

Survey of Indigenous Species of Marine Algae in Korea: New Record of *Hypnea flagelliformis* (Cystocloniaceae, Gigartinales)

Pil Joon KANG · Ki Wan NAM[†]
(Pukyong National University)

한국의 자생 해조 발굴 연구: 미기록종 털가시우무 (열매가지과, 돌가사리목)

강필준 · 남기완[†]
(부경대학교)

Abstract

한국의 자생해조 발굴연구의 과정에서 털가시우무(*Hypnea flagelliformis* Greville ex J. Agardh)가 동해 연안에서 채집되었다. 본 종은 뚜렷한 주축, 잘록한 기부, 가지, 주축 및 가지에 밀생하는 다수의 짧은 소지가 있으며, 수세포 벽에 원형질 비후가 없다는 점이 특징적이다. 털가시우무는 한국산 미기록종으로 본 연구에서 처음으로 보고된다.

Key words: New record, *Hypnea flagelliformis*, Morphology, Taxonomy, Korea

I . Introduction

Since Kang (1966), many species have been added to the floristic list of marine algae in Korea (Kang, 1968; Lee and Kang, 1986, 2002; Lee, 2008; Kim et al., 2013). Recently, this kind of study has been intensely performed in Korea (Jeong et al., 2013; Kang and Nam, 2013, 2014). It appears that about 900 species are currently recorded in the Korean marine algal flora (Boo and Ko, 2012; Kim et al., 2013).

In the course of the survey of indigenous species in Korea, many marine algal species were found in Korea. Of these, one red algal species, *Hypnea flagelliformis* Greville ex J. Agardh, which was

collected from east coast of Korea, was observed in details. Morphological and taxonomic data on this species are included in the present study. *Hypnea flagelliformis* is newly recorded in Korea here.

II . Materials and Methods

Specimens for the present study were collected along the east coast of Korea. Taxonomic data were obtained from fresh, liquid-preserved and herbarium specimens. Liquid-preserved material was stored in a 10% solution of Formalin/seawater. For anatomical observations the material was cleared in 5-10% NaOH in distilled water for 2-7 days, and

[†] Corresponding author: 051-629-5922, kwnam@pknu.ac.kr

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then rinsed in distilled water. Blades dissected from the cleared materials were hand sectioned, transferred to a slide with a drop of distilled water, and mounted in pure glycerin. In some instances, a smearing method for microscopic examination was employed. Measurements are given as width and length. For photographs the sections were stained with 0.5-1.0% aqueous methylene blue, aniline blue or hematoxylin. For permanent slides, the glycerin was exchanged with 10-20% corn syrup.

III. Results and Discussion

***Hypnea flagelliformis* Greville ex J. Agardh 1851: 446.**

Korean name: Toel-ga-si-u-mu nom. nov. (신창: 털가시우무).

