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Two unrecorded species of the family Comesomatidae Filipjev, 1918 (Nematoda: Araeolaimida) from Korea

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Two known species of the family Comesomatidae Filipjev, 1918 were collected from marine sediments of the sublittoral zone in the East Sea, Korea and described and illustrated. *Dorylaimopsis variabilis* Muthumbi, Soetaert and Vincx, 1997, which was originally described from the Kenyan coast in the Indian Ocean, is recorded from the East Sea, Korea for the first time; there are only slight differences in amphidial fovea turns, body length, body width and relative length of tail. *Setosabatieria hilarula* (De Man, 1922), Platt, 1985, which was originally described from the North Sea, is recorded from the East Sea, Korea for the first time; there are only slight differences in the number of precloacal supplements, the relative length of tail and the posterior portion of tail. We provide pictorial keys for determination of valid species in the genera *Dorylaimopsis* Ditlevsen, 1918 and *Setosabatieria* Platt, 1985. This is the first description of the genus *Dorylaimopsis* and *Setosabatieria* from Korean waters.

Keywords: Comesomatidae, *Dorylaimopsis*, East Sea, free-living nematodes, *Setosabatieria*

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Introduction

To date there are nearly 7,000 known species of free-living marine nematodes (Appeltans *et al*., 2012). Many intensive taxonomic studies of free-living marine nematodes have been undertaken in Europe. In Korea, about 70 species of free-living marine nematodes of 12 families (Comesomatidae Filipjev, 1918; Cyatholaimidae Filipjev, 1918; Draconematidae Filipjev, 1918; Enchelidiidae Filipjev, 1918; Enoplidae Dujardin, 1845; Ironidae de Man, 1876; Microlaimidae Micoletzky, 1922; Oncholaimidae Filipjev, 1916; Phanodermatidae Filipjev, 1927; Selachinematidae Cobb, 1915; Thoracostomopsidae Filipjev, 1927; Xyalidae Chitwood, 1951) have been described (Kang *et al*., 2022). The family Comesomatidae is comprised of 3 subfamilies, 23 genera and 253 species (Hodda, 2022).

The subfamily Dorylamimopsinae de Coninck, 1965, which contains eight genera and 47 species, is the second largest group of Comesomatidae (Fonseca and Bezerra, 2014). The genus *Dorylaimopsis* was established by Ditlevsen in 1918 with type species *D. punctata* Ditlevsen, 1918 and 27 species of *Dorylaimopsis* have been described so far. It is characterized by having lateral differentiation of longitudinal rows of dots in the cuticle; a cuticularized cylindrical portion in the posterior of buccal cavity; three strong thornlike teeth in anterior portion of the buccal cavity; the variety forms of spicules (from sinusoid to slightly bent or curved); directed caudally or dorso-caudally gubernacular apophyses (Jensen, 1979; Fonseca and Bezerra, 2014).

The subfamily Sabatieriinae Filipjev, 1934 is the largest group of Comesomatidae. This subfamily contains eight genera and 96 species (Fonseca and Bezerra, 2014). The genus *Setosabatieria* was established by Platt in 1985 with type species *S. hilarula* (De Man, 1922) Platt, 1985 and characterized by having no lateral differentiation in the cuticle and sublateral files of cervical setae (Platt, 1985; Fonseca and Bezerra, 2014). Only 11 species of *Setosabatieria* have been described to this time. The present study aims to provide all valid species list and pictorial keys of the genus *Dorylaimopsis* and *Setosabatieria*. In addition, we describe two unrecorded species collected from the East Sea, Korea.

Materials and Methods

During a survey on the meiofauna community along the east coast of Korea, *Dorylaimopsis* specimens were collected along the coast of Ulsan (35°37′35″N, 128°28′9″E, at a depth of 90 m, in clay sediment) on 5th September 2012 and *Setosabatieria* specimens were collected along the coast of Sokcho (38°12′42″N, 128°37′39″E, at a depth of 35 m, in the slightly gravelly sandy mud) on 12th September 2013. Sediment samples were taken using a 0.1 m^2 Van-Veen grab, and meiofauna samples were taken using a hand-held corer (surface area: 10 cm^2, depth: 5 cm). All samples were fixed immediately in 4% neutral buffered formalin at air temperature. In the laboratory, meiofauna were extracted following the protocol of Burgess (2001) and nematodes were sorted using a grid Petri dish under a stereoscopic microscope (SZX-7; Olympus, Tokyo, Japan). Sorted nematodes were then transferred into Seinhorst solution to be dehydrated and infiltrated with glycerine using the glycerine-ethanol method (Seinhorst, 1959). Then nematode specimens were mounted in anhydrous glycerine on glass slides with glass beads (beads size was selected according to the nematode diameter) using a standard wax-ring method (Hooper, 1986). For taxonomic studies, nematode specimens were examined under a 100x oil immersion objective with Nomarski Differential Interference Contrast (DIC) illumination. Drawings were made with an optical microscope (BX-51; Olympus, Tokyo, Japan) using a camera lucida. All morphometric measurements were obtained from the figures using a digital map-measurer and Zeiss AxioVision software Version 4.9.1.0 (Carl Zeiss Microscopy; Oberkochen, Germany). The classification used follows that given in de Ley and Blaxter (2004). Pictorial key for identification of species of *Dorylaimopsis* and *Setosabatieria* are founded upon the principles and examples of Platt (1984). Abbreviations used are as follows: a - body length divided by maximum body diameter; abd - anal body diameter (μm); AL - distance from anterior to anterior edge of amphidial fovea (μm); amp - diameter of amphidial fovea (μm); amp cbd - corresponding body diameter at the level of amphidial fovea (μm); ao - length of anterior ovary, measured from vulva (μm); at - length of anterior testis, measured from cloaca (μm); b - body length divided by pharynx length; c - body length divided by tail length; c′- tail length divided by anal body diameter; car - length of cardia (μm); cbd - corresponding body diameter (μm); cep - length of cephalic setae (μm); CEPL - distance from anterior to cephalic setae (μm); cer - length of cervical setae (μm); cylin - length of cylindrical tail portion (μm); cylin% - cylindrical tail portion length as percentage of tail length; dps: distance from cloaca to precloacal setae (μm); EPL - distance of ventral excretory pore from anterior end of body (μm); gub - length of gubernacular apophyses (μm); hd - diameter at the level of cephalic setae (μm); ils - length of inner labial setae (μm); L - total body length (μm); mbd - maximum body diameter (μm); N% - nerve ring distance from the anterior end as percentage of pharynx length; Ncbd - corresponding body diameter at nerve ring (μm); NL - nerve ring from anterior end of body (μm); nps - number of precloacal supplements; ols - length of outer labial setae (μm); Pb - pharynx bulb width (μm); Pcbd - corresponding body diameter at cardia (μm); PL - pharynx length (μm); po - length of posterior ovary, measured from vulva (μm); pt - length of posterior testis, measured from cloaca (μm); s - spicule length as arc length divided by anal body diameter; spia - spicule length as arc (μm); TEL - length of teeth (μm); ter - length of terminal setae (μm); TL - tail length (μm); V% - vulva distance from anterior end as percentage of total body length; V cbd - corresponding body diameter at vulva (μm); VL - distance from anterior end to vulva (μm).

Results and Discussion

Systematics

Class Chromadorea Inglis, 1983
Subclass Chromadoria Pearse, 1942
Order Araeolaimida De Connick and Schuurmans Stekhoven, 1933
Family Comesomatidae Filipjev, 1918
Subfamily Dorylaimopsinae De coninck, 1965

Genus *Dorylaimopsis* Ditlevsen, 1918

Diagnosis (amended from Jensen, 1979; Fonseca and Bezerra, 2014)

Dorylaimopsinae. Cuticle with transverse rows of punctuations, laterally differentiated as a ridge with coarse longitudinal dots arranged in rows. Unusually lateral differentiation with larger dots irregularly spaced at some body region and arranged longitudinal rows of dots on rest of body. Posterior part of buccal cavity cylindrical and located with three pointed teeth at border to anterior part. Spicules slender, slightly bent or curved, usually differentiated. Apophyses directed caudally and parallel to the body axis or dorsocaudally.

Type species: *Dorylaimopsis punctata* Ditlevsen, 1918

List of valid species

The genus *Dorylaimopsis* was reviewed by Jensen (1979). An emended generic diagnosis of *Dorylaimopsis* is provided by Fonseca and Bezerra (2014). According to WoRMs (WoRMS Editorial Board, 2022) and NeMys (Bezerra *et al*., 2022), 27 *Dorylaimopsis* species have been described to date. However, *D. communis* (Gagarin

and V.T. Nguyen, 2006) Fu, Leduc, Rao and Cai, 2019 from Mekong River Delta, Vietnam was missing in WoRMs and Nemys list. *Dorylaimopsis euryonchus* (Wieser, 1954) from Chile and *D. hawaiiensis* Allgen, 1951 from Hawaii are considered as *species incertae sedis* and as *species inquirenda*, respectively, because they have been described without males (Vitiello, 1969; Jensen, 1979). *Dorylaimopsis metatypica* Chitwood, 1936 in WoRMs and Nemys list should be transferred to genus *Hopperia* by reason of having larger, irregularly distributed coarse dots on lateral differentiation (Fu, Leduc, Rao and Cai, 2019). In summary, 27 species of *Dorylaimopsis* are considered valid.

1. ***Dorylaimopsis angelae* (Inglis, 1967)** [(Inglis, 1967: 39–40, Fig. 14–16 (=*Mesonchium angelae*); Saint Vincent Bay, New Caledonia, mangrove, no sampling data. Jensen, 1979: 91, no figures, *Mesonchium* is considered synonymous with *Dorylaimopsis*)].
2. ***Dorylaimopsis boucheri* Fu, Leduc, Rao and Cai, 2019** (Fu, Leduc, Rao and Cai, 2019: 439–443, Fig. 4 a–b, 5 a–e, 6 a–f; Beibu Gulf of the South China Sea, 20–32 m deep, mud, salinity 33.5–33.9 psu).
3. ***Dorylaimopsis brevispiculata* Gagarin, 2013** (Gagarin, 2013: 557–560, Fig. 5 a–g; South China Sea, littoral zone of the coast of Vietnam, 1–3 m deep, salinity 29.1–29.5 psu, no sediment data).
4. ***Dorylaimopsis communis* (Gagarin and V.T. Nguyen, 2006)** (Gagarin and V.T. Nguyen, 2006a: 18–21, Fig. 1–8; Mekong River Delta, Vietnam, 1–2 m deep, mangrove, silt, *Hopperia commnis* should be moved to genus *Dorylaimopsis* because of the presence of longitudinal rows of coarse dots and a cylindrical buccal cavity).
5. ***Dorylaimopsis coomansi* Muthumbi, Soetaert and Vincx, 1997** (Muthumbi *et al*., 1997: 49–50, Fig. 12 a–i; the Kenyan coast in the Indian Ocean, 18 m deep, no sediment data).
6. ***Dorylaimopsis gerardi* Muthumbi, Soetaert and Vincx, 1997** (Muthumbi *et al*., 1997: 50–52, Fig. 13 a–g; the Kenyan coast in the Indian Ocean, 511 m deep, no sediment data).
7. ***Dorylaimopsis halongensis* D.T. Nguyen, V.T. Nguyen, Smol and Vanreusel, 2008** (D.T. Nguyen *et al*., 2008: 14–15, Fig. 3 a–j, 4 a–g; Halong Bay, Vietnam, 1.8–3.5 m deep, mangrove, silt).
8. ***Dorylaimopsis intermedia* Gagarin, 2013** (Gagarin, 2013: 555–557, Fig. 4 a–g; South China Sea, littoral zone of the coast of Vietnam, 1–2.5 m deep, salinity 29.1–29.5 psu).
9. ***Dorylaimpsis janetae* (Inglis, 1963)** [(Inglis, 1963: 547–549, Fig. 30–36 (=*Mesonchium janetae*); the coast of South Africa, 54 m deep, mud. Jensen, 1979: 91, no figures, *Mesonchium* is considered synonymous with *Dorylaimopsis*)].
10. ***Dorylaimopsis jinyuei* Fu, Leduc, Rao and Cai, 2019** (Fu, Leduc, Rao and Cai, 2019: 443–447, Fig. 7 a–e, 8 a–d, 9 a–f; sublittoral zone in the Chukchi Sea, 45–52 m deep, mud, salinity 30.6–32.8 psu).
11. ***Dorylaimopsis longispicula* Fu, Leduc, Rao and Cai, 2019** (Fu, Leduc, Rao and Cai, 2019: 434–439, Fig. 1 a–b, 2 a–e, 3 a–d; Beibu Gulf, South China Sea, 20–32 m deep, mud, salinity 33.5–33.9 psu).
12. ***Dorylaimopsis lutosa* Gagarin, 2017** (Gagarin, 2017: 235–245: Fig. 4; the mouth of the Yen River in Vietnam, no depth data, mangrove, no sediment data).
13. ***Dorylaimopsis magellanense* Chen and Vincx, 1998** (Chen and Vincx, 1998: 101–106, Fig. 2 a–e, 3 a–f; Strait of Magellan, 123–219 m deep, silt and clay).
14. ***Dorylaimopsis mediterranea* Grimaldi-De Zio, 1968** (Grimaldi-De Zio, 1968: 137–140, Fig. 1 a–c; near Villefranche Bay, Mediterranean Sea, 50 m deep, gray mud).
15. ***Dorylaimopsis nini* (Inglis, 1961)** [Inglis, 1961: 301–304, Fig. 14–20 (=*Mesonchium nini*); coast of South Africa no sampling data. Jensen, 1979: 91, no figures, *Mesonchium* is considered synonymous with *Dorylaimopsis*)].
16. ***Dorylaimopsis nodderi* Leduc, 2012** (Leduc, 2012: 20–24, Fig. 9 a–e, 10 a–d, 11 a–d; Chatham Rise crest, southwest Pacific Ocean, 350 m deep, mostly fine sand (35.7%), silt/clay (33.0%), and very fine sand (23.5%); calcium carbonate content: 40.5%; total organic matter content: 4.5%).
17. ***Dorylaimopsis papilla* Guo, Chang and Yang, 2018** (Guo, Chang and Yang, 2018: 164–167, Fig. 3 a–j, 4 a–d; Fenglin, Tong'an Bay, China, 0 m, mangrove, sediment temperature 27.4°C, total nitrogen 2.28 mg g^{-1}, total phosphorus 0.46 mg g^{-1}, organic carbon 3.17%, no sediment data, salinity 22.9 psu).
18. ***Dorylaimopsis peculiaris* Platonova, 1971** (Platonova, 1971: 82–83, Fig. 9 a–b; Posyet Bay, East Sea, 3–22 m deep, no sediment data).
19. ***Dorylaimopsis pellucidum* (Cobb, 1920)** [(Cobb, 1920: 295–296, Fig. 77 (=*Personema pellucidum*); no mention of number of specimens, the harbor of Kingston, Jamaica, mud. Cobb, 1935: 466, no figures, *Personema* is considered synonymous with *Mesonchium*. Wieser and Hooper, 1967: 288, Fig. 57 a–d (=*Mesonchium pellucidum*); no mention of number of specimens, Biscayne Bay, Florida, USA, no sediment data. Jensen, 1979: 91, no figures, *Mesonchium* is considered synonymous with *Dorylaimopsis*)].
20. ***Dorylaimopsis perfecta* (Cobb, 1920)** [(Cobb, 1920: 263, Fig. 47 (=*Xinema perfectum*); no mention of

number of specimens, San Pedro, California, USA, mud. Filipjev, 1934: 27, no figures, *Xinema* is considered synonymous with *Dorylaimopsis*)].

