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Author(s)	小枝, 圭太; 小泉, 翔平; 畑, 晴陵
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First records of the Razorback Scabbardfish, *Assurger anzac* (Trichiuridae: Perciformes), from southern Japan

Keita Koeda^{1,*}, Syohei Koizumi², and Harutaka Hata³

¹National Museum of Marine Biology & Aquarium, 2 Houwan Road, Checheng, Pingtung 94450, Taiwan

²Graduate School of Engineering and Science, University of the Ryukyus,
1 Senbaru, Nishihara, Okinawa 903-0213, Japan

³The United Graduate School of Agricultural Sciences, Kagoshima University,
1-21-24 Korimoto, Kagoshima 890-0065, Japan

*Corresponding author. Tel: +866-966-543-754; E-mail: hatampo@gmail.com

Abstract. Specimens of the razorback scabbardfish *Assurger anzac* (963–2200 mm standard length) were collected from off Okinawa and Daito islands, and Uchinoura Bay in southern Kyushu. The species had previously been recorded only from the mainland of Japan. In addition, the morphology of this species is poorly known especially in small individuals, and thus detailed morphology of the specimens collected from southern Japan are described. The present specimens show that this species is widely distributed in southern Japan.

Introduction

The genus *Assurger* contains a single species, *A. anzac* (Alexander, 1917) “Nagayume-tachimodoki” (Nakamura & Parin 1993, 2001). This species in the family Trichiuridae is characterized by having an extremely elongated body, a forked caudal fin, a strongly reduced pelvic fin, more than 100 dorsal-fin elements, a prominent sagittal crest on its head profile, and lacking a notch between spinous and soft parts of the dorsal fin (Nakamura & Parin 1993, 2001). Although this species is widely known from all over the world (Nakamura & Parin 1993, 2001), only a few records exist, and the morphology of the species is still poorly described. These previous records are mostly based on large adult individuals sized at ca. 2 m in standard length, and details of smaller individuals are particularly poorly known. In addition, the distributional records of the species in Japan are restricted to mainland Japan (Nakabo & Doiuchi 2013; Koeda 2018).

In recent years, two adult specimens of *Assurger anzac* were collected off Okinawa and Daito islands, and a single small specimen was collected from Uchinoura Bay in southern Kyushu. The present study describes the morphology of this species in

detail. This study represents the first record of *A. anzac* from Okinawa and Daito islands.

Materials and Methods

Counts and measurements follow Sakiyama et al. (2011). Standard, total and head lengths are abbreviated as SL, TL and HL, respectively. Measurements were made to the nearest 0.1 mm with digital calipers, except for SL, TL, preanal, dorsal-fin base, pre-anal-fin, anal-fin base, and tail lengths, which were made to the nearest 1 mm with measures or calipers. The description is based on the present specimens. The examined materials are deposited in the Kagoshima University Museum, Japan (KAUM).

Results and Discussion

Assurger anzac (Alexander, 1917)

Standard Japanese name: Nagayume-tachimodoki (Figs. 1, 2)

Material examined. KAUM–I. 70647, 2200 mm SL, 2250 mm TL, southeast of Okinawa-jima Island (26°07'N, 127°52'E), Okinawa Prefecture, Japan, 14 November 2013, landed at Umino Fish Landing Port, purchased by S. Koizumi; KAUM–I. 97195, 2056.0 mm SL, 2100.0 mm TL, west of the Daito Islands (26°17'N, 130°01'E), Okinawa Prefecture, Japan, 4 December 2016, landed at Awase Fish Landing Port, collected by M. Tanahara, purchased by K. Koeda, M. Nishimura & T. Uejo; KAUM–I. 98082, 963.0 mm SL, 977.0 mm TL, Uchinoura Bay (31°18'N, 131°06'E), Kimotsuki, Kagoshima Prefecture, Japan, 22 February 2017, landed at Uchinoura Fish Landing Port, collected by No. 3 Chidori-maru, obtained by H. Hata, K. Koeda & K. Kawama.

Description. Counts and measurements are



Fig. 1. Fresh specimens of *Assurger anzac* collected from southern Japan. Top: KAUM-I. 70647, 2200 mm SL, off Okinawa-jima Island; middle: KAUM-I. 97195, 2056 mm SL, west of the Daito Islands; bottom: KAUM-I. 98082, 963 mm SL, Uchinoura Bay.

図1. 南日本から得られたナガユメタチモドキ. 上: KAUM-I. 70647, 2200 mm SL, 沖縄島沖; 中: KAUM-I. 97195, 2056 mm SL, 大東諸島西方; 下: KAUM-I. 98082, 963 mm SL, 内之浦湾.



