

A New Record of *Stephanasterias albula* (Asteroidea: Forcipulatida: Asteriidae) from the East Sea, Korea

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ABSTRACT

A sea star was collected with fishing nets at a depth of approximately 100-160 m in the East Sea and was identified as *Stephanasterias albula* (Stimpson, 1853) belonging to the family Asteriidae of the order Forcipulatida. This species characterized by having the capability of asexual reproduction by self-division turned out to be new to the Korean fauna. Its morphological characteristics are redescribed with illustrations. Thirty one species of sea stars including *S. albula* are now recorded from the East Sea of Korea.

Keywords: taxonomy, Asteroidea, Asteriidae, *Stephanasterias*, East Sea

INTRODUCTION

The genus *Stephanasterias* is regarded as one of the more fascinating genera within the starfish families. It is known to be omnivorous and capable of asexual reproduction by fission, a unique mode of reproduction (D'yakonov, 1950). This genus was first recognized by Verrill (1871) as belonging to the family Asteriidae, and its current systematic extent was finalized with the synonymization of the genus *Nanaster* Perrier, 1894 with it by Fisher (1930). Within *Stephanasterias*, *S. gracillus* and *S. hebes* were synonymized with *S. albula* as was *Allostichaster capensis* (A.M. Clark and Downey, 1992), leaving *S. albula* as the sole member of the genus *Stephanasterias*.

S. albula is known as a subarctic species, based on its habitat distribution patterns. In Korea it was collected mainly at a depth of approximately 100-160 m by using fishing nets in the coast of Gangwon-do during the winter period of December to February. The specimens were preserved in 70% methyl alcohol, and the important morphological features are redescribed and photographed using stereo- and light-microscopes. Not only the genus *Stephanasterias* is a new addition to the Korean fauna but also its species *S. albula*. Thus together with it thirty one species of Asteroidea are now recorded from the East Sea, Korea (Rho and Shin, 1980; Shin, 1995; Shin and Rho, 1996; Lee and Shin, 2009).

SYSTEMATIC ACCOUNTS

Class Asteroidea de Blainville, 1830

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Order Forcipulatida Perrier, 1884

Family Asteriidae Gray, 1840

¹*Genus *Stephanasterias* Verrill, 1871

Type-species: *Asteracanthion albulus* Stimpson, 1853.

Number of species: one in world (one in Korea)

²**Stephanasterias albula* (Stimpson, 1853) (Fig. 1A-Q)

Asteracanthion albulus Stimpson, 1853, p. 14.

Asteracanthion problema: Lütken, 1857, p. 84.

Asterias gracilis Perrier, 1881, p. 4.

Stephanasterias gracilis: Gray et al., 1968, p. 160.

Stephanasterias albula Verrill, 1871, p. 5; 1914, p. 147; D'yakonov, 1950, p. 106; Hansson, 1999, p. 29.

Stichaster albulus: Duncan and Sladen, 1881, p. 29.

Material examined. 24 individuals, Imwon, 26 Feb. 2009 (Lee T.J. and S. Shin), with fishing nets from 140 m in depth; 2 individuals, Gisamun, 27 Dec. 2009 (Lee T.J. and S. Shin), with fishing nets from 160 m in depth; 4 individuals, Jangsa, 27 Dec. 2009 (Lee T.J. and S. Shin), with fishing nets from 100 m in depth.

Description. R=16-30 mm, r=2.3-5.0 mm, R=6.2-8.8 r. Disk small, circular, densely covered with one type of spine and two kinds of pedicellariae. Arm broad and constricted basally, but tapering towards tip, cross section nearly circular. Arms three to eight in number, but usually six to seven, their length being very irregular. In case of three or four arms, their length similar, but in case of six to eight arms, three to four of them with complete shapes, and remaining ones short, incomplete sizes due to running regeneration. Spines on dorsal side numerous, shorter than adambulacral spines, and each spine with porous center and two to four thorns on its tip. Usually two madreporites, rarely one, located near margin of disk. Papulae

