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First Record of the Seahorse Fish, *Hippocampus trimaculatus* (Pisces: Syngnathidae) from Korea

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Seahorse fish, *Hippocampus trimaculatus* Leach, collected in the Cheju Island and Dolsan Island, Korea is recorded for the first time from Korea. *Hippocampus trimaculatus* is easily distinguishable from the other species of this genus, in having 20 dorsal fin rays, 17 anal fin rays, 11 trunk rings and 41 tail rings. *H. takakurae* reported from Japan is a junior synonym of *H. trimaculatus*.

KEY WORDS: *Hippocampus trimaculatus*, Seahorse Fish, Syngnathidae, Korea

The seahorse fishes of genus *Hippocampus* are mostly found in the shallow waters of warm temperate to tropical marine waters (Nelson, 1994). These fishes are characterized by swimming vertically in the water, having head uppermost, vibrating the dorsal fin and having egg pouch at the base of the tail ending near the vent of the male (Fowler, 1935; Araga, 1984).

The previous records of seahorse fishes of Korea were those of Mori (1952) and Chyung (1977) who listed 5 species from Korea. Since then this group in Korea has not been well known until now. In preparing the taxonomic discription of the Korean species of *Hippocampus*, two specimens collected from southern coast of Chollanam-do province and Cheju Island of Korea were found to be unrecorded from the waters of Korea. In this paper we report these specimens as the first record of *Hippocampus trimaculatus* from Korean waters and compare them with other species.

The specimens examined were collected at Hallim-up, Cheju-do province, on August 1991 and Dolsan Island, Chollanam-do on September, 1993 by the gill and trawl nets. Body parts counts and measured are shown in Fig. 1. Materials examined in this study were deposited at the Department of Biology, Chonbuk National University, Chonju, Korea (CNUC).

Family Syngnathidae

Hippocampus trimaculatus Leach, 1814

(New Korean name: Jom-hae-ma 점해마)
(Fig. 2 a and b)

Hippocampus trimaculatus Leach, 1814, p. 104 (type locality; China Seas) (cited from Fowler, 1935, p. 69-70); Jin, 1984, pp. 478-479; Shen, 1984, p. 28; Cheng and Zheng, 1987, pp. 267, 1014.

Hippocampus takakurae Tanaka, 1916, pp. 423-424, Fig. 341 (Bôshü, Japan); Matsubara, 1955, p. 430; Tomiyama, 1965, p. 238; Araga, 1984, p. 89, pl. 77; Senou, 1993, p. 488; Abe, 1987, p. 363.

Material examined: CNUC 19887, 146.5mm SL (without head length), male, Hanlim-up, Pukcheju-gun, Cheju-do, August 16, 1991; CNUC 19888, 130.7mm SL, female, Dolsan-do, Nam-myon, Yochon-gun, Chollanam-do, September 23, 1993.

Description: Counts and measurements of body parts are shown in Table 1 and 2.

Body strongly compressed, more or less

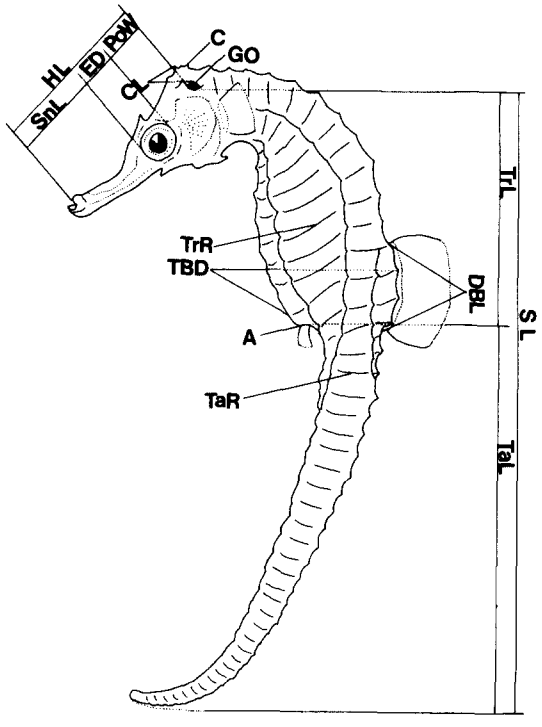

Fig. 1. Diagram showing counts and measurements of body parts of the genus *Hippocampus*. A, anus; C, coronet; CL, coronet length to gill opening; DBL, length of dorsal fin base; ED, eye diameter; GO, gill opening; HL, head length; PoW, postorbital width to gill opening; SL, standard length; SnL, snout length; TaL, tail length; TaR, tail rings; TrL, trunk length; TrR, trunk rings.

