

# A New Ophichthid Eel, *Ophichthus rotundus* (Ophichthidae, Anguilliformes) from Korea

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A new species of Korean ophichthid eel, *Ophichthus rotundus*, is described on the basis of specimens collected from Kyehwado, Chollabuk-do, Korea. *O. rotundus* is characterized by small eye, elongated and slender body, short head and trunk, small eye, long tail, low dorsal and anal fins, many vertebrae, and no spotted pattern on body and fins.

Ophichthid eels are broadly distributed in the tropical and temperate waters in the world (Nelson, 1994). The family Ophichthidae, which has the greatest diversity of anatomical specialization within a single apodal family, comprises more than 250 species of 55 genera (McCosker, 1977; McCosker et al., 1989).

The genus *Ophichthus* differs from other genera of the family Ophichthidae in the following characters: anterior nostril tubular, origin of dorsal fin behind gill opening, pectoral fin largely developed, no flange on upper lip, and eye over middle of upper jaw.

The first report on the family Ophichthidae from waters around Korea was made by Jordan and Metz (1913). Two species of *Ophichthus* from Korea, *O. evermanni* and *O. urolophus*, have been previously described (Mori, 1952; Chyung, 1977).

In 1993 and 1995, a number of specimens which differ sharply from others of *Ophichthus* by color pattern on surface of body, head length and number of vertebrae were collected from the tidal zone of Kyehwado, Chollabuk-do, western coast of Korea. The aim of this paper is to describe it as a new species.

Measurements and terminology follow Böhlke (1989). Vertebral counts were taken from radiographs. The holotype and paratypes are deposited at Department of Biology, Kunsan National University (BKNU).

*Ophichthus rotundus* sp. nov.  
(New Korean name: Dunggun-Mulbaem)  
(Figs. 1-4)

Holotype: BKNU 3001, 793.0 mm total length (TL), collected from tidal zone, Kyehwado, Puan-gun, Chollabuk-do, Korea, 35° 48' N, 126° 36' E. July 27, 1993.

Paratypes: BKNU 3002-3018, 17 specimens, 478.6-700.1

mm TL, with same date and locality as holotype. Two specimens (BKNU 3017 and 3018) were made into skeletal preparation; BKNU 3033-3039, 7, 537.6- 783.3 mm TL, with same locality as holotype, September 8, 1995.

Diagnosis: Body elongated and slender, complete round form, body depth at anus 2.3-2.7% of total length. Head short, 5.4-6.9% of total length and about 15-18 times in total length. Head and trunk short, about 1.6-1.7 times in tail. Eye small and covered with semitransparent membrane. Dorsal fin originates much behind pectoral tip. Upper lip with two papillae on lower edge. Dorsal and anal fins very low without any spots. Preoperculomandibular pores 5+2. Total vertebrae 178-184.

Description: Data for holotype and paratypes are shown in Table 1.

Body elongated, slender, almost complete cylindrical form and slightly tapering toward posteriorly (Fig. 1). Tip of tail lacks visible fin rays, pointed and very hard. Vertical fins very low. Dorsal fin originates much

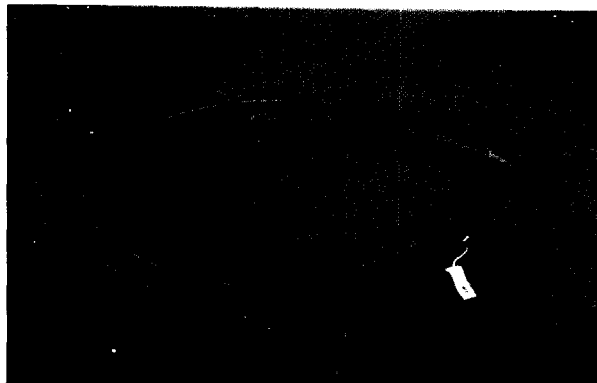


Fig. 1. *Ophichthus rotundus* sp. nov., holotype, BKNU 3001, 793.0 mm TL, from Kyehwado, Puan-gun, Chollabuk-do, Korea.