21. ***Dorylaimopsis poriferum* (Cobb, 1920)** [(Cobb, 1920: 294–295, Fig. 76 (=*Mesonchium poriferum*); Key West, Florida, algae. Jensen, 1979: 91, no figures, *Mesonchium* was considered synonymous with *Dorylaimopsis*)].
22. ***Dorylaimopsis punctata* Ditlevsen, 1918** (Ditlevsen, 1918: 163–164, Pl. II, Fig. 6; Pl. III, Fig. 2–3; Pl. IV, Fig. 1; Öresund, Denmark, no depth data, shells and gravel. Stekhoven, 1950: 146–148, Fig. 88 a–i; Villefranche Bay, Mediterranean 50–230 m deep, gray mud. Jensen, 1979: 101–104, Fig. 10 a–i, 11 a–e; Northern Øresund (Baltic Sea), Denmark, 27–28 m deep, silty sand and fine sand, haploops and *Amphiura filiformis* community).
23. ***Dorylaimopsis rabalaisi* Zhang, 1992** (Zhang, 1992: 31–34, Fig. 1 1–8; Bohai Sea, China, 10–20 m deep, clay and silt).
24. ***Dorylaimopsis timmi* (Timm, 1961)** [(Timm, 1961: 54, Fig. 39 a–b (=*Mesonchium punctatum*); one male, no mention of number of female specimens, Bay of Bengal, no depth data, mud and *Siphonocladus*. Jensen, 1979: 91, no figures, *Dorylaimopsis timmi* nom. nov. was proposed for *Mesonchium punctatum* Timmi, 1961, *Mesonchium* is considered synonymous with *Dorylaimopsis*)].
25. ***Dorylaimopsis tumida* Gagarin and V.T. Nguyen, 2006** (Gagarin and V.T. Nguyen, 2006b: 225–227, Fig. 8–15; Mekong River Delta, Vietnam, 1–2 m deep, Mangrove, silt).
26. ***Dorylaimopsis turneri* Zhang, 1992** (Zhang, 1992: 34–37, Fig. 3 1–6; Bohai Sea, China 10–20 m deep, clay and silt).
27. ***Dorylaimopsis valiabilis* Muthumbi, Soetaert and Vincx, 1997** (Muthumbi *et al*., 1997: 52–57, Fig. 14 a–m, 15 a–f, 16 a–i; population 1: the Kenyan coast in the Indian Ocean, 200 m deep, no sediment data; population 2: the Kenyan coast in the Indian Ocean, 20–50 m deep, no sediment data).

Dorylaimopsis variabilis Muthumbi, Soetaert and Vincx, 1997 (Figs. 1–4, Table 1)

Locality. The coast of Ulsan: sub-tidal southern part of East Sea, Korea (35°37′35″N, 128°28′9″E), at a depth of 90 m, in clay sediment.

Material. Four males (NIBRIV0000900857, NIBRIV0000900859, NIBRIV0000900860, NIBRIV0000900862) and three females (NIBRIV0000900863–NIBRIV0000900865) collected by Sangjin Kim along the coast of Ulsan on 5th September 2012, from Research Vessel Hansudan 1.

Measurements. See Table 1 for detailed measurements and morphometric ratios.

Description. Male (Figs. 2, 4, Table 1). Body cylindrical, gradually tapering toward both extremities, with blunt anterior end. Cuticle thin and punctuated. Fine dots started about anterior edge of amphids. Laterally modified punctuations begun at the posterior level of amphids, larger and more widely arranged on pharyngeal and tail regions. Laterally modified punctuation changed three times; at posterior amphids; near base of pharynx; around anus. Punctuations irregularly arranged on post amphidial regions; three rows on pharyngeal region; two rows in mid body; three rows on tail, finishing about 90 μm before tail tip. Lateral differentiations about 6–7 μm at base of pharynx, 6–7 μm in mid-body, 8–9 μm in anus region. Tail conico-cylindrical.

Anterior sensilla in three separate crowns, six inner labial sensilla small, with papillae form. Six outer labial sensilla short setiform. Four cephalic setae (5.8–7.5 μm) nearly equal length, located 0.5 head diameter from anterior end. Somatic setae (about 3–4 μm), in four dorso- and ventrolateral longitudinal rows scattered on body, much shorter than cephalic setae. Amphidial fovea (8.8–9.0 μm) large, 5.8–6.6 μm behind anterior end, situated behind cephalic setae, circular spiral form. Fovea spiral coiled ventrally, about 2.5 turns.

Buccal cavity composed with small cup-shaped anterior portion (about 2 μm deep) and sclerotized cylindrical posterior portion (19–21 μm deep) with three teeth. Pharynx long (208–226 μm) and slender, cylindrical except distinct posterior bulb (23–26 μm, cbd 42–46 μm). Nerve ring located at 101–118 μm (46.8–52.2%) of pharyngeal length from anterior end. Ventral gland pore just posterior nerve ring, situated at 116–134 μm of pharyngeal length from anterior end. Cardia round, small (8–9 μm), surrounded with intestinal tissue. Ventral gland cell body placed posterior of cardia.

Reproductive system diorchic, testes outstretched, anterior testis (situated left mid-gut) located 1049–1368 μm and posterior testis (situated right mid-gut) located 394–492 μm from the cloaca. Spicules paired, equal and long, arcuate and have a capitulum, 86–91 μm long as arc (2.3–2.4 abd). Gubernaculum very strongly sclerotized pieces, bearing caudal apophysis (13–22 μm) with swollen distal tip, surrounding spicules. Thirteen to fourteen minute mid-ventral supplementary papillae observed in precloacal region, several copulatory muscles located in pre-cloacal supplement region. First precloacal supplement situated about 14–16 μm from anus and most anterior precloacal supplement located 218–279 μm from anus. Tail consisted proximal conical and distal cylindrical part (30–40 μm). Tail 3.7–4.3 abd long with

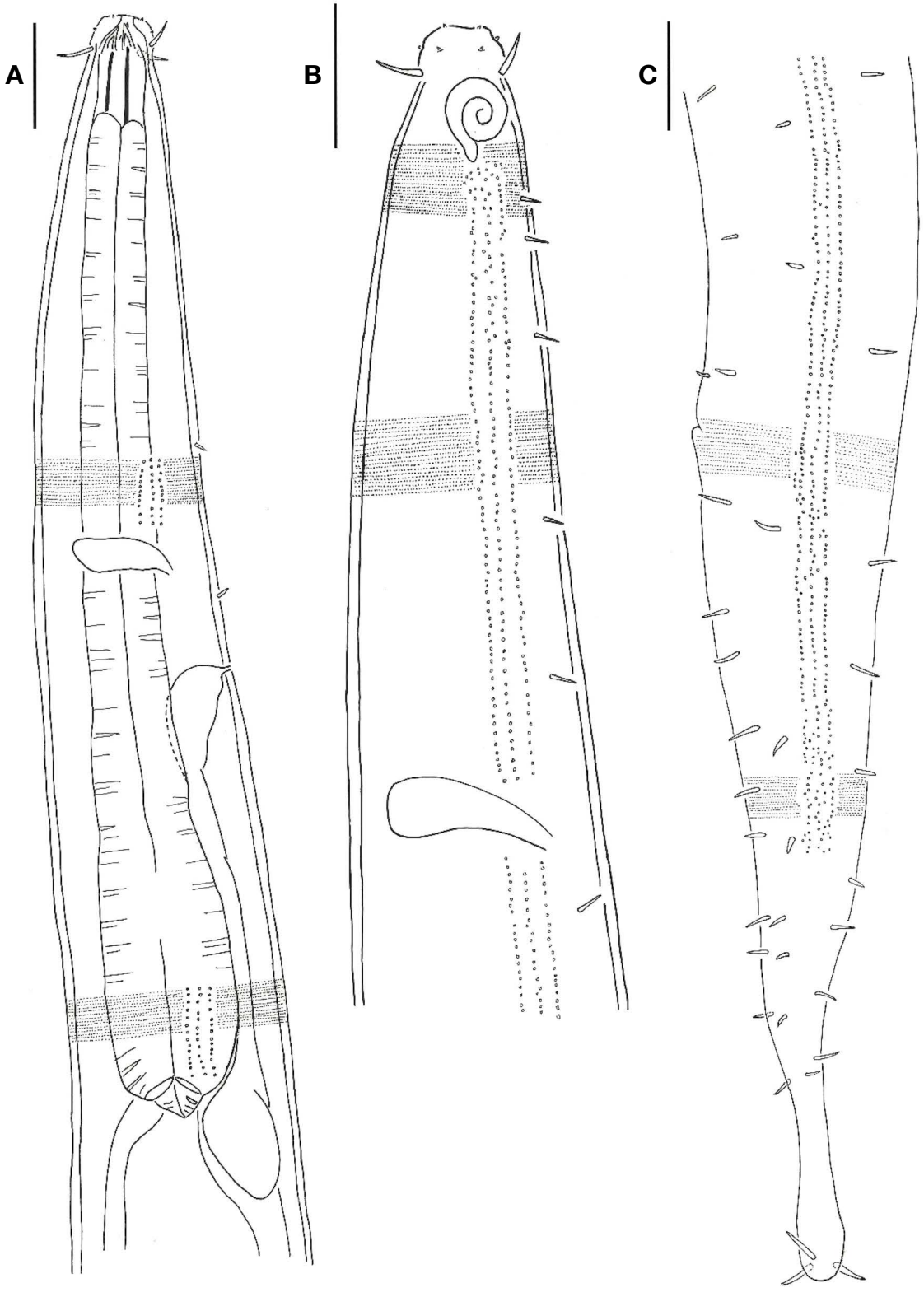

Fig. 1. *Dorylaimopsis variabilis* Muthumbi, Soetaert and Vincx, 1997 from East Sea, Korea, male 1: A. pharynx; B. head, showing amphideal fovea and cuticular ornamentation at head region; C. tail. Scale bars: 20 μm (A–C).

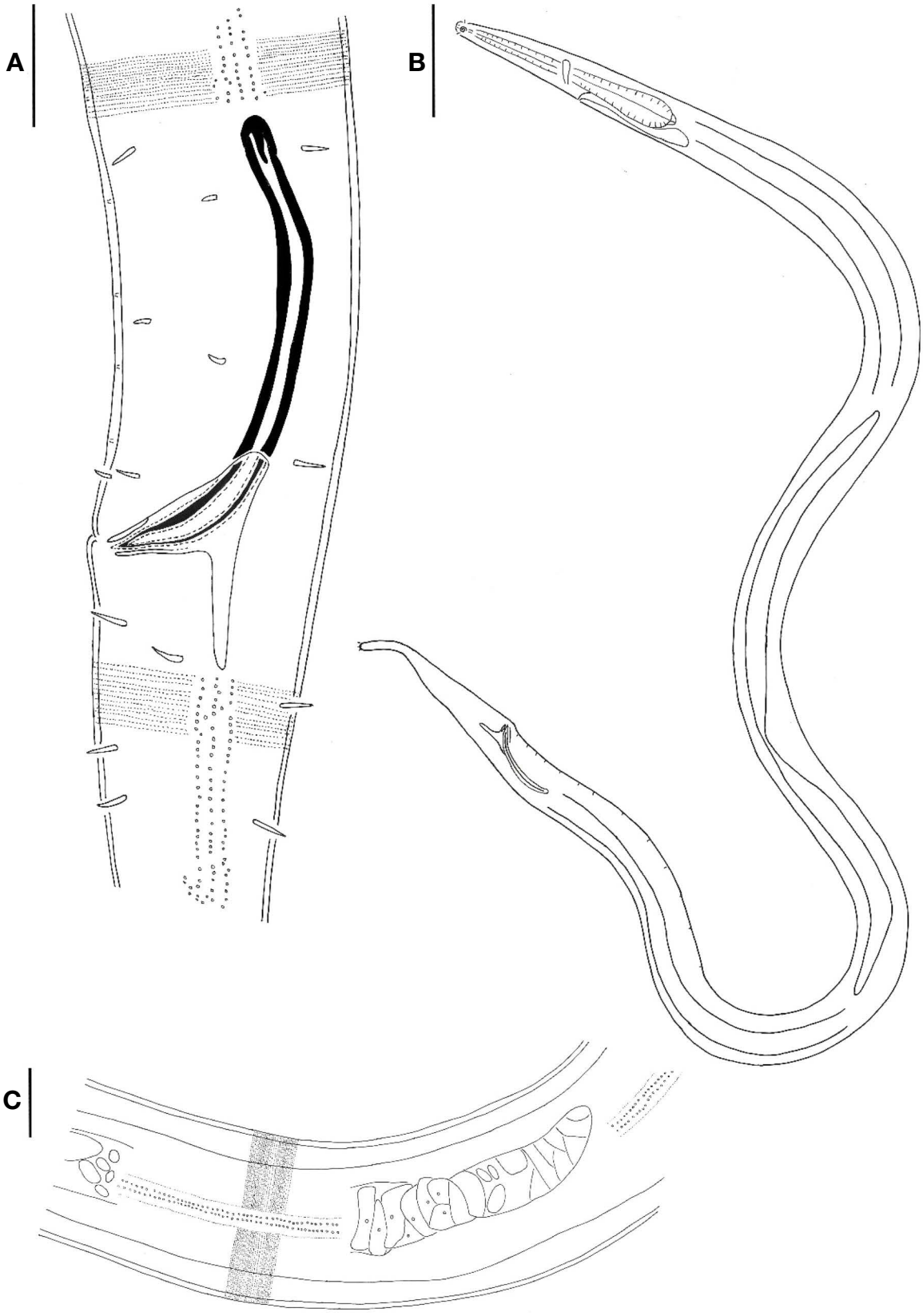

Fig. 2. *Dorylaimopsis variabilis* Muthumbi, Soetaert and Vincx, 1997 from East Sea, Korea, male 1: A. copulatory apparatus; B. habitus; C. midbody. Scale bars: 20 μm (A, C) and 100 μm (B).

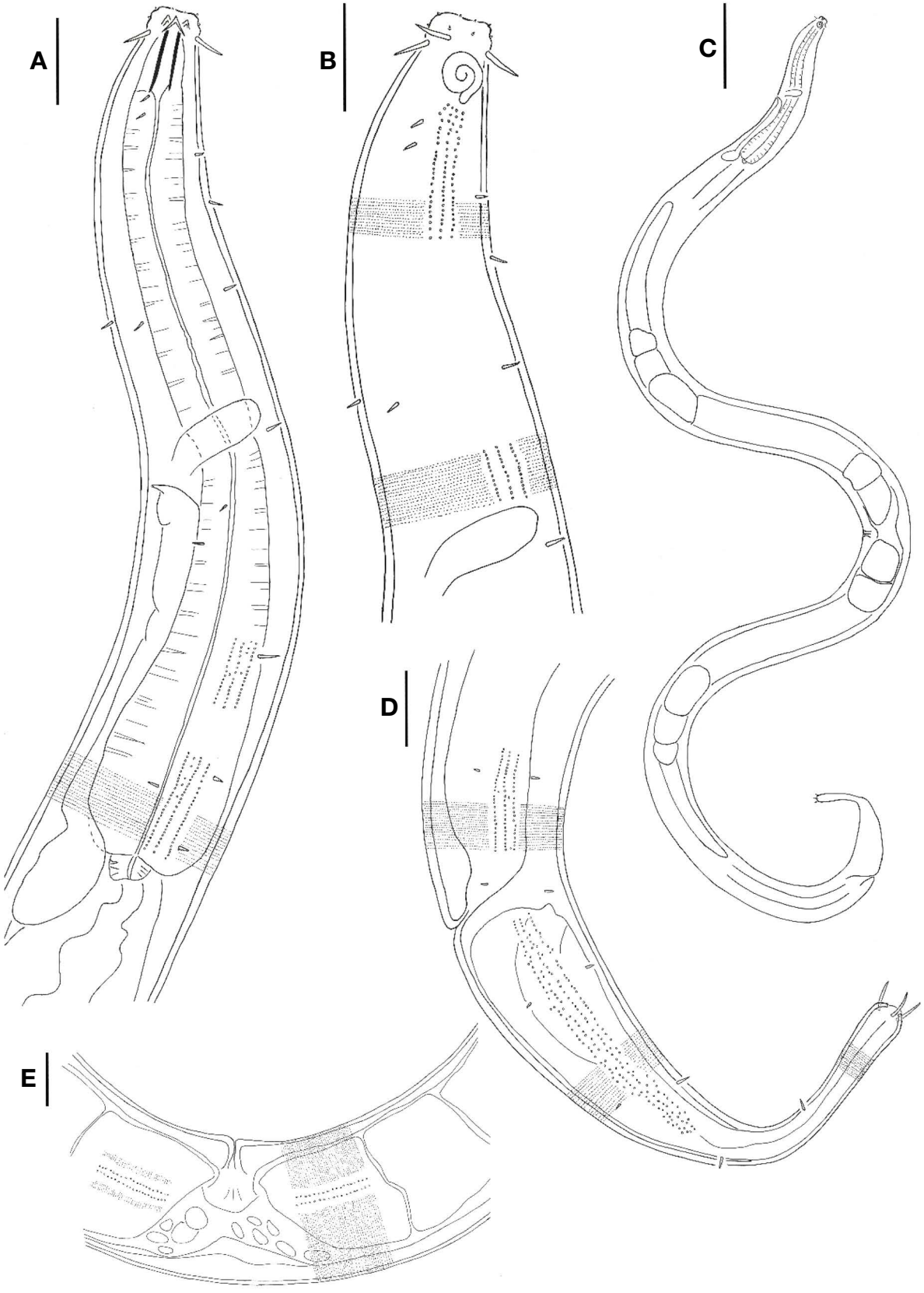

Fig. 3. *Dorylaimopsis variabilis* Muthumbi, Soetaert and Vincx, 1997 from East Sea, Korea, female 1: A. pharynx; B. head, showing amphideal fovea and cuticular ornamentation at head region; C. habitus; D. tail; E. midbody. Scale bars: 20 μm (A, B, D, E) and 100 μm (C).

