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Two New Species of the Gobiid Fish Genus *Eviota* (Teleostei, Perciformes, Gobioidei) from the Western Pacific

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Abstract Two new species of the gobiid fish genus *Eviota*, i.e., *E. korechika* and *E. ocellifer*, are described based on specimens from the West Pacific Ocean. *E. korechika* (19 type series and 9 non-type specimens, 12.3–24.4 mm SL, Ryukyu Archipelago, Japan, and Sulawesi, Indonesia) belongs to the subgroup bearing complete cephalic sensory-canal pore configuration for *Eviota* [i.e., pores B′, C (unpaired), D (unpaired), E, F, H′, N′ and O′]; it differs from the other 18 described species of this subgroup in having the following combination of characters: usually 9 and 8 dorsal- and anal-fin segmented rays, respectively; well-developed membranes between pelvic-fin segmented rays; edge of scale pockets densely pigmented, forming dusky reticulations on body; a narrow arc-shaped, diagonal pale band (subtranslucent in preserved specimen) at middle of first dorsal fin; 5–7 diagonal bright-blue to pale-blue bars (translucent and sometimes quite indistinct in preserved specimens) on second dorsal and anal fins in each; two ovoid dusky spots on dorsal and ventral parts of pectoral-fin base; no enlarged, distinct subcutaneous dusky spot on mid-lateral caudal peduncle; caudal fin without any conspicuous dusky markings. *E. ocellifer* (7 specimens, 16.4–18.4 mm SL, Iriomote-jima Island, Yaeyama Islands of Ryukyu Archipelago, Japan) is similar to *E. lacrimae* and *E. sparsa* in lacking preopercular canal and associated pores of cephalic sensory systems, but differs from the latter two in having moderately developed fifth pelvic-fin ray (10.5–18.1% of preceding ray in length) and a conspicuous semi-ocellated spot at anteroventral part of first dorsal fin.

Key words: *Eviota korechika* sp. nov., *Eviota ocellifer* sp. nov., Gobiidae, West Pacific.

Eviota belongs to the gobiid subfamily Gobiinae (*sensu* Pezold, 1993), and comprises small-sized marine gobies [less than 40 mm in standard length (SL)], commonly found in shallow coastal reefs of the Indo-Pacific Ocean. Although monophyly of the genus has not been ascertained (Winterbottom & Hoese, 1988), it is distinguished from the other gobiine genera in having the following combination of characters: cephalic sensory canals and pores present, but variously developed (posterior oculoscapular canal always absent); reduced transverse pattern of sensory-papillae rows on cheek; moderately narrow gill opening, not extending ventrally to a vertical line through middle of operculum; pelvic fins largely or completely separated, with or without rudimentary, low connecting membrane joining bases and no frenum; fifth pelvic-fin ray, when present, small rudiment or short unbranched ray; typically 10+15−16=25−26 vertebrae; no scales on head, nape and pectoral-fin base; trunk and/or tail with vertical, dark subcutaneous bars in many species. *Eviota* is well known as the one of most diverse gobioid genera, containing about 70 species (Lachner & Karnella, 1980). Of these, currently 48 described species are regarded as valid (Lachner & Karnella, 1980; Karnella & Lachner, 1981; Jewett & Lachner, 1983; Sunobe, 1988; Greenfield & Randall, 1999; Allen, 2001; Gill & Jewett, 2004), while the others are still unnamed.

Fricke (1998) described *Eviota corneliae* as a new species from New Caledonia, but the species was subsequently regarded as a junior synonym of *Trimmatom eviotops* (Schultz, 1943) (Gill & Jewett, 2004).

