

A new record of an armored searobin, *Paraheminodus kamoharai* (Actinopterygii: Perciformes: Triglidae), from Taiwan, with a checklist of peristediines (Peristediinae) from Taiwan

Yo SU¹, Ching-Feng LIN², Tah-Wei CHU¹

¹ Department and Graduate Institute of Aquaculture, National Kaohsiung University of Science Technology, Kaohsiung, Taiwan

² Department of Theatrical Design and Technology, Taipei National University of the Arts, Taipei, Taiwan

<https://zoobank.org/E31EC4C1-EE33-4415-A072-C5DF31908D4F>

Corresponding author: Tah-Wei Chu (twchu@nkust.edu.tw)

Academic editor: Ronald Fricke ♦ **Received** 25 January 2024 ♦ **Accepted** 5 March 2024 ♦ **Published** 14 June 2024

Citation: Su Y, Lin C-F, Chu T-W (2024) A new record of an armored searobin, *Paraheminodus kamoharai* (Actinopterygii: Perciformes: Triglidae), from Taiwan, with a checklist of peristediines (Peristediinae) from Taiwan. *Acta Ichthyologica et Piscatoria* 54: 131–137. <https://doi.org/10.3897/aiep.54.119501>

Abstract

A single specimen of a rare species of armored searobin, *Paraheminodus kamoharai* Kawai, Imamura et Nakaya, 2004, is recorded from Taiwan, South China Sea, for the first time. While this particular species has been recorded in the Philippines and Japan, it has never been found in Taiwan. Therefore, our specimen fills the distribution gap of this species in the western Pacific Ocean. A detailed description of the specimen is provided and compared to the data of type specimens. Additionally, a checklist of species recorded from Taiwan is provided. Currently, 20 peristediine species under six genera are recorded from Taiwan's EEZ.

Keywords

biodiversity, biogeography, ichthyology, Scorpaenoidei, Peristediinae, taxonomy

Introduction

The subfamily Peristediinae, otherwise known as armored searobins, currently comprised of six genera and 45 species, is widely distributed from tropical to temperate waters of three major oceans and inhabits depths of 50–1324 m (Richards 1999; Kawai 2008; Fricke et al. 2017, 2024). Among the six genera, the genus *Paraheminodus* Kamohara, 1958 is characterized by having: upper-jaw teeth present; lateral margin of the head smooth, not indented; posterior portions of bony plates on lower lateral rows separated from each other; and all barbels on the lower jaw unbranched, except for posteriormost one (Kawai 2008). Currently, four species are recognized as valid: *Paraheminodus kamoharai* Kawai,

Imamura et Nakaya, 2004 from the Philippines; *Paraheminodus laticephalus* (Kamohara, 1952) from Japan; *Paraheminodus longirostralis* Kawai, Nakaya et Séret, 2008 from New Caledonia; and *Paraheminodus murrayi* (Günther, 1880) from the Indo–West Pacific Ocean (Kawai et al. 2008).

The taxonomic study of the Peristediinae in Taiwan has been well studied in recent decades. Kawai and Ho (2019) listed 15 species of peristediines in Taiwan based on literature records (e.g., Shen and Wu 2011; Ho et al. 2013; Kawai 2013, 2019a, 2019b), and included four species from Dong-sha Atoll, South China Sea, of which, *Heminodus philippinus* Smith, 1917 is first recorded from Taiwan's EEZ. After that, Wada et al. (2019) and Kawai and Ho (2020) recorded *Peristedion richardsi* Kawai, 2016

and *Satyrichthys clavilapis* Fowler, 1938 from Taiwan, respectively. As a consequence, 19 peristediine species under six genera have hitherto been known from Taiwan.

Recently, a specimen of an armored searobin of the genus *Paraheminodus* was collected using a bottom trawl from northeastern Taiwan, the northern part of the South China Sea by the second author. A formal description and identification of the specimen is provided and compared to other specimens. Moreover, a checklist of peristediines recorded from Taiwan is provided.

Materials and methods

The specimen was fixed in 4% formaldehyde and transferred to 70% ethanol for preservation. The specimen was deposited in the Pisces Collection of the National Museum of Marine Biology and Aquarium, Pingtung, Taiwan (NMMB-P).

Counts and measurements follow Kawai et al. (2004a, 2004b, 2008). Terminology and methodology of counts of barbels and four rows of bony plates follow Yatou and Okamura (1985). The numbers of paired fins, bony plates, and barbels are presented as left/right whenever available. Gill rakers were counted on the outer face of the first gill arch, with all rudiments included. Terminology of cranial spines follows Miller (1967). All measurements were taken using digital calipers rounding to the nearest 0.1 mm. Morphometric data were expressed as ratios and/or percentages of standard length (SL) and head length (HL), except where otherwise indicated. Data of other specimens were retrieved from Kawai et al. (2004b) and Kawai (2017).

