

[단보, Short communication]

# A New Record of *Myurella nebulosa* (Terebridae: Gastropoda) from Korea

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## ABSTRACT

We report a new record of *Myurella nebulosa* (Sowerby, 1825) collected by SCUBA diving from sandy bottom of subtidal zone in Jeju Island in Korea. The specimen of *M. nebulosa* is distinguished from its congeners by having slightly plump shell, high spire, distinctive subsutural band, deep axial ribs, numerous and shallow spiral ribs, ivory in color. In this report, we provided a brief morphological description and photographs of *M. nebulosa*. An unrooted phylogenetic tree for mitochondrial *cox1* sequences using NJ analysis found Korean *M. nebulosa* sample was clustered with its conspecific sequences, but clearly separated from *M. columellaris* that is not easy to distinguishable based on external shell morphology alone.

**Keywords:** Terebridae, *Myurella nebulosa*, mtDNA *cox1*, Korea

## INTRODUCTION

The family Terebridae, commonly known as auger shells, is a group of predatory marine gastropods. This group is characterized by elongated and pointed shell with a relatively short anterior canal in the aperture. They are found in the sandy bottom from the intertidal zone to deep sea of tropical and subtropical waters (Bratcher and Cernohorsky, 1987). Some terebrid species use teretoxin (neuropeptide) secreted from a specialized venom apparatus to suppress their prey (Puillandre and Holford, 2010; Castelin *et al.*, 2012).

To date, 21 species from eight genera in the family Terebridae have been recorded in Korea (Yoo, 1976; Choe, 1992; Choe *et al.*, 1997; Lee and Min, 2002; Min *et al.*, 2004; see Appendix 1). During the survey of

marine mollusks in Korea, a specimen of *Myurella nebulosa* (Sowerby, 1825) was collected from Jeju Island in Korea. In this paper, we provide a detailed description and photographs of the shell morphology and comparison of mitochondrial cytochrome oxidase subunit I (*cox1*) sequences with some other congeneric species.

## MATERIALS AND METHODS

The specimen was collected from Jeju Island in Korea by SCUBA diving on April in 2008 and preserved in 95% ethanol, and morphologically observed under a stereoscopic microscope (Leica M205C, Wetzlar, Germany). The sample of animal was identified by the authors, and followed the taxonomic classification of Bouchet and Rocroi (2005). The external features of the shell were photographed with a Nikon D200 DSLR camera (Nikon, Tokyo, Japan). The specimen examined in this study was deposited in the National Institute of Biological Resources (NIBR), Incheon, Korea (KOSPIV0000218894).

For molecular study, genomic DNA was extracted from mantle tissue using the DNeasy Blood & Tissue Kit (Qiagen, Valencia, USA) according to the manufacturer's instructions. The mitochondrial *cox1*

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gene fragment was PCR-amplified using LCO1490 and HCO2198 primer set (Folmer *et al.*, 1994). PCR amplifications were conducted using TaKaRa Ex Taq™ (Takara Bio, Shiga, Japan) in 50  $\mu$ l containing 31.75  $\mu$ l of distilled water, 5  $\mu$ l 10X Ex Taq™ buffer, 4  $\mu$ l each 10 pM primer set, 0.25  $\mu$ l of TaKaRa Ex Taq™, and 5  $\mu$ l template DNA with the following conditions: 1 cycle of initial denaturation at 94 °C for 30s, followed by 35 cycles of denaturation at 98 °C for 10s, annealing at 47 °C for 30s, elongation at 72 °C for 1 min, and a final extension at 72 °C for 10 min. The amplified PCR product was purified using Expin™ Gel SV Kit (GeneAll Biotechnology, Seoul, Korea), and sequencing reaction was conducted using ABI PRISM 3700 DNA Analyzer (Applied Biosystems, Foster City, USA). The *cox1* sequence obtained from the specimen was deposited in GenBank (Accession number: KP031643), and aligned with 9 species of genus *Myurella* using CLUSTAL W program (Thompson *et al.*, 1994). Genetic distances among *Myurella* species were calculated using Kimura's 2 parameter model (Kimura, 1980) and an unrooted phylogenetic tree was produced using neighbor joining (NJ) method (Saitou and Nei, 1987) with MEGA 6.06 software (Tamura *et al.*, 2013).

