

Reconsideration on Two *Acanthodasys* Species (Gastrotricha: Macrodasysida: Thaumastodermatidae) from Korea, with Nomenclatural Note on Korean Marine Gastrotrichs

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ABSTRACT

Two marine gastrotrich species of the genus *Acanthodasys*, *A. ericinus* Lee, 2012 and *A. comtus* Lee, 2012, are taxonomically reconsidered. Both of them were originally described based on the specimens from intertidal or sublittoral sandy bottom of the Yellow Sea and Jeju Island, South Korea, and included in a monographical publication of <Flora and Fauna in Korea> in 2012. However, the description of them was quite insufficient, and designations of type specimens were entirely lacking. In this study, we make a subsequent designation of type specimens for the two *Acanthodasys* species, and carry out a full redescription of them with additional remarks on their morphological micro-characteristics by scanning electronic microscopy. Some brief nomenclatural notes on Korean marine gastrotrichs are also provided.

Keywords: subsequent designation, type, redescription, *Acanthodasys ericinus*, *Acanthodasys comtus*, Korean fauna

INTRODUCTION

Authors have conducted serial taxonomic studies on marine gastrotrichs in Korea since 1998 (Chang et al., 1998a, 1998b; Chang and Lee, 2001; Lee and Chang, 2002, 2003, 2004, 2006, 2007, 2012a, 2012b, 2014; Lee et al., 2009, 2013, 2014; Lee, 2012). In 2011, when the senior author (JL) took part in a joint program for the monographical studies of <Flora and Fauna in Korea> sponsored by the National Institute of Biological Resources, Korea, a total of 31 species of 11 genera of 5 families belonging to orders Macrodasysida and Chaetonotida were listed, including several taxa due to publication in 2013.

Following the original schedule of 'publication-within-2013,' she prepared a concise description for the 31 species, including two *Acanthodasys* species dealt herein, and figure plates as well as keys to species and genera in Korea according to the general style of the series of booklets. However, the booklet was printed in late 2013 under the nominal date of issue dated back to 24 December 2012 by reason of the

end of fiscal year of the program.

As a result, the booklet became a nominally preceding publication prior to the three articles for five new species published in 2013 or in the beginning of 2014 (Lee et al., 2013, 2014; Lee and Chang, 2014). Otherwise, two *Acanthodasys* species in the booklet, which were under preparation of submission to a journal in 2013 and later failed, are in need of an adequate full-redescription with subsequent designation according to the Article 69.1 of the International Code of Zoological Nomenclature (ICZN, 1999). The present paper deals with a full redescription of the two *Acanthodasys* species, with additional remarks on their morphological micro-characters by scanning electronic microscopy.

Notwithstanding the author's good will of providing a more comprehensive monograph within the range of original publication plan, the proper authorities and publication dates of the seven species in the booklet may probably be a highly controversial, which might cause long-lasting confusions. We provide a table for the emendation of the authorities of the seven species described in Korea in the last section of

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this paper, according to the Article 21.4 of ICZN.

MATERIALS AND METHODS

Gastrotrichs were collected from intertidal sandy bottoms at Sambong and Baegripo in the Yellow Sea, and from sublittoral ones at 10 m depth at Seongsan in Jeju Island. Samplings were conducted using a long-handled bowl in the lower intertidal zone or by SCUBA divers in the sublittoral zone. Sediments were taken by scooping the top few centimeters and placed in 700 mL bottles or plastic bags. In the field, at the former two stations, samples were filtered through a 63 μm mesh sieve after being treated with the anesthetization-decantation method with 7% MgCl_2 for 5–10 minutes, however, at Seongsan, they were sieved after freshwater rinsing for 10–30 minutes. Sieved materials were all fixed in 15% buffered formalin immediately. Specimens were measured when glycerin mounted on slide. The general methods, including preparation of whole mount, observation and scanning electron microscopy, were carried out according to our previous papers (Lee and Chang, 2003; Lee et al., 2009).

Type specimens were deposited in the National Biological Resources Center (NIBR), Incheon, Korea, and in the Korea Institute of Ocean Science & Technology (KIOST), Korea.

Terminology mostly follows Hummon et al. (1992) and Clausen (2000). Abbreviations used in the text and figures are as follows: Lt, total length, from anterior end of head to posterior tip of pedicles excluding adhesive tubes; PhJIn, junction between pharynx and intestine; TbA, anterior adhesive tubes; TbD, dorsal adhesive tubes; TbL, lateral adhesive tubes; TbP, posterior adhesive tubes; TbVL, ventrolateral adhesive tubes; U, percentage unit of Lt, used for the location (U–) from anterior to posterior, or for the relative length (–U).

SYSTEMATIC ACCOUNTS

Order Macrodasycida Remane, 1925 [Rao and Clausen, 1970]

Family Thaumastodermatidae Remane, 1927

Subfamily Diplodasyinae Ruppert, 1978

Genus *Acanthodasys* Remane, 1927

Acanthodasys ericinus Lee, 2012 (non Lee and Chang, 2013) (Figs. 1, 2)

Acanthodasys ericinus Lee, 2012, p. 18, fig. 5.

Type locality. Sambong beach, Taean, Korea (36°48'43"N, 126°09'14"E; 1–2 m deep).