Results

Suborder Scorpaenoidei

Family Triglidae

Subfamily Peristediinae

Paraheminodus kamoharai Kawai, Imamura et Nakaya, 2004

English name: Kamohara's armored searobin

New Chinese name: 蒲原氏副半節魴鯉

Figs. 1–4; Tables 1, 2

Paraheminodus kamoharai Kawai, Imamura et Nakaya, 2004.—Kawai et al. (2004b): 126 (Original description. Type locality: Sulu Sea, the Philippines, 08°11'48"N, 117°58'00"E, depth 285 m).—Kawai 2008: 22 (Listed).—Kawai et al. 2008: 377 (Mentioned, compared to the new species described).—Kawai 2011: 70 (Mentioned).—Kawai 2017: 175 (New record from Japan).

Specimen examined. NMMB-P 39557, 120.1 mm SL, off Daxi fishing port (ca. 24°56'28.16"N, 121°52'12.21"E), Yilan, northwestern Taiwan, 16 September 2023, coll. C.-F. Lin.

Description of NMMB-P 39557. Meristic and morphometric data provided in Tables 1, 2. Dorsal-fin rays VII, 20; pectoral-fin rays 17/17; pelvic-fin rays I, 5/I, 5; anal-fin rays 20; principal caudal-fin rays 12; gill rakers 6 + 1 + 19 = 26; branchiostegal rays 7; bony plates in dorsal row 28/28; bony plates in upper lateral row 34/34 (25th–30th/26th–31st plates with antrorse spine); bony plates in lower lateral row 23/23; bony plates in ventral row 24/24; bony plates before anus 2/2; groups of barbels (lip + chin) 5 + 3/5 + 3. Body fusiform, depth 6.77 in SL, and width 7.22 in SL; its surface covered with bony plates (except for pectoral-fin base, chest, and isthmus). Head large, depressed, and expanded laterally, length 2.87 in SL, and width 3.44 in SL. Rostral projections depressed and elongated, nearly parallel. Interorbital space concave, width 5.07 in HL. Eyes of moderate, width 4.10 in HL. Frontal-1 spine 1, its tip blunt; parietal spine 1, stout, slightly curved backwards. Posttemporal with ridge, and eventually developed as small central spine. Fourth suborbital ridge serrated and bearing 1 (left) or 3 (right) small spines. Nasal, ethmoid, lateral ethmoid, and opercular spines single. Supraorbital spines 3; sphenotic spines 2, both small; and pterotic spine single and small. Rostral, preorbital, frontal-2, supratemporal, third infraorbital spines absent (Figs. 1A, 1B). Mouth large and inferior, upper-jaw length 2.34 in HL, its posterior end before anterior border of orbit; lower-jaw length 2.63 in HL, its anterior tip at about middle of upper jaw, whereas its posterior tip slightly exceeds anterior border of orbit. Single longitudinal ridge starting from base of rostral projection to preopercle. Two preopercular spines: outer one stout, length 2.25 in HL, and inner one rudimentary. Gill rakers on first arch rod-shaped and laterally compressed (except for rudiments), their inner faces covered with minute spinules. Rakers on outer face of first arch longest; rakers on inner face of first arch and both outer and inner faces of second to third arches short. Upper jaw with villiform teeth. Lower jaw, vomer and palatine naked. Lip barbels 5, all simple except for posteriormost one longest and branched, length 1.28 in HL; chin barbels 3, all simple except for posterior one branched at base (Fig. 3). Gill membrane narrowly united anteriorly to base of isthmus. Four rows of bony plates on body, each plate bearing single and recurved spine, except for those in dorsal row on caudal peduncle and two wide plates before anus; 25th–30th / 26th–31st bony plates in upper lateral row with single antrorse spine (Fig. 4). Bony plate in anteriormost dorsal row larger than rest. Four anterior bony plates in upper lateral row smaller than rest. Lower lateral row ending at caudal peduncle, near caudal-fin base; other rows ending at caudal-fin base. Dorsal fin originating between first and second bony plates in dorsal row. Anal fin originating just posterior to first bony plate in ventral row. Pectoral-fin length 1.67 in HL, its tip reaching to vertical through base of sixth dorsal-fin soft ray; lower-two rays detached and thickened, with upper one longer than lower. Pelvic-fin length 1.73 in HL, its tip reaching slightly posterior to anus, to second bony plate on ventral row. Caudal fin truncated, slightly rounded.

