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Taxonomy of the Marine Bryozoans from Namhaedo Island and Its Adjacent Waters, Korea

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ABSTRACT

Twenty seven species of marine bryozoans from Namhaedo Island and its adjacent waters were identified. Among them, *Hippothoa distans* is new to Korean fauna and seven species are added as new to Namhaedo Island fauna. Twenty three species of them have been found also in Chejudo Island waters, which is affected by the Tsushima Current. Ten species have been found in the East Sea which is affected by both the Tsushima Warm Current and the North Korea Cold Current. So it is clear that the Namhaedo Island sea area is influenced by both the Tsushima Warm Current and the North Korea Cold Current.

Key words: Taxonomy, Marine Bryozoans, Namhaedo Island, Korea

INTRODUCTION

Namhaedo Island is located in the southern part of the Korean Peninsula. The bottom sediment in most of the South Sea is composed of sand. Fine sediment has been transported in suspension from China and has covered the sand (Chough, 1984). Thus muddy bottom extends from the west end of the South Sea to the Yeosu Peninsula. However, muddy sediment is becoming rare around Namhaedo Island, and it is difficult to find it with the naked eye. Therefore, Namhaedo Island waters are likely to provide better habitat than the west part of the South Sea for marine bryozoans which need substratum to attach.

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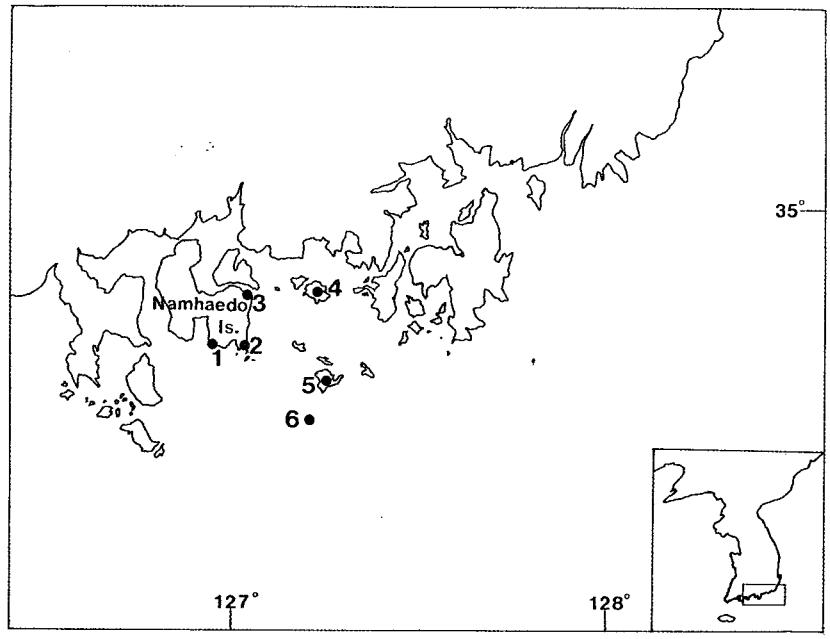

Fig. 1. A map showing the collecting localities. 1, Sangju; 2, Mijo; 3, Norumok; 4, Saryangdo; 5, Yokjido; 6, Galdo.

Twenty species has been previously reported from Namhaedo Island and its adjacent waters (Kim *et al.*, 1979; Rho and Song, 1980; Rho and Kim, 1981; Rho and Seo, 1984; 1985; 1990; Seo and Rho, 1989; Seo, 1992; 1993).

The specimens were collected from six localities (Sangju, Mijo, Norumok, Yokjido, Saryangdo and Galdo) with fishing nets and ropes, and by SCUBA divers, and by hand during the period from 1967 to 1998. Some specimens were bleached and others burned for observation with a stereomicroscope. The bleached specimens were photographed with a scanning electron microscope for more detailed observation.

