Bull. Natl. Mus. Nat. Sci., Ser. A, Suppl. 7, pp. 19–23, March 22, 2013

Opistognathus trimaculatus, a New Jawfish (Teleostei: Opistognathidae) from Tosa Bay, Japan

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Abstract A new opistognathid fish, *Opistognathus trimaculatus*, is described on the basis of two specimens (67.8 and 72.0 mm SL) collected from Tosa Bay, off Kochi Prefecture, in southern Japan. The new species is easily distinguished from all other congeners in having the following combination of characters: dorsal-fin rays XI–XII, 10–11, anal-fin rays II, 10; no scales on head, nape, breast, pectoral-fin base, predorsal and above anterior laterel line; longitudinal scale rows 48–50; lateral line terminating below the interspace between 10th dorsal-fin spine and 1st dorsal-fin soft ray; maxilla short without lamina flap, not reaching to preopercle margin; posterior end of maxilla truncated; relatively sparse cephalic sensory pores composed of single pores; lateral-line pores arranged in a single row; five dark brown bars on body and three dark blotches on dorsal fin.
Key words: Jawfish, *Opistognathus trimaculatus*, new species, Kochi, Japan.

The jawfish family Opistognathidae contains three genera, *Opistognathus* Cuvier, 1816, *Lonchopisthus* Gill, 1862 and *Stalix* Jordan and Snyder, 1902, with about 83 valid species (Eschmeyer, 2012) and many undescribed species, which are known as obligatory burrow dwellers and paternal mouth brooders, ranging from tropical to subtropical waters worldwide except for the eastern Atlantic and central Pacific (Nelson, 2006; Smith-Vaniz and Allen, 2007; Smith-Vaniz, 2009, 2010, 2011; Smith-Vaniz *et al.*, 2012). Among the genera, *Opistognathus* includes 67 valid and at least 34 undescribed species, being characterized by having a large mouth, naked head, continuous dorsal fin with 9–12 spines and 12–22 soft rays, anal fin with 2–3 spines and 10–21 soft rays, and lateral-line along the dorsal-fin base (Nelson, 2006). The genus is widely distributed in tropical to subtropical waters worldwide, inhabiting sandy and rubble bottoms (Nelson, 2006; Smith-Vaniz, 2011; Smith-Vaniz *et al.*, 2012). Around Japan, six species of *Opistognathus* are currently recorded: *Opistognathus castelnaui* Bleeker, 1874; *Opistognathus evermanni* (Jordan and Snyder, 1902); *Opistognathus hopkinsi* (Jordan and Snyder, 1902); *Opistognathus iyonis* (Jordan and Thompson, 1913); *Opistognathus decorus* Smith-Vaniz and Yoshino, 1985; and *Opistognathus liturus* Smith-Vaniz and Yoshino, 1985, although several undescribed species have been documented by underwater photographs of scuba divers (Smith-Vaniz and Yoshino, 1985; Aizawa, 2002; Hayashi and Okuri, 2007).

In the fish collection of the Laboratory of Marine Biology, Faculty of Science, Kochi University (BSKU), we found two specimens tentatively identified as *Opistognathus* sp. collected from off Kochi Prefecture. They clearly differ from previously described species by the combination of dorsal- and anal-fin ray counts and a unique color pattern consisting of five bars on body and three blotches on dorsal fin. We herein describe them as a new species.

Materials and Methods

Methods of measuring and counting follow Smith-Vaniz and Allen (2007). Measurements were made with needlepoint dial calipers to the nearest 0.1 mm. Vertebral counts were taken from soft X-ray photographs. Specimens examined are deposited in BSKU and the National Museum of Nature and Science, Tsukuba (NSMT).

Opistognathus trimaculatus sp. nov.

[New Japanese name: Yaito-ago-amadai]
[New English name: Japanese Five-banded Jawfish]
(Figs. 1–3)

Holotype. NSMT-P 111154 (formerly BSKU 41806), 72.0 mm SL, 89.1 mm TL, female, off Kochi City, central Tosa Bay, otter trawl, R/V Kotaka-maru, about 150 m depth, 23 May 1985.

Paratype. BSKU 37494, 67.8 mm SL, 82.7 mm TL, female, Mimase fish market, Kochi

Fig. 1. *Opistognathus trimaculatus* sp. nov., NSMT-P 111154, holotype (in fresh), 72.0 mm SL, female, off Kochi City, Tosa Bay, Japan.

Fig. 2. *Opistognathus trimaculatus* sp. nov., NSMT-P 111154, holotype (in preservation), 72.0 mm SL, female, off Kochi City, Tosa Bay, Japan.

City, Tosa Bay, off Cape Muroto-misaki, about 250 m depth, 5 Oct. 1982.

Diagnosis. A species of *Opistognathus* with the following combination of characters: dorsal-fin rays XI–XII, 10–11, anal-fin rays II, 10; scales absent on head, nape, breast, predorsal, pectoral-fin base and above anterior laterel line; longitudinal scale rows 48–50; lateral line terminating below the interspace between 10th dorsal-fin spine and 1st dorsal-fin soft ray; maxilla short without lamina flap, not reaching to preopercle margin; posterior end of maxilla truncated; relatively sparse cephalic sensory pores composed of single pores; lateral-line pores arranged in a single row; five dark brown bars on body; three dark blotches on dorsal-fin membrane near the base.

