

Seven new species of genus *Dysidea* (Demospongiae: Dictyoceratida: Dysideidae) from Korea

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Seven new species of genus *Dysidea* (Demospongiae: Dictyoceratida: Dysideidae) are described from Jeju Island and Geomundo Island, Korea. These new species are compared with other reported species in fibre structure and arrangement, and cored detritus. *Dysidea reticulum* n. sp. is similar to *D. glavea* in skeletal structure but differ in sponge shape. *Dysidea simplex* n. sp. is close to *D. glavea* with loosely arranged skeletal structure but fibres in this new species are not cored with large sands. *Dysidea pyeongdaensis* n. sp. is characterized by tube-like surface oscules open toward the sandy bottom. *Dysidea capillus* n. sp. is similar to *D. dokdoensis* in skeletal structure, but differs in long surface conules. *Dysidea mukriensis* n. sp. is close to *D. corallina* in distinct dense surface conules, but differs in sponge shape and skeletal structure. *Dysidea membrana* n. sp. is similar to *D. sabulum* in primary fibres cored with numerous large sands, but differs in sponge surface conules and secondary fibres. *Dysidea chujaensis* n. sp. is unique in the sponge shape and skeletal structure.

Keywords: *Dysidea*, Dysideidae, Korea, new species

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INTRODUCTION

This genus *Dysidea* is characterized by the primary and secondary fibres that are all cored with detritus. The genus *Dysidea* in family Dysideidae was reported to have over 70 species worldwide (Von Lendenfeld, 1886; 1889; De Laubenfels, 1936; Bergquist, 1965; 1995; Hoshino, 1985; Lehnert and Van Soest, 1998; Lee and Sim, 2007; Van Soest *et al.*, 2019; Kang *et al.*, 2020; Kim *et al.*, 2020). Among them 10 species were reported from Korea (Lee and Sim, 2007; Kang *et al.*, 2020; Kim *et al.*, 2020).

MATERIALS AND METHODS

Sponge collections were made from Geomundo Island and Jeju Island, Korea. They were collected from intertidal zone to depth of 5–20 m using SCUBA during 2004–2019. The specimens from the Geomundo Island were collected in 1977 from rocky substrate of intertidal zone by hand. Collected specimens preserved in 95% ethyl alcohol and were identified based on their morphological characteristics. The external feature of sponges was

observed with stereo microscope (Stemi SV. 6, Carl Zeiss, Germany). The skeletal fibres were studied under a light microscope (Axioscope II, Carl Zeiss, Germany). The type specimens were deposited in the National Institute of Biological Resources (NIBR), Incheon, Korea.

SYSTEMATIC ACCOUNTS

Phylum Porifera Grant, 1836
Class Demospongiae Sollas, 1885
Order Dictyoceratida Minchin, 1900
Family Dysideidae Gray, 1867
Genus *Dysidea* Johnston, 1842

1. *Dysidea reticulum* n. sp. (Figs. 1, 2) 정형디시디해면

Type specimen. Holotype (NIBRIV0000879331), Korea: Byeonchon, Seodo-ri (Geomundo Island), Sam-san-myeon, Yeosu-si, Jeollanam-do, 18 July 1977, intertidal zone, by S. J. Yoon, deposited in the NIBR.

Description. Thin encrusting small mass sponge, size up to 5 × 3 × 0.5 cm. Surface with large and small sands in