Type specimens. Holotype (NIBRIV0000779141) and 11 paratypes, all adult specimens (KIOST01G01-10, NIBRIV0000779142), mounted in glycerin on H-S slides, 18 Jul 2006, leg. J. Lee.

Additional material examined. *Korea:* Chungcheongnam-do: 3 inds., Taean-gun, Anmyeon-up, Seungeon-ri, Kkochji beach (36°29'42"N, 126°20'09"E; 1–2 m deep), 13 Jun 2002, Lee J, Chang CY; 15 inds., Taean-gun, Sowon-myeon, Uihang-ri, Baegripo beach (36°29'42"N, 126°20'09"E; 1–2 m deep), 29 Jun 2006, Lee J (4 inds. on aluminum stub for scanning electron microscopy).

Etymology. The proposed specific name, *ericinus* (L. 'of hedgehog') refers to body covered with cuticular armature of ancre.

Diagnosis. An elongate *Acanthodasys*, 550–750 μm in adult body length; both sides of body nearly parallel, except for a body constriction at level of the reproductive organs in posterior trunk region; anterior margin of head truncated; cuticular armature with both spiny scales (uniancres) and spineless scales (ellipsoidal scales), densely covering whole body surface; 2–4 TbA per side; 3–7 TbD forming 1 median column in intestinal region; 7–11 TbL per side, asymmetrically arranged, comprising foremost tube near pharyngeal pore and others along whole intestinal region anterior to the constricted posterior trunk region; 6–9 TbVL per side, distributed between PhJIn and anteriorly to the base of caudum, asymmetrically; each bifid caudal pedicle with 3–4 TbP per side, forming 2 distal and 1–2 medial TbP.

Description of the holotype. Body (Figs. 1A, B, 2A) elongate and strap-shaped, Lt 573 μm ; both lateral sides nearly parallel, constricted near posterior part of frontal organ in posterior trunk region (U89), a little widened at the level of caudal organ and again narrowing toward caudal lobes at U97. Widths of head/pharyngeal pores/trunk/base of caudal lobes 33/38/44/11 μm at U02/U23/U55/U97, respectively.

Anterior margin of head truncated, with a terminal mouth opening, 30 μm wide, and a narrow ciliary band surrounding the whole anteriormost part of mouth opening, where cuticular armature is absent (Fig. 2C). Pharynx 152 μm long, with paired pharyngeal pores which obliquely opened at level of PhJIn at U23. Intestine gradually narrowing toward posterior end. Anus at U91.

Epidermal glands 22–29 per side, arranged asymmetrically, distributed along whole body length from U05 to U93, except for anterior part of head and base of caudal region; generally oval-shaped, ranging 4–8 μm in diameter.

Cuticular armature extremely densely covered with both spiny scales (uniancres) and spineless scales, irregularly arranged on the whole body surface except for the anteriormost mouth region where a ciliary band is present (Fig. 2C); dorsal and lateral surface more densely covered with uni-

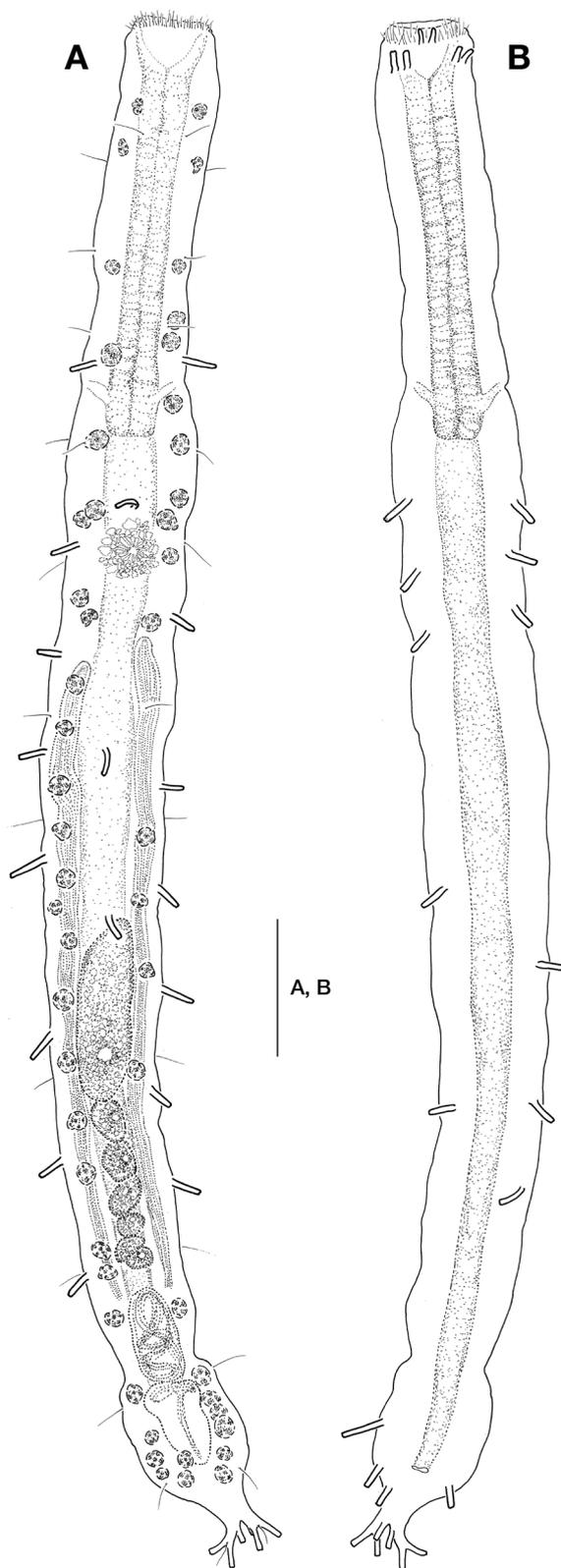


Fig. 1. *Acanthodasys ericinus* Lee, 2012. A, Habitus, dorsal; B, Habitus, ventral. Scale bar: A, B=50 μ m (modified from Lee, 2012).

