

First Record of the Banded Sergeant, *Abudefduf septemfasciatus* (Perciformes: Pomacentridae) from Jeju Island, Korea

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ABSTRACT Three specimens of *Abudefduf septemfasciatus* were collected firstly from tidal pools on the southern and northern coasts of Jeju Island, Korea in August 2015. This species is characterized by black blotches on the upper origin of the pectoral fin, upper caudal peduncle and a dorsal fin between the second and fourth spines, predorsal scales beyond to above the middle of the eye, 12~13 soft dorsal and anal fin rays, and 20 lateral-line scales. This species is distinguishable from *Abudefduf sordidus* by soft dorsal and anal fin rays, location of caudal peduncle blotch, and location of the dorsal fin blotch. The newly proposed Korean name is “Il-gop-jul-ja-dom”.

Key words: First record, *Abudefduf septemfasciatus*, Pomacentridae, tidal pool, Jeju Island

INTRODUCTION

The family Pomacentridae (Perciformes) is one of the largest fish groups, comprising 377 species worldwide (Allen and Erdmann, 2012), including 17 species in Korea (Kim *et al.*, 2005; Song *et al.*, 2014). Most species of Pomacentridae inhabit coral reefs, mangroves, and seagrass beds of the west and central Indo-Pacific regions (Allen, 1991; Nelson, 2006; Allen and Erdmann, 2012). A total of 20 species in the genus *Abudefduf* Forsskål, 1775, have been recognized worldwide, but only five species have been reported in Korea (Kim *et al.*, 2005): *A. bengalensis* (Bloch, 1787), *A. notatus* (Day, 1870), *A. sexfasciatus* (Lacepède, 1801), *A. sordidus* (Forsskål, 1775), and *A. vaigiensis* (Quoy and Gaimard, 1825). This genus is characterized by a compressed body with five or more lateral bands, 13 dorsal fin spines, and a smooth posterior margin of the preopercle (Aonuma *et al.*, 2013).

In this study, three specimens of the genus *Abudefduf*, collected from tidal pools on Jeju Island, were identified as *A. septemfasciatus* using molecular methods. We provide morphological description of these specimens.

MATERIALS AND METHODS

Three specimens collected from tidal pools on the southern and northern coasts of Jeju Island, with hand nets, in August 2015 were fixed as whole-body specimens in 99% ethanol. Counts and measurements were made according to Hubbs and Lagler (2004). The fin rays and lateral-line scales were counted under a stereomicroscope (Leica M205C, Germany). The specimens were deposited at the Biodiversity Dynamics Team (BDT) of the National Marine Biodiversity Institute of Korea.

The specimens were identified at the molecular level with a universal primer set that amplifies a fragment of the mitochondrial DNA cytochrome oxidase subunit I gene (COI) (Ward *et al.*, 2005). Genomic DNA extraction and polymerase chain reaction (PCR) were performed according to Ivanova *et al.* (2007). The nucleotide sequences were deposited in the DDBJ/EMBL/GenBank databases (accession numbers: KT879787-879789). The sequences were aligned with ClustalW (Thompson *et al.*, 1994) in BioEdit ver. 7 (Hall, 1999). The sequences of *A. sordidus* (JF434711, JQ431399) and *A. septemfasciatus* (JQ431396, KF009558, KJ967810) from the National Center for Biological Information (NCBI) database were used for sequence comparisons. The genetic distances were calcu-

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lated with MEGA 6 (Tamura *et al.*, 2013).

***Abudefduf septemfasciatus* (Cuvier, 1830)**

(New Korean name: Il-gop-jul-ja-dom)

(Fig. 1; Table 1)

Glyphisodon septemfasciatus Cuvier in Cuvier and Valenciennes, 1830: 463 (type locality: Mascarenes, southwestern Indian Ocean).

Abudefduf septemfasciatus: Allen and Erdmann, 2012: 563; Aonuma *et al.*, 2013: 1049.

Materials examined. BDT-196-197, 2 specimens, 24.3~32.7 mm in standard length (SL), Aerae (126°23'49"E, 33°14'23"N), Seogwipo, Jeju Island, Korea, hand net, 26 August 2015; BDT-198, 1 specimen, 22.9 mm SL, Oedo (126°25'25"E, 33°29'42"N), Jeju, Jeju Island, Korea, hand net, 24 August 2015.

