

A New Species of the Genus *Ammonicera* (Prosobranchia, Omalogyridae) in a Coralline Algae Community from Jeju Island, off the South Coast of Korea

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Abstract – A species of the genus *Ammonicera* Vayssière, 1893 collected from coralline algae communities in Jeju Island, South Korea, is described as a new species, *A. aurea*, for science. Its morphological characters are described and illustrated by SEM micrographs. This new species can be clearly distinguished from other *Ammonicera* species from the Pacific Ocean by the presence of a spiral cord and about 25 slightly-elevated axial ribs, resulting in about 25 nodules at intersecting points of the cord and ribs on the last whorl of the teleoconch.

Keywords – *Ammonicera aurea* sp. nov., Omalogyridae, micro mollusk, coralline algae community, tide pool, Jeju, Korea

1. Introduction

Coralline algae communities are commonly occurring in rocky intertidal pools, where these communities are considered to be important components of coastal marine ecosystems. Numerous marine benthic organisms have been found to be associated with these communities (Akioka et al. 1999; Kelaher et al. 2007; Olabarria 2002; Kang et al. 2008, 2014). Several studies have reported that more than 20 species of micro gastropods with high population densities (up to ca. 800 individuals/m²) are associated with coralline algae, and those micro molluscs play a key role in the algal community (Fujita 1999; Kelaher 2003; Hayakawa et al. 2013). Recently, Noseworthy and Choi (2010) and Waki et al. (2016) reported several species of marine micro gastropods occurring in rocky tide pools in Jeju Island.

Members of the family Omalogyridae G. O. Sars, 1878 are typical micro gastropods characterized by very small planispiral shells (ca. 0.5–1 mm in diameter), and they inhabit marine algae communities in the intertidal and shallow subtidal (Okutani 2000; Azevedo 1992; Waki et al. 2016). Over the past three decades, reports on the descriptions of new species in the Omalogyridae have increased considerably, due to the advent of scanning electron microscopy (SEM), which has provided images of detailed surface structures of the micro gastropod shells (Sleurs 1985a, 1985b, 1985c; Rolán 1991, 1992; Simone 1997; Chernyshev 2003; Sartori and Bieler 2014; Oliver and Rolán 2015). Among seven genera in the family Omalogyridae, *Ammonicera* Vayassière, 1893 contains the highest number of species (WoRMS 2017), and they are often found from coralline algal turf in rocky tidal pools (Oliver and Rolán 2015; Waki et al. 2016).

Micro gastropods in the genus *Ammonicera* often exhibit axial and spiral sculpture, and the protoconch usually shows cords and grooves, which can be quite useful characteristics for the identification of each species. Sleurs (1985a, 1985b, 1985c) described four species of *Ammonicera* from the South Pacific, and Rolán (1991, 1992) reported 12 species from the Caribbean and Cape Verde Islands, off the west coast of Africa in the North Atlantic Ocean. More recently, Chernyshev (2003) described new species of *Ammonicera* in the north-west Pacific area, and Sartori and Bieler (2014) reported new north-eastern Pacific species. Oliver and Rolán (2015) also reported several species in the genus *Ammonicera* from the Iberian Peninsula in the eastern Atlantic Ocean.

Micro gastropods in the family Omalogyridae are also

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common in tide pools in the north Pacific region. Habe (1972) first reported *A. japonica* as a new species. And two species, *A. angulata* Sleurs, 1985 and *Omalogyra atomus* Philippi, 1841 were added by Okutani (2000) and Kurabayashi and Ueshima (2000). Chernyshev (2003) discovered a new member of Omalogyridae and assigned it as *A. chosenuca*. Recently, Waki et al. (2016) discovered *A. japonica* Habe 1972 from a tide pool located on the south coast of Jeju Island, in Korea, for the first time which showed that *A. japonica* was associated with coralline algal turf.

A brief survey carried out in 2015 from the small tide pools in the south coast of Jeju Island revealed the presence of several unidentified species of micro gastropods in the coralline algal community. SEM analysis of the shell of one of the species showed that it is new to science.