ancre than ventral surface (Fig. 2B, D); uniancres straight, ranging 2–6 μ m long, arising from a suboval base and with a tapering apex crisscross-shaped in transverse section; dorsal and lateral uniancres longer than ventral ones; ellipsoidal spineless scales with a large central depression and a little thick rim, ranging 1–3 μ m in diameter; both suboval base of uniancres and ellipsoidal scales can be observed and distinguished only with scanning electron microscope, unclear at high magnification (1,000 \times) of differential interference contrast microscopy.

Adhesive tubes: TbA consisting of 3 tubes per side, comprising 1 mid-ventral tube at U02 and 2 ventral tubes obliquely arranged at U03; TbD (Fig. 2B) a single median column of 3 tubes, located at anterior intestinal region (U31–U57); TbL, 7–8 tubes per side, asymmetrical, the foremost one located near pharyngeal pore at U21 and the others distributed along whole intestinal region, anterior to the constriction of the posterior trunk region at U34–U80; TbVL, 8–9 tubes per side, asymmetrical, from the level of PhJIn to the base of caudum at U31–U95; anterior 4 tubes at anterior part of intestinal region, 2–3 tubes scattered in middle intestinal region, and the others at swollen posterior trunk region; TbP (Fig. 2D), 3 tubes per side, each forming a bifid pedicle, consisting of 2 distal tubes, 1 sensory hair between them, 1 short proximomedial tube.

Ventral ciliation arranged in a single column at mid-ventral surface, intermingling with both spineless ellipsoidal scales and uniancres; extending from just posteriorly to TbA to caudal base (U02–U96).

Hermaphrodite; paired testes not reaching PhJIn at U40. Rosette organ 23 μ m in diameter, located at anterior intestinal region (U32–U34) on mid-dorsal surface. Caudal organ inverse-pyriform, situated at swollen posterior trunk region (U88–U94). Frontal organ ellipsoidal, located in front of caudal organ. Seven ova located dorsally to the posterior half of intestine at U58–U80; the foremost one largest, the other decreasing in size posteriorly (Fig. 1A).

***Acanthodasys comtus* Lee, 2012 (non Lee and Chang, 2013) (Figs. 3, 4)**

Acanthodasys comtus Lee, 2012, p. 20, fig. 6.

Type locality. Seongsan, Jeju Island, Korea (33°27'52.71"N, 126°56'35.83"E; 10 m deep).

Type specimens. Holotype (NIBRIV0000779139) and six paratypes (KIOST02G01-05, NIBRIV0000779140), mounted in glycerin on H-S slides, 15 Jun 2010, *leg.* S.H. Kim.

Additional material examined. Four specimens, with same collection data, mounted on aluminum stub for scanning electron microscopy.

Etymology. The specific name, *comtus* (L. 'ornamented,'

