

**Three New Horny Sponges of the Genus *Psammocinia*
(Dictyoceratida: Irciniidae) from Korea**

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ABSTRACT

Three new *Psammocinia* species of the family Irciniidae, *Psammocinia jejuensis*, *P. mosulpia* and *P. mammiformis*, are described from Cheju Island and Namhae Island, Korea. The characteristic of these *Psammocinian* sponges is that they have the large quantity of sand grain in fibres, matrix and surface sand crust.

Key words: new species, horny sponge, *Psammocinia*, Korea

INTRODUCTION

There are no mineral skeletons in three orders, Dictyoceratida, Dendroceratida and Verongida, of the marine Demospongiae. The skeleton is replaced by collagenous elements which, in most representatives, are composed of spongin fibre. These orders are so called horny sponges (Laubenfels, 1948; Lendenfeld, 1889; Dendy, 1905; Bergquist, 1978; 1995). Because there are no spicules to describe, systematic diagnoses of horny sponges have frequently been inadequate, and there has been little serious attempt to find other characters which are informative (Bergquist, 1980).

The genus *Psammocinia* was included in the family Thorectidae (Bergquist, 1980). Bergquist and Wells (1983), in their study on sponge chemotaxonomy, noted that *Ircinia*, *Sarcotragus* and *Psammocinia* represented a distinct sub-group within that large assemblage. These genera were separated from family Thorectidae and transferred to family Irciniidae (Bergquist, 1995).

The characteristic of the family Irciniidae is that it has the fibres making up the anastomosing skeleton. The large quantities of debris are incorporated in the fibre skeleton and interstitially. The

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primary fibres are always fasciculate. The secondary fibres are uncored. The third element of the skeleton consists of fine collagenous filaments. The sponge is very tough and almost impossible to tear because of these filaments. Filaments have terminal knobs.

The characteristic of this genus *Psammocinia* is that it has the large quantity of sand grain in fibres matrix and surface sand crust. Surface conules can be reduced to mammiform protuberances. Lendenfeld (1889) reported eight species in subgenus *Psammocinia*. Of these, only four species (*Hircinia rugosa*, *H. arenosa*, *H. compacta* and *H. halmiformis*) are included in genus *Psammocinia*. *Psammocinia tubifera* are reported from New Caledonia (Bergquist, 1995). About the Korean horny sponge only two species in Dictyoceratida are reported from Cheju Island (Sim, 1985). Hoshino (1981) reported twelve species from Japan.

In this study, 40 specimens of order Dictyoceratida collected from South Sea of Korea were examined. Among them three *Psammocinia* species are turned out to be new to science. The materials examined in the present study were collected by SCUBA diving and fishing-nets. For the identification of horny sponge, light microscope and SEM (AKASHI ISI-SS40) were used for the fibre arrangement.

RESULT

Phylum Porifera Grant, 1836 해면동물 문
Class Demospongiae Sollas, 1885 보통해면 강
Order Dictyoceratida Minchin, 1900 망각해면 목
Family Irciniidae Gray, 1867 가는실해면 과

1. *Psammocinia mammiformis* n. sp. 유두모래해면(신칭) (Fig. 1 A-F)

Material examined. Holotype; Por. 27 (Hannam Univ. NHM), Manjaedo (Namhae Island) on 23 Aug. 1988. Two Paratypes; Por. 27-1, 27-2 (Hannam Univ. Dept. of Biology) collected with Holotype.

Description. Type specimen spherical, a little lobate, 7.5 cm long, 2.5 cm thick and 3.5 cm wide. The surface covered with mammiform protuberance, 1 mm high, 2 mm apart. Oscules 3 mm in diameter rare and situated on the summits of lobes. Pore not visible. Texture compressible and colour in life grayish purple. Cortex have thin membranous dermis mixed with filaments. Underneath surface there sand crust. Thin fasciculate primary columns contain sand 140-400 μm in diameter, Uncored secondary fibre, 62-140-550 μm in diameter. Choanosome, stout fasciculate primary fibre mixed with long chain sand, 550-900 μm in diameter. In secondary fibre no cored with debris, 180-750 μm in diameter. Primary fibres only weakly fasciculate and almost obscured by accumulation of sands, 20-60 μm in diameter. Filament 3-7 μm in diameter, terminal knobs 10-17 μm in diameter.

