

# A New Record of the Pacific Sleeper Shark, *Somniosus pacificus* (Squaliformes: Somniosidae) from the Western Margin of the East Sea, Korea

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**ABSTRACT** A single specimen (192 cm total length, TL) of the Pacific sleeper shark, *Somniosus pacificus*, belonging to the family Somniosidae, order Squaliformes, was firstly collected from the west margin of the East Sea, Korea in February 2008. This specimen was characterized by having interdorsal space, being less than the distance between the snout and first gill opening; and the distance between the snout and first dorsal fin origin more than 45% TL; head and body has overall dark brownish. The new Korean name “Jam-sang-eo-gwa” is proposed for the family Somniosidae, and “Jam-sang-eo-sok” for the genus *Somniosus*, and “Jat-bit-jam-sang-eo” for the species *S. pacificus*.

**Key words :** *Somniosus pacificus*, Somniosidae, new record, Gangwon-do, East Sea, Korea

## INTRODUCTION

The family Somniosidae in the order Squaliformes comprises 7 genera and 17 species worldwide (Ebert *et al.*, 2013), and 4 genera and 6 species in Japan (Hatooka and Kai, 2013); no occurrences of Somniosidae have been reported in Korea. The family is characterized by a fairly broad head and flat snout, large spiracles located close behind the eyes, low pectoral fins with short rounded free rear tips, and no anal fin (Ebert *et al.*, 2013). Members of the family usually inhabit the deep sea, with most collected at depths of 830 ~ 3,700 m (Hatooka and Kai, 2013). The genus *Somniosus* consists of two subgenera, *Somniosus* and *Rhinoscyrnus*, which differ primarily in size (Yano *et al.*, 2004). The smaller subgenus *Rhinoscyrnus* (adult total length, TL, < 1.4 m) includes two species, *Somniosus (Rhinoscyrnus) rostratus* and *Somniosus (Rhinoscyrnus) longus*, while the larger subgenus *Somniosus* (adult TL, > 4.0 m) includes three species, *Somniosus (Somniosus) microcephalus*, *Somniosus (Somniosus) pacificus* and *Somniosus (Somniosus) antarcticus*. In Febru-

ary 2008, a single specimen of *S. pacificus* was collected from the East Sea, Gangneung-si, Gangwon-do, Korea. We here report on the species and its affiliated genus and family as a new member of the Korean fish fauna.

During survey of fish species diversity in the East Sea, Korea, one specimen of an unknown shark was collected on the western margin of the East Sea, Gangneung-si, Gangwon-do, Korea, in February 2008. Identification, terminology, and measurements of the specimen follow those of Yano *et al.* (2004). The specimen was stuffed and deposited at the Korea Research Center of Maritime Animals, Korea.

### Family Somniosidae Jordan, 1888

(New Korean name: Jam-sang-eo-gwa)

Head moderately broad and somewhat flattened or conical. Abdomen usually with lateral ridges. Both dorsal fins either with or without fin spines (Ebert and Stehmann, 2013). The family comprises 7 genera and 17 species worldwide (Ebert *et al.*, 2013).

### Genus *Somniosus* Lesueur, 1818

(New Korean name: Jam-sang-eo-sok)

*Somniosus* Lesueur, 1818: 222 (type species: *Somniosus brevipinna* Lesueur, 1818).

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Fig. 1. *Somniosus pacificus*; TL, 192 cm; East Sea, Gangneung, Korea. (A) Fresh specimen, (B) Stuffed specimen.

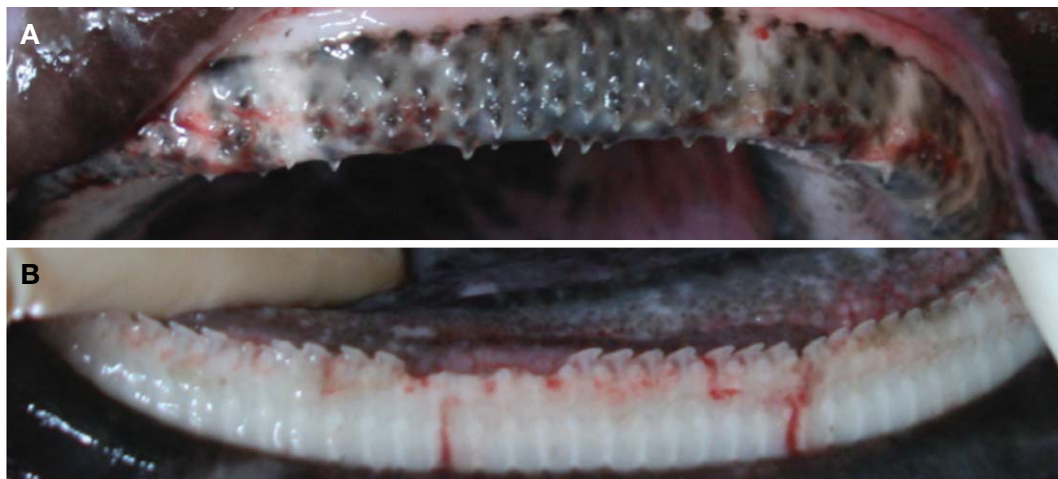


Fig. 2. (A) Spear-like upper teeth, (B) Slicing lower teeth with low bent cusps.

