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Short Communication

Second Record of the Dextral Flounder, *Samariscus hexaradiatus* (Teleostei: Samaridae), with the First Record from Kiritimati, the Central Tropical Pacific

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ABSTRACT: A specimen of the family Samaridae collected from off Kiritimati Island was identified as *Samariscus hexaradiatus* Díaz de Astarloa, Causse & Pruvost, 2013, which was previously known only from the Solomon Islands based on the two type specimens. This third specimen represents the second record of the species and the first record of this species from the central tropical Pacific Ocean.

KEY WORDS: righteye flounder, Pleuronectiformes, range extension, Line Islands, Kiribati

INTRODUCTION

The family Samaridae, comprising 29 species in four genera, is characterized by the eyes placed on the right side of the head, the origin of the dorsal fin in front of the eyes, and the absence of both the lateral line and pectoral fin on the blind side (Norman, 1934; Hensley, 2001; Díaz de Astarloa *et al.*, 2013; Voronina and Suzumoto, 2017). Samarids are known primarily from deep waters of the tropical and subtropical regions of the Indian, and the western and central Pacific oceans (Nelson *et al.*, 2016; Voronina and Suzumoto, 2017).

One specimen of the samarid genus *Samariscus* Gilbert, 1905 was found among specimens collected by the fisheries research vessel BCF Townsend Cromwell around Kiritimati Island, Kiribati, central Pacific in 1973. We identified this specimen as *Samariscus hexaradiatus* Díaz de Astarloa, Causse & Pruvost, 2013, previously known only from the Solomon Islands (Fig. 1). This specimen represents the third known specimen and second record of this species. We provide a detailed description of this specimen and report extensions in ranges of meristic characters for the species.

MATERIALS AND METHODS

The examined specimen is deposited in the Bernice Pauahi Bishop Museum (BPBM), Honolulu. Methods for counts and measurements follow those of Kawai *et al.* (2011). Standard and head lengths are abbreviated as SL and HL, respectively. All measurements were made to the nearest 0.1 mm with digital calipers. Vertebrae were counted from a radiograph.

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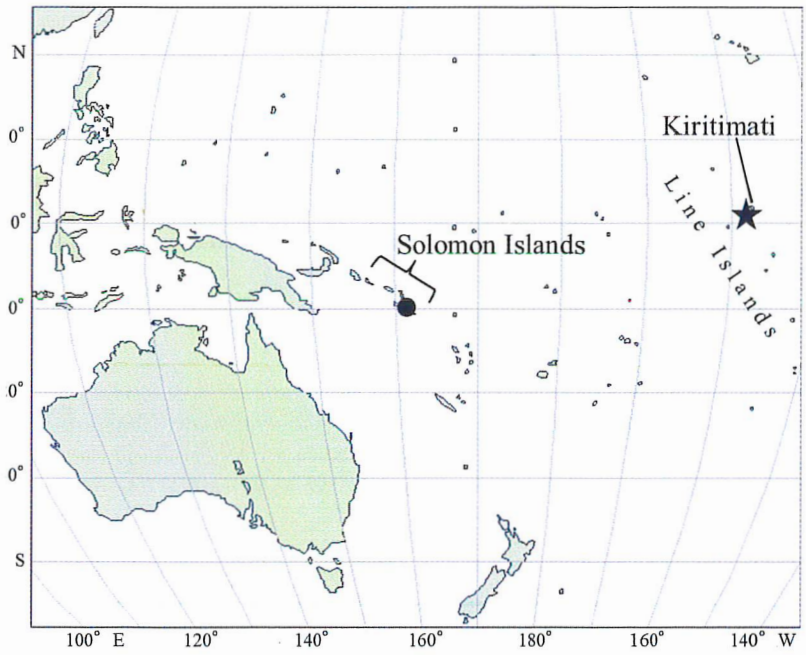


Figure 1. Map showing type (circle) and new (star) collection localities of *Samariscus hexaradiatus*.



Figure 2. Ocular (upper photo) and blind (lower photo) sides of *Samariscus hexaradiatus*, BPBM 24890, 90.4 mm SL, southwest of Kiritimati Island.