SYSTEMATIC DESCRIPTIONS

* indicates the species reported previously. ** indicates the species new to the Namhaedo Island fauna. *** indicates the species new to Korean fauna. (0) next to the collection date of materials means the zooids have ovicell.

Class Stenolaemata Borg, 1926 협후 강
Order Cyclostomata Busk, 1852 원구 목
Family Crisiidae 수염이끼벌레 과
Genus Crisia Lamouroux, 1812 수염이끼벌레 속

* **1. *Crisia eburneodenticulata* Smitt, 1865** 흰수염이끼벌레
Previous records. Mijo, 21 July 1967 (Rho and Kim, 1981).
Distribution. Japan, Philippine, Australia.

Class Gymnolaemata Allman, 1856 나후 강
Order Ctenostomata Busk, 1852 즐구 목
Family Vesiculariidae Johnston, 1847 주머니이끼벌레 과
Genus *Amathia* Lamouroux, 1812 주머니이끼벌레 속
* **2. *Amathia distans* Busk, 1886** 나선주머니이끼벌레
Material examined. Sangju, 29 July 1980; Mijo (Solri), 30 Aug. 1996; Sangju, 1 Sep. 1996; Sangju, 30 June 1998 (0).
Previous records. Yonhwado, 19 July 1978; Galdo, 21 July, 1978 (Kim *et al.*, 1979).
Habitat. Seaweed, worm tube, stem of seaweed.
Distribution. Japan, Australia, Brazil.

Order Cheilostomatida Busk 1852 순구 목
Suborder Anasca Levinsen, 1909 무낭 아목
Family Membraniporidae Busk, 1854 막이끼벌레 과
Genus *Membranipora* de Blainville, 1830 막이끼벌레 속
* **3. *Membranipora tuberculata* (Bosc, 1802)** 관막이끼벌레
Previous records. Yokjido, 1 Sep. 1988 (Seo, 1992).
Distribution. Japan, cosmopolitan.

Family Bugulidae Gray, 1848 다발이끼벌레 과
Genus *Bugula* Oken, 1815 다발이끼벌레 속
* **4. *Bugula dentata* (Lamouroux, 1816)** 치상이끼벌레
Material examined. Sangju, 30 June 1998 (0).
Previous records. Sangju, 24 May 1981 (Rho and Seo, 1990); Maemuldo, 18 July 1984; Mijo, 27 April 1990 (Seo, 1992).
Habitat. Sponges
Distribution. Japan, Australia, South Pacific Ocean, Africa.
** **5. *Bugula neritina* (Linne, 1758)** 큰다발이끼벌레
Material examined. Norumok, 31 Aug. 1996 (0); Sanju (10 m deep), 1 Sep. 1996 (0); Sangju, 30 June 1998 (0).
Habitat. Sponges, seaweed.
Distribution. Japan.

Family Beaniidae Canu and Bassler, 1927 콩이끼벌레 과
Genus *Beania* Johnston, 1840 콩이끼벌레 속
** **6. *Beania hexaceras* (Ortmann, 1890)** 육콩이끼벌레
Material examined. Mijo (Solri), 30 Aug. 1996.
Remarks. Colonies show the variation in the numbers of spines as the specimens in Rho and Se

(1990) and Seo (1992).
Habitat. Seaweed.
Distribution. Japan.

Family Cabereidae Busk, 1852 카베레아이끼벌레 과
Genus *Tricellaria* Fleming, 1828 세방이끼벌레 속
* **7. *Tricellaria occidentalis* (Trask, 1857)** 세방이끼벌레
Material examined. Norumok, 31 Aug. 1996; Sangju, 1 Sep. 1996; Mijo, 30 June 1998 (0).
Previous records. Mokdo, 7 June 1974 (Rho and Song, 1980); Yonhwado, 19 July 1978 (Kim *et al.*, 1979); Sangju, 14 July 1983 (Seo, 1992).
Habitat. Seaweed, shell, other bryozoans (*Watersipora subovoidea*).
Distribution. Japan, Pacific Ocean.