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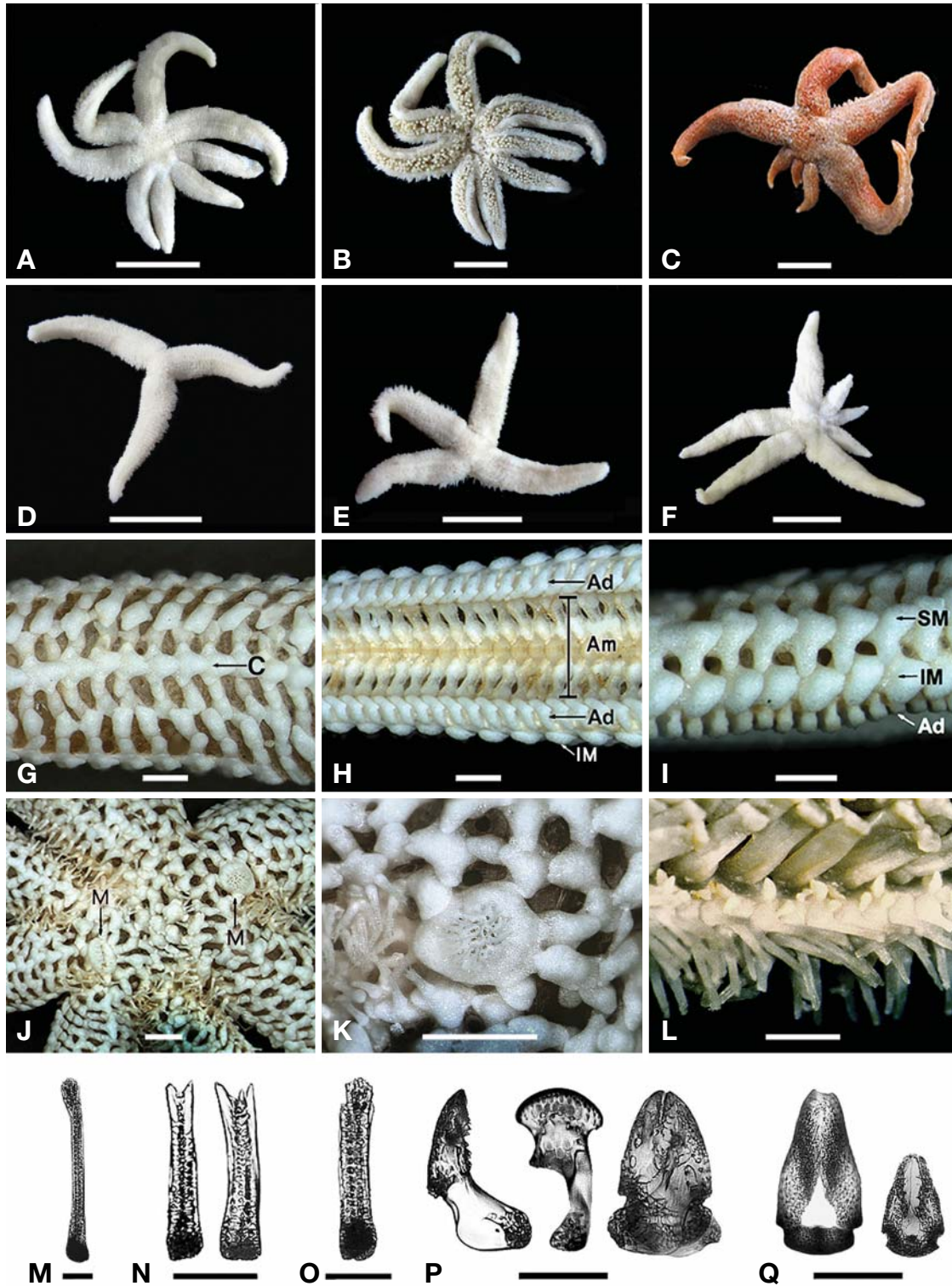


Fig. 1. *Stephanasterias albula*. A, D-F, dorsal side; B, ventral side; C, dorsal side (in life); G, carinal plates (C) on arm; H, adambulacral plates (Ad), ambulacral plates (Am) and inferomarginal plates (IM) on arm; I, superomarginal plates (SM), inferomarginal plates (IM) and adambulacral plates (Ad) on arm; J, two madreporites (M) on margin of disk; K, madreporite; L, small straight pedicellariae, adambulacral spines and tube feet; M, oral spine; N, spinules on dorsal side; O, adambulacral spine; P, crossed pedicellariae; Q, straight pedicellariae (large and small ones). Scale bars=1 cm (A-F), 1 mm (J, K, M, O), 0.5 mm (G-I, L, N), 50 μ m (P), 100 μ m (Q).

small, located singly or in small numbers on papular area. Carinal plate distinct, consisting of four lobes, and being slightly larger than marginal plate. Carinal skeleton closely imbricated into each other and distinctly arranged in one row to tip of arm. Superomarginal plate consisting of four lobes overlapping each other a bit, with three or four spines per plate. Inferomarginal plates longer and larger than superomarginal plates and overlapping each other a little, three or four spines per plate. Ventrolateral plates not present. Adambulacral plates rather small, without pedicellariae, but with three spines per plate. Spines similar in length, but one on dorsal side being longest. Adambulacral spine largest and longest one of all spines, about two times longer than spine on dorsal side, and having a porous center and unpointed tip. Ambulacral plates long, rod-shaped and arranged obliquely to tip of arm. Tube feet arranged in zigzag patterns of four series. Two kinds of pedicellariae present: crossed pedicellaria and straight pedicellaria which occurs in two sizes (large and small ones). Large ones with little interlocking apex as usually found on an oral plate but sometimes absent. Small ones present on dorsal side and along borders between ambulacral and adambulacral plates and with flat apex. Along boundary between adambulacral and ambulacral plates, straight pedicellariae densely arranged at constant space in a row towards tip of arm. Oral plate with two smooth well developed oral spines, similar to adambulacral spines, and with large straight pedicellariae densely located around mouth. Occasionally somewhat larger straight pedicellariae present.

Distribution. Korea (East Sea), Japan, North Pacific (Bering Sea, Okhotsk Sea, Alaska), North Atlantic (Barents Sea, Greenland, Kara Sea, Kola Bay, Murmansk Coast, northern North America, Gulf of Mexico).

Remarks. *S. albula* is the only species of the genus *Stephanasterias* reported worldwide. This species is a small sea star whose color in life is dark brown or light orange. It is reported as being a circumboreal species distributed in the North Pacific and the North Atlantic Oceans (D'yakonov, 1950). But *S. gracilis*, a synonym of it according to A.M. Clark and Downey (1992), was collected from the Gulf of Mexico (Gray et al., 1968). This species is characterized by having the capability of asexual reproduction by self-division. Ordinarily fission takes place on a plane between two madreporites in our specimens.

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