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Cribrilinidae (Bryozoa: Cheilostomata) of Korea

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Abstract

The cribrilinid Bryozoa of Korea are described for the first time. Eight species are recognized, distributed in five genera: *Cribrilina*, *Reginella*, *Jullienula*, *Figularia* and *Puellina*. *Juxtacribrilina* **n. subgen.** is recognized as comprising a group of species within *Cribrilina* characterized, *inter alia*, by having adventitious avicularia, reduced and/or vestigial ooecia, a pair of proportionately long protective latero-oral costae that cross the front of the ooecium and fuse in the midline, and a cribrimorph ancestrula. *Cribrilina* (*Juxtacribrilina*) *flavomaris* **n. sp.**, *Jullienula erinae* **n. sp.** and *Puellina paracaesia* **n. sp.** are so far known only from the west and southwest coasts of the Korean Peninsula. The following six new combinations are recognized: *Cribrilina* (*Juxtacribrilina*) *annulata* (Fabricius, 1780) **n. comb.**, *Cribrilina* (*Juxtacribrilina*) *corbicula* O'Donoghue & O'Donoghue, 1923 **n. comb.**, *Cribrilina* (*Juxtacribrilina*) *mutabilis* Ito, Onishi & Dick, 2015 **n. comb.**, *Reginella multipora* (Sakakura, 1935) **n. comb.**, *Reginella biporosa* (Okada, 1923) **n. comb.** and *Jullienula ortmanni* (Silén, 1941) **n. comb.**

Key words: new species, new genera, Yellow Sea, Baengnyeong Island, Jeju Island, *Reginella*, *Jullienula*, *Figularia*, *Puellina*, *Cribrilina*, *Juxtacribrilina*

Introduction

The most recent published paper dealing with Cheilostomata from Korea (Min e*t al*. 2017) noted that the diversity of this group in South Korea, as formally documented in the scientific literature, was 125 species. But based on many years of sampling, the collection known as the Marine Bryozoans Resources Bank of Korea (MBRBK), deposited at the Jincheon campus of Woosuk University, contains many additional taxa not described and illustrated in the monographs published by Seo (2005, 2010, 2011). This is the consequence of ongoing intensive investigations in parts of the Korean coast either not previously sampled or where the human resources were not available to work up the diversity of taxa (species, genera, families) being discovered.

One of these taxa is the acanthostegan (cribrimorph) family Cribrilinidae, a morphologically heterogeneous group that is probably not monophyletic. The family has been reported in the Straits of Korea (Japanese waters) by Okada (1923), in Russian waters of the Sea of Japan (East Sea of Korea) (Androsova 1958, 1971), in the Yellow Sea (Androsova 1959; Liu *et al*. 2001) and in the rest of the Japanese archipelago (Ortmann 1890; Okada & Mawatari 1935; Sakakura 1935; Silén 1941; Mawatari 1963; Mawatari & Mawatari 1981; Mawatari 1965, 1988; Grischenko *et al*. 2007; Hirose 2010; Dick & Grischenko 2017), so it is to be expected that cribrilinids are also found in Korean waters.

We have found eight cribrilinid species in the MBRBK and the purpose of this paper is to describe and illustrate them and evaluate their systematics in relation to the published regional studies listed above.

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Materials and methods

The bryozoan samples from which cribrilinids were sorted were collected from several localities at Baengyeong Island in northwestern Korea (Yellow Sea), from islands of the southeastern coast of the Korean Peninsula (South Sea), and from Jeju Island in the far south (East China Sea) (Table 1).

TABLE 1. Sampling localities in western and southern Korean waters.

Locality	Coordinates	Date	Depth
Hwadong, Baengnyeong Island	37.9192° N, 124.7002° E	24 Nov 2007	0.4 m
Junghwadong, Baengnyeong Island	37.9197° N, 124.6545° E	24 Nov 2007	0.4 m
Dumujin, Baengnyeong Island	37.9738° N, 124.6170° E	25 Nov 2007	0.3 m
Gobongpo, Baengnyeong Island	37.9835° N, 124.6930° E	26 Nov 2007	0.2 m
Jinchon-ri, Baengnyeong Island	37.9718° N, 124.7253° E	26 Nov 2007	0.2 m
Yeonhwa-ri, Baengnyeong Island	37.9378° N, 124.6233° E	27 Nov 2007	0.3 m
Cheongpodae, west coast	36.6334° N, 126.2997° E	26 May 2017	0.2 m
W of Cheongsan Island, South Sea	34.1585° N, 126.7689° E	29 July 2016	42 m
N of Soan Island, South Sea	34.2305° N, 126.6486° E	29 July 2016	37 m
SE of Wan Island, South Sea	34.2721° N, 126.7920° E	30 July 2016	27 m
Munseom Is., Seogwipo, Jeju Island	33.2276° N, 126.5677° E	24 Dec 2016	20 m

Specimens were air-dried. To isolate encrusting colonies from large rocks, a grinder tool (Model ACT-100SN, Keyang Co., Ansan, Korea) with a circular diamond-surfaced cutting bit was used to remove pieces (c. 2 cm) of rock with attached bryozoans. For smaller rocks and thick shells, a portable Dremel tool (Model 395JA, Dremel Co., Racine, WI, USA) with a circular diamond-surfaced cutting bit was used to cut them into smaller pieces. Colonies were examined with a stereomicroscope to select those suitable for scanning electron microscopy (SEM). Specimens were bleached and cleaned in aqueous sodium hypochlorite, washed in water and 95% ethanol, dried and coated with gold in an ion sputter coater, prior to examination with a SNE-3200M Mini-SEM at 20 kV accelerating voltage.

Measurements were made on SEM images of zooids in the zone of astogenetic repetition using ImageJ (Schindelin *et al.* 2012), and are expressed in the text as ranges and means. Abbreviations are: ZL, zooid length; ZW, zooid width; OpL, opesia length; OpW, opesia width; OrL, orifice length; OrW orifice width; AvL, avicularium length; AvW, avicularium width; OoL, ooecium length; OoW, ooecium width; AnL, ancestrula length; AnW, ancestrula width.

Some comparative material was examined based on SEM images supplied by the Natural History Museum, London (NHMUK). Some of the Korean type specimens designated herein are lodged in the National Institute of Biological Resources (NIBR), Incheon, Korea; other material is stored in the MBRBK.

Systematics

Order Cheilostomata Busk, 1852

Suborder Flustrina Smitt, 1868

Superfamily Cribrilinoidea Hincks, 1879

Family Cribrilinidae Hincks, 1879

Cribrilina (*Juxtacribrilina*) n. subgen.

Type species. *Cribrilina* (*Juxtacribrilina*) *flavomaris* Yang, Seo, Min, Grischenko & Gordon **n. sp.**