Genus *Amastigia* Busk, 1852 이은이끼벌레 속
** **8. *Amastigia rudis* (Busk, 1852)** 막대이은이끼벌레
Material examined. Sangju (10 m deep), 1 Sep. 1996.
Habitat. Sponges.
Distribution. Japan, Australia, South Pacific Ocean.

Family Thalamoprellidae Levinsen, 1909 안방이끼벌레 과
Genus *Thalamoporella* Hincks, 1887 안방이끼벌레 속
* **9. *Thalamoporella lioticha* (Ortmann, 1890)** 미끈안방이끼벌레
Previous records. Pijindo, 31 May 1987; Yokjido, 1 Sep. 1988 (Seo, 1992).
Distribution. Japan.

Family Cellariidae Lamouroux, 1821 마디이끼벌레 과
Genus *Cellaria* Ellis and Solander, 1786 마디이끼벌레 속
* **10. *Cellaria punctata* (Busk, 1852)** 마디이끼벌레
Material examined. Sangju, 29 July 1980.
Previous records. Sangju, 24 May 1981; Maemuldo, 18, July 1984; Pijindo, 31 May, 1987 (Seo, 1992).
Habitat. Other bryozoans (*Fenestrulina mutabilis*).
Distribution. Japan, East China Sea, Australia.

Suborder Ascophorina Levinsen, 1909 유낭 아목
Family Hippothoidae Fischer, 1866 항아리이끼벌레 과
Genus *Hippothoa* Lamouroux, 1821 항아리이끼벌레 속
*** **11. *Hippothoa expansa* (Dowson, 1859)** 줄항아리이끼벌레 (신칭) **(Fig. 2)**
Hippothoa expansa: Osburn, 1952, p. 279, pl. 30, fig. 9; Mawatari, 1956, p. 123, figs. 6a-e, 7a, b; Soule, 1961, p. 4; Maturo and Schopf, 1968, p. 56, fig. 16; Powell, 1968, p. 2295; Morris, 1980, p. 27, text-figs. 6, 36.
Material examined. Yokjido (15 m deep), 1 Sep. 1988 (0).

Fig. 2. *Hippothoa expansa*: Female zooid and autozooid show the difference in the shape of orifice.

Description. Colonies encrusting loosely on seaweed and composed of crowded uniserial zooids. Young zooids glassy and older zooids more calcified. Zooids oval and swollen at the middle. Sporadic lateral branching occurs. Frontal area convex and marked by coarse transverse wrinkles. Orifice rounded distally and shows a distinct proximal U-shaped to V-shaped notch. Female zooids have semicircular orifice without notch. Ovicells globose and have a few pores.
Habitat. Seaweed.
Distribution. Japan, Pacific Ocean, Arctic Ocean.

Family Exochellidae Bassler, 1935 우뚝이끼벌레 과
Genus *Escharoides* Milne-Edwards, 1836 혀이끼벌레 속
* **12. *Eschoroides excavata* (MacGillivray, 1860)** 난로이끼벌레
Material examined. Saryangdo (5m deep), 5 July 1993.
Previous records. Sangju, 29 July 1980; Mijo, 27 April 1990 (Seo, 1992).
Habitat. Shell.
Distribution. California, Galapagos Islands, Australia, New Zealand, Albemarle Strait.

Family Celleporariidae Harmer, 1957 섬유이끼벌레 과
Genus *Celleporaria* Lamouroux, 1821 섬유이끼벌레 속
* **13. *Celleporaria wakayamensis* (Okada and Mawatari, 1938)** 섬유이끼벌레
Previous records. Sangju, 23 May 1981 (Seo, 1992).

Distribution. Japan.