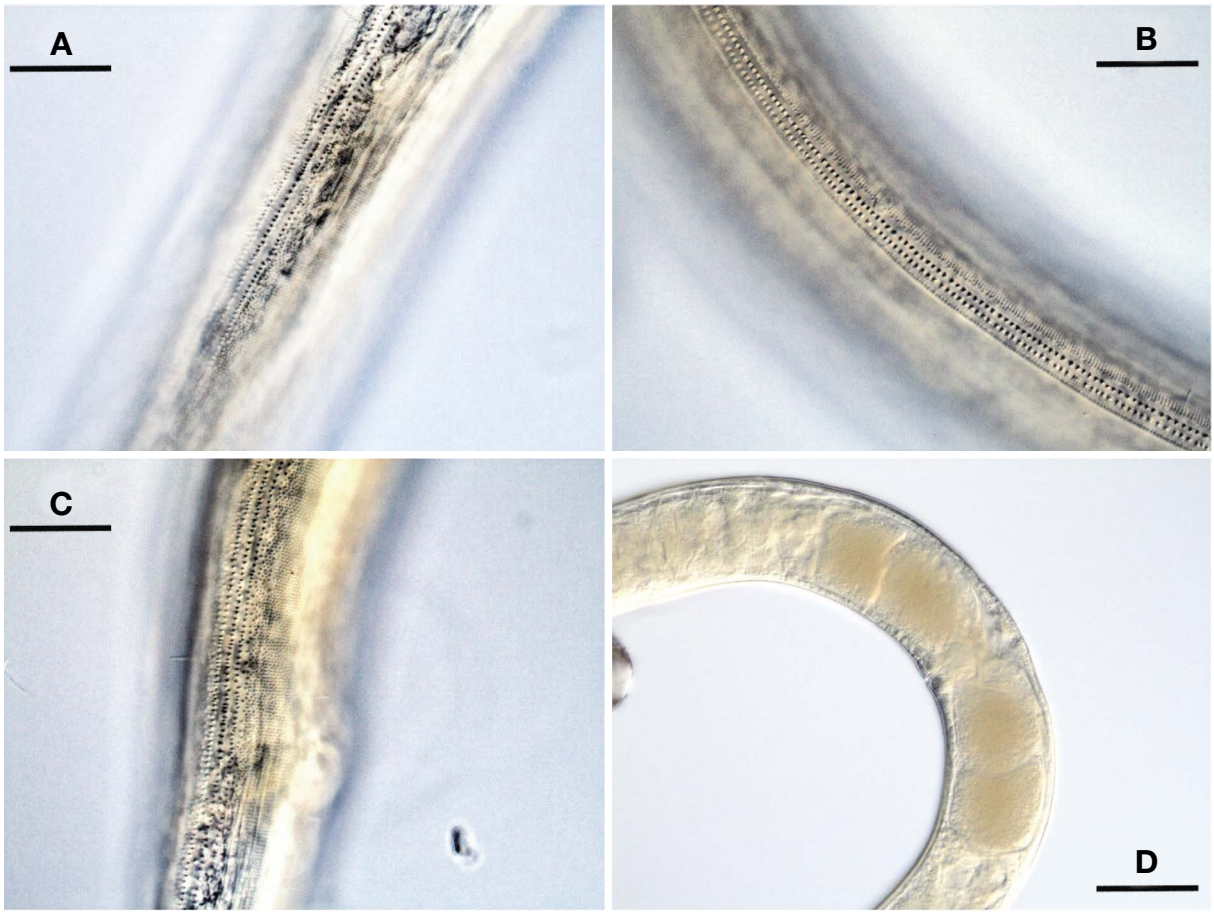

Fig. 4. *Dorylaimopsis variabilis* Muthumbi, Soetaert and Vincx, 1997 from East Sea, Korea. A. male pharynx, showing cuticular ornamentation at the base of pharynx, male 1; B. male midbody, showing cuticular ornamentation at midbody, male 1; C. male cloacal region, showing cuticular ornamentation at the cloaca, male 1; D. female vulva, female 1. Scale bars: 20 μm (A–C) and 50 μm (D).

three long terminal setae (about 7 μm long), three caudal glands, and prominent spinnerret. Other tail setae (about 3–5 μm) arranged in approximately eight dorso- and ventrolateral longitudinal rows.

Females (Figs. 3, 4, Table 1). Similar to male. Vulva at 47.3–56.1% of body of length. Didelphic, outstretched ovaries, anterior ovary (situated left mid-gut) 490–633 μm, posterior (situated right mid-gut) 543–604 μm long. Supplements absent.

Diagnosis. *Dorylaimopsis*. Body length 1745–1982 μm; a 31.7–38.9; b 8.1–9.5; c 11.2–14.2; c′ 3.7–4.6; s 2.3–2.4. Outer labial sensilla short setiform, cephalic setae 6.0–7.5 μm. Laterally modified punctuations three rows at pharynx (6–7 μm), two rows at midbody (6–7 μm), three rows at anus (8–9 μm). Spicules curved, with a capitulum, 86–91 μm long in arc. Gubernacular apophysis caudally, 13–22 μm long. Thirteen to fourteen minute precloacal supplements present. Tail conico-cylindrical, 140–158 μm long, cylindrical portion 20–32%.

Remarks. *Dorylaimopsis variablilis* is morphologically similar to *D. angelae*, *D. brevispicuia*, *D. gerardi*, *D. janetae*, *D. jinyuei*, *D. nini*, *D. papilla*, *D. poriferum*, *D. rabalaisi*, *D. timmi* and *D. turneri* in the shape of tail, spicule, gurbernaculums. However, there are differences in the pattern of lateral differentiation, body length, body ratio, cephalic setae length, amphidial fovea turns. The morphometry of *D. angelae*, *D. brevispicuia*, *D. gerardi*, *D. janetae*, *D. jinyuei*, *D. nini*, *D. papilla*, *D. poriferum*, *D. rabalaisi*, *D. timmi* and *D. turneri* are summarized in Table 2. *Dorylaimopsis intermedia*, *D. magellanense*, *D. mediterranea*, *D. nodderi*, *D. perfecta*, *D. punctata* and *D. tumida* can be distinguished from *D. variabilis* by spicule shape and (jointed or with a ventral apophysis in spicules *vs* simply curved spicule in *D. variabilis*). *Dorylaimopsis coomansi* is dissimilar to *D. variabilis* by having gubernacular apophysis without a blunt tip. *Dorylaimopsis longispicula* can be separated from *D. variabilis* by having much long spicules (179–196 μm *vs* 86–127 μm). *Dorylaimopsis boucheri*, *D. communis*, *D. halongensis*, *D. lutosa* and *D. peculiaris* can be dif-

Table 1. Measurements of *Dorylaimopsis variabilis* Muthumbi, Soetaert and Vincx, 1997 from East Sea, Korea. All measurements in μm unless otherwise stated, except ratio a, b, c, c′, s. n/a: not applicable, and the form: average ± standard deviation (measurement range).

Characters	♂ (n = 4) mean ± sd (range)	♀ (n = 3) mean ± sd (range)
L	1811 ± 89.4 (1745–1943)	1826 ± 134.8 (1746–1982)
mbd	50 ± 1.5 (49–52)	52 ± 2.6 (50–55)
hd	11.8 ± 0.3 (11.4–12.0)	11.2 ± 0.8 (10.5–12.1)
cep	6.9 ± 0.6 (6.0–7.5)	7.2 ± 0.3 (7.0–7.5)
CEPL	6.2 ± 0.6 (5.8–7.0)	4.5 ± 0.9 (3.5–5.0)
bcl	20 ± 0.9 (19–21)	18 ± 1.5 (17–20)
AL	6.2 ± 0.4 (5.8–6.6)	5.8 ± 0.5 (5.3–6.2)
amp	8.9 ± 0.1 (8.8–9.0)	7.3 ± 0.3 (7.1–7.7)
amp turns	2.50	2.50
amp cbd	14.8 ± 1.3 (14.0–16.7)	14.1 ± 1 (13.2– 15.2)
amp/amp cbd	60.6% ± 5.4% (52.7–64.3%)	52.0% ± 1.6% (50.7–53.8%)
LMP	32.5 ± 6.5 (24.0–38.0)	15.1 ± 1.4 (13.5–16.2)
LMPs	3	3
pLMP	1521 ± 110 (1425–1675)	1757 ± 132 (1678–1910)
NL	108 ± 7.7 (101–118)	100 ± 5.0 (95–105)
N cbd	35 ± 1 (34–36)	34 ± 2.6 (31–36)
N%	49.6% ± 2.4% (46.8%–52.2%)	50.5% ± 4.9% (47.3–56.1%)
EPL	126 ± 7.5 (116–134)	115 ± 1.5 (113–116)
PL	218 ± 7.5 (208–226)	199 ± 11.1 (187–209)
Pb	24 ± 1.3 (23–26)	30 ± 0 (30–30)
P cbd	44 ± 1.8 (42–46)	42 ± 3.1 (39–45)
car	9 ± 0.5 (8–9)	6 ± 0 (6–6)
VL	n/a	880 ± 63.5 (833–952)
V cbd	n/a	52 ± 2.6 (50–55)
V%	n/a	47.9% ± 0.9% (47.3%–48.9%)
ao	n/a	591 ± 88.4 (490–653)
po	n/a	572 ± 30.6 (543–604)
abd	38 ± 1.7 (36–40)	33 ± 1.5 (31–34)
spia	88 ± 2.1 (86–91)	n/a
s	2.4 ± 0.1 (2.3–2.4)	n/a
gub	18 ± 3.9 (13–22)	n/a
nps	13–14	n/a
dps	15 ± 1.0 (14–16)	n/a
das	249 ± 30.5 (218–279)	n/a
at	1220 ± 134 (1049–1368)	n/a
pt	443 ± 45.9 (394–492)	n/a
TL	150 ± 5.3 (146–158)	146 ± 6.7 (140–153)
c′	4.0 ± 0.3 (3.7–4.3)	4.4 ± 0.2 (4.2–4.6)
cylin	36 ± 4.5 (30–40)	43 ± 5.0 (38–48)
cylin%	24.1% ± 3.2% (20.3%–26.7%)	30.1% ± 2.6% (27.1%–31.9%)
ter	7 ± 1 (6–8)	6 ± 0.6 (6–7)
nrd in pharyngeal region	3	3
nrd in mid-body	2	2
nrd in anus region	3	3
wld at anus	9 ± 0.4 (8–9)	8 ± 0.3 (8–9)
wld at midbody	6 ± 0.3 (6–7)	7 ± 0.2 (6–7)
wld at base of pharynx	6 ± 0.3 (6–7)	6 ± 0.2 (6–6)
wld at vulva	n/a	7 ± 0.2 (6–7)
a	36.0 ± 1.3 (34.2–37.4)	35.2 ± 3.6 (31.7–38.9)
b	8.3 ± 0.2 (8.1–8.6)	9.2 ± 0.4 (8.7–9.5)
c	12.1 ± 0.8 (11.2–13.0)	12.6 ± 1.4 (11.4–14.2)

fered from *D. variabilis* by tail shape and length. *Dorylaimopsis poriferum* can be divided from *D. variabilis* by cuticle with two rows of coarse dots in males and three in female. The present population of *Dorylaimopsis variabilis* resembles that of Muthumbi, Soetaert and Vincx, 1997 from the Kenyan coast in the Indian Ocean in general characters. They slightly differ from by amphidial fovea turns (2.5 turns *vs* 2.75−3.00 turns), body length (1745−1943 μm *vs* 1119−2533 μm), body width (49−52 μm *vs* 35−87 μm) and the relative length of tail (c′: 3.7−4.3 *vs* 2.9−3.9). We consider such differences as intraspecific variation.

Pictorial key for valid species of *Dorylaimopsis* (Fig. 5, Table 2)

Pictorial keys were introduced to marine nematology by Platt (1984) and his coauthors. The keys consist of two components, a set of icons of taxa, and a table of main mensural and meristic characters. The species pictures are arranged in two principles, a sequence of complex structure in the spicules (in complex structure order: jointed spicule, spicule with ventral apophysis, spicule with a capitulum, spicule distally with subterminal hook and simply curved spicule) and a sequence of gradual increasing the number of lateral differentiation rows at mid body from top left to the bottom right corner of the page. Important characters to species identification are the length of cephalic setae and outer labial sensilla, the number of turns of amphidial fovea, the width of lateral differentiation of cuticle at mid body, the number of lateral differentiation rows at pharynx and anus region, spicule length, gubernaculum shape, the length of gubernacular apophysis and the number of precloacal supplements. Unfortunately, there are no tail figures in original descriptions of *D. mediterranea* and *D. poriferum*. In the original description of *D. mediterranea*, we can get

Table 2. Comparative data table of *Dorylaimopsis variabilis* and morphologically similar species in the genus *Dorylaimopsis*. All measurements in μm unless otherwise stated, except ratio a, b, c, c′, s. Data presented is measurement range unless n = 1. Unless otherwise stated, number of replicates indicates in brackets. [a]Inglis, 1967; [b]Gagarin, 2013; [c]Muthumbi *et al*., 1997; [d]Inglis, 1963; [e]Fu *et al*., 2018; [f]Guo *et al*., 2018; [g]Cobb, 1920; [h]Wieser and Hopper, 1967; [i]Zhang, 1992; [j]Gagarin and Nguyen, 2006. n/a: not applicable, n/f: not in figure, n/v: not visible.

Characters	*angelae*[a] ♂ (n = 2)	*brevispiculata*[b] ♂ (n = 10)	*gerardi*[c] ♂ (n = 2)	*jametae*[d] ♂ (n = 2)	*jinyuri*[e] ♂ (n = 5)	*nini*[a] ♂ (n = 1)	*papilla*[f] ♂ (n = 3)
L	1490−1520	1234−1620	1805−1957	4800−5600	2376−2499	1930	2019−2392
mbd	48−51	38−60	53−73	150−160	71−109	53	98−116
hd	12.0−13.0	10.0−11.0	16.0−18.0	23−24	15−16	10.0	16−17
ils	tiny	papillate	short setiform	papillate	papillate	papillate	papillate
ols	tiny	9.0 (1)	short setiform	papillate	papillate	papillate	papillate
cep	8.0−9.0	8.0−9.5	6.0−7.0	8.0−8.0	6.0−7.0	7.5	3.7−4.0
amp	8.0−9.0	7.5−9.0	9.0−12.0	12.0−13.0	7.0−12.0	7.0	10.0−11.0
amp turns	3.75	3.00	3.00	3.00	2.75	3.25	2.50
amp cbd	14.0−19.0	10.7−12.9	19.0−19.1	48 (1)	16.0−17.0	n/f	20.0−21.3
PL	200−210	191−209	243−248	470−490	292−332	204	235−268
Pb	n/f	33 (1)	32−42	n/f	60−93	n/f	61 (1)
abd	30−33	27−32	45−52	110−120	52−66	39	58−69
spia	88−89	59−68	85−89	220−220	127−151	82	101−107
s	2.7−2.9	2.1−2.2	1.7−1.9	1.8−2.0	1.9−2.5	2.1	1.5−1.8
gub	22−25	20−27	12−17	n/f	30−35	36	37−40
nps	n/f	n/a	13	n/f	15−20	n/a	16−18
TL	120−136	128−140	138.0 (1)	280−360	176−186	139	211−216
c′	4.0−4.1	3.6−4.3	2.7 (1)	2.5−3.0	13.0−14.0	3.5	3.1−3.7
nrd in pharyngeal region	4	3	3−4	5	4−7	4	4−5
nrd in mid-body	n/f	2	2	4	random	2	2
nrd in anus region	5	3	3	3	5−7	n/f	4~
a	29.2−31.7	25.0−37.0	26.8−34.1	30.0−37.3	22.0−34.0	36.4	21.0−22.0
b	7.3−7.5	6.4−8.0	7.4−7.9	10.2−11.4	7.0−8.0	9.5	8.0−10.0
c	11.2−11.4	10.5−13.6	12.8−14.2	15.6−17.1	13.0−14.0	13.9	8.0−11.0

Table 2. Continued.