## RESULTS

### Systematic accounts

Phylum Mollusca Linnaeus, 1758 연체동물문

Class Gastropoda Cuvier, 1795 복족강

Order Neogastropoda Wenz, 1938 신복족목

Family Terebridae Mörch, 1852 송곳고둥과

<sup>1\*</sup>Genus *Myurella* Hinds, 1844 흰띠송곳고둥속 (신칭)

<sup>2\*</sup>*Myurella nebulosa* (Sowerby, 1825) (Fig. 1)

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*Terebra nebulosa* Sowerby, 1825: 76, xxv; Hirase, 1917: 4, Pl. 2, fig. 10, Pl. 4, fig. 55; Hinton, 1972: 48, Pl. 24, fig. 16; Bratcher and Cernohorsky, 1987: 83, Pl. 19, fig. 68, color pl. D, fig. 18; Wilson, 1994: 227, Pl. 51, fig. 10a, b.

*Decorihastula nebulosa*: Okutani, 2000: 676-677, Pl. 337, fig. 51.

*Terebra* (*Decorihastula*) *nebulosa*: Cernohorsky and

Jennings, 1966: 47, Pl. 5, fig. 27.

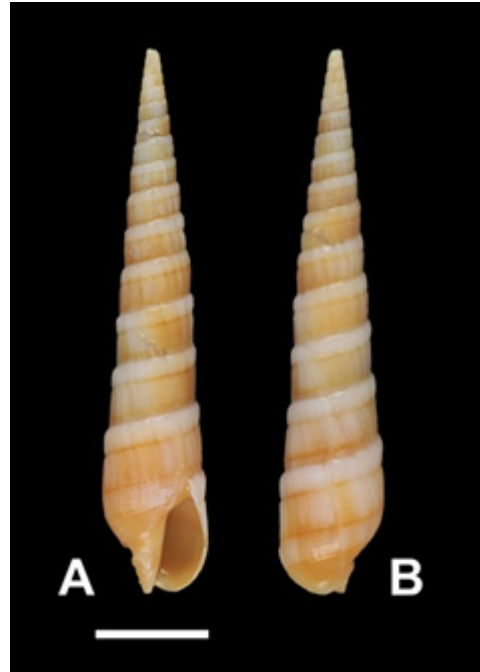


Fig. 1. *Myurella nebulosa* (Sowerby, 1825). A. Ventral view; B. Dorsal view. Scale bar=10 mm.

*Myurella nebulosa*: Poppe, 2008: 810, Pl. 700, fig. 9-11; Kantor *et al.*, 2012: 665, fig. 1, table 1, 3.

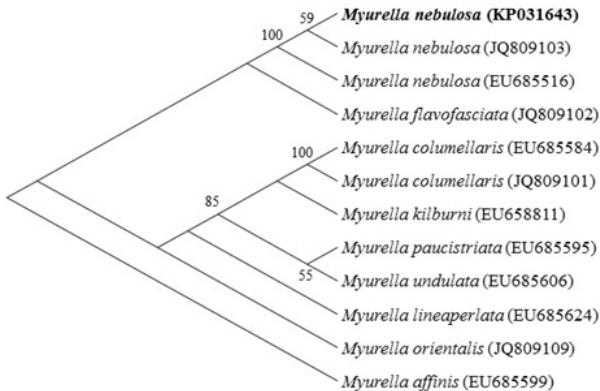
**Material examined.** Korea: 1 individual, Jeju Island, Seogwipo-si, Bomok-dong, Supseom, 24 April 2008.

**Measurement.** Shell height 49 mm; shell width 9 mm.

**Description.** Shell elongate with slightly plump, white and ivory with a little gloss in color. Whorls 15 in number with deep sutures. Apex worn-off. Spire very high, approximately 3/4 of shell height. Subsutural band creamy white in color, defined by subsutural groove, beginning on 4<sup>th</sup> whorl, with deep quadrated sculptures by axial ribs. Axial ribs distinct on spire, becomes unclear on body whorl. Spiral ribs narrow, numerous, faint to upward. Outline of body whorl slightly convex. Aperture elongated ovate with short, almost straight, opened siphonal canal, pale brown in color.