Anterior margin of dorsal fins without spines. Lower teeth with low and oblique cusps. Ventral caudal margin approximately 2/3 as long as the dorsal caudal margin. Eyes nearly circular (Ebert and Stehmann, 2013). The genus comprises five species worldwide; *Somniosus microcephalus* (Bloch and Schneider, 1801), *Somniosus rostratus* (Risso, 1827), *Somniosus longus* (Tanaka, 1912), *Somniosus antarcticus* (Whitley, 1939), and *Somniosus pacificus* (Bigelow and Schroeder, 1944).

***Somniosus pacificus* Bigelow and Schroeder, 1944**

(New Korean name: Jat-bit-jam-sang-eo)

(Figs. 1, 2; Table 1)

*Somniosus pacificus* Bigelow and Schroeder, 1944: 35

(type locality: Sagami Sea, Japan); Anderson *et al.*, 1979: 259 (United States of America); Castro-Aguirre and Garcia-Dominguez, 1988: 104 (Mexico); Glubokov, 2004: 357 (Russia); Yano *et al.*, 2004: 363 (Japan, North Pacific, USA); Hatooka and Kai in Nakabo, 2013: 186 (Japan).

**Material examined.** One specimen, 192 cm TL; 37° 57.78'N, 129° 19.43'E, East Sea, Gangneung; February 2008; by set net.

**Description.** Measurements are shown in Table 1. As a percent (%) of TL: snout to pectoral fin origin, 26.1; snout to pelvic fin origin, 62.7; snout to first dorsal fin origin, 57; snout to second dorsal fin origin, 69.9; snout

**Table 1.** Comparison of proportional measurements of *Somniosus pacificus* and two congeneric species

Measurements	<i>S. pacificus</i>			<i>S. microcephalus</i>	<i>S. antarcticus</i>
	Present study	Francis <i>et al.</i> (1988)	Yano <i>et al.</i> (2004)	Yano <i>et al.</i> (2004)	Yano <i>et al.</i> (2004)
No. of specimens	1	3	29	38	23
Total length (TL, cm)	192	41.7~136.8	41.8~430	64.8~480	94~438
In % of Total length					
Distance between snout and outer nostril	2.9	2.4~3.0	1.3~4.4	1.3~3.6	0.9~3.6
Distance between snout and eye	5.7	7.7~8.4	5.5~9.0	5.0~8.7	4.3~8.9
Distance between snout and mouth	7.1	8.7~10.6	4.9~14.0	5.4~9.9	6.7~12.2
Distance between snout and 1st gill opening	17.7	19.0~23.3	15.1~24.2	15.1~22.5	17.0~23.7
Distance between snout and pectoral origin	26.1	23.0~28.8	25.7~30.3	20.7~28.8	22.5~36.3
Distance between snout and pelvic origin	62.7	59.5~64.0	60.3~66.8	58.8~68.5	59.1~75.4
Distance between snout and 1st dorsal origin	45.6	45.7~47.5	44.2~52.6	35.5~45.9	45.0~53.1
Distance between snout and 2nd dorsal origin	69.9	66.2~70.7	65.8~70.7	62.0~71.0	54.0~78.1
Distance between snout and upper caudal origin	84.2	77.0~83.3	78.0~84.1	75.4~86.8	78.0~92.4
Distance between 1st and 2nd dorsal bases	16.1	17.0~18.3	13.2~18.6	16.0~23.4	14.0~20.4
Distance between inner corners of nostril	6.3	4.0~5.0	3.3~8.2	3.0~4.9	3.6~5.1
1st gill opening length	3.4	2.0~2.7	2.4~3.9	1.4~3.0	1.4~3.2
Spiracle length	0.3	—	0.5~1.2	0.5~2.3	0.4~1.0
Eye horizontal diameter	1.3	1.5~2.2	1.2~2.6	1.5~3.1	0.8~2.1
1st dorsal fin base length	7.3	4.1~6.5	4.2~9.4	4.9~18.1	4.4~8.8
1st dorsal fin height	2.3	2.3~3.1	2.2~3.4	2.4~4.5	1.9~3.3
2nd dorsal fin base length	4.2	3.8~4.8	4.7~7.8	5.4~8.8	4.5~21.3
2nd dorsal fin height	2.3	2.1~2.9	2.2~3.3	2.1~3.6	2.0~3.0
Pectoral fin base length	5.2	5.0~6.4	5.1~9.2	4.5~8.2	4.8~7.4
Pectoral fin anterior margin length	9.6	10.8~11.5	9.9~13.4	8.7~13.7	9.0~12.6
Pelvic fin base length	6.5	8.1~9.6	4.1~7.4	4.7~7.7	4.9~7.5
Pelvic fin anterior margin length	5.2	4.5~7.8	4.3~7.1	4.3~7.1	2.6~7.2
Caudal fin dorsal lobe length	17.7	17.3~21.3	11.9~21.5	14.8~21.2	15.8~21.2
Caudal fin ventral lobe length	12.5	12.2~14.9	8.2~15.8	8.6~16.6	10.8~15.2

