



New Distributional Record of *Peristedion liorhynchus* (Scorpaeniformes: Peristediidae) From Central Indian Ocean

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Abstract

Present study described the new distributional record of *Peristedion liorhynchus* (Günther in Proc of the Zool Soc Lond 1871:652–675, 1872) from Central Indian Ocean. Two specimens were collected from the continental slope of Arabian Sea, India at a depth of 934 m. Previous occurrence of *P. liorhynchus* in the Indian Ocean only came from its eastern region. The present record of this species extends its geographical distributional area towards the Central Indian Ocean and also represents the report of third species of the genus *Peristedion* from this area. Present record constitutes a valuable addition to the ichthyofauna of India. Along with morphometric and meristic characters previous distributional records also discussed.

Keywords Scorpaeniformes · Peristediidae · *Peristedion liorhynchus* · Central Indian Ocean

Introduction

The peristediid fishes (Peristediidae- Scorpaeniformes) commonly known as armored searobins or armored gurnards are medium sized benthic marine fishes usually inhabit on the continental slope and shelf at depths of 30–1324 m (Kawai 2008, 2016; Tenda and Kawai 2012; Richards and Miller 2016). The family is unique in having encased body with four rows of bony plates, detached pectoral-fin rays, rostral projections and barbels on the lower jaw (Kawai 2008). Rostral projections are equipped with sensory pores which can help them to detect the submerged prey in the sand along with detached pectoral fin rays and barbels. Family consists of six genera; *Gargariscus* Smith (1917) (with a single nominal species); *Heminodus* Smith (1917) (with a single species); *Paraheminodus* Kamohara (1957) (with 4 valid species); *Peristedion* Lacepède (1801) (with 24 valid species (Kawai 2016; Fricke et al. 2017); *Satyrichthys* Kaup (1873) with 7 valid species (Kawai 2013, 2014) and *Scalicus* Jordan (1923) with 8 valid species (Kawai 2008). Among the five genera, *Peristedion* is recognized as the most species rich, comprising 24 nominal species characterised by

absence of upper jaw teeth, smooth lateral margins of the head and posterior pairs of bony plates in lower lateral rows contralaterally sutured along the mid-line (Kawai 2016; Fricke et al. 2017).

Methods and Material

Two specimens were collected by the exploratory deep-sea fishery surveys of Fishery Oceanographic Research Vessel, *Sagar Sampada* (FORV SS) conducted by Centre for Marine Living Resources and Ecology (CMLRE), Ministry of Earth Sciences (MoES), India, along the continental slope of the Arabian Sea, off Trivandrum. The specimens were collected using High Speed Demersal Trawl crustacean version (HSDT-CV), operated at a speed of 2.5 knots at a depth of 934 m and preserved in 5% formaldehyde solution. Measurements, counts and other descriptive follow Ono and Kawai (2014); Kawai (2016). Counts for bony plates and barbels follow Yatou and Okamura (1985). Measurements and counts were compared with previous data and presented in the Table 1. The materials were kept in the CMLRE Referral Centre under the accession number IO/SS/FIS/00613 A & B (Fig. 1).

Material examined— IO/SS/FIS/00613 A & B, 170 mm, 174 mm SL respectively; Cruise 366, station 03, 8.35° N, 76.23° E, 934 m., Arabian Sea, Central Indian Ocean, FORV SS, HSDT-CV, 10:20 h, October 2017.

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Table 1 Morphometric and meristic data for *Peristedion liorhynchus* compared with previous study