Remarks. This new species is similar to *Psammocina rugosa* Lendenfeld, 1889, in sponge shape. The latter has conules which are a little sharp and rare, and the filaments of the specie are not abundant and have small terminal knob (Table 1). The filaments of the new species are arranged tightly inside the surface and mixed with matrix. They are very tough and difficult to tear.

Etymology. The specific name refers to the mammiform protuberance of the sponge surface.

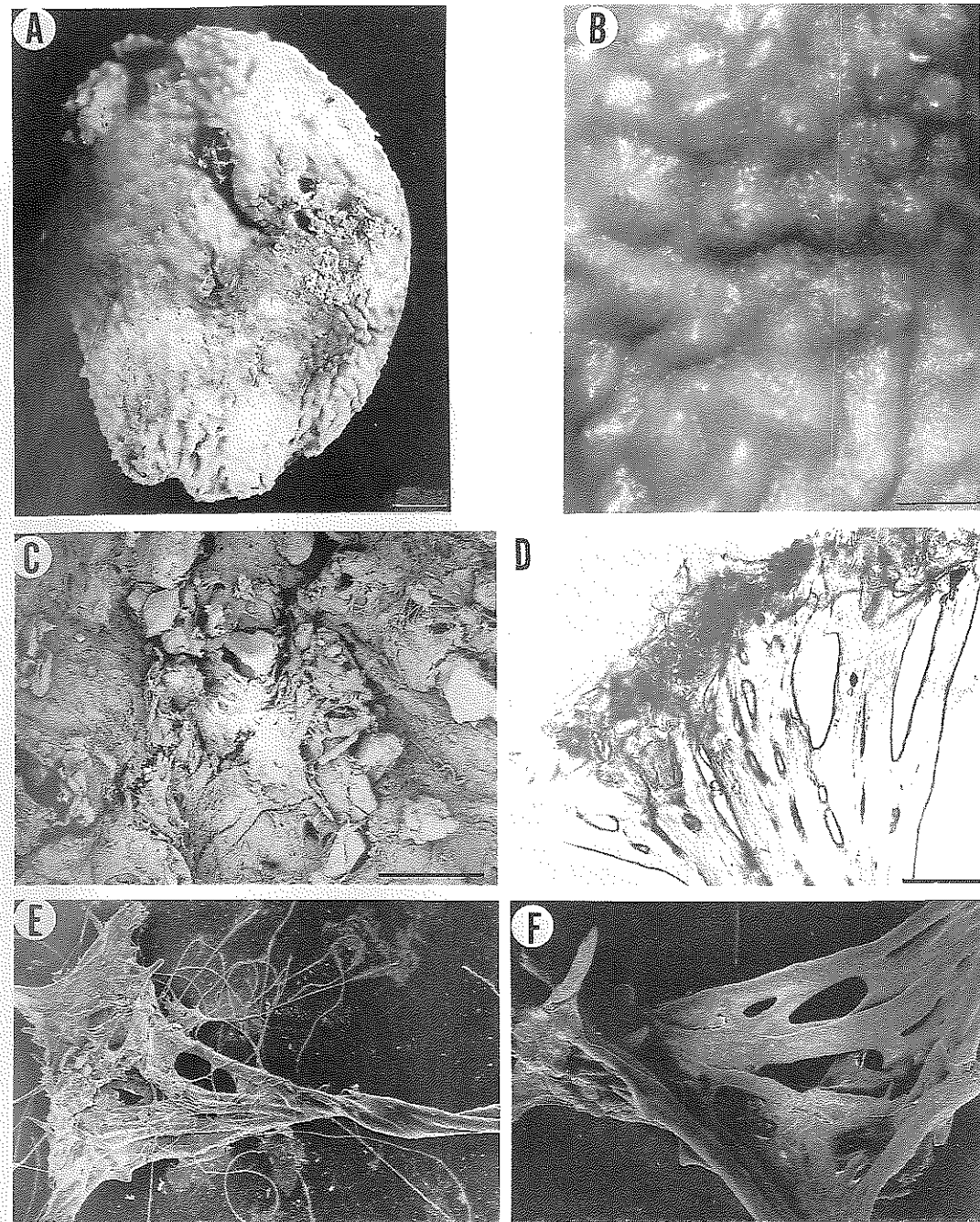


Fig. 1. *Psammocinia mammiformis* n. sp.: A, side view showing surface; B, surface of specimen (conules); C, endosome of specimen (transitional section, SEM); D, cortex fibre; E, cortex fibre and filaments (SEM); F, choanosome fibre (SEM). Scale bars: A-B, 1 cm; C, 400 μm ; D, 100 μm ; E, 400 μm ; F, 100 μm .

Table 1. Comparison of *Psammocinia mammiformis* n. sp. with *P. rugosa*

Characters	Species	
	<i>P. mammiformis</i> n. sp.	<i>P. rugosa</i>
Surface mammiform protuberance	1 mm high, 2 mm apart	2-3 mm high, 4-6 mm apart
Filament	abundant	not abundant
Filament terminal knob	10-17 μ m in diameter	3 μ m in diameter

2. *Psammocinia mosulpia* n. sp. 모슬모래해면 (신칭) (Fig. 2A-H)

Material examined. Holotype; Por. 28 (Hannam Univ. NHM), Mosulp'o (Cheju Island) on 6 Sep. 1988. (fishing-net) 100 m deep.

Description. Type specimen a irregular massive, somewhat lobate, 7 cm high, 10 cm wide and 2.3 cm thick, attached to shell. Surface has low mammiform protuberance, 1-3 mm high, 2-4 mm apart, and pore visible. Oscules 0.5 mm in diameter, situated apically on each sharp lobe which arises from sponge base. Inside of surface has large black sands like a pigment. Texture tough and sponge easily torn. Colour, gray outside and beige inside in spirit. Cortex has very