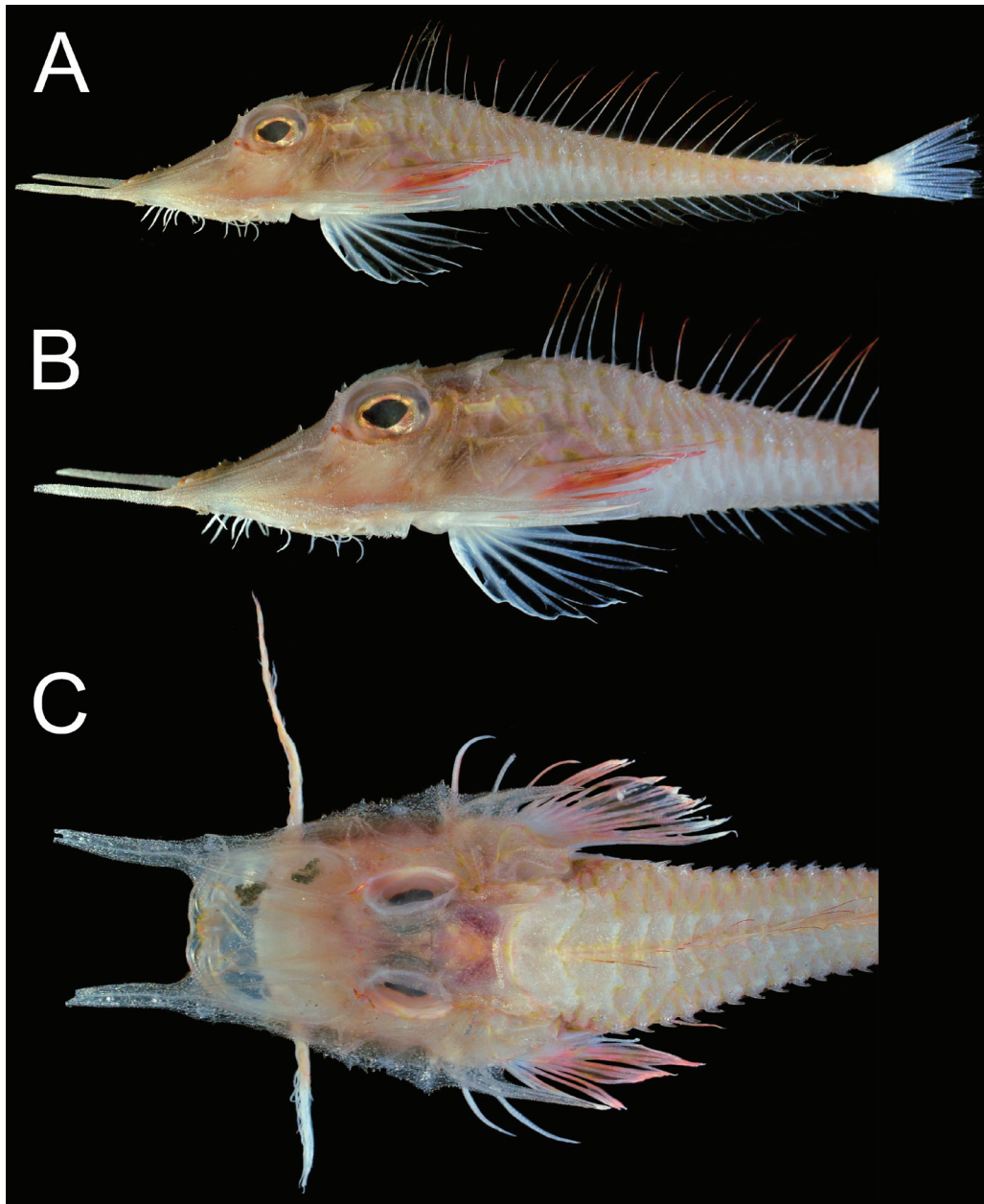


Figure 1. Fresh condition of *Paraheminodus kamoharai*, NMMB-P 39557, 120.1 mm SL. (A) Lateral view. (B) Close-up image of head in lateral view. (C) Close-up image of head in dorsal view, anterior to left, figure not to scale. Photos by C.-F. Lin.

Table 1. Meristic characters of *Paraheminodus kamoharai*. Data were presented as left/right whenever available.