Measurements	Present study		Kawai and Yabe (2006)	
	IO/SS/FIS/ 00,613 A	IO/SS/FIS/ 00,613 B	Holotype	(n=18)
Standard Length (mm)	170	174	188	130.6–222.6
Measurements % of SL				
Body depth	15.3	16.1	15.1	13.6–18.4
Body width	14.1	14.4	14.2	12.4–16.1
Head length	31.2	31.4	33.2	31.9–34.5
Head depth	14.1	13.8	14.7	13.2–17.7
Head width	21.5	22.0	22.9	21.8–27.5
Distance from snout to dorsal fin	30.0	31.0	33.4	32.2–34.5
Distance from snout to anal fin	43.5	43.7	46.5	45.4–50.8
Distance from snout to anus	40.0	39.7	42.2	39.6–45.4
Snout length	14.7	14.9	16.6	15.1–17.5
Rostral projection length	10.6	10.9	7.6	7.3–12.3
Rostral projection width	3.5	3.4	3.5	-
Interspace between rostral projections	4.0	4.0	6.6	-
Longest lip barbel length	9.4	8.0	10.6	8.2–13.9
upper jaw length	14.7	11.5	12.3	10.4–12.6
Lower jaw length	7.6	8.6	12.7	12.2–13.6
Orbital diameter	7.6	8.0	8.0	7.0–8.2
Interorbital width	6.5	6.3	7.3	6.7–8.1
Pectoral fin length	14.7	15.5	17.6	13.7–17.2
Length of upper detached pectoral fin rays	20.0	20.7	22.3	17.6–22.6
Length of lower detached pectoral fin rays	15.2	15.9	18.6	15.8–18.0
Pelvic fin length	16.4	17.2	16.9	16.3–18.7
First dorsal spine length	8.8	10.9	11.7	8.7–13.8
Caudal peduncle length	9.4	10.5	9.6	8.7–11.0
Caudal peduncle depth	2.4	2.3	2.0	2.0–2.5
Counts				
Dorsal spines	8	8	8	VII–IX
Dorsal fin rays	20	20	21	20–22
Anal fin rays	21	20	21	20–22
Pectoral fin rays including two free rays	14	14	14	14
Pelvic fin rays	6	6	6	6
Bony plates in dorsal row	30	30	32	30–32
Bony plates in upper lateral row	35	35	36	36–37
Bony plates in lower lateral row	25	26	26	25–27
Bony plates in ventral row	25	26	25	23–24+2
Bony plates before anus	2	2	2	2
Bony plates between anus and first anal fin ray	2	2	2	1–2
Gill rakers (upper + lower including at angle)	24	23	24	22–26
Lip barbels (one half)	3	3	3	3
Chin barbels (one half)	6	6	6	5–7

Results and Discussion

Systematic Accounts

Order—Scorpaeniformes Bloch 1789.

Family—Peristediidae Jordan and Gilbert (1883).

Genus—*Peristedion* Lacépède (1801).

Peristedion liorhynchus (Günther 1872).

Synonym- *Peristedion picturatum* McCulloch (1926)
(Kawai and Yabe 2006).

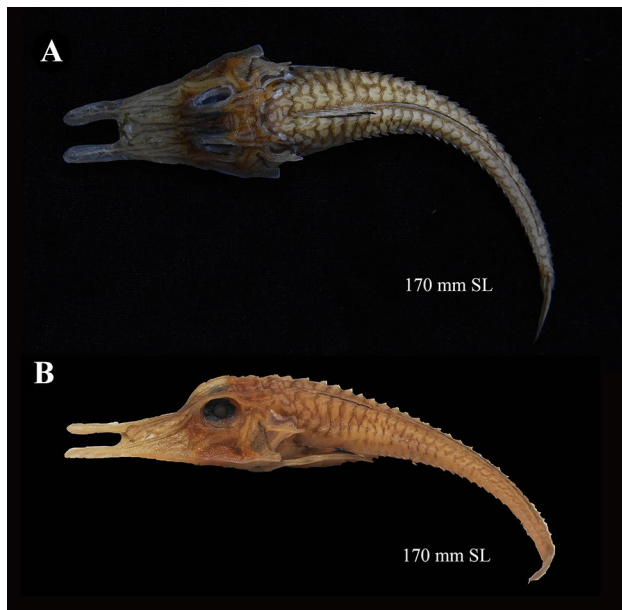


Fig. 1 *Peristedion liorhynchus* (preserved in 5% formaldehyde solution) IO/SS/FIS/00613 A, 170 mm SL. (A)—Dorsal view (B)—Lateral view

