematodes have been documented so far. The latest studies relating to marine nematodes in the Malaysia–Singapore region have focused on ecological approaches to determining their spatial distribution in Borneo (Chen et al. 2012a, 2012b).

The present article describes a new species from the genus *Setosabatieria* Platt, 1985 in the family Comesomatidae Filipjev, 1918. Comesomatidae are known to have the following features: annulated cuticle with a transverse row of punctuations; multispiral amphids; buccal cavity not folded anteriorly; gubernaculum with paired dorsal apophyses and precloacal supplements in males. The genus *Setosabatieria* belongs to the subfamily Sabatieriinae and is characterized by a small, cup-shaped buccal cavity; amphid spiral; cuticle transversely striated, not punctuated; the presence of long sublateral rows of numerous long cervical setae and small precloacal supplements. A key to all valid species of *Setosabatieria* is included.

Material and methods

Specimens were collected from intertidal sediments in Chek Jawa, Republic of Singapore during a comprehensive marine biodiversity survey. Samples were taken in an intertidal seagrass area of Chek Jawa (1°24.748′N, 103°59.711′E) on 17 October 2012 using a 2.5 cm inner diameter corer to a depth of 5 cm. Sediment samples were later rinsed through a set of sieves: 500 μm (on top) to remove the large particles and a 45 μm sieve to retain nematodes. Samples were fixed with 5% formalin in seawater. Each sample was washed into a Petri dish and nematodes were sorted under a stereo microscope (Zeiss Stemi SV6). Nematodes were later transferred to 90% freshwater, 5% glycerol and 5% ethanol prior to mounting on a microscope slide with anhydrous glycerol (Platt & Warwick 1988). The descriptions were made from the glycerin mounts using an interference contrast microscope (Olympus BX 51) and

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Table I. Measurements of *Setosabatieria singaporensis* sp. nov. (units: μm). See text for explanation of abbreviations.

Characters	Holotype Male	Paratypes			
		Male 2	Male 3	Female 1	Female 2
Total body length	1764	1857	1720	1953	1874
Head diameter	16	14	15	16	15
Length of cephalic setae	17	16	17	16	15
Amphid diameter	10	10	11	9	9
Amphid diameter / cd (%)	62	70	70	60	62
Oesophagus length	181	192	207	215	190
Oesophagus cd	29	31	22	32	20
Maximum body diameter	53	58	54	68	69
Sc	51	52	51	–	–
Sa	60	55	54	–	–
Length of gubernacular apophyses	25	13	18	–	–
abd	40.18	35.76	35.73	40.09	36.00
Tail length	207	212	172	236	227
Vulva from anterior	–	–	–	847	751
Vulva cd	–	–	–	62	63
V%	–	–	–	43.39	40.06
a	33.23	31.53	31.72	28.70	27.01
b	9.71	9.64	8.28	9.04	9.82
c	8.49	8.74	9.98	8.27	8.23

the drawings were produced with the aid of a camera lucida. All units are in μm. Structures that are curved are measured along the arc except for spicules (both arc and chord).

The following abbreviations are used throughout the text and figures: a, body length/maximum body diameter; b, body length/pharynx length; c, body length/tail length; abd, anal body diameter; cd, corresponding diameter; hd, head diameter; L, body length; Sa, spicule length as arc; Sc, spicule length as chord; V, vulva distance from anterior end of body; V%, V/total body length.

Type samples are deposited in the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research (RMBR), National University of Singapore and the Borneo Marine Research Institute (BMRI), Universiti Malaysia Sabah.

Taxonomy

Order Monhysterida
Family Comesomatidae Filipjev, 1918
Subfamily Sabatieriinae Filipjev, 1934
Genus *Setosabatieria* Platt, 1985

***Setosabatieria singaporensis* sp. nov.**

(Tables I–II; Figures 1–4)

Holotype

ZRC.NEM.01 (slide), adult male collected by C.A. Chen, 17 October 2012, Chek Jawa, 1°24.748′N, 103°59.711′E, intertidal seagrass area, sandy mud.

Paratypes

BMRI.NEM.01 (slide), adult female and male, same collection data and habitat as for holotype.