Fig. 2. Head of *Assurger anzac* collected from southern Japan. Top: KAUM-I. 97195, 2056 mm SL, west of the Daito Islands; bottom: KAUM-I. 98082, 963 mm SL, Uchinoura Bay.

図2. 南日本から得られたナガユメタチモドキの頭部. 上: KAUM-I. 97195, 2056 mm SL, 大東諸島西方; 下: KAUM-I. 98082, 963 mm SL, 内之浦湾.

shown in Table 1. Body extremely elongate, strongly compressed, ribbon-like, tapering to point posteriorly with small forked caudal fin. Head pointed; profile with a prominent sagittal crest; single nasal opening on each side of head. Mouth large; jaws not protractile; lower jaw extending beyond distal

tip of upper jaw. Teeth strong, two pairs (one pair in KAUM-I. 97195) of fang-like teeth in anterior part of upper and lower jaws. Anus located anterior to center of body. Dorsal fin low long, beginning shortly behind eye, anterior spinous and posterior soft parts continuous, former shorter than latter. Anal

Table 1. Counts and measurements of *Assurger anzac* collected from southern Japanese waters. Percentages of standard length given in parentheses.

表 1. 南日本で採集されたナガユメタチモドキの計数・計測値. 括弧内は各計測値の標準体長比を示す.

	KAUM-I. 70647 Okinawa-jima Island 沖縄島	KAUM-I. 97195 Daito Islands 大東諸島	KAUM-I. 98082 Uchinoura Bay 内之浦湾
Measurements (mm) 計測値			
Standard length 標準体長	2200	2056	963
Total length 全長	2250 (102.3)	2100 (102.1)	977 (101.5)
Pre-anal length 肛門全長	920 (41.8)	860 (41.8)	393 (40.8)
Head length 頭長	193.8 (8.8)	177.6 (8.6)	84.7 (8.8)
Snout length 吻長	78.4 (3.6)	71.1 (3.5)	32.4 (3.4)
Postorbital length 眼の後縁から鰓蓋後端までの長さ	89.0 (4.0)	82.4 (4.0)	40.5 (4.2)
Preopercle length 眼の後縁から前鰓蓋骨後端までの長さ	31.9 (1.4)	30.4 (1.5)	14.1 (1.5)
Upper-jaw length 上顎長	67.6 (3.1)	58.8 (2.9)	29.6 (3.1)
Body depth at pectoral-fin base 胸鰭基部での体高	103.9 (4.7)	88.9 (4.3)	32.8 (3.4)
Body width at pectoral-fin base 胸鰭基部での体幅	23.9 (1.1)	20.3 (1.0)	8.9 (0.9)
Body depth at anus 肛門での体高	90.4 (4.1)	82.8 (4.0)	27.5 (2.9)
Body width at anus 肛門での体幅	20.8 (0.9)	16.8 (0.8)	6.5 (0.7)
First dorsal-spine length 背鰭第 1 棘長	14.1 (0.6)	damaged	damaged
Pre-dorsal-fin length 背鰭前長	138.1 (6.3)	124.3 (6.0)	54.5 (5.7)
Dorsal-fin base length 背鰭基底長	2080 (94.5)	1940 (94.4)	902 (93.7)
Orbit diameter 眼窩径	26.1 (1.2)	25.5 (1.2)	12.2 (1.3)
Suborbital width 眼窩後縁の高さ	15.1 (0.7)	13.5 (0.7)	4.1 (0.4)
Interorbital width 両眼間隔	19.4 (0.9)	20.7 (1.0)	7.1 (0.7)
Depth above lateral line at anus 肛門上の側線から背縁までの高さ	50.2 (2.3)	46.2 (2.2)	14.3 (1.5)
Depth below lateral line at anus 肛門上の側線までの高さ	40.6 (1.8)	39.1 (1.9)	13.0 (1.4)
Pre-pectoral-fin length 胸鰭前長	216.5 (9.8)	216.0 (10.5)	93.6 (9.7)
Pectoral-fin base 胸鰭基底長	15.5 (0.7)	14.6 (0.7)	5.5 (0.6)
Length of pectoral fin 胸鰭長	80.5 (3.7)	79.3 (3.9)	28.0 (2.9)
Prepelvic-fin length 腹鰭前長	268.0 (12.2)	269.0 (13.1)	114.2 (11.9)
Length of pelvic fin 腹鰭長	12.9 (0.6)	14.3 (0.7)	10.6 (1.1)
Pre-anal-fin length 臀鰭前長	950 (43.2)	880 (42.8)	402 (41.7)
Anal-fin base length 臀鰭基底長	1238 (56.3)	1180 (57.4)	550 (57.1)
Depth of caudal peduncle 尾柄高	4.4 (0.2)	4.3 (0.2)	2.1 (0.2)
Length of caudal peduncle 尾柄長	18.3 (0.8)	17.4 (0.8)	11.2 (1.2)
Tail length 尾部長	1274 (57.9)	1206 (58.7)	560.2 (58.2)
Counts 計数值			
Dorsal-fin elements 背鰭条数	121	120	119
Dorsal-fin soft ray opposite first anal spine 臀鰭第 1 棘直上の背鰭軟条	42nd	42nd	41st
Pectoral-fin rays 胸鰭条数	12	12	12
Pelvic-fin rays 腹鰭条数	I	I	I
External anal-fin rays 臀鰭条数	"I, 22"	"I, 22"	"I, 26"
Caudal-fin rays 尾鰭条数	8 + 7 = 15	8 + 7 = 15	8 + 7 = 15
Gill rakers 鰓耙数	3 + 10 = 13	N/A	2 + 6 = 8

