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Two Species of the Genus *Disporella* (Bryozoa: Cyclostomata) from Korea

Hyun Sook Chae[1], Ho Jin Yang[2], Bum Sik Min[3], Ji Eun Seo[1,2,*]

[1]Department of Life Science, Woosuk University, Jincheon 27841, Korea
[2]Marine Bryozoans Resources Bank of Korea, Jincheon 27841, Korea
[3]Marine Research Center, National Park Research Institute, Korea National Park Service, Yeosu 59723, Korea

ABSTRACT

This paper describes two cyclostomatous bryozoans belonging to the genus *Disporella* Gray, 1848 found in Korean waters. This study was carried out with the materials which were collected from two localities, Jodo Island and Gapado Island, from 2014 to 2015. It is known that the genus *Disporella* Gray, 1848 needs a thorough revision and is difficult to identify because it has been documented in very few of the nominal species. Approximately 58 species have been recognized worldwide. One species, *Disporella novaehollandiae* (D'Orbigny, 1853), has been reported from Korean waters so far. Two species, *D. pristis* (MacGillivray, 1884) and *D. wanganuiensis* (Waters, 1887), distributed in the Indo-Pacific, are newly added to the Korean bryozoans fauna in this study. Accordingly, the Korean cyclostomatous bryozoans have increased to 17 species, ten genera and five families. Descriptions and illustrations of the two *Disporella* species using scanning electron microscopy are provided in this paper.

Keywords: cyclostomatous bryozoans, *Disporella*, *D. novaehollandiae*, *D. pristis*, *D. wanganuiensis*

INTRODUCTION

Although little is known about the fauna of Korean cyclostomatous bryozoans, the researchers expect that further taxonomic studies will increase the diversity of the cyclostomes from Korea (Chae et al., 2018). Before 2016, Korean cyclostomatous bryozoans were only comprised of four species and three genera belonging to three families, Tubuliporidae Johnston, 1837, Crisiidae Johnston, 1838, and Lichenoporidae Smitt, 1867. As of 2022, they have increased to 15 species and ten genera with the addition of two genera, Diaperoeciidae Canu, 1918 and Horneridae Smitt, 1867 as a result of continuous taxonomic studies (Chae et al., 2020, 2022).

The common genus *Disporella* of the family Lichenoporidae has approximately 58 species worldwide (http://www.bryozoa.net/cyclostomata/lichenoporidae/disporella.html, 4 Aug 2022); however only *Disporella novaehollandiae* (d'Orbigny, 1853) has previously been reported from Korea (Seo, 2005, 2010). The identification of the genus *Disporella* is difficult (Taylor and Grischenko, 2015; Cook et al., 2018) because it is a speciose genus in need of a thorough revision, beginning with the type species *Disporella hispida* (Fleming, 1828) [Gordon and Taylor, 2001] and has been documented for very few of the nominal species (Taylor and Grischenko, 2015). This paper aims to add two species of *Disporella* to the Korean bryozoan fauna through scanning electron microscope (SEM) illustrations.

MATERIALS AND METHODS

All specimens were collected from two localities, Jodo Island (South Sea) and Gapado Island (Jeju Island), from 2014 to 2015, and have been preserved in 95% ethanol. For identification, the external features of zooid were observed under stereomicroscope (SZX16; Olympus, Japan) and parts of specimens were bleached with hot aqueous sodium hypochlorite, washed, and gold coated (MCM-100; SEC, Korea), prior to examination using a SEM (SNE-3200M Mini-SEM; SEC) at 15 kV accelerating voltage. Measurements were made on SEM images of zooids using Image J. Specimen localities mentioned in this paper are given in Table 1.

***To whom correspondence should be addressed**
Tel: 82-43-531-2891, Fax: 82-43-531-2862
E-mail: jeseo@woosuk.ac.kr

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Table 1. Sampling localities of three species in Korea waters

Locality	Coordinates	Date	Depth (m)	Substratum
Jodo Island, South Sea	34°18′15.84″N, 126°0′33.83″E	24 Aug 2014	80	Stone
Gapado Island, Jeju	33°10′29.90″N, 126°16′14.30″E	5 Jul 2015	20–28	Stone