Family Hippopodinidae Levinsen, 1909 말발이끼벌레 과
Genus *Codonellina* Bassler, 1934 종이끼벌레 속

* **14. *Codonellina obtusata* (Ortmann, 1890)** 무딘종이끼벌레

Previous records. Sangju, 24 May, 1981 (Seo, 1993).
Distribution. Japan.

* **15. *Codonellina spatulata* Okada and Mawatari, 1936** 스파툴라이끼벌레

Previous records. Sangju, 24 May, 1981 (Seo, 1993).
Distribution. Japan.

Family Hippoporidae Brown, 1952 말구멍이끼벌레 과
Genus *Calyptotheca* Harmer, 1957 은협이끼벌레 속

** **16. *Calyptotheca symmetrica* (Ortmann, 1890)** 상칭은협이끼벌레

Material examined. Sangju (10 m deep), 1 Sep. 1996.
Habitat. Shell.
Distribution. Japan.

* **17. *Calyptotheca wasiensis* (Waters, 1913)** 은협이끼벌레

Previous records. Sangju, 24 May 1981 (Seo and Rho, 1989).
Distribution. Singapore, Banda Sea, Torres Strait, Africa, Red Sea.

Family Cryptosulidae Vigneaux, 1949 숨은이끼벌레 과
Genus *Cryptosula* Canu and Bassler, 1925 숨은이끼벌레 속

** **18. *Cryptosula pallasiana* (Moll, 1803)** 숨은이끼벌레

Material examined. Sangju, 30 June 1998.
Habitat. Shell.
Distribution. Japan, Pacific Ocean, Atlantic Ocean.

Family Watersiporidae Vigneaux, 1949 물구멍이끼벌레 과
Genus *Watersipora* Neviani, 1895 물구멍이끼벌레 속

* **19. *Watersipora subovoidea* (d'Orbigny, 1842)** 자주빛이끼벌레

Material examined. Galdo, 21 July 1978; Mijo, 1 Aug. 1980; Sangju, 29 June 1998; Sangju, 30 June 1998; Mijo, 30 June 1998.
Previous records. Mijo, 8 June 1974 (Rho and Seo, 1984); Sangju, 6 June 1974 (Seo, 1992); Pijindo, 7 July 1978 (Rho and Seo, 1984); Mijo, 1 Aug. 1980; Sangju, 15 Nov. 1980 (Seo, 1992); Sangju, 20 May 1981 (Rho and Seo, 1984); Mijo, 27 April 1990 (Seo, 1992).
Habitat. Sponges, shell, seaweed.
Distribution. Japan, cosmopolitan.

Family Schizoporellidae Jullien, 1883 구멍이끼벌레 과
Genus *Arthropoma* Levinsen, 1909 관절이끼벌레 속

** **20. *Arthropoma cecilii* (Audouin, 1826)** 관절이끼벌레

Material examined. Mijo (Solri), 30 Aug. 1996.
Habitat. Seaweed.
Distribution. Japan, cosmopolitan.

Genus *Schizoporella* Hincks, 1877 구멍이끼벌레 속
** **21. *Schizoporella unicornis* (Johnston, 1841)** 한구멍이끼벌레
Material examined. Sangju, 30 June 1998.
Habitat. Sponges.
Distribution. Japan, cosmopolitan.

Family Smittinidae Levinsen, 1909 입이끼벌레 과
Genus *Smittoidea* Osburn, 1952 태양입이끼벌레 속
* **22. *Smittoidea prolifica* Osburn, 1952** 입이끼벌레
Previous records. Sangju, 24 June 1981 (Seo, 1993).
Distribution. Japan, California.

Family Escharellidae Levinsen, 1909 빛이끼벌레 과
Genus Mucronella Hincks, 1880 침이끼벌레 속
* **23. *Mucronella perforata* Okada and Mawatari, 1937** 구멍침이끼벌레
Material examined. Sangju, 21 May 1981; Sangju (10 m deep), 1 Sep. 1996.
Previous records. Sangju, 20 May 1981 (Rho and Seo, 1985); Pijindo 19 July 1984 (Seo and Rho, 1989).
Habitat. Coral.
Distribution. Japan.