2. Materials and Methods

In July, 2015, a 10 cm × 10 cm micro-quadrat was installed in a small, shallow tide pool at Yerae, on the south coast of Jeju Island, to collect microgastropods associated with benthic algae. Complete specimens of coralline algae were removed and the samples were placed in plastic bags. Some sediment and detritus settled on the algae were also sampled. In the laboratory, the algae-microshell samples were immersed in 70% ethanol for 15 minutes and sieved through 2 m mesh to isolate the associated microorganisms. Microscopic examination of the filtrate revealed numerous small organisms including several species of gastropods. A scanning electron microscope (SEM: Carl Zeiss AG - SUPRA 55VP) (ZEISS, Jena, Germany) was used to identify the micro-gastropods by examining the microstructure of the shell surface.

In this sediment, in addition to specimens of *A. japonica*, some specimens of an *Ammonicera* were found which, after a careful study, is considered new to science and is herein described. The specimens, holotype and paratypes, have been deposited at National Marine Biodiversity Institute of Korea (MABIK, Registration Number MO00163043), and are stored in 70% ethanol.

3. Results and Discussion

Superfamily: Omalogyroidea G. O. Sars, 1878

Family: Omalogyridae G. O. Sars, 1878

Genus: *Ammonicera* Vayssière, 1893

Ammonicera aurea sp. nov. (Figs. 2 and 3A–F)

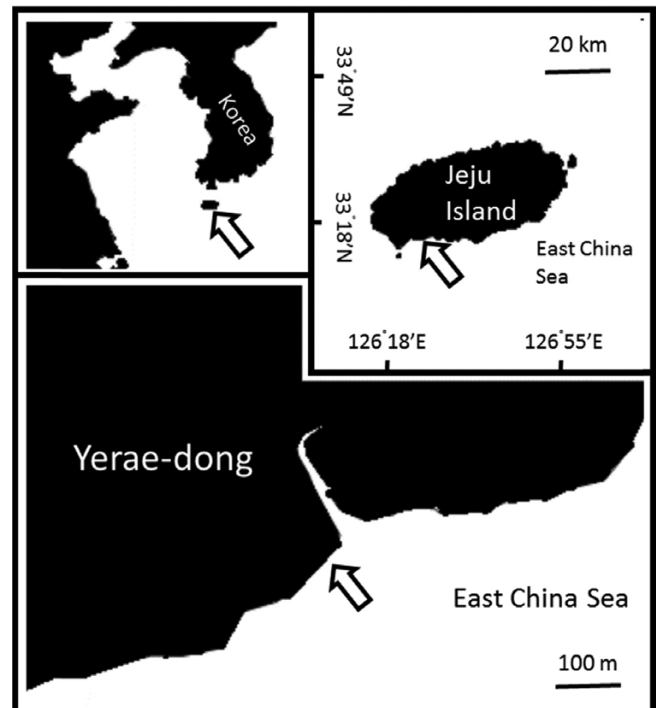


Fig. 1. Sampling location of *Ammonicera aurea* sp. nov. (After Waki et al. 2016)

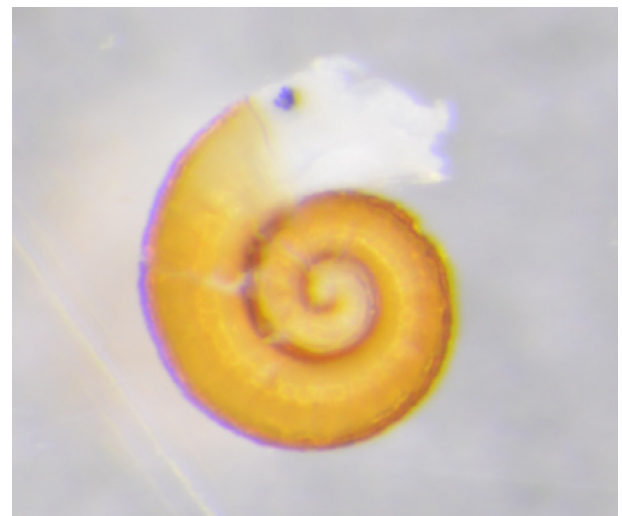


Fig. 2. *Ammonicera aurea* sp. nov. Microphotograph of live-taken specimen

Type material: Holotype (Fig. 3A–B) and 5 paratypes deposited at MABIK.

