

Four New Species of Dictyoceratid Sponges (Demospongiae) from Korea

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Abstract: Four new species, *Semitaspongia jejuensis*, *Scalarispongia regularis*, *S. nigra* and *Dysidea violata* are described from Jeju, Korea. They were collected from 15 m depth by SCUBA diving and from intertidal area by hand. *Semitaspongia jejuensis* n. sp. is easily distinguished from other *Semitaspongia* species in growth form, conules, colour, skeletal structure, diameter of fibre and habitat. *Scalarispongia regularis* n. sp. is very close to *S. scalaris* (Schmidt, 1862) in skeletal structure, but *S. scalaris* has longer conules, larger meshes, longer distance between primary fibres, and highly developed subdermal canal system. *Scalarispongia nigra* n. sp. is very close to *S. regularis* in skeletal structure but can be easily distinguished by its black colour of external surface and growth form. *Dysidea violata* n. sp. is similar with *D. ethria* (Laubenfels, 1936) in sponge appearance, but *D. ethria* is clearly defined by its blue colour and thickness of fibre.

Key words: New species, Thorectidae, *Semitaspongia*, *Scalarispongia*, Korea

The family Thorectidae was erected by Bergquist (1978). This family is characterized by laminated skeletal fibre structures and diplodal choanocyte chambers. The thorectid sponges are divided into two subfamilies, Thorectinae and Phyllospongiinae, containing 23 valid genera. Among these genera, *Semitaspongia* and *Scalarispongia* were newly established by Cook and Bergquist (2000) through their review of the cacospongian sponge group.

Cook and Bergquist (2000, 2002a) defined *Semitaspongia* which is the unarmored thorectid sponge with an irregular to regular skeletal reticulum, slightly fascicular primary fibres, and moderate to abundant collagen deposition. Five species have been described in this genus worldwide (Soest,

2005).

Cook and Bergquist (2000, 2002a) separated *Cacospongia scalaris* Schmidt, 1862 from the genus *Cacospongia* and established the genus *Scalarispongia*. They defined *Scalarispongia* to be unarmored Thorectinae, with a regular, rectangular fibre skeleton, simple primary fibres, and moderate collagen. Seven species have been reported in *Scalarispongia* worldwide (Soest, 2005).

The family Dysideidae (Dictyoceratida: Demospongiae) consists of five valid genera, *Dysidea*, *Pleraplysilla*, *Euryspongia*, *Lamellodysidea*, and *Citronia*, with around 120 species described (Cook and Bergquist, 2002b; Lee and Sim, 2007).

The genus *Dysidea* is easily characterized by cored primary fibres and secondary fibres. Usually, the skeleton of *Dysidea* is regular and rectangular in arrangement. Primary fibres are pithed by coring material. There is only light collagen deposition in the mesohyl (Cook and Bergquist, 2002b). To date, around 90 species in *Dysidea* are known in the world (Soest, 2005).

Scalarispongia, *Semitaspongia* and *Dysidea* are newly reported to Korean Sponge Fauna through this paper.

MATERIAL AND METHODS

Sponge specimens were collected from Jeju, Korea. Specimens were obtained in shallow water (15 m deep) by SCUBA diving and intertidal zone by hand in 2005. Also, specimens preserved in Department of Biological Science, Hannam University were used. The collected specimens were fixed by 90% or absolute ethyl alcohol in the field. Sponges were examined under the stereo-microscope (Carl Zeiss, Stemi SV 6 and Leica, MZ75) for surface and skeletal arrangement and were examined under the light microscope (Carl Zeiss, Axio-cop II and Leica DMLS) for thin surface membrane and skeletal structure. The type

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specimens were deposited in the Natural History Museum, Hannam University (HUNHM), Hannam University, Daejeon, Korea.

SYSTEMATIC ACCOUNTS

Phylum Porifera Grant, 1836
Class Demospongiae Sollas, 1885
Order Dictyoceratida Minchin, 1900
Family Thorectiidae Bergquist, 1978

Semitaspongia jejuensis n. sp.
(Fig. 1)

Type specimen: Holotype (Por. 71), Seongsanpo, Jeju-do, 23 Apr. 2005, intertidal zone, K. J. Lee, deposited in HUNHM, Daejeon, Korea.

