

# *Limnoperna coreana* n. sp. (Bivalvia: Mytiloidea: Mytilidae) from Baengnyong Cave, Gangweon-do, Korea

Gab Man Park and Yong Gun Choi<sup>1</sup>

Department of Parasitology, Kwandong University College of Medicine, Gangnung,  
Gangweon-do 210-701, Korea

<sup>1</sup>The Korean Institute of Biospeleology, Yeongwol, Gangweon-do 230-808, Korea

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## ABSTRACT

A new species of the mytiloidean freshwater bivalve is described from Baengnyong Cave, Pyeongchang-gun, Gangweon-do. *Limnoperna coreana* n. sp. belongs to the genus *Limnoperna* Rochebrune, 1882 with the byssus. This species has a small shell with the glossy surface and rounded-triangular and differs morphologically from all of its congeners.

**Key words:** *Limnoperna coreana*, new species, Mytilidae, Korea

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## INTRODUCTION

The Chinese freshwater mussel *Limnoperna fortunei* is an invasive fouling pest of water supply systems in Hong Kong, Korea, Taiwan, Japan, and most recently, South America (Morton, 1973; Darrinran & Pastorino, 1995; Nakai, 1995). It should be considered as a significant invasion threat for North America (Ricciardi, 1998; Goto, 2002). Like the zebra mussels (*Dreissena polymorpha*, Dreissenidae), *L. fortunei* (Mytilidae) adheres to hard surfaces with byssal threads and the byssal adhesion leads to bio-fouling of natural and man-made structures (Kimura, 1994a). Therefore, it lives in freshwater and is able to survive in very low salinity near river mouth (Mansur *et al.*, 1999). The anatomy, population dynamics and reproductive biology of the species have been described by Morton (1982). Around 1990, this species was introduced in Argentina and has since spread extensively upstream in Uruguay river, at least as far north as the Paraguay river and southern

Brazil (Boltovskoy and Cataldo, 1999). In Hong Kong, the species is controlled in raw water supply systems using chlorine (Morton *et al.*, 1976). In Korea, *Volsella lavastris*(=*Limnoperna fortunei*) was first recorded from the Han River in 1969 (Yoo, 1969). Habe (1981) identified a subspecies of *L. fortunei*, i.e., *L. fortunei kikuchii*, first recorded from Japan between 1974 and 1979 (Nishimura and Habe, 1987; Kimura, 1994b; Kimura and Sekiguchi, 1994).

In Korea, one species, *Limnoperna fortunei* (Dunker, 1857), are known to live in freshwater (Kwon *et al.*, 1993). A tiny bivalve attaching with byssus in rock was collected at Baengnyong Cave of Pyeongchang. This paper describes which represent a new species of the genus *Limnoperna* by morphological comparison with congeneric species known from the Asia.

## MATERIALS AND METHODS

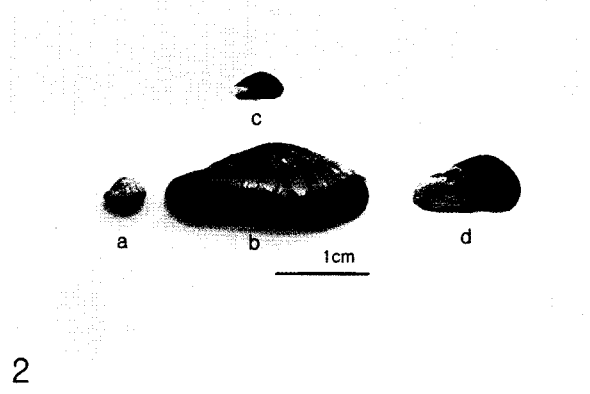
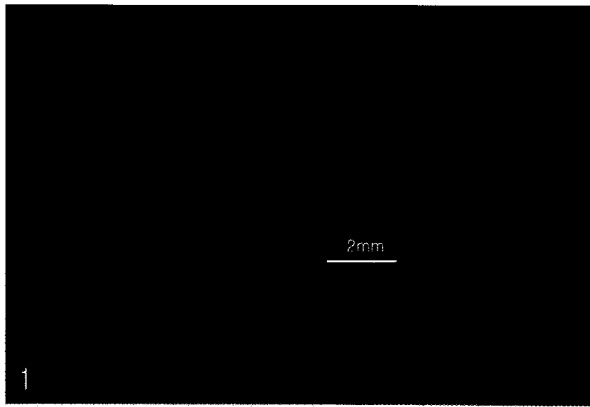
The seven specimens were collected by Mr. Y. G. Choi of the Korean Institute of Biospeleology. The materials were collected in June, 2002, Baengnyong Cave (37°16'7"N, 128°34'40"E) in Maha-ri, Mitanmyeon, Pyeongchang, Gangweon-do, Korea. The collected specimens were fixed in 10% neutral formalin and then transferred to 80% alcohol and

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Corresponding author: Park, Gab Man

