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Records of four species of armored searobins (Teleostei: Peristediidae) from Dongsha Atoll in the South China Sea

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Abstract

Twenty-three specimens of the armored searobin family Peristediidae were collected by bottom trawl from Dongsha Atoll in the South China Sea. They were identified as *Heminodus philippinus* Smith, 1917, *Paraheminodus murrayi* (Günther, 1880), *Peristedion riversandersoni* Alcock, 1894, and *Scalicus orientalis* (Fowler, 1938). Of them, *H. philippinus* and *P. murrayi* are new records from the South China Sea, meaning that 17 peristediid species have now been identified in Taiwanese waters.

Key words: *Heminodus philippinus*, *Paraheminodus murrayi*, *Peristedion riversandersoni*, *Scalicus orientalis*, Taiwan, taxonomy

Introduction

Armored searobins (otherwise known as armored gurnards; Actinopterygii: Teleostei: Peristediidae) are relatively deep-water fish distributed throughout both temperate and tropical seas (Nelson et al., 2016). The family Peristediidae consists of six genera: *Gargariscus*, *Heminodus*, *Paraheminodus*, *Peristedion*, *Satyrichthys*, and *Scalicus* (Kawai, 2008). Previously, 15 peristediids were known from Taiwan: *Gargariscus prionocephalus*, *Peristedion amblygenys*, *Pe. liorhynchus*, *Pe. longicornutum*, *Pe. orientale*, *Pe. riversandersoni*, *Satyrichthys laticeps*, *Sa. milleri*, *Sa. moluccensis*, *Sa. rieffeli*, *Sa. welchi*, *Scalicus hians*, *Sc. orientalis*, *Sc. paucibarbatus*, and *Sc. quadratorostratus* (*e.g.*, Shen et al., 1993; Shen and Wu,

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Platax 16: 67-75, 2019

2011; Ho et al., 2013; Kawai, 2013, 2019a, b). Some bycatch from bottom trawlers operating around Dongsha Atoll in the South China Sea (SCS) on February 13, 2019 were sent to us for further study, and the four species identified have been described in detail herein.

Materials and methods

Counts and measurements generally followed Kawai et al. (2004a), though rostral projection widths of *H. philippinus*, *Pa. murrayi*, and *Sc. orientalis* followed Kawai (2019a), and rostral projection lengths and widths of *Pe. riversandersoni* followed Ono and Kawai (2014). The interspace between rostral projections of *Pe. riversandersoni* followed Kawai (2016). The specimens examined in this study were deposited in the fish repository of the National Museum of Marine Biology and Aquarium (NMMBA) in Pingtung, Taiwan.

Results

***Heminodus philippinus* Smith, 1917**

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Fig. 1 *Heminodus philippinus* Smith, 1917: 146 (type locality: Mindanao Sea off Tawi-Tawi, Philippines).

Material examined.

NMMB-P30868, 1 specimen, 129.2 mm standard length (SL); NMMB-P30870, 1, 72.5 mm SL.

Diagnosis.

Upper-jaw teeth present; lateral margin of head smooth; one or two very short lip barbels present; rostral projection spine-like; no antrorse spines on posterior bony plates of upper lateral row (Kawai, 2008; Kawai and Causse, 2017; present study).

Description.

Counts. Dorsal-fin rays VII, 20-21; anal-fin rays 19-20; pectoral-fin rays (including two detached rays) 17-18; pelvic-fin rays I, 5; principal caudal-fin

Fig. 1. *Heminodus philippinus*, NMMB-P30868, 129.2 mm SL.

DOI: 10.29926/PLATAX.201912_2019.0005

Platax 16: 67-75, 2019

rays 12 (n=1); bony plates in dorsal row 29; bony plates in upper lateral row 34-35; bony plates in lower lateral row 24; bony plates in ventral row 24; bony plates before anus 4; groups of barbels (lip+chin) 2+0; branches on filamentous barbel 2; gill rakers 5+1+15-16=21-22.

Measurements (% SL). Body depth 18.9-19.6; body width 14.6-14.9; head length (HL) 42.1-42.6; head depth 18.1-18.9; head width 29.2-32.6; snout to dorsal fin 41.1-41.2; snout to anal fin 53.7-58.3; snout to anus 48.7-53.6; snout length 19.3-20.2; rostral projection length 5.2-9.4; rostral projection width 3.4-5.1; filamentous barbel length 5.4-6.6; upper-jaw length 20.8-24.0; lower-jaw length 23.2-26.6; orbital diameter 9.9-10.3; interorbital width 8.7-11.6; pectoral-fin length 19.3-26.1; upper detached pectoral-fin ray length 18.2-19.7; lower detached pectoral-fin ray length 17.2-18.9; pelvic-fin length 16.4-20.1; first dorsal-fin spine length 12.1-13.5; caudal peduncle length 8.0-8.5; caudal peduncle depth 2.8-3.3.

Distribution and remarks.