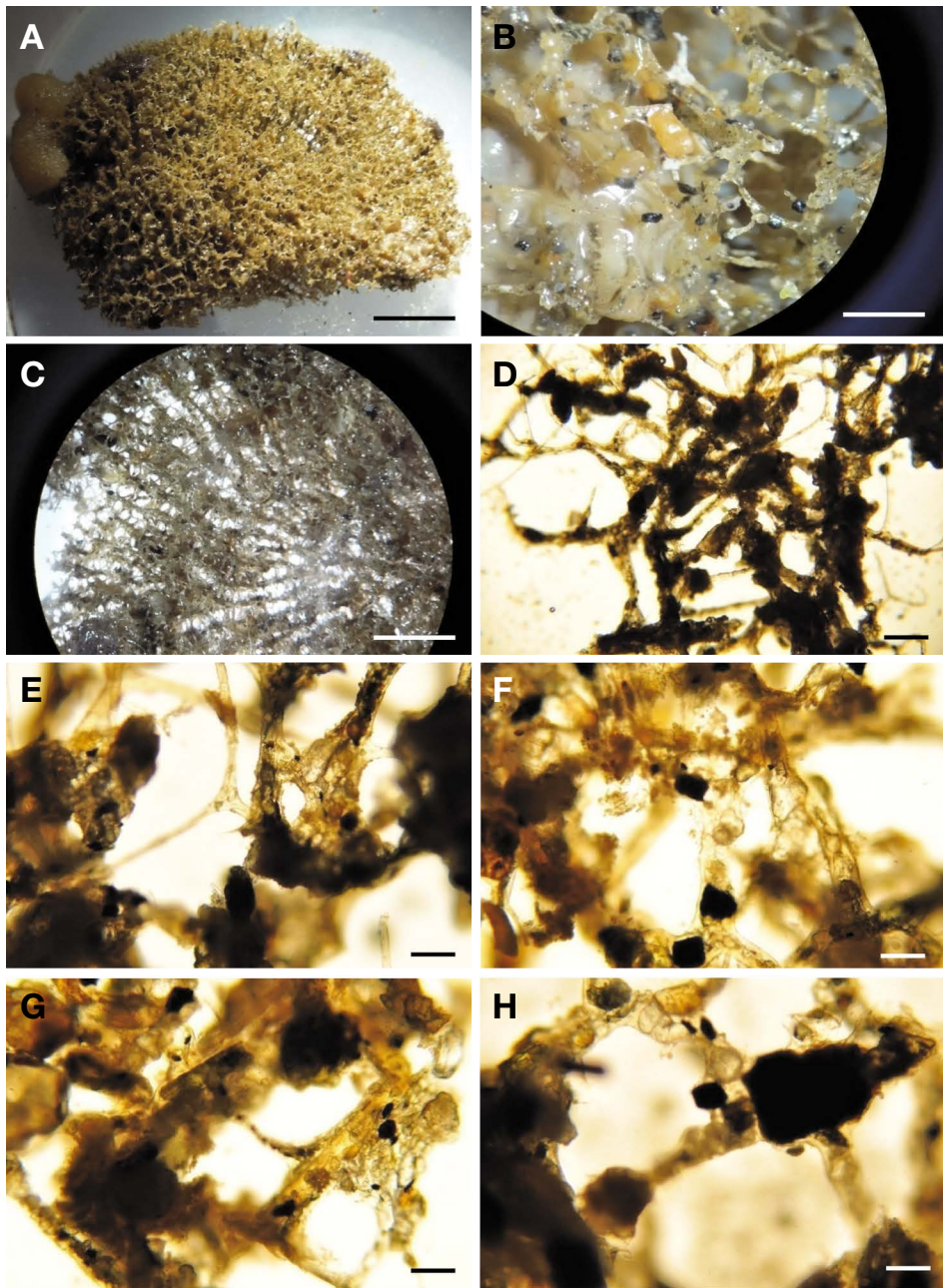


Fig. 1. *Dysidea reticulum* n. sp. A, external morphology; B, surface close up under the dissecting microscope; C, skeletal structure under the dissecting microscope; D, skeletal structure; E, cored large sands; F-H, secondary fibres cored with small sands. Scale bars: A = 1 cm, B = 500 μ m, C = 2 mm, D = 200 μ m, E-H = 100 μ m.

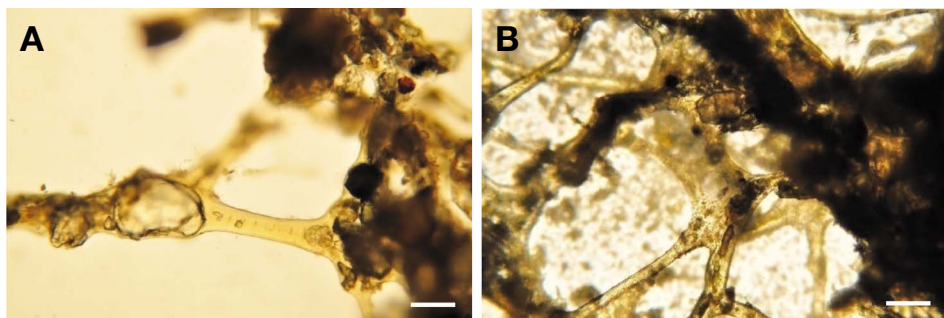


Fig. 2. *Dysidea reticulum* n. sp. A, secondary fibres cored with large sands; B, rarely cored bridge type secondary fibres. Scale bars: A, B = 100 μ m.