Character	This study	Kawai et al. 2004b		Kawai 2017
	NMMB-P 39557	Holotype	Paratypes ($n = 2$)	FAKU 95640
Dorsal-fin rays	VII, 20	VII, 20	VII, 19–20	VII, 20
Pectoral-fin rays (including two detached rays)	17/17	17	17–18	18
Pelvic-fin rays	I, 5/I, 5	I, 5	I, 5	I, 5
Anal-fin rays	20	20	19	19
Principal caudal-fin rays	12	11	10–12	12
Bony plates in dorsal row	28/28	28	28	29
Bony plates in upper lateral row	34/34	33	33	34
Bony plates in lower lateral row	23/23	22	22–23	23
Bony plates in ventral row	24/24	23	23–24	23
Bony plates before anus	2/2	3	2	2
Bony plates in upper lateral row with antrorse spine	6 (25 th –30 th)/6 (26 th –31 st)	6 (25 th –30 th)	7 (24 th –30 th)	8 (24 th –31 st)
Gill rakers	6 + 1 + 19 = 26	5 + 1 + 17 = 23	5 + 1 + 18–19 = 24–25	5 + 1 + 20 = 26
Barbels (lip + chin)	5 + 3/5 + 3	5 + 3	5 + 3	5 + 3
Branchiostegal rays	7	7	7	7



Figure 2. Preserved condition of *Paraheminodus kamoharai*, NMMB-P 39557, 120.1 mm SL. (A) Lateral view. (B) Dorsal view. (C) Ventral view. Photos by Y. Su.

Table 2. Morphometric characters of *Paraheminodus kamoharai*.

Character	This study	Kawai et al. 2004b		Kawai 2017
	NMMB-P 39557	Holotype	Paratypes ($n = 2$)	FAKU 95640
Absolute values [mm]				
Standard length (SL)	120.1	106.9	107.3–114.8	114.2
Relative values [%SL]				
Body depth	14.8	17.8	17.7–19.0	16.9
Body width	13.9	13.4	12.2–14.6	15.0
Head length (HL)	34.9	38.4	37.7–40.4	38.1
Head depth	16.1	16.7	17.6–17.8	17.2
Head width	29.1	30.7	30.6–32.8	30.9
Distance from snout to dorsal fin	36.3	38.5	38.1–39.9	37.0
Distance from snout to anal fin	48.1	49.1	50.8–51.8	51.0
Distance from snout to anus	43.7	44.7	45.0–47.6	46.0
Distance from anus to caudal-fin base	55.1	—	—	46.9
Snout length	18.1	19.8	19.3–19.9	19.7
Rostral-projection length	broken	18.1	16.4	16.2
Longest barbel length	27.3	26.7	25.5–28.5	30.3
Upper-jaw length	14.9	16.3	15.5–16.9	15.4
Lower-jaw length	13.3	14.0	14.0–15.0	14.4
Orbital diameter	8.5	8.5	9.4–9.6	8.8
Interorbital width	6.9	6.4	5.9–6.3	6.2
Preopercular spine length	15.5	—	—	15.5
P length	20.8	25.5	21.8–23.2	22.2
Upper detached P ray	16.9	19.3	15.3–17.7	16.8
Lower detached P ray	13.6	16.0	13.0–14.3	14.4
V length	20.2	21.6	19.3–22.1	21.9
First D spine	10.4	10.1	7.8–9.0	10.5
Caudal-peduncle length	8.5	8.5	9.1–9.4	8.8
Caudal-peduncle depth	3.1	3.3	3.0	2.7

D = dorsal fin, P = pectoral fin, V = pelvic fin.

