

MARINE RECORD

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New distributional records of three soldier fishes (Pisces: Holocentridae: *Myripristis*) from Indian waters

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Abstract

Three species of *Myripristid* fishes identified as *Myripristis seychellensis*, *M. formosa* and *M. greenfieldi* were collected from Indian waters. This adds to the already existing six species of soldierfishes *Myripristis adusta*, *M. berndti*, *M. botche*, *M. hexagona*, *M. murdjan* and *M. violacea* recorded from Indian and Andaman waters. Since these three fishes are new distributional records for Indian waters, meristic counts, body measurements and descriptions of the specimens are presented.

Keywords: Seychelles soldier, Holocentridae, Range extension, Indian waters

Introduction

Order Beryciformes with two sub families Myripristinae and Holocentrinae (Nelson, 2006) occur mainly on reefs or rocky substrate at shallow to moderate depths of tropical and sub-tropical waters of Indo-Pacific. Subfamily Holocentrinae consists of 3 genera *Holocentrus* (2 Atlantic species), *Sargocentron* (5 Atlantic and about 21 Indo-Pacific species) and *Neoniphon* (1 Atlantic and 4 Indo-Pacific species); subfamily Myripristinae consists of 5 genera *Corniger* Agassiz, *Pristilepis* Randall, Shimizu and Yamakawa, *Plectrypops* Gill, *Ostichthys* Cuvier and *Myripristis* Cuvier. Of these five genera, *Myripristis* (soldierfishes) is the largest with about 28 species recorded from all over the world (Randall and Greenfield 1996; Froese and Pauly 2010 online). Six species of soldierfishes *Myripristis adusta*, *M. berndti*, *M. botche*, *M. hexagona*, *M. murdjan* and *M. violacea* are recorded from Indian and Andaman waters (Randall and Greenfield 1996; Rajan et al., 2011). Myripristid fishes are characterized by deep ovate moderately compressed body with the last dorsal spine distinctly longer than the penultimate; snout very short, blunt; eye very large with slightly concave interorbital; coarsely ctenoid body scales. These fishes are reported to occur on reefs or rocky strata from shallow to moderate depths. They are nocturnal and characterized by

their large eyes hiding in crevices or caves in aggregations during day and dispersing at night to feed on zooplankton at night. During the course of study on the reef fishes of India, three soldier fishes which are new distributional records for Indian waters have been recorded. The fishes were identified as *Myripristis seychellensis*, *M. formosa* and *M. greenfieldi*. *M. seychellensis* was earlier recorded from Seychelles, Red Sea from the Western Indian Ocean; *M. greenfieldi* from Ogasawara Islands, southern Japan and is reported to be endemic to the region while *M. formosa* was first reported from Taiwan. The three fishes were hitherto not reported from the Indian waters and the present account is the first report of the species from these waters.

Materials and methods

Nine specimens of *Myripristis seychellensis* in the length range 168.01–217.01 mm and weight 95–190 g respectively were collected on 25 February 2012 during routine fish survey at Cochin Fisheries Harbour, from the commercial trawler vessels operating off west coast of India at depth range between 50 and 200 m. Later in February 2012 one specimen of *M. formosa* was also collected from Cochin Fisheries Harbour. *M. greenfieldi* was from a previous 2006 collection from Cochin Fisheries Harbour. Methods of taking counts and measurements follow Hubbs and Lagler (1949). Gut content and sex of the collected specimens were also studied. The fishes were identified as *Myripristis seychellensis* (Fig. 1) *M. formosa*

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Fig. 1 *Myripristis seychellensis* collected from Cochin Fisheries Harbour



Fig. 3 *Myripristis greenfieldii* collected from Cochin Fisheries Harbour

(Fig. 2) and *M. greenfieldii* (Fig. 3) respectively based on available literature (Randall and Greenfield 1996). The specimens were preserved and deposited in the reef fish collection in the Demersal Fisheries Division, CMFRI, Kochi, India as DFD-1-2012(1/9), DFD-2-2012 and DFD-3-2012 respectively.

