

Description of a new species of *Obliquogobius* (Teleostei: Gobiidae) from the Andaman Sea (northeastern Indian Ocean)

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Abstract. *Obliquogobius eptactis*, new species (Teleostei: Gobiidae) is described on the basis of four specimens (40.7–50.1 mm in standard length) collected by the R/V *Dr. Fridtjof Nansen* from the Andaman Sea, off Myanmar, in depths of 181–184 m. The new species is characterised by the following combination of characters: 2nd dorsal-fin rays I, 9 or 10; head somewhat large, length 32.9–34.4% of SL; lateral surface of nape scaled; postorbital pore G present (in anterior oculoscapular canal); gill opening relatively narrow, anteroventral point extending slightly forward to vertical level of preopercle margin; caudal fin dorsoventrally asymmetrical, rays in upper half much longer than those in lower half, giving obliquely pointed appearance; seven bright yellow bars (pale whitish in preserved specimens) on body, two under 1st dorsal-fin base, remainder under 2nd dorsal fin (from origin) and on caudal peduncle; dorsal fins pale brown with bright yellow barred pattern; 1st dorsal fin without broad black margin; pectoral fin bright yellow; three bright yellow vertical bars on upper part of caudal fin; distinct black spot on centre of caudal-fin base absent. Although the new species is similar to *Obliquogobius yamadai* Shibukawa & Aonuma, 2007, the former can be distinguished from the latter by having seven bright yellow bars on the body [vs. five bars (rarely six, including indistinct partial bar located above anus) in *O. yamadai*], a bright yellow barred pattern on the dorsal fins (vs. 1st and 2nd dorsal fins lacking barred patterns: 1st dorsal fin with distinct broad black margin, 2nd dorsal fin generally faint yellow), bright yellow pectoral fins (vs. translucent white or faint yellow), no distinct small black spot centrally on the caudal-fin base [vs. a small black spot (variable in size) with following indistinct yellow partial bar present], three bright yellow irregular vertical bars restricted to upper part of caudal fin (vs. three longitudinal yellow stripes on entire fin; stripes faded out soon after capture), and larger head, length 32.9–33.3 (vs. 28.3–32.2) and 34.4 (vs. 29.1–33.5) % of SL in males and females, respectively.

Key words. *Obliquogobius eptactis*, *Obliquogobius yamadai*, deepwater goby, R/V *Dr. Fridtjof Nansen*, trawl surveys, Myanmar, Indian Ocean

INTRODUCTION

The deep-dwelling gobiid genus *Obliquogobius* Koumans, 1941 is characterised by the following combination of characters: VI–I, 8–10 dorsal-fin rays; I, 8–10 anal-fin rays; 20–24 pectoral-fin rays; 22–26 longitudinal scale rows; midline of pre-dorsal-fin region naked; gill opening relatively wide, anteroventral point extending to (or beyond) vertical through preopercular margin; outermost teeth on both jaws

slender, larger than inner row teeth; enlarged, stout canine-like teeth absent; head sensory papillae well developed, usually modified into bulbous or short barbel-like fleshy flaps; reduced longitudinal pattern of sensory papillae rows on cheek; head sensory canal pores moderately developed, comprising snout pore (B³), single anterior (C) and posterior (D) interorbital pores, four postorbital pores (E, F, G, and H³); absent in some species) and three preopercular pores (M³, N, and O³); 10+16=26 vertebrae; P-V 3/II II I I 0/9 (Shibukawa & Aonuma, 2007). To date, six species have been described, all being regarded as valid [viz. *Obliquogobius cirrifer* Shibukawa & Aonuma, 2007, *Obliquogobius cometes* (Alcock, 1890), *Obliquogobius fulvostriatus* Chen, Jaafar & Shao, 2012, *Obliquogobius megalops* Shibukawa & Aonuma, 2007, *Obliquogobius turkayi* Goren, 1992, and *Obliquogobius yamadai* Shibukawa & Aonuma, 2007] (Shibukawa & Aonuma, 2007; Chen et al., 2012).

In 2013, 2015, and 2018, the EAF-Nansen Programme of FAO in cooperation with the Myanmar Government carried out trawl surveys using the R/V *Dr. Fridtjof Nansen* off the coast of Myanmar to obtain biological and environmental information in the study area and identify species diversity within the country as a basis for a FAO marine species identification guide intended for fishery purposes. Sixteen

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gobiid species, including the comet deepwater goby *O. cometes* were included in the guide (see Psomadakis et al., 2019). Four unidentified specimens of *Obliquogobius* were caught during the 2018 survey but were not able to be examined in time for inclusion in the guide. In the following pages, we describe the specimens collected from the Andaman Sea characterised by distinct yellow bars as a new species.