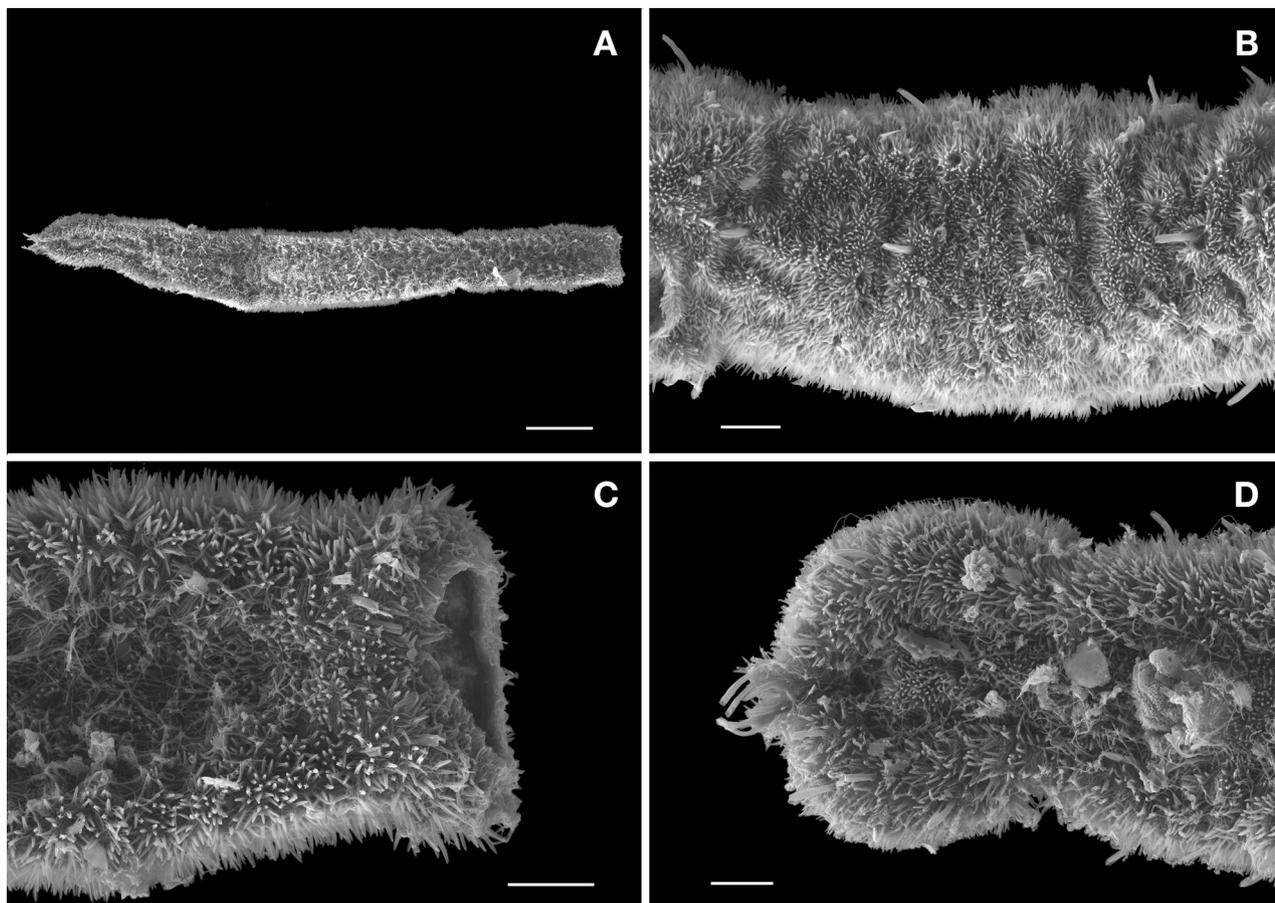


Fig. 2. *Acanthodasys ericinus* Lee, 2012. Scanning electron microscope photographs. A, Habitus, ventral; B, Dorsal adhesive tubes and lateral adhesive tubes on the trunk, dorsal; C, Mouth opening and anterior adhesive tubes, ventral; D, Constriction in the posterior trunk region and posterior adhesive tubes, ventral. Scale bars: A=50 μ m, B-D=10 μ m.

‘adorned’) alludes to the cuticular armature ornamented with uniancres and spineless scales, covering whole body.

Diagnosis. *Acanthodasys* with thick cuticular armature both dorsally and ventrally, Lt 500–600 μ m; dorsal surface covered with a single median column of spiny scales (uniancres), 4–6 columns of large sculptured rhombic plates, and numerous small elliptical scales between them; lateral sides each with 2 columns of uniancres; ventrolateral sides each covered with 2–5 columns of uniancres, increasing in size toward lateral side; ventral surface with various spineless scales in size and in shape; 10–12 TbA per side; 4 TbL per in mid-trunk region; 62–69 TbVL per side; 20–30 TbP along round caudal lobe.

Description of the holotype. Description based on fixed specimen after freshwater rinsing not *in vivo*. Body large, thickly covered with cuticular armature both dorsally and ventrally, Lt 582 μ m. Anterior margin of head broad, slightly convex; body a little widened in mid-trunk region and gradually narrowing towards caudal lobe. Widths of anterior

part of head/trunk/caudum 95/149/55 μ m at U09/U55/U95, respectively (Figs. 3A, B, 4A).

Anterior margin of head slightly truncated, without ciliary band surrounding antermost part of head. Mouth opening subterminal, 61 μ m wide, surrounded with a double row of about 40 small uniancres, except on mid-ventral side; an cres on innermost edge of lip smaller than those on outer edge (Fig. 4E).

Cuticular armature composed of both spiny scales (uniancres) and two kinds of spineless scales on dorsal and lateral surfaces of body, while only spineless scales with various in size and shape on ventral surface.

Spiny scales (Figs. 3D, 4D), cone-shaped uniancres, each with 4 keels showing cruciform shape in transversal cutting plane, arising from a rhomboidal base with a little thickening on the edge of each keel base; spiny scales arranged in 1 single medial column, 2 lateral columns per side, and 2–5 ventrolateral ones per side. The single medial column consists of 39 spiny an cres, arranged from anterior head (U02)