In this paper, we describe two new species of *Eviota* from shallow coastal waters in Japan and Indonesia. One of them was first reported by Hayashi *et al*. (1990) as an undescribed species of *Eviota* (named "Shibori-isohaze" as the Japanese vernacular) from the Amami Islands of Ryukyu Archipelago, Japan, and subsequently recorded by Shibukawa *et al*. (2003) from the northeastern part of Sulawesi, Indonesia. The other one was recently collected from the mouth of the Urauchi-gawa River in Iriomote-jima Island, Yaeyama Islands of Ryukyu Archipelago, Japan. These two species resemble one another in the general physiognomy (e.g., meristic counts, shape of body and fins, and general coloration when preserved in alcohol), but are readily distinguished based on the cephalic sensory-canal pore configuration, as well as differences in color.

Materials and Methods

Institutional abbreviations follow Leviton *et al*. (1985), except for BLIH (Biological Laboratory, Imperial Household, Japan).

The methods of counts and measurements follow Lachner and McKinney (1974) and Lachner and Karnella (1978, 1980), except for the following (the snout tip refers to the mid-anteriormost point of the upper lip): longitudinal and transverse scales are counted in two and three ways, respectively (see description); gill rakers including all rudiments are counted on the outer side of first arch; counts of pseudobranchial filaments include all rudiments; interorbital width is the least width between innermost rims of right and left eyes; jaw length is measured between the snout tip and the posteriormost point of lip; body depth is measured at the anal-fin origin; nape width is measured between uppermost ends of gill openings; preanal and prepelvic lengths are measured from the snout tip to the origin of each fin; pectoral-fin length is measured from the base to the tip of the longest ray; caudal-fin length is measured from the base to the tip of the middle caudal-fin ray. Scales (except for predorsal and circumpeduncular scales) and paired-fin rays are counted bilaterally. The notation of pattern of interdigitation of the dorsal-fin proximal pterygiophores between the neural spines ("P-V") and cephalic sensory-canal pores follow Akihito (1984).

Eviota korechika sp. nov.

(Japanese name: Shibori-isohaze)

(Fig. 1; Table 1)

Eviota sp. A: Hayashi *et al*., 1990: 130, pl.1, fig. 7 (Sakinome Beach, Amami-oshima Island, Ryukyu Archipelago, Japan); Senou *et al*., 2004:118 (Amami-oshima Island and Iriomote-jima Island, Ryukyu Archipelago, Japan).

Eviota sp.1: Akihito *et al*., 1993:1024, 1097 & 1355, 2000:1177, 1282 & 1608, 2002:1177, 1282 & 1598 (Amami-oshima Island, Ryukyu Archipelago, Japan).

Eviota species: Shibukawa *et al*., 2003: 182 (Sulawesi, Indonesia).

Holotype. NSMT-P 70710, male, 24.4 mm SL, Uehara, Iriomote-jima Island, Yaeyama Islands of Ryukyu Archipelago, Japan (24°25.08′ N, 123°48.12′E), 18 Aug. 1999 (collected by K. Yano).

Paratypes. Eighteen specimens (7 males and 11 females), 12.3–23.4 mm SL: AMS I.43577-001, 1 specimen (male), 19.6 mm SL, Serena Besar, Lembeh Strait, Bitung, Sulawesi, Indonesia (1°27.5′N, 125°14.0′E), 12 m depth, 15 July 2000 (collected by K. Matsuura); AMS I.43578-001, 3 specimens (2 males and 1 female), 20.3–23.0 mm SL, same locality with NSMT-P 31456, 2–3 m depth, 14 Sept, 1989 (collected by K. Matsuura); BLIH 19990210, 1 specimen (female), 23.4 mm SL, female, collected with holotype; NSMT-P 31456, 16.4 mm SL, 1 specimen (male), Sakinome Beach, Amami-o'shima Island, Amami Islands of Ryukyu Archipelago, Japan (28°11.13′N, 129°16.05′E), 12 Sept. 1989 (collected by M. Aizawa); NSMT-P31773, 1 speci-

Fig. 1. Freshly collected specimens of *Eviota korechika* sp. nov. Top, NSMT-P 70710, holotype, male, 24.4 mm SL; middle, AMS I.43577, paratype, male, 19.6 mm SL; bottom, NSMT-P 62151, paratype, female, 22.9 mm SL.

