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Four New Species of the Genus *Hyattella* (Dictyoceratida: Spongiidae) from Korea

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ABSTRACT

Four new species of the genus *Hyattella* (Dictyoceratida: Spongiidae); *H. sinchangensis* n. sp., *H. mara* n. sp., *H. chuja* n. sp. and *H. lendenfeldi* n. sp., were collected from Jeollanam-do and Jeju-do, Korea. *Hyattella sinchangensis* n. sp., *H. mara* n. sp., *H. chuja* n. sp. and *H. grobosa* Lendenfeld, 1889 are very similar to each other in some characters. However, *Hyattella sinchangensis* n. sp. characterized by no special dermal lamella and no tertiary fibres, and more thin secondary fibres than *H. globosa*. *Hyattella mara* n. sp. is differs in having well developed dermal lamella, slightly fasciculated primary fibres, and thick tertiary fibres. *Hyattella chuja* n. sp. differs in surface characters with a slightly elevated part, skeleton with abundant spongine, and very complex meshes. *Hyattella lendenfeldi* n. sp. is similar to *H. tenella* (Lendenfeld, 1889) in skeletal structure, thickness of primary and secondary fibres, but differs in growth form.

Keywords: *Hyattella*, Spongiidae, Dictyoceratida, new species, Korea

INTRODUCTION

The family Spongiidae includes six valid genera; *Spongia*, *Hippospongia*, *Coscinoderma*, *Hyattella*, *Leiosella* and *Rhopaloeides*. Among them, the genus *Hyattella* was erected by Von Lendenfeld (1888). This genus was characterized by unarmoured surface, lacunose sponge body, and cored primary fibres (Cook and Bergquist, 2001; Hooper and Van Soest, 2002). Von Lendenfeld (1889) reported 14 species of *Hyattella* from Australia, and this was reviewed by Bergquist (1980). Van Soest (1978) discussed *Hyattella intestinalis* from Curacao and other Caribbean Islands and considered two types, massive and branches. Wiedenmayer (1977) summarized *Hyattella cavernosa* with *Hyrtios cavernosus*. Many other authors reported one or two species of the genus *Hyattella* (Willson, 1902; Dendy, 1905; De Laubenfels, 1936, 1948, 1954). To date, 12 valid species of the genus *Hyattella* has been reported worldwide (The World Porifera Database, 2013). In the present study, we discovered this genus for the first time in Korean waters.

MATERIALS AND METHODS

The material examined in this study was collected from Sinchang and Mara Island, Jeju-do and Gageodo Island, Jeollanam-do, Korea by SCUBA diving, 25–30 m in depth, during the period 2001–2007. All specimens were fixed in 95% or absolute ethanol. Identification was made on the basis of external features of sponges, including growth form, and skeletal structure and thickness. This procedure followed the methods of Sim and Lee (2002). Sponges were examined under steromicroscope (Stemi SV 6; Carl Zeiss, Jena, Germany) and light-microscope (Axiocop II; Carl Zeiss). The voucher specimens examined in this study were deposited in the National Institute of Biological Resources (NIBR), Incheon, Korea.

SYSTEMATIC ACCOUNTS

Phylum Porifera Grant, 1836
Class Demospongiae Sollas, 1885

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Order Dictyoceratida Minehin, 1900
Family Spongiidae Gray, 1867
[1*]Genus *Hyattella* Lendenfeld, 1888

[2*]***Hyattella sinchangensis* n. sp. (Fig. 1)**

Type specimen. Holotype (NIBRIV0000282410), Korea: Jeju-do, Jeju-si, Hankyung-myeon, Sinchang-ri, 19 Oct 2001, Lee KJ, by SCUBA diving, 5 m in depth, deposited in the NIBR.

Description. Massive sponge, size up to 8 × 6 × 2.5 cm. Surface with many holes 2–5 mm in diameter, which lead into extensive vestibular space of sponge body. Surface mostly smooth, covered with thin translucent dermal membrane which easily separates from endosome. End of primary fibres project to surface. Colour, purplish beige in life and, to yellowish beige in alcohol. Texture, hard and compressible. Skeleton. Primary fibres near surface well developed, 30–80 μm in diameter. Primary fibres in choanosome, 50–100 μm in diameter, rare. Primary fibres slightly cored with small sand grain. Secondary fibres, 20–30 μm in diameter, clear. Secondary fibres, connected to each other and make irregular polygonal reticulation. Reticulated meshes, 100–300 μm in diameter.