Characters	*pellucidum*[g,h] ♂[l] (n = ?)	*pellucidum*[g,h] ♂[m] (n = ?)	*rabalaisi*[i] ♂ (n = 20)	*turneri*[i] ♂ (n = 10)	*timmi*[j] ♂ (n = 1)	*variabilis*[c] ♂[pop1] (n = 10)	*variabilis*[c] ♂[pop2] (n = 4)	Present study ♂ (n = 4)
L	2000	1770–2000	1418–1919	1328–1630	1870	1780–2533	1119–1271	1745–1943
mbd	74	73–75	48(1)	38(1)	57	60–87	35–48	49–52
hd	14.0	15.0	12.0–13.0	11.5–12.0	12.0	15.0–18.0	11.0–14.0	11.4–12.0
ils	papillate		papillate	papillate	papillate		short setiform	
ols	papillate		papillate	papillate	papillate		short setiform	
cep	13.0	12.0	7.0–10.0	6.0–10.0	10.0	6.0–9.0	5.0–6.0	6.0–7.5
amp	8.0	10.0	8.0–11.0	7.5–11.0	9.0	9.0–13.0	8.0–9.0	8.8–9.0
amp turns	2.50	2.50	2.5–2.75	2.5–2.75	2.50	3.00	2.75	2.50
amp cbd	15.0	n/f	14.0–19.0	13.9–14.2	14.0	19.0–22.0	12.0–14.0	14.0–16.7
PL	280	250	212 (1)	180 (1)	223	226–296	156–172	208–226
Pb	n/f	n/f	28 (1)	18 (1)	n/f	35–42	21–26	23–26
abd	56	45–50	39 (1)	30 (1)	42	45–65	31–37	36–40
spia	n/f	110	60–97	57–67	77	105–127	73–85	86–91
s	n/f	2.3	1.9–2.5	1.9–2.3	1.8	1.8–2.3	2.1–2.4	2.3–2.4
gub	n/f	30	24 (1)	22 (1)	25	23–38	15–23	13–22
nps	n/f	about 16	14–21	11–17	n/f	17–26	12–13	13–14
TL	180	200	143 (1)	114 (1)	193	148–214	107–115	146–158
c′	3.2	4.2	3.0–4.6	3.3–4.3	4.6	2.9–3.9	3.2–3.5	3.7–4.3
nrd in pharyngeal region	n/f	n/f	3	5	2	3		
nrd in mid-body	n/f	n/f	2	5	n/f	2		
nrd in anus region	n/f	n/f	4 (1)	6	3–4	3		
a	27.0	25.4	33.0–44.0	37.0–49.0	32.8	27.4–35.0	22.4–32.9	34.2–37.4
b	7.1	7.6	7.0–9.0	6.9–9.6	8.4	7.5–10.1	7.2–7.8	8.1–8.6
c	11.1	9.4	11.0–15.0	12.3–15.1	9.7	10.1–15.5	10.5–11.4	11.2–13.0

a detail spicule figure. In the case of *D. mediterranea*, the figure of spicule is substituted for the figure of tail in the pictorial key. However, we cannot get *D. poriferum* tail figure anywhere. Unavoidably, there is only *D. poriferum* head figure in the pictorial key. In the description of *D. poriferum*, tail of male specimen is conico-cylindrical shape. Tail cylindrical portion is 40%. Twelve precloacal supplements are presented. Spicules are distally acute.

Key to the genus *Dorylaimopsis* Ditlevsen, 1918

(amended from Jensen, 1979; Zhang, 1992, Leduc, 2012 and Fu *et al*., 2018)

1. Lateral differentiation of cuticle changes within one species, cuticle with four longitudinal rows of coarse dots in pharynx and mid body or entire body, or with irregularly distributed dots ····· *D. communis*
- Cuticle with longitudinal rows of dots in part or over entire body ····· 2
2. Cuticle with lateral longitudinal rows of coarse dots along part of body length ····· 3
- Cuticle with longitudinal rows of dots along entire length of body ····· 5
3. Lateral longitudinal rows of coarse dots present posterior to pharyngeal region only ····· 4
- Lateral longitudinal rows of coarse dots present in two regions, one is from posterior edge of amphid to anterior of intestine region, the other is tail region in males ····· *D. jinyuei*
4. Lateral differentiation of cuticle consisting of 1–3 longitudinal rows of dots beginning posterior to pharynx, gubernaculum with swollen distal end ····· ····· *D. coomansi*
- Lateral differentiation of cuticle consisting of 3–5 longitudinal rows of dots beginning posterior to pharynx, triangular gubernaculum tapering distally ····· ····· *D. turneri*
5. Cuticle laterally with two longitudinal rows of coarse dots in middle body region of both sexes ····· 6
- Cuticle laterally with more than two longitudinal rows of coarse dots in at least one of the sexes ····· 19
6. Lateral differentiation of cuticle narrower than 0.2

corresponding body diameter ····· 7
- Lateral differentiation wider than 0.2 corresponding body diameter ····· 11

7. Spicules with ventral projection····· *D. punctata*
- Spicules without ventral projection····· 8

8. Precloacal supplements absent····· 9
- Precloacal supplements present ····· 10

9. Long spicules (149–162 μm)····· *D. intermedia*
- Short spicules (59–68 μm)·····*D. brevispiculata*

10. Body length > 2.0 mm, spicules length > 100 μm ····· ····· *D. papilla*
- Body length < 2.0 mm, spicules length < 100 μm ····· ····· *D. rabalaisi*

11. Spicules jointed, with ventral projection, or simple····· ····· 12
- Spicules jointed and irregularly cuticularized····· ····· *D. mediterranea*

12. Spicules jointed, with two equal segments, precloacal supplements absent ····· *D. perfecta*
- Spicules jointed, precloacal supplements present····· ····· *D. tumida*
- Spicules otherwise ····· 13

13. Spicules without distal hooks or projections ····· 14
- Spicules with distal hooks or ventral projections····· 18

14. Gubernaculum with irregular base; gubernacular apophyses with blunt distal end ····· *D. nini*
- Gubernaculum with smooth base; gubernacular apophyses with pointed or rounded distal end ····· 15

15. Gubernaculum with pointed end····· 16
- Gubernaculum with rounded end····· 17

16. Spicules elongated, slightly arcuate at the border of spicules and gubernaculums ·····*D. longispicula*
- Spicules arcuate····· *D. peculiaris*

17. Male body length < 2100 μm, spicules with poorly developed capitulum, spicule length 1.7–1.9 cloacal body diameters ·····*D. gerardi*
- Male body length > 2100 μm, spicules with well-developed capitulum, spicule length 1.8–2.4 cloacal body diameters ····· *D. variabilis*

18. Spicules with small distal hook····· *D. pellucirum*
- Spicules with rounded ventral projection at one third of spicule length from distal end ····· *D. nodderi*

19. Cuticle with two rows of coarse dots in males and three in females ····· 20
- Cuticle with more than two rows of coarse dots in males····· 21

20. Spicules distally acute····· *D. poriferum*
- Spicules distally with a subterminal hook ····· *D. timmi*

21. Cuticle with three rows of coarse dots in middle body region of males ····· 22
- Cuticle with four or five rows of coarse dots in middle body region of males····· 24

22. Tail without swollen tip and terminal setae ····· 23
- Tail with swollen tip and terminal setae ·····*D. janetae*

23. Longer tail (369–380 μm), higher value of c′ (11–14) ····· *D. halongensis*
- Shorter tail (158–228 μm), lower value of c′ (5–7)···· ····· *D. boucheri*

24. Spicules without subterminal hook, short cephalic seta, long spicule·····*D. lutosa*
- Spicules without subterminal hook, long cephalic seta, short spicule ·····*D. angelae*
- Spicule with subterminal hook····· *D. magellanense*

Systematics

Family Comesomatidae Filipjev, 1918
Subfamily Sabatieriinae Filipjev, 1934

Genus *Setosabatieria* Platt, 1985

Diagnosis (emended from Platt, 1985; Riera *et al*., 2006; Leduc *et al*., 2012; Fonseca and Bezerra, 2014)

Sabatieriinae. Cuticle not punctuated. Anterior sensilla arranged in three circles. Cephalic setae longer than outer labial sensilla. Anterior portion of buccal cavity cup-shaped, without teeth, posterior collapsed. Two latero-dorsal and two latero-ventral longitudinal rows of cervical setae. Spicules bent, usually widened proximally, gubernacular apophysis directed dorso-caudally. Precloacal supplements usually present. Males with two opposed testes and females with two opposed and reflexed ovaries.

Type species: *Setosabatieria hilarula* de Man, 1922

List of valid species

The genus *Setosabatieria* was established by Platt (1985), including *S. hilarula* and *S. fibulata*. According to WoRMs (WoRMS Editorial Board, 2022) and NeMys (Bezerra *et al*., 2022), 11 *Setosabatieria* species have been described to date.

1. ***Setosabatieria australis*** **Leduc and Gwyther, 2008** (Ledec and Gwyther, 2008: 340–343, Fig. 1 a–e, 2 a–d, 3 f; Papanui Inlet, Otago Peninsula, southern New Zealand, fine sand).
2. ***Setosabatieria conicauda*** **Leduc, Probert and Nodder, 2012** (Leduc *et al*., 2012: 48–51, Fig. 5 a–e, 6 a–c; southern flank of Chatham Rise, New Zealand, 1240 m deep, slit and clay).
3. ***Setosabatieria coomansi*** **Huang and Zhang, 2006** (Huang and Zhang, 2006: 277–280, Fig. 6 a–e, 7 a–d; Yellow Sea, 41–68 m deep, silt and clay).
4. ***Setosabatieria fibulata*** **(Wieser, 1954)** [Wieser, 1954: 126, Fig. 162 a–c (=*Sabatieira fibulata*); Chilean Coast, 70–80 m deep, sublittoral soft bottom. Platt, 1985: 46, transfer *Sabatieira fibulata* to the genus *Setosabatieria*].

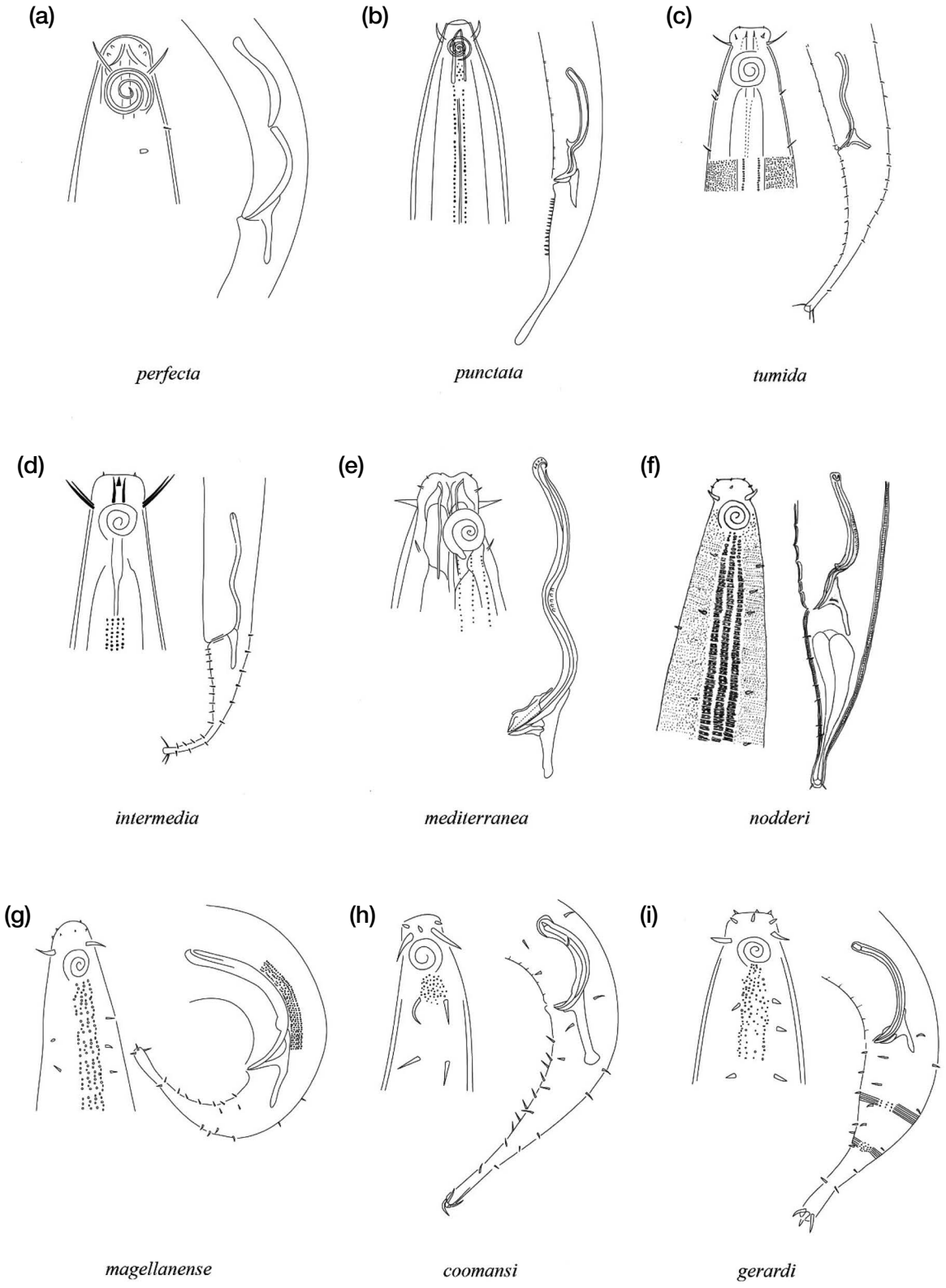

Fig. 5. Pictorial key for valid species of genus *Dorylaimopsis*. Figure source: (a) Cobb, 1920; (b) Ditlevsen, 1918; (c) Gagarin and V.T. Nguyen, 2006b; (d) Gagarin, 2013; (e) Grimaldi-De Zio, 1968; (f) Leduc, 2012; (g) Chen and Vincx, 1998; (h) Muthumbi *et al*., 1997; (i) Muthumbi *et al*., 1997; (j) Muthumbi *et al*., 1997; (k) Gagarin, 2013; (l) Fu *et al*., 2019; (m) Guo *et al*., 2018; (n) Timm, 1961; (o) Inglis, 1963; (p) D.T. Nguyen *et al*., 2008; (q) Cobb, 1920; (r) Zhang, 1992; (s) Inglis, 1961; (t) Inglis, 1967; (u) Cobb, 1920; (v) Platonova, 1971; (w) Zhang, 1992; (x) Fu *et al*., 2019; (y) Fu *et al*., 2019; (z) Gagarin, 2017; (aa) Gagarin and V.T. Nguyen, 2006a.