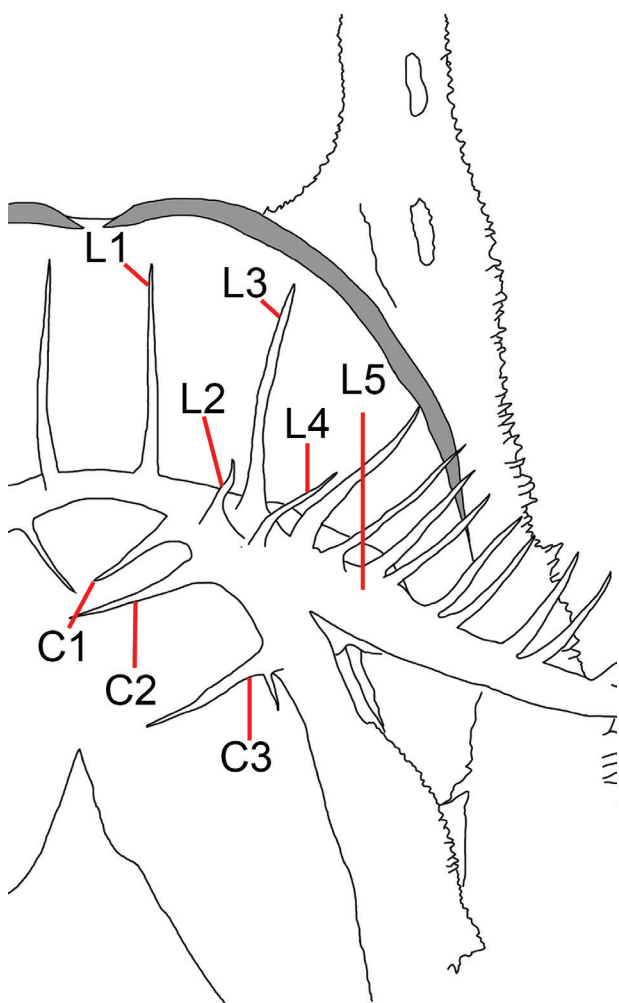


Figure 3. Line drawing of ventral view of *Paraheminodus kamoharai*, NMMB-P 39557, 120.1 mm SL, showing barbels on the lip (L) and chin (C), with villiform tooth patch on upper jaw shaded in grey. Anterior to top. Figure not to scale. Illustrated by Y. Su.

Coloration (fresh). (Fig. 1), head and body reddish yellow. Bony plates on dorsal and upper lateral rows yellow on center and posterior margins. Bony plates on lower lateral and ventral rows pale. Pectoral fin red, slightly

tinted with yellow. Pelvic, anal, and caudal fins pale. Dorsal fin pale, with distal half yellow or red. Longest barbel yellow and tinted with red.

Coloration (preserved). (Fig. 2), head, body, all barbels, oral cavity, gill membrane, and arches, and all fins pale. Peritoneum black.

Discussion

Morphological variations. The presently reported specimen is identified as *Paraheminodus kamoharai* in having upper-jaw teeth present (Fig. 3); lateral margin of the head smooth; bony plates on the upper lateral row with an antrorse spine (Fig. 4); rostral-projection length ca. 35% HL (its tip slightly damaged); and pectoral-fin length 59.7% HL (Kawai et al. 2004b, 2008). The meristic characters of our specimen generally agree with the type specimens, with the exception that our specimen possesses one more raker on the upper limb (6, vs. 5; Table 1). On the other hand, several differences in morphometric characters were observed compared to the type specimens. The Taiwanese specimen has a smaller body depth (14.8%SL, vs. 16.9–19.0%SL; Table 2); smaller head length (34.9%SL, vs. 37.7–40.4%SL); slightly smaller distance from the snout to the dorsal fin (36.3%SL, vs. 37.0–39.9%SL); slightly smaller distance from the snout to anal fin (48.1%SL, vs. 49.1–51.8%SL); slightly smaller distance from snout to the anus (43.7%SL, vs. 44.7–47.6%SL); slightly smaller snout length (18.1%SL, vs. 19.3–19.9%SL); slightly smaller upper-jaw length (14.9%SL, vs. 15.4–16.9%SL); slightly smaller lower-jaw length (13.0%SL, vs. 14.0–15.0%SL); slightly smaller pectoral-fin length (20.8%SL, vs. 21.8–25.5%SL); and slightly larger interorbital width (6.9%SL, vs. 5.9–6.4%SL). Since our specimen is by far the largest (120.1 mm SL, vs. 106.9–114.8 mm SL in other specimens), those minor differences are considered ontogenetic variations. However, more specimens are needed to confirm those major differences (e.g., smaller body depth and head length) among different populations or ontogenetic variations.