MATERIAL AND METHODS

Counts and measurements followed Chen et al. (2012), measurements being made to the nearest 0.01 mm, except for standard length (abbreviated as SL), which was measured to the nearest 0.1 mm. In the description, holotype data is presented first, followed by data for other paratypes in parentheses (if different). Cephalic sensory canal pores and papillae were observed using versatile staining with Cyanine Blue (Saruwatari et al., 1997), their terminologies following Akihito (1984) and Miller (1986), respectively. Osteological features were observed from radiographs of all specimens. Description of dorsal formula followed Akihito (1984). Institutional codes follow Sabaj (2020).

In addition to comparative materials examined in this study (see below), data for 4 species of *Obliquogobius* (*O. cirrifer*, *O. cometes*, *O. megalops*, and *O. yamadai*), *O. fulvostriatus*, and *O. turkayi* were obtained from Shibukawa & Aonuma (2007), Chen et al. (2012), and Goren (1992), respectively. A colour photograph of *O. yamadai* from Indonesia (Ho et al., 2021: pl. 8C) was also included in our comparisons.

TAXONOMY

Obliquogobius eptactis, new species

[New English name: Seven-striped deepwater goby]
(Figs. 1–3; Table 1)

Holotype. SAIAB 208554, male, 50.1 mm SL; Indian Ocean; Andaman Sea; Myanmar; off Myiek Archipelago; Tanintharyi coast; station 154 (10°02'42"N 97°22'45"E); R/V. *Dr. Fridtjof Nansen*; demersal trawl; depth 184 m; P. N. Psomadakis; 27 September 2018.

Paratypes. SAIAB 208473 (squashed condition), male, 47.0 mm SL; SAIAB 208484 (heavily rubbing, scale condition could not be observed), female, 40.7 mm SL; Indian Ocean, Andaman Sea; Myanmar; off Myiek Archipelago; Tanintharyi coast; station 149 (10°21'26"N 97°25'06"E); R/V. *Dr. Fridtjof Nansen*; demersal trawl; depth 181–184 m; P. N. Psomadakis; 26 September 2018. — KAUM–I. 157330 (formerly SAIAB 20854), male, 42.4 mm SL; same data as holotype.

Diagnosis. A species of *Obliquogobius* (Fig. 1) distinguished from other members of the genus by the following combination of characters: 2nd dorsal-fin rays I, 9 or 10; head somewhat large, length 32.9–34.4% of SL; lateral surface of nape scaled; postorbital pore G present (in

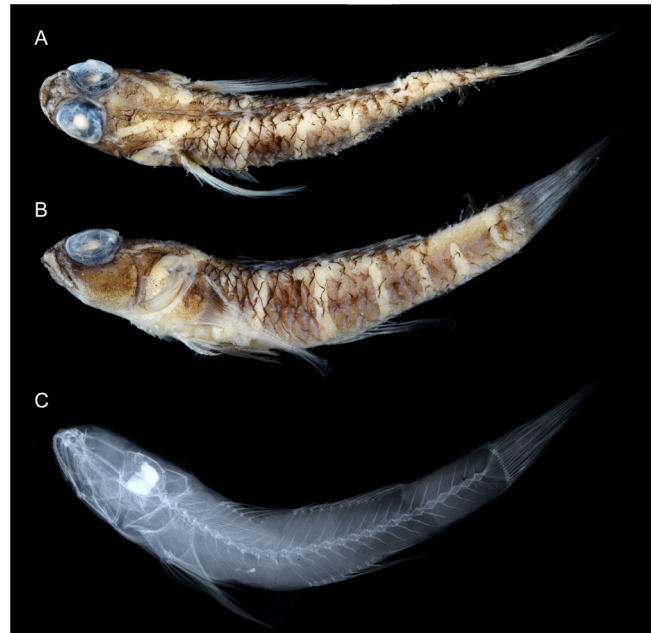


Fig. 1. Photographs (A and B; dorsal and lateral views, respectively) and radiograph (C) of the (preserved) holotype of *Obliquogobius eptactis*, new species (SAIAB208554, male, 50.1 mm SL, Andaman Sea).

anterior oculoscapular canal); gill opening relatively narrow, anteroventral point extending slightly forward to vertical level of preopercle margin; caudal fin asymmetrical dorsoventrally, rays in upper half much longer than those in lower half, giving obliquely pointed appearance; seven bright yellow (pale whitish in preserved specimens) bars on body, two located under 1st dorsal-fin base, remainder under 2nd dorsal-fin (from origin) and on caudal peduncle; dorsal fins pale brown with bright yellow barred pattern; 1st dorsal fin without broad black margin; pectoral fin bright yellow; three bright yellow vertical bars on upper part of caudal fin; distinct black spot on centre of caudal-fin base absent.

