

A New Record of Smittinid Bryozoa (Gymnolaemata, Cheilostomata) from Manjae Island, Korea

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ABSTRACT

One of bryozoans collected from the subtidal zone of Manjae Island on Aug. 23, 1988 was identified. *Parasmittina delicatula* (Busk, 1884) turned out to be new to the Korean fauna. Therefore, twelve bryozoan species are reported from Manjae Island so far. Ten species including the present one among them were recorded only from the Pacific Ocean. They consisted of four tropical, three cold temperate and four endemic species to Korea and Japan. It is quite probable that Manjae Island, which is influenced by both warm and cold water currents, seems to be unique and significant area in terms of marine zoogeography.

Key words : New record, *Parasmittina*, Smittinid, Manjae Island, Korea.

INTRODUCTION

Manjae Island (34° 12'00", 12° 29'30") is located at the west end of the South Sea and the south end of the Yellow Sea, which is affected not only by the Tsushima warm current strongly, but also by the Korean cold coastal water. Thus Manjae Island shows the lowest coastal water temperature among the other areas of the South Sea by the Korean coastal cold water (Kordi, 1991). This means that Manjae Island fauna is likely to show uniqueness in marine invertebrates diversity, compared with the eastern part of the South Sea mainly influenced by the Tsushima warm current. It was reported that the subtidal zone of Manjae Island was dominated by the bryozoans, sponges and some corals (Kordi, 1991). However, the poor collectings from Manjae Island were done, so

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that only eleven species have been reported so far: *Beania vegae*, *Amastigia rudis*, *Caberea lata*, *Cellaria punctata*, *Hippothoa distans*, *Crepidacantha poissoni*, *Codonellina acuta*, *Fenestrulina malusii*, *Celleporina geminata*, *Celleporina porosissima* and *Phidolopora pacifica* (Kordi, 1991; Seo, 1992, 2000). The more examination of the specimens from Manjae Island resulted in the identification of a smittinid species new to the Korean fauna. The present species is redescribed and illustrated with scanning electron micrographs.

DESCRIPTION OF SPECIES

Phylum Bryozoa Ehrenberg, 1831 태형동물문
 Class Gymnolaemata Allman, 1856 나후강
 Oder Cheilostomata Busk, 1852 순구목
 Suborder Ascophora Levinsen, 1909 유낭아목
 Family Smittinidae Levinsen, 1909 입이끼벌레과
 Genus *Parasmittina* Osburn, 1952 측입이끼벌레속

***Parasmittina delicatula* (Busk, 1884) 고운입이끼벌레 (신칭) (Fig. 1)**

Mucronella delicatula Busk, 1884, p. 156.

Smittina unispinosa: Brown, 1952, p. 327.

Smittina aviculata Mawatari, 1952, p. 240, fig. 15.

Parasmittina unispinosa: Powell, 1967, p. 330.

Parasmittina decorata: Soule and Soule, 1973, p. 398, fig. 6A-C.

Parasmittina delicatula: Soule and Soule, 1973, p. 401, fig. 6D-F; Gordon, 1984, p. 94, pl. 35, A; 1989, p. 53; Gordon and Mawatari, 1992, p. 33, pl. 9, C; Hayward and Parker, 1994, p. 57, figs. 2D-F, 3A-D.

Material examined. Manjae Island (20 m deep), Aug. 23, 1988, J. K. Je.

Description. The colony unilamellar, encrusting the other bryozoans or forming tube around hydrozoans and stems of seaweeds. Zooids (Fig. 1A) 0.24-0.34 mm wide, 0.66-0.81 mm long, rectangular to subquadrate, arranged regularly. Zooidal boundaries look very clear and salient. Frontal wall in young zooids (Fig. 1A) finely granular and smooth looking, distinctly granular in older zooids with 9-11 areolae along each lateral margin. Primary orifice (Fig. 1C) 0.13 mm long in average, subcircular with moderately broad and truncate lyrula and a pair of small thorn-like condyles. Peristome completely encircling the primary orifice, especially developed on each side, thus forming angular lappet. Oral spine (Fig. 1C) one or none, inside the distal peristomial rim in the mid-line. Avicularia of three types; generally one or two of small elongate oval or spatulate avicularia (Fig. 1A) with a pair of pivot bars on the frontal, directed proximally or lateroproximally. Pyriform avicularium (Fig. 1B) with round triangular mandible, shorter than above, with raised rostrum with a rather large premandibular area, with complete pivot bar. Large subspatulate avicularium (Fig. 1C) with complete pivot bar, situated lateral to orifice along lateral margin of autozoid, almost as long as them. Ovicell (Fig. 1D) moderately large, about 0.38 mm wide as same as long, the distal side covered in encroaching secondary calcification, the proximofrontal surface perforated by many pores.

