

# First Record of a Longfin Snake-eel, *Pisodonophis cancrivorus* (Anguilliformes: Ophichthidae) in Korea

By Chung-Lyul Lee\*

Department of Biology, College of Natural Science, Kunsan National University, Kunsan 573-701, Korea

**ABSTRACT** A specimen (862.3 mm standard length) of *Pisodonophis cancrivorus* (Richardson, 1848), family Ophichthidae, was first collected from the coast of Uljin-gun in Gyeongsangbuk-do, Korea in September 2008. This species is characterized by the following: fleshy protrusions of upper jaw in the front and rear of the posterior nostril, 3~5 irregular rows of granular teeth in bands on maxilla, mandible and vomer, and origin of dorsal fin above the middle of the pectoral fin. Based on the fleshy protrusions found on its upper jaw, a new Korean name "dol-gi-ba-da-baem" has been proposed for this species.

**Key words** : *Pisodonophis cancrivorus*, first record, Ophichthidae, Korea

## INTRODUCTION

The family Ophichthidae, under the order Anguilliformes, is characterized by the absence or atrophied status of the caudal fin. This family is widely distributed from tropical to temperate seas (Nelson, 1994). 9 species and 5 genera of the family Ophichthidae have been reported in Korea (Kim *et al.*, 2005, 2008, 2009). Of these, *Pisodonophis zophistius* is the only member of the genus *Pisodonophis* to have been reported in Korea (Kim *et al.*, 2005). The morphological characteristics of the genus *Pisodonophis* are easily distinguished by the following features: granular-shaped teeth band and dorsal fin originating above the middle of the pectoral fin (Herre, 1923; Cheng and Zheng, 1987; McCosker *et al.*, 1989; Shen, 1990; Hatooka, 2002). During an investigation of the fish found along the coast of East Sea, Korea, a specimen falling under the family Ophichthidae was collected. This particular specimen, which had not been reported in Korea before, was identified into *P. cancrivorus*. This study analyzes the important taxonomical characteristics of this recently discovered *P. cancrivorus* in Korea.

Methods and abbreviations of study followed McCosker (1977). The number of fin rays and vertebrae were counted from radiographs of soft x-ray. The examined specimen was deposited in Department of Biology, Kunsan National University (BKNU), Korea.

san National University (BKNU), Korea.

### Genus *Pisodonophis* Kaup, 1856

(Korean name: Dot-mul-baem-sok)

*Pisodonophis* Kaup, 1856: 47 (type specimen: *Ophisurus cancrivorus* Richardson, 1848).

Body much elongated and cylindrical form and slightly tapering toward posterior. Origin of dorsal above or behind the well-developed pectorals. Third preopercular pore usually present. Teeth sharp or blunt and granular, maxillary teeth with regular or irregular rows. Lateral line present.

### *Pisodonophis cancrivorus* (Richardson, 1848)

(New Korean name: Dol-gi-ba-da-baem)

(Figs. 1, 2)

*Ophisurus cancrivorus* Richardson, 1848: p. 97, pl. 50 (type locality: Port Essington, Northern Territory, Australia).

*Pisodonophis cancrivorus*: Jordan and Richardson, 1910: 10; Herre, 1923: 169; Chen and Weng, 1967: 64; Dor, 1977: 138; Asano in Masuda *et al.*, 1984: 31; McCosker and Castle in Smith and Heemstra, 1986: 185; Cheng and Zheng, 1987: 113; Hatooka in Nakabo, 2002: 224.

**Material examined.** BKNU 5701, one specimen, 862.3 mm in standard length (SL), off Buk-myeon, Uljin-gun, Gyeongsangbuk-do, Korea, September 26, 2008.

\*Corresponding author: Chung-Lyul Lee Tel: 82-63-469-4586,  
Fax: 82-63-463-1560, E-mail: leecl@kunsan.ac.kr



Fig. 1. *Pisodonophis cancrivorus*, BKNU 5701, 862.3 mm SL, off Buk-myeon, Uljin-gun, Gyeongsangbuk-do, Korea, September 26, 2008.

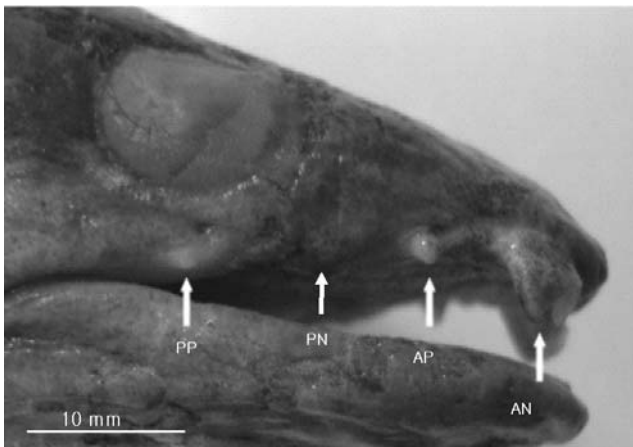


Fig. 2. Lateral view of mouth part of *Pisodonophis cancrivorus*. BKNU 5701, 862.3 mm SL. AN, anterior nostril; AP, anterior fleshy protrusion; PN, posterior nostril; PP, posterior fleshy protrusion.