Description. Dorsal-fin rays VI–I, 10 (9 in 3 paratypes); anal-fin rays I, 9; pectoral-fin rays 22 (21 in SAIAB 208473, 208484); pelvic-fin rays I, 5; segmented caudal-fin rays 9+8; branched caudal-fin rays 6+6 (7+6 in KAUM–I. 157330); longitudinal scale rows ca. 24 (counted from scale pockets); transverse scales 7; pre-dorsal-fin scale rows 0; vertebrae 10+16. P–V 3/II II I I 0/9; 2 anal-fin pterygiophores anterior to first haemal spine. Proportional measurements given in Table 1.

Body slender, compressed, width much less than depth. Head subcylindrical, depressed anteriorly. Head size of female slightly larger than that of males. No raised cutaneous ridges on head and nape. Snout short (much shorter than eye diameter), rounded, slightly inflated. Eye large, located dorsolaterally. Interorbital region very narrow (its width much narrower than pupil diameter), flattened. Anterior and posterior nostrils close to each other; former located midway between eye and upper jaw, with membranous tube; latter located before anterior margin of eye, small, circular. Mouth terminal, inclined obliquely upwards anteriorly, forming angle of ca. 30° to 40° with body axis. Anterior margin of

Table 1. Morphometric measurements of type specimens of *Obliquogobius eptactis*, new species.

| | SAIAB 208554 | SAIAB 208473 | KAUM-I. 157330 | SAIAB 208484 |
|--|--------------|--------------|----------------|--------------|
| | Holotype | Paratype | Paratype | Paratype |
| | male | male | male | female |
| Standard length (SL; mm) | 50.1 | 47.0 | 42.4 | 40.7 |
| As % of SL | | | | |
| Head length (HL) | 33.3 | 32.9 | 33.0 | 34.4* |
| Pre-dorsal length | 37.8 | – | 36.2 | 37.6 |
| Snout to 2 nd dorsal-fin length | 55.8 | – | 55.4 | 54.5 |
| Snout to anus length | 55.5 | – | 52.2 | 53.7 |
| Snout to anal-fin origin length | 60.8 | – | 58.2 | 59.7 |
| Pre-pelvic-fin length | 32.7 | – | 34.4 | 32.6 |
| Caudal-peduncle length | 29.3 | – | 28.1 | 27.9 |
| Caudal-peduncle depth | 10.9 | – | 11.0 | 10.8 |
| 1 st dorsal-fin base length | 12.4 | 11.6 | 11.6 | 11.2 |
| 2 nd dorsal-fin base length | 18.1 | 18.2 | 19.2 | 18.8 |
| Anal-fin base length | 19.3 | 16.6 | 19.4 | 16.1 |
| Caudal fin length | 29.3 | – | – | 27.6 |
| Pectoral fin length | 32.5 | 28.2 | 33.5 | 28.6 |
| Pelvic fin length | 21.0 | 22.7 | 22.6 | 21.8 |
| Body depth at pelvic-fin origin | 17.7 | – | 18.1 | 16.5 |
| Body depth at anal-fin origin | 16.6 | – | 16.1 | 15.7 |
| Body width at anal-fin origin | 10.6 | – | 12.2 | 9.2 |
| Pelvic-fin origin to anus length | 24.7 | 22.1 | 20.4 | 22.3 |
| Snout length | 6.2 | 7.5 | 6.6 | 6.6 |
| Eye diameter | 11.5 | 12.1 | 12.0 | 11.5 |
| Cheek depth | 9.3 | 8.5 | 9.6 | 9.8 |
| Postorbital length | 16.5 | 14.3 | 16.5 | 17.0* |
| Head width in maximum | 20.5 | – | 18.4 | 17.3 |
| Head width in upper gill opening | 16.1 | – | 14.4 | – |
| Bony interorbital width | 1.1 | – | 0.9 | 0.9 |
| Fleshy interorbital width | 10.9 | – | 9.3 | 9.8 |
| Low-jaw length | 12.4 | – | 10.8 | 11.8 |
| As % of HL | | | | |
| Snout length | 18.6 | 22.9 | 19.9 | 19.2 |
| Eye diameter | 34.7 | 36.8 | 36.4 | 33.5 |
| Cheek depth | 27.9 | 25.8 | 29.2 | 28.5 |
| Postorbital length | 49.7 | 43.6 | 50.0 | 49.5* |
| Head width in maximum | 61.6 | – | 55.6 | 50.4 |
| Head width in upper gill opening | 48.4 | – | 43.7 | – |
| Bony interorbital width | 3.3 | – | 2.8 | 2.6 |
| Fleshy interorbital width | 32.6 | – | 28.1 | 28.4 |
| Low-jaw length | 37.4 | – | 32.8 | 34.2 |

