

# First Record of Shortbelly Eel, *Dysomma anguillare* (Synphobranchidae, Anguilliformes) from Korea

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The synphobranchid eel, *Dysomma anguillare* was redescribed on the basis of a specimen collected from the Yellow Sea, Chollabuk-do, Korea. The *D. anguillare* was characterized by many fleshy plicae at the front of upper and lower jaws, dorsal fin originated in slight advance than pectoral fin base, degenerated eyes, very short trunk and long tail, anus located below near tip of pectoral fin and no scales.

**Key words :** Shortbelly eel, *Dysomma anguillare*, Synphobranchidae, Anguilliformes

## Introduction

According to the descriptions of Chen and Weng (1967), Asano (1988), Mok *et al.* (1991), Hatooka (1993), Shen (1994) and Chen and Mok (1995), it was well known that various species of synphobranchids belonging to the order Anguilliformes largely distributed in adjacent sea of Korea. Among them, the genus *Dysomma* appeared in around sea of Taiwan, China and Japan was reported to be confirmed four species (Cheng and Zheng, 1987; Hatooka, 1993; Shen, 1994). But until a recent date, it was not recognized either only one species as synphobranchids from the coastal sea of Korea.

In 1996, a specimen which was classified into *D. anguillare* of the family Synphobranchidae was collected in the Yellow Sea of Jeollabuk-do, Korea. This species was characterized by having very short trunk and long tail. The purpose of this study is to redescribe it as a first record of synphobranchid species from Korea.

The methods of count and measurement followed mainly Asano (1962). Counts of vertebrae and fin ray were taken from radiograph. The shape and row of teeth were made observation after stain with alizarin red. All observations and figures were accomplished by a binocular stereo-microscope (Wild, M8 set and Olympus SZH-10

set). The examined specimen was deposited in the Department of Biology, Kunsan National University (BKNU).

## Family Synphobranchidae

(New Korean name: Ginkkoli-jangeo-kwa)

## Genus *Dysomma* Alcock

(New Korean name: Ginkkoli-jangeo-sok)

*Dysomma* Alcock, 1889: 459 (Type species: *Dysomma bucephalus* Alcock, 1889).

## *Dysomma anguillare* Barnard, 1923

(New Korean name: Ginkkoli-jangeo)

(Fig. 1-4)

*Dysomma anguillare* Barnard, 1923: 443 (original description); Castle, 1986: 189; Hatooka, 1993: 174.

**Material examined :** BKNU 710, 478 mm in total length (TL), caught by a small-trawl boat, Yellow Sea, 126° 17'E, 35° 42'N, off Buan, Buan-gun, Jeollabuk-do, Korea, May 10, 1996.

**Diagnosis :** Body elongated and slender. Tip of upper and lower jaws with many fleshy wrinkles. Upper jaw further more longer than lower jaw. Anus located below near tip of pectoral fin, so trunk very short and long tail. No scales (Fig. 1).

**Description :** Dorsal fin rays 294, anal fin rays 284, pectoral fin rays 10 and caudal fin rays

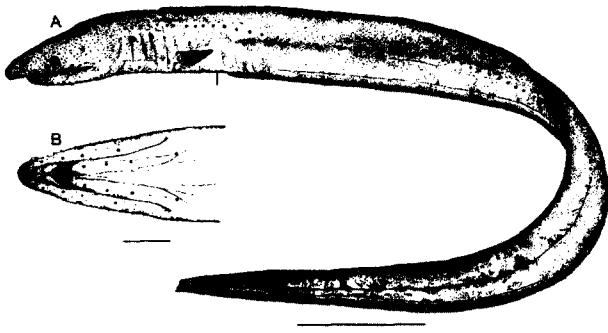


Fig. 1. *Dysomma anguillare* Barnard, BKNU 710, 478 mm TL. Scales indicate 50 mm (A) and 10 mm (B).

