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# A Newly Recorded Sea Star of Genus *Henricia* (Asteroidea: Spinulosida: Echinasteridae) from Jeju Island, Korea

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**Abstract - Some asteroid specimens were collected at a depth of 150 m near Moseulpo in Jeju Island, Korea using fishing nets on October 2014. The specimens were identified as *Henricia pacifica* Hayashi, 1940 belonging to the family Echinasteridae of order Spinulosida. In the Korean fauna, seven species of genus *Henricia* were reported of which two species, *H. nipponica* and *H. ohshimai*, were distributed in Jeju Island. The morphological characteristics of this species were re-described with illustrations.**

**Key words: Sea star, Echinasteridae, Spinulosida, morphological characteristics, Jeju Island, Korea**

## INTRODUCTION

The taxonomy of asteroids is usually based on externally observable characteristics of the skeleton, particularly the primary ossicular series, which define the body wall (ambulacral plates, adambulacral plates, marginal plates, dorsal plates, ventral plates), as well as secondary ossicles such as spines and spinelets. Works by Perrier (1884) and Sladen (1889) have established the taxonomic foundation of most asteroid groups. Genus *Henricia* is a large genus belonging to the family Echinasteridae Verrill, 1870 which is widely distributed in the cold waters of both the Northern and Southern hemispheres (Clark 1946) from intertidal to deep sea waters along the temperate zones of the Pacific coast from Baja California to British Columbia (Eernisse *et al*. 2010), in addition to locations along the eastern Atlantic coast of the United States (Shield and Witman 1993). In the Atlantic, *Henricia* species are most often found in the rocky subtidal zone (Shield and Witman 1993). Genus *Henricia* consists of 91 species (Mah 2015) and contains a fairly large number of exceedingly variable species, although their systematics are not satisfactorily worked out (D'yakonov 1950). These species usually have slender arms, sometimes short arms. Dorsal ossicles are small, closely united, or overlapping at the edges and are arranged in a reticulated or imbricated pattern, leaving small papular areas, carrying few or often single papulae, and are not covered with a thick integument. Fisher (1911) recognized eight species and five subspecies in the North Pacific, Hayashi (1940) described 17 species from Japan, and D'yakonov (1950) described 19 species from USSR. Clark (1996) listed 76 species and 11 subspecies of this genus. Clark and Jewett (2010) reported 13 new species from the Aleutian Archipelago. Xiao *et al*. (2011) reported eight species and three subspecies from China and the East China Sea. Seven *Henricia* species, *H. leviuscula*, *H. nipponica*, *H. ohshimai*, *H. pachyderma*, *H. regularis*, *H. reniossa*, and *H. reticulata*, were recorded from the Korean fauna (Shin and Rho 1996; Shin 2010; Shin and Ubagan 2015).

## MATERIALS AND METHODS

Some asteroid specimens were collected at a depth of 150 m near Moseulpo, Jeju Island of Korea by fishing nets on 2

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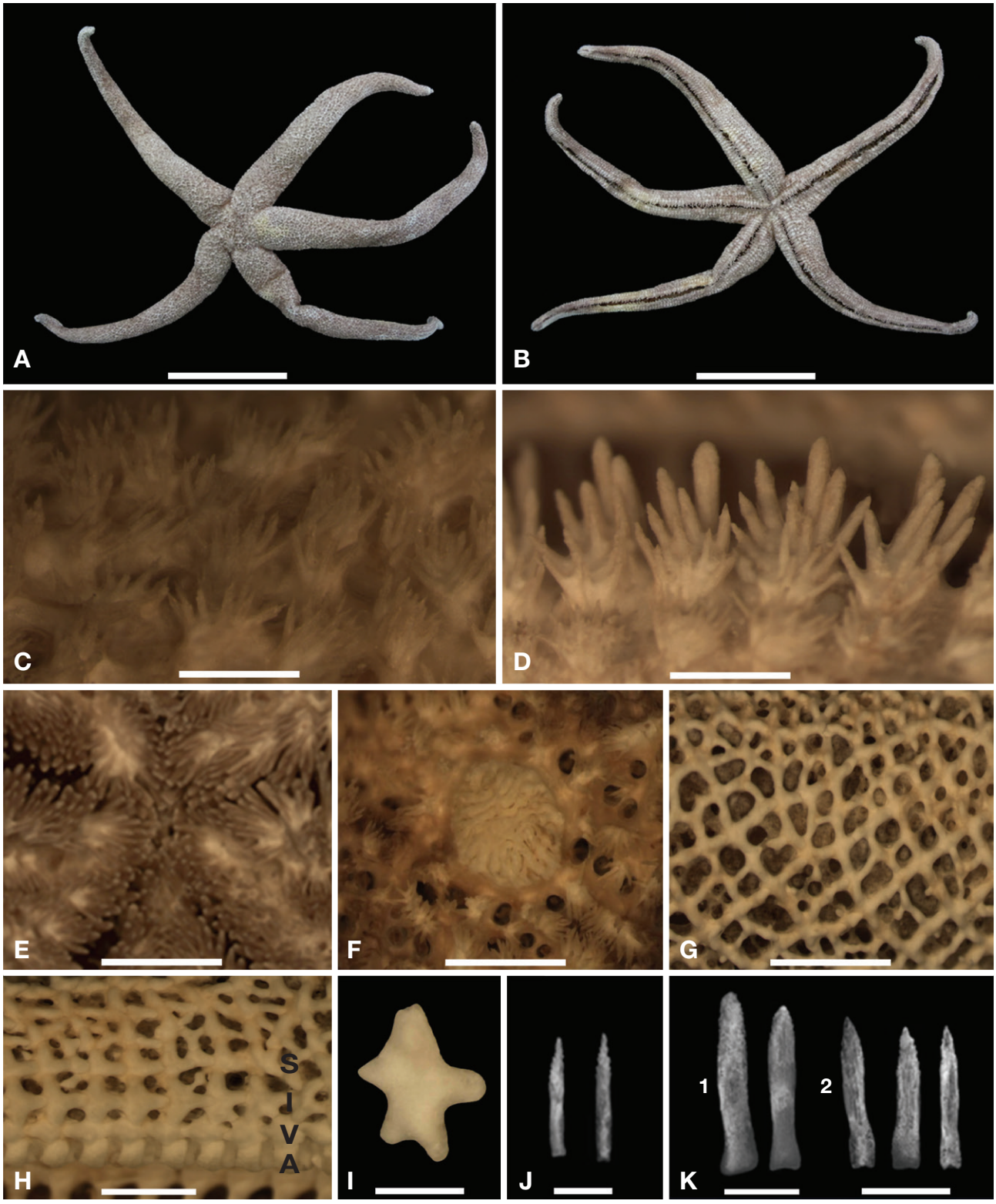


