

First Record of a Carangid Fish Species, *Carangoides hedlandensis* (Perciformes: Carangidae), in Korean Waters

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A single specimen of *Carangoides hedlandensis* was collected from a set net installed at 25 m depth near Sangju Beach, Namhae, Gyeoksangnamdo, Korea. The morphology of the species was similar to that of *C. armatus*. *Carangoides hedlandensis* and *C. armatus* can be clearly distinguished by the number of gillrakers on the first arch: *C. hedlandensis* has 20-28 gillrakers whereas *C. armatus* has 30-39. Unlike other species, interorbital region of the head in *C. hedlandensis* is bumped. We suggest that *C. hedlandensis* should be added to lists of Korean fish fauna, and propose a Korean name, "Hok-jeon-gaeng-i" for this species.

Key words : *Carangoides hedlandensis*, Carangidae, First record, Sangju, Korea

Introduction

The bumpnose trevally, *Carangoides hedlandensis* (also known as the bumpnose kingfish or onion kingfish), is a relatively small species of the family Carangidae inhabiting inshore marine waters (Nakabo et al., 2001). This fish is a common species in the tropical and subtropical waters of the Indo-west Pacific region, ranging from South Africa to Japan and Samoa. Approximately 140 species belonging to 32 genera in Carangidae have been reported worldwide (Nelson, 2006). Species belonging to the family Carangidae have been examined in detail (Gushiken, 1983; Smith-Vaniz, 1984; Lin and Shao, 1999; Kim, 2000). Among the genera in the family, genus *Carangoides* (Bleeker, 1851) comprises 22 species worldwide. Five species of *Carangoides* have been reported: *C. ferdau* (Forsskål, 1775), *C. orthogrammus* (Jordan and Gilbert, 1882), and *C. oblongus* (Cuvier, 1833) from near Jeju Island, Korea (Yoo et al. 1995; Kim et al., 1999; Kim et al., 2008), and *C. dinema* (Bleeker, 1851) and *C. uii* (Wakiya, 1924) from coastal waters off of Busan, Korea (Mori, 1952; Park et al., 2007).

Here, we report that a single specimen of *C. hedlandensis* was collected from the southern coastal waters of Sangju Beach, Namhae, Korea, for the first

time. We describe the morphological characters of *C. hedlandensis*, which should be added to the list of Korean fish fauna, and we also provide classification keys to the genus.

Materials and Methods

A single specimen of *Carangoides hedlandensis* was collected from a set net near Sangju Beach, Namhae, Gyeoksangnamdo, Korea, on 26 October 2009. The specimen was photographed while fresh and then preserved in 10% formalin. We followed Gushiken (1983) for morphological terminology, counts, and measurements. Vertebral numbers were counted using soft X-ray photographs. The examined specimen was deposited at the Korean Ocean and Fisheries Institute (KOFI), Korea.

Materials examined

KOFI 20091028-01, 101.8 mm FL (94.1 mm SL, 111.8 mm TL), Sangju Namhae Gyeoksangnamdo, Korea, 26 October 2009, set net, 25 m depth, collected by Dr. Chung-Bae Kang.

Results and Discussion

Carangoides hedlandensis (Whitley, 1934)

(New Korean name: Hok-jeon-gaeng-i)

(Fig. 1; Table 1)

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Fig. 1. *Carangoides hedlandensis* (Whitley, 1934), KOFI 20091028-01, 94.1 mm SL, from Sangju, Namhae, Korea.

Olistus hedlandensis Whitley, 1934: 156, fig. 2 (Type locality: Port Hedland, north-western Australia).

Caranx (Citula) armatus (Ruppell); and *plumbeus* (Quoy et Gaimard): Wakiya, 1924: 361, pl. 20, fig. 3 (Japan and Formosa)

Caranx armata (Ruppell): Oshima, 1925: 396 (Formosa)

Citula plumbeus (Quey et Gaimard): Suzuki, 1962: 173 (Japan, etc).