Description. Counts are shown in Table 1. Proportions

as % SL: body depth 48.9~54.1 (51.1); head length 35.5~40.6 (38.0); snout length 9.6~11.1 (10.3); postorbital length of the head 13.6~14.8 (14.3); suborbital width 1.7~4.6 (2.8); interorbital width 10.4~13.1 (11.7); eye diameter 12.3~13.5 (13.0); upper jaw length 8.2~10.5 (9.1); predorsal length 37.9~42.4 (40.7); prepelvic length 37.9~47.3 (42.2); preanal length 68.1~72.4 (70.6); caudal peduncle depth 16.9~17.5 (17.2); pectoral fin length 23.9~27.2 (25.0); pelvic fin length 32.9~35.4 (34.2).

Body oval, compressed, and moderately deep. Head moderate and eyes large. Snout short and slightly pointed. Mouth small and terminal; posterior margin of the maxilla reaches slightly beyond the anterior margin of the eye. Interorbital region slightly concave. Two pairs of nostrils present. Conical teeth present on both jaws. Sensory pores well developed around eye. Posterior margins of preopercle and opercle smooth. Opercle ending posteriorly in a small flat spine, its tip slightly obtuse. Upper



Fig. 1. *Abudefduf septemfasciatus*, BDT-196, 32.7 mm SL.

Table 1. Comparison of meristic characters of *Abudefduf septemfasciatus* and *Abudefduf sordidus*

	<i>Abudefduf septemfasciatus</i>			<i>Abudefduf sordidus</i>
	Present study	Cuvier (1830)	Aonuma <i>et al.</i> (2013)	Present study
Number of specimens	3	–	–	2
Standard length (mm)	22.9~32.7	–	–	27.4~36.9
Dorsal fin rays	XIII, 12~13	XIII, 13	XIII, 12~14	XIII, 15~16
Anal fin rays	II, 12~13	II, 12	II, 11~13	II, 15
Pectoral fin rays	17~18	–	17~19	19
Pelvic fin rays	I, 5	–	–	I, 5
Caudal fin rays	8+7	–	–	8+7
Lateral line scales	20+8~9	–	20~22+8~10	20~21+7

and lower procurent caudal rays not spinous. Head and body covered with ctenoid scales, including cheek. Predorsal scales beyond to above the middle of the eye. Lateral-line scales tubular. Lateral line incomplete, scales interrupted below between third and fourth soft dorsal fin ray. Posterior margin of soft portion of dorsal fin slightly rounded. Posterior tip of pelvic fin beyond origin of first anal fin spine.

Coloration. When fresh, the head and body greenish white, darker dorsally than ventrally. Seven broad and diffuse black bars on lateral body. Dark blotches on upper origin of pectoral fin, upper caudal peduncle, and spinous portion of dorsal fin between second and fourth spines above third black bar (Fig. 2A). All fins semi-transparent and white, except pelvic and anal fins, which yellowish distally. After alcohol fixation, head and body whitish gray with seven distinct light black bars. All fins whitish, with tiny melanophores on the membranes.

Distribution. *Abudefduf septemfasciatus* is distributed in the east Africa, and the western Indian Ocean to eastern Australia (Allen and Erdmann, 2012), the Maldives (MRS, 1997), the Indo-Pacific, including southern Japan (Aonuma *et al.*, 2013). In Korea, it occurs on the northern and southern coasts of Jeju Island (present study).

Remarks. Morphologically, the present specimens can be assigned in the genus *Abudefduf* based on the following characters: 13 dorsal fin spines, posterior margin of the preopercle smooth, and body with numerous lateral bands (Aonuma *et al.*, 2013). Among *Abudefduf* species, these specimens are most similar to *A. sordidus* in that they have a dark blotch on the upper caudal peduncle. However, they differ from *A. sordidus* in having fewer soft dorsal and anal fin rays (12~13 and 12~13, respectively, in *A. septemfasciatus* vs. 15~16 and 15, respectively, in *A. sordidus*) (Table 1). They also correspond to the original description of *A. septemfasciatus* in their greenish body coloration, seven dark bands on the body, and the dorsal and anal fin counts (Cuvier, 1830; Table 1). Three specimens of the genus *Abudefduf* collected from tidal pools on Jeju Island had identical mtDNA COI sequences and were more closely related to that of *A. septemfasciatus* ($d=0.000\sim0.002$) than to that of *A. sordidus* ($d=0.050\sim0.054$) (Table 2). Therefore, we identified these three specimens as *A. septemfasciatus* based on both morphological and molecular analyses. Interestingly, several references state that *A. septemfasciatus* has no black blotch on the upper caudal peduncle (MRS, 1997; Allen and Erdmann, 2012; Aonuma *et al.*, 2013), but the present