**Description.** Dorsal fin rays 287; anal fin rays 208; pectoral fin rays 14; number of vertebrae 155; preanal lateral sensory pores 55 (total lateral sensory pores 143). Measurements in percentage of SL: Body depth 3.0; head length 11.6; predorsal length 14.0; prepectoral length 11.8; preanal length 42.6; snout length 2.3; eye diameter 0.9; interorbital width 1.9; length of gill opening 1.6; length of pectoral fin 27.3. Percentages of head length: Body depth 25.5; snout length 20.2; eye diameter 7.4; interorbital width 16.0; length of anterior nasal tube in right side 3.6; length of anterior nasal tube in left side 3.5; diameter of nasal tube 2.2; length of anterior fleshy protrusion in right side 1.6; length of anterior fleshy protrusion in left side 1.5; length of

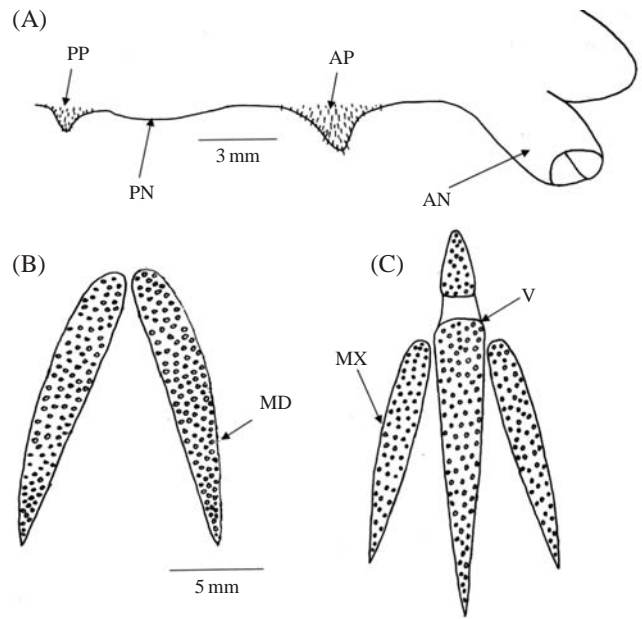


Fig. 3. Upper lip and teeth bands of *Pisodonophis cancrivorus*. BKNU 5701, 862.3 mm SL. A, upper lip; B, mandibular teeth; C, maxillary and vomerine teeth. AN, anterior nostril; AP, anterior fleshy protrusion; MD, mandibular teeth; MX, maxillary teeth; PN, posterior nostril; PP, posterior fleshy protrusion; V, vomerine teeth.

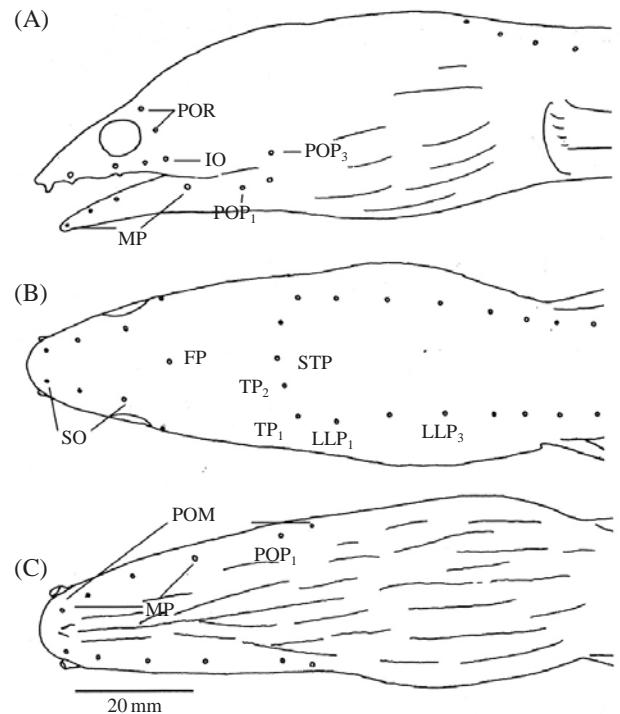


Fig. 4. Sensory pores in head part of *Pisodonophis cancrivorus*. BKNU 5701, 862.3 mm SL. A, lateral view, B, dorsal view, C, ventral view. FP, frontal pore; IO, infraorbital pores. LLP, lateral line pore; MP, mandibular pores; POM, preoperculomandibular pores; POR, postorbital pores; SO, supraorbital pores; STP, supratemporal pore; TP, temporal pore; POP<sub>1</sub>, 1st preopercular pore.