**Distribution.** Korea, Japan, China, Vietnam, Philippines, Australia, Fiji Island, Polynesia, Hawaii, South Africa.

**Habitat.** From intertidal zone to sub-tidal zone. Sandy or mud bottom.



**Fig. 2.** Unrooted phylogenetic tree for mtDNA *cox1* sequences of some selected terebrid species. Bootstrap values of  $\geq 50\%$  are indicated on the branches and GenBank accession numbers are shown in parentheses after species names. The *cox1* sequence from Korean sample is indicated in bold.

**Remarks.** Identification of *Myurella nebulosa* is often confused with *Myurella columellaris* due to their similar external shell morphology. The shell of *M. nebulosa* is slightly plumped and less glossed than *M. columellaris* (Okutani, 2000), but these difference are not clear, and it is not easy to precisely differentiate these two species based on external shell morphology alone. In this study, we determined nucleotide sequence of mitochondrial *cox1* gene fragment and compared it with some other congeneric species. Sequence comparison revealed 17.0-18.0% divergence between *M. nebulosa* and *M. columellaris*. An unrooted phylogenetic tree from NJ analysis (Fig. 2) found Korean *M. nebulosa* sequence (KP031643) was clustered with sequences obtained from Mozambican (JQ809103) and Filipino samples (EU685516) of the same species with 100% bootstrap values, but clearly separated from *M. columellaris* (EU685584 and JQ809101).

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**Appendix 1.** Species list of the family Terebridae in Korea.

**Family Terebridae Mörch, 1852 송곳고등과**

**Genus *Cinguloterebra* Oyama, 1961 고리송곳고등속 (신칭)**

*Cinguloterebra anilis* (Röding, 1798) 노랑고리송곳고등

*Cinguloterebra lima* (Deshayes, 1857) 미남송곳고등

**Genus *Duplicaria* Dall, 1908 빈송곳고등속**

*Duplicaria albozonata* (Smith, 1875) 흰띠송곳고등

*Duplicaria dussumierii* (Kiener, 1860) 빈송곳고등

*Duplicaria evoluta* (Deshayes, 1859) 속재송곳고등

*Duplicaria hiradoensis* (Pilsbry, 1921) 나사송곳고등

*Duplicaria koreana* (Yoo, 1976) 고운무늬송곳고등

*Duplicaria latisulcata* (Yokoyama, 1922) 끈은줄흰줄송곳고등

*Duplicaria recticostata* (Yokoyama, 1920) 끈은줄송곳고등

**Genus *Euterebra* Cotton & Godfrey, 1932 띠죽순송곳고등속 (신칭)**

*Euterebra taylori* (Reeve, 1860) 검은보라송곳고등

**Genus *Granuliterebra* Oyama, 1961 구슬송곳고등속 (신칭)**

*Granuliterebra bathyrhapse* (Smith, 1875) 구슬송곳고등

**Genus *Hastula* Adams & Adams, 1853 죽순송곳고등속**

*Hastula celidonota* (Melvill & Sykes, 1898) 꼬마송곳고등

*Hastula hectica* (Linnaeus, 1758) 민첩송곳고등

*Hastula matheroniana* (Deshayes, 1859) 흰띠적갈색점죽순고등

*Hastula rufopunctata* (Smith, 1877) 죽순고등

*Hastula strigilata* (Linnaeus, 1758) 점줄송곳고등

*Hastulopsis melanacme* (Smith, 1873) 가는송곳고등

**Genus *Myurella* Hinds, 1844 흰띠송곳고등속 (신칭)**

*Myurella nebulosa* (Sowerby, 1825) 굵은흰띠나선송곳고등(신칭)

**Genus *Strioterebrum* Sacco, 1891 갈색띠송곳고등속 (신칭)**

*Strioterebrum japonicum* (Smith, 1873) 갈색띠송곳고등

**Genus *Terebra* Bruguière, 1789 송곳고등속**

*Terebra amanda* Hinds, 1844 대마디송곳고등

*Terebra spectabilis* Hinds, 1844 송곳고등

**Genus *Triplostephanus* Dall, 1908 줄칼송곳고등속 (신칭)**

*Triplostephanus fenestratus* (Hinds, 1844) 줄칼송곳고등