*measured from right side; – indicates no data

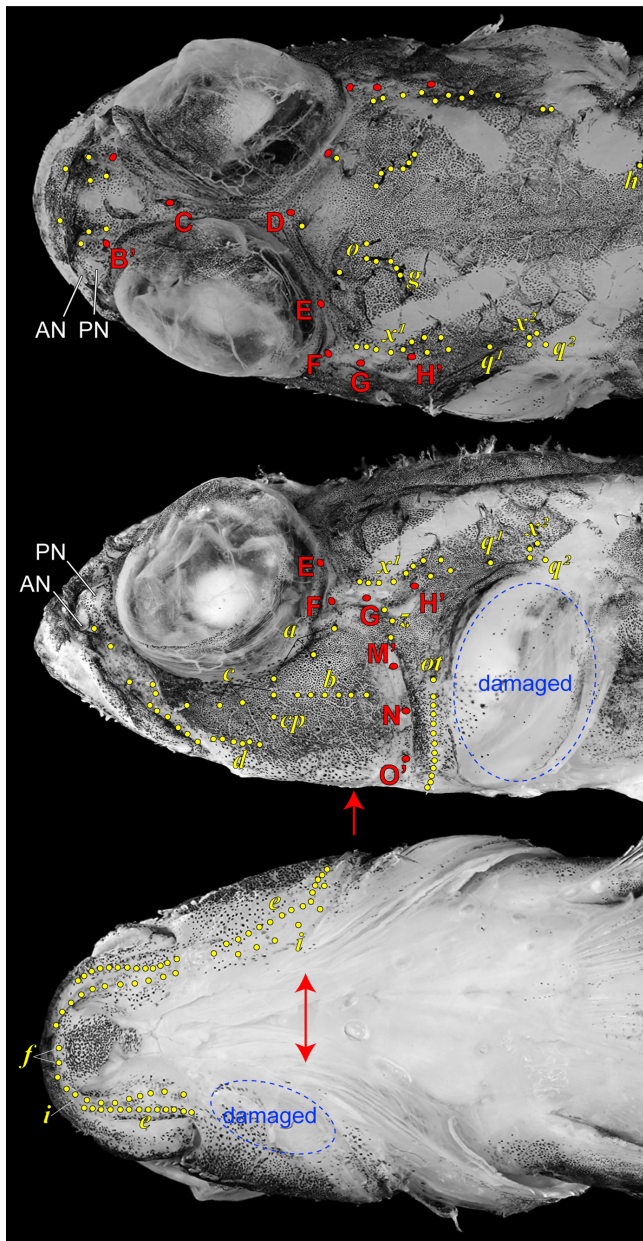


Fig. 2. Photographs of head of *Obliquogobius eptactis*, new species (SAIAB208554, 50.1 mm SL), showing sensory canal pores (red circles) and papillae (yellow circles). AN and PN indicate anterior and posterior nostrils, respectively. Arrow heads indicate anteroventral end of gill opening.

tongue slightly emarginate, free from floor of mouth. Mental flap on each side of chin slightly developed as low fleshy bump. Lower jaw subequal with upper jaw, its posterior tip reaching to vertical through middle of pupil. Upper-jaw tip behind vertical through lower-jaw tip. Both jaws with three or four irregular rows of small, pointed conical teeth, the tip of each slightly incurved posteriorly; teeth on outermost row on jaws evenly/widely spaced, slender, distinctly larger than teeth on inner rows; teeth on anterior part of outermost row largest in both jaws; enlarged canine-like teeth on jaws absent; vomerine and palatine teeth absent. Gill membranes attached anteriorly to isthmus. Preopercular and opercular margins rounded, upper ends horizontally level with upper and lower margins of pupil, respectively.

A photograph of the holotype cephalic sensory system is given in Fig. 2. Head sensory canal pores moderately developed, comprising snout pore (B'), single anterior (C), and posterior (D) interorbital pores, four postorbital pores (E, F, G, and H') and three preopercular pores (M', N, and O'). Sensory papillae on head well developed, modified into short barbel-like fleshy flaps (damaged in SAIAB 208473, 208484); reduced longitudinal pattern of sensory-papillae rows on cheek, all rows uniserial or comprising a single papillae; sensory-papillae row *a* with 3 well-spaced papillae; row *b* with 6 papillae, extending from just behind posterior end of row *c* to just before preopercle; row *c* with 4 papillae, slightly elevated posteriorly, the posteriormost close to the anterior pores of rows *a* and *b*; row *cp* with a single papilla below anteriormost papilla of row *a*; row *d* with 6 papillae, short, not bifurcated, extending horizontally from below second papilla of row *c* to just before row *cp*; row *f* with 2 papillae just behind lower jaw symphysis.