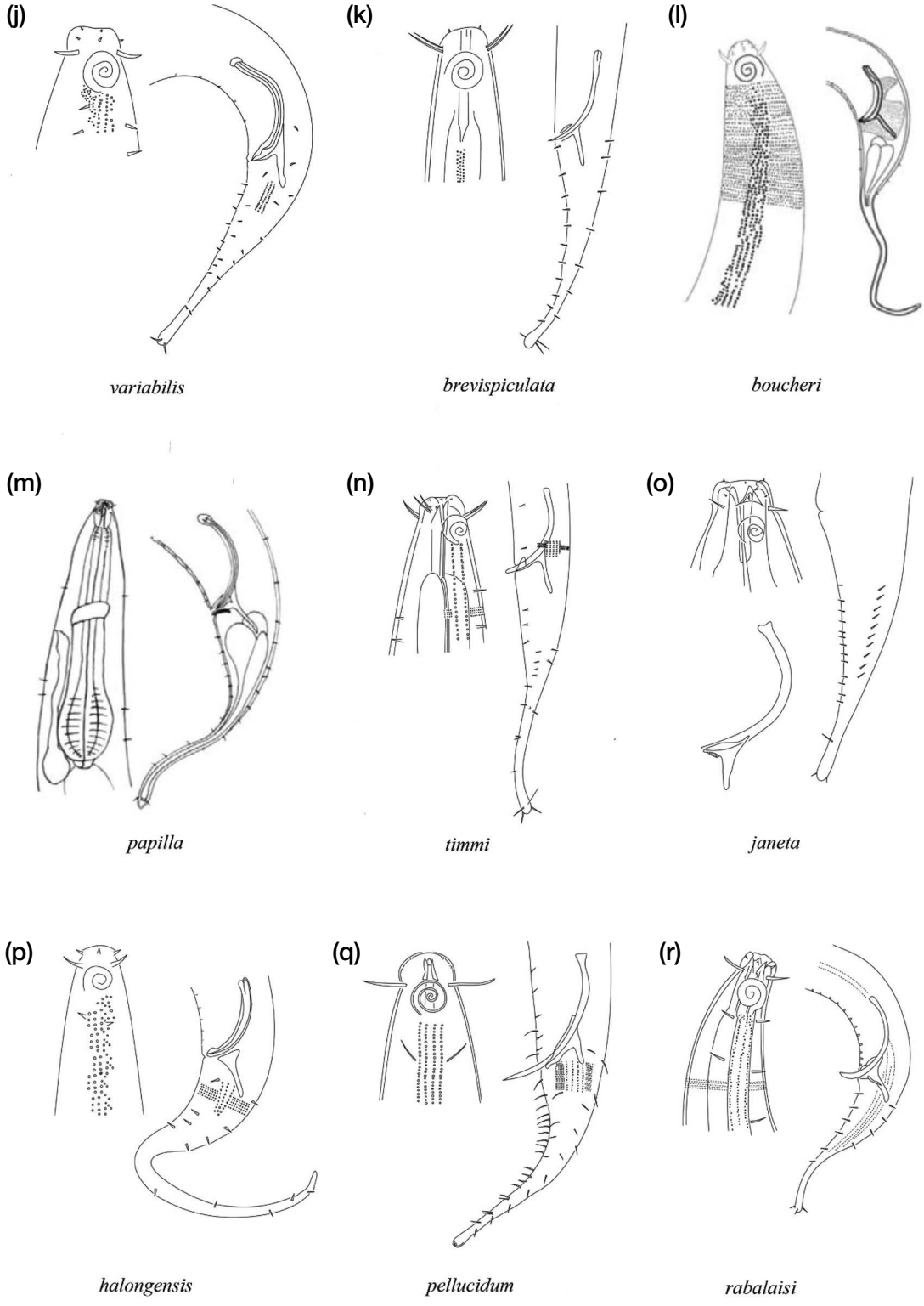

Fig. 5. Continued.

5. ***Setosabatieria hilarula* (De Man, 1922)** [(De Man, 1922: 236, Fig. 24 a–b (=*Sabatieria hilarula*); North Sea, no sampling data. Kreis, 1929: 86, Fig. 38 a–c (=*Sabatieria hilarula*); English Channel, no sampling data. Schuurmans Stekhoven, 1950: 151–152, Fig. 91 a–f (=*Sabatieria hilarula*); Ville-

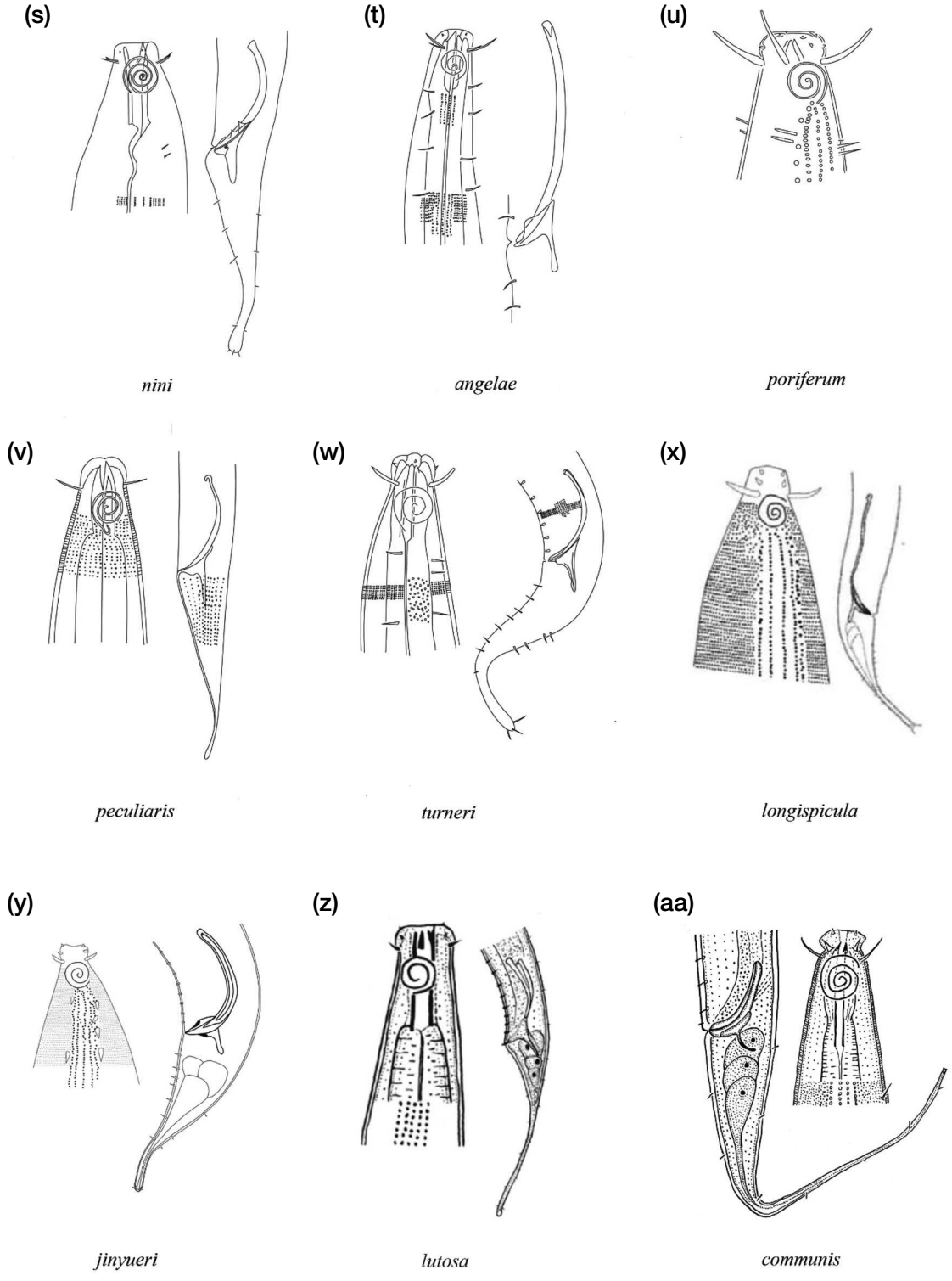

Fig. 5. Continued.

franche Bay, Mediterranean Sea, 50–230 m deep, gray mud. Wieser, 1954: 122, Fig. 163 a–d (= *Sabatieria chitwoodi*); Chile, sublittoral coarse and soft bottom. Wieser, 1954: 127, Fig. 164 a–c (= *Sabatieria jubata*); Chile, no sampling data. Inglis, 1961: 287–291, Fig. 5–9 (= *Sabatieria scotlandia*);

Table 3. Measurements of valid *Setosabatieria hilarula* de Man, 1922. All measurements in μm unless otherwise stated, except ratio a, b, c, c′. Data presented is measurement range, unless n = 1. Unless otherwise stated, number of replicates indicates in brackets. Literature source: [a]de Man, 1922; [b]Kreis, 1929; [c]Schuurmans Stekhoven, 1950; [d]Wieser, 1954; [e]Inglis, 1961; [f]Timm, 1961; [g]Vitiello, 1970; [h]Jensen, 1979. n/a: not applicable, n/f: not in figure, n/v: not visible.

Characters	*hilarula*[a,b,c,d,e,f,g,h]								
	♂[a] (n = 1)	♂[b] (n = 1)	♂[c] (n = 2)	♂[d(jubata)] (n = 1)	♂[d(chitwoodi)] (n = 1)	♂[e] (n = 4)	♂[f] (n = 1)	♂[g] (n = 2)	♂[h] (n = 5)
L	1812	1856	1440–1612	2340	1500	1700–2400	1140	1389–1433	1745–1830
mbd	49	49	44–44	87	46.0	60–82	34	48–57	52 (1)
hd	n/f	13	12–18	20	15.5	15–18	n/f	15–17	15 (1)
ils	papillate	papillate	papillate	papillate	papillate	papillate	papillate	papillate	papillate
ols	short setae	papillate	papillate	papillate	papillate	short setae	0.5	papillate	1.5–1.5
cep	n/f	13	9–14	18	23	14–17	12	13	14–15
AL	n/f	5	n/f	n/f	7	7 (1)	n/f	n/f	8 (1)
amp	n/f	10	9 (1)	n/f	13	10–11	n/f	10–12	10–11
amp turns	3.25	3.5–4.0	3.5	n/f	3.0	3.0–3.25	4.0	3.25	3.5–4.0
amp/amp cbd	70%	80%	73% (1)	n/f	70%	48–65%	60%	61–76%	60–65%
cer	n/f	8–13	n/f	n/f	18–20	14–19	n/f	10–13	9–12
NL	n/f	n/f	120–132	n/f	n/f	120–145	n/f	88–101	137 (1)
N cbd	n/f	26	n/f	n/f	n/f	n/f	n/f	n/f	48 (1)
EPL	n/f	n/f	n/f	n/f	n/f	141–150	n/f	n/f	n/f
PL	211	186	192–208	282	172	240–260	154	157–180	220 (1)
P cbd	n/f	44	36–40	43	39	n/f	n/f	40–43	49 (1)
car	n/f	13	n/f	n/f	n/f	n/f	n/f	n/f	n/f
VL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
V cbd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
V%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ao	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
po	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
abd	n/f	39	36–36	58	35	49–54 (3)	32	31–34	50 (1)
spia	n/f	70	n/f	84	48	67–81	48	56–58	81–100
s	n/f	1.8	n/f	1.5	1.3	1.4–1.5	1.5	1.5–1.7	1.4–1.4
gub	n/f	29	n/f	42	18	39–46	n/f	21–23	30 (1)
nps	n/f	n/f	11–12	n/v	n/v	n/f	n/v	n/a	14
dps	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/a	n/f
at	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f
pt	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f
TL	226	187	172–200	260	155	210–250	134	145–151	244 (1)
c′	n/f	4.8	4.8–5.6	4.5	4.4	4.5–4.6	4.2	4.3–4.8	4.3–5.0
cylin	n/f	80	n/f	106	39	70 (1)	n/f	n/f	120 (1)
cylin%	n/f	42.8%	n/f	41.0%	25.0%	33% (1)	n/f	50.0%	49.2% (1)
ter	n/f	n/f	n/f	14	n/v	4 (1)	n/f	12	17–19
a	37.0	37.5	32.7–36.5	27.0	32.5	26.5–33.3	33.4	25.1–28.9	35.0 (1)
b	8.6	10.0	6.9–8.4	8.3	8.7	7.1–9.6	7.4	7.9–8.8	8.3 (1)
c	8.0	9.9	8.0–8.4	9.0	9.7	8.1–9.6	8.5	9.6–9.8	7.5 (1)

west coast of Scotland, 12–15 m deep, holdfasts of *Laminaria saccharina*. Timm, 1961: 53, Fig. 37 a (= *Sabatieria hilarula*); Bay of Bengal, *Siphonocladus* community. Vitiello, 1970: 456–458, Fig. 5 a–d (= *Sabatieria hilarula*); Gulf of Lion, Mediterranean Sea, 310–650 m deep, mud. Jensen, 1979: 97–98, Fig. 7 a–h (= *Sabatieria hilarula*); Northern Øresund (Baltic Sea), Denmark, 27 m deep, fine sand,

Table 3. Continued.

Characters	*hilarula*[a,b,c,d,e,f,g,h]							
	♀[a] /	♀[b] /	♀[c] (n = 1)	♀[d(jubata)] (n = 1)	♀[d(chitwoodi)] (n = 1)	♀[e] (n = 4)	♀[f] (n = ?)	♀[g] (n = 1)	♀[h] (n = 7)
L			1580	2350	2150	2300–2500	1700–1780	1533	1915–2090
mbd			60	103	53	71–92	54–65	47	68 (1)
hd			16	20	15	16–18	13–15	14	16 (1)
ils			papillate	papillate	papillate	papillate	papillate	papillate	papillate
ols			papillate	papillate	papillate	short setae	0.5	papillate	n/f
cep			10	18	18	15–18	12	n/f	n/f
AL			n/f	n/f	7	n/f	6 (1)	n/f	8 (1)
amp			9 (1)	11.5	10.5	10–11	9 (1)	n/f	8–9
amp turns			3.5	3.0	2.75	3.0–3.25	4.0	n/f	3.0–3.25
amp/amp cbd			57%	50.0%	54%	50–56%	61% (1)	n/f	50–55%
cer			n/f	n/f	18–20	14–22	7–12 (1)	10–13	n/f
NL			n/f	n/f	n/f	133–152	n/f	n/f	160 (1)
N cbd			n/f	n/f	n/f	n/f	n/f	n/f	44 (1)
EPL			n/f	n/f	n/f	150–159	n/f	n/f	n/f
PL			220	261	222	280–290	170–193	199	265 (1)
P cbd			44	43	40	n/f	n/f	43	51 (1)
car			n/f	n/f	n/f	n/f	n/f	n/f	n/f
VL			720	n/v	1071	1080–1120	770–837	727	940 (1)
V cbd			60	n/v	53	71–92	n/f	47	68 (1)
V%			46%	n/v	50%	46–47%	45–47%	47%	43–46%
ao			n/f	n/v	n/f	n/f	n/f	n/f	n/f
po			n/f	n/v	n/f	n/f	n/f	n/f	n/f
abd			36	57	31	46–51	n/f	32	40 (1)
TL			160	228	172	250–310	172–181	145	255 (1)
c′			5.2	4.0	5.6	5.4–6.1	n/f	4.5	6.4 (1)
cylin			85	88	57	n/f	n/f	n/f	n/f
cylin%			53.0%	38.5%	33.0%	n/f	n/f	n/f	n/f
ter			n/f	13	8	n/f	n/f	n/f	n/f
a			26.3	22.8	40.3	26.4–32.5	26.2–33.0	32.5	31.0 (1)
b			7.2	9.0	9.7	7.9–8.9	8.8–10.0	7.7	7.9 (1)
c			9.9	10.3	12.5	8.1–9.2	9.8–10.3	10.5	8.2 (1)

Amphiura filiformis community. Platt, 1985: 44–46, Fig. 10 a–d, 11 a–d; west coast of Scotland, Tamar estuary, Southwest England, Northumberland Coast, Northwest England, Northern Øresund (Baltic Sea), Denmark, transfer *Sabatieria chitwoodi*, *Sabatieria jubata* and *Sabatieria scotlandia* to the genus *Setosabatieria*]. The morphometry of *S. hilarula* of De Man (1922), Kreis (1929), Schuurmans Stekhoven (1950), Wieser (1954), Inglis (1961), Timm (1961), Vitiello (1970) and Jensen (1979) are summarized in the Table 3.

6. ***Setosabatieria jingjingae*** **Guo and Warwick, 2001** (Guo and Warwick, 2001: 1576–1579, Fig. 1 a–f, 2 c; Bohai Sea, China, 20.5–38.5 m deep, silt and clay).
7. ***Setosabatieria longiapophysis*** **Guo *et al*., 2015** (Guo *et al*., 2015: 2022–2026, Fig. 1 a–d, 2 a–e; East China Sea, China, salinity 20.0–22.0 psu, sand).
8. ***Setosabatieria major*** **Guo *et al*., 2015** (Guo *et al*., 2015: 2026–2029, Fig. 3 a–e, 4 a–d; the Chukchi Sea (the Arctic Ocean), 52 m deep, salinity 32.13 psu, no sediment data).
9. ***Setosabatieria orientalis*** **Gagarin, 2013** (Gagarin, 2013: 550–555, Fig. 2 a–h, 3; South China Sea, littoral zone of the coast of Vietnam, 1–3 m deep, salinity 29.1–29.5 psu, no sediment data).
10. ***Setosabatieria singaporensis*** **Chen and Shabdin, 2014** (Chen and Shabdin, 2014: 2–6, Fig. 1 a–c, 2

Table 4. Measurements of *Setosabatieria hilarula* de Man, 1922 from East Sea, Korea. All measurements in μm unless otherwise stated, except ratio a, b, c, c′, s. n/a: not applicable, and the form: average ± standard deviation (measurement range).