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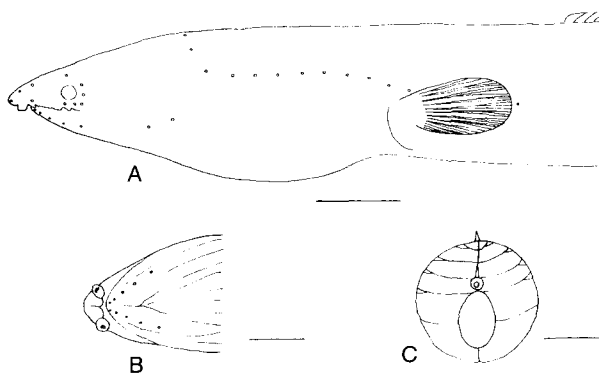


Fig. 2. Head part and trunk section of *Ophichthus rotundus* sp. nov., paratype, BKNU 3015, 617.0 mm TL. A: lateral view, B: ventral view, C: transverse section at anus. Scales bars=10 mm.

behind pectoral fin tip. Pectoral fin with 12 rays moderately elongate and round form. Mouth small, gap of upper and lower jaws reaches beyond posterior margin of eye (Fig. 2). Cephalic sensory pores minute, not conspicuous: 1+3 supraorbital pores; six or seven infraorbital pores (3+3 or 3+4); 5+2 preoperculo-mandibular pores; one transverse frontal pore; 3 supratemporal pores (Fig. 3). Both cephalic lateral line systems connected through frontal and supratemporal canals. Anterior nostril tubular under tip of snout without obvious tentacles. Posterior nostril opening along lower

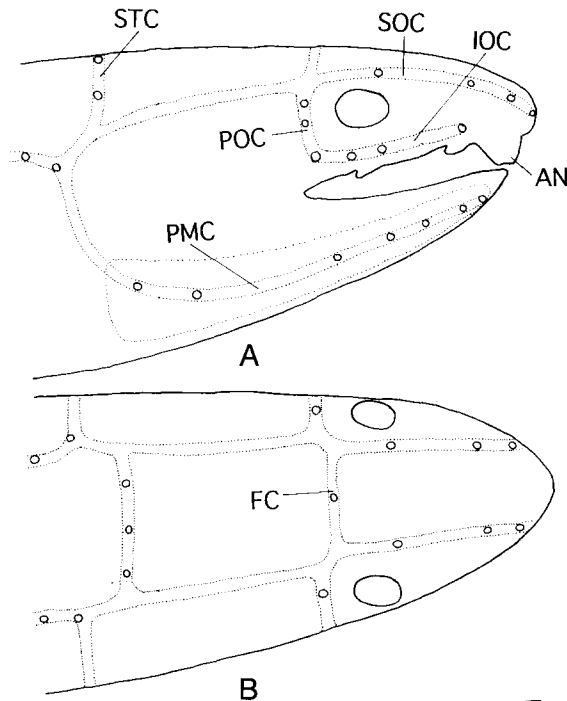


Fig. 3. Cephalic lateral line system of *Ophichthus rotundus* sp. nov., paratype, BKNU 3017, 621.3 mm TL. A: lateral view; B: dorsal view. AN: anterior nostril, FC: transverse frontal commissure, IOC: infraorbital canal, PMC: preoperculo-mandibular canal, POC: postorbital canal, SOC: supraorbital canal, STC: supratemporal commissure. Scale bar=5 mm.

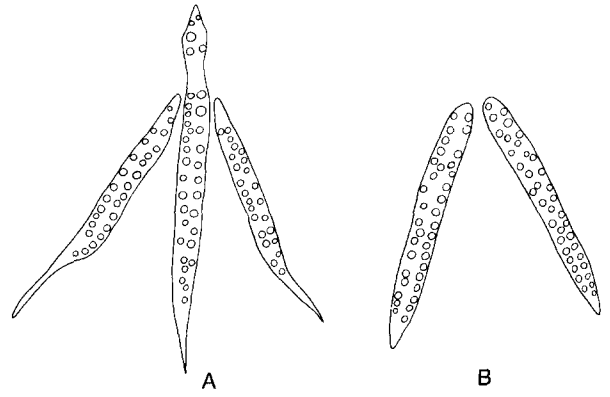


Fig. 4. Dentition of *Ophichthus rotundus* sp. nov., paratype, BKNU 3018, 612.7 mm TL. A: maxillary-vomerine teeth, B: dentary teeth. Scale bar=5 mm.

edge of upper lip. Two distinct papillae on lower edge of upper lip before and behind posterior nostril (Figs. 2 and 3). Eye very small and covered with semitransparent membrane. Tail longer than head plus trunk. Teeth small and conical. Upper and lower jaws and vomerine teeth biserial or irregular serial (Fig. 4). The structure of lateral line canals well ossified.