Description. Counts and conditions for the paratype given in parentheses if different from those of the holotype. Dorsal-fin rays XII (XI), 10 (11), anal-fin rays II, 10, pectoral-fin rays 20, caudal fin: procurrent rays 3 + 3, segmented rays 7 + 8 (7), middle 13 (12) branched, hypural 5 absent. Vertebrae 10 + 16 = 26. Supraneural bones absent. Gill rakers 13 + 21 = 34 (12 + 22 = 34)

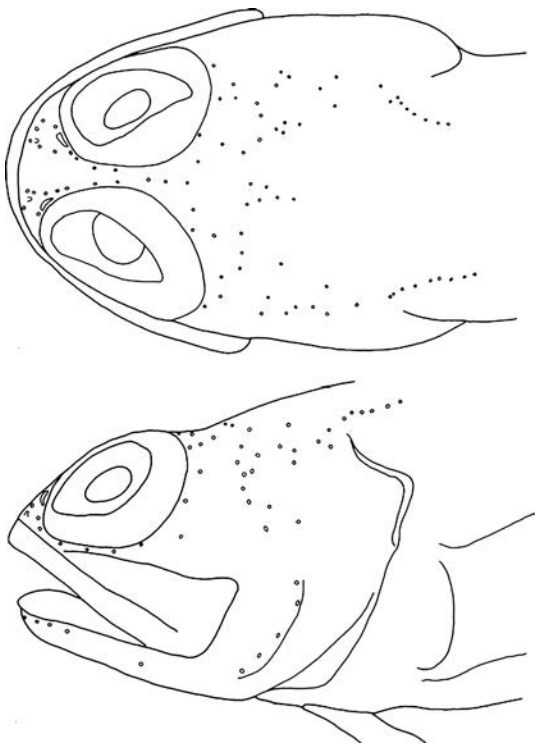

Fig. 3. Cephalic sensory pores in *O. trimaculatus* sp. nov., NSMT-P 111154, holotype 72.0 mm SL, female.

Body somewhat elongate, slightly compressed posteriorly. Head enlarged, its length equal to body depth (slightly shorter than body depth). Eyes large, positioned close to dorsal contour.

Scales cycloid. Head and nape naked. Body covered by scales except predorsal area, breast, pectoral-fin base, and area above lateral line; longitudinal scales counts 50 (48). Lateral line originating from the upper margin of opercle, through dorsum near dorsal-fin base, reaching a vertical at the interspace between 10th and 11th dorsal-fin spines (11th spine and 1st soft ray). Lateral-line pores sparse, most arranged in a single row. Cephalic sensory pores relatively sparse, consisting of single pores; all dentary and preopercle pores composed of single pores (Fig. 3). Maxilla rigid and truncated, extending beyond posterior margin of orbit (the distance beyond the margin 0.7 in orbit diameter). Jaws with small conical teeth in 1–4 rows, 3–4 irregular rows near symphyses, decreasing to 1 row posteriorly; anterior to middle of outer row much enlarged, teeth sparsely arrayed, posterior teeth gradually becoming smaller in size; premaxillary teeth in 3 rows near symphysis with 2–3 enlarged canine-like teeth anteriorly in each medial row of band; dentary teeth in 1–3 (1–4) rows, 3 (4) rows near symphysis. No teeth on vomer and palatine. Anterior nostril forming a small tube, closer to posterior nostril than dorsal margin of upper lip; posterior nostril cresent-shaped, along the anterior margin of eye. Gill rakers slender and large.

Dorsal fin moderately low; profile of spinous dorsal fin equal in height; soft dorsal fin increasing in height posteiroly. Dorsal-fin spines straight, slender and sharp distally. The origin of anal fin vertical through first (second) dorsal-fin soft rays. First anal-fin spine very short, about one-third height of 2nd anal-fin spine, which is

straight, relatively stout and sharp distally; anal-fin soft rays gradually increasing in height to penultimate soft ray. Segmented rays of dorsal and anal fins branched distally. Pectoral fin rounded with almost all rays branched except uppermost and lowermost rays. Pelvic fin slender and located just below the origin of pectoral fin. Caudal fin rounded.

Proportions of the holotype are presented first, followed by those of the paratype in parentheses. As percentages of SL: predorsal length 30.6 (33.9); preanal length 65.0 (67.7); prepelvic length 33.6 (33.3); dorsal-fin base 61.5 (60.5); anal-fin base 28.8 (26.8); pectoral-fin length 19.4 (19.2); pelvic-fin length 21.7 (20.6); caudal-fin length 21.5 (20.4); body depth at dorsal fin origin 23.9 (27.2); caudal peduncle depth 13.3 (12.5); head length 31.1 (33.0); postorbital length 16.7 (18.0); upper-jaw length 20.3 (21.7); orbit diameter 11.8 (10.9.) As percentages of head length: postorbital length 54.3 (54.5); upper-jaw length 65.3 (63.9); orbit diameter 37.9 (33.0).