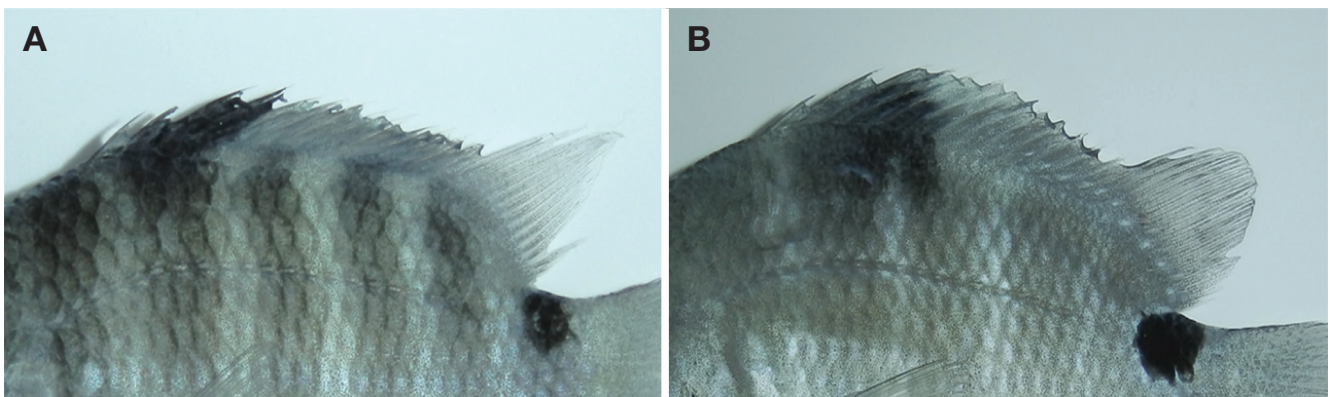


Fig. 2. Location of blotches on the dorsal fin membranes and upper caudal peduncle. (A) *Abudefduf septemfasciatus*, BDT-196; (B) *Abudefduf sordidus*, BDT-195.

Table 2. Genetic divergence of *Abudefduf septemfasciatus* and *Abudefduf sordidus*

	1	2	3	4	5	6	7
1 <i>Abudefduf septemfasciatus</i> (BDT-196)							
2 <i>Abudefduf septemfasciatus</i> (BDT-197)	0.002						
3 <i>Abudefduf septemfasciatus</i> (BDT-198)	0.002	0.000					
4 <i>Abudefduf septemfasciatus</i> (JQ431396)	0.000	0.002	0.002				
5 <i>Abudefduf septemfasciatus</i> (KF009558)	0.000	0.002	0.002	0.000			
6 <i>Abudefduf septemfasciatus</i> (KJ967810)	0.000	0.002	0.002	0.000	0.000		
7 <i>Abudefduf sordidus</i> (JF434711)	0.050	0.052	0.052	0.050	0.050	0.050	
8 <i>Abudefduf sordidus</i> (JQ431399)	0.052	0.054	0.054	0.052	0.052	0.052	0.002

specimens have a distinct black blotch on the upper caudal peduncle (Fig. 2A), which is similar to *A. sordidus*, so this seems to be an ontogenic, regional, or environmental variation. We also found newly characters that distinguish *A. septemfasciatus* and *A. sordidus*: location of the caudal peduncle blotch (anterior margin of the blotch reaches above the last or second last soft dorsal fin ray in *A. septemfasciatus* vs. beyond above the third last soft dorsal fin ray in *A. sordidus*) and the location of the dorsal fin blotch (above the third black bar on the body in *A. septemfasciatus* vs. above the second and third black bars on the body in *A. sordidus*) (Fig. 2). We propose the new Korean name, “Il-gop-jul-ja-dom”, for *A. septemfasciatus*.

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한국산 자리돔과(Pomacentridae) 어류 1미기록종, *Abudefduf septemfasciatus*

권혁준 · 박진순 · 김혜선 · 배한나

국립해양생물자원관

요 약 : 2015년 8월, 우리나라 제주도 남부 및 북부 연안 조수웅덩이에서 *Abudefduf septemfasciatus* 3개체가 처음 채집되었다. 본 종은 가슴지느러미 기점 위, 꼬리자루 위 및 2번째와 4번째 등지느러미 극조 사이에 검은 반점이 있고 등지느러미 전방 비늘은 눈의 중앙을 지나며, 등지느러미 및 뒷지느러미 연조는 12~13개, 측선비늘은 20개이다. 본 종은 줄자돔과 등지느러미 및 뒷지느러미 연조수, 꼬리자루 반점 위치 및 등지느러미 반점 위치에서 차이를 보인다. 본 종의 새로운 국명으로 '일곱줄자돔'을 제안한다.

찾아보기 낱말 : 미기록종, *Abudefduf septemfasciatus*, 자리돔과, 조수웅덩이, 제주도