Etymology. This species is named after its type locality, Sinchang, Jeju-do, Korea.

Remarks. This species is closely related to *Hyattella grobosa* Lendenfeld, 1889 in growth form and thickness of the primary fibres, but differs in the dermal membrane and thickness of the secondary fibres. This new species lacks a special dermal lamella and has thinner secondary fibres than those of *Hyattella globosa* (40–100 μm in diameter).

[3*]***Hyattella mara* n. sp. (Fig. 2)**

Type specimen. Holotype (NIBRIV0000282411), Korea:

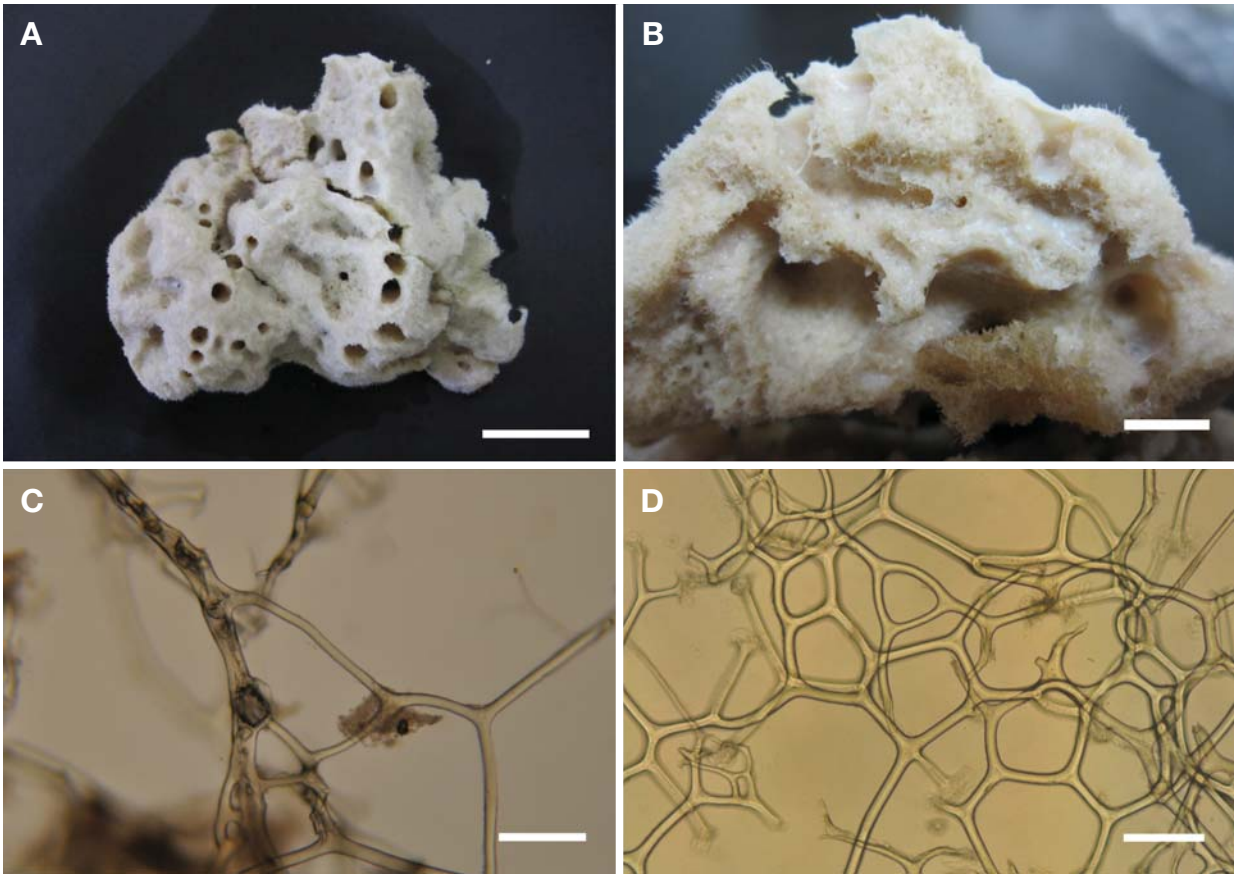

Fig. 1. *Hyattella sinchangensis* n. sp. A, Entire animal; B, Perpendicular section; C, Primary fibres; D, Secondary fibres. Scale bars: A=2 cm, B=5 mm, C, D=200 μm.