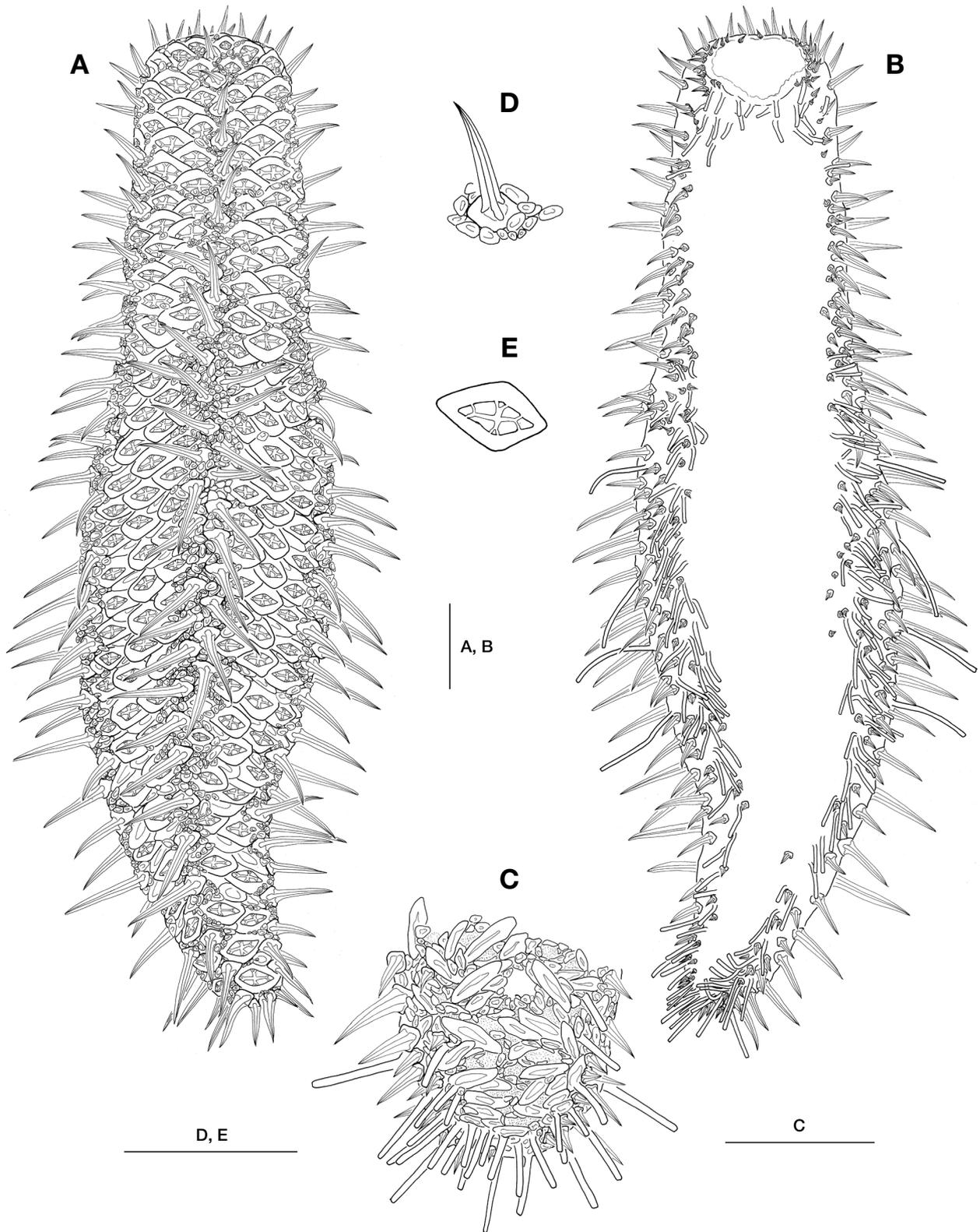


Fig. 3. *Acanthodasys comtus* Lee, 2012. A, Habitus, dorsal; B, Habitus, ventral; C, Caudal lobe with posterior adhesive tubes, ventral, paratype; D, Uniancre with small spineless scales on its base; E, Large sculptured rhombic scale. Scale bars: A–E=50 μ m (modified from Lee, 2012).