Body covered with deciduous (almost all scales lost due to abrasion) ctenoid scales. Pre-pelvic-fin region covered with cycloid scales; anterior margin of pre-pelvic-fin scales just behind anteroventral point of gill opening. Entire head region (except for lateral surface of nape) naked. Scales on cheek and pectoral-fin base not found (see Remarks).

All dorsal- and anal-fin spines slender, flexible. First dorsal fin triangular, 1st and 2nd spines longest, all spines lacking filamentous tips; dorsal fin origin located posterior to vertical through pectoral-fin base. Second dorsal and anal fins relatively long, origin of latter slightly posterior to vertical through 2nd dorsal-fin origin, last rays well separated from caudal-fin base. Pectoral fin long, pointed, middle rays longest, tips reaching to above origin of 3rd anal-fin soft ray; all rays connected by membrane, two uppermost (damaged in holotype) and lowermost rays unbranched. Pelvic fins fused medially with connecting membrane (between innermost rays) and thin frenum (between spines); posterior tip reaching below 2nd dorsal-fin origin when appressed; pelvic-fin origin just below ventral end of pectoral-fin base; posterior margin of pelvic frenum smooth, slightly emarginated; all segmented pelvic-fin rays branched. Caudal fin relatively long, subequal to caudal-peduncle length.

Colouration. Fresh colouration based on Fig. 3 and KAUM-I. 157330 (dorsal view only). Head brown dorsally, faint yellow ventrally (especially around lower jaw) with two oblique bright yellow stripes on nape; anterior strip extending from vertical through middle of head to just behind eye, posterior stripe wider than anterior stripe, extending from above pectoral-fin base to horizontally level with posterior tip of jaws; both stripes on each side generally separated mid-dorsally (anterior stripes connected in KAUM-I. 157330). Body brown, with seven similar width (< pupil diameter) bright yellow bars; two anteriormost bars located below origin and middle of 1st dorsal-fin base, respectively, middle three bars below origin, middle, and posterior end of 2nd dorsal-fin base, respectively, two posteriormost bars on caudal peduncle. Dorsal fins pale brown with bright yellow barred pattern; anal fin bright yellow, marginal one-third

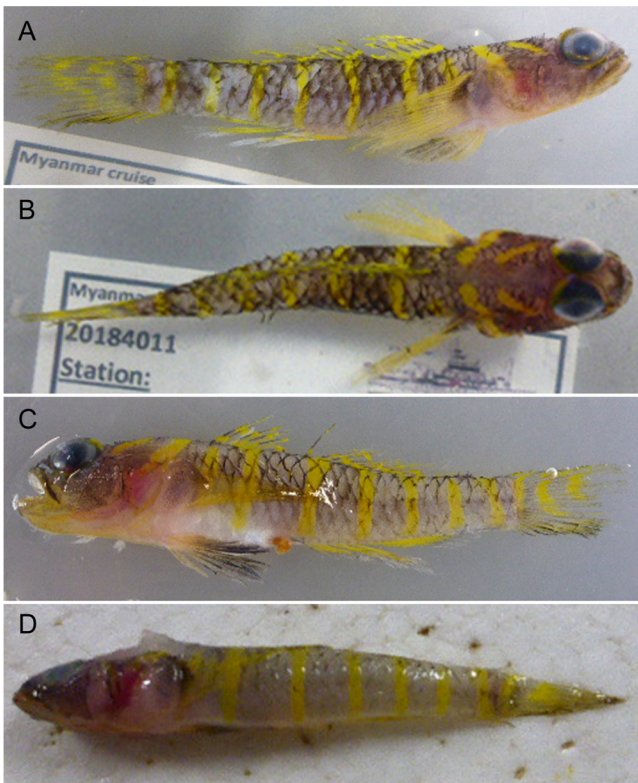


Fig. 3. Fresh colouration of *Obliquogobius eptactis*, new species. A, B, SAIAB208554, male, 50.1 mm SL; C, SAIAB 208473, male, 47.0 mm SL; D, SAIAB 208484, female, 40.7 mm SL. A, C, D, lateral views; B, dorsal view.

of fin translucent white; pectoral fin bright yellow; pelvic fin light yellowish anteriorly, blackish posteriorly; caudal fin pale brown dorsally, blackish-brown ventrally (ca. 1/4 height of fin) with three incomplete bright yellow bars on upper part, anteriormost bar on caudal-fin base, following bars similarly spaced; small distinct black spot on centre of caudal-fin base absent (poorly defined pale brown mark apparent in holotype).