Tel: +82 (33) 649-7480 e-mail: gmpark@kd.ac.kr  
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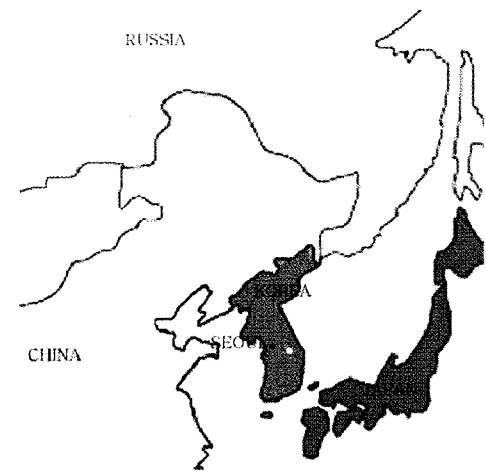
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**Fig. 1.** *Limnoperna coreana* n. sp. (Holotype specimen)  
**Fig. 2.** Comparison of *Limnoperna coreana* (a), *Limnoperna fortunei* (b), young shell (juveniles) of *Limnoperna fortunei* (c) and *Limnoperna fortunei kikuchii* (d).  
**Fig. 3.** Illustrated shell morphology of *Limnoperna coreana*. a, exterior of right valve; b, interior of left valve.

examined microscope. We compared with the closely related species, *L. fortunei* in order to know the confident taxonomic position. Specimens examined in this study were deposited in the Department of Parasitology, Kwandong University College of Medicine and Mollusks Division, Division of Life



**Fig. 4.** Map showing the sampling area (white spot).

Sciences, College of Natural Sciences, Kangwon National University.

**Systematic**

*Limnoperna coreana* n. sp.  
 (Figs. 1-3)

**Type species :** *Dierssena siamensis* Morelet 1866

The shell is dark brown above the umbonal keel and a yellow brown below. The interior of the shell with the nacreous layer, is purple above and white below the keel. The umbones are nearly terminal and the dorsal ligamental margin is straight or slightly curved. The ventral margin of the shell is a variable feature within specimens. There are no hinge teeth and no byssal notch.

**Holotype :** KUCM-Mof100, a specimen preserved in alcohol, collected by Y.G. Choi, 13-June-2002. Paratypes KNU-Mof3002.

**Type locality :** Baengnyong Cave, Mitan-myeon, Pyeongchang-gun, Gangweon-do (37°57'N, 128°57'E), about 50 m inside from the mouth (Fig. 4).

**Description :** Shell almost elliptical, rounded, equivalve, swollen in front, with a blunt crest running from the top along the ventral margin. Shell thin, covered by a dark yellow epidermis with a dull non-sheen. Byssus outlet elongated. Umbo terminal, a false alveolus lying in front of it; the anterior septum.

Hinge margin spherical, sloped markedly forward; ventral margin with tortuous median part; posterior margin rounded, obtuse-angled at site of connection with hinge margin (Fig. 1). Latter composed of no teeth. Length of shell 5.3 mm, height 3.5 mm; width 2.1 mm (Holotype specimen). Width is 58% of height and 39% of length. Shell is dark yellow with fine growth lines. There are crowded, slender and rather sharp concentric ribs that are particularly emphasized on the upper portion of the central area, where the surface is generally fan shape. Internal surface of the shell is glistening luster of nacreous layer as usual for the genus. Anterior adductor scar is small and oval. Posterior adductor scar is circular and very obsolete. Ligament is very short. Hinge plate is strong with no teeth typical for the genus. The byssus threads are numerous, very fine and silky with a pale brownish-yellow color.

**Habitat :** Rocks or stones in freshwater waters.

**Variability :**

	Shell length	Shell height	Shell width	Voucher specimens
Holotype	5.3 mm	3.5 mm	2.1 mm	KUCM-Mof100
Paratype 1	5.5	3.7	2.1	KUCM-Mof101
Paratype 2	5.4	3.6	2.0	KUCM-Mof102
Paratype 3	5.8	3.8	2.2	KUCM-Mof103
Paratype 4	5.2	3.3	1.9	KNU-Mof3002
Paratype 5	5.6	3.8	2.2	KNU-Mof3003
Paratype 6	5.8	3.9	2.5	KNU-Mof3004

**Abbreviations :** KUCM (Kwandong University College of Medicine, Gangnung), KNU (Mollusca Division, Natural Science Museum, Kangweon National University, Chunchon)

**Comparisons :** The new species is the smallest species in the genus *Limnoperna* and it is distinguished from other *Limnoperna* species by the characters listed below (Fig. 2). This species is quite unique between the known species of the genus *Limnoperna* in having a byssus well developed and

hinge margin without teeth and ligament poorly developed, attached marginally. All known species of *Limnoperna* have wedge-shaped or round, anterior smaller than posterior adductor. *Limnoperna fortunei* (Dunker, 1857) and *L. fortunei fortunei* has the shell being round-triangular in a lateral view. Also, the anterior margin of the shell is narrowly rounded, the antero-dorsal margin being straight or gently curved, and ventral margin being straight but often arcuate in larger specimens (Habe, 1981; Kwon *et al.*, 1993; Fukuda and Fukuda, 1995; Kimura, 1994a, 1994b; Kimura *et al.*, 1999). However, *Limnoperna coreana* has a tiny and ventro-dorsal margin is rounded shaped of shell (Fig. 3). It also has a byssus threads and the interior wall of the shell is purple-iridescent. Thus, the new species belongs to the genus *Limnoperna Rochebrune*, 1882.

**Etiology :** Latin *corea*, Korea.

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