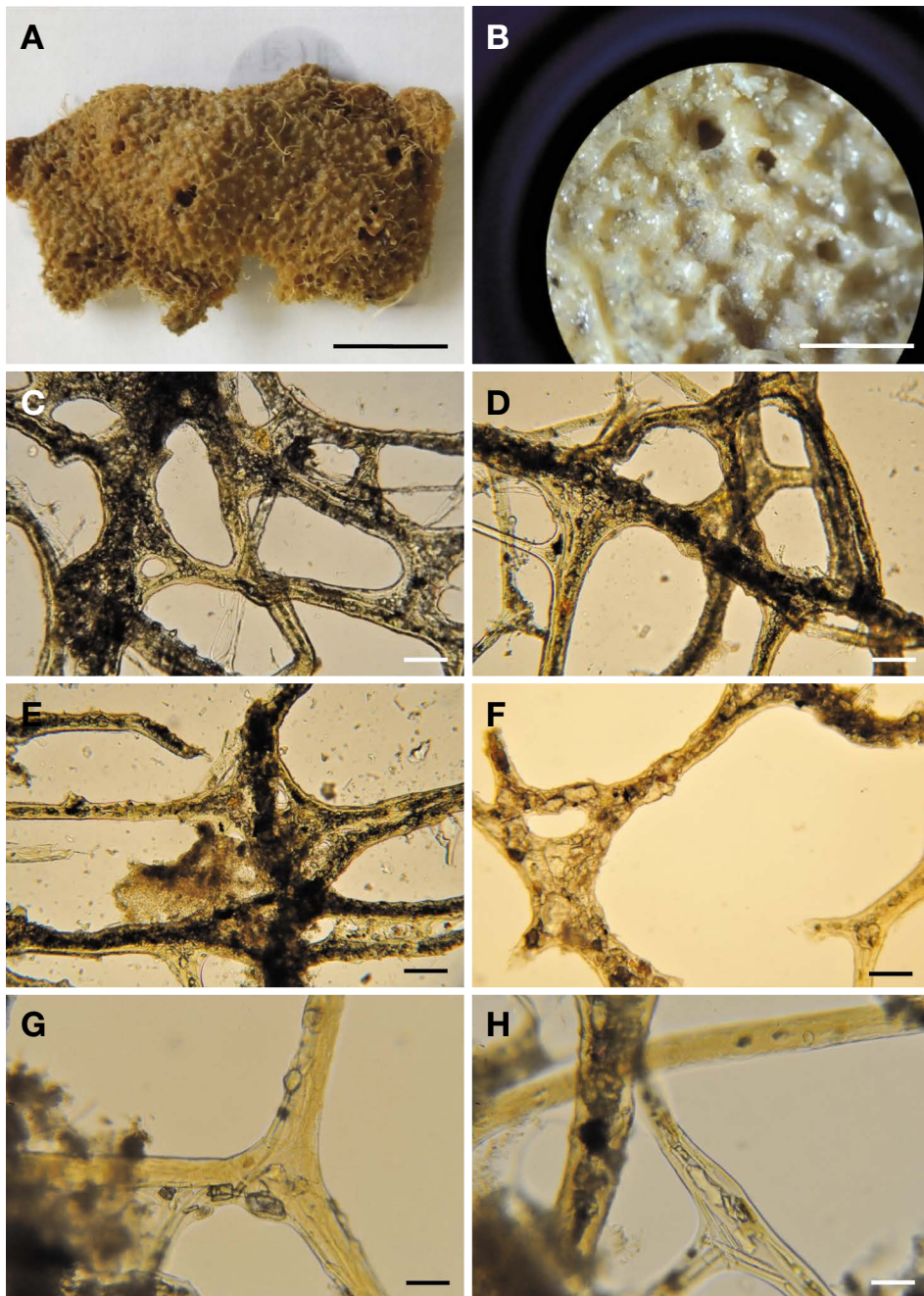


Fig. 3. *Dysidea simplex* n. sp. A, external morphology; B, surface close up under the dissecting microscope; C, D, skeletal structure; E, thin secondary fibres; F, web type secondary fibres; G, H, secondary fibres cored with sands and spicules. Scale bars: A = 1 cm, B = 2 mm, C–F = 100 μ m, G, H = 50 μ m.

fibres. Mostly primary fibres cored with large sands and secondary fibres with wide sand plates. Surface conules not distinct. Oscules rare, 1.5 mm in diameter. Color in life, dark brown. Texture soft and compressible.

Skeleton: All fibres with irregular diameter. Measurement of diameter in primary fibres is somewhat difficult because of attachment with large sands. Some primary fibres, 150–350 μ m in diameter. Secondary fibres, 30–80 μ m in diameter.

Etymology. The species name, *reticulum*, is named after

the shape of skeletal structure network.

Remarks. This new species is similar to *Dysidea glavea* Kim *et al.*, 2020 in skeletal structure but differ in sponge shape. All fibres of new species are densely cored with numerous large and small sands. Surface of sponge covered with numerous cored and attached sands. Several parts of skeletal structure have plate-like shape with numerous spaced networks (Fig. 1C). This new species is much thinner than *D. glavea*'s thick mound shape.

2. *Dysidea simplex* n. sp. (Fig. 3) 단순디시디해면

Type specimen. Holotype (NIBRIV0000879332), Korea: Deokchon-ri (Geomundo Island), Samsan-myeon, Yeosu-si, Jeollanam-do, 18 July 1977, intertidal zone, by S. J. Yoon, deposited in the NIBR.

Description. Thin encrusting small mass sponge, size up to $4.5 \times 2 \times 0.5$ cm. Surface smooth with several mound and round conules. Oscules 1–2 mm in diameter open at the end of each mound. Color in life, dark brown. Texture soft and compressible.

Skeleton. Skeletal structure very simple, regular mesh-like with *scalaryspongia* easy to separate from sponge body. Primary fibres forms very wide plate-like sand. Primary fibres, 60–100, 150–200 μ m in diameter. Secondary fibres, 40–60 μ m in diameter, rarely cored with spicules.

Etymology. The species name, *simplex*, is named after the shape of simple skeletal structure of this sponge.

Remarks. This new species is similar to *Dysidea glavea* Kim *et al.*, 2020 with loosely arranged skeletal structure but fibres in the new species are not cored with large sands.

3. *Dysidea pyeongdaensis* n. sp. (Figs. 4, 5)

평대디시디해면

Type specimen. Holotype (NIBRIV0000895363), Korea: Pyeongdae-ri, Gujwa-eup, Jeju-si, Jeju-do, 14 August 2019, intertidal zone (sandy beach), deposited in the NIBR.

Description. Thick encrusting sponge from under side of flat rock in sandy beach, size up to $9 \times 7 \times 2.5$ cm. Surface smooth with several tube-like projections covered with short conules. Oscules, 1–4 mm in diameter, at the top of projections and open toward sandy bottom. Color in life pale green. Texture soft and compressible.

Skeleton: All fibres cored with sands and broken spicules, but near surface conules cored with more sands than spicules. All near surface fibres membrane arranged irregularly (Fig. 4E). Primary fibres, 100–160 μ m in diameter, densely cored with sands and broken spicules. Secondary fibres, 50–80 μ m in diameter, bridged or wide web type, like loose mesh, rarely cored with sands and spicules.

Etymology. The species name, *pyeongdaensis*, is named after type locality Pyeongdae-ri, Jeju-do.

Remarks. This new species is similar to *Dysidea hydra* Kang *et al.*, 2020 in numerous broken spicules cored in some section of primary fibres, but differs in shape of sponge surface. The new species has several tube-like low projections. Oscules open toward the sandy bottom.

4. *Dysidea capillus* n. sp. (Figs. 6, 7) 잔털디시디해면

Type specimen. Holotype (NIBRIV0000895364), Ko-

rea: Pyeongdae-ri, Gujwa-eup, Jeju-si, Jeju-do, 14 August 2019, intertidal zone (sandy beach), deposited in the NIBR.

Description. Thin encrusting sponge from under side of rock in sandy beach, with shape like small piece of a plate, size up to $7 \times 3 \times 1.5$ cm. Surface smooth, covered with long conules and several oscules, 2–3 mm in diameter, open toward the sandy bottom. Color in life green. Texture soft and compressible.

Skeleton: All fibres cored with more sands than spicules, and arranged regularly. Primary fibres, 70–100 μ m in diameter. Secondary fibres, 50 μ m in diameter.

Etymology. The species name, *capillus*, is named after the shape of long conules on the sponge surface.