fin low, beginning shortly behind anus. Pectoral fins short, low in position. Pelvic fins strongly reduced to scale-like spine. Lateral line single, mostly through center of body side. Scales absent. Color generally silver, and faintly dusky at head and caudal-peduncle when fresh.

Distribution. *Assurger anzac* is widely

distributed all over the world: e.g. off Puerto Rico, Uruguay and at Walvis Ridge in the Atlantic, off Western Australia in the Indian Ocean, and in the Pacific off Japan, Korea, New Guinea, Midway Island, California, Sala y Gomez Ridge, and Nazcaand (Nakamura & Parin, 1993, 2001; Nakabo & Doiuchi, 2013). In Japan, this species had been

recorded from Honshu and Shikoku: Tsugaru Strait in Aomori Prefecture, Iwaizumi in Iwate Prefecture, Sagami Bay, Irozaki in Shizuoka Prefecture, Kumano Sea, Kii Chanel, Tosa Bay, and from the Sea of Japan in Yamaguchi Prefecture (Nakabo & Doiuchi, 2013; Ikeda & Nakabo, 2015), and here is newly recorded from southern Kyushu, Okinawa-jima Island, and the Daito Islands.

Remarks. Characters of the present specimens agree with the diagnoses of *Assurger anzac* given by both Nakamura & Parin (1993; 2001) and Nakabo & Doiuchi (2013): body extremely elongated, caudal fin forked, pelvic fin strongly reduced, 119–121 dorsal-fin elements, head profile with a prominent sagittal crest, and notch between spinous and soft parts of dorsal fin absent.

In our comparison of measurement characters between three specimens from southern Japan indicated that the body depth of the smallest specimen (KAUM–I. 98082, 963.0 mm SL) is remarkably lower than the other two large specimens (KAUM–I. 70647, 2200 mm SL and KAUM–I. 97195, 2056.0 mm SL) (Table 1). This difference indicates that the body depth of the species grows higher with their body growth.

Matsubara (1955) reported the species from Tosa Bay. His report is presumably the first record of the species from Japan. After that, sporadic articles reported this species from Japan from Aomori Prefecture, west to Yamaguchi Prefecture, and south to Uchinoura Bay in southern Kyushu (Shiogaki et al. 2004; Iwate Fisheries Technology Center 2006; Kamide et al. 2011; Yoshida 2012; Ikeda & Nakabo 2015; Koeda 2018). Therefore, the present specimens from Okinawa-jima Island, and the Daito Islands represent the first records of *A. anzac* from each locality, and indicate that the species is widely distributed in southern Japanese waters.

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日本海域の南部広域から得られたナグユメタチモドキ *Assurger anzac*

小枝圭太^{1*}・小泉翔平²・畑晴陵³

¹ 〒277-8564 千葉県柏市柏の葉 5-1-5 東京大学
大気海洋研究所

² 〒294-0301 千葉県館山市香 11 お茶の水女子
大学湾岸生物教育研究センター

¹94450 屏東縣車城鄉後灣村後灣路 2 號 台湾
国立海洋生物博物館

² 〒903-0213 沖縄県中頭郡西原町千原 1 番地
琉球大学大学院理工学研究科

³ 〒890-0065 鹿児島市郡元 1-21-24 鹿児島大
学大学院連合農学研究科

* 通信著者. 電話: +866-966-543-754; E-mail:
hatampo@gmail.com

要旨. 沖縄島南東沖, 大東諸島西沖, 鹿児島県内之浦湾においてそれぞれ1個体のナグユメタチモドキ *Assurger anzac* (標準体長 963–2200 mm) が採集された. 本種はこれまで日本海域において本州および四国, 九州の太平洋・日本海沿岸からのみ記録されているとともに, 報告の多くは体長約 2 m の大型個体に限られ, 小型個体に関する知見は少ない. 本研究で得られた標本から, 本種が日本海域の南部にも広く分布することが示されるとともに, 小型個体の形態の詳細が明らかになった.