Results

Systematics

Order BERYCIFORMES

Family BERYCIDAE Lowe 1839

Subfamily Myripristinae Nelson 1955

Genus *Myripristis* Cuvier 1829

Myripristis seychellensis Cuvier 1829

(Fig. 1)

Materials examined

Myripristis seychellensis Cuvier 1829 DFD-1-2012(1/9) 9 specimens with total length range 168.01–217.01 mm and weight 95–190 g collected from Cochin Fisheries Harbour, Kerala, India.

Diagnosis

Dorsal fin rays X+I, 14; anal fin rays IV, 13–14; pectoral fin rays 15–16; lateral-line scales 28–30; mouth terminal with lower jaw slightly inferior when closed; posterior border of teeth on vomer rounded.



Fig. 2 *Myripristis formosa* collected from Cochin Fisheries Harbour

Description

Body deep, ovate moderately compressed with large rough ctenoid scales on the body; gill rakers 11–13 on upper limb and 22–23 on lower limb, with a total of 33–36. Body oblong, moderately compressed, depth 2.3–2.7 times in standard length; head length 2.6–2.7 times in standard length; eyes large, its diameter 2.1–2.7 times in head length; mouth moderate, terminal, slightly inferior when closed; maxilla vertically reaching the posterior edge of orbit; pre-operculum finely serrated. Fourth dorsal spine longest, its length 1.3 times in longest dorsal ray; third anal spine length 1.6 times in longest anal ray; caudal peduncle depth less than eye diameter, its depth 1.3–1.8 times in eye diameter; caudal fin forked, lobes rounded.

Colour: Body and head reddish pink to white dorsally and pinkish silvery ventrally; edges of the scales reddish. Head light red, scales on operculum pinkish silver with edges tipped light red. A prominent black blotch seen on opercular membrane, diameter equal to the length of eye diameter; blotch fades or becomes dusky ventrally; axil of pectoral, dorsal, pectoral base blackish; iris dark reddish with a black blotch dorsally. Dorsal fin spines reddish to pink; upper half of inter spine membranes orangish – red, lower part whitish; soft dorsal, anal and caudal rays reddish yellow with a whitish leading edge, followed by a black streak. Pelvic fin rays pinkish white with a whitish outer edge, followed by reddish band. Pectoral fin pale red to transparent.

Colour in formalin: Body colour fades to creamy white - brownish except the black blotches on the opercular membrane and the black pectoral axil.

Order BERYCIFORMES

Family BERYCIDAE Lowe 1839

Subfamily Myripristinae Nelson 1955

Genus *Myripristis* Cuvier 1829

Myripristis formosa (Fig. 2)

Material examined

Myripristis formosa (DFD-2-2012), 1 specimen with total length 177.41 mm and weight 120 g collected from Cochin Fisheries Harbour, Kerala, India.

Table 1 Morphometric comparison of *Myripristis seychellensis* (in SL and HL) from India with the earlier records

Morphometric measurements	Randall and Gueze 1981 Red Sea	Chen et al. 1990 Taiwan	Randall and Greenfield 1996 Seychelles	Present specimens 2012 Kochi
Dorsal fin	X+I, 14–15	X+I, 14	X+I, 14–15	X+I, 14–15
Anal fin	IV, 13	IV, 11	IV, 13	IV, 13–14
Pectoral Fin	14–15	15	14–15	15–16
Lateral line	28	28	28	28–30
Gill rakers	(12–15) + (25–29)	11 + 22	(12–15) + (25–29)	(11–13) + (22–23)
In standard length				
Body depth	2.19–2.38	2.20	2.2–2.4	2.3–2.7
Head length	2.58–3.02	2.94	2.6–3	2.6–2.7
In head length				
Eye diameter	*	2.17	*	2.1–2.7
Snout length	4.75–5.28	7.28	*	7.6–8.8
Inter orbital	4.19–4.50	4.88	4.1–4.5	5–5.8
3rd dorsal spine	2.29–2.49	2.11	*	2.7
2nd dorsal ray	*	1.54	*	1.8–2
4th anal spine	*	2.44	2.1–2.45	2.9
2 or 3rd anal ray	1.31–1.58	*	*	1.6–1.9
Depth of caudal peduncle	3.39–3.83	3.27	*	3.7–3.9
Pectoral fin length	1.47–1.56	*	*	1.4–1.6
Ventral fin Length	1.46–1.66	*	*	1.5–1.9
Caudal fin length	1.16–1.29	*	*	1.3

*Not available

Diagnosis

D XI, 14; A IV, 12; P 16; V I, 7; Ll 33; Gr 11+22. Deep bodied, oblong solidfish with deeply forked caudal fin and serrated pre-operculum.