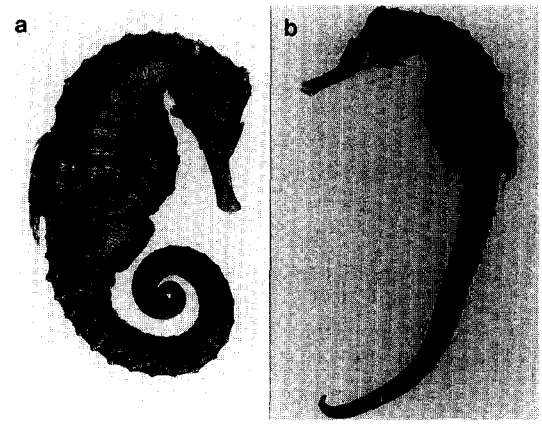

Fig. 2. a, *Hippocampus trimaculatus*, 146.5 mm SL, male, Cheju Isl., CNUC 19887; b, *H. trimaculatus*, 130.7 mm SL, female, Dolsan Isl., CNUC 19888.

Table 1. Counts and measurements of body parts of *Hippocampus trimaculatus* collected from Korea.

	Cheju Isl. CNUC 19887	Dolsan Isl. CNUC 19888
Standard length (mm)*	146.5	130.7
Sex	Male	Female
No. of		
Dorsal fin rays	19	20
Pectoral fin rays	17	17
Ventral fin rays	4	4
Trunk rings	11	11
Tail rings	40	40
In % of standard length		
Head length	20.0	21.0
Body depth of tenth ring	18.1	14.8
Trunk length	31.5	33.4
Tail length	68.5	66.6
Length of dorsal fin base	11.0	11.1
Snout length	9.1	9.6
Postorbital width	8.3	8.0
Eye diameter	3.2	3.4
Coronet length	3.7	3.4
In % of head length		
Snout length	45.7	45.5
Postorbital width	41.3	38.2
Eye diameter	16.0	16.0
Coronet length	18.4	16.0

* without head length

elevated, belly gibbous, with 11 rings, tapering abruptly to long quadrangular prehensile tail. Head without distinct curved neck, placed nearly at right angle with axis of trunk; coronet very low, ending in 5 small spines. Opercle with convex keel bent upwards to gill opening. Top and sides of head with spines. Aspect of head like horse; body and tail covered with bony plates forming rings, on body with 6 tubercles, on tail with 4. Prominent rings on 1, 4, 7, 10, 11 on body; 1, 5, 9 or 10, 13 or 14, 17 or 18, 20, 23 on tail; no cutaneous flaps. Dorsal fin moderate, opposite vent, on elevated base on trunk and tail; anal fin present, short. Egg pouch in male a sac at base of tail, terminating near vent.

Color variable from light-brown to black; 3 round black blotches on upper side of trunk, on first, fourth and seventh trunk rings, may be difficult to discern in a black specimens (Fig. 2b).

Table 2. Comparison of counts and measurements of body parts of *Hippocampus trimaculatus* and *H. takakurae* reported by several authors

