

A NEW TAIWANESE AND NORTHERNMOST RECORD OF *CEPHALOPHOLIS CYANOSTIGMA* (ACTINOPTERYGII: PERCIFORMES: SERRANIDAE)

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Abstract. Until recently, eleven species of the genus *Cephalopholis* (Serranidae) have been recorded from Taiwanese waters. Although *Cephalopholis cyanostigma* (Valenciennes, 1828) was previously known from the western Pacific Ocean north to Philippines, no records have been reported from Taiwan. The main objective of this study was to document the presence of *C. cyanostigma* in waters of Taiwan. Three specimens (169.9–189.7 mm standard length) of *C. cyanostigma* were collected from southern Taiwan in 2017. The morphology and fresh coloration of the collected specimens are herein described. The majority of morphological characters are consistent with those representing previous descriptions of *Cephalopholis cyanostigma*: dorsal-fin soft rays 16; anal-fin soft rays 8; longitudinal scale series 93; caudal fin rounded; body colour reddish brown with small dark-edged pale blue spots on head and body; body with pale spots larger than pupil form irregular bars; pectoral fin nearly all orange with dark-edged pale blue spots. The grouper specimens from southern Taiwan are identified as *Cephalopholis cyanostigma*. The presently reported specimens represent the first record for Taiwan, and their finding constitutes the northernmost record of this species.

Keywords: taxonomy, distribution, coral reef, grouper, *Cephalopholis argus*

Serranid fishes of the genus *Cephalopholis* Bloch et Schneider, 1801, are commonly known as groupers or sea basses. There are at least 24 valid species representing this genus worldwide (Eschmeyer et al. 2017). Until recently, eleven species of the genus have been recorded from Taiwanese waters (Shen and Wu 2011). Representatives of *Cephalopholis* are characterized by head length 37.0%–45.5% in standard length, a single dorsal fin with 9 spines and 13–17 soft rays, anal fin with 3 spines and 8–9 soft rays, middle pectoral-fin rays longest, caudal fin rounded (Randall and Heemstra 1991, Heemstra and Randall 1993).

A total of three specimens of the genus *Cephalopholis* (Fig. 1) were acquired from the Hengchun market, Pingtung, southern Taiwan. They were probably captured off Kenting (in the proximity of Pingtung). One specimen was purchased on 1 September while other two on 7 November 2017. The fish were identified as *Cephalopholis cyanostigma* (Valenciennes, 1828). This species was previously recorded from western Pacific north to the Philippines, thus the presently reported specimens represent the first Taiwanese record and the northernmost record of the species. The morphology and fresh colouration of the newly collected specimens are herein

described. Counts and measurements follow Randall and Heemstra (1991). Measurements were made to the nearest 0.1 mm with needle-point callipers. Standard and head lengths are abbreviated as SL and HL, respectively. The morphological description, provided below, is based on the fish specimens collected from Taiwan. The specimens of *C. cyanostigma* examined in this study are deposited at National Museum of Marine Biology and Aquarium, Pingtung, Taiwan (NMMB-P):

- NMMB-P 26640, 189.7 mm SL;
- NMMB-P 27717, 171.1 mm SL;
- NMMB-P 27718, 169.8 mm SL.

Family Serranidae

Cephalopholis Bloch et Schneider, 1801

Cephalopholis cyanostigma (Valenciennes, 1828)

齊星九刺鰷 (New Taiwanese common name)

Fig. 1, Table 1

Cephalopholis cyanostigma (Valenciennes, 1828): 359 (type locality: Java, Indonesia); Randall and Heemstra 1991: 41; Heemstra and Randall 1993: 40; Adrim et al. 2004: 119; Kimura et al. 2012: 48; Allen and Erdmann 2012: 262, unnumbered figs; Larson et al. 2013: 98; Fricke