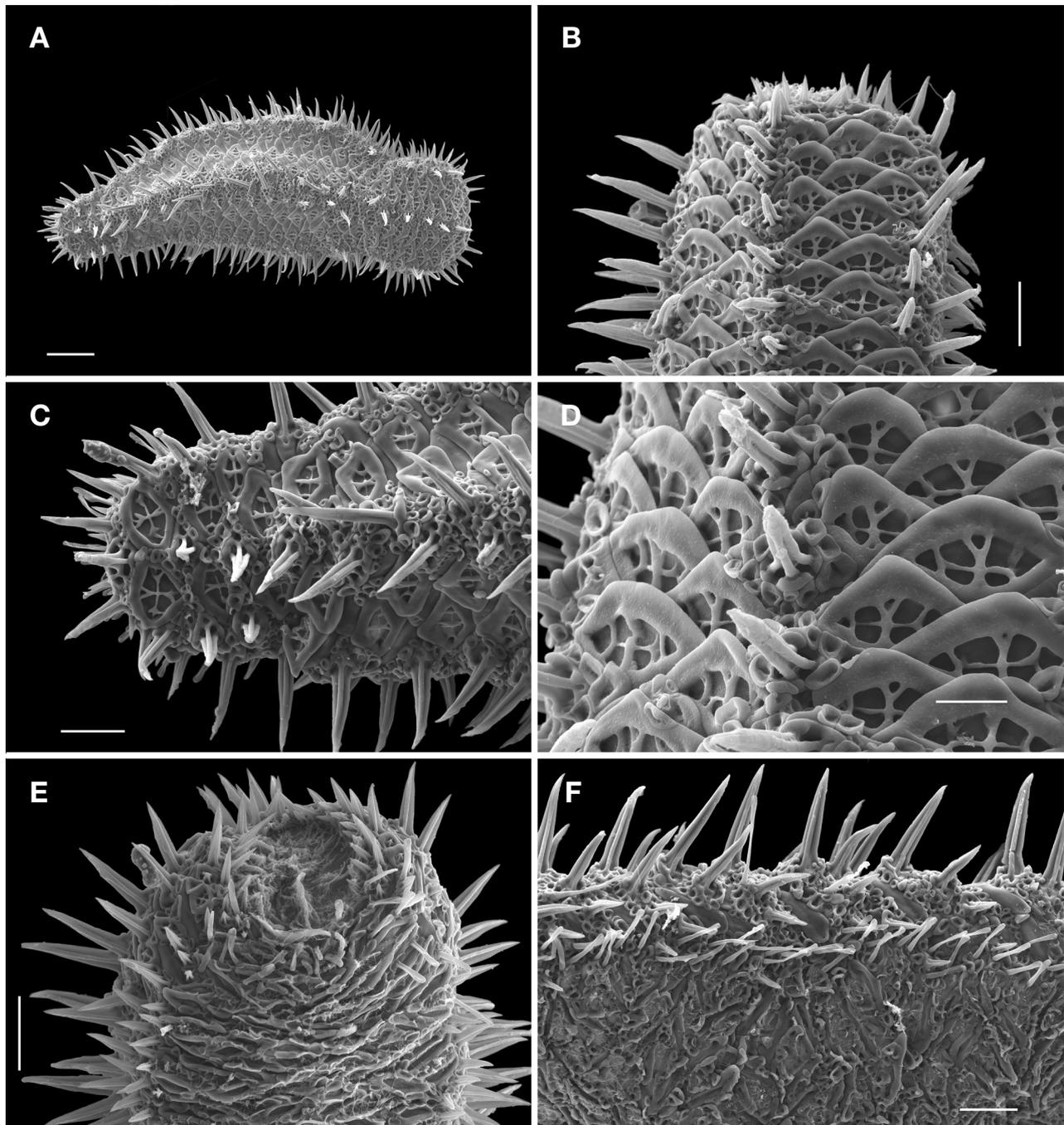


Fig. 4. *Acanthodasys comtus* Lee, 2012. Scanning electron microscope photographs. A, Habitus, dorsal; B, Head, dorsal; C, Caudum, dorsal; D, Dorsal cuticular armature on the head; E, Mouth opening and cuticular armature on ventral side; F, Lateral adhesive tubes and ventrolateral adhesive tubes on the trunk, ventral. Scale bars: A=50 μ m, B, C, E, F=20 μ m, D=10 μ m.

to caudum, with uniancres largest in mid-trunk region (U59), 54 μ m long, gradually decreasing in length toward both head (25 μ m long, at U08) and caudum (33 μ m long, at U95); arrangement from the 11th uniancre to 29th one (U33–U66) in the medial column, shown as 2 alternative columns due

to shrinking body, however, in the others specimens, shown a single column. Lateral uniancres arranged in 2 columns per side, except for anterior part of head and posterior part of trunk, where single column; largest in mid-trunk region, 52 μ m long at U67. Ventrolateral uniancres 4–5 columns

per side in mid-trunk region while 2–3 columns on anterior part of head and posterior part of trunk region, respectively; clearly increasing in size toward lateral sides, ranging 4–39 μm in length.

Spineless scales on dorsal surface (Figs. 3E, 4D) of 2 kinds: large, sculptured, rhombic plates, similar to cuticular plates of *Diplodasys*, and small elliptical scales; large rhombic plates, 13–37 μm in diameter, sculptured with central depression where embossed in criss-cross shape with its terminal end split up (Fig. 3E); a few rhombic plates among large sculptured plates incompletely sculptured without criss-cross; arranged in 4–6 columns on dorsal surface; median column composed of 21–22 plates; the first anterior 10 rows of plates overlap each other posteriorly; the 11th scale of the median column not overlapped; next 10–11 rows overlap each other anteriorly. Other numerous small scales, irregularly shaped, from triangular to rhombic or elliptical, ranging 2–12 μm in length, with only central depression without sculpture and thickly rimmed; piled up around bases of dorsal and lateral uniancres and extending over plates between them.

Spineless scales on ventral surface irregularly and densely covered with various elliptical scales, bearing only central depression with thickened rim; narrow, different in size, ranging 2–37 μm in maximum diameter; larger scales transversely or obliquely arranged and smaller ones filled up between large ones (Figs. 3C, 4E, F).

Adhesive tubes: TbA (Fig. 3B), 10–12 tubes per side, located posteriorly to the ventral margin of mouth opening and on the ventrolateral surface of head, forming 2–3 oblique rows; TbL of 4 tubes per side, elongate, 51 μm long, distributed in mid-trunk region at U43–U68, more or less evenly spaced; TbVL 62–69 per side, the foremost tube located just posterior to the TbA at U14, other tubes arranged in about 3–5 columns along whole trunk region. Caudal lobe convex, with round posterior margin, armed with 24 TbP (Fig. 3C). TbD and TbV absent.

Ventral ciliation distributed in the bare area between spineless scales, arranged just behind TbA to posterior trunk region along the whole ventral surface (U10–U97).

Pharynx, digestive tract and reproductive organs, in all the specimens including paratypes, could not be observed due to immediately formalin-fixed after freshwater rinsing.