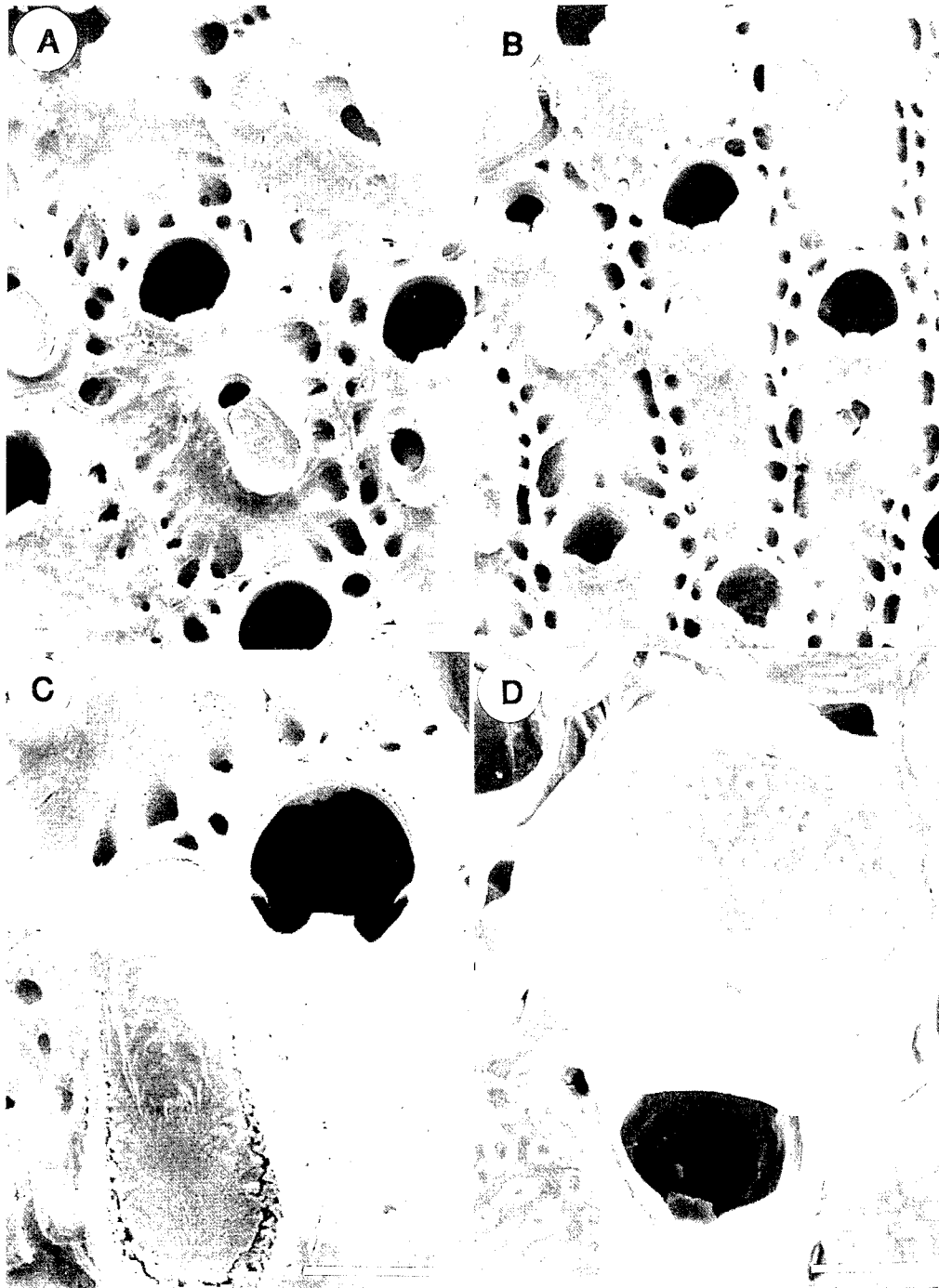


Fig. 1. *Parasmittina delicatula* (Busk, 1884). A, zooids with one or two spatulate avicularia on the frontal wall; avicularium with a pair of pivots; B, some zooid bearing a triangular avicularium with raised rostrum; C, a large spatulate avicularium shown in some zooid; primary orifice with one spine, lyrula and a pair of condyles; D, ovicell with pores on its proximofrontal surface. Scale bars are 0.1 mm.

Remarks. *Parasmittina delicatula* is described to be a variable and adaptable species by Hayward and Parker (1994). Especially avicularia are highly variable in both size and form. Pyriform avicularium is bigger in New Zealand specimens (Gordon and Mawatari, 1992) than in Manjae Island's one. Large spatulate avicularium looks rather subspatulate in our specimen, but it is spoon-shaped with broader distal part in Hawaiian and New Zealand specimens (Hayward and Parker, 1984; Gordon, 1984). In addition, our specimen shows a few differences from the one in New Zealand. The former has longer (0.66-0.81 mm) and narrower (0.24-0.34 mm) zooids than the latter which is 0.48-0.78 × 0.32-0.53 mm. It is also different from the latter which has complete pivot bar by having a pair of pivots in the small spatulate avicularium. The proximofrontal surface of the ovicell was perforated by around 20 pores in New Zealand specimens (Gordon, 1984). This is different from Korean specimen which has about 40 pores. Whereas Hawaiian specimens have one or two spines (Soule and Soule, 1973), both Manjae Island and New Zealand specimens bear only one spine or none (Gordon, 1984).