Remarks. This new species is similar to *Dysidea dokdoensis* Kang *et al.*, 2020 in skeletal structure, but differs in conules of primary fibres. Surface of the new species has numerous long and distinct conules with oscules open toward the sandy bottom.

5. *Dysidea mukriensis* n. sp. (Fig. 8) 묵리디시디해면

Type specimen. Holotype (NIBRIV0000895365), Korea: Muk-ri, Chuja-myeon, Jeju-si, Jeju-do, 24 February 2005, intertidal zone, deposited in the NIBR.

Description. Thick encrusting mass sponge, with several seaweeds, animals and stones attached to sponge surface, size up to $9 \times 7.5 \times 2.3$ cm. Thin pigmented membrane with distinct short conules. Oscules, open over the surface, 1–4 mm in diameter. Color in life black, grayish brown in alcohol. Texture firm and compressible.

Skeleton: Numerous thin translucent fibres, rarely cored with detritus except near conules (Fig. 8D), with mostly no cored fibres near surface membrane. Primary fibres, 150–250 μ m in diameter, densely cored with small and large sands only at the end of conules and few other sections. Primary fibres in most areas rarely cored with sands. Secondary fibres, 70–100–150 μ m in diameter, rarely cored with detritus. Some fibres with no cored resembling wood bark, make it difficult to distinguish between primary and secondary fibres.

Etymology. The species name, *mukriensis*, is named after type locality Mukri, Chujado, Jeju-do.

Remarks. This new species is similar to *Dysidea coralina* Kim *et al.*, 2020 in distinct dense surface conules, but differs in sponge shape and skeletal structure. Color of this new species is brown.

6. *Dysidea membrana* n. sp. (Figs. 9, 10)

얇은막디시디해면

Type specimen. Holotype (NIBRIV0000895366), Korea: Deokchon-ri (Geomundo Island), Samsan-myeon, Yeosu-si, Jeollanam-do, 18 July 1977, intertidal zone,

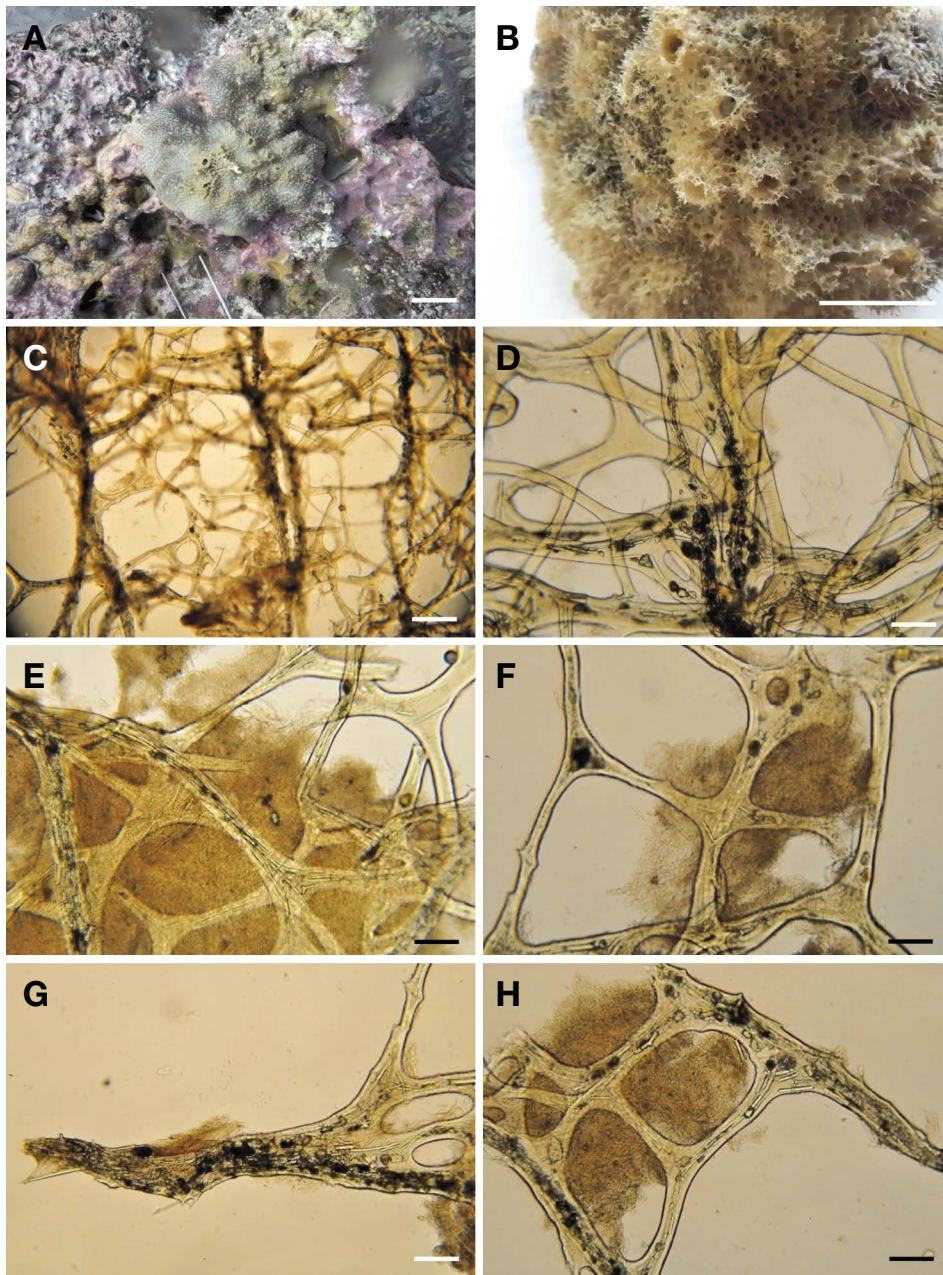


Fig. 4. *Dysidea pyeongdaensis* n. sp. A, external morphology in situ; B, surface close up; C–E, skeletal structure; F, bridge type secondary fibres; G, H, primary fibres near conules cored with sands. Scale bars: A = 3 cm, B = 2 cm, C = 200 μ m, D–H = 100 μ m.