Family Microporellidae Hincks, 1879 소공이끼벌레 과
Genus *Microporella* Hincks, 1877 소공이끼벌레 속
* **24. *Microporella discors* Uttley and Bullivant, 1972** 불협화소공이끼벌레
Previous records. Mokdo, 29 July 1980 (Seo and Rho, 1989).
Distribution. Chatham Islands.
* **25. *Microporella cribrosa* Osburn, 1952** 체소공이끼벌레
Previous records. Mijo, 1 Aug. 1980 (Seo, 1992).
Distribution. California.

Genus *Fenestrulina* Jullien, 1888 방사이끼벌레 속
* **26. *Fenestrulina mutabilis* (Hastings, 1932)** 변이방사이끼벌레
Previous records. Pijindo, 19 July 1984 (Seo and Rho, 1989); Sangju, 29 July 1979 (Seo, 1992).
Distribution. Japan, Queensland, Netherlands.

Family Celleporidae Lamouroux, 1821 가지이끼벌레 과
Genus *Celleporina* Gray, 1848 가지이끼벌레 속

Table 1. The regional distribution of the marine bryozoans from Namhaedo Island and its adjacent waters.

Species \ Regions	Cheju Island	East Sea	Yellow Sea
Crisia eburneodenticulata	+		+
Amathia distans	+	+	+
Membranipora tuberculata	+		
Bugula dentata	+	+	
Bugula neritina			+
Beania hexaceras	+	+	+
Tricellaria occidentalis	+	+	+
Amastigia rudis	+		+
Thalamoporella lioticha	+		
Cellaria punctata	+	+	+
Hippothoa expansa			
Escharoides excavata	+		
Celleporaria wakayamensis	+		+
Codonellina obtusata	+		
Codonellina spatulata	+		+
Calyptotheca symmetrica	+		
Calyptotheca wasiensis	+		+
Cryptosula pallasiana			
Watersipora subovoidea	+	+	+
Arthropoma cecilii	+		
Schizoporella unicornis		+	+
Smittoidea prolifica	+		
Mucronella perforata	+	+	+
Microporella discors	+	+	
Microporella cribrosa	+		+
Fenestrulina mutabilis	+		+
Celleporina porosissima	+	+	+
Total	23	10	16

*** 27. *Celleporina porosissima* (Okada, 1923)** 포로시씨마이끼벌레

Material examined. Mijo, 30 June 1998.

Previous records. Yokjido, 1 Sep. 1988 (Seo, 1992).

Habitat. Stem of seaweed.

Distribution. Japan.

DISCUSSION

As a result of the study on the marine bryozoans from Namhaedo Island and its adjacent waters, a total of 27 species were found. Among them *Hippothoa expansa* is new to Korean fauna and seven species new to Namhaedo Island. Table 1 shows the three regional distribution of them except the South Sea including Namhaedo Island. Two branches of the Kuroshio Warm Current flow into the Yellow Sea and East Sea respectively passing Chejudo Island waters. However, the East sea is also affected by the North Korea Cold Current. As shown in table 1, twenty three of the 27 species (85%) were found also in Chejudo Island waters, 16 species in the Yellow Sea and 10 in the East Sea. More species are shared with Chejudo Island waters and the Yellow Sea than the East Sea. It is clear that the distribution of species from Namhaedo Island is more influenced by the Kuroshio Warm Current than the North Korea Cold Current.

REFERENCES

Chough, S. K., 1984. Further evidence of the fine-grained sediment dispersal in the southeastern Yellow Sea. Sed. Geol., **41**: 159-172 (from KORDI, 1993).

Kim, H. S., B. J. Rho, S. Y. Hong, I. H. Kim, S. Shin and C. H. Han, 1979. The marine invertebrate fauna in the southern part of Geoje Island and its by adjecent five islands. The report of the Korean Association for Conservation of Nature, (14): 103-126.