**Fig. 1.** *Henricia pacifica*. A. dorsal view; B. ventral view; C. dorsal spines; D. adambulacral spines; E. oral part; F. madreporite; G. dorsal skeleton; H. ventral skeleton: adambulacral plate (A), ventrolateral plate (V), inferomarginal plate (I), supermarginal plate (S); I. inferomarginal plate; J. dorsal spines; K. adambulacral spines (1. inner, 2. outer). Scale bars: A, B = 2 cm, C, D, G, H = 2 mm, E, F = 1 mm, I = 3 mm, J = 100 μm, K = (1) 300 μm, (2) 200 μm.

October 2014. The collected specimens were preserved in 95% ethanol and their morphological characteristics such as size of disc, upper and proximal portion of arms, adambulacral spines, dorsal skeleton, and ventral skeleton, were determined. Morphological features of the specimen were photographed using a scanning electron microscope (JSM-6510, JEOL Ltd., Tokyo Japan), stereomicroscope (Nikon SMZ1000, Nikon Co., Tokyo, Japan), and digital camera (Nikon D7000). Abbreviations for measurements are: R, major radius from disc center to arm tip; r, minor radius from disc center to edge of disc.

## SYSTEMATIC ACCOUNTS

Class Asteroidea de Blainville, 1830
Order Spinulosida Perrier, 1884
Family Echinasteridae Verrill, 1870
Genus *Henricia* Gray, 1840

***Henricia pacifica* Hayashi, 1940**
**태평양애기불가사리 (신칭) (Fig. 1A-K)**

*Henricia pacifica* Hayashi, 1940: p. 152, pl. 9, figs. 7-10; Mah, 2015: 369133.

**Material examined**: Four specimens, near Moseulpo, Jeju Island, Korea, 2 October 2014, at 150 m depth by fishing net, Shin, S. and D. Kim.

**Description**: Disk small. Arms five in number, slender, long, and flexible. Dorsal skeleton small, forming irregular mesh, reticulated, some meshes contain small ossicles subdividing papular areas. Dorsal paxillae closely converge, formed in groups, and pointed tips bearing 5-19 spinelets. Papular areas small, containing one to five papulae, irregular in form. Madreporite circular in form, covered with spinelets similar to adjacent dorsal spinelets, situated about midway between center and margin of disk. Marginal plates relatively distinct. Supermarginal plates smaller than inferomarginal plates, forming a kidney shape, reaching tip of arm, but series of plates bend upward toward base of arm in midway part. Inferomarginal plates larger than ventrolateral plates, forming star shape, transversely elongated, a series extending to tip of arm. Ventrolateral plates slightly convex, forming a series with numerous spinelets, extending three-fourths length of arm. Adambulacral plate with 10 to 15 spinelets with slender to pointed tips, inner three or four being longer and stouter than the other, arranged in two transverse or in a zigzag row. Furrow spine single, long and slender, sometimes reaching middle of subambulacral spines.

**Size**: R = 69-82 mm, r = 9-11 mm, R : r = 6.9-8.4.

**Habitat**: Muddy-sandy and rocky substrates.

**Distribution**: Korea (Jeju Island), Japan (Tsugaru Straight, Seto of Honshu, Goto of Kyushu).

**Deposition**: The collected specimens were deposited in the Marine Echinoderm Resource Bank of Korea (MERBK), Sahmyook University, Seoul, Korea.

**Remarks**: *Henricia pacifica* was firstly recorded by Hayashi, 1940 in Japan. This species was collected from the northern part (Tsugaru strait) to southern region (off Goto) of Japan, which means that this species can live in temperate regions. From Jeju Island, the dorsal skeleton of this species was found to be weaker and fragile compared to other *Henricia* species. This species was recorded in Korea for the first time.

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