Type locality: Yerae-dong, south coast of Jeju Island, South Korea (Fig. 1).

Etymology: The specific name is from the Latin “*aureus*, a,

um” which means “golden” the color of the shells of this new species (Fig. 2).

Description: Shell planispiral, golden in color, very small, with 2 whorls, of which $\frac{3}{4}$ of the first is protoconch. Protoconch with wide groove delineated internally by spiral cord becoming narrower at end of protoconch; under high magnification, small tubercles are visible in the groove. Two grooves visible in basal view, internal one narrow and one wide. Sculpture of

internal part of protoconch with rough surface.

Teleoconch with irregular spiral cord as continuation of cord in protoconch. Numerous nodules on cord at intersection points, with about 25 scarcely-elevated axial ribs on last whorl. Ribs prolonged towards periphery, with small depressions between them forming spiral in external part of cord. Entire surface covered by fine spiral cordlets. Aperture rounded, except somewhat flattened at point of contact with periphery of previous whorl; peristome thin.

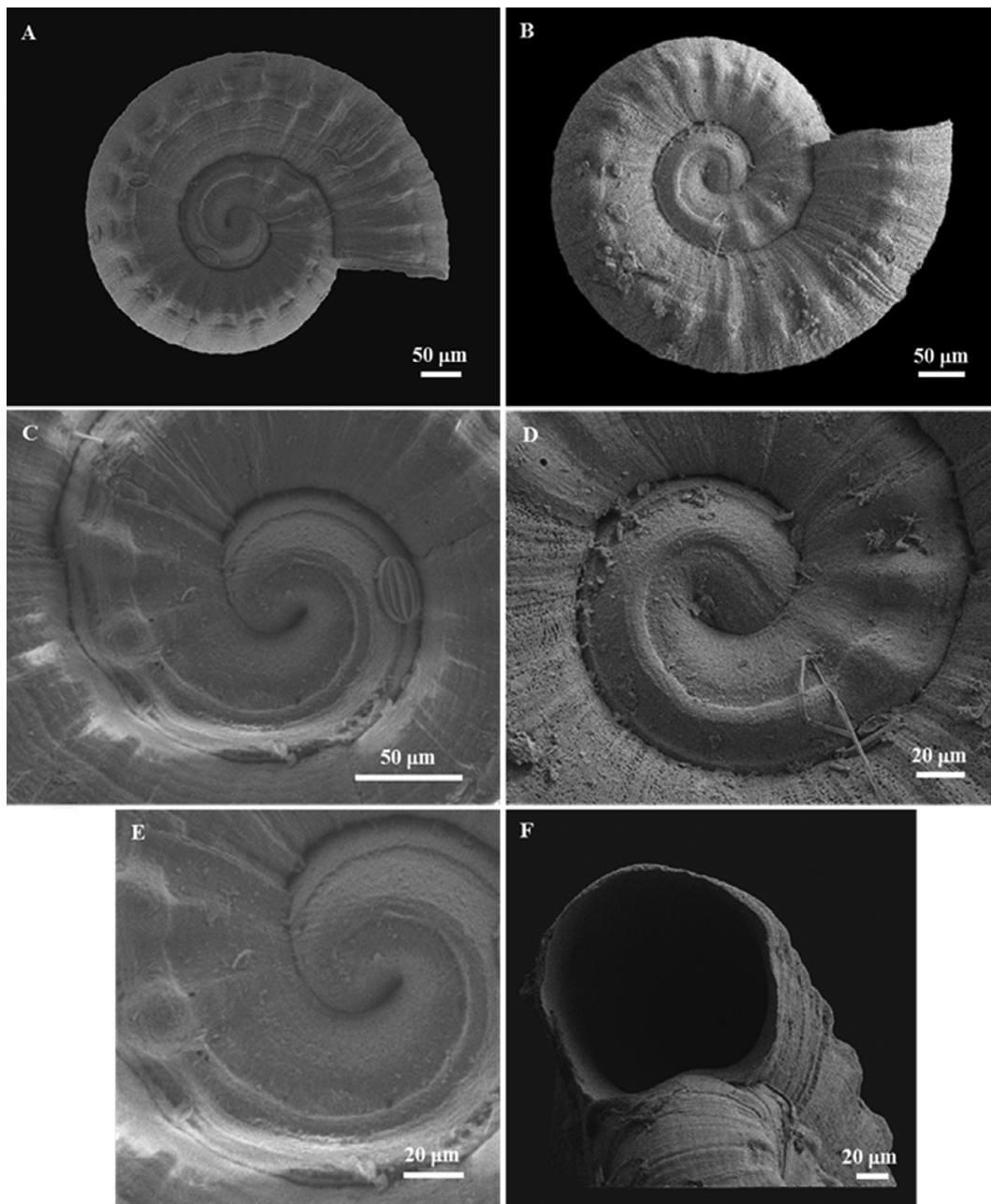


Fig. 3. *Ammonicera aurea* sp. nov. A–B: holotype, 0.43 mm, Yerae-dong, Jeju Island, South Korea (SAL); C–E: protoconch: detail of apical and basal views; F: apertural view

Dimensions: The holotype 430 μm in diameter; protoconch approximately 128 μm in diameter.

Habitat: Small, shallow tidepools in a rocky intertidal area, in coralline algae, a mixed community of *Corallina pilulifera* and *C. officinalis*.

Distribution: Known only from the type locality.

Remarks: This new species from Jeju, Korea, can be distinguished from other *Ammonicera* species by the following characters: teleoconch has spiral cord and about 25 slightly-elevated axial ribs on last whorl; other species have 12–21 strong ribs and nodules, or more than 20 narrow and weak ribs on the last whorl. Intersection points of cord and ribs exhibit about 25 nodules on the last whorl; other species have less than 21 nodules or lack nodules on the last whorl.