Description

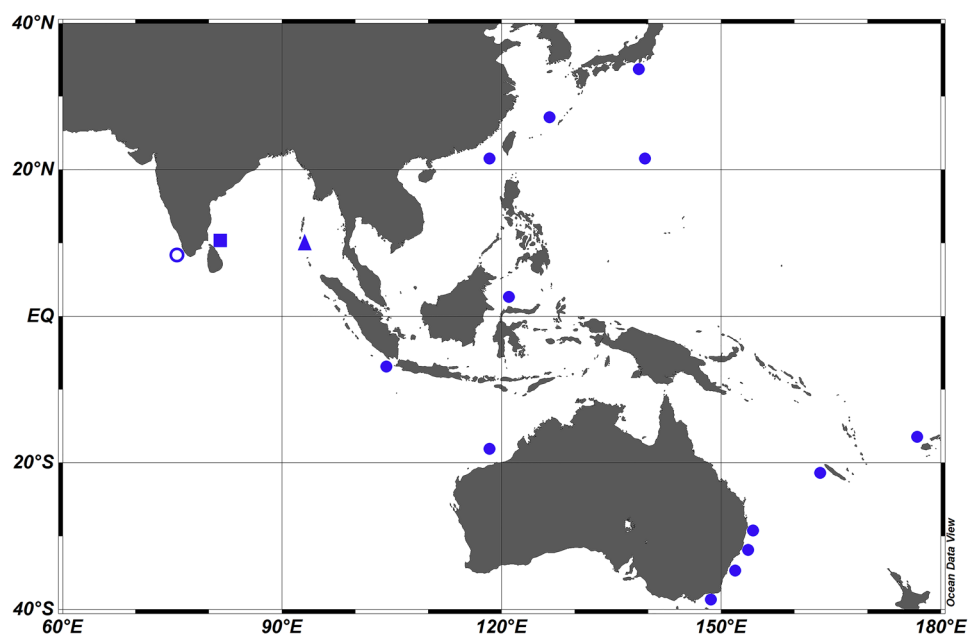
Body fusiform, covered with four rows of bony plates such as dorsal, upper lateral, lower lateral and ventral rows; head large and depressed, lateral margin of head smooth; snout broad; perifacial rim straight, starting at anterior margin of lower jaw, gradually increasing in width posteriorly and terminating at posterior edge of preopercle. Rostral projection

long, spatulate in outline with 4 sensory pores on each of its ventral surface and ends up with curved margin on medial side at base. Anterior edge of 4th sensory pore of rostral projection located posterior to anterior edge of premaxilla; mouth large and inferior, both jaws, vomer and palatine toothless.

No spines on nasal, lateral ethmoid, and mesethmoid; first and second frontal spines are stout and small; parietal spine present; post temporal ridge weak with small spine; single prominent ridge on 4th infraorbital without any spine below the orbit; opercle with a prominent ridge and spine at the tip. All the bony plates with a single backwardly placed spines which gradually decreasing its size posteriorly. Forwardly directed spines present on the posterior part of upper lateral row, 23rd plate onwards up to caudal peduncle. Posterior pairs of bony plates in lower lateral rows contralaterally sutured with plates of the other side along the mid-line. Two large contralateral pairs of bony plates with low ridge before anus; bony plates are tightly sutured along ventral midline. Dorsal fin originating at anterior end of 2nd bony plates in dorsal row, ending at caudal peduncle. Anal fin originating between 2nd and 3rd ventral bony plates; detached pectoral-fin rays thick, upper ray longer than lower and former barely reaches up to the anal fin origin, lower and pelvic fin rays almost reaching up to anus; weakly emarginated caudal fin. VIII- 20 dorsal fin rays; 20–21 anal soft fin rays. Three groups of lip barbels (one half), 1st with cluster of 3 barbels; 2nd with 2–3 barbels and 3rd, long filamentous barbel with 19–23 small branches. Six groups of barbels on chin, each group consists of 3 to 4 branches.

Color of the specimen—In fresh, not documented. In preservative, head and body light brown with distinct dark reticulate pattern. Rostral region having series of longitudinal lines with dark brown color. Both dorsal fin spine and

Fig. 2 Geographical distribution of *Peristedion liorhynchus*; present record (open circle), previous records (closed circle). Distribution of *P. riversandersoni* (closed square) and *P. amblygenys* (closed triangle) from Central Indian Ocean. A single symbol may represent more than one capture



soft rays margins are black, markings is prominent especially in spinous region of dorsal fin. Caudal fin with light brown, dorsal and ventral margins retain black. Three faded black blotches on the joined pectoral fin. Detached pectoral fin rays and pelvic fins having light brown without any marking. Anal fin rays with black margin.