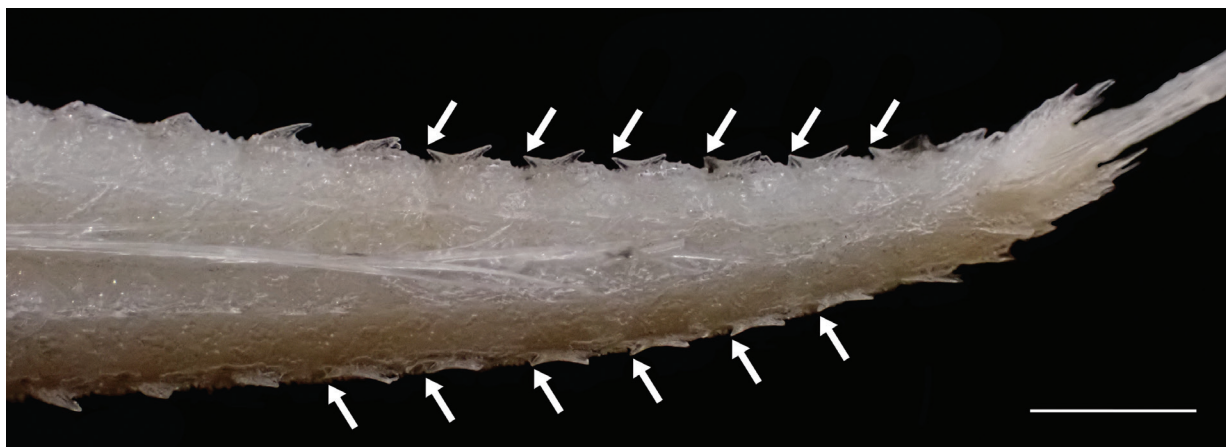


Figure 4. Bony plates on upper lateral row of *Paraheminodus kamoharai*, NMMB-P 39557, 120.1 mm SL, preserved. Arrows point to the antrorse spines. Anterior to left. Scale bar = 5 mm. Photo by Y. Su.

Distribution. This species was previously only known from type specimens collected from the Philippines at a depth of 285 m (Kawai et al. 2004b). Recently, Kawai (2017) reported a specimen collected from Kochi, Japan, representing the northernmost record of this species. Our specimen fills the distribution gap of this species and suggests a wide distribution in the northwest Pacific Ocean.

Checklist of peristediines from Taiwan. Table 3 provides a list of 24 species of Peristediinae recorded from Taiwan, including 20 valid and four invalid species. Among them, four species: *Paraheminodus kamoharai*, *Peristedion longicornutum* Fricke, Kawai, Yato et

Motomura, 2017, *Peristedion richardsi*, *Satyrichthys clavilapis* were reported recently (Kawai 2019b; Wada et al. 2019; Kawai and Ho 2020; this study) and represent the northernmost record of each species. On the other hand, four species previously recorded as: “*Peristedion nierstraszi*”, “*Satyrichthys isokawae*”, “*Satyrichthys piercei*”, and “*Scalicus amiscus*” (see Shen 1984a, 1984b; Shao and Chen 1993; Shen and Wu 2011) are now regarded as junior synonyms of *Peristedion riversandersoni* Alcock, 1894, *Satyrichthys moluccensis* (Bleeker, 1850), *Satyrichthys laticeps* (Schlegel, 1852), and *Scalicus hians* (Gilbert et Cramer, 1897), respectively (Kawai 2013, 2016, 2019a).

Table 3. Checklist of peristediine species (Actinopterygii: Perciformes: Triglidae: Peristediinae) recorded from Taiwan.

