

## First record of the Sculpin scorpionfish *Scorpaenopsis cotticeps* Fowler, 1938 (Teleostei: Scorpaenidae) from Taiwanese waters

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### Abstract

The Sculpin scorpionfish *Scorpaenopsis cotticeps* is widely distributed in the Western and Indo-Pacific but, until this year, never observed in Taiwanese waters. Herein I have described two individuals collected from Chikan, Penghu, Taiwan, one of which being the largest known specimen of this species ever recorded: 80.31 mm standard length.

**Key words:** biodiversity, fish, ichthyology, scorpionfish, Taiwan

### Introduction

The genus *Scorpaenopsis* Heckel, 1837 is distinguished from other scorpaenids (scorpionfish) in possessing 12 dorsal fin spines and three or more suborbital spines; palatine teeth are lacking, and three lineages have been described (Randall & Eschmeyer, 2001): the (1) humpback lineage, (2) large, long-snouted lineage, and (3) small, short-snouted lineage. Nine valid species are known from the latter (Randall & Eschmeyer, 2001; Motomura & Causse, 2011; Fricke *et al.*, 2013): *S. altirostris* Gilbert, 1905, *S. brevifrons* Eschmeyer & Randall, 1975, *S. cotticeps* Fowler, 1938, *S. crenulate* Motomura & Causse, 2011, *S. gilchristi* Smith, 1957, *S. pluralis* Randall

& Eschmeyer, 2001, *S. pusilla* Randall & Eschmeyer, 2001, *S. rubrimarginatus* Fricke, Durville & Mulochau, 2013, *S. vittapinna* Randall & Eschmeyer, 2001. *S. cotticeps* (Sculpin scorpionfish) is distinct in having a relatively small body size, a short snout, and its upper opercular spine is divided into two or more points (see details on this in the Discussion). It is widely distributed, and the 22 specimens have been described from Japan, the Philippines, the South China Sea, Queensland (Australia), the Seychelles, Somalia, and the Gulf of Aden (Randall & Eschmeyer, 2001). However, it has never before been recorded in Taiwan (Chen, 1981; Shao *et al.*, 2008; Shen & Wu 2011; Koeda & Ho 2019). On 11 July 2021, two

small scorpionfish specimens were collected from the by-catch of the Silver stripe round herring (*Spratelloides gracilis* Temminck & Schlegel, 1846) fishery at Chikan, Penghu, Taiwan from a depth range of 8–25 m. A detailed examination of these first Taiwanese specimens of a rare species *Scorpaenopsis cotticeps* has been presented herein.

## Methods and materials

Counts, measurements (including morphometrics), and terminology of the spines on the head generally followed Randall and Eschmeyer (2001). The last rays of the dorsal and anal fins were counted as a single ray, and data were standardized to length and presented as standard length (SL). Measurements were taken by digital calipers (to nearest 0.01 mm), and specimens were deposited in the Pisces Collection of Taiwan's National Museum of Marine Biology and Aquarium (NMMBA).