Figure 3. Pectoral fin on ocular side of *Samariscus hexaradiatus*, BPBM 24890, 90.4 mm SL, southwest of Kiritimati Island.

Samariscus hexaradiatus Díaz de Astarloa, Causse & Pruvost, 2013
(Figs 2, 3)

Material examined. 1 specimen: BPBM 24890, 90.4 mm SL, southwest of Kiritimati Island, Line Islands, Kiribati (1°50′N, 157°30′W), 183 m depth, dredge, BCF Townsend Cromwell, Cruise 62, station 73, 20 Feb 1973.

Description. Counts and measurements are provided in Table 1.

Head length 3.9 times in SL; body depth 3.3 times in SL; snout length 4.1 times in HL; upper-eye diameter 4.3 times in HL; lower-eye diameter 4.2 times in HL; orbital length 3.8 times in HL; interorbital width 33.3 times in HL; upper-jaw length 3.4 times in HL on ocular side, 3.6 times in HL on blind side; lower-jaw length 2.1 times in HL on ocular side, 2.3 times in HL on blind side; caudal-peduncle depth 8.4 times in SL; pectoral-fin length 3.8 times in SL; pelvic-fin length 6.8 times in SL on ocular side, 11.7 times in SL on blind side.

Body elliptical, strongly compressed and deepest at midpoint; body depth greater than head depth. Mouth oblique; posterior margin of upper jaw reaching beyond anterior margin of lower eye but not middle. Small conical teeth in bands on both jaws. Vomer and palatine without teeth. Ocular-side anterior nostril long, tubular; ocular-side posterior nostril short, tubular. Blind-side anterior nostril tubular with one flap on its dorsal margin; blind-side posterior nostril short, tubular. Eyes dextral; lower eye slightly anterior to vertical through anterior margin of upper eye. Interorbital bony ridge covered with ctenoid scales. Gill rakers on first branchial arch of both sides rudimentary and short. Gill membranes united to each other. Ctenoid scales on most of body and head, except for cycloid scales on blind-side opercle and cheek; snout and lower jaw without scales. Ocular-side lateral line almost

Table 1. Proportional measurements and counts of three known specimens of *Samariscus hexaradiatus*.

	New specimen BPBM 24890	Holotype* MNHN 2002-3566	Paratype* MNHN 2002-3761
SL (mm)	90.4	100.3	80.9
Measurements (% SL)			
Body depth	30.6	31.0	34.4
Head length	25.8	21.5	21.9
Pectoral-fin length	26.1	26.9**	28.1**
Pelvic-fin length on ocular side	14.7	19.6**	15.9**
Pelvic-fin length on blind side	8.5	9.6**	9.0**
Caudal-peduncle depth	11.8	13.3	11.5
Measurements (% HL)			
Snout length	24.5	18.5	19.2
Upper-eye diameter	23.2	33.3	32.2
Lower-eye diameter	24.0	34.2	32.7
Orbital length	26.6	35.2	34.4
Interorbital width	3.0	3.2	3.4
Upper-jaw length on ocular side	29.6	30.1	25.4
Upper-jaw length on blind side	27.5	27.8	24.8
Lower-jaw length on ocular side	47.6	47.2	46.9
Lower-jaw length on blind side	43.8	44.9	41.8
Counts			
Dorsal-fin rays	87	83***	83***
Anal-fin rays	68	61***	63***
Pectoral-fin rays	6	6	6
Pelvic-fin rays on both sides	5	5	5
Caudal-fin rays	16	16	16
Lateral-line scales	ca. 87	74	75
Gill rakers on ocular side	0 + 9	0 + 5	0 + 6
Gill rakers on blind side	0 + 8	0 + 3	0 + 5
Abdominal vertebrae	9	9	9
Caudal vertebrae	34	32	32

*Data from Díaz de Astarloa *et al.* (2013).