men (male), 19.4 mm SL, same collecting data with NSMT-P 31456; NSMT-P31796, 1 specimen (female), 12.3 mm SL, same locality and date with NSMT-P 31456 (collected by K. Matsuura); NSMT-P31804, 3 specimens (2 males and 1 female), 20.3–23.0 mm SL, same locality with NSMT-P 31456, 2–3 m depth, 14 Sept, 1989 (collected by K. Matsuura); NSMT-P61055, 1 specimen (male), 19.4 mm SL, Tanjung Kusukusu, west coast of Lembeh Island, Bitung, Sulawesi, Indonesia (1°26.8′N, 125°14.5′ E), 15 m depth, 14 July 2000 (collected by K. Matsuura); NSMT-P61065, 2 specimens (females), 16.7–17.6 mm SL, Tanjung Lampu, west coast of Lembeh Island, Bitung, Sulawesi, Indonesia (1°26.0′N, 125°11.0′E), 20 m depth, 22 Jan. 2000 (collected by K. Matsuura); NSMT-P61612, 1 specimen (female), 17.4 mm SL, collected with NSMT-P61065; NSMT-P62151, 1 specimen (female), 22.9 mm SL, Serena Kecil, Lembeh Straight, Bitung, Sulawesi, Indonesia (1°26.5′N, 125° 13.5′E), 1 m depth, 17 July 2000 (collected by K. Shibukawa); NSMT-P62161, 2 specimens (females), 16.2–16.7 mm SL, Serena Kecil, Lembeh Straight, Bitung, Sulawesi, Indonesia (1°26.5′N, 125°13.5′E), 12 m depth, 17 July 2000 (collected by K. Matsuura); NSMT-P 70711, 3 specimens (1 male and 2 females), 20.0–23.4 mm SL, Bitung, Sulawesi, Indonesia, (collected by K. Matsuura).

Non-type materials. NSMT-P 64235, 9 specimens (4 males and 5 females), 13.4–21.6 mm SL, southeast coast of Kotania Bay, Seram Island, Indonesia, 20 m depth, 4 Dec. 1998 (collected by K. Matsuura and K. Shibukawa).

Diagnosis. *Eviota korechika* differs from the other described species of the genus in having the following combination of characters: VI-I, 9 dorsal-fin rays; I, 8–9 (almost always I, 8) anal-fin rays; 15–18 pectoral-fin rays, including 1–7 (typically 4–6) branched rays; first spine of first dorsal fin typically elongate, filamentous in male (i.e., usually reaching to middle of second dorsal-fin base when adpressed), but not or slightly elongate in female (usually just or not reaching to origin of second dorsal fin when adprssed); fifth pelvic-fin ray reduced, rudimentary or less than 10% of preceding ray in length; well-developed membranes between pelvic-fin segmented rays (i.e., extending beyond base of first branche of each pelvic-fin ray); cephalic sensory-canal pores B′, C (unpaired), D (unpaired), E and F, H′, N′ and O′; genital papilla of male nonfimbriate; edge of scale pockets densely pigmented, forming dusky reticulation on body; first dorsal fin dark red to dark gray tinged with red or yellow (dusky in preserved specimen) with a narrow arc-shaped, diagonal pale band (subtranslucent in preserved specimen) at middle of fin; 5–7 diagonal bright-blue to pale-blue bars (usually faded in preserved specimens) on second dorsal and anal fins in each; two ovoid dusky spots on pectoral-fin base; no enlarged, distinct subcutaneous dark spot on mid-lateral caudal peduncle; caudal fin without any conspicuous dark markings (e.g., dots, spots or bands).

Table 1. Proportional measurements of two new speceis of *Eviota*. Number of specimens is in parenthesis following each sex.