Mawatari (1952) recorded a new species, *Smittina aviculata* from Kii Peninsula. His illustrations show all of diagnostic features that are found in Korean specimen. Therefore, I totally agree with Gordon (1984) who explained that *Smittina aviculata* is certainly conspecific with *P. delicatula*, even though the former shows slight difference in location of the pyriform avicularium lateral to the peristome from the latter. However, *Parasmittina aviculata* (Mawatari, 1952) from Indian waters, which is described to be synonymous to *Smittina aviculata* from Japan by Menon (1972), doesn't seem to be *P. delicatula*. The former which has small pointed avicularia below the orifice and two inconspicuous spine bases is clearly different from the latter which has no pointed avicularium lateral to the peristome and only one spine or none. Besides the present species has one or two spatulate avicularia on the frontal surface.

The present species was found at wharf pilings as well as below low tide from New Zealand (Gordon and Mawatari, 1992). The specimen from Manjae Island was collected only from the subtidal zone. Therefore this species needed to be monitored as one of expected fouling bryozoans at ports and harbors of Korea.

Distribution. Korea (South Sea), Japan (Kii Peninsula), Hawaii, Australia (Victoria, New South Wales), New Zealand.

DISCUSSION

Manjae Island is located at the west end of the South Sea where the north limit of the tropical and warm temperate species, and transition zone to cold temperate or boreal exist, and thus shows the lowest water temperature of the South Sea by the influence of the Korean cold coastal waters (Kordi, 1991).

Table 1 shows the distributional forms of ten bryozoan species of twelve from Manjae Island, except for *Caberea lata* which recorded from both the Pacific and Indian Ocean and *Fenestrulina malusii* which is cosmopolitan. All of ten were found only in the Pacific Ocean. Four of which were endemic species to Korea and Japan and four (*Amastigia rudis*, *Hippothoa distans*, *Crepidacantha poissoni* and *Phidolopora pacifica*) were also found from tropical waters including

Table 1. The distribution of bryozoan species from Manjae Island endemic to the Pacific Ocean.

	Pacific Ocean				
	only in Korea & Japan	warm temperate	warm and cold temperate	warm temperate to tropical	cold temperate to tropical
<i>Beania vegae</i>	*				
<i>Amastigia rudis</i>				*	
<i>Cellaria punctata</i>		*			
<i>Hippothoa distans</i>					*
<i>Crepidacantha poissoni</i>				*	
<i>Codonellina acuta</i>	*				
<i>Parasmittina delicatula</i>			*		
<i>Celleporina geminata</i>	*				
<i>Celleporina porosissima</i>	*				
<i>Phidolopora pacifica</i>					*

the temperate area. And *Hippothoa distans*, *Parasmittina delicatula* and *Phidolopora pacifica* are also reported from cold waters.

It is quite certain that Manjae Island area showing diverse distributional forms of species as shown in Table 1 is more influenced by the Korea coastal cold water than the southern and eastern area of the South Sea, whereas Munseom, Kwantaldo and Yeoseodo where are located in the area that the Tsushima warm water current flows in the South Sea showed the diversity of tropical or subtropical species (Kordi, 1991). It is probable that more cold temperate or subantarctic species seem to occur in Manjae Island. The intensive examination of the specimens from Manjae Island will result in diverse bryozoan fauna and shows the zoogeographical significance of this Island.

P. delicatula is reported as fouling bryozoan from New Zealand. Mawatari (1981) recorded two smittinid species, *P. collifera* and *P. trispinosa* as the fouling animals from Japan. These species are not recorded from Korean waters yet. Twenty three species of fouling bryozoans are listed with the all the fouling animals reported in the area of power plant in Weolseong and Seocheon by Song (1985). Four species of them were smittinids, *Smittina landsborovii*, *Smittina levis*, *Parasmittina triangulis* and *Smittoidea pacifica*. Therefore it is very possible that more fouling smittinid bryozoans will be recorded in the Korean fauna newly by the intensive research on the fouling bryozoans in the future.

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요 약

남해의 서쪽 끝에 위치한 만재도의 조하대로부터 1988년 8월 23일에 채집된 대형동물을 분류한 결과 고운입이끼벌레 (*Parasmittina delicatula*)가 한국미기록 종으로 밝혀졌다. 만재도에서 보고된 12종 중 10종은 오직 태평양에서만 밝혀진 종들로서 4종은 열대종, 3종은 한류의 영향을 받는 곳에서도 보고되는 종이고 4종은 한국과 일본에서만 밝혀진 고유종이다. 만재도는 대마난류와 서해연안냉수의 영향을 모두 받는 동물지리학적으로 독특하며 중요한 지점으로 여겨진다.