Korean name: [1*]히아텔라해면속, [2*]신창히아텔라해면(신칭), [3*]마라히아텔라해면(신칭)

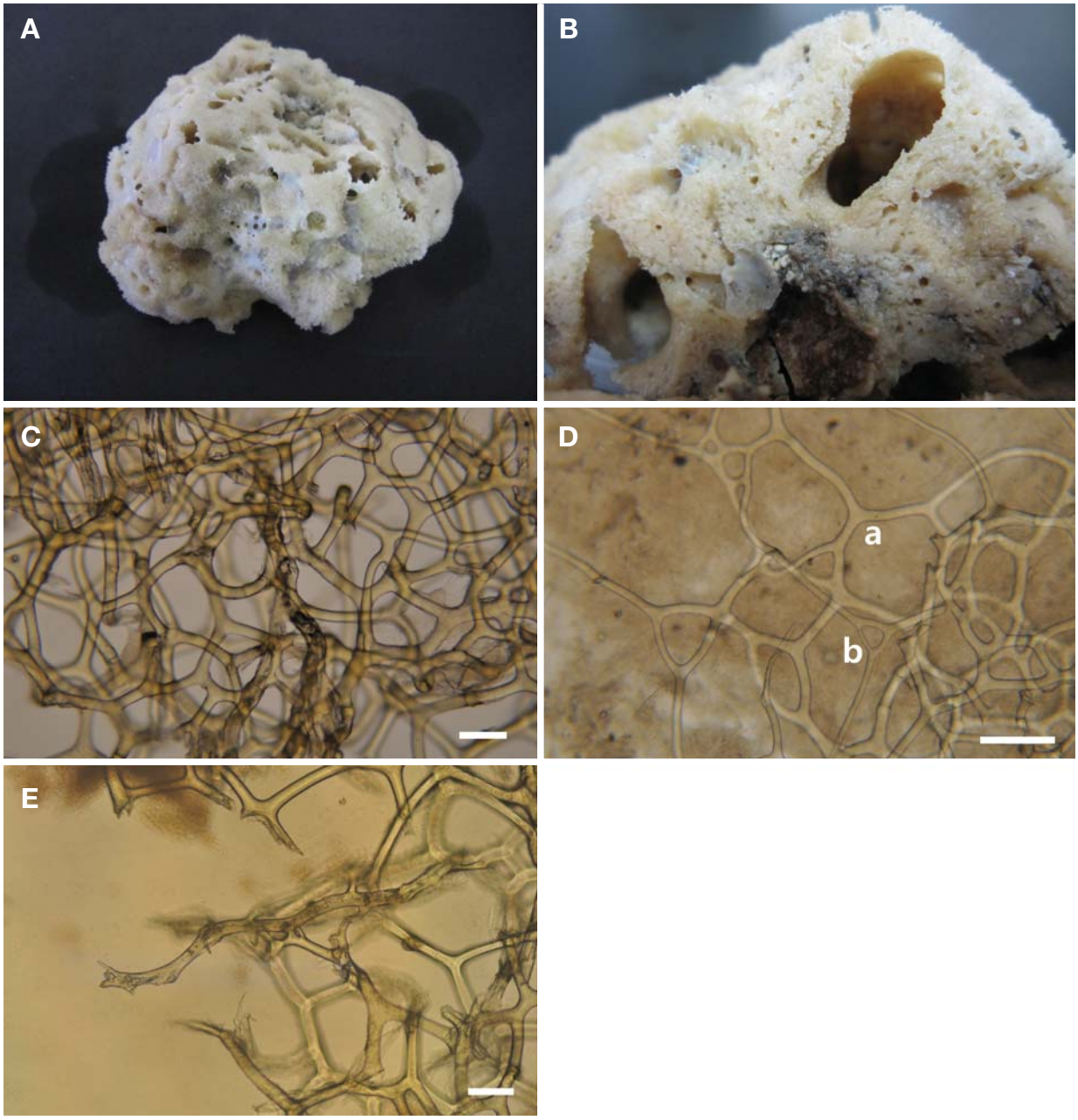

Fig. 2. *Hyattella mara* n. sp. A, Entire animal; B, Perpendicular section; C, Primary and secondary fibres network; D, Secondary and tertiary fibres (a, secondary fibre; b, tertiary fibre); E, Primary fibres cored spicules. Scale bars: A=2 cm, B=5 mm, C, D=200 μm, E=100 μm.