**Table 1.** Comparison of important taxonomical characters of *Pisodonophis cancrivorus*

Characters	Present specimen	Herre (1910)	McCosker and Castle (1986)	Asano (1984)
Pectoral fin rays	14	—	—	13~14
Preanal lateral line sensory pores	55	—	—	55~60
Number of Vertebrae	155	—	155~159	153~162
Dorsal fin origin	Middle of pectoral	Middle of pectoral	Middle of pectoral	Middle of pectoral
Shape of teeth	Round (granular)	Round (granular)	Molari-form	Round, blunt* (granular)
Fleshy protrusion	Present	Present	—	Present*
Intermaxillary teeth band	Separated	Separated	—	—
Arrangement of teeth	Multiserial	Multiserial	Multiserial	Multiserial*
Size of teeth	Small	Small	—	Small
Margin color of vertical fin	Black	Black	Black	Black

\*: Hatooka (2002)

posterior fleshy protrusion in right 1.0; length of posterior fleshy protrusion in left 0.9; length of gill opening 13.6.

Body elongated, slender and cylindrical form, and slightly tapering toward posterior. Mouth moderate, upper and lower jaws strong and solid. Eyes positioned in middle of upper jaw, covered with semitransparent membrane. Anterior nostril tubular type, but posterior one slit, covered toward inside of mouth in lower part of eye (Fig. 2). Fleshy protrusions in front and rear posterior nostrils, bigger fleshy protrusion in front than in rear, covered with microcilium-like processes on two fleshy protrusions (Fig. 3). Upper jaw longer than lower one, front vomerine teeth slightly visible when mouth closed. Granular-shaped maxillary, mandibular and vomerine teeth bands, with 3~5 rows of irregularly arranged teeth (Fig. 3). Vomerine teeth separating at anterior part (Fig. 3). Tail longer than total length of head and body. Dorsal fin originating at above middle of pectoral fin. Hard muscle evident on tip of tail, but no caudal fin. Dorsal and anal fins ending slightly before the tail. Sensory pores of head part opened directly: 4 infraorbital pores, 2 post orbital pores, 3 supraorbital pores, 4 mandibular pores, 6 preoperculo-mandibular pores, 1 frontal pore, 1 supratemporal pore, 2 temporal pores on each side (Fig. 4).

**Color in formalin.** Upper side of head and body dark blackish, but belly of body and inside of mouth pale or light. Dorsal and anal fins with black margin, that of dorsal fin much thicker than anal one. Pectoral fin light blackish.

**Distribution.** East Sea of Korea, Japan (Asano, 1984), Taiwan (Chen and Weng, 1967), China (Cheng and Zheng, 1987), Indo-Pacific (McCosker and Castle, 1986), Philippine (Herre, 1923).

**Remarks.** The taxonomical characteristics of this specimen were consistent with the descriptions of *P. cancrivorus* which have been reported to date (Herre, 1923; Asano, 1984; McCosker and Castle, 1986; Hatooka, 2002; Table 1). *P. cancrivorus* was very similar to *P. zophistius* in their external morphology, but two species

were easily distinguishable from each other by the shape of their teeth (which are granular or molar shaped in the former vs sharp in the latter), teeth bands and arrangement (broad and irregular vs narrow and 1~2 rows), presence of fleshy protrusion located in the front and rear of posterior nostril (present vs absent), and the number of vertebrae (155 vs 161 or 181) (Herre, 1923; Cheng and Zheng, 1987; McCosker *et al.*, 1989; Shen, 1990; Hatooka, 2002). In addition, Herre (1923) mentioned that the following characteristics distinguished *P. boro* from *P. cancrivorus*: *P. boro*'s vomerine teeth were connected (separated in *P. cancrivorus*), its lower part of the upper jaw did not show any fleshy protrusion (present), and its dorsal fin started from far behind the tip of the pectoral fin (middle). McCosker *et al.* (1989) has remarked that genus *Pisodonophis* from the Eastern Atlantic and Indo-Pacific oceans generally have 3 preopercular pores. However, this specimen discovered in the Korean coast featured 3 pores on the left side and 4 pores on the right.

#### Key to the species of *Pisodonophis* from Korea

- 1a. Pectoral fin rays 11, preanal lateral sensory pores 62; vertebrae 181; teeth sharp, maxillary teeth with 1~2 rows. .... *P. zophistius*  
 1b. Pectoral fin rays 14, preanal lateral sensory pores 55, vertebrae 155, teeth blunt and granular, maxillary teeth with 3~5 irregular rows. ....  
 ..... *P. cancrivorus*

#### ACKNOWLEDGMENTS

This research was supported by the Ministry of Environment of the Korean Government and Kunsan National University.