Remarks on taxonomy affinities. The genus *Acanthodasys* Remane, 1927 is characterized by cuticular armatures with one-pronged hooks or spiny scales, called uniancres, and paired vasa deferentia, which differentiate this genus from the other genera in the family Thaumastodermatidae. Ten valid species are currently recognized in the genus *Acanthodasys*: *A. aculeatus* Remane, 1927, *A. algarvensis* Hummon, 2008, *A. arcassonensis* Kisielowski, 1987, *A. caribbeanensis* Hochberg & Atherton, 2010, *A. carolinensis* Hummon,

2008, *A. fibrosus* Clausen, 2004, *A. flabellicaudus* Hummon & Todaro, 2009, *A. lineatus* Clausen, 2000, *A. paurocactus* Atherton & Hochberg, 2012, and *A. silvulus* Evans, 1992 (Todaro, 2002–2016; Hummon and Todaro, 2010).

Among the ten valid species, four species are allied with the present two species from Korea in sharing the cuticular armature of both uniancres and spineless scales: *A. aculeatus*, *A. arcassonensis*, *A. caribbeanensis* and *A. paurocactus*.

Acanthodasys ericinus from Yellow Sea is easily distinguished from the four species above by the elongate, strap-shaped body with constriction of the posterior trunk at the level of the reproductive organs and by 3–7 dorsal adhesive tubes arranged in a column. Those features are unique in the genus. In particular, the former character of strap-shaped body with constriction near reproductive organs is reminiscent of that of *Lepidodasys castoroides* Clausen, 2004, which shows the caudal portion ‘like a beaver tail or a flounder’ where copulatory organ exists (see Clausen, 2004, p. 431, figs. 8–10). It does not shrink when the specimens are fixed after the anesthetization-decantation with 7% MgCl_2 , although it could not be observed *in vivo*. Moreover, *A. ericinus* evidently differs from the four congeners in having dorsal adhesive tubes (TbD) body.

Acanthodasys comtus from Jeju Island most resembles *A. caribbeanensis* in having large uniancres in distinguishable columns on the dorsal and lateral surfaces, as well as the large, sculptured, spineless plates, similar to the cuticular plates of *Diplodasys*. However, *A. comtus* differs from it by 4–5 columns of large uniancres on each ventrolateral side (against lacking in *A. caribbeanensis*) and by the unique shape of spineless scales ornamented with criss-cross sculptured central depression (against with unadorned central depression in *A. caribbeanensis*). Furthermore, it is definitely discernible from *A. caribbeanensis* by presenting four lateral adhesive tubes per side in the mid-trunk region (against without lateral adhesive tubes in *A. caribbeanensis*) and 24 posterior adhesive tubes on round caudum (against bifid pedicle forming four posterior adhesive tubes in *A. caribbeanensis*).

Nomenclatural note on Korean marine gastrotrichs

As above mentioned in the Introduction chapter, an article for three species of the genus *Tetranchyroderma*, was published in 2013 (Lee et al., 2013) substantially before the booklet of <Flora and Fauna of Korea> (Lee, 2012), and was immediately followed by a description of another *Tetranchyroderma* species (Lee and Chang, 2014) and one of *Dendrodasys* (Lee et al., 2014) at the beginning of 2014. Otherwise, an article for two *Acanthodasys* species due for publication in late 2013 was aborted just ahead of publica-

Table 1. Emendation of authorities for seven macrodasyid species from Korea

Species	References
Family Dactylopodolidae Strand, 1929	
Genus <i>Dendrodasys</i> Wilke, 1954	
<i>Dendrodasys duplus</i> Lee, 2012	
<i>Dendrodasys duplus</i> Lee, Kim and Chang, 2013 in Lee, 2012, p. 10, fig. 3.	Lee (2012)
<i>Dendrodasys duplus</i> Lee, Chang and Kim, 2014, p. 104, figs. 1, 2.	Lee et al. (2014)
Family Thaumastodermatidae Remane, 1927	
Subfamily Diplodasyinae Ruppert, 1978	
Genus <i>Acanthodasys</i> Remane, 1927	
<i>Acanthodasys ericinus</i> Lee, 2012	Present study
<i>Acanthodasys ericinus</i> Lee and Chang, 2013 in Lee, 2012, p. 16, fig. 5.	Lee (2012)
<i>Acanthodasys comtus</i> Lee, 2012	Present study
<i>Acanthodasys comtus</i> Lee and Chang, 2013 in Lee, 2012, p. 18, fig. 6.	Lee (2012)
Subfamily Thaumastodermatinae Ruppert, 1978	
Genus <i>Tetranchyroderma</i> Remane, 1926	
<i>Tetranchyroderma anisoankyrum</i> Lee, 2012	
<i>Tetranchyroderma anisoankyrum</i> Lee, Kim and Chang, 2013, p. 484, fig. 1; Lee, 2012, p. 40, fig. 15.	Lee (2012), Lee et al. (2013)
<i>Tetranchyroderma coreense</i> Lee, 2012	
<i>Tetranchyroderma coreensis</i> Lee, Kim and Chang, 2013 in Lee, 2012, p. 42, fig. 16.	Lee (2012)
<i>Tetranchyroderma coreense</i> Lee, Kim and Chang, 2013, p. 486, fig. 2.	Lee et al. (2013)
<i>Tetranchyroderma oblongum</i> Lee, 2012	
<i>Tetranchyroderma oblongum</i> Lee, Kim and Chang, 2013, p. 489, fig. 3; Lee, 2012, p. 59, fig. 24.	Lee (2012), Lee et al. (2013)
<i>Tetranchyroderma pinnatum</i> Lee, 2012	
<i>Tetranchyroderma pinnatum</i> Lee and Chang, 2013 in Lee, 2012, p. 61, fig. 25.	Lee (2012)
<i>Tetranchyroderma pinnatum</i> Lee and Chang, 2014, p. 210, figs. 1, 2.	Lee and Chang (2014)

tion of the booklet. To avoid the authority problem for the seven species above, we adopt the Article 24.1 of the ICZN, and emendate the authorities of them as shown in the Table 1.