Ammonicera mexicana Sartori and Bieler, 2014 and *A. mcleani* Sartori and Bieler, 2014, reported from Baja California and the west coast of Mexico, respectively, resemble *A. aurea* sp. nov. by the presence of strong nodules on the teleconch. However, these two species differ by the characteristics described above and also by the following: a protoconch with three spiral cords, and two or three strong spiral carina on the peripheral wall of the teleconch. *A. sleursi* Sartori and Bieler, 2014, reported from the west coast of the USA and Mexico, has a similar protoconch, but its mean protoconch diameter (0.144 mm) is slightly larger than *A. aurea* sp. nov. (1.28 mm). Moreover, *A. sleursi* differs by the morphology of the teleoconch which has narrow and weak axial ribs without prominent nodules on the last whorl.

Ammonicera angulata Sleurs, 1985 from the west Pacific Ocean slightly resembles *A. aurea* sp. nov. by the presence of scarcely-elevated axial ribs on the last whorl of the teleconch. However, *A. angulata* differs with the teleoconch having three very prominent carinae. Moreover, its protoconch is very short (about 1/2 whorl) and the external groove is narrow and separated from the suture, with the inner one being very wide. *A. japonica* Habe, 1972 also occurs in the west Pacific Ocean; however, it differs in the dark brown teleconch without a spiral cord and with about 16 strong axial ribs having a smooth surface. *Ammonicera chosenica* Chernyshev, 2003 reported from the east coast of South Korea can also be distinguished from the new species. *A. chosenica* has a short protoconch, with about 1/4 whorl, with poorly delineated end; the internal groove is a little

wider and the external is very far from the suture, having irregular small lamellae.

Characteristics of the species referred to here are found in the following references: *A. mexicana* and *A. mcleani* in Slerus (1985b); *Ammonicera sleursi* in Sartori and Bieler (2014); *A. angulata* in Okutani (2000); *A. japonica* in Waki et al. (2016); *A. chosenica* in Chernyshev (2003).

The habitat of *A. japonica* reported by Waki et al. (2016) was the same as the coralline algae community in this study. This result shows that more new species of micro mollusks can be discovered in the algae community of this area. Additionally, mollusks surveys should be carried out not only in the coralline algae community but also in other algae communities to determine the micro mollusk fauna in Korea.

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