abundant filament mixed with large black sand, 400-600 μ m in diameter. Underneath of surface have sand crust mixed with spicules. Primary fibres small size up 60-280 μ m in diameter, sometime mixed with large sand in part of fasciculated. Uncored secondary fibres, 32-100 μ m in diameter. Choanosome stout simple primary fibre mixed with sand and rare spicules 150-400 μ m in diameter. Secondary fibre 15-50 μ m in diameter. Filament loosely arrange, 3-8 μ m in diameter, terminal knobs, 12-16 μ m in diameter.

Remarks. This new species is distinct from other species of the genus in its sand crust mixed with spicules. Large spicules and sand are including in primary fibre. Mostly large sand attached outside of the fibre.

Etymology. This species is named after its type locality.

3. *Psammocinia jejuensis* n. sp. 제주모래해면 (신칭) (Fig. 3A-H)

Material examined. Holotype; Por. 29 (Hannam Univ. NHM), Kimnyong (Cheju Island) on 15 Jul. 1991, (SCUBA) 10 m deep.

Description. Type specimen a massive, 7.5 cm long, 6 cm wide and 2.5 cm thick, attached to rocky substrate. Surface has small conules, 1-2 mm high, 2-5 mm apart. Inside of conules has irregular network. Surface of basal part and top of sponge coated with many shell, 1-5 mm in diameter. Several oscules, 1-3 mm diameter, found on top margin of sponge. Pore not visible. Texture tough and hard like stone, colour beige brown in spirit. Cortex has filamentous membrane mixed with many spicules and sand. Fibres a irregular network and interlock to make up stout fasciculate columns up to 150-470 μ m across. Secondary fibres also irregularly arranged 40-190 μ m in diameter. In choanosome, short secondary fibre connected with sand. Collagen filaments fine, 3-9 μ m in diameter, spherical terminal knobs, 12-20 μ m in diameter.