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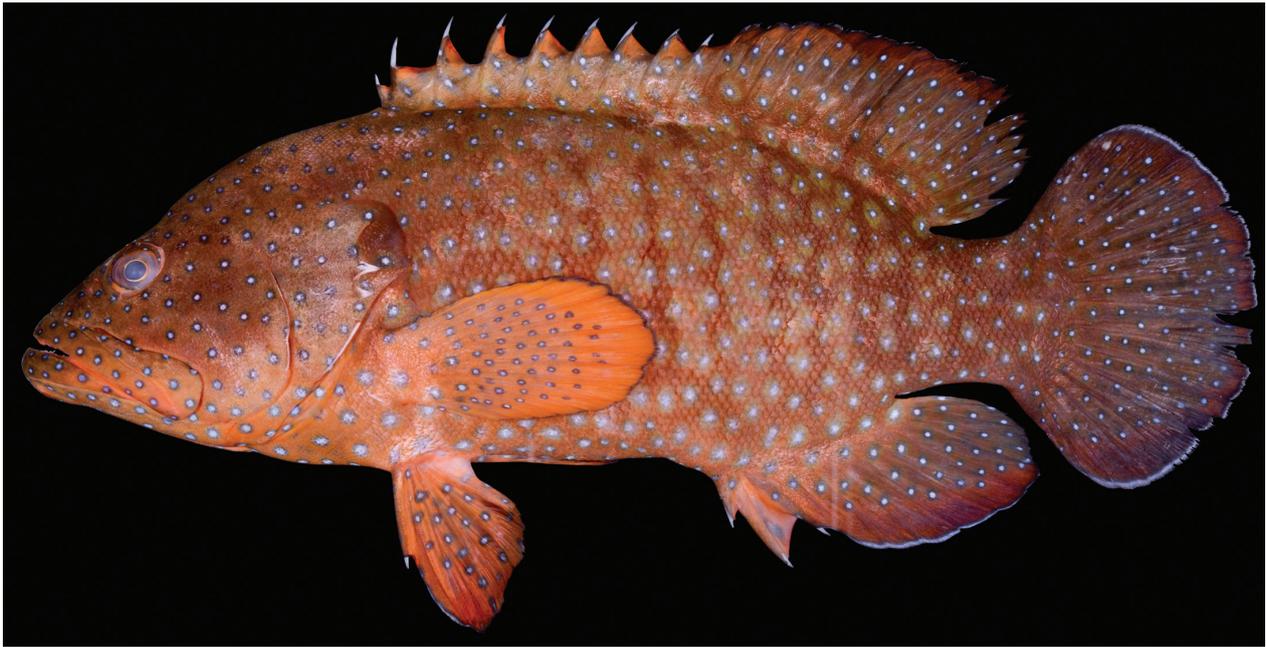


Fig. 1. Fresh specimen of *Cephalopholis cyanostigma* from Kenting, southern Taiwan (NMMB-P 26640, 189.7 mm standard length)

et al. 2014: 59; Hata 2017: 81, unnumbered fig.; Craig et al. 2011: 23, unnumbered figs.

Description of Taiwanese specimens. Counts and measurements are shown in Table 1. Body oblong and moderately compressed, greatest depth at origin of dorsal fin, greatest width at uppermost point of pectoral-fin insertion; dorsal profile moderate rising from snout to dorsal-fin origin, thereafter lowering to caudal peduncle, but slightly concave above eye; ventral profile lowering from lower-jaw tip to origin of pectoral fin, thereafter rising from anal-fin origin to caudal peduncle. Caudal peduncle well compressed.

Body covered with small rough ctenoid scales. Isthmus, lips, and pectoral-fin axillary region without scales. Lateral line continuous, parallel with dorsal contour. Eye and iris rounded. Interorbital space flat. Posterior edge of preopercle weakly serrated. Lower edge of preopercle and opercle smooth. Opercle with three spines, upper spine larger than lower two. Nostrils round, paired, positioned close together and anterior to eye. Anterior nostril with dermal flap. Mouth large, posteriormost point of upper jaw well beyond eye. Tip of lower jaw slightly projecting than upper jaw. Upper jaw, vomer, palatine and lower jaw with small dense conical teeth. A pair of fang-like teeth anteriorly on both jaws.

Dorsal-fin origin located above posteriormost point of opercle, uppermost point of pectoral-fin insertion, and pelvic-fin origin; posterior end of dorsal-fin base located posterior to posterior end of anal fin base. Contour of spinous portion of dorsal fin moderately notched, soft ray portion straight. Anal-fin origin located below origin of 2nd dorsal-fin soft ray. Posterior margin of pectoral fin rounded, reaching to vertical line through origin of 8th dorsal-fin spine. Depressed pelvic fin beyond vertical line through origin of 7th dorsal-fin spine, not reaching

anus. Last pelvic-fin ray connected to body by membrane. Caudal fin rounded.