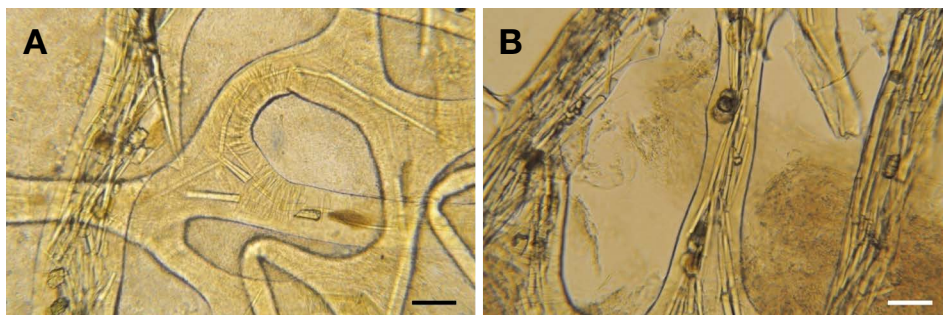


Fig. 5. *Dysidea pyeongdaensis* n. sp. A, wide secondary fibres rarely cored with spicules; B, primary fibres mostly cored with broken spicules. Scale bars: A, B = 50 μ m.

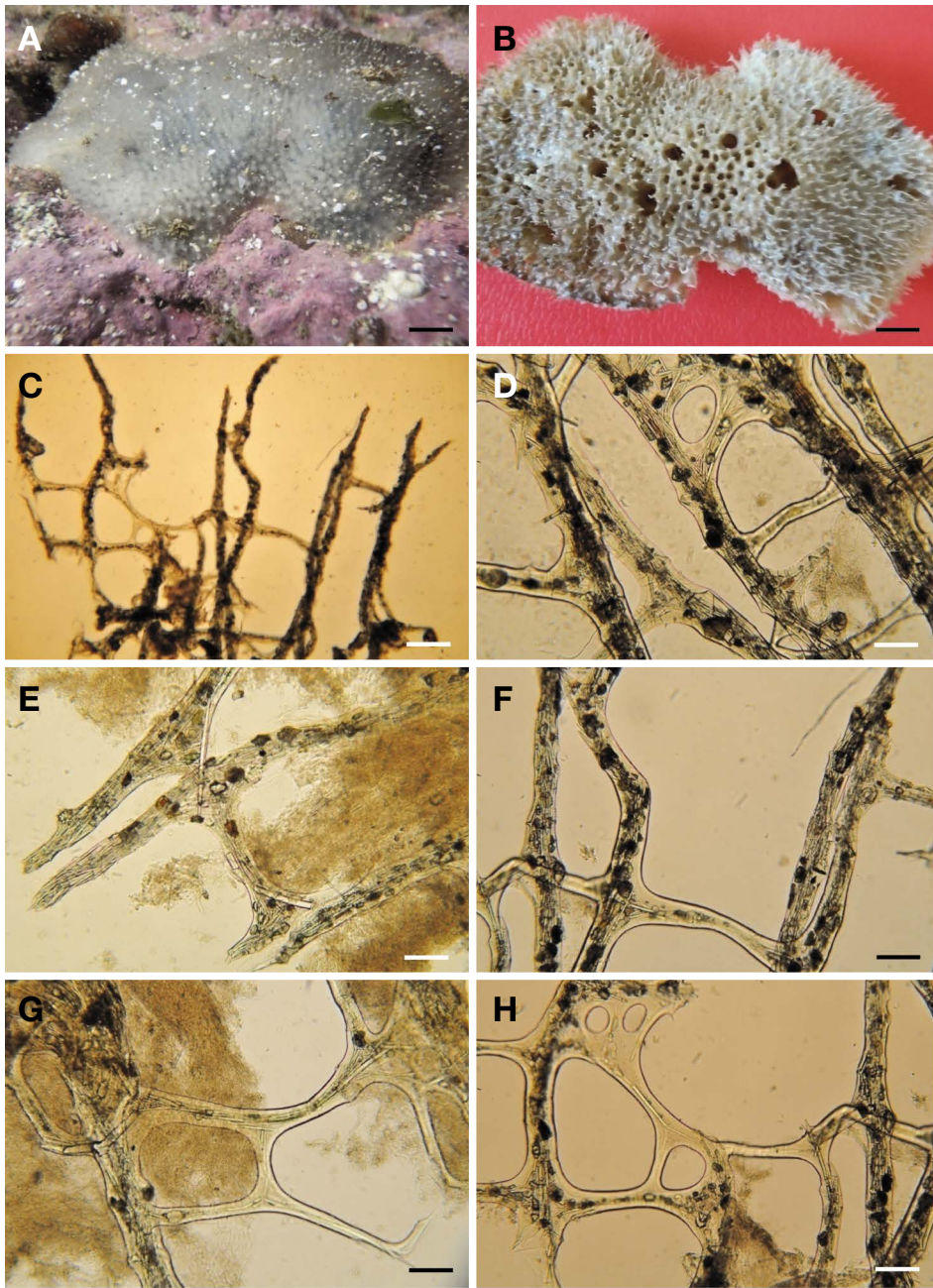


Fig. 6. *Dysidea capillus* n. sp. A, external morphology in situ; B, surface close up; C, D, skeletal structure; E, F, primary fibres near conules; G, H, secondary fibres between primary fibres. Scale bars: A = 1 cm, B = 1 cm, C = 200 μ m, D–H = 100 μ m.