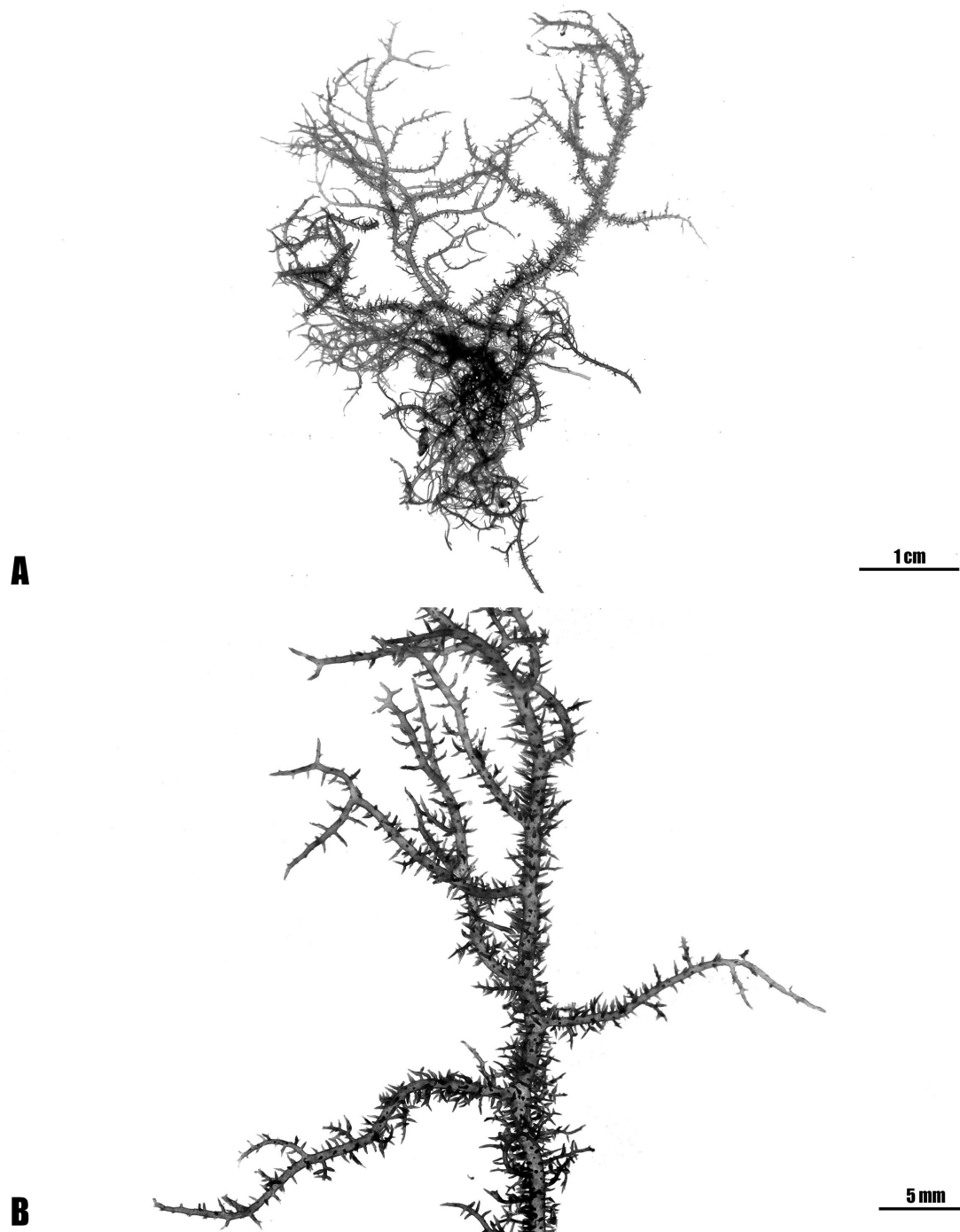
Specimens examined: PKN 0000127926, PKN 0000127927 (Geoilli: 03.vii.2013).

Habitat: Growing on rock near upper to lower intertidal.