Color of holotype when fresh (Fig. 1). Head and body light reddish-brown, darker dorsally, pale ventrally and abdomen whitish. Rim of circumorbtal bones dark brown. Posterior end of upper jaw and lower part of opercular region pale, slightly yellowish. A series of 5 vertical dark brown bars on sides of body: 1st bar below 1st–4th dorsal-fin spines, 2nd below 5th–8th dorsal-fin spines, 3rd below 8th–11th dorsal-fin spines, 4th below 8th–11th dorsal-fin soft-rays, 5th slightly yellow, on caudal peduncle. Dorsal fin pale chocolate brown with yellow distally except the last 2 rays; the last dorsal-fin soft ray clearly darker than the penultimate ray distally; 3 oval-shaped dark blotches surrounded with paler background on membrane along the dorsal-fin base: 1st blotch between 5th and 8th spines, 2nd oblong and between 11th spine and 4th soft ray, and the 3rd semicircular and between 9th and the last soft rays. Anal fin white at the base and yellow distally, a few posterior soft rays dark distally. Pectoral fin yellowish. Pelvic fin entirely yellow. Caudal fin white at basal half, yellow at distal half.

Color of holotype in alcohol (Fig. 2). Body light brown with five dark bars on the sides of body. Three oval-shaped dark brown blotches along the dorsal fin. The latter 2 soft rays of dorsal and anal fins dark near tip.

Distribution. Currently known only from Tosa Bay in depths of about 150 to 250 m.

Etymology. The species name "*trimaculatus*" is derived from the Latin "*tri*" (three) and "*macula*" (spot), in reference to the three blotches on the dorsal fin.

Remarks. *Opistognathus trimaculatus* resembles the following five Indo-West Pacific species which all have the combination of 10–11 soft dorsal-fin rays and 10 soft anal-fin rays: *O. evermanni* from Vietnam to southern Japan; *Opistognathus hongkongiensis* Chan, 1968 from the western Pacific Ocean; *O. liturus* from Wakayama Prefecture, Japan; *Opistognathus rufilineatus* Smith-Vaniz and Allen, 2007 from Triton Bay, West Papua and Indonesia; *Opistognathus crassus* Smith-Vaniz, 2010 from Maldive (Chan, 1966; Jordan and Snyder, 1902; Smith-Vaniz and Yoshino, 1985; Smith-Vaniz and Allen, 2007; Smith-Vaniz, 2010). However, *O. trimaculatus* is clearly distinguished from *O. evermanni* and *O. rufilineatus* in having vertical body bars on the sides of body and oval-shaped blotches on the dorsal-fin. Although *O. hongkongiensis* and *O. crassus* also have vertical bars on the body and a series of blotches on the dorsal-fin base, *O. trimaculatus* differs from these two species in having a more anteriorly positioned lateral-line terminus (interspace below 10th dorsal-fin spine and 1st dorsal-fin soft ray vs. 6th dorsal-fin soft ray in *hongkongiensis* and 2nd dorsal-fin soft ray in *crassus*) and the numbers of blothches on the dorsal fin (3 vs. 5) (Chan, 1966; Smith-Vaniz, 2010). Additionally, the new species is easily distinguished from *O. hongkongiensis* by the numbers of dark bars on body (5 vs. 7) and from *O. crassus* by sparse cephalic sensory pores (vs. numerous) (Fig. 3). Among the five species mentioned above, the new species is somewhat similar to *O. liturus* in having blotches on the dorsal fin. However, the

new species clearly differs from *O. liturus* in having no blotches on head (vs. a few irregularly-shaped dark blotches on head) and lateral-line terminus below the interspace between 10th dorsal-fin spine and 1st dorsal-fin soft ray (vs. 4th dorsal-fin soft-ray) (Smith-Vaniz and Yoshino, 1985).

Hayashi and Okuri (2007) recorded an undescribed species as *Opistognathus* sp. from Ishigaki Island in the Ryukyu Islands, which shares the same dorsal- and anal-fin ray counts with the new species. However, *O. trimaculatus* is easily distinguished from that species in lacking an ocellated spot anteriorly on the spinous dorsal fin, a chin-strap band extending obliquely through eye onto the head and a double row of pale blotches on the body. William Smith-Vaniz will describe this new species (W. Smith-Vaniz, personal comm.).

Acknowledgments

We wish to express our sincere gratitude to William F. Smith-Vaniz (Florida Museum of Natural History, University of Florida) for reading early draft manuscript critically and giving useful suggestions. Special thanks to Takashi Suzuki and Kunio Harada (BSKU) for taking X-ray photographs and cephalic sensory photographs of types. The study was partially supported by a grant-in-aid of "Marine Science Project"of Natural Science Cluster, Sciences Unit, Kochi University, and the Kuroshio Project of National Museum of Nature and Science, Tsukuba.

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Manuscript received 27 November 2012; revised 11 December 2012; accepted 15 January 2013.

Associate editor: K. Matsuura.