**Measured as length of longest ray of each fin.

***Modified following Kawai *et al.* (2011) with dorsal- and anal-fin rays counted individually.

straight, although anterior part slightly curved upward. Blind-side lateral line absent. Dorsal and pelvic fins without prolonged anterior rays. Dorsal-fin origin on blind-side of head anterior to lower eye and above ocular-side posterior nostril. All dorsal- and anal-fin rays unbranched. Length of pectoral fin on ocular side slightly longer than head length; all pectoral-fin rays unbranched. Pectoral fin on blind side absent. Pelvic fins subsymmetrical; length of pelvic fin on ocular side longer than that on blind side. Origin of ocular-side pelvic fin slightly anterior to that of blind-side pelvic fin. Posterior margin of caudal fin rounded; two upper and one lower caudal-fin rays unbranched; middle 13 caudal-fin rays branched. Anus on ventral midline just anterior to anal-fin origin. Small urogenital papilla on ocular side slightly dorsal to anal-fin origin.

Color in alcohol. Both sides of body and head pale brown. Obscure pigment on ocular side of body forming some darker patches. Dorsal, anal and pelvic fins pale without pigment. Pectoral fin pale with obscure pigment forming four to five dusky bands (Fig. 3). Caudal fin pale with some obscure pigment on posterior margin.

Distribution. Known only from the Solomon Islands, in the western tropical Pacific Ocean, at 135–325 m depth (Díaz de Astarloa *et al.*, 2013) and southwest of Kiritimati Island, in the central tropical Pacific Ocean, at 183 m depth (this study).

Remarks. The family Samaridae currently comprises four genera, *Samaris* Gray 1831, *Samariscus* Gilbert, 1905, *Plagiopsetta* Franz, 1910 and *Samaretta* Voronina & Suzumoto, 2017 (Voronina and Suzumoto, 2017). The present specimen, in lacking the prolonged anterior rays of the dorsal and pelvic fins, in having branched middle caudal-fin rays, in having six ocular-side pectoral rays, and in having the body depth greater than the head depth in adults (Kawai *et al.*, 2011; Díaz de Astarloa *et al.*, 2013; Voronina and Suzumoto, 2017), was identified as a species of *Samariscus*. Among the 20 recognized species in the genus, this specimen agrees only with *Samariscus hexaradiatus* in having six ocular-side pectoral rays vs. the four or five rays of all other congeners (Kawai *et al.*, 2011; Díaz de Astarloa *et al.*, 2013). Although the coloration of the present specimen is mostly faded, four to five dusky bands, reminiscent of those of *S. hexaradiatus*, remain visible on the pectoral fin (Fig. 3). In the original description of *S. hexaradiatus*, dusky bands were not mentioned, but the presence of these bands can be confirmed from color photographs provided in the original description of the holotype and paratype (Díaz de Astarloa *et al.*, 2013: fig. 1 on p. 242). In addition, obscure pigment forming patches was observed on the ocular-side body of the specimen examined. However, the markings are quite indistinct because of specimen discoloration, and it was not possible to confirm if the shapes and distribution of the patches match the original description of *S. hexaradiatus*.

Although most meristic and measurement characters are similar to those of *S. hexaradiatus* provided by Díaz de Astarloa *et al.* (2013), rather large differences were observed in the numbers of dorsal-fin rays, anal-fin rays, lateral-line scales, gill rakers on ocular and blind sides, and caudal vertebrae (Table 1). Some species of the genus *Samariscus*, however, are known to have considerable variations in meristic characters [e.g., an Indo-Pacific widely spread species, *Samariscus triocellatus* Woods, 1960 having 62–70 dorsal-fin rays, 69–76 lateral-line scales and 30–32 caudal vertebrae, respectively (see Kawai *et al.*, 2011: table 1 on p. 66)]. Therefore, the differences noted here are considered to be intraspecific

variations for the species, and the present specimen is identified as *S. hexaradiatus*. Additional specimens are needed to reveal precise ranges for meristic characters of the species.

Samariscus hexaradiatus was previously known only from the Solomon Islands, based on the holotype and paratype (Díaz de Astarloa *et al.*, 2013). Therefore, the present specimen represents the second record of the species, the third known specimen of this species, and the first record from the central tropical Pacific Ocean.

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