

First Record of the Slender Giant Moray, *Strophidon sathete* (Muraenidae, Anguilliformes) from Korea

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ABSTRACT A single specimen of *Strophidon sathete* (1,302 mm in total length), belonging to the family Muraenidae, was collected in a danish seine off the southern coast of Jeju Island in April, 2019 for the first time. It was characterized by having unpatterned coloration and thin body, snout slightly rounded, three superorbital pores, four infraorbital pores, and six mandibular pores. This species is distinguishable from morphologically similar *Gymnothorax albimarginatus* inhabiting Korean waters by having all fins dark (vs. fins dark posteriorly with white margin for latter), body depth 1.8~3.1% in total length (vs. 3.2~5.7%), and no dark band on head in less than 50~70 cm (vs. exist). We add *Strophidon sathete* to the Korean fish fauna and propose a new Korean name, “Ga-neun-gom-chi” for the species because the body is relatively thinner than other similar moray species (*G. albimarginatus*) in Korea.

Key words: *Strophidon sathete*, Muraenidae, first record, Jeju Island, Korea

INTRODUCTION

The family Muraenidae, which belongs to the order Anguilliformes, has 16 genera with about 199 species worldwide (Froese and Pauly, 2019). It is characterized by the elongate body, posterior nostril high on the head, above or before the eye, a simple pore or in a tube, gill opening a small round hole or slit, pectoral and pelvic fins absent, and lateral-line pores absent on the body except for one or two above and before gill opening (Böhlke *et al.*, 1999; Nelson *et al.*, 2016). In Korea, seven species with two genera in the family Muraenidae have been reported so far (Kang *et al.*, 2018).

Three species in the genus *Strophidon* have been reported worldwide (Hibino *et al.*, 2017; Fricke *et al.*, 2020). Recently, a single specimen of unrecorded morays species was collected by a danish seine off the southern coast of Jeju Island (sea block no. 252), Korea. It was morphologically identified as *Strophidon sathete* according to Hatoooka (2013) and Loh *et al.* (2015). Here, we described its

morphology based on the specimen and added the species to the list of the Korean fish fauna.

Measurements followed the method of Böhlke and Randall (2000), and Hubbs *et al.* (2004). Vertebral counts were made from soft X-ray photo; mean vertebral formula was expressed as predorsal-preanal-total vertebrae (Böhlke, 1982). Teeth counts follow the method of Böhlke (1989), and were counted using a magnifying glass and stereo microscope. The examined specimen are deposited at the Fish Genetics and Breeding Laboratory of Jeju National University (JNU), Korea.

Strophidon McClelland, 1844

(New Korean genus name: Ga-neun-gom-chi-sok)

Strophidon McClelland, 1844: 187 (type species: *Lycodontis longicaudata* McClelland, 1845).

Description. Body elongate, its depth 40 times or more in total length (TL); tail about equal to preanal length; dorsal fin elevated, well developed; anterior nostrils simple tubes; teeth not noticeably molariform; usually some canine teeth present; dorsal fin origin before anus; 1~4 branchial pores (Böhlke and Randall, 2000).

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Fig. 1. *Strophidon sathete*, JNU1504, 1,302.0 mm TL, Jeju Island, Korea.