Species	Chinese name	Reference	Remarks
<i>Gargariscus prionocephalus</i> (Duméril, 1869)	波面黃魴鯉	Shen 1984b; Shao and Chen 1993; Shen and Wu 2011; Yato 2019	
<i>Heminodus philippinus</i> Smith, 1917	菲律賓鬚魴鯉	Kawai and Ho 2019	Only known from Dong-Sha (Pratas) Island
<i>Paraheminodus murrayi</i> (Günther, 1880)	默氏副半節魴鯉	Shen and Wu 2011; Kawai and Ho 2019	
<i>Paraheminodus kamoharai</i> Kawai, Imamura et Nakaya, 2004	蒲原氏副半節魴鯉	This study	
<i>Peristedion amblygenys</i> Fowler, 1938	鈍頰黃魴鯉	Ho et al. 2013; Yato 2019	
<i>Peristedion liorhynchus</i> (Günther, 1872)	光吻黃魴鯉	Shen and Wu 2011; Ho et al. 2013; Yato 2019	
<i>Peristedion longicornutum</i> Fricke, Kawai, Yato et Motomura, 2017	長角黃魴鯉	Kawai 2019b	
<i>Peristedion orientale</i> Temminck et Schlegel, 1843	東方黃魴鯉	Shen 1984a, 1984b; Chen and Yu 1986; Shao and Chen 1993; Shen and Wu 2011; Ho et al. 2013; Yato 2019	The figure in Shen and Wu 2011 depicts <i>Satyrichthys rieffeli</i>
<i>Peristedion richardsi</i> Kawai, 2016	里氏黃魴鯉	Wada et al. 2019; Yato 2019	
<i>Peristedion riversandersoni</i> Alcock, 1894	黑帶黃魴鯉	Shen 1984a, 1984b; Shao and Chen 1993; Shen and Wu 2011; Ho et al. 2013; Kawai and Ho 2019; Yato 2019	Reported as “ <i>Peristedion nierstraszi</i> ” by Shen 1984a, 1984b; Shao and Chen 1993; Shen and Wu 2011; Ho et al. 2013
<i>Satyrichthys clavilapis</i> Fowler, 1938	菲律賓紅魴鯉	Yato 2019; Kawai and Ho 2020	Reported by Yato 2019 as <i>Satyrichthys</i> sp.
<i>Satyrichthys laticeps</i> (Schlegel, 1852)	闊頭紅魴鯉	Shen and Wu 2011; Kawai 2013; Yato 2019	Reported by Shen and Wu 2011 as <i>Satyrichthys piercei</i>
<i>Satyrichthys milleri</i> Kawai, 2013	米氏紅魴鯉	Kawai 2013; Yato 2019	One paratype (HUMZ 213180) was collected from Taiwan
<i>Satyrichthys moluccensis</i> (Bleeker, 1850)	摩鹿加紅魴鯉	Shen and Wu 2011; Yato 2019	Reported by Shen and Wu 2011 as “ <i>Satyrichthys isokawae</i> ”
<i>Satyrichthys rieffeli</i> (Kaup, 1859)	瑞氏紅魴鯉	Shen 1984a, 1984b; Chen and Yu 1986; Shao and Chen 1993; Shen and Wu 2011; Kawai 2013; Yato 2019	
<i>Satyrichthys welchi</i> (Herre, 1925)	魏氏紅魴鯉	Shen and Wu 2011; Yato 2019	
<i>Scalicus hians</i> (Gilbert et Cramer, 1897)	褐緣叉吻魴鯉	Shen 1984b; Chen and Yu 1986; Shao and Chen 1993; Shen and Wu 2011; Kawai 2019a; Yato 2019	Reported by Shen 1984b; Chen and Yu 1986; Shao and Chen 1993; Shen and Wu 2011 as “ <i>Scalicus amiscus</i> ”. The figure in Shen and Wu 2011 depicts <i>Satyrichthys milleri</i>
<i>Scalicus orientalis</i> (Fowler, 1938)	東方叉吻魴鯉	Kawai 2019a; Yato 2019	One paratype (USNM 98917) was collected from off Dong-Sha (Pratas) Island
<i>Scalicus paucibarbatulus</i> Kawai, 2019	少鬚叉吻魴鯉	Kawai 2019a	One paratype (NMMB-P 12029) was collected from Taiwan
<i>Scalicus quadratostratus</i> (Fourmanoir et Rivaton, 1979)	方吻叉吻魴鯉	Kawai 2019a	

Acknowledgments

We thank Dr T. Kawai (HUMZ) for assistance in identifying the specimen; Dr H.-C. Ho (NKUST) for reading the early draft, giving critical suggestions, and providing

access to facilities; P.-N. Lee (NMMBA) for curatorial assistance; and Y.-C. Hsu (NSYSU) for various assistance in specimen fixation. This study was supported by the National Kaohsiung University of Science Technology (NKUST).