Description

Male (holotype: Figures 1, 3). Body cylindrical and tapering towards both anterior and posterior regions. Total body length 1720–1857 μm; maximum body diameter 53–58 μm. Head rounded, diameter 14–16 μm. Buccal cavity small, without noticeable teeth and cup-shaped. Six inner and 6 outer labial papillae followed by 4 cephalic setae, 16–17 μm long. Two latero-dorsal and 2 latero-ventral, longitudinal rows of cervical setae, 14–17 per row (11–16 μm long). Other somatic setae short and sparse. Cuticle with faint annulations visible throughout body and most obvious on anterior region. Amphid spiral with 2.75–3 turns (10 μm width). Pharynx with gradual swelling at base but not a true bulb. Excretory pore and nerve ring not seen.

Reproductive system diorchic, opposed, outstretched. Anterior testis to left of intestine and posterior testis to right of intestine. Sperm cells observed. Spicules paired, equal and arcuate (arc: 54–60 μm long; chord: 51–52 μm long), with central cuticularized strip. Gubernaculum with pair of apophyses bent in the proximal portion (13–25 μm long). Small precloacal seta present. Seventeen to 20 small precloacal supplements in form of papillae, often difficult to observe. Leaf-like cuticle extension present. Caudal glands located near spicules. Tail conico-cylindrical (172–212 μm long) with a number

Table II. Morphometrics and distribution of males of valid species of the genus *Setosabatieria*. All measurements are in µm. See text for explanation of abbreviations.

Character	*Setosabatieria hilarula* De Man, 1922	*S. fibulata* Wieser, 1954	*S. jingjingae* Guo & Warwick, 2001	*S. coomansi* Huang & Zhang, 2006	*S. triangularis* Riera et al., 2006	*S. australis* Leduc & Gwyther, 2008	*S. conicauda* Leduc et al., 2012	*S. orientalis* Gagarin, 2013	*S. singaporensis* sp. nov.
L	1812–1865	1490	1620–1370	1601–1954	1700–2371	1231–1321	1094–1640	1238–1545	1720–1875
a	37–38	34	29–34	31–37	32–44	33–35	25–30	26–39	31–33
b	8–10	7.4	7.6–9.3	7.5–8.5	8.1–15.4	6.5–7.1	6–8	6.9–9.8	8.2–9.7
c	8–9	13.1	10.2–11.7	9.6–11.1	9.9–14.4	8.3–8.9	15–18	9.2–11.8	8.4–9.9
Cephalic setae length	13–14	11	8–9	10–16	20–27	10–11	10–11	9–10	16–17
Number of amphideal foveal turns	3.5–4.0	4.25	3.5	3.5	2.5	3.5	4.25–4.5	2.5–3.0	2.75–3.0
Spicule length	67–70	59	43–52	49–86	39–54	45–51	45–51	46–50	54–60
Length of apophysis	29–33	20	12–14	17–21	34–36	19–21	19–21	18–21	13–25
Number of precloacal supplements	13–16	17	9	15	15	7–9	7–9	15–19	17–20
Geographical distribution	Northeast and southwest England; west coast of Scotland; Celtic Sea; North Sea; Mediterranean Sea; Atlantic Ocean off Central Africa and the USA; Bay of Bengal	Atlantic Ocean (USA)	Yellow Sea (China)	Yellow Sea (China)	Canary Islands (Spain)	New Zealand	New Zealand	South China Sea (Vietnam)	Johor Strait (Singapore)
Literature	Gerlach & Riemann (1973), Platt & Warwick (1988)	Wieser (1954)	Guo & Warwick (2001)	Huang & Zhang (2006)	Riera et al. (2006)	Leduc & Gwyther (2008)	Leduc et al. (2012)	Gagarin (2013)	Present paper

of short caudal setae (7–11 µm long) and 3 longer terminal setae (9–11 µm long).

Female (paratype: Figures 2, 3). Similar to males, but slightly wider body. Cephalic setae 15–16 µm long. Amphid spiral with 3 turns (8–9 µm width). Two latero-dorsal and 2 latero-ventral, longitudinal rows of cervical setae, 16–17 per row (13–16 µm long). Pharynx with gradual swelling at base but not a true bulb. Excretory pore and nerve ring not seen.

Reproductive system didelphic, opposed and outstretched. Both uteri spacious and filled with eggs (the largest 41 × 96 µm). Vulva at 40.1–43.4% of total length. Tail slightly longer than in males (227–236 µm), with fewer caudal setae (6 µm long). Three terminal setae (14–22 µm long).