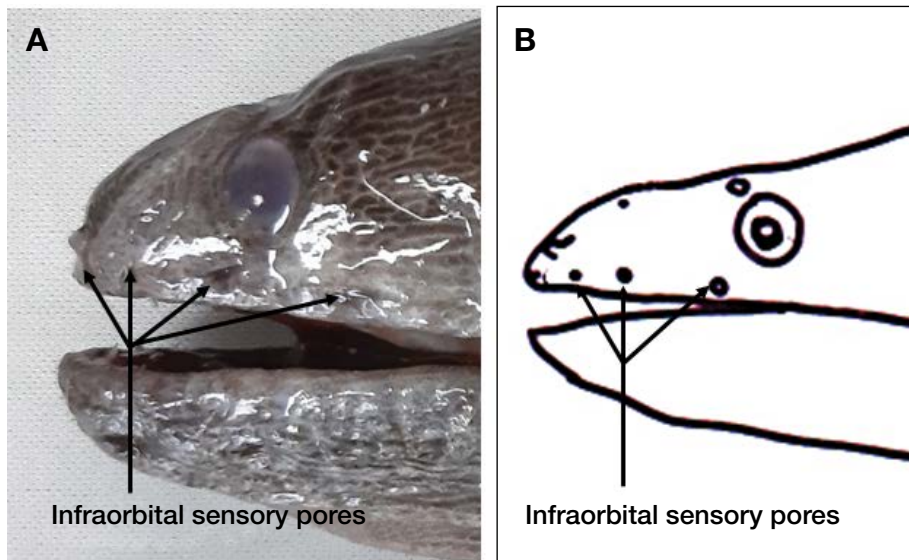


Fig. 2. Position of infraorbital sensory pores of *Strophidon sathete* (A) and *S. ui* in Hatooka (2013) (B).

***Strophidon sathete* (Hamilton, 1822)**

(New Korean name: Ga-neun-gom-chi)

(Figs. 1, 2; Table 1)

Muraenophis sathete Hamilton, 1822: 17, 363 (type locality: near Calcutta, India).

Strophidon sathete: Chen *et al.*, 1994: 54 (Taiwan); Böhlke, 1997: 106 (Indo-Pacific); Böhlke *et al.*, 1999: 1647 (Western Central Pacific); Myers, 1999: 51 (Micronesia); Randall and Lim, 2000: 585 (South China Sea); Hatooka in Nakabo, 2013: 249 (Japan).

Material. JNU1504, one specimen, 1,302 mm in TL, off the southern coast of Jeju Island (sea block no. 252) with a danish seine, 1 April, 2019.

Description. Counts and measurements are shown in Table 1.

Body very elongated, cylindrical, slightly compressed behind anus; head long with pores typical, three superior-

bital pores, four infraorbital pores (Fig. 2A), six mandibular pores; mouth moderately; snout blunt and short (two times of eye diameter); anterior nostril with a short tube; posterior nostril above eye; lower jaw projecting slightly than upper jaw; in upper jaw, 5~6 intermaxillary teeth on each side, 5 median teeth (Fig. 3A); maxillary teeth biserial, an outer row of 14 short triangular teeth and an inner row of 5 tall depressible teeth; vomerine teeth uniserial 5 in number in lower jaw (Fig. 3B); dentary teeth biserial, an anterior inner row of 4~5 large teeth and an outer row of 23 smaller teeth; the origin of dorsal fin far at behind the pectoral pore; dorsal and anal fins confluent with caudal fin; pectoral and pelvic fins absent; anus located before midbody; tail much longer than preanal length.

Coloration. when fresh, body uniformly brown head, body and fins with unpatterned coloration; dorsal, anal and caudal fin dark brown.

Distribution. Known from Indo-West Pacific: South Afri-

Table 1. Comparison of morphological characters between present and previous studies on *Strophidon sathete*

Characters	Present study	Chen <i>et al.</i> (1994)	Böhlke (1997)	Loh <i>et al.</i> (2015)
No. of specimens	1	4	15	2
Total length (mm)	1,302	310~1,200	182~2,425	413~941
Vertebra				
Predorsal	9	–	8~11	7~10
Preanal	79	–	73~82	78~83
Total	194	183~191	186~208	188~200
Teeth				
Intermaxillary	5~6	–	6	5~6
Median	3	–	4	2~4
Maxillary				
Inner	6~6	–	6~15	4~9
Outer	17~19	–	18~30	19~27
Vomerine	5	–	3~9	3~8
Dentary				
Inner anterior	4~5	–	2~9	3~4
Outer	23~24	–	22~37	23~33
Proportions in total length				
Head length	10.2	8.7~11.2	6.9~12.0	8.9~9.1
Tail length	55.6	–	–	58.6~58.9
Trunk length	33.1	28.6~38.5	–	32.4~33.1
Body depth at gill opening	3.7	2.2~3.2	2.0~4.0	2.9~3.4
Body depth at anus	3.2	–	1.7~3.3	2.5~2.6
Predorsal length	10.2	–	–	–
Preanal length	45.5	–	–	–
Proportions in head length				
Length of upper jaw	37.3	–	28.0~37.0	36.1~36.4
Length of lower jaw	37.3	–	28.0~36.0	34.9~36.6
Snout length	13.7	–	8.2~14.0	8.7~9.8
Eye diameter	4.9	–	3.4~9.3	5.4~6.0
Interorbital width	11.8	–	5.9~11.0	6.2~6.5
Gill opening length	8.8	–	–	–

ca, Red Sea, Australia to Taiwan, Japan (Loh *et al.*, 2015) and Korea (Present study).

