INTRODUCTION

The poorly studied family Poraniidae from the order Valvatida is distributed throughout the Atlantic, Indian, Pacific, and Southern Oceans (Clark, 1984, 1993). Recently, the classification of this group has been revised based on morphological and molecular phylogenetic data (Mah and Foltz, 2014). Mah and Foltz (2014) presented two new genera, Bathyporania and Clavaporania, and genus Culcitopsis was reinstated to genus level which is the previously synonymized genus Glabraster. Therefore, the family Poraniidae comprises 11 genera: Bathyporania Mah and Foltz, 2014; Chondraster Verrill, 1895; Clavaporania Mah and Foltz, 2014; Culcitopsis Verrill, 1914; Glabraster Clark, 1916; Marginaster Perrier, 1881; Porania Gray, 1840; Poraniomorpha Danielsen and Koren, 1881; Poraniopsis Perrier, 1891; Spoladaster Fisher, 1940; Tylaster Danielsen and Koren, 1881 (see Mah and Foltz, 2014; Mah, 2017), of which only the genus Poraniopsis has been reported in Korean waters until now (Shin and Rho, 1996; Shin, 2010).

The genus Marginaster is known only from small specimens (R < 20 mm) among the Poraniidae (Clark, 1984) and comprises only four species (Mah, 2017). Verrill (1914) questioned the status of M. pectinatus, a type species of the genus Marginaster, and argued that it was probably a young specimen of Porania or some other similar genus. However, Downey (1973) found sexually mature specimens of Marginaster from the West Indies. Two species of Marginaster have been synonymized to species of another genus (Clark, 1984; Clark and Downey, 1992). Accordingly, species identification of the genus Marginaster requires careful consideration.

On November 5, 2016, a sea star was collected with a trawl net at a depth of 92 m in waters of the Korea Strait, adjacent to eastern side of Jeju Island, Korea. The collected specimen was preserved in 95% ethyl alcohol and deposited in the Marine Echinoderm Resource Bank of Korea (MERBK), Sahmyook University, Seoul, Korea. Its important morphological characteristics were photographed using a digital camera (G12; Canon, Tokyo, Japan) and stereo mi-
A Newly Recorded Sea Star of the Genus Marginaster from the Korea Strait

Table 1. Primers used in this study

<table>
<thead>
<tr>
<th>Primer name</th>
<th>Primer sequence (5′-3′)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>COIceF</td>
<td>ACTGCCACGCGCCTAGAATGATATTGATTTTTATGGTATAGCC</td>
<td>Hoareau and Boissin (2010)</td>
</tr>
<tr>
<td>COIceR</td>
<td>TCGTGGTCTACGCTATCCATCTACTGTGTRAACATRTG</td>
<td>Palumbi et al. (1991)</td>
</tr>
<tr>
<td>16sar-L</td>
<td>CGCTGTATTATCAAAAACAT</td>
<td></td>
</tr>
<tr>
<td>16sb-L</td>
<td>CCGTCTGGAACCTGACATCGT</td>
<td></td>
</tr>
</tbody>
</table>

Type species: Marginaster pectinatus Perrier, 1881
Body nearly pentagonal, small, R usually under 20 mm. Abactinal plates covered with skin and spines. Inferomarginal plates project to form a margin, each plate with five spines forming a marginal edge.

Marginaster paucispinus Fisher, 1913

Material examined. One specimen, 33°39′86″N, 127°33′12″E, Korea Strait near eastern part of Jeju Island, Korea, 5 Nov 2016, at 92 m depth with a trawl net.

Description. Body small, flat, nearly stellate-pentagonal in form. Actinal side flattened, abactinal surface covered with skin. Arms short, tapering to a blunt straight tip (Fig. 1A–C). Abactinal skeletons obscured by skin, reticulate and abactinal plates around disk center rounded, one to four club-shaped short spines on each plate (Fig. 1D). Madreporite small, flat, circular, with irregular grooves, slightly higher than abactinal surface (Fig. 1E). Anus small, covered with club-shaped short spines (Fig. 1F). Actinal plates form transverse rows from adambulacral plates to inferomarginal plates (Fig. 1G, H). Inferomarginal plates flat, wider than long (largest plate: length = 0.9 mm, width = 1.9 mm), slightly spaced, with five or six digital webbed spines (length 0.18–0.24 mm) (Fig. 1I). Adambulacral plates with two webbed digitiform spines, two furrow spines on first five plates, but one spine on subsequent plates (Fig. 1J). Oral plate narrow, with four spines and two suboral spines (Fig. 1K).

Size. R = 16 mm, r = 10 mm, R = 1.6 r.

Color. Body is light reddish brown in the living animal.

Distribution. Korea (Korea Strait), South China Sea.

Remarks. Marginaster paucispinus is one of the rarest sea stars in the world and the only species of Marginaster in the North Pacific (Fisher, 1913, 1919). M. paucispinus was the only species of the genus found in the Pacific region before McKnight (2006) reported M. patriciae in the adjacent water of New Zealand. A few specimens were collected in previous studies at a depth of around 180 m in the South China Sea.

Korean name: 19가장자리불가사리속(신청). 28가시가장자리불가사리(신청)
Sea (Fisher, 1913; Lane et al., 2000). Our specimen differs in two morphological characteristics from the original description by Fisher (1913): the number of adambulacrals plate with two furrow spines (Fisher: 2, Korean specimen: 5) and the number of spines on inferomarginal plate (Fisher: 4 or 5, Korean specimen: 5 or 6). Several previously described species of Marginaster were either juveniles of other poranids or members of other taxa (Clark, 1984; Clark and Downey, 1992). Therefore, nominal species and description of new taxa should be carefully interpreted (Mah, 2017). Korean specimen of M. paucispinus was sexually mature, which specimen has fully matured gonad. Accordingly, we accomplished genomic DNA extraction from gonad tissue.

The partial sequences of the mt COI (644 bp) and 16S rRNA (604 bp) are deposited in GenBank under accession numbers MF599201 (COI) and MF599200 (16S rRNA). These sequences are the first to be deposited in GenBank from the genus Marginaster.

**ACKNOWLEDGMENTS**

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A Newly Recorded Sea Star of the Genus Marginaster from the Korea Strait

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