13 (Fig. 4A). Lateral line complete and its pores tubular, 12 before the anus (Fig. 3D). Total vertebrae 129: preanal 24 and postanal 105. Head length 8.4 time in total length; head depth 23.3; head width 31.9; body depth 18.3; body width 18.8; trunk length 34.6; preanal length 6.7; postanal length 1.2. Head depth 2.8 time in head length; body width 4.1; snout length 4.0; eye diameter 16.8; interorbital width 5.2; anterior internasal space 7.9; posterior internasal width 5.5; gill opening length 11.7; pectoral fin length 5.4. Eye diameter 4.3 time in snout length.

Body elongated, compressed especially posteriorly. Tip of upper and lower jaw somewhat blunt with many fleshy plicae. Eye small and degenerated, covered with semitransparent membrane (Fig. 2). Head covered with fairly minute villiform papillae, especially at snout. No distinct papillae on edge of upper lip.

Mouth rather large, gape extending behind eye by distance more than two fold of eye diameter. Anterior nostril tubular on lateral side of snout, while posterior nostril nearly circular, which located at edge of upper lip in front of eye, relatively as large as eye ball.

Teeth small, conical, and mostly tip somewhat blunt. A narrow band of villiform teeth plate on maxilla, located on either side centering around vomer (Fig. 3A). Two premaxillary teeth placed transversely. Vomerine teeth with four canine in a row, third tooth was most largest and very sharp, and last one smallest (Fig. 3A). Dentary teeth uniserial, widely spaced, with 7 right and 8 left (Fig. 3B). All teeth are set in an oval flesh except teeth plate which is maxilla, so only its point projecting (Fig. 3A, B, C).

Cephalic sensory pores minute: three supraorbital (circular) which was located tip of snout; five

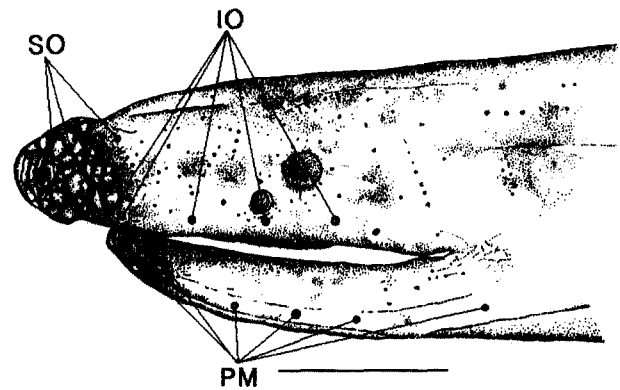


Fig. 2. Cephalic sensory pores pattern of *Dysomma anguillare* (lateral view). Scale indicates 10 mm. IO, infraorbital; PM, preoperculo-mandibular; SO, supraorbital.

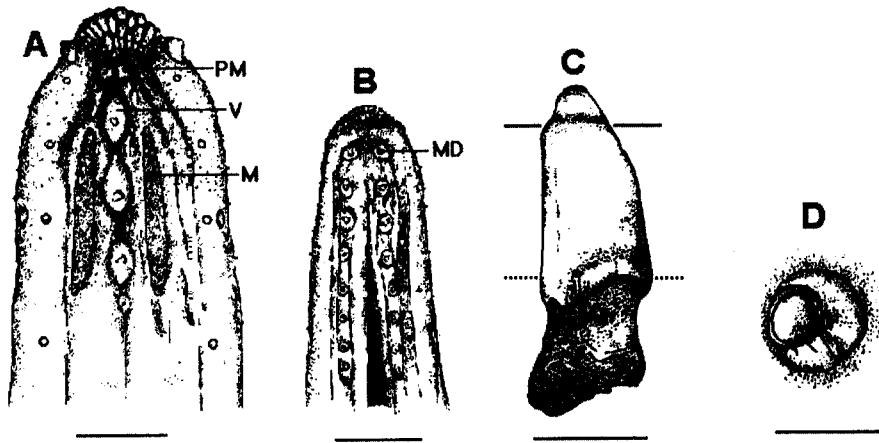
infraorbital (tubular); six preoperculo-mandibular (tubular except two circular in front of lower jaw); no posttemporal (Fig. 2).

Dorsal fin origin in slight advance of pectoral fin base. Predorsal length 1.3 time in preanal length. Pectoral fin small, about 5.4 in head length. Gill opening small, 2.2 in pectoral fin length, ventrolateral just below pectoral fin base. Anus located below near tip of pectoral. Trunk very short, about 4.1 in head and tail awfully long, about 1.2 in total. Caudal slender, and end of the tail blunt.