Description: Thickly encrusting sponge size up to 5 × 4.5 cm wide and 1.5 cm thick. Conules very low, under 1 mm high, with emergent terminal fibre and irregularly distributed on surface. Surface smooth with thin membrane which has

small amount of detritus. Some fibres exposed to air in area with reduced membrane. Colour in life blackish gray in ectosome and ivory in endosome. Oscules, under 0.5 mm in diameter, scattered on surface. Sponge has moderate amount of collagenous matrix (around 50 %). texture soft to firm, and compressible.

Skeleton: Skeleton has diverse ranges in structure and density, from regular to irregular reticulum in structure and low to high density in fibre arrangement. Primary fibre, 60-130 µm in diameter, axially fully charged with sand and broken spicules. Secondary fibres, 20-60 µm in diameter, slightly cored with sands and spicules, but partly heavily cored with sands and spicules, especially near surface. Secondary fibres well-developed compared with primary fibres. All fibres slightly laminated.

Etymology: The species name *jejuensis* is named after its type locality, Jeju-do.

Remarks: Five species in *Semitaspongia* are reported

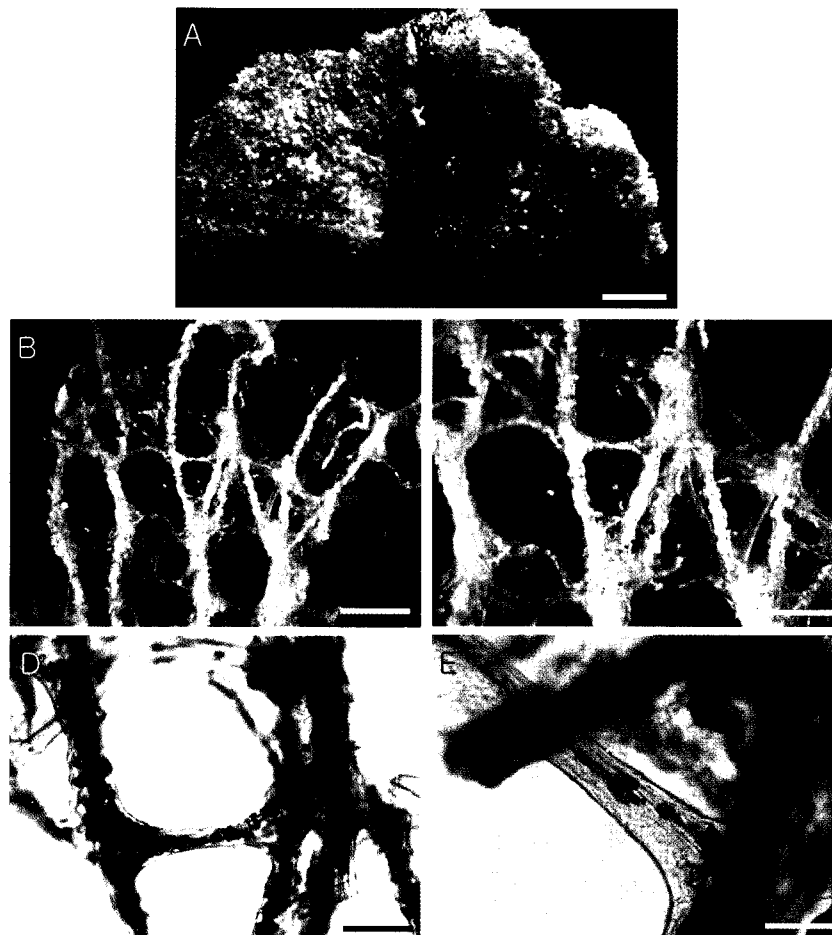


Fig. 1. *Semitaspongia jejuensis* n. sp. A, preserved specimen in alcohol. B-E, skeletal structure. Scale bars: A, 1 cm. B, 2 mm. C, 1 mm. D, 100 µm. E, 50 µm.