Description

Body deep, oblong, depth 2.4 times in SL; head length 2.9 times in SL; snout short; eyes big, diameter 2.2 times in HL. Mouth oblique, terminal; lower jaw protruding slightly and fitting into a notch in the upper jaw. Very small villiform teeth on the vomer in a triangular patch. Preoperculum serrated; operculum with single spine. Dorsal fin origin on a vertical straight above pelvic fin origin; above second to third lateral line scale. Fins with hard, sharp spines; caudal peduncle small, narrow; caudal fin deeply forked. Scales strongly ctenoid with ridges on surface.

Colour in fresh condition: Body reddish to silvery white; dorsal, anal and paired fins reddish, interfin membranes slightly pale red to white; tips of soft dorsal and anal fins with a blackish spot; the leading edges of all fins white. Axil of pectoral fins blackish except the white scaled part. Outer free central end of opercular membrane is blackish; a black patch extends vertically across the eye.

Order BERYCIFORMES

Family BERYCIDAE Lowe 1839

Subfamily Myripristinae Nelson 1955

Genus *Myripristis* Cuvier 1829*Myripristis greenfieldi* Randall & Yamakawa 1996

(Fig. 3)

Diagnosis

Myripristis greenfieldi Randall & Yamakawa 1996 (DFD-3-2012), 1 specimen with total length 215 mm and standard length 182 mm collected from Cochin Fisheries Harbour, Kerala, India in 2006

Material examined

D X+I, 14; A IV, 12; pectoral fin rays 14, pelvic I, 5; lateral line scales 29; gill rakers 43. Small soldier fish with oblong body, broad interorbital space, forked caudal fin with pointed lobes. Scales absent in the axil of the pelvic fins; pelvic, second, dorsal and caudal fin with white leading lines. Body covered with thick osseous scales.

Description

Body compressed, depth 2.4 times in SL; head length 2.9 times in SL; eyes large, diameter 2.1 times in HL; broad inter-orbital space; mouth moderate, terminal; narrow

Table 2 Morphometric comparison of *Myripristis formosa* from India with its holotype and paratype

Morphometric measurements	Chen et al. 1990 HOLOTYPE Taiwan	Chen et al. 1990 PARATYPE Taiwan	Present Specimen 2012 Kochi
Dorsal fin	X+I, 14	X+I, 14	X+I, 14
Anal fin	IV, 12	IV, 12	IV, 12
Pectoral Fin	14–15	15	15
Lateral line	28	28	28
Gill rakers	10–11 + 22–23	10–11 + 22–23	23
As % of standard length			
Body depth	47.5	45.2	28.55
Body width	21.8	21.1	39.64
Head length	35.8	34.8	34.36
Snout length	7.5	7.3	5.15
Orbit diameter	15.1	13.6	15.24
Inter-orbital width	7.6	8.1	7.77
Upper jaw length	20.3	19.4	19.53
Caudal peduncle depth	11	10.7	9.62
Caudal peduncle length	12.3	13	11.98
Pre-dorsal length	40.2	38.3	40.38
Pre-anal length	74.5	73.0	70.41
Pre-pelvic length	42.9	39.7	39.64
First dorsal spine	10.4	9.4	9.5
Second dorsal spine	13.7	12.9	12.5
Longest dorsal spine	15.1	14.2	15.46
Tenth dorsal spine	4.9	5.1	5.2
Eleventh dorsal spine	10.1	10.3	*
Longest dorsal ray	22.2	21.4	20.04
First anal spine	2.8	1.9	*
Third anal spine	13.2	13.2	*
Fourth anal spine	13.9	13.3	*
Longest anal ray	22.4	21.6	18.42
Caudal fin length	27.3	24.5	25.74
Caudal concavity	14.2	13.3	*
Pectoral fin length	24.9	23.7	26.33
Pelvic spine length	15.9	15.1	*
Pelvic fin length	22.7	22.8	17.83

*not available

band of villiform teeth on palatine. Scales absent in the axil of the pectoral fin; pre-operculum finely serrated. Dorsal rays longer than spines, length 1.6 times in HL; third anal spine length 2.7 times in HL

Colour in fresh condition: Body scales reddish dorsally, silvery white ventrally with a brassy sheen. Upper half of dorsal fin reddish and basal region white. Prominent black blotches on pectoral axil and opercular membrane. Head reddish in colour; soft dorsal, anal, caudal and pelvic fins light red.