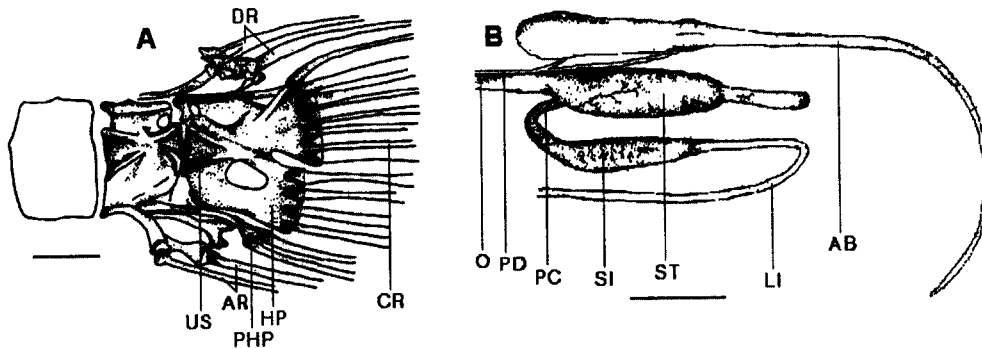
The terminal vertebra bears two hypurals which upper part with seven caudal fin rays and lower one having a large foramen with four rays. The penultimate vertebra also contributes a ventral projection that serves as a parhypural supporting two rays (Fig. 4A).

Digestive tract consists of an oesophagus, stomach, small intestine and large intestine, but mostly simple and weak, the wall of visceral cavity with dark pinkish. The whole color of viscera light pinkish, but large intestine slightly dark. Stomach was a stretched jar shape; light pinkish; anterior part of stomach more darker than posterior. The shape of air bladder was very peculiar form having long and slender tubular type posteriorly, light pinkish; its length about 320 mm, so visceral cavity also very long; it connected with oesophagus by pneumatic duct. Large intestine simple delicate tubular (Fig. 4B).

**Color in 10% formalin** : The whole color grayish white; tip of upper and lower jaw darker; upper half of head and dorsal body slightly dark grayish; lower jaw light grayish; ventral part



**Fig. 3.** Upper jaw (A), lower jaw (B), tooth of lower jaw (1st in right) (C) and sensory pore of lateral line (30th) (D) of *Dysomma anguillare*. The dotted line signify buried the part in dentary, and the solid line was covered with in oval fleshy. M: maxilla; MD: mandible; PM: premaxillary; V: vomer. Scales indicate 5 mm (A, B) and 0,5 mm (C, D).



**Fig. 4.** The caudal skeleton (A) and alimentary canal and air bladder (B) of *Dysomma anguillare*. AR, anal ray; CR, caudal ray; DR, dorsal ray; HP, hypural; PHP, parhypural; US, urostyle. AB, air bladder; LI, large intestine; O, oesophagus; PC, pylorus; PD, pneumatic; SI, small intestine; ST, stomach. Scales indicate 1 mm (A) and 50 mm (B).

sliver-white; around tip of tail darks; base of dorsal and anal fins posteriorly dark, but edge white.

**Distribution :** The Yellow Sea of Korea, Japan, China, Taiwan, Indonesia, South Africa, West Pacific, Atlantic Ocean.

**Remarks :** The synphobranchid eels showed many problems at their taxonomic position today (Asano, 1988; Hatooka, 1993; Nelson, 1994; Shen, 1990, 1994). Although Asano (1988) described the families Synphobranchidae, Dysommatidae and Simenchelyidae into each different three families, Hatooka (1993) and Nelson (1994) mentioned that these three families were classified into three subfamilies (Ilyophinae, Synphobranchinae and Simenchelyinae) of the family Synphobranchidae, on the basis of their

common morphological characters of position of gill opening, numbers of vertebrae, direction of third hypobranchial and feature of larva eyes. The genus *Dysomma* including *D. anguillare* collected in off Buan, Chollabuk-do was characterized by having the following characters: (1) body naked; (2) jaws well developed, lower jaw shorter than upper jaw; (3) degenerated eyes; (4) compound teeth on vomer; (5) gill opening ventrolateral and (6) very short trunk and long tail (Chen and Mok, 1995).