	S. hilarula from East Sea, Korea	
Characters	♂ (n = 4) mean ± sd (range)	♀ (n = 3) mean ± sd (range)
L	2295 ± 186 (2068–2502)	2165 ± 329 (1888–2529)
mbd	66 ± 3.1 (61–68)	82 ± 6.4 (77–89)
hd	18.3 ± 1.1 (17.0–19.5)	17.7 ± 1.8 (15.9–19.5)
ils	papillate	papillate
ols	papillate	papillate
cep	12.7 ± 0.6 (12.0–13.2)	12.4 ± 1.0 (11.5–13.5)
AL	7.6 ± 0.7 (7.0–8.5)	6.1 ± 0.4 (5.7–6.5)
amp	12.3 ± 0.8 (11.3–13.3)	10.9 ± 0.5 (10.4–11.3)
amp turns	3.25–3.50	3.25–3.50
amp cbd	19.5 ± 1.7 (17.0–20.4)	19.9 ± 2.4 (17.7–22.5)
amp/amp cbd (%)	63.5% ± 10.1% (55.4–78.2%)	55.1% ± 5.8% (48.4–58.7%)
cer	10–16	7–12
NL	149 ± 7.5 (140–157)	131 ± 22.5 (106–150)
N cbd	50 ± 1.7 (48–52)	48 ± 1.5 (46–49)
N%	55.2% ± 1.2% (54.1–56.4%)	51.4% ± 5.9% (44.9–56.4%)
EPL	174 ± 14.2 (162–194)	157 ± 27.2 (128–182)
PL	269 ± 17.2 (248–290)	253 ± 25.8 (236–283)
P cbd	58 ± 1.5 (56–59)	61 ± 2.6 (58–63)
car	10 ± 2.2 (8–13)	9 ± 3.1 (6–12)
VL	n/a	1029 ± 133 (880–1138)
V cbd	n/a	82 ± 6.4 (77–89)
V%	n/a	47.7% ± 3.4% (44.9–51.5%)
ao	n/a	580 ± 106 (508–702)
po	n/a	523 ± 45.6 (470–549)
abd	52 ± 1.3 (50–53)	43 ± 8.3 (34–50)
spia	66 ± 6.8 (60–75)	n/a
s	1.3 ± 0.2 (1.2–1.5)	n/a
gub	21 ± 2.9 (19–25)	n/a
nps	16–18	n/a
dps	19 ± 3.3 (14–22)	n/a
at	1565 ± 124 (1398–1674)	n/a
pt	707 ± 218 (551–1030)	n/a
TL	279 ± 15.4 (262–297)	247 ± 54 (192–300)
c'	5.4 ± 0.2 (5.2–5.7)	5.7 ± 0.3 (5.4–6.0)
cylin	138 ± 13.1 (125–156)	135 ± 34.1 (102–170)
cylin%	49.3% ± 3.1% (48.9–52.5%)	54.2% ± 2.1% (53.0–56.6%)
ter	13 ± 4.7 (9–18)	10 ± 2.6 (8–13)
a	35.2 ± 4.2 (31.3–41.0)	26.4 ± 2.3 (23.9–28.4)
b	8.5 ± 0.6 (8.2–9.4)	8.5 ± 0.6 (7.8–8.9)
c	8.2 ± 0.6 (7.5–8.7)	8.8 ± 0.8 (8.3–9.8)

a–c, 3 a–c, 4 i; Chek Jawa, Singapore, intertidal seagrass area, sandy mud).

11. ***Setosabatieria triangularis*** **Riera, Núñez and Del Carmen Brito, 2006** (Riera *et al*., 2006: 58–60, Fig. 3 a–b; Los Cristianos beach, Tenerife, Canary Islands, Spain, fine sand).

Setosabatieria hilarula **de Man, 1922 (Figs. 6–8, Table 4)**

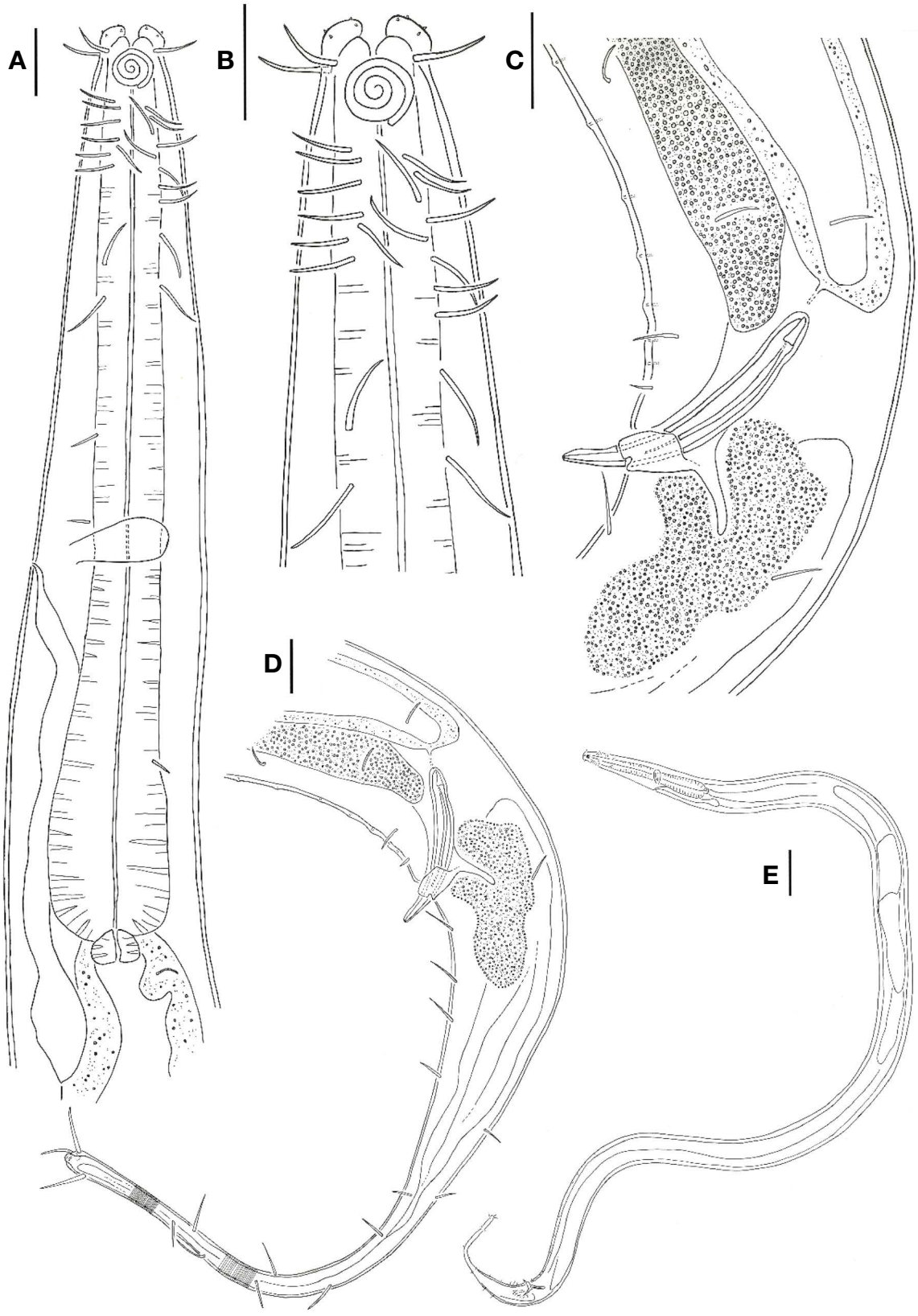

Fig. 6. *Setosabatieria hilarula* de Man, 1922 from East Sea, Korea, male 1: A. pharynx; B. head; C. precloacal and anal region; D. tail; E. habitus. Scale bars: 20 μm (A–D) and 100 μm (E).

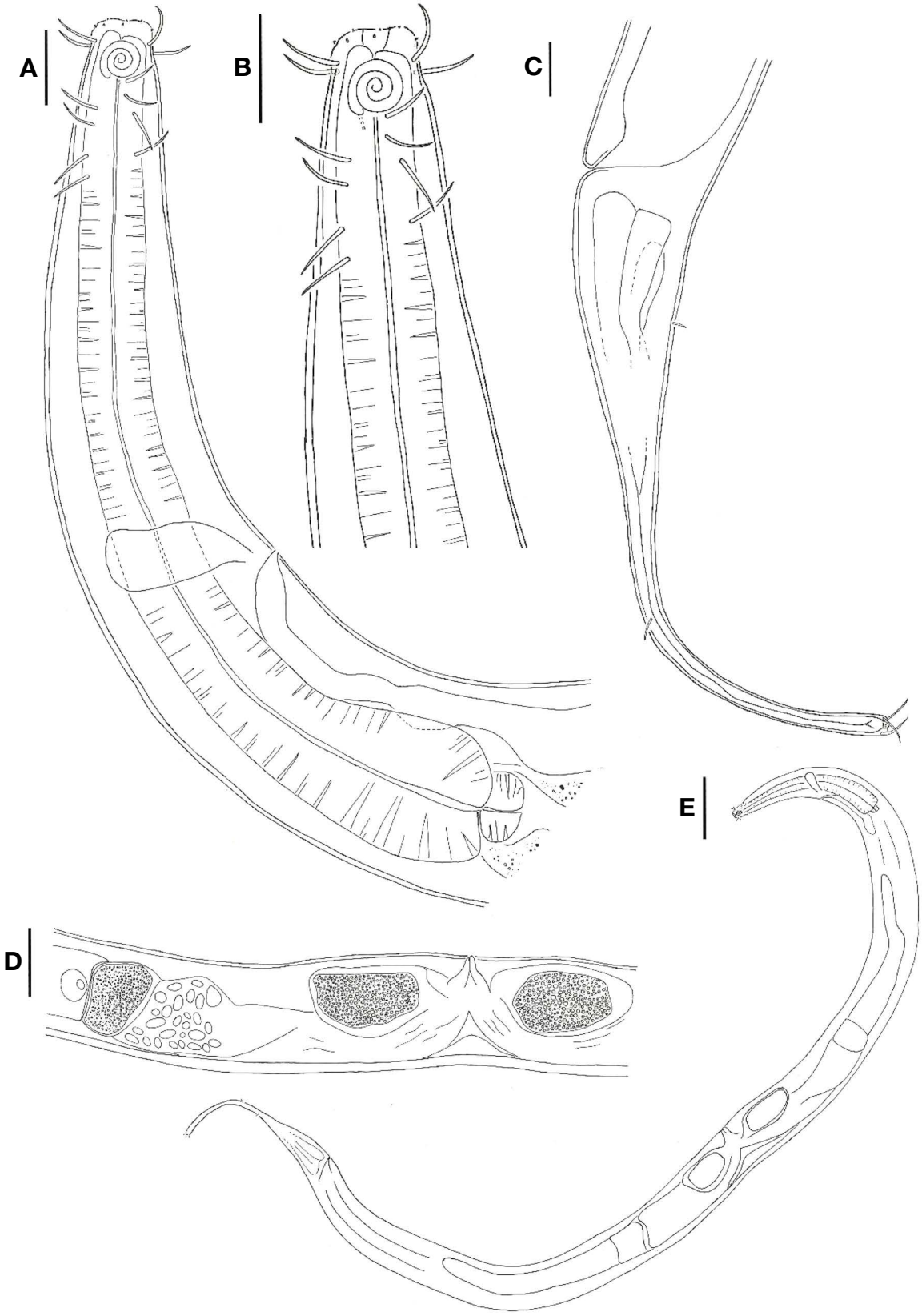

Fig. 7. *Setosabatieria hilarula* de Man, 1922 from East Sea, Korea, female 1: A. pharynx; B. head; C. tail; D. vulva; E. habitus. Scale bars: 20 μm (A–C), 50 μm (D) and 100 μm (E).

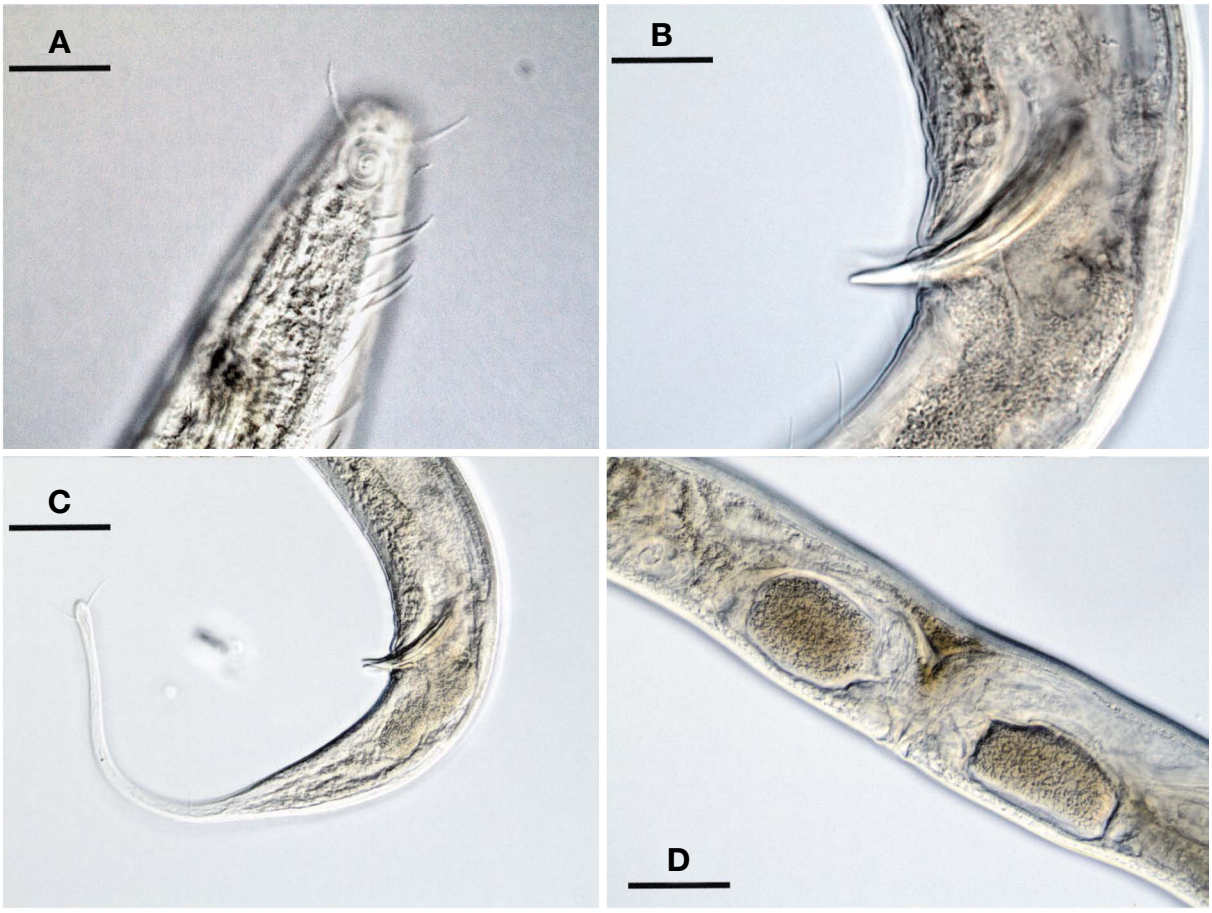

Fig. 8. *Setosabatieria hilarula* de Man, 1922 from East Sea, Korea: A. male head, paratype; B. male copulatory apparatus, paratype; C. male tail, paratype; D. female vulva, paratype. Scale bars: 20 μm (A, B) and 50 μm (C, D).

Locality. The coast of Sokcho: sub-tidal northern part of East Sea, Korea (38°12′42″N, 128°37′39″E, at a depth of 35 m, in the slightly gravelly sandy mud.
Material. Four males (NIBRIV0000900847–NIBRIV 0000900850) and three females (NIBRIV0000900853, NIBRIV0000900855, NIBRIV0000900856) were collected by Sangjin Kim along the Sokcho coast on 12th September 2012, from Research Vessel Hansudan 1.
Measurements. See Table 4 for detailed measurements and morphometric ratios.
Description. Male (Figs. 6, 8, Table 4). Body cylindrical, slender, gradually tapering toward both extremities. Cuticle thin, with faint, relatively fine cross striations throughout body. Punctuation in cuticle not visible. Tail conico-cylindrical.

Anterior sensilla in three separate crowns, six inner and outer labial sensilla small, with papillae form. Four cephalic setae of nearly equal length, 12.0–13.2 μm long. Cephalic setae located 0.4 head diameter from anterior end. Cervical setae 10–16 μm long, arranged in two latero-dorsal and two latero-ventral longitudinal files of six to thirteen setae and situated at 18–80 μm from anterior body end. Amphidial fovea large, circular multispiral. Fovea coiled ventrally, in about 3.25–3.50 turns.