Etymology

The species name refers to the first marine nematode species recorded from the Singapore region.

Comparisons

The genus *Setosabatieria* was erected by Platt (1985) to accommodate two *Sabatieria* species that lack cuticlar punctations and have characteristic sublateral rows of numerous, long cervical setae. Until now, eight species have been reported: *Setosabatieria hilarula* De Man, 1922, *S. fibulata* Wieser, 1954, *S. jingjingae* Guo & Warwick, 2001, *S. coomansi* Huang & Zhang, 2006, *S. triangularis* Riera et al., 2006, *S. australis* Leduc & Gwyther, 2008, *S. conicauda* Leduc et al., 2012 and *S. orientalis* Gagarin, 2013. The present new species, *Setosabatieria singaporensis* sp. nov., is characterized by an amphideal fovea with 2.75–3.0 turns, 14–17 cervical setae per row, 17–20 small precloacal supplements, arcuate spicules with a central cuticularized strip and gubernaculum apophyses bent in the proximal portion. The new species most closely resembles *S. hilarula* in the number of cervical setae per row, precloacal supplements and the presence of a leaf-like extension, but they differ in both gubernacular apophyses and amphideal fovea turns. The most important feature which distinguishes *S. singaporensis* sp. nov. from *S. hilarula* is that it does not have a gubernaculum with straight dorso-caudal apophyses (Figure 4). A similar structure of apophyses to that seen in *S. singaporensis* sp. nov. has been observed in *S. conicauda*, yet the number of amphideal fovea turns (2.75–3.0 vs. 4.25–4.5) and the shape of the tail (conico-cylindrical vs. conical) are different.

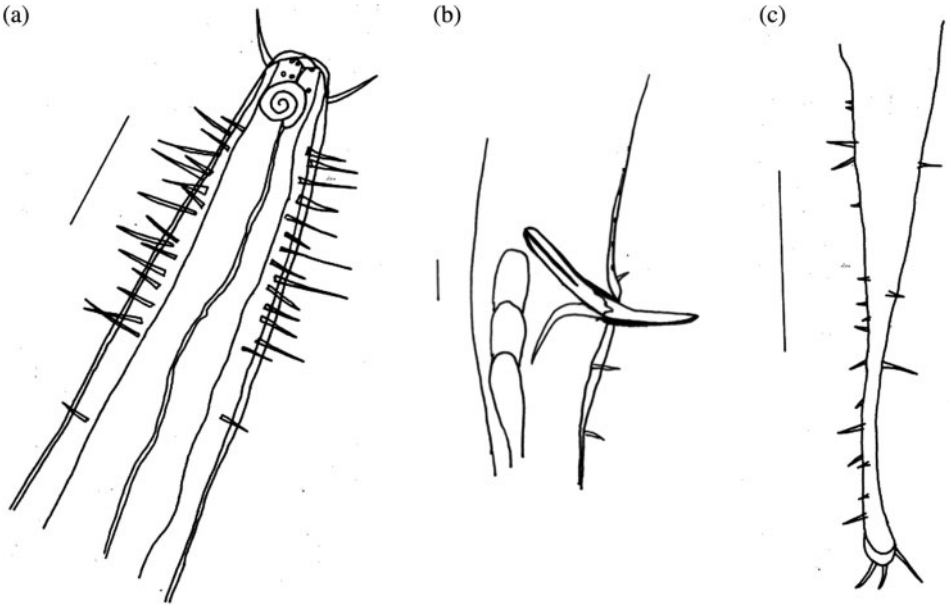

Figure 1. *Setosabatieria singaporensis* sp. nov., male. (a) Lateral view of head; (b) posterior body region showing copulatory apparatus; (c) lateral view of tail. Scale bars: a, b = 20 μm; c = 50 μm.