Jeju-do, Seogwipo-si, Daejung-eup, Marado Island, 22 Feb 2001, Lee KJ, by SCUBA 20 m in depth, deposited in the NIBR.

Description. Thickly encrusting, size up to 8.5 × 7.5 × 3 cm. Surface rough with low conules, Special dermal lamella covered lacunae. Dermal membrane has hole-like oscules, 5–8 μm in diameter. Dermal membrane, difficult to separate from endosome. Colour beige in life. Texture firm and compressible. Skeleton consists of lightly fasciculated primary fibres 30–100 μm in diameter, cored with sand and spicules. Rough primary fibres have protruded spicules near surface. Secondary fibres, no cored 30–40 μm in diameter. Intricately connected secondary fibres make reticulated mesh of diverse size, Thin tertiary fibres, 20 μm in diameter, derived from

secondary fibres and uncored.

Etymology. This species is named after the type locality, Marado, Jejudo Island, Korea.

Remarks. This new species is closest to *Hyattella sinchangensis* and *H. globosa* Lendefeld, 1889 in growth, but differs in well-developed dermal lamella, slightly fasciculated primary fibres, and tertiary fibres. Most of all, this new species is easily distiguished from *Hyattella sinchangensis* and *H. globosa* by the existence of tertiary fibres. This new species is similar to *H. chuja* in having tertiary fibres, but they are thicker.

[1]**Hyattella chuja* n. sp. (Fig. 3)

Type specimen. Holotype (NIBRIV0000282412), Korea: Jeju-do, Jeju-si, Chuja-myeon, Sinyang-ri, Jeolmyeongyeo, 1 Jul 2004, Lee KJ, by SCUBA diving, 25–35 m in depth, deposited in the NIBR.

Description. Massive and thickly encrusting, size up to 10 × 9 × 2.5 cm, on oyster shell (*Crassostrea* sp.). Many oscule like holes, 3–7 mm in diameter, open on surface. Some oscules open at the end of a slightly elevated part. Two or three large holes located together, or merge with each other. These multihole, irregularly scattered over sponge surface. Surface smooth with tiny protuberance. Texture, firm and compressible. Colour beige in life. Well-developed spongin forms strong skeletal structure. Fibres difficult to distinguish from well-developed matrix. Skeleton consists of irregularly arranged fibres. Primary fibres, 70–100 μm in diameter, very lightly cored with sand and spicule. Some primary fibres not cored. Secondary fibres, 20–30 μm in diameter, not cored. Meshes in mesohyl made by secondary fibres which form round polygonals, 40–200 μm in diameter. Tertiary fibres, 6–10 μm in diameter, distributed under thin dermal membrane.