Distribution—Günther (1872) described *Peristethus liorhynchus* (now, *Peristedion liorhynchus*) from Manado, Indonesia (type locality). Widely distributed in Indo-Pacific; East China Sea, southern Japan, the Philippines, New Caledonia, northern and western Australia and, Indonesia (Kawai and Yabe 2006; Ono and Kawai 2014). Present specimens collected from Central Indian Ocean represent greater depth distribution (934 m) than previously acknowledged (140–710 m, Ono and Kawai 2014).

All the measurements of present specimens provided herein fall well within the range described for *P. liorhynchus* by Kawai and Yabe in (2006). However, Ono and Kawai (2014) mentioned four blotches on joined pectoral fin but present specimens having only 3 blotches instead of four, may be faded entirely due to the preservation. Alcock (1894) described *P. riversandersoni* based on a single specimen collected from off Colombo, Sri Lanka and later, reported from off Kollam, Arabian Sea by Talwar in (1976). Alcock (1898) described two more species from the Indian territorial waters; *Peristethium serrulatum* and *Peristethium investigatoris* from Andaman waters. Based on the new combination proposed by Kawai (2008, 2013) *Peristethium serrulatum* now accepted as *Scalicus serrulatus* (Alcock 1898) and *Peristethium investigatoris* as *Scalicus investigatoris* (Alcock 1898). Further, Rajeeshkumar et al. (2016) added few more records from Indian waters viz, *Satyrichthys laticeps* (Schlegel 1852); *S. milleri* Kawai 2013; *Scalicus orientalis* (Fowler 1938), *Heminodus philippinus* Smith (1917), *Peristedion amblygenys* Fowler (1938) and *P. liorhynchus* (present study). *Gargariscus prionocephalus* (Duméril, 1869) reported by Talwar and Mukerjee in (1978) from Arabian Sea. It can be summarized that Indian peristediids are now represented by 5 genera and 9 species. *Peristedion liorhynchus* reported herein represents the third species of *Peristedion* from Central Indian Ocean other than *Peristedion amblygenys* and *P. riversandersoni* (Fig. 2).

Peristedion liorhynchus can be easily distinguished from its congeners *P. riversandersoni* and *P. amblygenys* in having anterior edge of 4th sensory pore of rostral projection located posterior to anterior edge of premaxilla (vs. anterior to anterior edge of premaxilla) and perifacial rim smooth and straight (vs prominent perifacial rim); rostral projection spatulate (vs. triangular rostral projection). Further, *P. riversandersoni* distinct from *P. amblygenys* in the rostral projection shape and its inner margin shape at base. Former having narrowly triangle rostral projection with rounded inner margin, latter with broadly triangular projection having

straight inner margin. Also, *P. amblygenys* having broad rostral projection (12.1–13.3% HL) vs. narrow rostral width (8.6–12.3% HL) in *P. riversandersoni* (Ono and Kawai 2014).