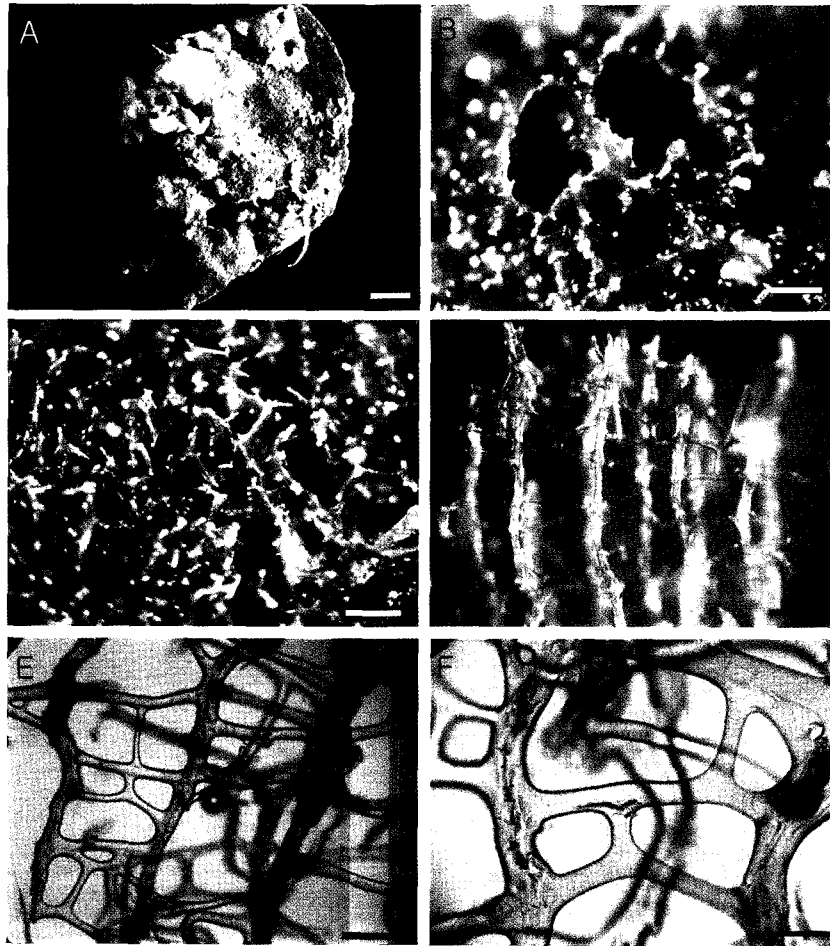


Fig. 2. *Scalarispongia regularis* n. sp. A, preserved specimen in alcohol. B, oscule cluster. C, conules. D-F, skeletal structure. Scale bars: A, 1 cm. B-D, 5 mm. E, 100 μ m. F, 50 μ m.

worldwide by Cook and Bergquist (2000). This new species is easily distinguished from other *Semitaspongia* species in growth form, conules, colour, skeletal structure, diameter of fibre and habitat. Most of all, only this new species was collected from intertidal zone. This species can be confused with *Hyrtilos*, because it looks as if all fibres are cored with detritus, but secondary fibres are not cored with detritus through the whole sponge. Heavily cored secondary fibres appeared only near the surface area.

Scalarispongia regularis n. sp.
(Fig. 2)

Type specimen: Holotype (Por. 72), Seongsanpo, Jejudo, 3 July 1971, deposited at HUNHM.

Description: Massive sponge size up to 13 \times 10 cm wide and 6.5 cm thick. Conules very low, 0.3-0.5 mm high, and regularly distributed on surface. Colour, yellowish gray and partly gray in alcohol. Oscules 1-2 mm in diameter, irregularly scattered on surface. Two or three oscules from a large oscule cluster or make an indeterminate form with get

together. Surface smooth with thin membrane which has a small amount of detritus. Texture soft and slightly firm, but compressible.

Skeleton: Skeletal structure very regularly arranged. In ectosome, secondary fibre makes mesh like reticulum structure, especially near surface, but makes a rectangular form like ladder in endosome. Primary fibre 46-185 μ m in diameter, straightly running from base to surface and slightly cored with broken spicules and small amounts of sands. Many spicules attached to terminal part of primary fibre. Secondary fibres 15-62 μ m in diameter and clear. Each primary fibre is around 460-620 μ m in distance with adjacent one. All fibres slightly laminated.

Etymology: The species name *regularis* is named after its regular skeletal structure.