Etymology. This species is named after the type locality,

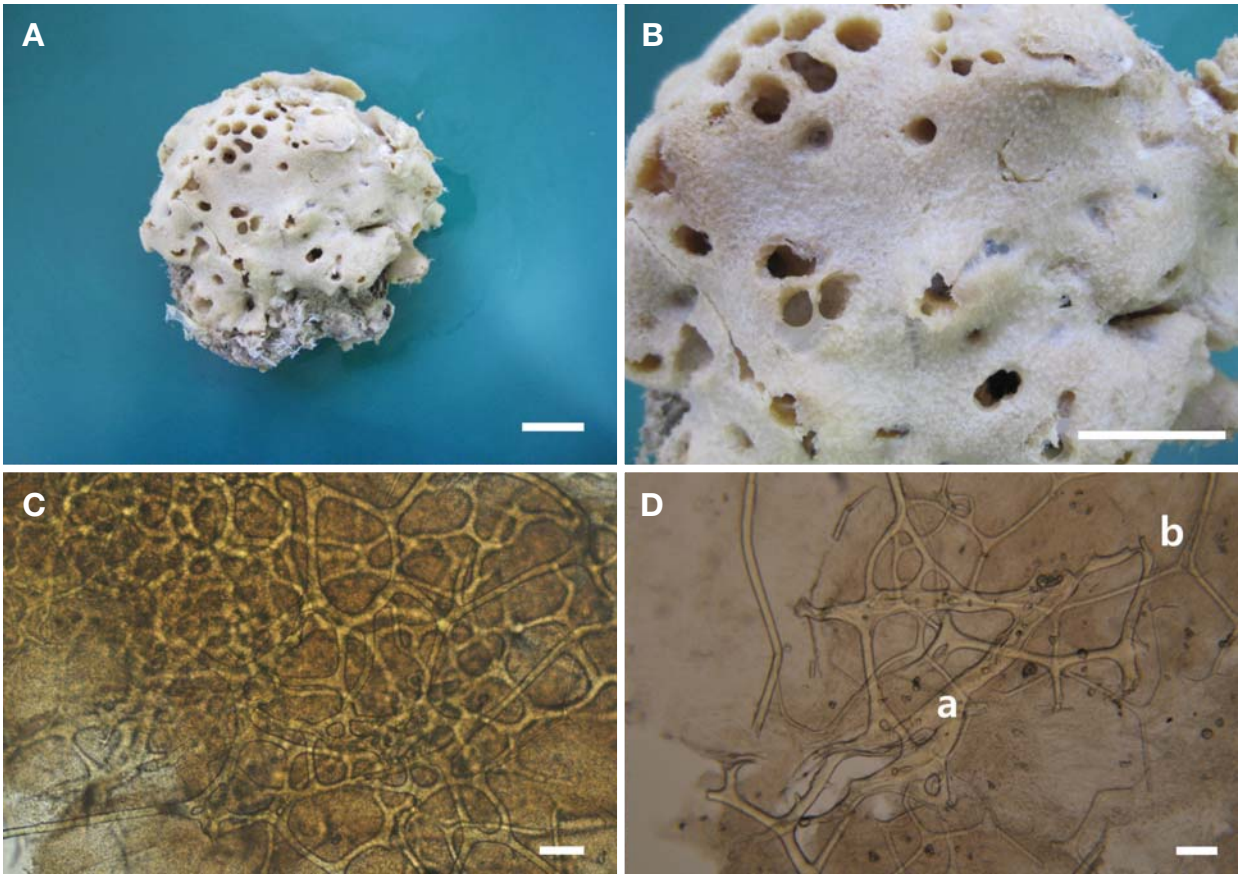

Fig. 3. *Hyattella chuja* n. sp. A, Entire animal; B, Closed surface; C, Secondary fibres; D, Primary and tertiary fibres (a, primary fibre; b, tertiary fibre). Scale bars: A, B=2 cm, C=100 μm, D=200 μm.

Korean name: [1]*추자히아텔라해면 (신칭)

Chujado, jejudo Island, Korea.
Remarks. *Hyatella chuja* n. sp. is closely related to *H. sinchangensis*, *H. mara* and *H. globosa* Lendenfeld, 1889 in growth form, but differs in the surface with a slightly elevated part, the skeleton with abundant spongin. This new species has a very complex mesh of secondary fibres compared with other species.

[1]**Hyattella lendenfeldi* n. sp. (Fig. 4)

Type specimen. Holotype (NIBRIV0000282413), Korea: Jeollanam-do, Shinan-gun, Heuksan-myeon, Gageodo Island, 20 Jul 2007, Kim HS, by SCUBA diving 15 m in depth, deposited in the NIBR.
Description. Massive sponge, size up to 11 × 6 × 7 cm, with many tubercles. Numerous holes located at base of sponge body. Large holes, 5 mm in diameter, open at the end of tubes, 1–1.5 cm high. Each hole leads into internal cavities. Surface rough with many small conules, under 1 mm high, Primary fibres emerging out of sponge, connected with the conules. No special dermal membrane at surface. Colour purplish brown in life, more purple around large hole at top of tube. Texture soft and compressible. Matrix easily separated from fibres. Skeleton. Primary fibres, 40–70 μm in diameter, cored with small amount of sand and broken spicules, and branched under sponge surface. Uncored secondary fibres, 20–50 μm in diameter, connected to each other, and make meshes 300–350 μm in diameter between adjacent primary fibres.
Etymology. *Hyattella lendelfeldi* is named in honor of R. Von Lendenfeld who erected genus *Hyattella*.
Remarks. This new species is similar to *Hyatella tenella* (Lendenfeld, 1889) in skeletal structure, thickness of primary and secondary fibres, but differs in growth form. This new species is not a branched form, but a tube with a large hole from a massive sponge.