Carangoides hedlandensis : Williams et al. 1980: 17, fig. 1 (Indo-Pacific); Gushiken, 1983: 241 (Japan); Gushiken in Masuda et al., 1984: 157, pl. 141-D,E (Japan); Smith-Vaniz, 1986: 17, fig. 1 (Indo-Pacific); Shen et al., 1993: 334, pl. 90-6 (Taiwan); Lin and Shao, 1999: 53, figs. 20, 21 (Taiwan); Smith-Vaniz 1999: 2702 (Western Central Pacific); Nakabo et al., 2001: 203 (Kuroshio Current).

Description

1. Counts and measurements are presented in Table 1

Body bilaterally compressed and deep; dorsal and ventral profiles equally convex. Head profile extremely steep, adults with a distinct break in contour “bump” in the interorbital region (Fig. 2). Eye diameter slightly larger than snout length. Snout blunt, subequal to eye. Maxilla extending to middle of eye. Both jaws subequal. Mouth cleft at level with lower margin of eye. Chord of curved part of lateral line longer than straight part, and straight part begins from the thirteenth soft ray of second dorsal fin. Scutes present on posterior three quarters of straight lateral line. Naked area of breast extending to pectoral fin base, and its hind margin more - or -less straightly backwards. First rays of second dorsal and

anal fin produced. Middle rays of dorsal and anal fins not elongated. The inner surface of the gillrakers densely armed with numerous short prickles (Fig. 3).

2. Color while fresh

Greenish-blue above with dusky tinge; shaded silvery gray below; about six, faint cross bands on side of body, the first band on edge of upper opercle and the last on peduncle; blackish blotch on upper margin of opercle and in the base of pectoral fin; yellowish on the second dorsal, pelvic, and caudal fin with dark edges; yellowish anal fin with pale edges (Fig. 4).

3. Color in formalin

Dark grayish brown dorsally, gradually paler ventrally; opercular blotch distinct; spinous dorsal fin, prolonged dorsal-fin rays, edges of caudal and pelvic fin blackish; pectoral and anal fin pale; cross bands on side of body faint.

4. Distribution

Widely distributed in tropical and subtropical waters of the Indo-West Pacific; Seychelles south to Durban, South Africa, and east to Japan, the Arafura Sea (Gushiken, 1983; Russell and Houston, 1989; Lin and Shao, 1999), Australia, and Samoa (Smith-Vaniz, 1986), the South China Sea (Gloerfelt-Tarp and Kailola, 1984; Randall and Lim, 2000), and the Southeast Sea of Korea (present study).

Remarks

Counts of the present specimen were consistent with previous descriptions of *Carangoides hedlandensis* (Table 1). *Carangoides hedlandensis* and *C. armatus* are closely related species in terms of morphology. Both are deep-bodied carangids with the breast bare of scales to the pectoral fin base and sometimes with elongate middle rays of the second dorsal and anal fins (characteristic of adult males) in addition to elongate first rays of both fins. The two species also overlap in counts of vertebrae (24), dorsal fin rays (19-22), anal fin rays (16-18), and pectoral fin rays (18 or 19). However, they can be clearly distinguished by the following characteristics: the number of gillrakers on the first arch of *C. hedlandensis* is 20-28 (6-11+14-17), whereas that of *C. armatus* is 30-39 (10-15+20-24) (Senou, 2000); the head profile of adult *C. hedlandensis* has a distinct break or “bump” in the interorbital region, which becomes more pronounced with increasing size (Gushiken, 1983; Lin and Shao, 1999; Smith-Vaniz, 1999); however, other species of *Carangoides*

Table 1. Comparison of morphological characters of *Carangoides hedlandensis* n, number