Known from Indonesia (Sumatra and Java), the Philippines (Mindanao), southern Japan, French Polynesia (Marquesas) (Kawai and Causse, 2017), and Dongsha Atoll (present study). Detailed descriptions and geographic distribution patterns of the present species were provided by Kawai and Nakaya (2007) and Kawai and Causse (2017). Our specimens represent the first records from Dongsha Atoll, as well as the SCS as a whole.

***Paraheminodus murrayi* (Günther, 1880)**

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Fig. 2 *Peristethus murrayi* Günther, 1880: 52, pl. 32, fig. A (type locality: Banda Sea, Indonesia, depth 200 fathoms [366 m]).

Material examined.

NMMB-P30855, 1 specimen, 183.4 mm SL; NMMB-P30856, 1, 136.8 mm SL; NMMB-P30857, 1, 139.0 mm SL; NMMB-P30858, 1, 217.5 mm SL; NMMB-P30859, 1, 174.4 mm SL; NMMB-P30860, 1, 194.9 mm SL; NMMB-P30861, 1, 167.8 mm SL; NMMB-P30862, 1, 193.9 mm SL; NMMB-P30863, 1, 164.6 mm SL; NMMB-P30864, 1, 140.6 mm SL; NMMB-P30865, 1, 125.7 mm SL; NMMB-P30866, 1, 116.3 mm SL; NMMB-P30871, 4, 158.3-232.9 mm SL.

Diagnosis.

Upper-jaw teeth present; lateral margin of head smooth; groups of barbels

DOI: 10.29926/PLATAX.201912_2019.0005

Platax 16: 67-75, 2019

(lip+chin) 4+3; filamentous barbel long with 7-13 branches; gill rakers 3-5+1+13-15=17-21; rostral projection length 24.6-36.9% HL; upper-jaw length 48.5-53.2% HL; lower-jaw length 39.2-43.4% HL; no antrorse spines on posterior bony plates of upper lateral row (Kawai et al., 2004a, b; Kawai, 2011; present study).

Description.

Counts. Dorsal-fin rays VII-VIII, 19-21; anal-fin rays 20-22 (n=15); pectoral-fin rays (including two detached rays) 17-19; pelvic-fin rays I, 5; principal caudal-fin rays 11-12 (n=14); bony plates in dorsal row 28-30; bony plates in upper lateral row 34-36; bony plates in lower lateral row 23-25; bony plates in ventral row 24-26; bony plates before anus 2; groups of barbels (lip+chin) 4+3; branches on filamentous barbel 7-13; gill rakers 4-5+1+13-15=18-21.

Measurements (% SL). Body depth 10.3-20.9; body width 11.3-17.7 (n=15); HL 39.8-45.8; head depth 11.5-19.9 (n=15); head width 28.3-34.7; snout to dorsal fin 38.8-45.8; snout to anal fin 51.2-58.5 (n=15); snout to anus 46.2-52.5; snout length 20.5-25.0; rostral projection length 11.6-14.9 (n=10); rostral projection width 2.5-4.4; filamentous barbel length 26.4-34.3; upper-jaw length 19.6-24.4; lower-jaw length 15.9-19.5; orbital diameter 8.0-9.5; interorbital width 6.9-8.5; pectoral-fin length 20.4-28.2; upper detached pectoral-fin ray length 16.8-19.9; lower detached pectoral-fin ray

Fig. 2. *Paraheminodus murrayi*, NMMB-P30865, 125.7 mm SL.

DOI: 10.29926/PLATAX.201912_2019.0005

Platax 16: 67-75, 2019

length 13.7-16.3; pelvic-fin length 16.4-19.2; first dorsal spine length 7.8-10.7; caudal peduncle length 7.3-9.9; caudal peduncle depth 2.2-2.9.

Distribution and remarks.

Widespread in the Indo-West Pacific, including the Maldives, Indonesia (Sumatra, Java, and Banda Sea), East China Sea, southern Japan (Kawai, 2011), and Dongsha Atoll (SCS; this study). Kawai (2011) reported a specimen (SNFR 11323) from the SCS; however, that specimen was actually collected from the East China Sea. Therefore, our specimens represent the first confirmed record from the SCS. Detailed descriptions and geographic distribution patterns can be found in Kawai et al. (2004a) and Kawai (2011).

***Peristedion riversandersoni* Alcock, 1894**

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Fig. 3 *Peristethium riversandersoni* Alcock, 1894: 121, pl. 6, figs. 2, 2a, b (type locality: 13.5 miles northwest of Colombo Light, Sri Lanka, depth 142-400 fathoms [260-732 m]).

Peristedion nierstraszi Weber, 1913: 514, pl. 5, figs. 1, 1a, b (type locality: Flores Sea, Indonesia [7°35.4'S, 117°28.6'E], 521 m).

Material examined.

NMMB-P30869, 4 specimens, 117.1-138.2 mm SL.

Diagnosis.