Colour in alcohol. Head and body brown. All stripes and bars (of fresh specimens) retained as pale white. All fins generally translucent white (bright yellow colouring lost); dorsal fins with brown barred patterns; pelvic fin slightly blackish posteriorly; caudal fin with three indistinct brown bars.

Distribution. Currently known only from four specimens trawled between 181–184 m off the Myeik Archipelago, Andaman Sea.

Etymology. The specific name “*eptactis*”, a combination of the New Greek “*epta*” and “*aktis*”, means “seven light rays”, in reference to the seven characteristic yellow bars on the body.

Comparisons. The new species is very similar to *O. yamadai*, *O. eptactis* differing from the latter in having 7 [vs. 5 (rarely 6, including indistinct partial bar located above anus) in *O. yamadai*] bright yellow bars on the body [2 (vs. 1) under the 1st dorsal-fin base, 5 (vs. 4) under the 2nd dorsal fin (from

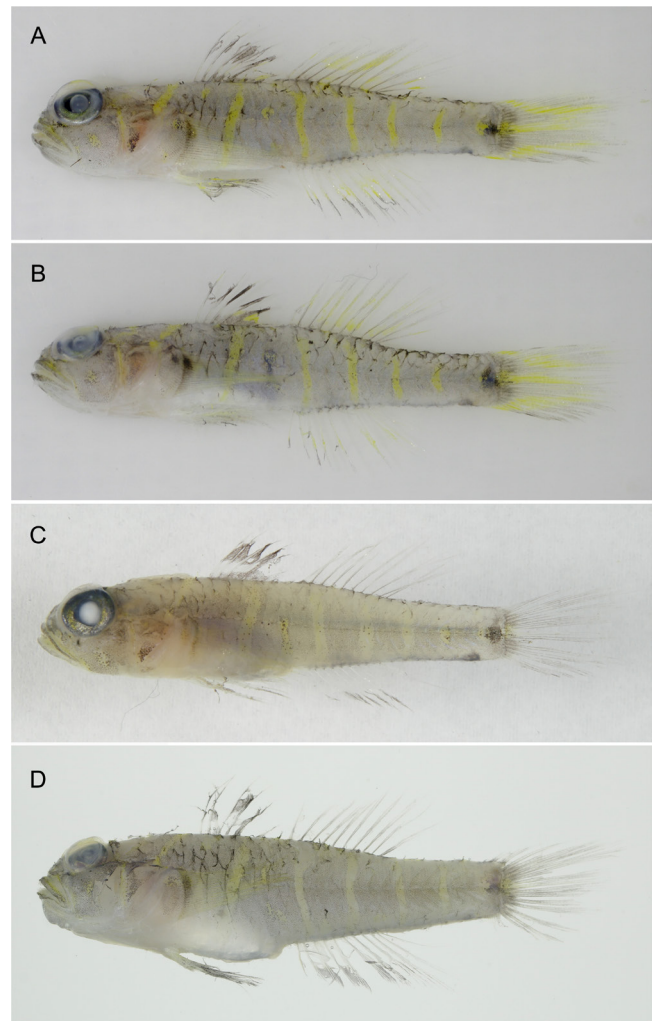


Fig. 4. Fresh specimens of *Obliquogobius yamadai*. A, KAUM-I. 57485, male, 41.5 mm SL; B, KAUM-I. 57486, male, 41.2 mm SL; C, KAUM-I. 35869, male, 34.8 mm SL; D, KAUM-I. 70091, male, 49.6 mm SL.

origin) and on the caudal peduncle], a bright yellow barred pattern on the dorsal fins, a broad black margin absent on the 1st dorsal fin (vs. dorsal fins lacking barred patterns: 1st dorsal fin with distinct broad black margin, 2nd dorsal fin generally faint yellow), bright yellow (vs. translucent white or faint yellow) pectoral fins, no distinct black spot centrally on the caudal-fin base [vs. a black spot (variable in size) with following indistinct yellow partial bar present], 3 bright yellow irregular vertical bars restricted to upper part of caudal fin (vs. 3 longitudinal yellow stripes on entire fin; stripes faded out soon after capture: Fig. 4C, D), and larger head, length 32.9–33.3 (vs. 28.3–32.2) and 34.4 (vs. 29.1–33.5) % of SL in males and females, respectively (Figs. 1, 3–6).