References

- Chen JTF, Yu M-J (1986) [A synopsis of the vertebrates of Taiwan. Revised and enlarged edition. Vol. 2.] Commercial Press, Taipei, Taiwan, 548 pp. [In Chinese]
- Fricke R, Kawai T, Yato T, Motomura H (2017) *Peristedion longicornutum*, a new species of armored gurnard from the western Pacific Ocean (Teleostei: Peristediidae). *Journal of the Ocean Science Foundation* 28: 90–102. <https://doi.org/10.5281/zenodo.1008818>
- Fricke R, Eschmeyer WN, Van der Laan R (Eds) (2024) Eschmeyer's catalog of fishes: genera, species, references. California Academy of Sciences, San Francisco, CA, USA. [Accessed 5 April 2024] <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>
- Ho H-C, Chee W-L, Chang C-H, Shao K-T (2013) Taxonomic review and DNA barcoding of the fish genus *Peristedion* (Scorpaeniformes: Peristediidae) in Taiwan. *Platax* 19: 37–55. https://doi.org/10.29926/PLATAX.201312_2013.0003
- Kawai T (2008) Phylogenetic systematics of the family Peristediidae (Teleostei: Actinopterygii). *Species Diversity* 13(1): 1–34. <https://doi.org/10.12782/specdiv.13.1>
- Kawai T (2013) Revision of the peristediid genus *Satyrichthys* (Actinopterygii: Teleostei) with the description of a new species, *S. milleri* sp. nov. *Zootaxa* 3635(4): 419–438. <https://doi.org/10.11646/zootaxa.3635.4.5>
- Kawai T (2016) *Peristedion richardsi* sp. nov. (Actinopterygii: Teleostei: Peristediidae) from Indonesian waters, with synonymy between *Peristedion riversandersoni* Alcock, 1894 and *Peristedion nierstraszi* Weber, 1913. *Zootaxa* 4171(2): 335–346. <https://doi.org/10.11646/zootaxa.4171.2.6>
- Kawai T (2017) First Japanese record of *Paraheminodus kamoharai* (Peristediidae) from Kochi, Japan. *Japanese Journal of Ichthyology* 64: 175–178. [In Japanese with English Abstract] <https://doi.org/10.11369/jji.64-175>
- Kawai T (2019a) Revision of an armored searobin genus *Scalicus* Jordan 1923 (Actinopterygii: Teleostei: Peristediidae) with a single new species. *Ichthyological Research* 66(4): 437–459. <https://doi.org/10.1007/s10228-019-00691-z>
- Kawai T (2019b) *Peristedion longicornutum* Fricke, Kawai, Yato and Motomura, 2017 (Actinopterygii: Teleostei: Peristediidae) from Philippines and Taiwan. *Thailand National History Museum Journal* 13: 69–75.
- Kawai T, Ho H-C (2019) Records of four species of armored searobins (Teleostei: Peristediidae) from Dongsha Atoll in the South China Sea. *Platax* 16: 67–75. https://doi.org/10.29926/PLATAX.201912_2019.0005
- Kawai T, Ho H-C (2020) First record of an armored searobin, *Satyrichthys clavilapis* Fowler, 1938 (Teleostei: Peristediidae) from Taiwan. *Platax* 17: 113–117. https://doi.org/10.29926/platax.202012_17.0008
- Kawai T, Imamura H, Nakaya K (2004a) *Paraheminodus kochiensis* Kamohara, 1957 (Teleostei: Peristediidae), a junior synonym of *Paraheminodus murrayi* (Günther, 1880), with a comparison of *Paraheminodus murrayi* and *Paraheminodus laticephalus* (Kamohara, 1952). *Ichthyological Research* 51(1): 73–76. <https://doi.org/10.1007/s10228-003-0188-0>
- Kawai T, Imamura H, Nakaya K (2004b) A new species of armored sea robin, *Paraheminodus kamoharai* (Teleostei: Peristediidae), from the Philippines. *Ichthyological Research* 51(2): 126–130. <https://doi.org/10.1007/s10228-004-0205-y>
- Kawai T, Nakaya K, Séret B (2008) A new armored searobin *Paraheminodus longirostralis* (Teleostei: Peristediidae) from New Caledonia. *Ichthyological Research* 55(4): 374–378. <https://doi.org/10.1007/s10228-008-0061-2>
- Miller GC (1967) A new species of western Atlantic armored searobin, *Peristedion greyae* (Pisces: Peristediidae). *Bulletin of Marine Science* 17: 16–41.
- Richards WJ (1999) Family Triglidae. Pp. 2359–2382. In: Carpenter KE, Niem VE (Eds) *Species identification guide for fisheries purposes. The living marine resources of the western central Pacific. Volume 4. Bony fishes part 2 (Mugilidae to Carangidae)*. FAO, Rome.
- Shao K-T, Chen J-P (1993) [Subfamily Peristediinae.] Pp. 251–252, pls 61-3–62-3. In: Shen S-C (Ed.) [Fishes of Taiwan.] National Taiwan University, Taipei, Taiwan. [In Chinese]
- Shen S-C (1984a) [Coastal fishes of Taiwan.] National Taiwan Museum, Taipei, Taiwan, 189 pp. [In Chinese]
- Shen S-C (1984b) [Synopsis of fishes of Taiwan.] Southern Materials Center, Taipei, Taiwan, 533 pp. [In Chinese]
- Shen S-C, Wu K-Y (2011) [Fishes of Taiwan.] National Museum of Marine Biology and Aquarium, Checheng, Taiwan, 986 pp. [In Chinese]
- Wada H, Hata H, Motomura H (2019) First Northern Hemisphere record of a poorly known armored searobin *Peristedion richardsi* (Actinopterygii: Teleostei: Peristediidae) from Taiwan. *Species Diversity* 24(2): 203–207. <https://doi.org/10.12782/specdiv.24.203>
- Yato T (2019) [Family Peristediidae.] Pp. 557–570. In: Koeda K, Ho H-C (Eds.) [Fishes of southern Taiwan.] National Museum of Marine Biology and Aquarium, Checheng, Taiwan. [In Chinese and English]
- Yatou T, Okamura O (1985) *Satyrichthys isokawae* Yatou et Okamura, sp. nov. Pp. 586–589. In: Okamura O (Ed.) *Fishes of the Okinawa Trough and the adjacent waters, Vol 2. The intensive research of unexploited fishery resources on continental slopes*. Japan Fisheries Resource Conservation Association, Tokyo, Japan. [In English and Japanese]