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Declarations

Conflicts of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

- Alcock AW (1894) Natural history notes from H. M. Indian marine survey steamer Investigator, Commander C. F. Oldham, R. N., commanding. Series II, no. 11. An account of a recent collection of bathybial fishes from the Bay of Bengal and from Laccadive Sea. J Asiat Soc Bengal 63:115–137, pls. 6–7
- Alcock AW (1898). Illustrations of the zoology of the royal indian marine surveying steamer investigator. Fishes Calcutta 5:152–153, pls. XXV
- Fricke R, Kawai T, Yato T, Motomura H (2017) *Peristedion longicor-nutum*, a new species of armored gurnard from the western Pacific Ocean (Teleostei: Peristediidae). J Ocean Sci Found 28:90–102. <https://doi.org/10.5281/zenodo.1008818>
- Fowler HW (1938) Descriptions of new fishes obtained by the United States Bureau of Fisheries steamer “Albatross”, chiefly in Philippine seas and adjacent waters. Proceedings of the United States National Museum 85:31–135
- Günther A (1872) Report on several collections of fishes recently obtained for the british museum. Proc of the Zool Soc Lond 1871:652–675, pls 53–70
- Jordan DS (1923) A classification of fishes including families and genera as far as known. Stanford University Publications, University Series, Biological Sciences 3:77–243+i–x (index)
- Jordan DS, Gilbert CH (1883) Synopsis of the fishes of North America. Bulletin of the United States National Museum 16:i–liv+ 1–1018
- Kamohara T (1957) Notes on twenty additions to marine fish fauna of Prov. Tosa, Japan, including one new genus (family Peristediidae). Research Reports of the Kochi University 6:1–6
- Kaup JJ (1873) Ueber die Familie Triglidae nebst einigen Worten über die Classification. Archiv für Naturgeschichte 39:71–93
- Kawai T (2008) Phylogenetic systematics of the family Peristediidae (Teleostei: Actinopterygii). Species Diversity 13:1–34. <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 (2014) *Satyrichthys kikingeri* Pogoreutz, Vitecek & Ahnelt, 2013, a junior synonym of *Satyrichthys laticeps* (Schlegel, 1852) (Actinopterygii: Teleostei: Peristediidae). Zootaxa 3900:1, 135–140. <https://doi.org/10.11646/zootaxa.3900.1.9>

- 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, Yabe M (2006) *Peristedion picturatum* (Actinopterygii: Peristediidae), a junior synonym of *Peristedion liorhynchus*. Species Diversity 11:1–5
- Lacépède BGE (1801) Histoire Naturelle des Poissons. Vol. 3. Prasson, Paris, lxvi+558 pp. 34 pls
- McCulloch AR (1926) Report on some fishes obtained by the F. I. S. "Endeavour" on the coasts of Queensland, New South Wales, Victoria, Tasmania, South and South-Western Australia. Part V. Biological Results of the Fishing Experiments Carried on by the F. I. S. "Endeavour" 1909–14, 5:157–216, pls 43–56
- Ono M, Kawai T (2014) Review of armored searobins of the genus *Peristedion* (Teleostei: Peristediidae) in Japanese waters. Species Diversity 19:117–131. <https://doi.org/10.12782/sd.19.2.117>
- Rajeeshkumar MP, Vinu J, Sumod KS, Hashim M, Sanjeevan VN, Sudhakar M (2016) Fishes of the family peristediidae (Pisces: Scorpaeniformes) from Indian Waters with Four New Records. South Indian J Biol Sci 2(4):404–414
- Richards WJ, Miller GC (2016) Peristediidae. Armoured searobins. In: Carpenter KE & De Angelis N (Eds.) The living marine resources of the eastern Central Atlantic. Volume 3, bony fishes part 1 (Elopiformes to Scorpaeniformes). FAO Rome Italy pp 2296–2297
- Schlegel H (1852) Beschrijving eener nieuwe soort van visschen, *Peristedion laticeps*. Bijdragen tot de Dierkunde I:43–44
- Smith HM (1917) New genera of deep-water gurnards (Peristediidae) from the Philippine Islands. Proceedings of the Biological Society of Washington 30:145–146
- Talwar PK (1976) On the rare bathypelagic fish, *Peristedion riversandersoni* (Alcock, 1894). J Mar Bio Ass India 16(1):294–297
- Talwar PK, Mukerjee P (1978) Record of the crocodile fish, *Gargariscus prionocephalus* (Dumeril) in Indian Waters. Bull Zool Surv India 1:1
- Tenda M, Kawai T (2012) Record of the armored searobin *Peristedion barbiger* (Garman, 1899) (Actinopterygii: Teleostei: Peristediidae) off Peru with taxonomic notes. Species Diversity 17:2:135–144. <https://doi.org/10.12782/sd.17.2.135>
- Yatou T, Okamura O (1985) *Satyrichthys isokawae* Yatou et Okamura, sp. nov. In: Okamura, O. (Ed.), Fishes of the okinawa trough and the adjacent waters. Vol. 2. Japan Fisher Res Conserv Associat Tokyo pp. 586–589

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