Buccal cavity very tiny, cup-shaped, its walls not sclerotized and not differentiated, teeth not observed. Pharynx long (248–290 μm) and slender, cylindrical. Nerve ring located at 140–157 μm (54.1–56.4%) of pharyngeal length from anterior end. Ventral gland pore just posterior nerve ring, situated at 162–194 μm of pharyngeal length from anterior end. Cardia round, small (8–13 μm), surrounded with intestinal tissue. Ventral gland cell body placed posterior of cardia.

Reproductive system diorchic, testes outstretched, anterior testis (situated right mid-gut) located 1398–1674 μm and posterior testis (situated left mid-gut) located 551–1030 μm from the cloaca. Spicules paired, equal and arcuate, 60–75 μm long as arc (1.2–1.5 abd). Gubernaculum sclerotized pieces, proximal portion slightly bent, bearing dorso-caudal apophysis (19–25 μm), surrounding spicules. Sixteen to eighteen minute mid-ven-

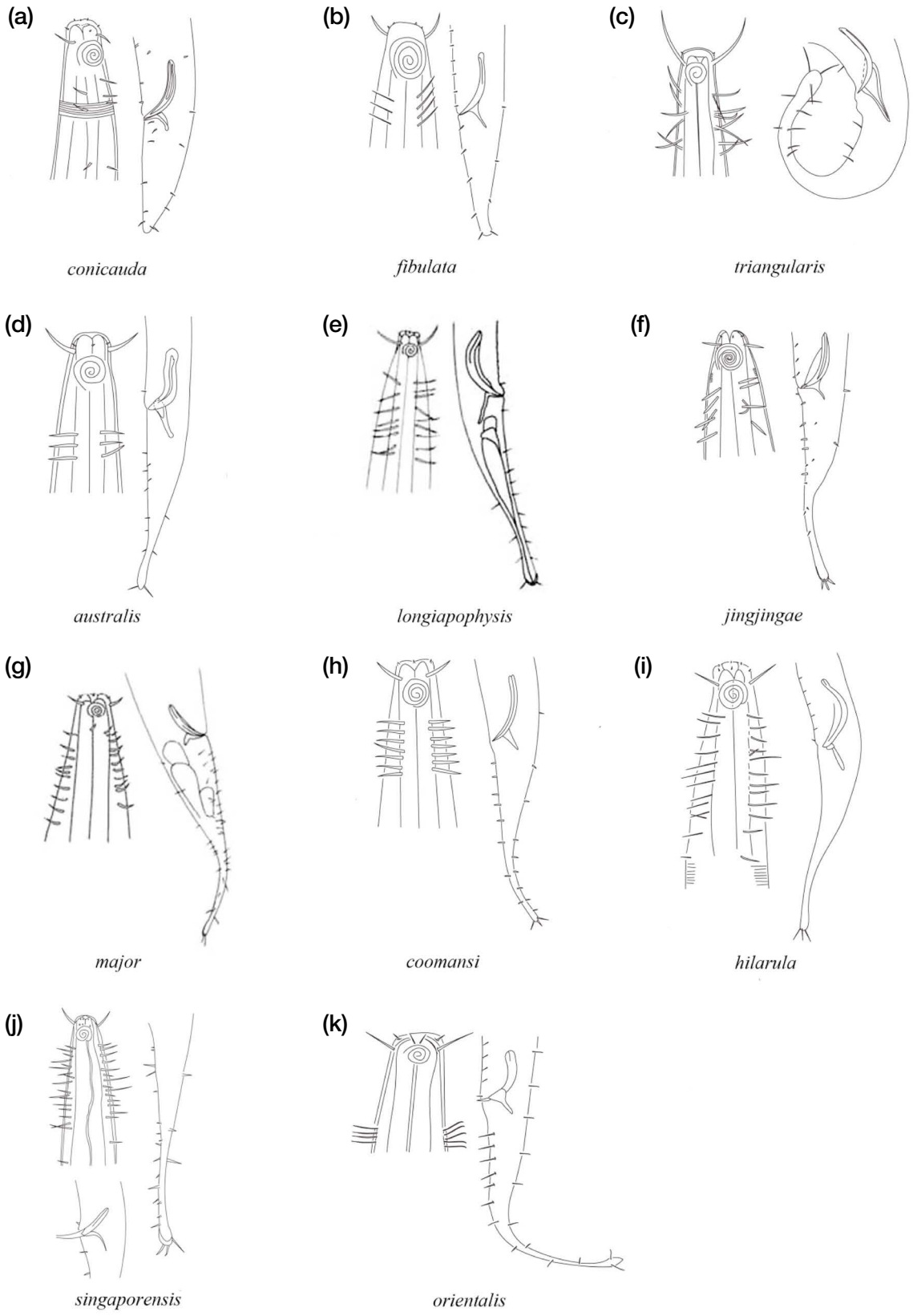

Fig. 9. Pictorial key for valid species of genus *Setosabatieria*. Figure source: (a) Leduc *et al*., 2012; (b) Wieser, 1954; (c) Riera *et al*., 2006; (d) Leduc and Gwyther, 2008; (e) Guo *et al*., 2015; (f) Guo and Warwick, 2001; (g) Guo *et al*., 2015; (h) Huang and Zhang, 2006; (i) Platt, 1985 (head and tail), Platt and Warwick, 1988 (spicule); (j) Chen and Shabdin, 2014; (k) Gagarin, 2013.

tral supplementary papillae observed in precloacal region, several copulatory muscles located in pre-cloacal supplement region. First precloacal supplement situated about 14−22 μm from anus and most anterior precloacal supplement located about 190−353 μm from anus. Tail consisted proximal conical and distal cylindrical part (125−156 μm). Tail 5.2−5.7 abd long with three long terminal setae (about 9−18 μm long), three caudal glands, and prominent spinnerret. Other tail setae (about 8−15 μm) arranged in approximately four dorso- and ventrolateral longitudinal rows.

Females (Figs. 7, 8, Table 4). Similar to male, except body larger than male (females maximum body diameter average 82 μm wide). Vulva at 44.9−51.5% of body of length. Didelphic, outstretched ovaries, anterior ovary (situated left mid-gut) 508−702 μm, posterior (situated right mid-gut) 470−549 μm long. Supplements absent.

Diagnosis. *Setosabatieria*. Body length 1888−2529 μm;

Table 5. Comparative data table of the measurements for published species of *Setosabatieria*. All measurements in μm unless otherwise stated, except ratio a, b, c, c′, s. Data presented is measurement range unless n = 1. Unless otherwise stated, number of replicates indicates in brackets. Literature sources: [a]Leduc and Gwyther, 2008; [b]Leduc *et al*., 2012; [c]Huang and Zhang, 2006; [d]Wieser, 1954; [e]de Man, 1922; [f]Kreis, 1929; [g]Schuurmans Stekhoven, 1950; [h]Inglis, 1961; [i]Timm, 1961; [j]Vitiello, 1970; [k]Jensen, 1979; [l]Guo and Warwick, 2001; [m,n]Guo *et al*., 2015; [o]Gagarin, 1920; [p]Chen and Shabdin, 2014; [q]Riera *et al*., 2006. n/a: not applicable; n/f: not in figure.

Characters	*austalis*[a] ♂ (n = 4)	*conicauda*[b] ♂ (n = 5)	*coomansi*[c] ♂ (n = 5)	*fibulata*[d] ♂ (n = 1)	*hilarula*[d,e,f,g,h,i,j,k] ♂ Sum
L	1231−1321	1094−1640	1601−1954	1400	1140−2400
mbd	35−39	40−52	42−70	42	34−82
hd	10−12	16−17	15−21	14	12−20
ils	papillate	papillate	papillate	papillate	papillate
ols	short setae	papillate	papillate	papillate	papillate or short setae
cep	10−11	6−8	10−16	11	9−23
AL	5−6	6−8	11 (1)	4	5−8
amp	7−9	11−12	12−13	13	9−13
amp turns	3.5	4.25−4.5	3.5	4.25	3.0−4.0
amp/amp cbd	67−84%	65−75%	59−71%	90%	48−80%
cer	8−10	5−7	7−11	12	8−20
NL	n/f	96−114	121−140	n/f	88−137
N cbd	n/f	34−38	37−53	n/f	26−48
EPL	n/f	126−133	n/f	n/f	141−150
PL	183−189	166−190	218−254	189	154−260
P cbd	30−34	36−43	43−60	n/f	36−49
abd	29−33	33−39	38−50	33	31−58
spia	45−51	51−59	49−86	59	48−100
s	1.5−1.6	1.5−1.5	1.3−1.7	1.7	1.4−1.8
gub	19−33	11−13	17−21	20	21−46
nps	7−9	7−9	15	17	11−16
dps	55 (1)	27 (1)	30.0	21.0	n/f
at	n/f	n/f	n/f	n/f	n/f
pt	n/f	n/f	n/f	n/f	n/f
TL	140−157	61−93	153−200	107	134−250
c′	4.5−5.2	1.8−2.4	3.9−4.4	3.2	4.2−5.6
cylin	36 (1)	0	96	16	39−106
cylin%	24.0%	0.0%	48.0%	14.9%	25−50%
ter	7−10	6 (1)	11−14	9	4−19
a	33.3−35.3	25.0−30.0	31.5−36.7	33.5	25.1−37.5
b	6.5−7.1	6.0−8.0	7.0−8.5	7.4	6.9−10.0
c	7.8−8.9	15.0−18.0	9.6−11.1	13.1	7.5−9.9

Table 5. Continued.

Characters	*jingjingae*[l] ♂ (n = 4)	*longspophysis*[m] ♂ (n = 5)	*major*[n] ♂ (n = 5)	*orientalis*[o] ♂ (n = 6)	*singaporensis*[p] ♂ (n = 3)	*triangularis*[q] ♂ (n = 2)
L	1370–1620	2380–2800	3700–3130	1238–1545	1720–1857	1700–2371
mbd	40–56	42–54	106–168	40–47	53–58	54–54
hd	11–13	15–17	19–24	10–11	14–16	17–19
ils	papillate	papillate	papillate	papillate	papillate	papillate
ols	1.5–2	2–2	1.5–2	1.5–1.5	papillate	2–2
cep	8–10	17–19	9–11	9–10	16–17	20–27
AL	4–6	10 (1)	7 (1)	n/f	4 (1)	10–16
amp	8–11 (3)	10–11	20–26	8–11	10–11	11–13
amp turns	3.5	2.75–3.0	3.25–3.75	2.5–3.0	2.75–3.0	2.5
amp/amp cbd	62–73% (3)	59–69%	50–57%	50–55%	62–70%	68% (1)
cer	11–13	15–17	8–10	4–6	11–16	13–16
NL	100 (1)	161–169	154–206	n/f	n/f	n/f
N cbd	38 (1)	35–38	61–96	n/f	n/f	n/f
EPL	113 (1)	178 (1)	200 (1)	n/f	n/f	n/f
PL	175–190	252–270	282–366	158–185	181–207	154–211
P cbd	34–60	40–43	74–117	n/f	22–31	32–39
abd	29–38	38–40	64–82	22–26	36–40	32–32
spia	43–52	77–80	73–87	46–50	54–60	39–54
s	1.4–1.5	1.9–2.1	0.9–1.3	1.8–2.0	1.5–1.5	1.2–1.7
gub	12–14	31–37	17–23	18–21	13–25	34–36
nps	9	15–16	26–28	15–19	17–20	15
dps	10	18 (1)	n/f	n/f	n/f	21
at	n/f	n/f	n/f	n/f	n/f	n/f
pt	n/f	n/f	n/f	n/f	n/f	n/f
TL	120–155	206–227	241–325	128–140	172–212	164–171
c'	3.6–4.1	5.3–6.0	3.8–4.5	5.1–6.0	4.8–5.9	5.2–5.3
cylin	50 (1)	47 (1)	140 (1)	n/f	n/f	n/f
cylin%	32.3%	22.8%	43.0%	41.2–47.4%	n/f	n/f
ter	11–13	12–12	15–15	5–7	9–11	17
a	28.9–34.3	44.9–57.9	18.6–25.4	26.0–39.0	31.5–33.2	31.7–44.2
b	7.6–9.3	9.2–10.7	8.6–9.6	6.9–9.8	8.3–9.7	8.1–15.4
c	10.2–11.7	10.7–12.6	9.4–11.2	9.2–11.8	8.5–10.0	9.9–14.4

a 23.9–41.0; b 7.8–9.4; c 7.5–9.8; c′ 5.2–6.0. Cephalic setae 11.5–13.5 µm. Cervical setae 10–16 µm long, 6–13 setae per files. Spicules curved, 60–75 µm long in arc. Thin gubernacular apophysis dorso-caudally, 19–25 µm long. Sixteen to eighteen minute precloacal supplements present. Tail conico-cylindrical, 192–300 µm long, cylindrical portion 49–57%.

Remarks. *Setosabatieria hilarula* can be separated from *S. conicaudata* by its conico-cylindrical tail shape. *Setosabatieria australis* differs from *S. hilarula* by spicule shape (L-shaped *vs* curved). *Setosabatieria hilarula* can be distinguished from *S. coomansi*, *S. fibulata*, *S. jingjingae*, *S. major*, *S. orientalis* and *S. triangularis* by the presence leaf-like extensions of the cuticle lateral to cloaca. *Setosabatieria singaporensis* is dissimilar to *S. hilarula* by the shape of gubernacular apophysis (respectively, bent in the proximal portion *vs* long and thin *vs* short). *Setosabatieria longiapophysis* can be differentiated from most other species of the genus by having spicules with long straight apophysis.

The present population of *Setosabatieria hilarula* resembles that of de Man, 1922 in general characters. They slightly differ from by the number of precloacal supplements (16–18 *vs* 11–16), the relative length of tail

Table 5. Continued.

Characters	*austalis*[a] ♀ (n = 4)	*conicauda*[b] ♀ (n = 5)	*coomansi*[c] ♀ (n = 2)	*fibulata*[d] ♀ (n = 3)	*hilarula*[d e,f,g,h,i,j,k] ♀ Sum
L	1173–1400	1360–1807	1580–1983	1520–1640	1533–2500
mbd	38–46	54–78	50–54	50–61	47–103
hd	10–10	17–19	16–17	14–15	14–20
ils	papillate	papillate	papillate	papillate	papillate
ols	short setae	papillate	papillate	papillate	papillate or short setae
cep	9–11	6–8	11–13	9–9	10–18
AL	5–5	8–9	n/f	4 (1)	7–8
amp	5–6	11–11	11–11	10–10	8–11
amp turns	3.0–3.25	4.25–4.5	3.5	3.75	2.75–4.0
amp/amp cbd	42–56%	55–58%	61–69%	50–50%	50–61%
cer	n/f	n/f	7–11	10–12	7–22
NL	n/f	110–116	119–121	n/f	133–160
N cbd	n/f	35–39	38–41	n/f	44
EPL	n/f	130–134	n/f	n/f	150–159
PL	171–191	183–219	223–235	208–231	170–290
P cbd	32–35	43–52	42–50	n/f	40–51
VL	557–674	675–830	780–930	815–859	727–1120
V cbd	45–48	54–77	50–54	n/f	47–92
V%	47–48%	44–50%	47–49%	50–56%	43–50%
ao	n/f	n/f	n/f	n/f	n/f
po	n/f	n/f	n/f	n/f	n/f
abd	24–28	35–48	38–40	32–35	31–57
TL	119–135	69–90	178–193	95–114	145–310
c′	4.6–5.2	1.9–2.0	4.6–4.8	3.0–3.3	4.0–6.4
cylin	n/f	0	74	n/f	57–88
cylin%	n/f	0.0%	38.3%	n/f	33–53%
ter	n/f	5 (1)	11–14	n/f	8–13
a	27.9–34.7	23.0–28.0	35.9–36.7	26.7–32.5	22.8–40.3
b	6.7–7.3	7.0–10.0	7.1–8.4	7.1–7.3	7.2–10.0
c	9.9–10.7	16.0–19.0	8.9–10.3	13.3–17.2	8.1–12.5

(c′: 5.2–6.0 *vs* 4.2–5.6) and the posterior portion of tail (49–57% *vs* 25–50%). We consider such differences as intraspecific variation.

Pictorial key for valid species of *Setosabatieria* (Fig. 9, Table 5)

The species pictures are arranged in a sequence of gradual increasing length of the tail and the cylindrical portion of tail from top left to the bottom right corner of the page. The length of outer labial setae, the length of cephalic setae, the diameter of amphidial fovea, the presence of evident teeth in the buccal cavity, tail length, spicule length and the number of precloacal supplements are important characters to species identification.