	E. korechika			*E. ocellifer*		
	Holotype	Type series		Holotype	Type series	
	NSMT-P 70710	Males (8)	Females (11)	NSMT-P 70712	Males (4)	Females (3)
SL (mm)	24.4	15.8–24.4	12.3–23.4	18.3	17.0–18.4	16.4–17.0
Measurements in % of SL						
Head length	29.9	29.0–31.6	29.9–32.7	31.9	31.7–32.3	33.0–33.7
Snout length	7.5	6.3–7.5	6.0–7.5	8.3	7.2–8.5	7.3–7.6
Eye diameter	8.0	8.0–10.0	8.0–10.5	9.4	9.3–10.2	9.5–10.8
Interorbital width	1.9	1.2–1.9	1.2–1.9	1.8	1.3–1.8	1.5–1.8
Nape width	15.4	11.2–15.4	10.9–15.2	15.7	15.7–16.5	15.3–16.0
Head width	18.3	15.7–18.3	16.4–18.7	20.9	19.5–20.9	19.5–21.3
Head depth	21.0	18.3–21.0	18.9–21.2	24.1	24.1–24.9	23.1–25.1
Jaw length	12.9	11.4–12.9	11.1–12.8	12.1	12.2–13.2	11.7–11.
Body depth	21.7	19.6–22.7	17.7–22.9	22.3	21.8–23.2	21.0–22.0
Body width	13.5	11.2–13.5	10.8–14.9	13.9	13.9–15.0	14.1–14.8
Predorsal length	34.8	34.7–36.5	34.4–38.6	36.6	37.6–39.2	37.5–39.0
Prepelvic length	30.4	30.4–33.4	30.3–36.3	33.0	32.4–33.2	32.5–35.1
Preanal length	58.7	58.7–63.4	59.5–65.0	60.7	59.9–60.8	61.4–62.9
Caudal–peduncle length	26.1	24.5–26.2	23.7–27.1	26.1	25.6–26.1	25.5–26.4
Caudal–peduncle depth	14.4	12.9–15.5	12.6–14.1	14.6	14.3–14.7	13.8–14.2
Length of first dorsal–fin base	22.9	22.2–24.0	20.7–24.7	21.9	21.2–22.3	20.8–22.
Length of second dorsal–fin base	23.9	21.9–24.3	19.8–23.8	22.7	21.8–23.0	19.9–21.1
Length of anal–fin base	19.0	15.7–19.2	15.6–17.8	17.3	15.9–17.5	16.0–16.7
Pectoral–fin length	30.9	27.5–35.3	28.2–36.8	31.2	31.2–32.9	27.0–33.4
Pelvic–fin length	30.1	29.0–34.2	27.5–35.5	31.7	28.0–32.3	26.5–33.5
Caudal–fin length	24.4	23.8–25.6	20.6–28.5	24.3	24.3–25.2	23.5–25.0

Description. In the following description, the counts of holotype have an asterisk, and the frequency of each count in given in the parentheses following relevant count. Dorsal-fin rays VI-I, 9* (19); anal-fin rays I, 8* (18) or I, 9 (1); pectoral-fin rays 15 (1), 16 (8), 17* (22) or 18* (7); pelvic-fin rays I, 5* (38); branches on fourth pelvic-fin rays 2 (2), 3* (11), 4 (10), 5 (3), 6 (2) or 7 (1); segments between branches of fourth pelvic-fin ray 3 (5), 4 (3), 5 (13), 6* (11), 7 (10), 8 (5), 9 (2), 10* (1), 11* (1), 12 (2) or 14 (1); segmented caudal-fin rays 9+8*(18), including 12 (4), 13 (9) or 14* (5) branched rays; dorsal unsegmented (procurrent) caudal-fin rays 6* (17) or 7 (1); ventral unsegmented (procurrent) caudal-fin rays 5* (15) or 6 (3); longitudinal scales counted as number of oblique (anterodorsal to posteroventral) scale rows from the one closest to upper attachment of opercular membrane to mid-base of caudal fin 23* (5), 24* (27) or 25 (3); longitudinal scale rows counted from just posterior of mid-base of pectoral fin to mid-base of caudal fin 23* (28) or 24 (8); transverse scales from anal-fin origin upward and forward to dorsal-fin base 7 (3), 8* (28) or 9 (5); transverse scales from anal-fin origin upward and backward to dorsal-fin origin 6 (1), 7 (30) or 8* (5); transverse scales from origin of second dorsal fin downward and backward to anal-fin base 7* (29) or 8 (7); predorsal scales 0* (18); vertebrae 10+16=26* (18); P-V 3/II II I I 0/9* (18); two* anal-fin pterygiophores anterior to first haemal spine (18); single* epural (18); gill rakers 1+6 (1), 2+4 (12), 2+5 (4) or 2+6 (1)*; pseudobranchial filaments 4* (18).