	Present study	Whitley (1934)	Suzuki (1962)	Gushiken (1983)	Lin and Shao (1999)
Number of specimens (mm)	n=1	n=1	n=3	n=13	n=5
Fork length (mm)	101.8	-	-	-	124-237
Standard length (mm)	94.1	160	200.5-216.0	115-225	
Counts					
Dorsal fin rays	VIII-I, 21	VIII-I, 20	VIII-I, 21	VIII-I, 21-22	VIII-I, 20-21
Pectoral fin rays	i, 19	-	i, 17	i, 18-19	i, 18
Pelvic fin rays	I, 5	-	-	-	-
Anal fin rays	II-I, 17	II-I, 16		II-I, 17	II-I, 17
Scutes	24	17	21-25	19-23	21-27
Curved lateral line scales	67	-	-	-	63-70
Straight lateral line scales	12	-	-	-	8-14
Gill rakers	8+16	?+13	-	6-8+15-17	7-9+16-19
Vertebrae	10+14	-	-	-	10+14
Measurements (% of SL)					
Body depth	59.2	53.8	49.5-59.5	50.8-51.8	
Head length	31.0	30.0	27.5-28.9	28.7-29.0	-
Measurements (% of HL)					
Snout length	28.1	29.2	27.0-28.7	29.1-29.2	-
Eye diameter	29.5	27.1	28.1-32.1	29.0-29.7	-
Upper jaw length	42.5	-	46.9-47.2	43.1-43.7	-
Interorbital width	33.2	-	36.8-38.8	33.8-34.1	-
Postorbital length	42.5	-	-	42.4-42.6	-
Length of largest dorsal spine	46.6	-	40.7-48.5	48.8-51.5	-
Height of second dorsal fin	112.3	-	208-232.6	188.7-208.3	-
Height of anal fin	72.3	-	175.4	138.9-188.7	-
Basal length of second dorsal fin	148.6	-	158.7-161.3	111.1-122.0	-
Basal length of anal fin	129.1	-	135.1-138.9	128.2-137.0	-
Length of pectoral fin	106.8	-	128.2-140.1	135.1	-
Length of pelvic fin	65.8	-	52.4-55.2	48.5-53.2	-
Length of upper caudal lobe	95.2	-	250.0	102.0-107.5	-
Length of caudal peduncle	32.9	-	29.2-29.3	-	-
Depth of caudal peduncle	17.5	-	18.5-19.0	16.2-18.2	-
Width of caudal peduncle	20.9	-	-	18.0-21.6	-

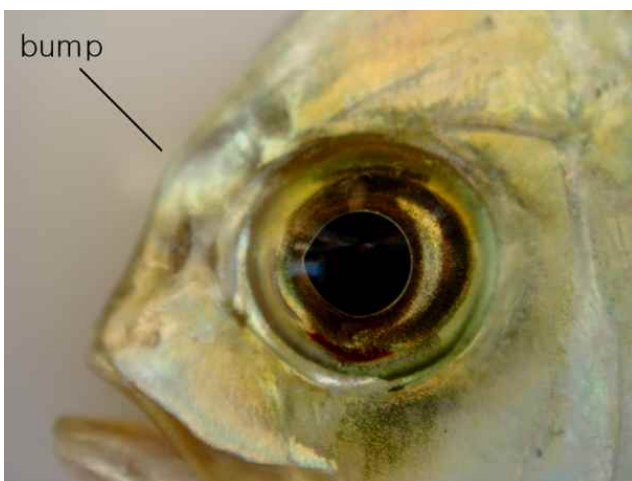


Fig. 2. Head profile.

do not exhibit this bump. Although the genus *Carangoides* is morphologically very similar to the genus *Caranx* Lacepede, 1801, the former has an



Fig. 3. First gill arch.

underdeveloped adipose eyelid compared to the latter (Kim et al., 1999). We suggest a new Korean name "Hok-jeon-gaeng-i" for *C. hedlandensis*.