	H. trimaculatus				*H. takakurae*			
	Present study (n=2)	Günther* (1870)	Jin (1984)	Shen (1984)	Tanaka** (1917)	Tomiyama (1965)	Aaraga (1984)	Senou (1993)
Standard length (mm)***	130.7-146.5	–	140-182	60.5	45	120	170	200
Localities	Korea	China	China	Taiwan	Japan	Japan	Japan	Japan
No. of								
Trunk rings	11	11	11	11	11	11	11	11
Tail rings	40	38-42	38-42	40	41	40	41	41
Dorsal fin rays	19-20	19-21	19-21	20-21	21	20	21	21
Pectoral fin rays	17	–	17	18	17	17	17	17
#SL/HL	4.75-5.00			4.8-6.2	–	–	–	–
TrL/HL	1.57-1.58	–	–	–	1.38	1.5	–	–
HL/SnL	2.19-2.20	–	–	1.9-2.2	–	–	–	–
HL/ED	6.23-6.38	–	–	7.2-9.6	–	6.0-7.0	–	–
SnL/ED	2.84-2.85	–	–	–	2.80	–	–	–

*. from Fowler (1935); **. original description; ***. without head length.
#. SL-Standard length; HL-Head length; TrL-Trunk length; SnL-Snout length; ED-Eye diameter.

Eye with radiating white lines.

Distribution: Southern coast of Korea (Cheju Island, Dolsan Island), Japan and China.

Habitat: Feeds mainly on fish larvae and small crustaceans. Inhabits gravel or sandy bottoms around shallow reefs (Araga, 1984).

Remarks: *Hippocampus trimaculatus* Leach, 1814 is distinguished from congener species in having 19-21 dorsal fin rays, 17-18 pectoral fin rays, 11+38-42 rings, lower coronet and 3 large brown spots below dorsal profile.

Tanaka (1916) originally described *H. takakurae* based on a 45 mm SL (without head length) specimen collected in the off Hôzô, Bôshü, Japan. But, *H. takakurae* from Japan agree well with the some meristic and morphometric characters of *H. trimaculatus* from Korea, Taiwan and China (Table 2). As Tomiyama (1965) and Senou (1993) commented previously, the characters of *H. takakurae* which was characterized with 3 round black blotches on the upper side of trunk and several important meristic counts, are similar to those of *H. trimaculatus*. The two specimens collected in the present study showed the morphological uniformity with the *H. trimaculatus* from Taiwan and China and *H. takakurae* from Japan in the color pattern, meristic and morphometric characters (Table 2; Fig. 2). Therefore we considered that *H. takakurae* is a junior synonym of *H. trimaculatus*.

Accordingly we proposed the provisional key to species of the genus *Hippocampus* of Korea as follows:

1a. Trunk rings 10; dorsal fin with 13-14 rays ··· ·····*H. coronatus* Temminck et Schlegel, 1847, 해마

1b. Trunk rings 11; dorsal fin with 15-21 rays ··· ·····2

2a. Spines on body and head well developed, pointed, very high, some equal in height to occipital crest ····· ····· *H. histrix* Kaup, 1856, 가시해마

2b. Spines on body weakly developed, blunt, low, much lower than occipital crest ·····3

3a. Pectoral fin with 11-12 rays; size small (less than 8cm TL in adult) ····· ·····*H. japonicus* Kaup, 1856, 산호해마

3b. Pectoral fin with 15-17 rays; size large (more than 17cm TL in adult) ·····4

4a. Tail rings 34-37; dorsal fin 19-21 rays; 3 round black spots on upper side of trunk;

coronet low ....*H. trimaculatus* Leach, 1814, 점해마

4b. Tail rings 34-37; dorsal fin 15-18 rays; no black spot on upper side of trunk; coronet high 5

5a. Snout equal to post orbital part of head ....*H. aterrimus* Jordan et Snyder, 1901, 진질해마

5b. Snout half size of post orbital part of head ... .*H. kuda* Bleeker, 1852, 복해마

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한국산 해마속 어류 1 미기록종, ***Hippocampus trimaculatus*** Leach

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1991년 8월 16일에 제주도 한림과 1993년 9월 23일 전남 돌산도 연안에서 채집한 실고기과의 해마속 어류는 지금까지 한국에서는 보고된 적이 없는 *Hippocampus trimaculatus* Leach, 1814로 동정되었다. 본 종은 기조수, 체륜수와 체색등이 한국에서 기록된 해마속의 다른 종들과 잘 구별되었다. 그리고 일본에서 기록되어 사용하고 있는 *H. takakurae*는 본 종의 동종이명으로 간주하고, 한국산 해마속 어류 6종에 대한 검색표를 제시하였다.