Proportional measurements are given in Table 1. First spine of first dorsal fin greatly elongate and filamentous in male (reaching to bases of second to seventh segmented rays of second dorsal fin when adpressed), typically not or slightly elongate in females (not or just reaching to base of spine or first segmented ray of second dorsal fin, except for a single specimen, NSMT-P 62151, with greatly elongate spine reaching to base of 6th segmented ray of second dorsal fin); tip of first dorsal fin reaches between bases of first and seventh soft rays of second dorsal fin when adpressed, whereas typically not reaching to origin of second dorsal fin in female (except for large specimen). Second dorsal fin slightly higher than anal fin; all second dorsal- and anal-fin rays usually branched. Pelvic fins moderately long, extending to or beyond anal-fin origin when adpressed; membranes between pelvic-fin segmented rays well developed (similar to condition appeared in fig. 1 of Lachner and Karnella, 1980), usually extending distally beyond base of first branch of each fin ray; fifth pelvic-fin ray reduced, rudimentary or less than 10% of preceding ray in length.

Scales on body ctenoid, excluding those on belly cycloid; head and predorsal and prepelvic regions naked. Teeth on jaws simple, conical, forming villiform patches anteriorly to anterolaterally; in upper jaw, teeth in outermost row enlarged, those in inner rows distinctly smaller; lower jaw teeth arrangement similar to upper jaw, except for 1–3 enlarged teeth at innermost row.

Illustration of cephalic sensory systems, based on two specimens including a single paratype herein designated (NSMT-P 31456), are found in Akihito *et al*. (1993, 2000, 2002), and not included here. Anterior oculoscapular canal typically with pores B′, C (unpaired), D (unpaired), E, F and H′ (pore H′ lacked in one side of a single specimen). Posterior oculoscapular canal undeveloped. Preopercular canal with pores N′ and O′.

Coloration of freshly collected material (based on color slides of several type specimens). Ground color of head and body pale brown or reddish brown; cheek with oblong or irregular-shaped dark brown spots, sometimes forming dusky radiation from eye; operculum with irregular-shaped brown spots; anterior nasal tube uniformly dark brown or black; iris silver or pale gold, with bronze or reddish orange radiation from pupil; nape and occipital region sometimes with three broad dusky (tinged with red) saddle-like patterns; base of pectoral fin with two transversely-elongated ovoid dark-brown or reddish-brown spots, and pale or broad pale-brown inter-