#### REFERENCES

Asano, H. 1984. *Pisodonophis cancrivorus* (Richardson). In:

- Masuda, H., K. Amaoka, C. Araga, T. Uyeno and T. Yoshino. (eds.), The fishes of the Japanese archipelago. Tokai University Press, Tokyo, p. 31.
- Chen, J.T.E. and H.T.C. Weng. 1967. A review of the apodal fishes Taiwan. Tunghai Univ. Taichung, Taiwan, 32: 1-86.
- Cheng, Q. and B. Zheng. 1987. Systematic synopsis of Chinese fishes. Science Press, Beijing, China, 643pp. (in Chinese)
- Dor, M. 1977. New records of two ophichthid eels from the Red Sea. *Isr. J. Zool.* 26: 137-140.
- Hatooka, K. 2002. Ophichthidae. In: Nakbo, T. (ed.), Fishes of Japan with pictorial keys to the species. english ed. I, II, Tokai University Press, Tokyo, pp. 215-225.
- Herre, A.W.C.T. 1923. A review of the eels of the Philippine archipelago. *Philippine J. of Science*, 23: 123-236, pls, 1-11.
- Jordan, D.S. and R.E. Richardson, 1910. Check-list of the species of fishes known from the Philippine archipelago. Bureau of Science, Manila, pp. 3-78.
- Kaup, J.J. 1856: Uebersicht der Aale. *Arch. Naturegeschichte*, 22: 41-77.
- Kim, B.G., C.H. Jeong and K.N. Han. 2008. New record of a worm eel *Muraenichthys gymnopterus* (Anguilliformes: Ophichthidae) from Korea. *Korean J. of Ichthyol.*, 20: 318-323.
- Kim, B.J., J.H. Choi, D.S. Chang, H.K. Cha and J.H. Park. 2009. New record of the snake eel *Ophichthus ajakusae* (Ophichthidae: Anguilliformes) from Korea. *Fisheries and Aquatic Science*, 12: 236-239.
- Kim, I.S., Y. Choi, C.L. Lee, Y.J. Lee, B.J. Kim and J.H. Kim. 2005. Illustrated book of Korean fishes. Kyohak Pub. Seoul, Korea, pp. 86-89. (in Korean)
- McCosker, J.E. 1977. The osteology, classification and relationships of the eel family Ophichthidae. *Proceedings of the California Academy of Science*, 41: 1-123.
- McCosker, J.E. and P.H.J. Castle. 1986. Family 42: Ophichthidae. In: Smith, M.M. and P.C. Heemstra. (eds.), *Smith's Sea Fishes*. Smith Institute of Ichthyology, Grahamstown, South Africa, pp. 176-185.
- McCosker, J.E., E.B. Böhlke and J.E. Böhlke. 1989. Fishes of the Western North Atlantic. part nine, vol. 1, Memoir Sears Foundation for Marine Research, Yale Univ. no. 1, p. 298.
- Nelson, J.S. 1994. Fish of the world. 3rd ed., John Wiley & Sons, New York, pp. 110-111.
- Richardson, J. 1848. Ichthyology. In: Richardson, J. and J.E. Gray (eds.), *The zoology of the voyage of H.M.S. "Erebus" and "Terror" under the command of Capt Sir J.C. Ross during 1839-43*. London, 2: 1-139, 62 pls.
- Shen, S.C. 1990. Synopsis of fishes of Taiwan. SMC Publishing INC. Taipei, pp. 116-118. (in Chinese)

## 한국산 바다뱀과 어류 1 미기록종, *Pisodonophis cancrivorus*

### 이충렬

군산대학교 자연과학대학 생물학과

---

**요 약** : 한국산 바다뱀과 어류에 포함되는 *Pisodonophis cancrivorus* (체장 862.3 mm) 1 개체가 경상북도 울진군 북면 연안에서 2008년 9월에 채집되었다. 본 종의 특징은 후비공 전후에 근육돌기가 1개씩 나 있고, 상악치를 비롯하여, 하악치와 서골치가 과립상으로 무질서하게 3~5줄로 된 치관을 형성하고 있으며, 등지느러미는 가슴지느러미의 중앙 상부에서 출발하는 점이다. 본종은 상악의 후비공 전후에 근육돌기가 있는 점을 들어 국명을 “돌기바다뱀”이라고 명명하였다.

---

**찾아보기 낱말** : *Pisodonophis cancrivorus*, 미기록종, 돌기바다뱀, 바다뱀과