Remarks. Surface and inside of the sponge has many large piece of shell, 5 \times 6 mm. In the choanosome there are found only short secondary fibres, but rare primary fibres. In the choanosome its contains also the large sand and shell surporting the sponge instead of the fibres. Filaments of this new species have thicker knob than other *Psammocinia* knob. Mostly large sand attached to the

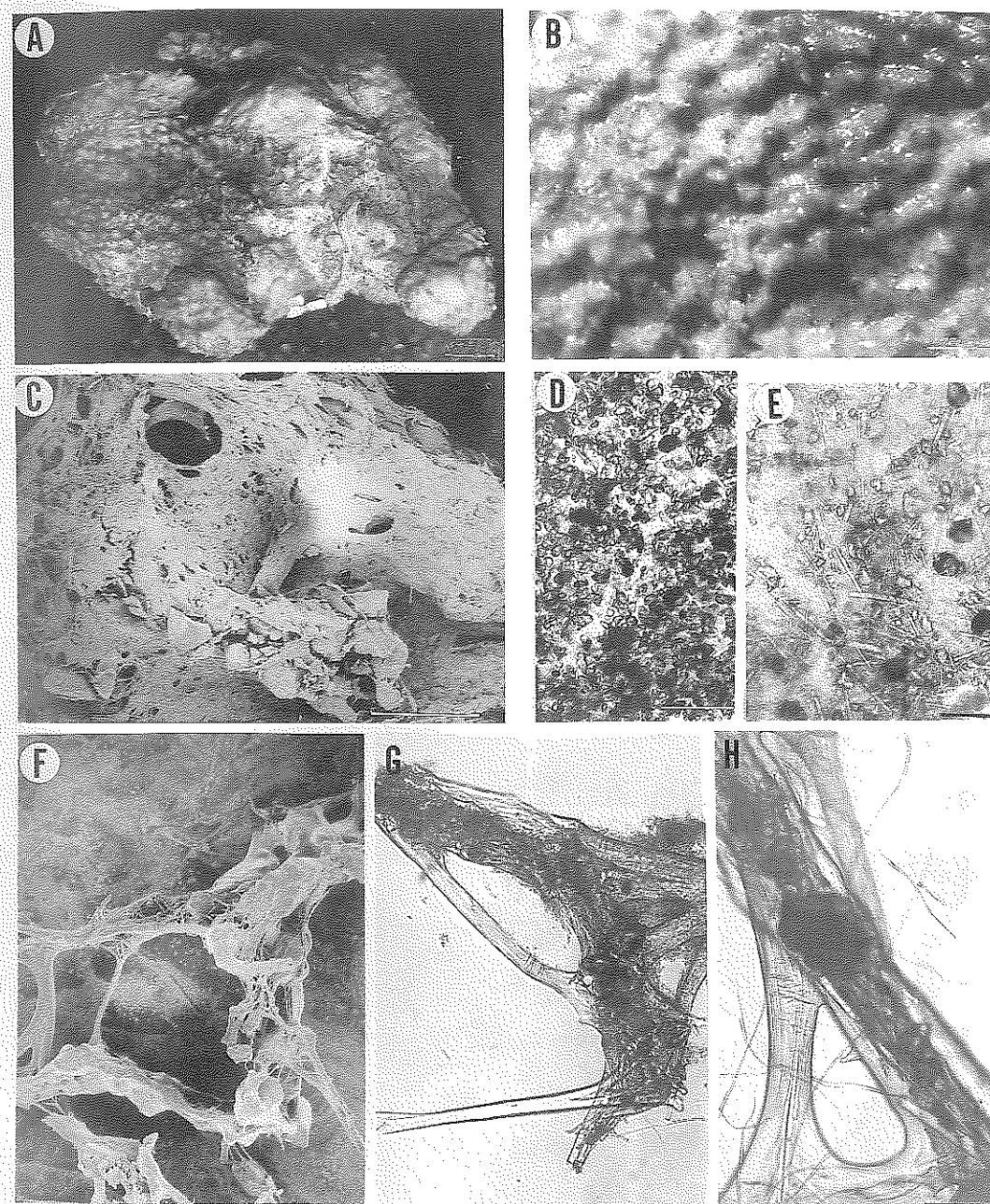
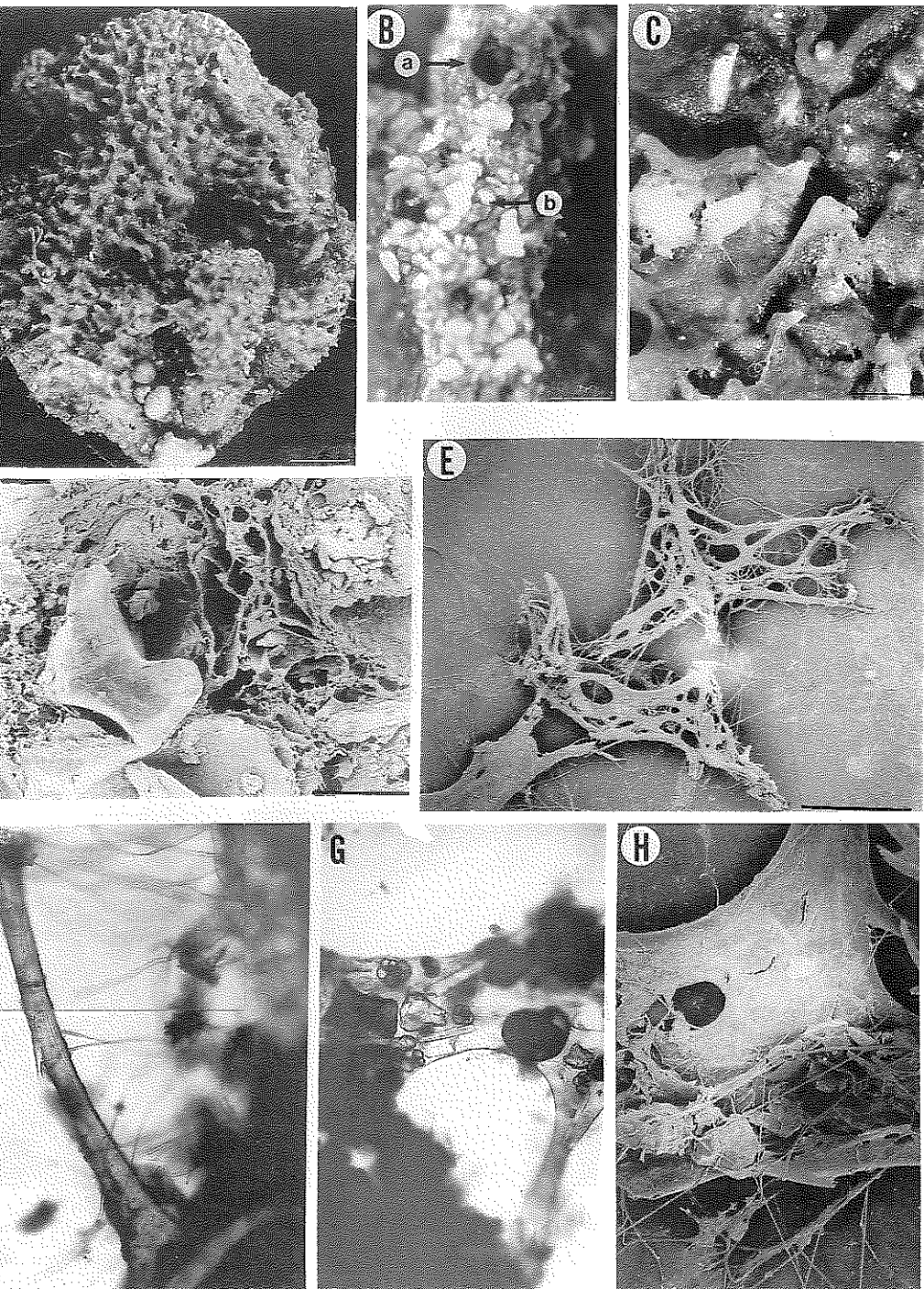