Colour when fresh. Body, head, and all fins reddish brown with numerous small black-edged pale blue spots, those on head, thorax, and fins distinctly black-edged than those on body; body with pale spots larger than pupil forming irregular transverse bands. Caudal fin, and soft-ray portions of dorsal and anal fins darker than body; distal margin bluish white, submarginally blackish; thorax, and pectoral and pelvic fins more orange than body; posterior margin of pectoral fin blackish; black-edged pale blue spots on pectoral fin progressively smaller distally, none in outer part of fin; distal margin of pelvic fin bluish white, submarginally blackish.

Distribution. *Cephalopholis cyanostigma* is currently known mainly from the western Pacific Ocean (Randall and Heemstra 1991, Heemstra and Randall 1993, Allen and Erdmann 2012). Specimens have previously been collected widely from the western Pacific Ocean north to Philippines and Palau, but now from Taiwan (presently reported study).

Remarks. The majority of morphological characters of the presently described specimens are consistent with the description of *Cephalopholis cyanostigma* given by Randall and Heemstra (1991) and Heemstra and Randall (1993): dorsal-fin soft rays 16; anal-fin soft rays 8; longitudinal scale series 89–94; caudal fin rounded; body colour reddish brown with small dark-edged pale blue spots on head and body; body with pale spots larger than pupil form irregular bars; pectoral fin nearly all orange with dark-edged pale blue spots.

Although *Cephalopholis cyanostigma* is closely similar to *Cephalopholis microprion* (Bleeker, 1852) among the congeners, sharing anal-fin soft rays 8, ground colour brown to dark brown, small spots on head and least anteriorly on body, the former can clearly distinguish by

Table 1
Counts and measurements of specimens of *Cephalopholis cyanostigma* collected from Southern Taiwan

Character	Specimen number		
	26640	27717	27718
Standard length (SL) [mm]	189.7	171.1	169.8
Counts			
Dorsal-fin rays	IX, 16	IX, 16	IX, 16
Anal-fin rays	III, 8	III, 8	III, 8
Pectoral-fin rays	17	18	17
Pelvic-fin rays	I, 5	I, 5	I, 5
Lateral-line scales	49	49	48
Longitudinal scale series	93	94	89
Gill rakers on first arch	9 + 15	9 + 15	9 + 15
Measurements [% of SL]			
Body depth	36.4	36.1	37.8
Body width	18.2	16.8	16.8
Head length	39.9	39.4	39.2
Snout length	10.7	10.2	10.5
Orbit diameter	6.5	6.4	6.4
Interorbital width	6.7	6.1	5.8
Suborbital depth	3.5	3.4	3.8
Upper jaw length	20.7	19.8	20.0
Caudal peduncle depth	14.4	13.8	13.8
Caudal peduncle length	14.0	13.8	14.2
Predorsal-fin length	41.3	40.9	41.0
Preanal-fin length	69.3	67.4	68.7
Prepelvic-fin length	38.5	38.7	37.9
Dorsal-fin base	56.1	55.5	55.4
First dorsal-fin spine length	4.3	6.9	6.0
Second dorsal-fin spine length	7.9	10.3	9.5
Third dorsal-fin spine length	9.8	12.8	11.2
Ninth dorsal-fin spine length	10.3	12.2	10.4
Longest dorsal-fin soft ray	17.0	19.2	17.7
Anal-fin base	19.7	19.2	19.2
First anal-fin spine length	6.1	7.9	7.3
Second anal-fin spine length	11.9	14.0	13.9
Third anal-fin spine length	11.9	13.9	12.3
Longest anal-fin soft ray length	18.7	19.4	19.0
Caudal fin length	22.4	24.5	23.3
Pectoral fin length	26.8	28.0	26.4
Pelvic-fin spine length	11.0	12.3	12.7
Pelvic fin length	20.4	21.0	20.4

The specimen number prefix is NMMB-P (National Museum of Marine Biology and Aquarium, Pingtung, Taiwan).

having 16 dorsal-fin soft rays (vs. 15), small dark-edged pale blue spots on head and body (vs. no spots on middle to posterior body), body with pale spots larger than pupil form irregular bars (vs. absence of large pale spots), and pectoral fin nearly all orange with dark-edged pale blue spots (vs. dark brown without spots) (Randall and Heemstra 1991, Heemstra and Randall 1993).

Cephalopholis cyanostigma has not been previously recorded from Taiwanese waters, and, until recently, the northernmost record of the species was from Luzon, Philippines (Randall and Heemstra 1991, Heemstra and Randall 1993, Craig et al. 2013). Therefore, the presently

described specimens collected from southern Taiwan represent the first record of *C. cyanostigma* from Taiwan, and their finding constitutes the northernmost record of the species.

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