Colour in formalin: Body colour fades to creamy white - brownish except the black blotches on the opercular membrane and the black pectoral axil.

Remarks

M. seychellensis gets its name from its unique locality from where it was first described. *M. seychellensis* is identified by its unique characters, terminal mouth, slightly inferior lower jaw when mouth is closed, posterior border of vomerine tooth patch rounded and the

Table 3 Morphometric comparison of *Myripristis greenfieldi* from India with earlier records

Morphometric measurements	Randall and Greenfield 1996	Present specimen
Dorsal fin	X+I, 14–15	X+I, 14
Anal fin	IV, 11–12	IV, 12
Pectoral fin	14–16	14
Lateral line scales	28–29	29
Gill rakers	(15–17) + (28–31)	-
In standard length		
Body depth	2.25–2.5	2.4
Head length	2.75–2.9	2.9
Inter orbital space	3.6–4.1	3.8
Third anal spine	1.85–2.1	2.7

orange red upper half of inter spine membrane of dorsal fin. The morphometric and meristic ratios were compared with previous records from different waters, agrees well except that of interorbital values (Table 1). The sex and gut content of the collected 10 species were studied. The majority (8 specimens) were female at the stage F4 and F5 with fully digested material in the gut. One big specimen of length 166 mm had a small trigger fish in its gut. This species was previously only reported from Seychelles, Reunion, St. Brandon's Shoals and Madagascar of Western Indian Ocean and Taiwan of Western Pacific. But now with the present study, the distribution range of this species has extended to Indian waters. *M.seychellensis* differs from its close relative *M.murdjan* in lesser number of lateral line scales (27–32 in *M. murdjan*) and more number of pectoral fin rays (14–16 in *M. murdjan*). Randall's observation of the largest specimen was only 175 mm while the present specimens were in the length range of 168–217 mm.

Myripristis formosa was previously identified as *M. seychellensis* a species known only from Western Indian Ocean by Chen et al. (1990). However, it differs from the latter in fewer number of gill rakers (33) compared to 37–43 in latter, shorter anal spines compared to latter, 14 dorsal rays compared to 15 in latter and 12 anal rays in former and 13 in latter. The figure given by Chen et al. (1990: fig. 9) is not of *M. seychellensis* but of *M. formosa* as can be seen by the close resemblance in the picture with the present specimen. The morphometric and meristic measurements of the present specimen match well with that of the holotype and paratype, except slight variations in the case of pectoral and pelvic fin length as can be seen in Table 2. *Myripristis formosa* was available only from Taiwan (Randall and Greenfield 1996), with the present collection from Kochi, Kerala, the fish has shown distributional extension to the south-west coast of India to the Arabian sea. The fish comes

under the Data Deficient (DD) category of the IUCN as per IUCN 2013 online (McEachran et al. 2010). This confirms the presence of this specimen in Indian waters (Table 3).

In the case of *Myripristis greenfieldi* only one sample was obtained. This fish was previously reported only from Japan, Ogasawara and Ryukyu Islands (Randall and Heemstra 1985). With the collection from Kochi waters, Kerala, India the fish has shown a distributional extension to Indian waters.

Acknowledgement

The authors wish to thank Director and Head, Division of Demersal Fisheries Central Marine Fisheries Research Institute, Kochi, India for the encouragement and support. The financial support from Ministry of Environment and Forest is gratefully acknowledged.

Authors' contributions

RJN prepared the design of the study, RJN and SD were both involved in the collection of fish samples, its meristic and morphometric measurements and taxonomic identification. RJN prepared and evaluated the manuscript. Both authors thoroughly read the manuscript approved and prepared the final version of it.

Competing interests

The authors declare that they have no competing interests.

Received: 12 September 2016 Accepted: 12 September 2016

Published online: 10 October 2016

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