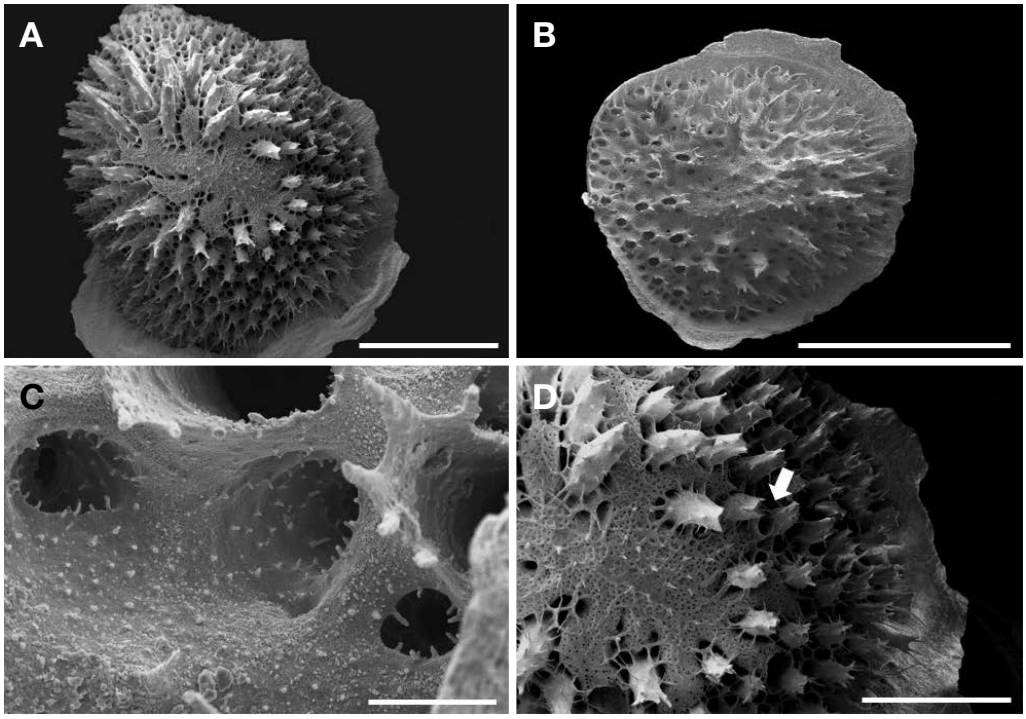

Fig. 1. *Disporella pristis* (MacGillivray, 1884). A, B, Colony: autozooidal radii and gonozooid; C, Kenozooidal opening showing spinules; D, Ooeciopore (arrow) and spines of peristomes. Scale bars: A, B = 1 mm, C = 50 μm, D = 500 μm.

RESULTS

Phylum Bryozoa Ehrenberg, 1831
Class Stenolaemata Borg, 1926
Order Cyclostomata Busk, 1852
Family Lichenoporidae Smitt, 1867
Genus *Disporella* Gray, 1848

[1*]**1. *Disporella pristis* (MacGillivray, 1884) (Figs. 1, 2)**

Discoporella pristis MacGillivray, 1884: 126.
Disporella pristis: Gordon and Taylor, 2001: 260; Dick et al., 2006: 2244.

Material examined. Korea: Jeollanam-do: Jindo-gun, Jodo Island, 24 Aug 2014; Jeju-do: Seogwipo-si, Gapado Island, 5 Jul 2015, MABIK IV00172839.

Substratum. Stones.

Description. Colony encrusting, small, more or less circular, adnate, slightly raised, centrally depressed region with irregular macular, approximately 2.8–3.1 mm in diameter (Fig. 1A, B). All surface of colony densely granular, including marginal lamella (Fig. 1B, D); centre surface of colony occupied by gonozooid with small, sharp spines. Peristomes distinct, not connate, elevated extension on macular side, increasingly facing laterally, at end into 2–6 sharp processes; often with sparse spines around sides. Kenozooids (alveoli) numerous, between zooids, interior surface with small, sharp spinules (Fig. 1C). Gonozooid developing in centre, irregular lobes, surface of initially irregularly porous but becoming thickened with reticulate calcification; rarely, as incompletely developed, having openings larger than apertures on edges of lobes. Ooeciopore located at distal end of gonozooid, facing frontally,

Korean name: [1*]왕관접시이끼벌레 (신칭)