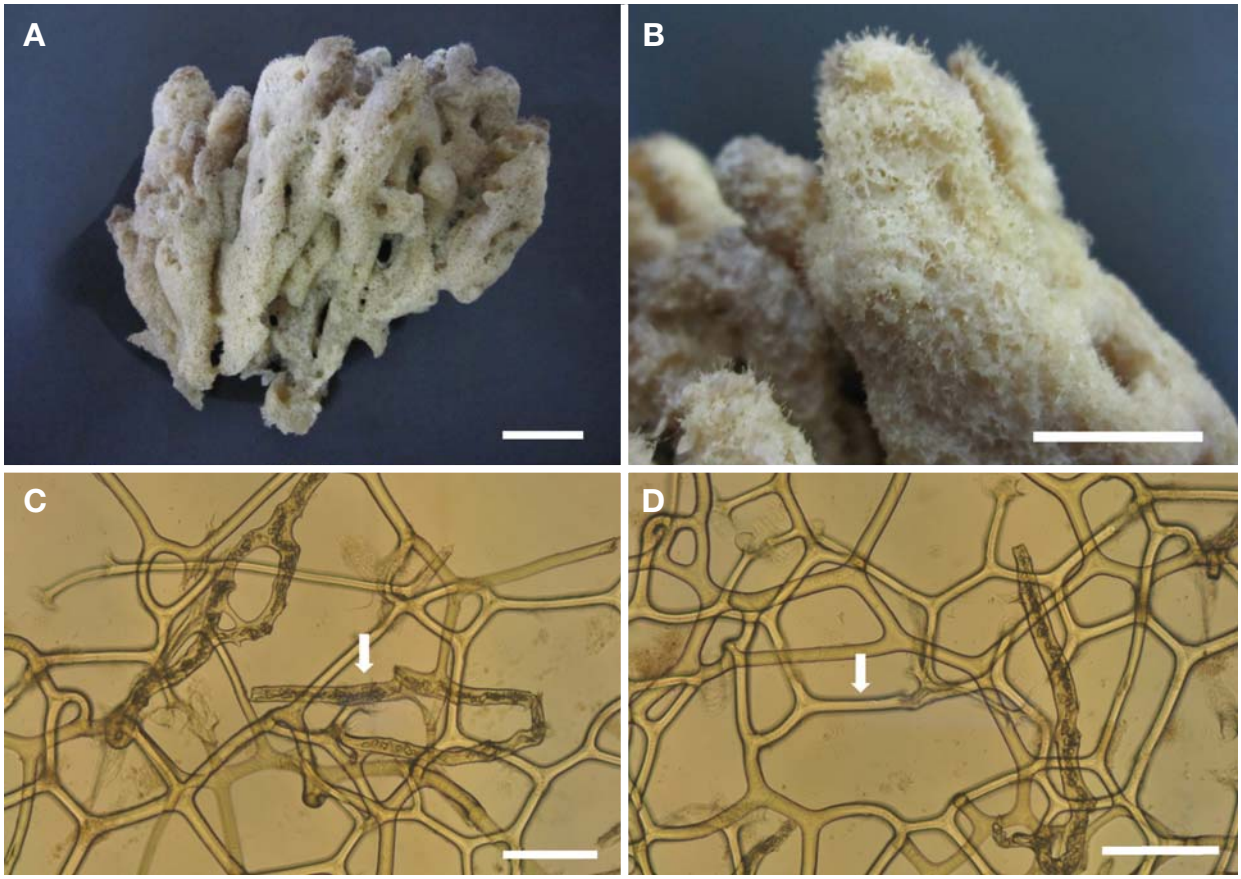

Fig. 4. *Hyattella lendenfeldi* n. sp. A, Entire animal; B, Surface; C, Primary fibres (arrow); D, Secondary fibres (arrow). Scale bars: A=2 cm, B=1 cm, C, D=200 μm.

Korean name: [1]*렌덴펠드히아텔라해면 (신칭)

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