to upper caudal fin origin, 84.2.

Body stout. Snout short, broadly rounded. Eyes nearly circular, relatively small (1.3% TL). Several rows of small conical teeth in the upper jaw; one row of bent cusped teeth in the lower jaw; lower jaw teeth larger than upper jaw teeth. Spiracle moderate (0.3% TL). Pectoral fin relatively small in size and slightly blunt. First dorsal fin origin posterior to a vertical through pectoral fin base, not reaching to a vertical of the pelvic fin origin; two dorsal fins equally sized and spineless. No anal fin. Caudal fin heterocercal; upper caudal fin lobe (17.7% TL) longer than lower caudal fin lobe (12.5% TL). Caudal peduncle slender, without lateral keels. Skin rough and bristly.

**Coloration.** When fresh, head and body dark brown in color. After fixation, head and body uniformly brown.

**Distribution.** East Sea, Korea (present study), Japan, Alaska, North America, and Mexico (Hart, 1973; Compagno, 1984; Masuda *et al.*, 1984; Orlov, 1999). The species is found mainly in cold temperate to polar waters of both hemispheres (Castro, 1983; Compagno, 1984; Last and Stevens, 1994).

**Remarks.** The present specimen, collected from the East Sea, belongs to the genus *Somniosus*, in having a short- to moderate-sized snout, the first dorsal fin clearly behind the pectoral fin bases, a paddle-shaped caudal fin,

and oblique and relatively short cusped teeth in the lower jaw (Compagno, 1984). Also, our specimen (1.92 m TL) exceeds 1.4 m TL, and thus belongs to the subgenus *Somniosus*, according to the criteria of Yano *et al.* (2004). The present specimen agrees with the previous descriptions made by Francis *et al.* (1988) and Yano *et al.* (2004). However, slight differences were observed in some measurements, such as the distances between the snout and gill opening, length of spiracle, and anterior margin of pectoral fin. These differences may be due to the small sample size (one individual) or to geographic variations. Further morphological and genetic studies on this species are required based on more specimens. *Somniosus pacificus* is similar to *S. microcephalus* but differs in the interdorsal space (less than the distance between the snout and first gill opening in *S. pacificus* vs. almost equal to the distance between the snout and first gill opening in *S. microcephalus*), and the distance between the snout and first dorsal fin origin (>45% TL in *S. pacificus* vs. <45% TL in *S. microcephalus*). *Somniosus pacificus* is most similar to *S. antarcticus* in external shape but differs in the number of turns in spiral valve (32~37 in *S. pacificus* vs. 36~41 in *S. antarcticus*), and distribution (North Pacific in *S. pacificus* vs. South Indo-Pacific and South Atlantic in *S. antarcticus*) (Yano *et al.*, 2004).

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## 한국산 Somniosidae 어류 1 미기록종, *Somniosus pacificus*

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**요 약 :** 돛발상어목 Somniosidae에 속하는 *Somniosus pacificus* 1개체가 2008년 2월 강원도 강릉해역에서 채집되었다. 본 종은 두 등지느러미 사이의 길이가 주둥이에서 첫 번째 새알까지의 길이보다 짧으며, 주둥이에서 첫 번째 등지느러미 사이의 길이가 전장의 45%를 넘고 몸은 전체적으로 잿빛을 띠는 특징을 가진다. 우리나라에서 처음 보고되는 본 종의 새로운 과명, 속명 및 종명으로 “잠상어과”, “잠상어속” 및 “잿빛잠상어”를 제안한다.

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**찾아보기 낱말 :** *Somniosus pacificus*, Somniosidae, 미기록종, 잿빛잠상어, 동해