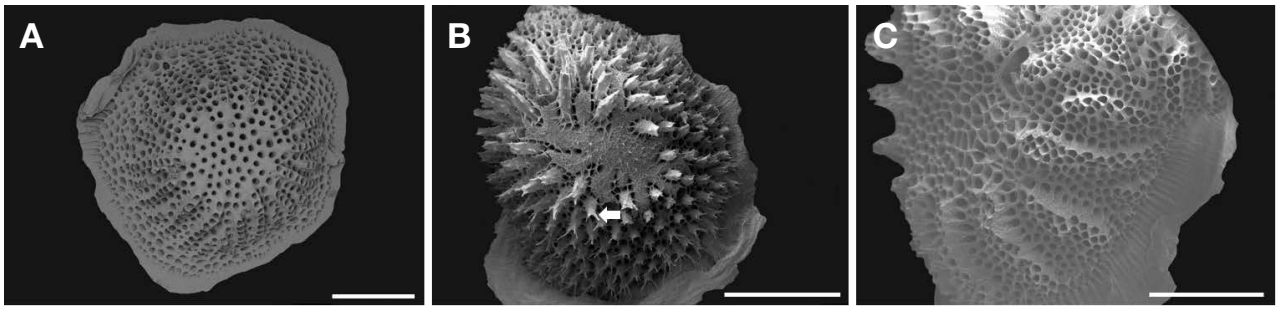

Fig. 2. Colonies of three Korean *Disporella* species. A, *D. novaehollandiae* (d'Orbigny, 1853); B, *D. pristis* (MacGillivray, 1884): white arrow indicates sharp processes of peristomes; C, *D. wanganuiensis* (Waters, 1887). Scale bars: A–C = 1 mm.

Table 2. Comparison of characteristics of three species in the genus *Disporella*

	D. novaehollandiae	*D. pristis*	*D. wanganuiensis*
Colony form	Encrusting	Encrusting	Encrusting
Sharp processes of peristomes	Absent	Present	Absent
Spines (kenozooids)	Present	Present	Absent
Radiating rows	1	Absent	1–3
Distribution	Cosmopolitan	Indo-Pacific (Japan, Indonesia, the Great Barrier Reef, southern Australia, eastern and southern Africa, and Hawaiian Islands)	Indo-Pacific (Japan, Philippines, New Zealand, and eastern Africa)

either circular or slightly oval, thin, slightly granulated (Fig. 1A, D).

Remarks. Gordon and Taylor (2001) described the peristomes of *D. pristis* as follows: peristomes sometimes continuing outwards as short connate rays, uni- to quadriserial. However, our specimens agree well with Hawaiian specimen which peristomes are not connate (Dick et al., 2006). *Disporella pristis* differs from *D. novaehollandiae* and *D. wanganuiensis* in having sharp processes on the peristome (Table 2, Fig. 2). In Korea, *D. novaehollandiae* was the only species of *Disporella* until 2021.

Distribution. Korea (Jeju Island), Indo-Pacific from Japan through Indonesia, Great Barrier Reef, southern Australia, eastern and southern Africa (Dick et al., 2006), and Hawaiian Islands.

[1*]2. *Disporella wanganuiensis* (Waters, 1887) (Figs. 2, 3)

Lichenopora wanganuiensis Waters, 1887: 346.

Disporella wanganuiensis: Gordon and Taylor, 2001: 266.

Material examined. Korea: Jeju-do: Seogwipo-si, Gapado Island, 5 Jul 2015, depth 20–28 m, MABIK IV00172838.

Substratum. Stones.

Description. Colony encrusting, centrally depressed, radiating autozooidal, 2.5–3.6 mm in diameter (Fig. 3A). Zooids connate only proximally, arranged 1–3 radiating rows from centre, proximal ends of radii sometimes fascicle-like, new rows arise by intercalation (Fig. 3A, B). Kenozooids (alveoli) variable in size, arranged 1–5 rows, interior surface with no spine. Autozooidal peristomial openings radially ovate, simple with pseudopores, aperture 70–83 μm in diameter. Marginal lamina slightly raised and smooth. Gonozooid found in alveoli centres, nearly stellated, with minute pseudopores (Fig. 3C). Ooeciopore oval, circular, 50–66 μm in diameter, vertically concentric, surrounded by flange, distal about half-way towards colony margin (Fig. 3D).

Remarks. *Disporella wanganuiensis* is differentiated from *D. novaehollandiae* and *D. pristis* by the absence of spine in the zooid or kenozooid, and the presence of 1–3 rows of connate peristomes (Table 2).

Disporella wanganuiensis was originally described from New Zealand, where it is a shelf species typically found on

Korean name: [1*]분화구접시이끼벌레 (신칭)