## Results

### *Scorpaenopsis cotticeps* Fowler, 1938

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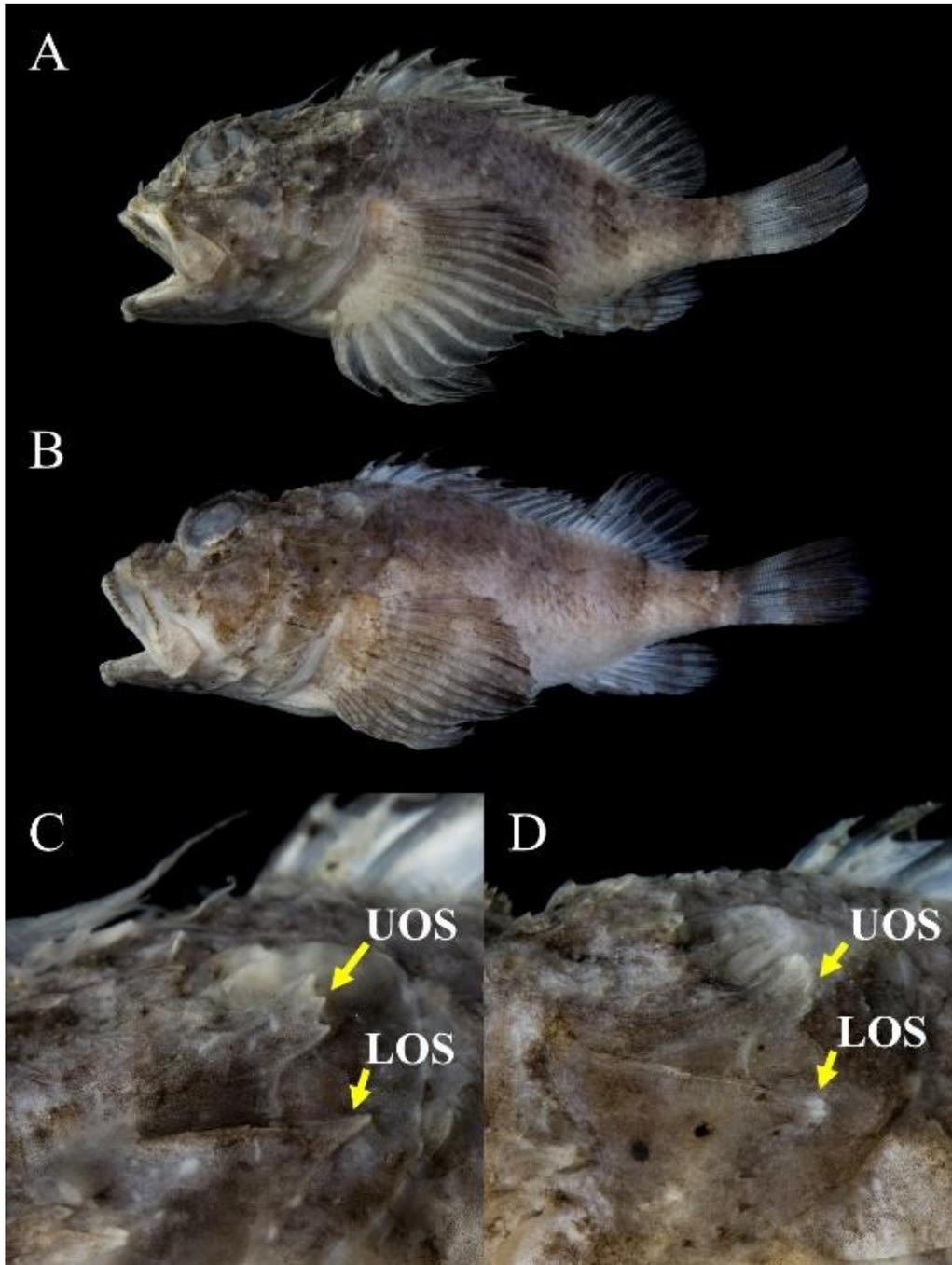
Figs. 1-2, Table 1

**Material examined.** NMMB-P035560, two individuals, 73.44–80.31 mm SL, Chikan, Penghu, Taiwan, 8–25 m, 11 July 2021, collected by H.-C. Ho.

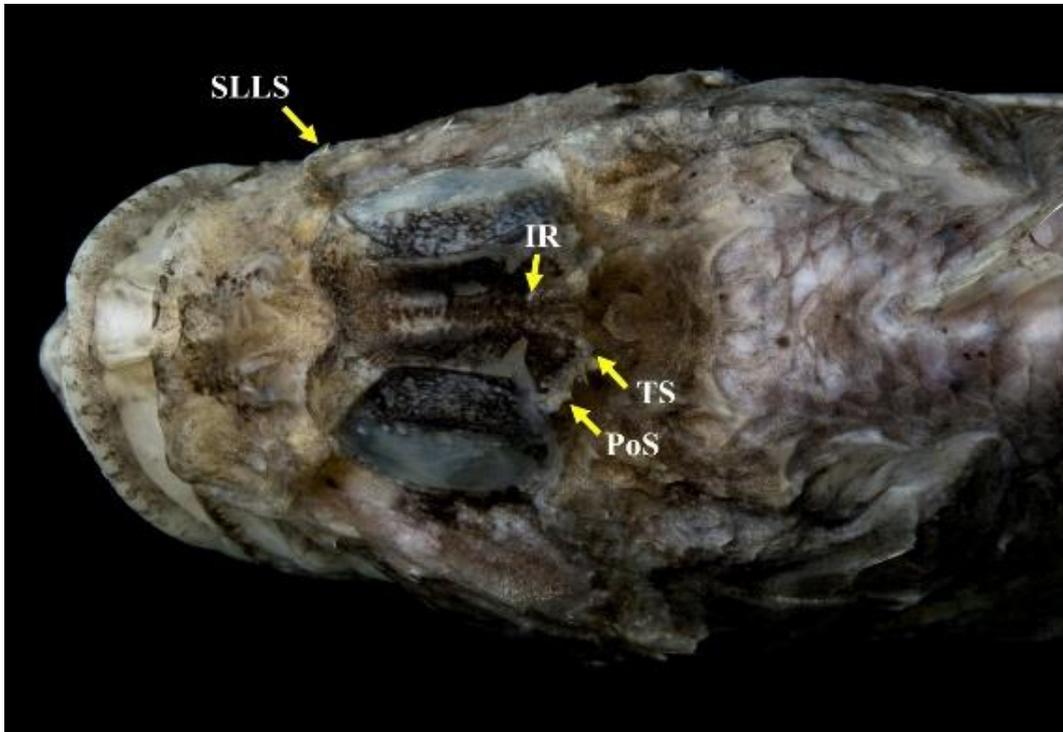
**Description.** Selected meristic and morphometric data were shown in Table 1.