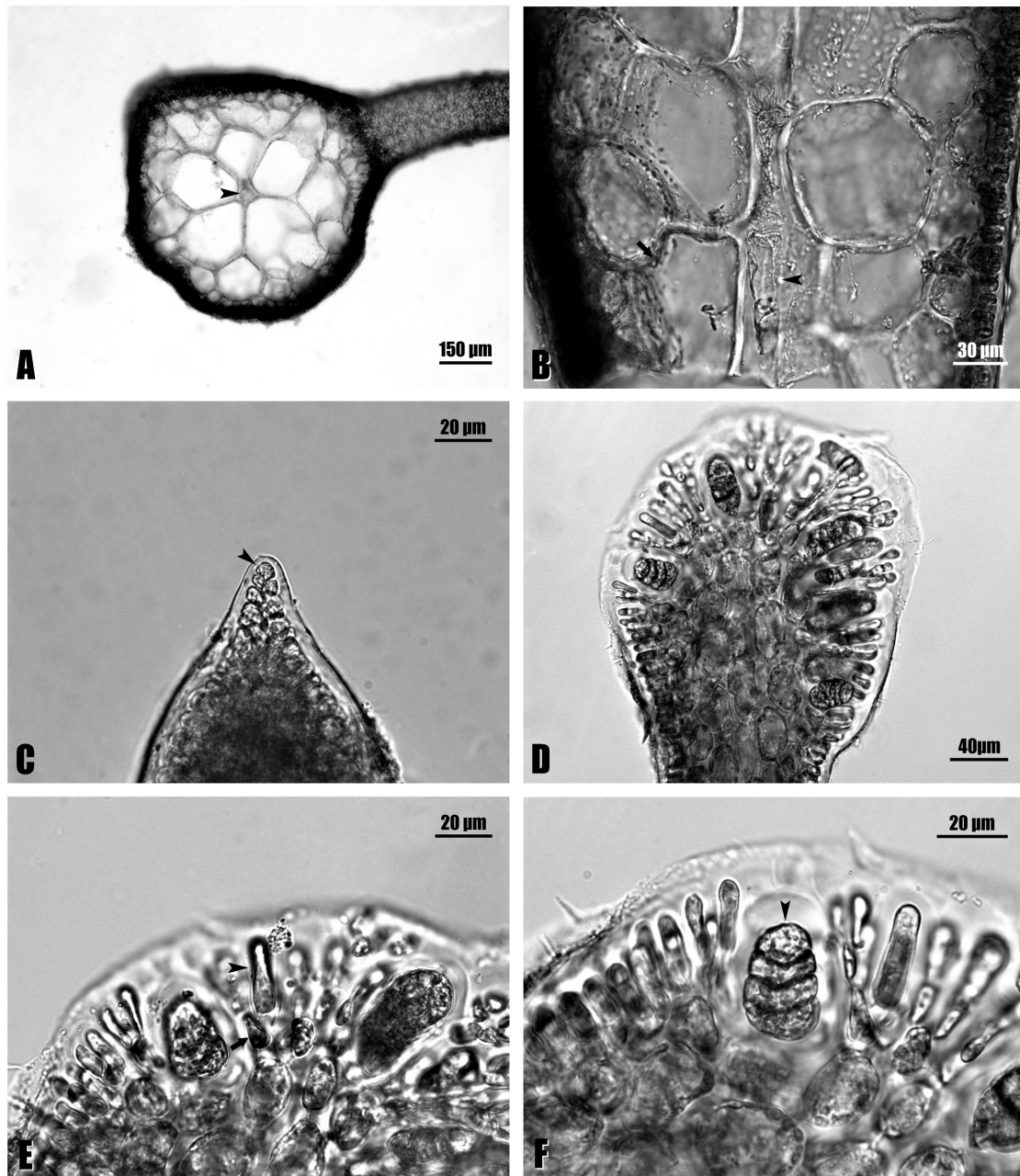
Morphology: Thalli up to 10-15 cm high [Fig. 1A], terete, entangled, dark red to brown in color, cartilaginous in texture; main axes often rather percurrent, issuing branches and proliferations [Fig. 1B]; branches bearing branchlets in alternate to spiral manner; branchlets short, linear to lanceolate, sometimes hooked, 1-10 mm long; apical cells distinct at the apices of axes [Fig. 2C]; lenticular thickenings absent in the wall of medullary cells [Fig. 2A]; cortex two to three cell layer thick; medullary cells round to elliptical in transverse section, linear to cylindrical shape in longitudinal section [Fig. 2B], with many pit connection between adjacent cells; tetrasporangia produced from cortical cell, restricted in ultimate branchlets, zonately divided, 10-25 μm \times 20-40 μm [Fig.

2D-2F]. Sexual plants were not collected during this study.

Remarks: *Hypnea flagelliformis* Greville ex J. Agardh, which was originally described from India (Silva et al., 1996), is distributed in Japan (Guiry and Guiry, 2014). In general, medullary lenticular thickenings are considered as useful character in *Hypnea* (Tseng, 1984; Chiang, 1997; Xia and Wang, 1997; Geraldino et al., 2010). These thickenings are not observed in our specimens as other reports (Yamagishi and Masuda, 1997; Yoshida, 1998). *Hypnea flagelliformis* is distinguished from other similar *Hypnea* species in Korea in lacking these features. *Hypnea flagelliformis* is characterized by percurrent axis and short and abundant branchlets densely covering axis and branches with basal constrictions in addition to the absence of lenticular thickenings in medullary cell walls. This is the first record of *Hypnea flagelliformis* in Korea.



[Fig. 1] *Hypnea flagelliformis*. A, Habit of vegetative plant; B, Details of vegetative branches covered densely with many branchlets



[Fig. 2] *Hypnea flagelliformis*. A, Axial cell (arrowhead) with large pericentral cells in transverse section; B, Cylindrical axial cells (arrowhead) with pericentral cell (arrow) in longitudinal section; C, Distinct apical cell (arrowhead) at apex of branchlet; D, Tetrasporangial branchlets; E, Tetrasporangial initial (arrowhead) produced from cortical cell (arrow); F, Tetrasporangium (arrowhead) with zonate division

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