The external appearance of *D. anguillare* were very close to those of *D. ophisthoproctus* from Taiwan (Chen and Mok, 1995), but it sharply differed from *D. ophisthoproctus* in having several important characteristics with lack of minute cheek papillae (well developed in *D. ophisthopro-*

**Table 1.** Comparison of important taxonomic characters of the genus *Dysomma*

Characters	<i>D. anguillare</i> (present study)	<i>D. anguillare</i> (Barnard, 1923)	<i>D. opisthoproctus</i> (Chen and Mok, 1995)
Papillae on cheek	absent	—	well developed
No. of lateral line pores	12+53	—	—
Cephalic sensory pores			
Infraorbital	5	—	4
Supraorbital	3	—	3
Preoperculomandibular	6	—	7
Total vertebrae	129	—	120
Origin of dorsal fin	slightly in advance of pectoral base	above or slightly in advance of gill-slit	about one pectoral before pectoral base
Position of anus	near pectoral fin tip	near pectoral fin tip	about 10 times pectoral behind pectoral base
Teeth on			
Vomer	4	4	4
Premaxillary	2, transverse	2, transverse	2, transverse
Dentary teeth	8 (left), 7 (right)	7~8	8 (left), 7 (right)

**Table 2.** Comparison of important morphometric characters of the genus *Dysomma*

Characters	<i>D. anguillare</i> (present study)	<i>D. anguillare</i> (Barnard, 1923)	<i>D. opisthoproc- tus</i> (Chen and Mok, 1995)
Total length (TL, mm)	478	360	420.6
% of TL			
Head length (HL)	12.0	14.3	12.5
Trunk length	2.9	—	20.2
Predorsal length	11.8	—	10.6
Preanal length	15.0	—	35.1
Postanal length	85.0	—	64.9
% of HL			
Trunk length	24.1	—	161.8
Snout length	25.3	22.2	22.0
Pectoral fin length	18.5	22.2	16.0

*ctus*), five infraorbital and six preoperculomandibular in cephalic sensory pores (four and seven), 129 vertebrae (120) and 15.0% preanal length to the total length (35.1%) (Chen and Mok, 1995) (Table 1).

On the other hand, according to the morphometric description of Chen and Mok (1995), the trunk of *D. anguillare* was terribly shorter than that of *D. opisthoproctus* (2.9% versus 20.2% of total length). And postanal length of *D. anguillare* was far longer than that of *D. opisthoproctus* (85.0% versus 64.9% of total length) (Table 2). Although Chen and Mok (1995) mentioned that preanal length of *D. anguillare* was 16~22% of total length, this species from Korea showed more shorter than the former as 15.0% of total length

(Table 2).

And also Fishelson (1994) mentioned that air bladder of *D. anguillare* was thick and its end extended to the posterior part of the visceral cavity. The length of air bladder of *D. anguillare* which extending to the posterior part was as long as 67.0% of total length. Therefore visceral cavity also very long as well as length of air bladder. Barnard (1923) also mentioned that the body cavity of *D. anguillare* extend to within 70 mm from end of the tail.

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## 한국산 Synphobranchidae과 어류 1 미기록종, *Dysomma anguillare*

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1996년 우리나라의 서해연안에서 채집된 뱀장어목 어류 1종을 동정한 결과 지금까지 우리나라에서는 서식이 확인되지 않았던 Synphobranchidae과에 속하는 *Dysomma anguillare* Barnard로 동정이 되었다. 본 종은 외부 형태적으로 *D. ophisthoproctus*와 유사하나, 상하악의 앞부분은 근육질의 작은 돌기를 가지며, 눈이 퇴화되었고, 체장은 아주 짧고 꼬리가 매우 길며, 항문이 가슴지느러미의 끝 아래에 위치하고 비늘이 없는 점 등이 특징적이다. 본 종은 체장이 짧고 꼬리가 길다는 특징에 따라 한국명을 긴꼬리장어과, 긴꼬리장어속, 긴꼬리장어로 명명하였다.