Remarks: This species is very close to *Scalarispongia scalaris* (Schmidt, 1862) (in Lendenfeld, 1889; Laubenfels, 1948; Vacelet, 1959; Cook and Bergquist, 2002a) in skeletal

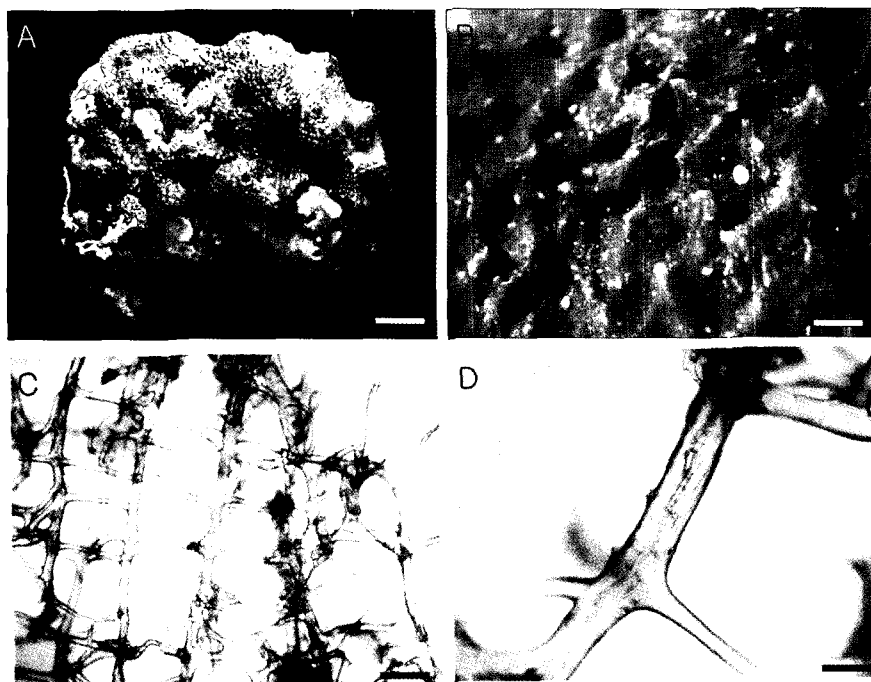


Fig. 3. *Scalarispongia nigra* n. sp. A, preserved specimen in alcohol. B, conules. C-D, skeletal structure. Scale bars: A, 1 cm. B, 5 mm. C, 100 μm. D, 50 μm.

structure and colour but, *S. scalaris* has longer conules, larger meshes, longer distance between primary fibres, and highly developed subdermal canal system.

Scalarispongia nigra n. sp.
(Fig. 3)

Type specimen: Holotype (Por. 73), the front of breakwater, Boingli, Daejung, Jejudo, 23 Feb. 2005, SCUBA diving, 15 m deep, K. J. Lee and H. J. Kim, deposited in HUNHM, Daejeon, Korea.

Description: Thickly encrusting sponge, size up to 5.5 × 6 cm wide and 1.5 cm thick, with small mounds. Sponges attached to rocky substrate and easily taken from substrate by hand. Low and fine conules under 0.3 mm high and regularly distributed on surface. Colour in life and alcohol black in ectosome and grayish ivory in endosome. Oscules 0.5-1.5 mm in diameter and irregularly appearing on small mound. Surface smooth with thin membrane which has a small amount of detritus, but not armoured. Texture soft, slightly firm, compressible and easy to tear.

Skeleton: Skeletal structure very regularly arranged through whole sponge. Primary fibre 60-125 μm in diameter, slightly cored with broken spicules and small amounts of sands and running to surface straightly from sponge base. Secondary fibres 15-62 μm in diameter, clear, and regularly connected with primary fibres. Each primary fibre is around 700-920 μm in distance. All fibres slightly laminated.

Etymology: The species name *nigra* is named after the black colour of whole specimen.

Remarks: This new sponge is very close to *Scalarispongia regularis* (above new species) in skeletal structure but can be easily distinguished by the black colour of external surface and growth form.

Family Dysideadae Gray, 1867

Dysidea violata n. sp.
(Fig. 4)

Type specimens: Holotype (Por. 74), the front of breakwater, Bongil-li, Daejeong, Jejudo, 23 Feb. 2005, SCUBA, 15 m depth, K. J. Lee and H. J. Kim, deposited in HUNHM, Korea.