Obliquogobius eptactis is readily distinguished from *O. cirrifer*, *O. fulvostriatus*, and *O. megalops* by the following combination of characters: 2nd dorsal-fin rays I, 9 or 10; lateral surface of nape scaled; relatively narrow gill opening (anteroventral point extending slightly forward to vertical level of preopercle margin); and postorbital pore G (in anterior oculoscapular canal) present (vs. 2nd dorsal-fin rays I, 8; lateral surface of nape naked in *O. cirrifer* and *O. megalops*; gill opening wide, anteroventral point beyond vertical through

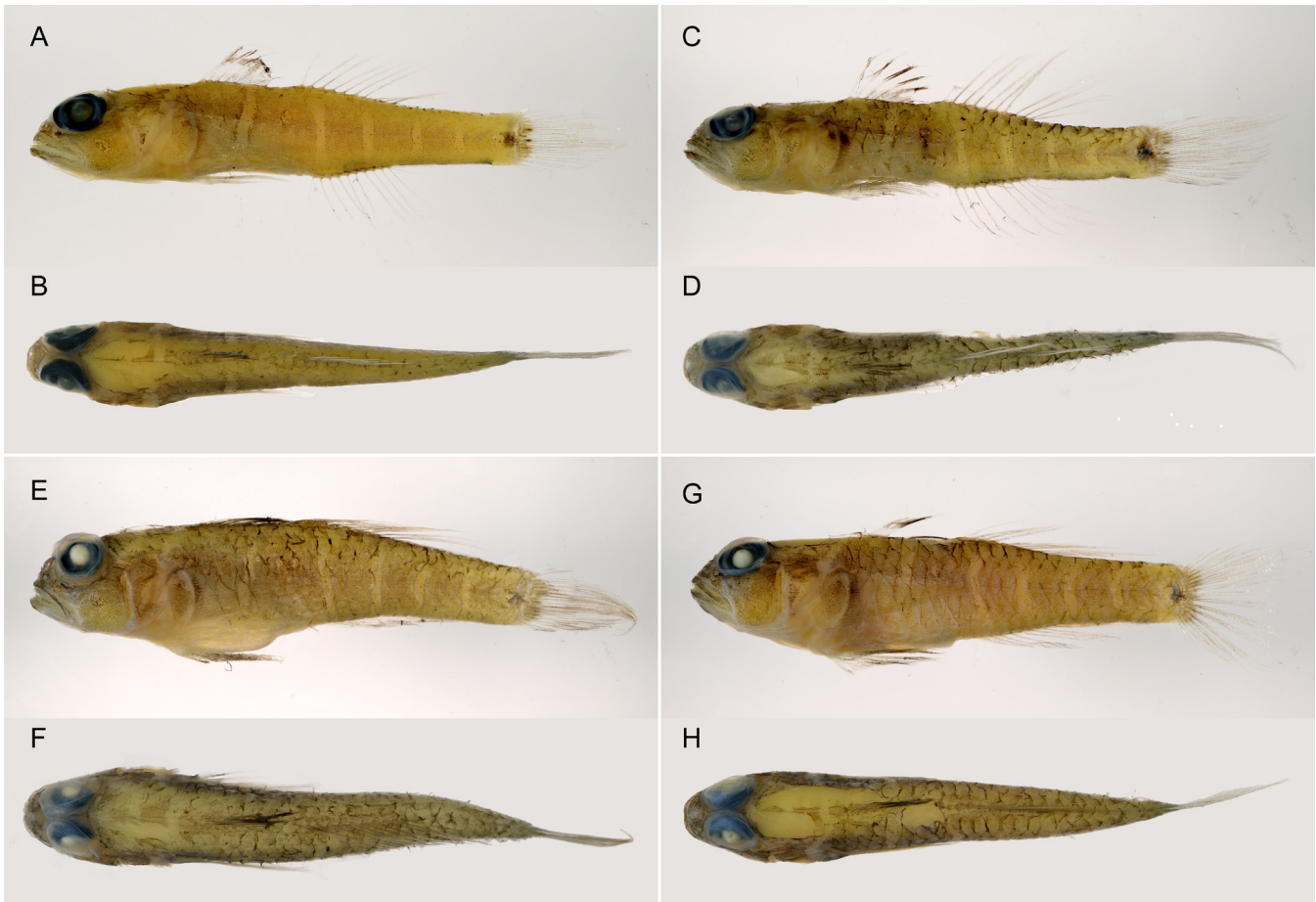


Fig. 5. Preserved specimens of *Obliquogobius yamadai*. A, B, KAUM-I. 81144, female, 37.1 mm SL; C, D, KAUM-I. 57486, male, 41.2 mm SL; E, F, KAUM-I. 70096, male, 52.3 mm SL; G, H, KAUM-I. 70109, male, 48.7 mm SL. A, C, E, G, lateral views; B, D, F, H, dorsal views.

posterior margin of eye in *O. fulvostriatus* and *O. megalops*; postorbital pore G absent in all three species).