Dorsal fin continuous; fourth or fifth spines longest; membrane of spinous portion of dorsal fin moderately notched; all soft rays branched; second ray longest; last soft ray connects to caudal peduncle with membrane (Table 1). Pectoral fin rounded; both side of rays was 17; second to fifth rays branched; the first ray and the remaining lower rays unbranched and thin; eighth ray longest. Pelvic fin elements I, 5; all soft rays of pelvic fin branched; third soft ray longest; last soft ray connects to abdomen with membrane. All anal fin rays branched; second soft ray longest; absence of membrane between last soft ray and caudal peduncle. Caudal fin with 13 rays; posterior margin slightly rounded (Table 1).

Body moderately compressed; absence to several small skin flaps on dorsal portion of body; ctenoid scales on lateral body surface, becoming cycloid scales on gular abdomen; pectoral fin base without scales. Head moderately large; postorbital to preopercular region without scales; cheek covered by embedded cycloid scales; snout, suborbital, and interorbital regions naked; supraocular tentacle absent or distinct. Mouth moderately large, slightly oblique, and with posterior margin of maxilla reaching middle level of orbit; maxilla without scales; upper and lower jaws with a band of villiform teeth; vomer with a V-shaped tooth patch, formed by villiform teeth; palatine without teeth; lower jaw with a



**Fig. 1.** Photographs of the specimens of *Scorpaenopsis cotticeps* from Chikan, Penghu, Taiwan. Preserved specimens (A) and portion of opercle (C) of NMMB-P35560-1 (73.44 mm SL). Preserved specimens (B) and portion of opercle (D) of NMMB-P35560-2 (80.31 mm SL). UOS: upper opercular spine. LOS: lower opercular spine.



**Fig. 2.** Dorsal view of the head of the *Scorpaenopsis cotticeps* (specimen NMMB-P35560-2; 80.31 mm SL). IR: interorbital ridge. PoS: postocular spine. SLLS: the spine on lacrimal lateral surface. TS: tympanic spine.

moderate symphyseal knob; chin with several small fresh flaps.

Lateral surfaces of lacrimal with a backward spine (Fig. 2); lacrimal ridge present; anterior lacrimal spine simple and forward; posterior lacrimal spine simple and backward. Suborbital pit absent. Preopercle with five spines. Upper opercular spine divided into three or more points; lower opercular spine simple or divided into three points (Fig. 1C-D). Spines on skull mostly well developed; median interorbital ridge absent; interorbital ridges posteriorly joining base of tympanic spines (Fig. 2); postocular

spines joined by a low ridge to tympanic spines (Fig. 2); coronal and pre-tympanic spines absent; interorbital space shallow; occipital pit moderately deep.

**Coloration.** Two preserved specimens are mainly brownish to pale (Fig. 1A-B). Head, upper half of body, and caudal peduncle brownish. Underside of mandible grayish. Abdomen pale. Several blackish spots on cheek to opercle. Based on the original description of this species when fresh (Fowler, 1938), its body was light brown with brown mottle. All fins pale. Mandible with white spots. Pectoral fin with small white spots.

**Table 1.** Counts and morphometric data of specimens of *Scorpaenopsis cotticeps* from the present study, and other sources. Morphometric analyses followed Randall and Eschmeyer (2001). Data were standardized to standard length (%SL). Unavailable data are denoted as “-”.