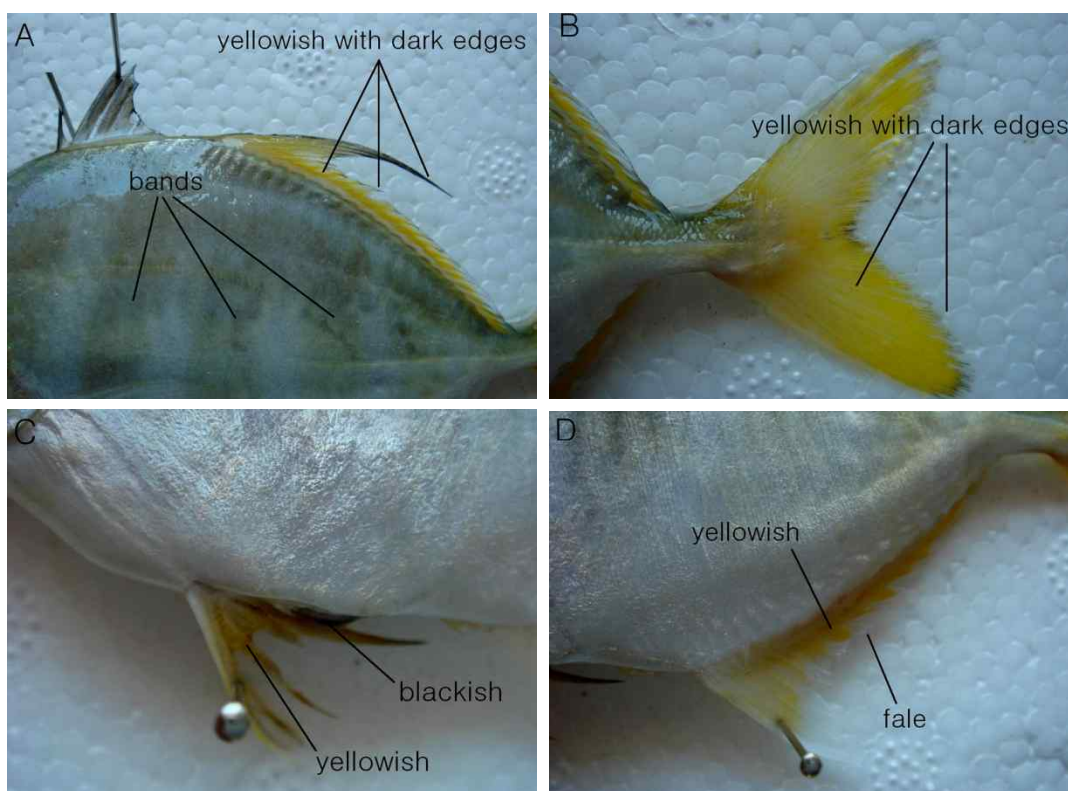


Fig. 4. Color pattern. A; Dorsal fin and body, B; Caudal fin, C; Pelvic fin, D; Anal fin.

Key to species of the genus *Carangoides* from Korea: Based on the present study and Lin and Shao (1999), Smith-Vaniz (1986), Gushiken (1983, 1984).

- 1a. Naked area of breast separated from naked base of pectoral fin by a broad band of scales ----- 2
- 1b. Naked area of breast uninterrupted to naked base of pectoral fin ----- 5
- 2a. Dorsal-fin rays 25-34; anal-fin rays 21-27 ----- 3
- 2b. Dorsal-fin rays 17-23; anal-fin rays 15-19 ----- 4
- 3a. Six distinct dusky cross bands on body sides, without yellow dots when alive, snout length almost equal to eye diameter -----
----- *Carangoides ferdau*
- 3b. Dark band usually absent on body, elliptical yellow spots present mostly below lateral line, snout length longer than eye diameter -----
----- *Carangoides orthogrammus*
- 4a. Straight lateral line slightly longer than curved part, row of indistinct black blotches among second dorsal fin base, scutes 37-45 -----
----- *Carangoides oblongus*
- 4b. Straight lateral line slightly shorter than curved part, row of black blotches along base of second dorsal fin, scutes 23-33 ----- *Carangoides*

dinema

- 5a. Head profile with a break or “bump” in front of eye (in adults), central soft rays of dorsal and anal fins elongated in mature males, eye diameter about equal to, larger than snout length -----
----- *Canrangoides hedlandensis*
- 5b. Head profile without a break in front of eye in adults, central soft rays of dorsal and anal fins not elongated in mature males, eye diameter shorter than snout length ----- *Canrangoides uii*

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