Remarks. The present specimen, belonging to the family Muraenidae, is characterized by having body very elongated, cylindrical, slightly compressed behind anus, dorsal and anal fins confluent with caudal fin, pectoral and pelvic fins absent, anus located before midbody, tail much longer than preanal length and infraorbital sensory pore located below posterior part of eye. The morphological characteristics of present specimen were compared with those in the previous reports of *Strophidon sathete* (Hatooka, 2013; Loh *et al.*, 2015), which revealed that all morphological traits examined were well matched with those of *Strophidon sathete* (Table 1).

Böhlke (1997) regarded that *Straphidon ui* Tanaka, 1918

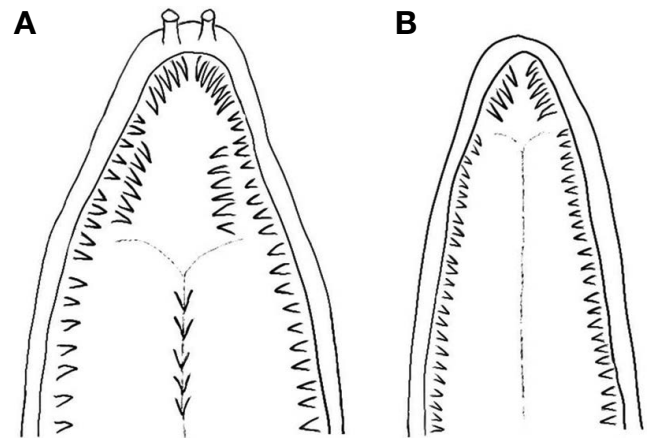


Fig. 3. Shape of teeth of *Strophidon sathete*. A: upper jaw, B: lower jaw.

was as a junior synonymy of *S. sathete* based on description, counts and measurements. However, Hatooka (2013) did not follow Böhlke's classification and regarded *S. ui* as a different species based on the position of infraorbital sensory pore. That is, *S. sathete* has a sensory pore below posterior part of eye, while *S. ui* does not (Fig. 2). Also, Loh *et al.* (2015) suggested that *Gymnothorax dorsalis* should be placed in *Strophidon* rather than in *Gymnothorax* based on morphological and molecular characteristics. Further review studies are needed to clarify the taxonomic position of these species.

S. sathete morphologically resembles *G. albimarginatus* Temminck and Schlegel, 1846 inhabiting Korean waters. However, it is distinguishable from the latter by the dorsal and anal fin color (all fins dark *vs.* fins dark posteriorly with white margin for latter), body depth (1.8~3.1% in total length *vs.* 3.2~5.7%), and presence or absence of dark band on head in less than 50~70 cm (no *vs.* exist) (Böhlke, 1997; Hatooka, 2013). We suggest its new Korean name, "Ga-neun-gom-chi" for the species because the body is relatively thinner than other similar moray species (*G. albimarginatus*) in Korea.

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한국산 곱치과 어류 1 미기록종, *Strophidon sathete*

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요 약 : 곱치과에 속하는 *Strophidon sathete* 1개체 (전장 1,302 mm)가 2019년 4월 제주도 남방 해역에서 외끌이 기선저인망으로 처음 채집되었다. 이 종의 특징은 무늬가 없고, 몸이 가늘며, 주둥이 약간 둥근 형태를 띠며, 3개의 안상골공(superorbital pores), 4개의 안하골공(infraorbital pores), 그리고 6개의 하악골공(mandibular pores)을 갖는다. 형태적으로 가지굴(*Gymnothorax albimarginatus*)과 유사하지만 등지느러미와 뒷지느러미가 전체적으로 어둡고(vs. 말단에 하얀색을 띠며), 전장에 대해 체고비율이 1.8~3.1% (vs. 3.2~5.7%), 그리고 전장이 50~70 cm보다 작을 때 반문이 없는 것(vs. 반문이 있음)으로 구분할 수 있다. 따라서 몸의 굵기가 유사종에 비해 상대적으로 가는 형태적 특징에 근거해서 이 미기록종의 국명을 “가는곱치”로 제안한다.

찾아보기 낱말 : 곱치과, *Strophidon sathete*, 가는곱치, 미기록종, 제주도