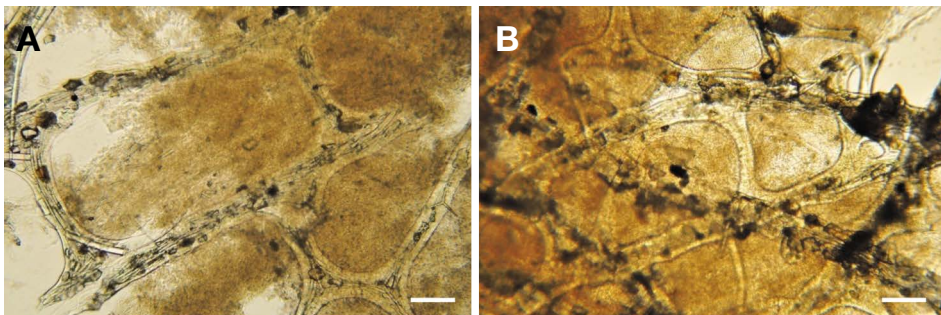


Fig. 7. *Dysidea capillus* n. sp. A, B, primary fibres with surface membrane cored with sands. Scale bars: A, B = 100 μ m.

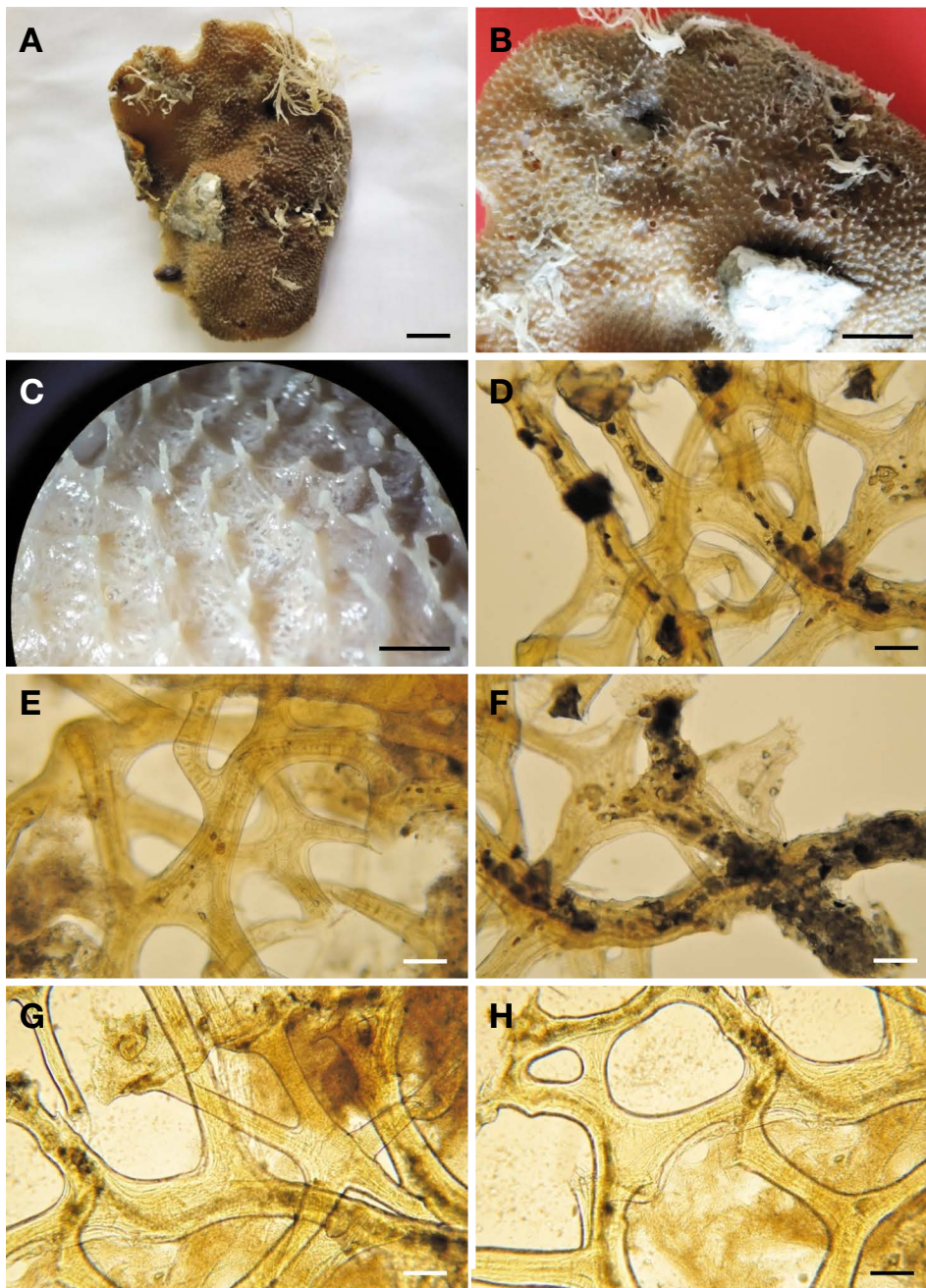


Fig. 8. *Dysidea mukriensis* n. sp. A, external morphology; B, surface close up; C, regular sharp conules at the surface under the dissecting microscope; D, primary fibres cored with large sands; E, rarely cored secondary fibres; F, primary fibres cored with sands near conules; G, H, primary and secondary fibres difficult to distinguish. Scale bars: A = 2 cm, B = 1 cm, C = 1 mm, D-H = 100 μ m.

by S. J. Yoon, SCUBA diving, deposited in the NIBR.

Description. Thin encrusting mass sponge, size up to $9 \times 2 \times 1.5$ cm. Surface, distinctly conulous, covered with thick membrane mixed with sands. Several oscules, 1–2 mm in diameter. Color in life, dark brown. Texture firm and compressible.