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REFERENCES

- Chang CY, Lee JM, 2001. Two new *Tetranchyroderma* gastrotrichs (Macrodasyida, Thaumastodermatidae) from South Korea. Korean Journal of Biological Science, 5:187-194. <https://doi.org/10.1080/12265071.2001.9647601>
- Chang CY, Lee JM, Clausen C, 1998a. Two new species of *Thaumastoderma* (Gastrotricha, Macrodasyida) from Korea. Sarsia, 83:329-336. <https://doi.org/10.1080/00364827.1998.10413692>
- Chang CY, Lee JM, Clausen C, 1998b. Description of two new thaumastodermatids (Gastrotricha, Macrodasyida) from Korea. Korean Journal of Biological Science, 2:315-321. <https://doi.org/10.1080/12265071.1998.9647425>
- Clausen C, 2000. Gastrotricha Macrodasyida from the Tromsø region, northern Norway. Sarsia, 85:357-384. <https://doi.org/10.1080/00364827.2000.10414588>
- Clausen C, 2004. Gastrotricha from the Faroe Bank. Sarsia, 89: 423-458. <https://doi.org/10.1080/00364820410002677>
- Hummon WD, Balsamo M, Todaro MA, 1992. Italian marine gastrotricha: I. Six new and one redescribed species of Chaetonotida. Bollettino di Zoologia, 59:499-516. <https://doi.org/10.1080/11250009209386711>
- Hummon WD, Todaro MA, 2010. Analytic taxonomy and notes on marine, brackish-water and estuarine Gastrotricha. Zootaxa, 2392:1-32.
- International Code of Zoological Nomenclature (ICZN), 1999. International code of zoological nomenclature [the Code]. Fourth edition [Internet]. The International Trust for Zoological Nomenclature, c/o Natural History Museum, London, Accessed 4 Dec 2016, <<http://www.iczn.org>> .
- Lee J, 2012. Invertebrate fauna of Korea, vol. 11, no. 1. Marine gastrotrichs (Gastrotricha). National Institute of Biological Resources, Incheon, pp. 1-85.
- Lee J, Chang CY, 2012a. *Crasiella clauseni*, a new gastrotrich species (Macrodasyida, Planodasyidae) from Jeju Island, South Korea. Animal Systematics, Evolution and Diversity, 28:42-47. <https://doi.org/10.5635/ASED.2012.28.1.042>
- Lee J, Chang CY, 2012b. Three new gastrotrich species of the genus *Tetranchyroderma* (Macrodasyida: Thaumastodermatidae) from Korea. Zootaxa, 3368:245-255.

- Lee J, Chang CY, 2014. A new gastrotrich species of the genus *Tetranchyroderma* (Macrodasyida: Thaumastodermatidae) from Korea. *Proceedings of the Biological Society of Washington*, 127:209-215.
- Lee J, Chang CY, Kim D, 2014. *Dendrodasys duplus*, a new gastrotrich species (Macrodasyida: Dactylopodolidae) from South Korea. *Animal Systematics, Evolution and Diversity*, 30:103-107. <https://doi.org/10.5635/ASED.2014.30.2.103>
- Lee J, Kim D, Chang CY, 2013. Description of three new *Tetranchyroderma* gastrotrichs (Macrodasyida: Thaumastodermatidae) from South Korea. *Zootaxa*, 3709:483-493.
- Lee JM, Chang CY, 2002. *Pseudostomella* gastrotrichs (Macrodasyida, Thaumastodermatidae) from South Korea with a brief review of the Genus. *Korean Journal of Biological Science*, 6:207-213. <https://doi.org/10.1080/12265071.2002.9647653>
- Lee JM, Chang CY, 2003. Two new marine gastrotrichs of the genus *Ptychostomella* (Macrodasyida, Thaumastodermatidae) from South Korea. *Zoological Science*, 20:481-489. <https://doi.org/10.2108/zsj.20.481>
- Lee JM, Chang CY, 2004. Marine chaetonotid gastrotrichs of genus *Halichaetonotus* (Chaetonotida: Chaetonotidae) from Korea. *Korean Journal of Systematic Zoology*, 20:55-62.
- Lee JM, Chang CY, 2006. Marine gastrotrichs of the genus *Diplodasys* (Macrodasyida: Thaumastodermatidae) from Korea. *Korean Journal of Systematic Zoology*, 22:109-115.
- Lee JM, Chang CY, 2007. Two new marine gastrotrichs of the genus *Tetranchyroderma* (Macrodasyida: Thaumastodermatidae) from South Korea. *Zoological Studies*, 46:474-482.
- Lee JM, Hwang UW, Chang CY, 2009. A new gastrotrich species of the genus *Ptychostomella* (Macrodasyida: Thaumastodermatidae) from South Korea. *Animal Cells and Systems*, 13:25-30.
- Todaró MA, 2002–2016. *Gastrotricha World Portal* [Internet]. Accessed 4 Dec 2016, <<http://www.gastrotricha.unimore.it/marine.htm>> .

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