Fig. 2. *Psammocinia mosulpia* n. sp.: A, side view showing surface; B, surface of specimen (conules); C, endosome of specimen (transitional section, SEM); D, sand crust; E, sand crust mixed with sponge spicules; F, choanosome fibre (SEM); G, cortex fibre; H, choanosome fibre. Scale bars: A-B, 1 cm; C, 400 μ m; D, 200 μ m; E, 100 μ m; F, 400 μ m; G-H, 100 μ m.

outside of fibre, small sand to the inside of fibre. This new species is very hard like stone.

Etymology. The species is named after its type locality.



3. *Psammocinia jejuensis* n. sp.: A, side view showing surface; B, a, oscule, b, armored with sand; C, surface of specimen (conules); D, endosome of specimen (transitional section, SEM); E, cortex fibre and filaments; F, choanosome secondary fibre; G, cortex fibre; H, cortex fibre (SEM). Scale bars: A-C, 1 cm; D-E, 400 μ m; F-H, 100 μ m.

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REFERENCE

- Bergquist, P.R. 1978. 'Sponges'. pp. 1-268 (Hutchinson: London).
- Bergquist, P.R. 1980. A revision of the supraspecific classification of the orders Dictyoceratida, Dendroceratida and Verongida (Class Demospongiae). *New Zealand Journal of Zoology*, **7**: 443-503.
- Bergquist, P.R. 1995. Dictyoceratida, Dendroceratida and Verongida from the New Caledonia Lagoon (Porifera: Demospongiae). *Memoirs of the Queensland Museum.*, **38**(1): 1-51.
- Bergquist, P.R. and R.J. Wells, 1983. Chemotaxonomy of the Porifera: The development and current status of the field, *Marine Natural Products*. pp. 1-50.
- Dendy, A. 1905. Report on the sponges collected by Professor Herdman at Ceylon in 1902. *Rep. Pearl Oyster Fish. Gulf of Manaar*, 3, Suppl., **18**: 57-246.
- Hoshino, T. 1981. Shallow-Water Demosponges of Western Japan, I. *J. Sci. Hiroshima Univ., Ser. B. Div. 1*, **29**(1): 47-205.
- Laubenfelds, M.W. de, 1948. The order Keratosa of the phylum Porifera- A monographic study. The University of Southern California Occasional Paper Number, **3**: 1-195.
- Lendenfeld, R. von, 1889. A monograph of the horny sponges. London: Published for the Royal Society by Turner and Co, Ludgate Hill, E. C., **2**: 468-936.
- Sim, C.J. 1985. A systematic study on the marine sponges from the South Sea of Korea. *Korean J. Syst. Zool.*, **1**(1-2): 1-11.

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한국 각질해면류 모래해면속
(망각해면목: 가는실해면과)의 3신종

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요 약

제주도와 남해도에서 채집된 모래해면속의 3신종, *Psammocinia mammiformis*, *P. mosulpia*, 그리고 *P. jejuensis*를 기재한다. 모래해면속의 특징은 많은 양의 모래입자가 그들의 섬유나 기질안에 포함되어 있거나 또는 해면의 표면에 모래겉질로서 포함되어 있는 것이 특징이다.