Compared with *O. cometes* and *O. turkayi*, *O. eptactis* has an asymmetrical caudal fin (upper half of rays much longer than lower half, giving obliquely pointed appearance), lacking black barred patterns (vs. caudal fin symmetrical dorsoventrally in *O. turkayi*; upper half of fin with a distinct black barred pattern in *O. cometes*). In addition, the head of *O. eptactis* is smaller than that of *O. cometes* (32.9–34.4% SL vs. 35.6–41.5% SL). *Obliquogobius eptactis* has bright yellow (pale white in preserved specimens) bars on the body, such a pigmentation pattern being absent in other species of *Obliquogobius* (except for *O. yamadai*) [viz. body with one or several blotches in *O. cometes* (5 faint yellow blotches in fresh specimens), *O. cirrifer* and *O. turkayi* (1 and 5 or 6 brown blotches in preserved specimens, respectively, fresh colour unknown); body lacking bars and blotches in *O. megalops* (fresh colour unknown) and *O. fulvostriatus*].

Remarks. In the original description of *O. yamadai*, Shibukawa & Aonuma (2007) described cycloid scales on the cheek and pectoral-fin base as diagnostic of the species. However, no trace of such scales could be confirmed in 15 examples of that species examined in this study, except in KAUM-I. 70094 (right side cheek scales present only). Clearly, scales on the cheek and pectoral-fin base are

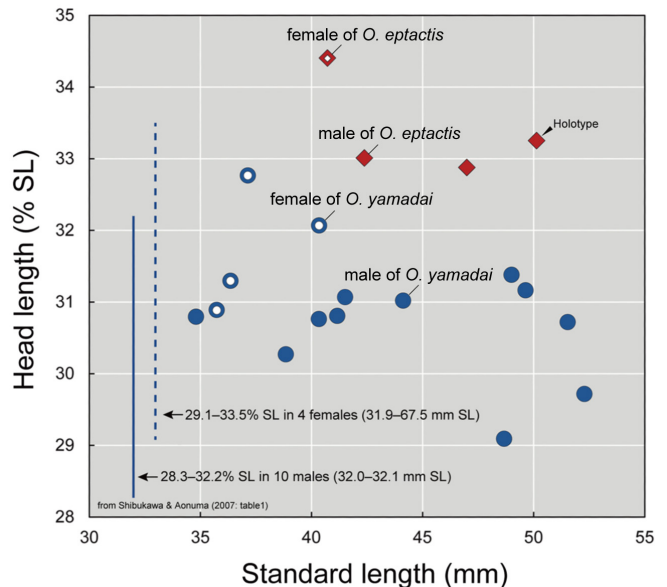


Fig. 6. Relationship of head length (% SL) to standard length (mm) of *O. eptactis*, new species (red diamonds) and *O. yamadai* (blue circles and lines). Open and closed symbols indicate females and males, respectively.

deciduous and very difficult to detect in abraded specimens. Unfortunately, non-abraded specimens of *O. eptactis* were unavailable in this study. Whereas it is likely that cycloid

cheek and pectoral-fin base scales are diagnostic for species of *Obliquogobius*, their susceptibility to abrasion reduces their potential usefulness as a distinguishing character.

Material Examined. *Obliquogobius cometes*: SAIAB 208690, female, 86.3 mm SL; Andaman Sea, Myanmar. *Obliquogobius yamadai*: KAUM-I. 35869, male, 34.8 mm SL; KAUM-I. 57485, male, 41.5 mm SL; KAUM-I. 57486, male, 41.2 mm SL; KAUM-I. 70091, male, 49.6 mm SL; KAUM-I. 70093, female, 36.4 mm SL; KAUM-I. 70094, male, 51.5 mm SL; KAUM-I. 70095, male, 40.3 mm SL; KAUM-I. 70096, male, 52.3 mm SL; KAUM-I. 70097, male, 49.0 mm SL; KAUM-I. 70106, male, 44.1 mm SL; KAUM-I. 70109, male, 48.7 mm SL; KAUM-I. 75200, male, 38.9 mm SL; KAUM-I. 81143, female, 35.7 mm SL; KAUM-I. 81144, female, 37.1 mm SL; KAUM-I. 81295, female, 40.4 mm SL; East China Sea, Japan.

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