space; margin of each scale pocket dark brown or reddish brown, forming dusky reticulation of body; sometimes 8–10 indistinct, short, narrow white saddles from nape to base of caudal fin; body with about six vague dusky subcutaneous bars (may be quite indistinct in heavily-pigmented large adult), the first below anterior part of spinous dorsal fin and the last at posterior part of caudal peduncle; middle two (and, sometimes, posteriormost one) of these subcutaneous bars on tail X-shaped; usually 6–7 dark ventral midline spots associated with subcutaneous bars, the first three attached to base of anal fin, and the seventh one, if present, at base of ventral procurrent rays of caudal fin; no enlarged, distinct subcutaneous mid-lateral dark spot on caudal peduncle; first dorsal fin dark red to dull orange basally, gray brown tinged with red or yellow distally; narrow arc-shaped, diagonal pale band at middle of first dorsal fin (from mid-anterior margin to mid-base of the fin); some or several small dusky spots (some of which attaching to pale diagonal bar) on anteroventral part of first dorsal fin in large specimens; second dorsal-fin membrane dark red to dull orange brown basally, gray brown tinged with red or yellow distally; 5–7 narrow bright pale-blue oblique bars on second dorsal fin; anal fin reddish orange basally, gray brown tinged with red or yellow distally; five bright pale-blue oblique bars on anal fin; caudal fin brown or dull orange brown (paler distally), without dusky dots or bars; small orange or brown wedge-shaped spots (smaller than pupil), margined both anteriorly and posteriorly by blight pale blue, at dorsal and ventral procurrent parts of caudal fin; pectoral and pelvic fins subtranslucent.

Live coloration. Live coloration is shown in underwater photographs in Senou *et al*. (2004: as "*Eviota* sp. A"). The color is similar to that of fresh specimens, except as follows: pale or pale-blue bars on fins more vivid and conspicuous; interspaces of dusky subcutaneous bars on body bright white (especially those on dorsum and ventral part of tail conspicuous).

Color in alcohol. Similar to live coloration, except as follows: reddish color on head, body and fins faded; pale or pale blue bars on vertical fins usually faded (only diagonal pale bar on first dorsal fin turns translucent); dusky subcutaneous bars on body not visible in external view; iris entirely blackish.

Sexual dimorphism. Urogenital papilla in male not fimbriate, relatively slender and long, sometimes reaching to base of anal-fin spine in large specimen; female urogenital papilla bulbous, short with finger-like projections at its tip. Anteriormost spine of first dorsal fin greatly elongate in male, whereas typically not or slightly elongate in female (may be greatly elongate in large specimen).

Comparison. *Eviota korechika* is placed in the "Group I," a subgroup of the genus defined by Lachner and Karnella (1980), by having: complete cephalic sensory-canal pore configuration for *Eviota* [i.e., pores B′, C (unpaired), D (unpaired), E, F, H′, N′ and O′]; 10+16=26 vertebrae; pectoral fin typically with more than some branched rays; nonfimbriate genital-papilla in male (see also Lachner & Karnella, 1980; Jewett & Lachner, 1983). It is the largest subgroup of *Eviota*, and, in addition to *E. korechika*, following 18 described species are assigned to the Group I (Lachner & Karnella, 1980; Karnella & Lachner, 1981; Jewett & Lachner, 1983; Gill & Jewett, 2004): *E. abax* (Jordan & Snyder, 1901); *E. albolineata* Jewett & Lachner, 1983; *Eviota disrupta* Karnella & Lachner, 1981; *E. distigma* Jordan & Seale, 1906; *E. epiphanes* Jenkins, 1903; *Eviota fasciola* Karnella & Lachner, *E. guttata* Lachner & Karnella, 1978; *E. herrei* Jordan & Seale, 1906; *E. inutilis* Whitley, 1943; *Eviota irrasa* Karnella & Lachner, *E. melasma* Lachner & Karnella, 1980; *E. monostigma* Fourmanoir, 1971; *E. nebulosa* Smith, 1958; *E. nigripinna* Lachner & Karnella, 1980; *E. pardalota* Lachner & Karnella, 1978; *E. pseudostigma* Lachner & Karnella, 1980; *E. readerae* Gill & Jewett, 2004; *E. smaragdus* Jordan & Seale, 1906.