Korea Ocean Research and Development Institute, 1993. Oceanographic Atlas of Korean Waters vol.2. South Sea. pp. 157.

Maturo, F. J. S. Jr. and T. J. M. Schopf, 1968. Ectoproct and Entoproct type material: Postilla, (120): 1-95.

Mawatari, S., 1956. Cheilostomatous Bryozoa from the Kurile Islands and the neighbouring districts. Pacif. Sci., **10**: 113-135.

Morris, P. A., 1980. The byrozoan Family Hippothoidae (Cheilostomata-Ascophora) with emphasis on the Genus *Hippothoa*. Monograph series of the Allan Hancock Foundation, (10): 1-113.

Okada, Y. and S. Mawatari, 1936. Bryozoa fauna collected by the "Misago" during the zoological survey around Izu Peninsula (II). Sci. Rep. Tokyo Bunrika Daigaku sect. B., **3**(49): 53-73.

Osburn, R. C., 1952. Bryozoa of the Pacific coast of America part I. Cheilostomata- Anasca. Allan Hancock Pacific Expedition, **14**(2): 271-518.

Powell, N. A., 1968. Bryozoa (Polyzoa) of Arctic Canada. Jour. Fish. Resear. Board Canada, **25**(11): 2269-2320.

Rho, B. J. and H. K. Kim, 1981. A study on the marine bryozoans in Korea 3. Stenolaemata and Gymnolaemata. J. Kor. Res. Inst. Bet. Liv., **54**(27): 57-80.

Rho, B. J. and J. E. Seo, 1984. A systematic study on the marine bryozoans in Cheju-do, Kor. J. Zool., **29**(1): 31-60.

Rho, B. J. and J. E. Seo, 1985. A systematic study on the marine bryozoans in Korea 5. Cheilostomata. J. Kor. Res. Inst. Bet. Liv., Ewha Womans Univ., **35**: 53-68.

Rho, B. J. and J. E. Seo, 1990. A systematic study on the marine bryozoans in Korea 7. Suborder Suborder

Anasca. Korean J. Syst. Zool., **6**(1): 145-160.

Rho, B. J. and J. I. Song, 1980. A systematic study on the marine bryozoans in Korea 2. Anasca Cheilostomata Commem. Papers Prof. C.-W. Kim's 60th Birth. Anniv., pp.147-162.

Seo, J. E., 1992. A systematic study on the bryozoans from the South Sea in Korea I. Cheilostomata. Korean J. Syst. Zool., **8**(1): 141-160.

Seo, J. E., 1993. Systematic study on bryozoans from the South Sea in Korea II. Smittinidae. Korean J. Syst. Zool., **9**(1): 35-50.

Seo, J. E. and B. J. Rho, 1989. A systematic study on the marine bryozoans in Korea 6. Ascophora. Korean J. Syst. Zool., **5**(2): 205-223.

Soule, J. D., 1961. Results of the Puritan American Museum of Natural History Expedition of western Mexico 13. ascophoran Cheilostomata (Bryozoa) of the Gulf of California. Amer. Mus. Novit., **2053**: 1-66, figs. 1-4.

Soule, D. F. and J. D. Soule, 1976. Species groups in Watersiporidae. Docum. Lab. Geol. Lyon H. S. (fasc.2): 299-309, pls. 1-4.

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한국 남해도 해역의 태형동물에 관한 분류

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요 약

남해도와 인근해의 해산 태형동물 27종을 보고하며, 이중에서 줄항아리이끼벌레 (*Hippothoa distans*)는 한국미기록종이다. 이들 중 23종은 제주도 해역에도 분포하는 종이고 10종은 동해에도 분포하고 있었다. 이와 같은 사실은 남해도의 태형동물 분포상이 쓰시마난류와 북한한류의 영향을 받고 있음을 나타낸다.