Key to all known species of *Setosabatieria* (modified from Leduc et al. 2012)

1a. Tail conico-cylindrical 2
1b. Tail conical ..... *S. conicauda*
2a. Spicules not arcuate or curved 3
2b. Spicules arcuate or curved 4
3a. L-shaped spicules with median hollow region ..... *S. australis*
3b. L-shaped spicules with capitulum and median cuticular strip at proximal end ..... *S. orientalis*

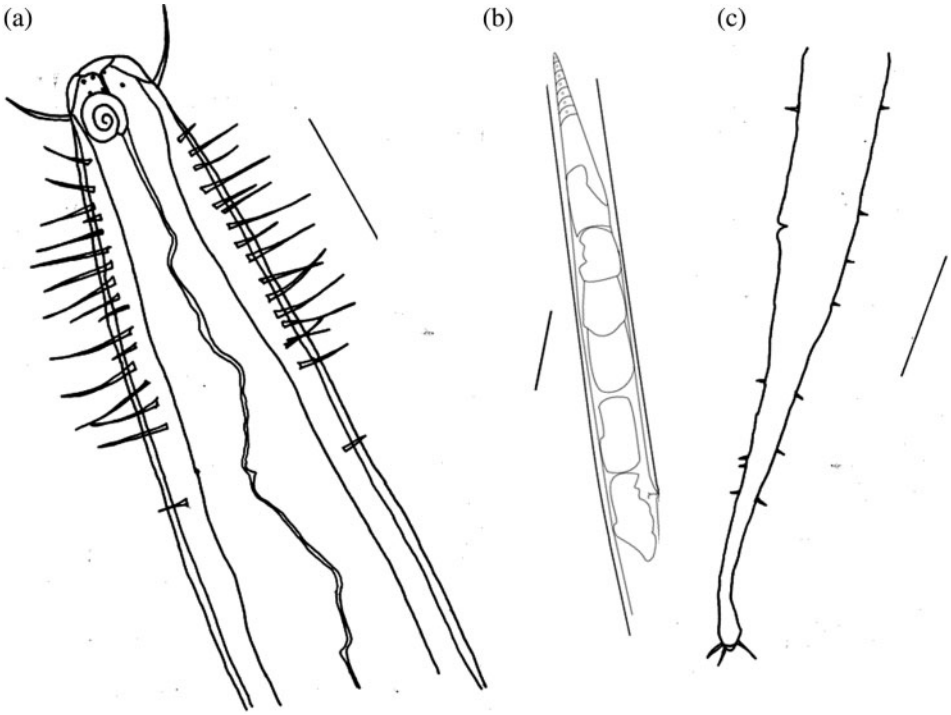

Figure 2. *Setosabatieria singaporensis* sp. nov., female. (a) Lateral view of head; (b) vulva region; (c) posterior body region. Scale bars: a = 20 μm; b = 100 μm; c = 50 μm.

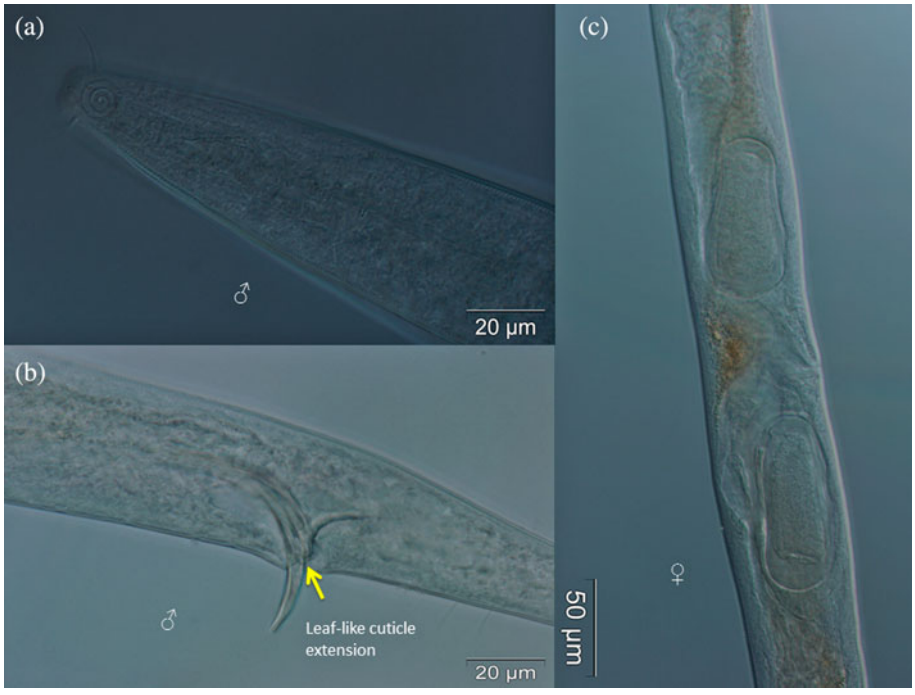

Figure 3. *Setosabatieria singaporensis* sp. nov. (a) Lateral view of anterior end of male, showing amphideal fovea and cephalic setae; (b) lateral view of spicule and gubernacular apophysis; (c) lateral view of vulva.