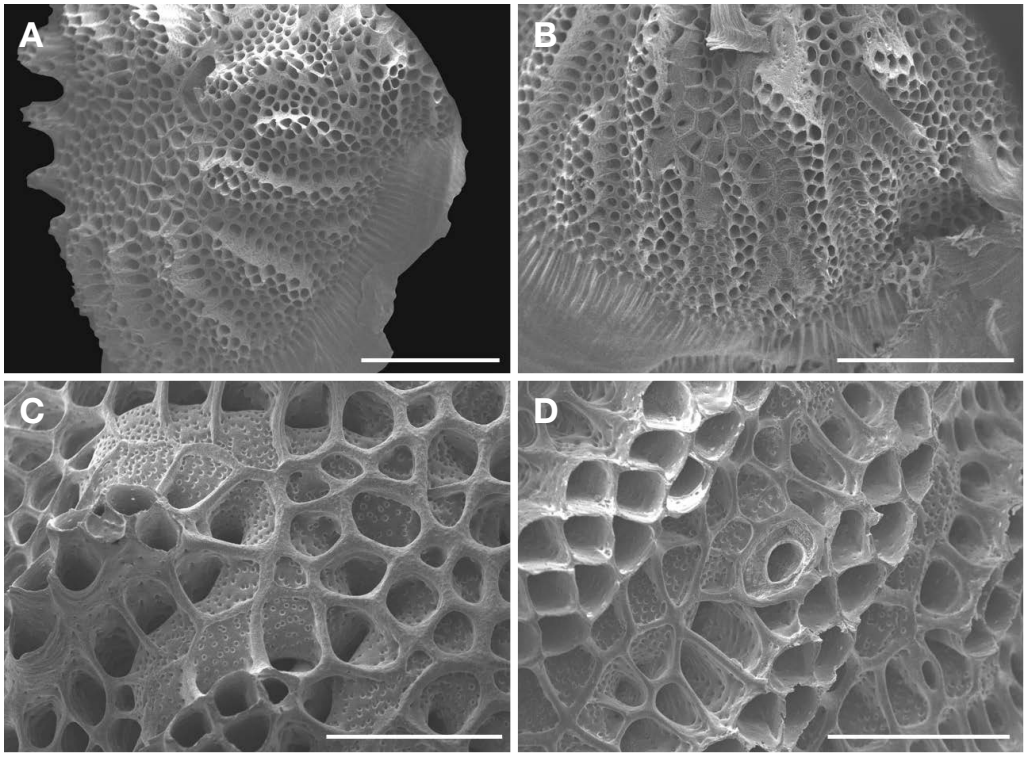

Fig. 3. *Disporella wanganuiensis* (Waters, 1887). A, Colony; B, Autozooidal radii; C, Gonozooid; D, Ooeciopore. Scale bars: A, B = 1 mm, C, D = 300 μm.

calcareous substrata, with a known depth range of 107–419 m (Gordon and Taylor, 2001). In Korea, *Disporella wanganuiensis* occurred from a depth of 20–28 m in Jeju Island, where it is quite shallower than the collected site of New Zealand.

Distribution. Korea (Jeju Island), Japan, Philippines, New Zealand, and East Africa.

DISCUSSION

Disporella Gray, 1848 can experience considerable changes in skeletal morphology as colonies grow, develop additional cormidial units and become fertile with gonozooids that may subsequently be overgrown (Talyor and Grischenko, 2015). These morphological changes make it difficult to identify *Disporella* species.

Two species of *Disporella* described here from Gapado Island (Jeju Island) and Jodo Island (South Sea) have been reported from Australia (*D. pristis*) and New Zealand (*D. wanganuiensis*). Currently, these species are distributed in the Indo-Pacific including Japan as shown in Table 2. Three species of *Disporella* has been reported in Korea, with two additional species (*D. pristis* and *D. wanganuiensis*) resulting from this study. Accordingly, the Korean cyclostomatous bryozoans have increased to 17 species, ten genera and five families in consequence of the present study. They are as follows: *Tubulipora similis* Liu in Liu, Yin and Ma, 2001, *T. perforata* Liu, Liu and Zágoršek, 2019, *T. pulchra* MacGillivray, 1885, *Exidmonea intercalata* Liu, Liu and Zágoršek, 2019, *Qingdaoella conaria* Liu, Liu and Zágoršek, 2019, *Nevianipora pulcherrima* (Kirkpatrick, 1890), *Bicrisia erecta* Mawatari and Mawatari, 1973, *Crisia cuneata* Maplestone, 1905, *C. elongata* Milne Edwards, 1838, *C. jejuensis* Chae, Min, Zágoršek, Yang, Kil and Seo, 2020, *C. spissus* Chae, Kil, Zágoršek and Seo, 2018, *Filicrisia cygnus* Chae, Min, Zágoršek, Yang, Kil and Seo, 2020, *Hornera jeongsangi* Zágoršek, Chae, Min, Yang and Seo, 2017, *Disporella novaehollandiae* (d'Orbigny, 1853), *D. pristis* (MacGillivray, 1884), *D. wanganuiensis* (Waters, 1887), and *Patinella radiata* (Audouin, 1826).

ORCID

Hyun Sook Chae: https://orcid.org/0000-0002-2702-9095
Ho Jin Yang: https://orcid.org/0000-0003-4592-8542
Bum Sik Min: https://orcid.org/0000-0003-4308-3734
Ji Eun Seo: https://orcid.org/0000-0001-5764-5457

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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