Skeleton. All fibres not easily separate from sponge body. Primary fibres and secondary fibres difficult to distinguish from each other. Some sections of fibres cored with large sands, 400–450 μ m in diameter. Primary fibres, 200–300 μ m in diameter. Secondary fibres, densely

cored with sands, 60–80–100 μ m in diameter and partly web type.

Etymology. The species name, *membrana*, is named after the thick membrane of sponge surface.

Remarks. This new species is similar to *Dysidea sabulum* Kang *et al.*, 2020 in numerous large sands cored in primary fibres, but differs in sponge surface conules and secondary fibres. The new species has wide interval of thick conules and secondary fibres cored with dense sands more than *D. sabulum*.

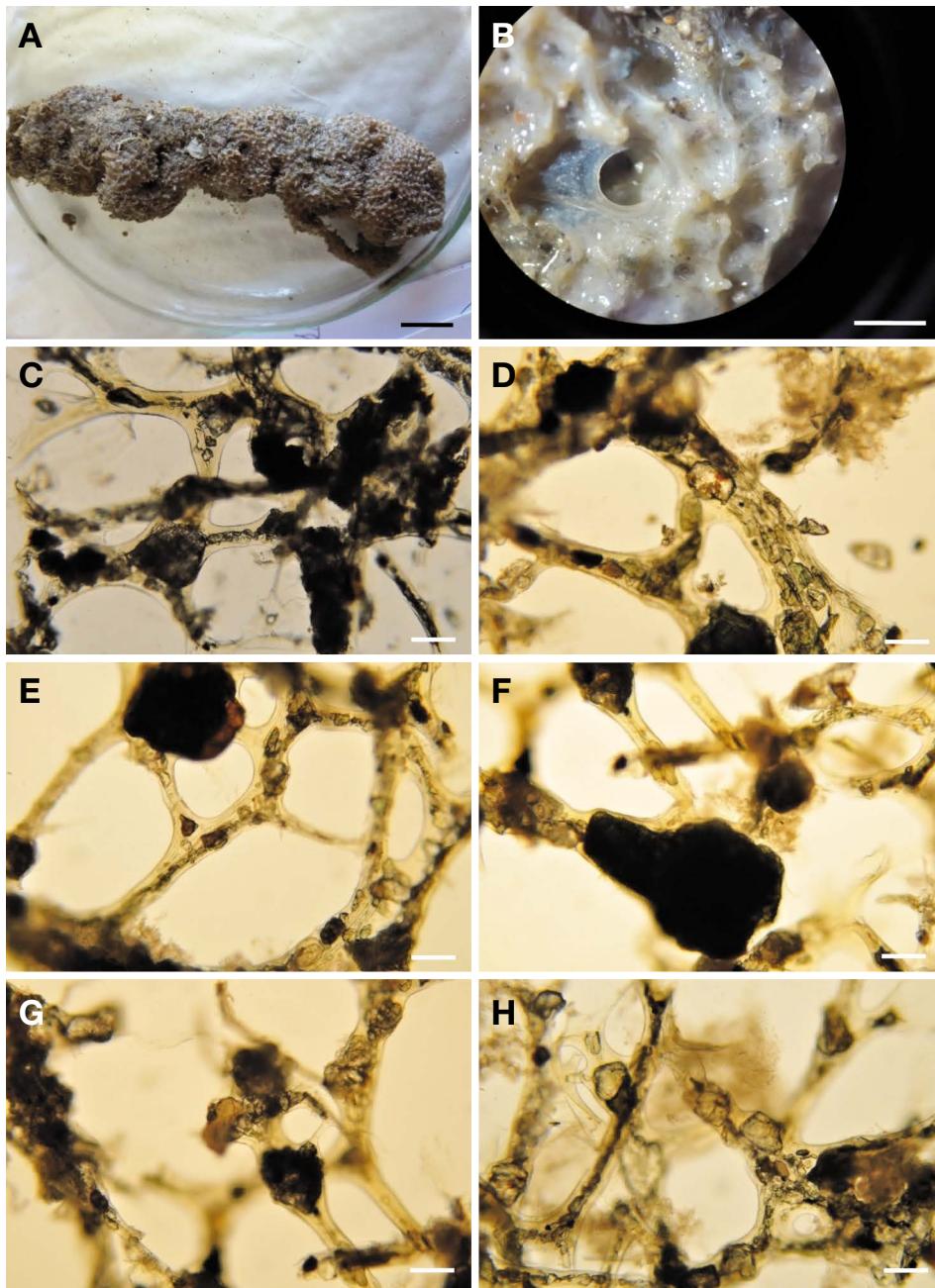


Fig. 9. *Dysidea membrana* n. sp. A, external morphology; B, surface close up under the dissecting microscope; C, D, skeletal structure; E, F, secondary fibres with large sands; G, H, secondary fibres with middle sized sands. Scale bars: A = 2 cm, B = 5 mm, C-H = 100 μ m.

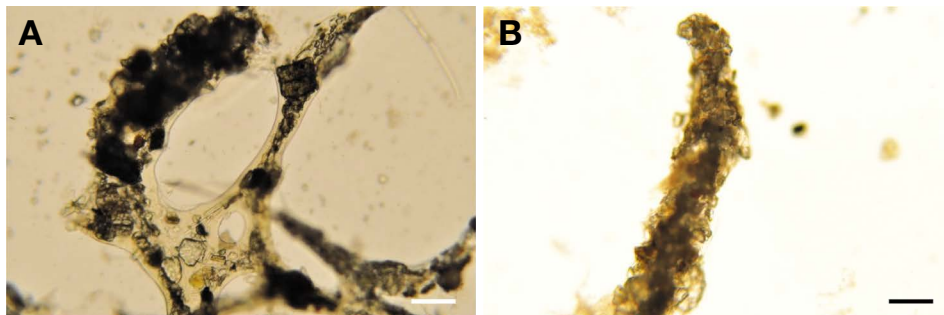


Fig. 10. *Dysidea membrana* n. sp. A, dense cored primary fibres; B, primary fibres near conules. Scale bars: A, B = 100 μ m.