Branchiostegal rays are very slender, numerous and long arch. The underlying osteology of caudal vertebrae complex and reduced. Otolith ovate and slightly biconvex, with a shallow sulcus on medial surface. Digestive canal simple, smooth and straight tube, opening directly into anus. Gas bladder elongate and not connect with intestine by pneumatic duct.

Color in 10% formalin: Upper half of head and body

Table 1. Meristics and proportional measurements of *O. rotundus* sp. nov.

Characters	Holotype	Paratypes(n=24)
Total length	793.0	478.6-783.3
Lateral line pores before anus	65	65-66
Total number of lateral line pores	165	164-179
Vertebrae	180	178-184
Infraorbital pores	6	6-7
Supraorbital pores	1+3	1+3
Preoperculo-mandibular pores	7	7
Supratemporal pores	3	3
Branchiostigal rays	27	27
In % total length		
Body depth	2.5	2.3-2.7(2.4 ± 0.03)*
Head length	5.9	5.4-6.9(6.0 ± 0.02)
Snout length	0.9	0.9-1.0(0.9 ± 0.02)
Eye diameter	0.3	0.3-0.4(0.3 ± 0.01)
Interorbital width	0.7	0.7-0.9(0.8 ± 0.02)
Predorsal length	9.9	8.6-10.8(9.9 ± 0.03)
Preanal length	36.9	36.3-38.3(37.8 ± 0.03)
Tail length	63.1	60.7-66.7(63.2 ± 0.04)
In % of head length		
Snout length	15.0	13.9-17.2(15.6 ± 0.04)
Eye diameter	5.0	4.7-6.5(5.3 ± 0.02)
Interorbital width	12.1	12.3-15.6(13.9 ± 0.02)

\* range(mean ± SD)

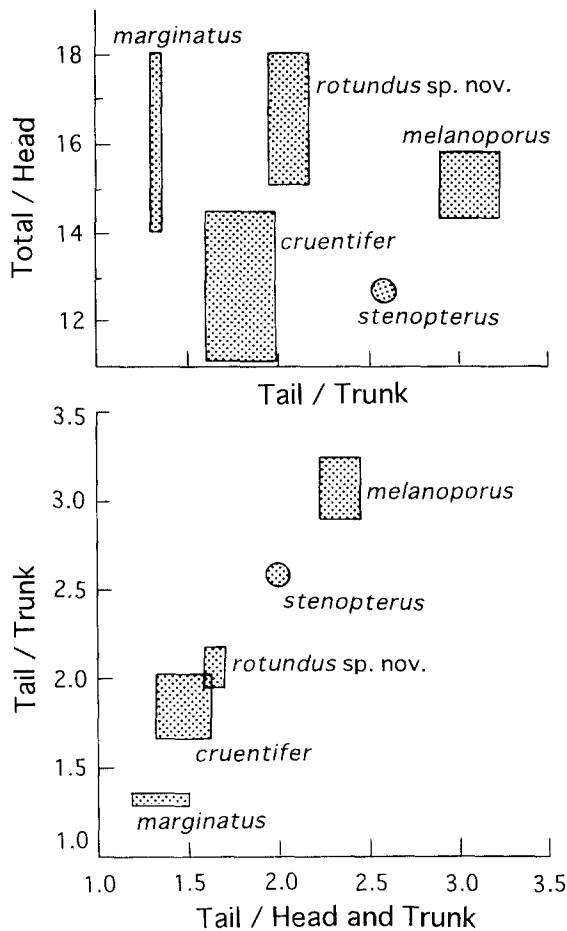


Fig. 5. Relationships between body measurements in *Ophichthus rotundus* sp. nov. and its related species. Data except *O. rotundus* were cited from Cope (1871), Smith (1961, 1962), McCosker (1977), Castle and McCosker (1986), and McCosker et al. (1989).

dark gray, lower half pale or slight yellowish, without any color patterns. Anterior portion of head blackish all around. Pectoral fin slight yellowish or pale, and vertical fins pale without spots. Digestive tract and gas bladder pale.

Etymology: "rotundus"(L) means round or circular. The specific name *rotundus* is based upon body form.