Reference	This study		Randall and Eschmeyer (2001)	Motomura et al. (2004)
	NMMB- P035560-1	NMMB- P035560-2	n=22	n=7
Standard length (mm)	73.44	80.31	19.00–62.90	20.00–62.00
Counts:				
Dorsal fin	XII,9	XII,9	-	-
Anal fin	III,5	III,5	-	-
Pectoral fin rays	17	17	16–18 (rarely 16)	16–17 (usually 17)
Scales above lateral line	3	3	-	-
Scales below lateral line	9	10	-	-
Lateral line scales	17	17	17–19	16–18 (usually 17)
Longitudinal scale rows	32	33	33–37	33–38
Gill rakers	4+7	4+8	3–5 + 7–8	-
Morphometrics:				
SL/body depth	2.56	2.67	2.35–2.75	-
SL/head length	2.24	2.11	2.0–2.15	-
Head length/snout length	4.43	4.54	3.4–3.75	-
Head length/orbit diameter	3.60	4.53	3.55–4.2	-
Head length/interorbital width	6.52	8.62	7.0–7.8	-
Second/first dorsal spine	1.43	1.72	1.7–1.9	1.4–2.0
Head length/longest dorsal fins spine	2.92	3.02	2.45–2.85	-
Twelfth/eleventh dorsal spine	1.06	1.36	1.3–1.5	1.2–1.5
Morphometrics:				
Body depth	39.12	37.44	-	35.2–42.2
Body width	28.10	27.43	-	-
Head length	44.59	47.34	-	44.8–49.7
Snout length	10.08	10.43	-	-
Orbit diameter	12.38	10.45	-	-
Interorbital width	6.84	5.49	-	-
Caudal peduncle depth	10.38	9.05	-	-
Caudal peduncle length	15.29	14.26	-	-
Upper jaw length	23.35	20.52	-	-
Predorsal length	36.33	37.79	-	-
Preanal length	65.33	72.83	-	-
Prepelvic length	35.54	36.01	-	-
First dorsal spine	8.52	6.10	-	-
Second dorsal spine	12.19	10.48	-	-
Longest dorsal spine	15.26	15.65	-	-
Eleventh dorsal spine	11.53	8.83	-	-
Twelfth dorsal spine	12.17	12.04	-	-
Longest dorsal ray	18.44	16.76	-	-
First anal spine	8.59	6.45	-	-
Second anal spine	13.49	12.03	-	-
Third anal spine	12.83	12.15	-	-
Longest anal ray	20.14	16.55	-	-
Caudal fin length	20.40	21.09	-	-
Pectoral fin length	32.39	29.46	-	-
Pelvic spine length	15.09	12.61	-	-
Pelvic fin length	24.80	20.77	-	-

**Distribution.** With this new record, this species now appears to be continuously distribution between Japan and the South China Sea.

**Remarks.** Counts and measurements of the specimens (NMMB-P035560-1, 2) generally agree with the description of Fowler (1938) except for the upper opercular spine; Fowler (1938), Nakabo *et al.* (1993), and Randall and Eschmeyer (2001) all noted that the upper opercular spine was divided into two spinous points but that of NMMB-P035560-1, 2 were split into three or more spinous points (Fig. 1C-D). Motomura *et al.* (2004) also found this to be the case in Japanese specimens. In addition, the lower opercular spine of the specimen NMMB-P035560-2 (Fig. 1D) divided into three spinous points. Those features appear, then, to vary within the species. NMMB-P035560-2 (Fig. 1B) was 80.31 mm SL, far larger than the previous largest specimen to date: FAKU-S 192 (62.9 mm SL) from Tsushima Islands, Nagasaki Prefecture, Japan (Randall & Eschmeyer, 2001).

As mentioned above, *S. cotticeps* can be distinguished from its eight congeners by its 1) single posterior lacrimal spine (which is divided into two or three points in *S. brevifrons*, *S. crenulata*, *S. pluralis*, & *S. vittapinna*), 2) interorbital ridges posteriorly joining base of tympanic spines, 3) postocular spines joined by a low ridge

to the tympanic spines (this feature is absent in *S. insperatus*, *S. pusilla*, & *S. rubrimarginatus*), 4) 33–37 longitudinal scale rows (>37 in the other congeners except 37 in *S. crenulate*), 5) pectoral fin lacking a large, black spot on inner surface (presented in *S. crenulate*) and 6) lack of a black spot on the 8<sup>th</sup>–10<sup>th</sup> rays (presented in males of *S. rubrimarginatus*) (Randall & Eschmeyer, 2001; Motomura, 2004; Motomura *et al.*, 2004; Motomura & Causse, 2011; Fricke *et al.*, 2013).

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