Description: Thickly encrusting sponge slightly upright with digitated form 5.5 × 7 cm wide and 3 cm thick. Each erect part like branch 2-3.5 cm high and 1-1.5 cm wide. Sponges attached to rocky substrate. Specimen easily taken from substrate by hand. Texture very soft. Oscules not visible. Colour pale violet and ivory partly in life and changes to grayish ivory in alcohol. Surface smooth and covered with low conules, under 1.5-3 mm high, 2-5 mm apart. Basement of conules broad, formed with reticulated secondary fibres and primary fibre, and tip of conules ended with single primary fibre. Surface has some sands and particles of shell partly between fibres. Many parts of

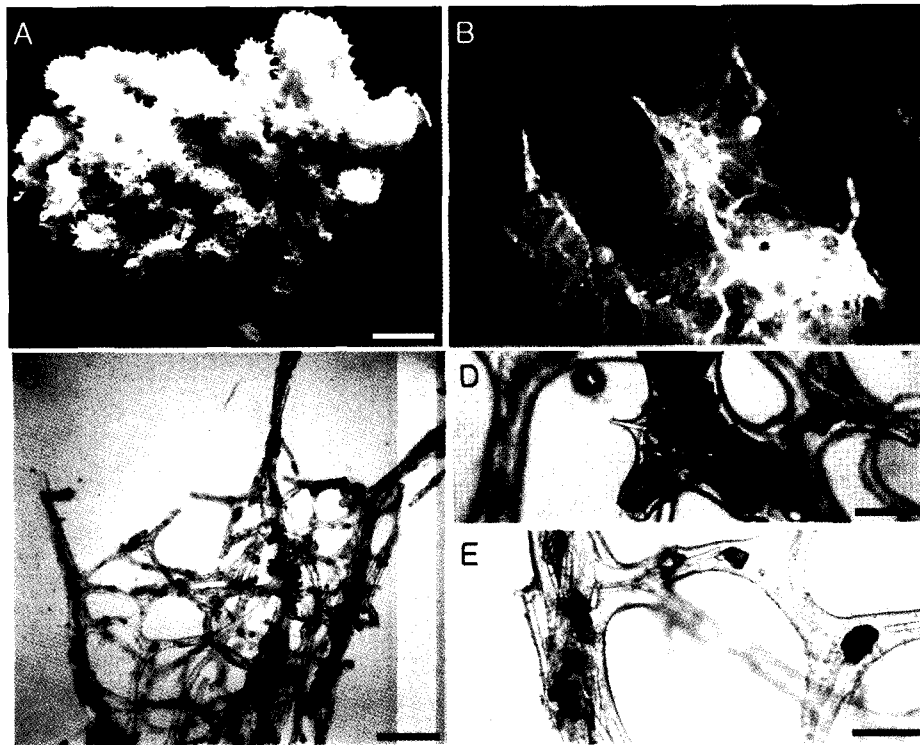


Fig. 4. *Dysidea violata* n. sp. A, entire specimen. B, conules. C-E, skeletal structure. Scale bars: A, 1 cm. B, 2 mm. C, 200 μ m. D-E, 50 μ m.

sponge loosened in matrix and skeleton exposed out of surface. Surface unarmoured but has a small amount of sands in surface membrane.

Skeleton: All skeleton irregularly arranged. Single primary fibres elongated to out of surface and elongated primary fibres support conules. Primary fibre 100-180 μ m in diameter, heavily cored with mainly spicules and partly small sands. Usually primary fibres simple and unfasciculated. Secondary fibre 20-80 μ m in diameter and charged with spicules. Secondary fibre well-developed and irregularly branched. Mesh of skeleton diverse form and size.

Etymology: This species name, *violata*, is named after its external colour.

Remarks: About 90 species are known in the genus *Dysidea* worldwide (Soest, 2005). The genus *Dysidea* may be easily confused with *Hyrtios* in the distribution of debris of fibre but *Hyrtios* has fasciculated fibres. The genus *Euryspongia* is the closest genus to genus *Dysidea*. They are distinguished by uncored secondary fibre of *Euryspongia* clear. This new species is similar with *Dysidea ethria* (Laubenfels, 1936) in sponge appearance, but *D. ethria* is clearly defined by its blue-coloured fibre.

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