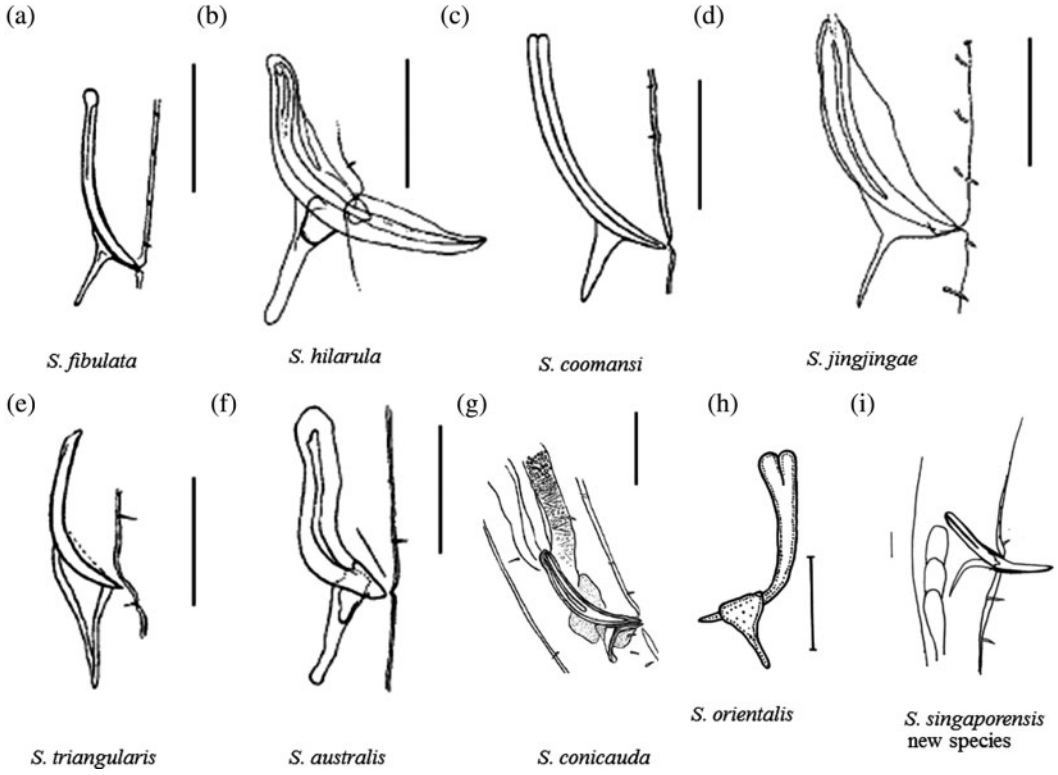

Figure 4. Comparison of the copulatory apparatus of all nine known species of the genus *Setosabatieria*, including *Setosabatieria singaporensis* sp. nov. (modified from Leduc & Gwyther 2008). Scale bars: a, c, e = 40 µm; b, f = 29 µm; d, h, i = 20 µm; g = 30 µm.

4a. Spicules with central cuticularized strip 5
4b. Spicules without central cuticularized strip ..... *S. triangularis*
5a. Leaf-like extensions of the cuticle lateral to cloaca absent 6
5b. Leaf-like extensions of the cuticle lateral to cloaca present 8
6a. Precloacal supplements less than 10 ..... *S. jingjingae*
6b. Precloacal supplements more than 15 7
7a. Amphideal fovea with 3.5 turns or less ..... *S. coomansi*
7b. Amphideal fovea with 4.25 turns ... *S. fibulata*
8a. Gubernaculum with straight dorso-caudal apophyses ..... *S. hilarula*
8b. Gubernacular apophyses bent in the proximal portion..... *S. singaporensis* sp. nov.

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