Upper-jaw teeth absent; lateral margin of head smooth; interspace between both rostral projections 0.48-0.91 in rostral projection width; position of anterior edge of 4th sensory pore of rostral projection anterior to premaxilla; prominent perifacial rim; shape of inner margin at rostral projection base rounded; shape of rostral projection triangular; antrorse spines present on posterior bony

Fig. 3. *Peristedion riversandersoni*, NMMB-P30869, 137.8 mm SL.

DOI: 10.29926/PLATAX.201912_2019.0005

Platax 16: 67-75, 2019

plates of upper lateral row (Kawai, 2016; present study).

Description.

Counts. Dorsal-fin rays VIII, 20-23; anal-fin rays 21-23; pectoral-fin rays (including two detached rays) 14-15; pelvic-fin rays I, 5; principal caudal-fin rays 11-12; bony plates in dorsal row 31-33; bony plates in upper lateral row 36-38; bony plates in lower lateral row 26-28; bony plates in ventral row 25-26; bony plates before anus 2; groups of barbels (lip+chin) 3+6; branches on filamentous barbel 21-25; total chin barbels 20-23; gill rakers 5+1+18-19=24-25.

Measurements (% SL). Body depth 11.8-13.7; body width 10.8-12.3; HL 30.8-32.1; head depth 12.0-14.0; head width 19.5-23.5; snout to dorsal fin 31.6-32.8; snout to anal fin 44.4-48.6; snout to anus 39.6-43.0; snout length 14.4-15.2; rostral projection length 13.4-16.1; rostral projection width 2.8-3.3; interspace between rostral projections 4.1-5.2; filamentous barbel length 11.6-14.6; upper-jaw length 12.0-12.6; lower-jaw length 12.0-12.8; orbital diameter 8.2-8.3; interorbital width 7.0-7.9; pectoral-fin length 15.6-17.6; upper detached pectoral-fin ray length 21.3-22.9; lower detached pectoral-fin ray length 17.3-18.3; pelvic-fin length 17.1-17.6; first dorsal-fin spine length 8.5-10.2; caudal peduncle length 9.3-11.8; caudal peduncle depth 1.9-2.0.

Distribution and remarks.

Sri Lanka, Flores Sea, Java, Taiwan, SCS, and southern Japan (Kawai, 2016). This species was described in detail by Ono and Kawai (2014) and Kawai (2016) and has been synonymized with *Peristedion nierstraszi*.

***Scalicus orientalis* (Fowler, 1938)**

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Fig. 4 *Nemaperistedion orientale* Fowler, 1938: 127, fig. 61 (type locality: off Makyan Island, between Gillolo and Makyan Islands, Indonesia, 272 fathoms [497m]).

Material examined.

NMMB-P30867, 1 specimen, 122.0 mm SL.

Diagnosis.

Upper-jaw teeth absent; long triangular rostral projection, rostral projection width 1.26-1.64 of rostral projection length; groups of barbels (lip+chin) 5 (rarely 6) + 3 (rarely 4); filamentous barbel with 22-31 branches, filamentous barbel length 34.0-55.7% SL; posterior part of filamentous barbel with

DOI: 10.29926/PLATAX.201912_2019.0005

Platax 16: 67-75, 2019

membrane on each base of branch; posterior-most chin barbel simple or divided into two branches at base; antrorse spines on posterior bony plates of upper lateral row absent (Kawai, 2019a; present study).

Description.

Counts. Dorsal-fin rays VII, 21; anal-fin rays 22; pectoral-fin rays (including two detached rays) 17; pelvic-fin rays I, 5; principal caudal-fin rays 12; bony plates in dorsal row 30; bony plates in upper lateral row 36; bony plates in lower lateral row 25; bony plates in ventral row 26; bony plates before anus 2; groups of barbels (lip+chin) 5+3; branches on filamentous barbel 26; gill rakers 7+1+21=29.

Measurements (% SL). Body depth 15.0; body width 12.0; HL 38.0; head depth 15.8; head width 31.6; snout to dorsal fin 37.4; snout to anal fin 49.5; snout to anus 44.1; snout length 18.7; rostral projection length 9.7; rostral projection width 5.9; filamentous barbel length 43.3; upper-jaw length 15.3; lower-jaw length 14.2; orbital diameter 9.8; interorbital width 6.8; pectoral-fin length 21.1; upper detached pectoral-fin ray length 20.6; lower detached pectoral-fin ray length 16.8; pelvic-fin length 17.1; first dorsal-fin spine length damaged; caudal peduncle length 8.4; caudal peduncle depth 2.2.

Distribution and remarks.

Widespread in the Indo-West Pacific: Arabian Sea, Maldives, Indonesia (Molucca Sea, Java, and Sumatra), New Caledonia, Philippines, Dongsha Atoll, and southern Japan (Kawai, 2019a).

Fig. 4. *Scalicus orientalis*, NMMB-P30867, 122.0 mm SL.

Detailed description and geographic distribution patterns were provided by Kawai (2019a). One paratype (USNM 98917) was collected by a research vessel from near Dongsha Atoll, though the species has never officially been collected from Taiwan until the present study.

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Platax 16: 67-75, 2019

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Platax 16: 67-75, 2019