Key to the genus *Setosabatieria* Platt, 1985

(amended from Leduc *et al*., 2012; Chen and Shabdin, 2014)

1. Tail conico-cylindrical ····· 2
– Tail conical ····· *S. conicauda*
2. Large body (length 2700–3145 μm; maximum body diameter 106–176 μm) ····· *S. major*
– Small body ····· 3
3. Spicules arcuate or curved ····· 4
– L-shaped spicules with median hollow region ····· *S. australis*
4. Cylindrical portion of tail more than 30%; amphidial fovea with less than 4 turns ····· 5
– Cylindrical portion of tail less than 20%; amphidial fovea with 4.25 turns ····· *S. fibulata*

Table 5. Continued.

Characters	*jingjingae*[l] ♀ (n = 4)	*longspophysis*[m] ♀ (n = 2)	*major*[n] ♀ (n = 1)	*orientalis*[o] ♀ (n = 7)	*singaporensis*[p] ♀ (n = 2)	*triangularis*[q] ♀ (n = 2)
L	1510–1950	2540–2810	3145	1441–1551	1874–1953	1657–2100
mbd	45–76	51–58	176	43–51	68–69	61–68
hd	14–14	16–17	23	10–11.5	15–16	23–39
ils	papillate	papillate	papillate	papillate	papillate	papillate
ols	2–2	2–2	2	n/f	papillate	n/f
cep	9–10	16–18	11	10–11.5	15–16	21–25
AL	3–5	n/f	n/f	n/f	4(1)	10–10
amp	8–9	7.8–9.2	12	7–9	9–9	11–11
amp turns	3.5	2.75–3.0	3.25–3.75	2.5–3.0	3.0	n/f
amp/amp cbd	50–57%	49–54%	46%	45–55%	60–62%	n/f
cer	12–14	15–17	8–10	n/f	13–16	n/f
NL	104–124	166–175	188	n/f	n/f	n/f
N cbd	32–44	37–39	75	n/f	n/f	n/f
EPL	127–135 (3)	n/f	n/f	n/f	n/f	n/f
PL	185–228	270–271	332	176–189	190–215	111–282
P cbd	42–58	41–44	104	n/f	20–32	39–46
VL	720–880	1270–1370	1390	662–752	751–847	758 (1)
V cbd	45–76	49–52	164	43–51	62–63	n/f
V%	43–56%	49–50%	44%	46–48%	40–43%	46%
ao	n/f	n/f	n/f	n/f	n/f	n/f
po	n/f	n/f	n/f	n/f	n/f	n/f
abd	28–43	38–41	80	27–34	36–40	36–50
TL	145–170	227–237	316	169–189	227–236	114–225
c′	3.9–5.2	5.8–6.0	3.95	5.6–6.7	5.9–6.3	3.2–4.5
cylin	53 (1)	n/f	n/f	n/f	n/f	n/f
cylin%	31.7%	n/f	n/f	42.4–52.5%	n/f	n/f
ter	11–13	12–12	15	n/f	14–22	n/f
a	25.7–33.6	48.5–49.8	17.9	27.0–45.0	27.0–28.7	27.3–30.9
b	7.4–8.8	9.4–10.4	9.5	7.7–8.5	9.0–9.8	7.4–14.9
c	9.6–11.6	11.2–11.9	11.2	8.2–8.5	8.2–8.3	7.3–18.4

5. Leaf-like extensions of the cuticle lateral to cloaca present ····· 6
- Leaf-like extensions of the cuticle lateral to cloaca absence ····· 7
6. Gubernacular apophys is bent in the proximal portion ····· *S. singaporensis*
- Gubernacular apophysis with straight dorso-caudally ····· *S. hilarula*
7. Gubernacular apophysis longer than 31 μm; tail tip significantly dilated ····· 8
- Gubernacular apophysis shorter than 25 μm; tail tip slightly dilated ····· 9
8. Triangular gubernaculum ····· *S. triangularis*
- Long straight apophysis of gubernaculum ····· *S. longiapophysis*
9. Spicule with central cuticularised strip ····· 10
- Spicule without central cuticularised strip ····· *S. coomansi*
10. Precloacal supplements more than 15; amphidial fovea with 2.5–3.0 turns ····· *S. orientalis*
- Precloacal supplements less than 10; amphidial fovea with 3.5 turns ····· *S. jingjingae*

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References

Appeltans, W., S.T. Ahyong, G. Anderson, M.V. Angel, T. Artois, N. Bailly, R. Bamber, A. Barber, I. Bartsch, A. Berta, M. Błażewicz-Paszkowycz, P. Bock, G. Boxshall, C.B. Boyko, S.N. Brandão, R.A. Bray, N.L. Bruce, S.D. Cairns, T.-Y. Chan, L. Cheng, A.G. Collins, T. Cribb, M. Curini-Galletti, F. Dahdouh-Guebas, P.J.F. Davie, M.N. Dawson, O. De Clerck, W. Decock, S. De Grave, N.J. de Voogd, D.P. Domning, C.C. Emig, C. Erséus, W. Eschmeyer, K. Fauchald, D.G. Fautin, S.W. Feist, C.H.J.M. Fransen, H. Furuya, O. Garcia-Alvarez, S. Gerken, D. Gibson, A. Gittenberger, S. Gofas, L. Gómez-Daglio, D.P. Gordon, M.D. Guiry, F. Hernandez, B.W. Hoeksema, R.R. Hopcroft, D. Jaume, P. Kirk, N. Koedam, S. Koenemann, J.B. Kolb, R.M. Kristensen, A. Kroh, G. Lambert, D.B. Lazarus, R. Lemaitre, M. Longshaw, J. Lowry, E. Macpherson, L.P. Madin, C. Mah, G. Mapstone, P.A. McLaughlin, J. Mees, K. Meland, C.G. Messing, C.E. Mills, T.N. Molodtsova, R. Mooi, B. Neuhaus, P.K.L. Ng, C. Nielsen, J. Norenburg, D.M. Opresko, M. Osawa, G. Paulay, W. Perrin, J.F. Pilger, G.C.B. Poore, P. Pugh, G.B. Read, J.D. Reimer, M. Rius, R.M. Rocha, J.I. Saiz-Salinas, V. Scarabino, B. Schierwater, A. Schmidt-Rhaesa, K. Schnabel, M. Schotte, P. Schuchert, E. Schwabe, H. Segers, C. Self-Sullivan, N. Shenkar, V. Siegel, W. Sterrer, S. Stöhr, B. Swalla, M.L. Tasker, E.V. Thuesen, T. Timm, M.A. Todaro, X. Turon, S. Tyler, P. Uetz, J. van der Land, B. Vanhoorne, L.P. van Ofwegen, R.W.M. van Soest, J. Vanaverbeke, G. Walker-Smith, T.C. Walter, A. Warren, G.C. Williams, S.P. Wilson and M.J. Costello. 2012. The magnitude of global marine species diversity. Current Biology 22:2189-2202.

Bezerra, T.N., U. Eisendle, H. Hirsch, M. Hodda, O. Holovachov, D. Leduc, H. Mejía-Madrid, V. Mokievsky, M. Pedram, R. Peña Santiago, J. Pérez-García, V. Půža, J. Saraiva De Oliveira, J. Sharma, N. Smol, A. Tchesunov, V. Venekey, Z. Zhao, A. Zullini and A. Vanreusel. 2022. Nemys: world database of nematodes [Available from: http://nemys.ugent.be/, accessed 12 March 2023].

Burgess, R. 2001. An improved protocol for separating meiofauna from sediments using colloidal silica sols. Marine Ecology Progress Series 214:161-165.

Chen, C.A. and M.L. Shabdin. 2014. A new species of *Setosabatieria* Platt, 1985 (Nematoda: Comesomatidae) from Check Jawa, Singapore, with a key to valid species of the genus. Marine Biology Research 11(2):203-208. https://doi.org/10.1080/17451000.2014.898849.

Chitwood, B.G. 1936. Some marine nematodes from North Carolina. The Proceedings of the Helminthological Society of Washington 3(1):1-16.

Cobb, N. 1920. One hundred new nemas. Contribution to a Science of Nematology (Baltimore) 9:217-343.

Cobb, N. 1935. A key to the genera of freeliving nemas. Contribution to a Science of Nematology (Baltimore) 26:451-490.

de Ley, P. and M.L. Blaxter. 2004. A new system for Nematoda: combining morphological characters with molecular trees and translating clades into ranks and taxa. Nematology Monographs and Perspectives 2:633-653.

de Man, J.G. 1922. Neue freilebende Nematoden aus der Zuidersee. Tijdschrift der Nederlandsche Dierkundige Vereeniging 2(18):124-134.

Ditlevsen, H. 1918. Marine freeliving nematodes from Danish waters. Videnskabelige meddelelser fra Dansk Naturhistorisk Forening 70:147-214.

Filipjev, I. 1934. The classification of the freeliving nematodes and their relation to the parasitic nematodes. Smithsonian Miscellaneous Collections 89:1-63.

Fonseca, G. and T.N. Bezerra. 2014. Order Araeolaimida De Coninck and Schuurmans Stekhoven, 1933. In: A. Schmidt-Rhaesa (ed.), Handbook of zoology (1st ed.), De Gruyter, Berlin. pp. 465-486.

FU, S., D. Leduc, Y. Rao and L. Cai. 2019. Three new free-living marine nematode species of *Dorylaimopsis* (Nematoda: Araeolaimida: Comesomatidae) from the South China Sea and the hukchi Sea. Zootaxa 4608(3):433-450.

Gagarin, V.G. 2013. Four new species of free-living marine nematodes of the family Comesomatidae (Nematoda: Araeolaimida) from coast of Vietnam. Zootaxa 3608(7):547-560.

Gagarin, V.G. and V.T. Nguyen. 2006a. Three new species of the genus *Hopperia* (Nematoda, Comesomatidae) from mangroves of the Mekong River Delta (Vietnam). Zoologicheskiy Journal 85(1):18-27.

Gagarin, V.G. and V.T. Nguyen. 2006b. Three new species of free-living nematodes of the family Comesomatidae from the delta of the Mekong River, Vietnam (Nematoda, Monhysterida). Zoosystematica Rossica 15:221-228.

Grimaldi de Zio, S. 1968. Una Nuova specie di nematodi Comesomatidae: Dorylaimopsis mediterraneus. Bollettino di Zoologia Italiana 35:137-141.

Guo, Y. and R.M. Warwick. 2001. Three New Species of Free-l iving Nematodes from the Bohai Sea, China. Journal of Natural History 35:1575-1586.

Guo, Y., D. Huang, Y. Chen, J. Wang and R. Lin. 2015. Two new free-living nematode species of *Setosabatieria* (Comesomatidea) from the East China Sea and the Chukchi Sea. Journal of Natural History 49 (33-34):2021-2033.

Guo, Y.Q., Y. Chang and P.P. Yang. 2018. Two new free-living nematodes species (Comesomatidae) from the mangrove wetlands in Fujian Province, China. Acta Oceanologica Sinica 37:161-167.

Hodda, M. 2022. Phylum Nematoda: a classification, catalogue and index of valid genera, with a census of valid species. Zootaxa 5114 (1):1-289.

Hopper, B. 1967. Free-living marine nematodes from Biscayne Bay, Florida, I. Comesomatidae: the male of *Laimella longicauda* Cobb, 1920, and description of *Actarjania* new genus. Marine Biology 1:140-144.

Hooper, D. 1986. Extraction of free-living stages from soil. In Laboratory Methods for Work with Plant and Soil Nematodes. Ministry of Agriculture, Fisheries and Food, London. pp. 5-30.

Huang, Y. and Z. Zhang. 2006. New species of free-living marine nematodes from the Yellow Sea, China. Journal of the Marine Biological Association of the United Kingdom 86:271-281.

Inglis, W.G. 1961. Two new species of free-living marine nematodes from the west coast of Scotland, Hydrobiologia 18:284-292.

Inglis, W.G. 1963. New marine nematodes from off the coast of South Africa. Bulletin of the British Museum of Natural History (Zoology) 10:529-552.

Inglis, W.G. 1967. Interstitial nematodes from St. Vincent's Bay, New Caledonia - Exped. Francaise sur les recifs coralliens de la Norvelle Caledonie. Editions Foundation Singer-polignac 2:29-74.

International Code of Zoological Nomenclature (Fourth Edition). Apopted by the International Union of Biological Science. The natural History Museum.

Jensen, P. 1979. Revision of Comesomatidae (Nematoda). Zoologica Scripta 8(2):81-105.

Kreis, H. 1929. Freilebende marine Nematoden von der Nordwestkuste Frankreichs (Trebeurden Cotes du Nord). Capita zoologia 2(1):1-98.

Leduc, D. 2012. Deep-sea nematodes (Comesomatidae) from the Southwest Pacific Ocean: five new species and three new species records. European Journal of Taxonomy 24:1-42.

Leduc, D. and J. Gwyther. 2008. Description of new species of *Setosabatieria* and *Desmolaimus* (Nematoda: Monhysterida) and a checklist of New Zealand free-living marine nematode species. New Zealand Journal of Marine and Freshwater Research 42(3):339-362.

Leduc, D., P.K. Probert and S.D. Nodder 2012. Two new free-living nematode species (Comesomatidae) from the continental slope of New Zealand, with keys and notes on distribution. Zootaxa 3348:40-55.

Muthumbi, A., K. Soetaert and M. Vincx. 1997. Deep-sea nematodes from the Indian Ocean: new and known species of the family Comesomatidae. Hydrobiologia 346:25-57.

National Marine Biodiversity Institute of Korea (MABIK). 2022. 2022 National list of marine species. II. marine invertebrates. National marine biodiversity institute of Korea. Seocheon. Korea [Available from: https://www.mabik.re.kr/kor/index.do, accessed 12 March 2023].

Nguyen, D.T., V.T. Nguyen, N. Smol and A. Vanreusel. 2008. New genus *Asymmelaimus* gen. n., sp. n. and new marine nematode species of the subfamily Dorylaimopsinae de Coninck, 1965 (Comesomatidae Filipjev, 1918) from Halong Bay, Vietnam. Russian Journal of Nematology 16:7-16.

Platonova, T.A. 1971. Free-living marine nematodes from the Possjet Bay of the Sea of Japan. Proceedings of the Zoological Institute, Academy of Sciences of the USSR 8(41):72-108.

Platt, H.M. 1984. Pictorial taxonomic keys: their construction and use for the identification of freeliving marine nematodes. Cahiers de Biologie Marine 25:83-91.

Platt, H.M. 1985. The freeliving marine nematode genus *Sabatieria* (Nematoda, Comesomatidae) - Taxonomic revision and pictorial keys. Zoological Journal of the Linnean Society 83(1):27-78.

Riera, R., J. Núñez and M.C. Brito. 2006. Two new species of Comesomatidae Filipjev, 1922 (Nematoda: Chromadorida) from sandy bottoms of Tenerife, Canary Islands. Zootaxa 1126:53-61.

Schuurmans Stekhoven, J.H.S. 1950. The freeliving marine nemas of the Mediterranean. I. The Bay of Villefranche. Institut Royal des Sciences Naturelles de Belgique 37:1-220.

Seinhorst, J.W. 1959. A rapid method for the transfer of nematodes from fixative to anhydrous glycerin. Nematologica 4:67-69.

Timm, R.W. 1961. The marine nematodes of the Bay of Bengal. Proceedings of the Pakistan Academy of Science 1:1-88.

Vitiello, P. 1969. Hopperia, nouveau genre de Nématode libre marin (Comesomatidae). Tethys 1(2):485-491.

Vitiello, P. 1970. Nematodes libres marins des vases profondes du golfe du lion. 2. Chromadorida. Tethys 2(2):449-500.

Wieser, W. 1954. Free-living nematodes. 2. Chromadoroidea. Reports of the Lund University Chile Expedition 1948-1949, 17, C.W.K. Gleerup, Lund. pp. 148.

Wieser, W. and B. Hooper. 1967. Marine nematodes of the east coast of North America. I. Florida. Bulletin of the Museum of Comparative Zoology at Harvard College 135:239-344.

WoRMS Editorial Board. 2022. World Register of Marine Species [Available from: https://www.marinespecies.org at VLIZ, accessed 12 March 2023].

Zhang, Z. 1992. Two new species of the genus *Dorylaimopsis* Ditlevsen, 1918 (Nematoda: Adenophora, Comesomatidae) from the Bohai Sea, China. Chinese Journal of Oceanology and Limnology 10:31-39.

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