Remarks: *O. evermanni* and *O. urolophus*, ophichthid eels from Korea, greatly differ from *O. rotundus* in having many irregular brown color patterns on the

body surface and uniserial teeth in jaws (in *O. evermanni*), and having 52-57 pores of lateral line before anus, 135-136 vertebrae and uniserial teeth in jaws (in *O. urolophus*) (Chyung, 1977; Masuda et al., 1988) (Table 1 and 2). Morphologically, *O. rotundus* is fairly similar to *O. tsuchidae* and *O. asakusae* from Japan, but *O. rotundus* was well-characterized by having a larger number of vertebrae (134-140 in *O. tsuchidae* and 120-131 in *O. asakusae*), more pores of lateral line before anus (52-58 and 53-57) and fewer pectoral fin rays (14-15 and 14-17) (Masuda et al., 1988; Hatooka, 1993) (Table 2). *O. apicalis* from China is also similar to *O. rotundus* in exomorphology, but differs from *O. rotundus* in having uniserial teeth in jaws (bi or irregular in *O. rotundus*) and 9.1-11.1 head length in total length (15.0-18.0) (Chu, 1984; Cheng and Zheng, 1987).

McCosker et al.(1989) made a revised key to the Western Atlantic species of *Ophichthus* and recognized 12 species there. *O. rotundus* is related to *O. cruentifer* and *O. melanoporos* in general appearance. However, *O. cruentifer* differs from the new species in having fewer vertebrae, higher proportions of head length and dorsal fin origin (Table 3). On the other hand, *O. melanoporos* differs from *O. rotundus* in having higher number of POP, as well as conspicuous brown spots on lateral line pores. McCosker (1977) and Smith (1961, 1962) described the tail length of *O. marginatus* and *O. stenopterus* as about 1.30-1.35 and 2.60 times the trunk length, while that of *O. rotundus* is about 1.94-2.16 (Fig. 5). McCosker et al. (1989) also reported that tail of *O. melanoporos* and *O. cruentifer* showed about 2.88-3.23 and 1.68-2.00 times the trunk length, and their total lengths were 14.3-15.8 and 11.5-14.5 times the head length (15.0-18.0 in *O. rotundus*) (Fig. 5). *O. stenopterus* differs from *O. rotundus* in having a higher proportion of DFO and of head length, and fewer vertebrae (Table 3).

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Table 2. Comparisons of character between *O. rotundus* and its related species from Korea and Japan

Characters	<i>O. rotundus</i> sp. nov.	<i>O. evermanni</i>	<i>O. urolophus</i>	<i>O. asakusae</i>	<i>O. tsuchidae</i>
Pectoral fin rays	12	14	14-17	14-15	14-17
Lateral line pores before anus	65-66	68-74	52-57	53-57	53-58
Number of vertebrae	178-184	51	134-140	129-131	134-140
Teeth row of jaws	bi or irregular	uniserial	uniserial	uniserial	biserial
Color pattern of body	gray-brown	irregular brown cross band	uniformly light-brown	light-brown	light-brown
Origin of dorsal fin	behind pectoral	behind pectoral	behind pectoral	above middle of pectoral	above tip of pectoral

Data except *O. rotundus* were cited from Jordan and Snyder (1901), Chyung (1977), Masuda et al., (1988) and Hatooka (1993).

**Table 3.** Comparisons of several characters between *Ophichthus rotundus* sp. nov. and its related species from Western Atlantic

Species	Vertebrae	POP*	Proportion (% TL)			Teeth on Jaws and vomer	
			Tail	DFO**	Body depth		
<i>O. rotundus</i> n. sp.	178-184	5+2	60.7-66.7	8.6-10.8	2.3-2.7	5.4-6.9	bi or irregular serial
<i>O. cruentifer</i> <sup>1)</sup>	144-155	5-6+2-3	57-62	10-16	2.3-3.0	6.9-8.2	biserial
<i>O. melanoporys</i> <sup>2)</sup>	177-186	6+3	69-71	8.2-9.4	1.5-1.8	6.3-7.0	uniserial
<i>O. marginatus</i> <sup>3)</sup>	174-186	-	55.6-62.5	behind pectoral tip	2.1-2.3	5.6-7.1	bi or triserial
<i>O. stenopterus</i> <sup>4)</sup>	169-173	-	66	12	-	7.8	biserial

\* preoperculomandibular pores.

\*\* dorsal fin origin.

1), 2) Data after McCosker et al. (1989).

3) Data after Smith (1961, 1962) and McCosker and Castle (1986).

4) Data after Cope (1871) and Böhlke (1982).

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