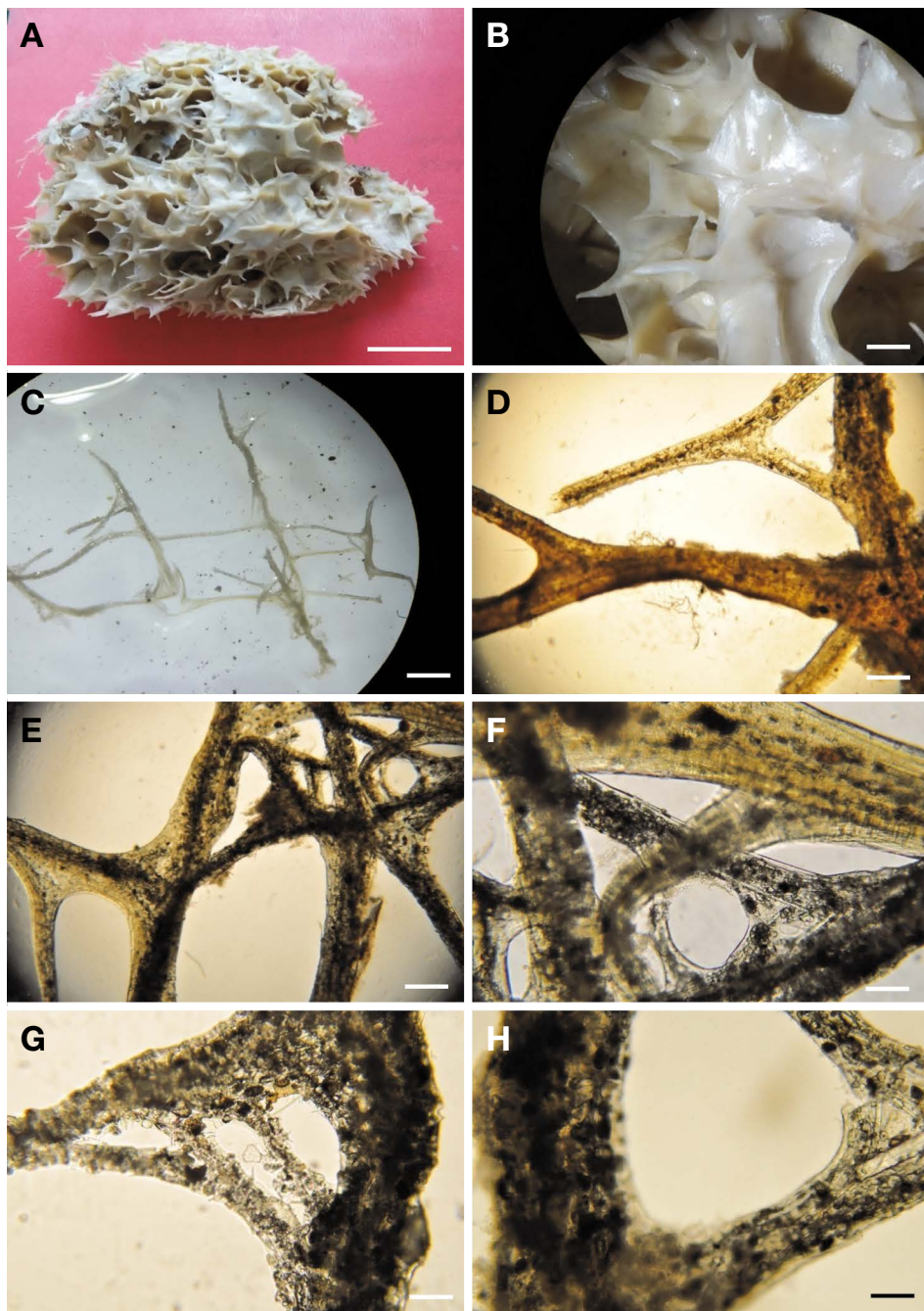


Fig. 11. *Dysidea chujaensis* n. sp. A, external morphology; B, surface close up under the dissecting microscope; C, skeletal structure under the dissecting microscope; D, thin secondary fibres; E, skeletal structure; F, primary and secondary fibres cored with small sands; G, H, primary and secondary fibres. Scale bars: A = 2 cm, B = 5 mm, C = 2 mm, D, E = 200 μ m, F-H = 100 μ m.

7. *Dysidea chujaensis* n. sp. (Fig. 11) 추자디시디해면

Type specimen. Holotype (NIBRIV0000895367), Korea: Jeolmyeongyeo, Chujado, Chuja-myeon, Jeju-si, Jeju-do, 1 July 2004, intertidal zone, by H. S. Kim, SCUBA diving, depth 25 m, deposited in the NIBR.

Description. Thick encrusting mass sponge, size up to $10 \times 6 \times 4.5$ cm. Surface, rough with sharp large conules. Oscules not present. Fibres easily separate from sponge body. Color in life, beige. Texture soft and compressible.

Skeleton: All fibres cored with very small sands and fibres with wide intervals (Fig. 11C) and arranged regularly. Primary fibres, 200–500 μ m in diameter. Secondary fibres, 150–250–400 μ m in diameter. All fibres have simple arrangement.

Etymology. The species name, *chujaensis*, is named after type locality Chujado, Jeju-do.

Remarks. This new species is very similar to genus *Pleraplysilla* in the shape of sponge surface with thick spine-like conules, but differs in skeletal fibres. Fibres of the

new species are not branched type. Simple skeleton is arranged regularly. All fibres are evenly cored with very small sands.

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