Of the Group I members of *Eviota*, *E. korechika* resembles *E. abax* and *E. distigma* in having the following combination of characters: first

dorsal fin elongate or filamentous at least in male; membranes between pelvic-fin rays moderate to well developed; two dark spots on base of pectoral fin; scale pockets densely pigmented, usually forming dark reticulation of body; a series of 6–7 dark spots along ventral midline from anal-fin origin to base of caudal fin, three of which attached to base of anal fin; cheek with rounded or irregular-shaped dusky spots. *E. korechika* differs from the latter two in having: segmented dorsal/anal fin rays typically 9/8 (vs. typically 10/8 and 8/8 in *E. abax* and *E. distigma*, respectively); no distinct, enlarged dusky subcutaneous spot on midlateral caudal peduncle (vs. present in *E. distigma*); first dorsal fin dusky with a pale diagonal arc-shaped band at middle of the fin (vs. no such pattern, see also below); diagonal, pale to bright blue barred pattern on second dorsal and anal fins when live or fresh (vs. no such pattern); caudal fin more or less plain colored [vs. a series of minute dark dots on each caudal-fin ray (often indistinct in *E. distigma*)]. Likewise *E. korechika*, *E. distigma* has alternating clear and pigmented diagonal barred pattern on first dorsal fin; in *E. distigma*, however, the mid-portion is occupied by dark colored bar (see, e.g., Lachner & Karnella, 1980: 47, fig. 23).

Alternating reddish and narrow pale or pale-blue diagonal barred pattern on dorsal and anal fins might be a good diagnosis for the new species when alive or fresh.

Distribution and habitat. *Eviota korechika* is hitherto known from the Ryukyu Archipelago of Japan (Amami-oshima Island and Iriomote-jima Island) and Indonesia (Sulawesi Island and Seram Island); the species probably is distributed more widely in the western Pacific. It is found around the roof of small coral caves and interstices of dead-coral rubbles on coral reefs in the protected bays (Senou *et al*., 2004).

Etymology. The new species *Eviota korechika* is named for Korechika Yano, who provided us many interesting fish specimens, including some type specimens of the new species described in this paper, and is treated as a noun in apposition.

Remarks. The holotype of *Eviota korechika* differs from conspecifics and congeners in having a single element in the ultimate segmented ray of second dorsal fin; this species usually has the ultimate ray comprising two elements, which attach one to another at base.

Hayashi *et al*. (1990) noted that *Eviota* sp. A (=*E. korechika*) lacked the cephalic sensory-canal pore H, but, as pointed out by Akihito *et al*. (1993, 2000, 2002), the species almost always possessed it. We examined only a single specimen (one of NSMT-P 62161) lacking pore H on its left side.

Eviota ocellifer sp. nov.

(New Japanese name: Urauchi-isohaze)

(Figs. 2 & 3, Table 1)

Eviota sp. 14: Senou *et al*., 2004 : 153 (Iriomote-jima Island, Ryukyu Archipelago, Japan).

Holotype. NSMT-P 70712, male, 18.4 mm SL, mouth of Urauchi-gawa River, Iriomote-jima Island, Yaeyama Islands of Ryukyu Archipelago, Japan (24°24.82′N, 123°46.44′E), 31 July 2003 (collected by T. Suzuki and M. Hosokawa).

Paratypes. Six specimens (3 males and 3 females), 16.4–18.4 mm SL, collected with holotype: AMS I.43579-001, 1 specimen (male), 18.3 mm SL; BLIH 20030464, 1 specimen (male), 18.4 mm SL; OMNH 29480, 1 specimen (male), 17.0 mm SL; NSMT-P 70713, 3 specimens (females), 16.4–17.0 mm SL.

Diagnosis. *Eviota ocellifer* is distinguished from the other described species of the genus in having the following combination of characters: VI-I, 8–9 (usually VI-I, 9) dorsal-fin rays; I, 8 anal-fin rays; 15–16 pectoral-fin rays, including 5–8 branched rays; anterior 1–2 spines of first dorsal fin very elongate in males (reaching to base of first, second or third segmented ray of second dorsal fin when adpressed), but not in females; fifth pelvic-fin ray moderately developed, 10.5–18.1% of preceding ray in length; well developed membranes between pelvic-fin rays (i.e., extending to or beyond base of first branch of each pelvic-fin ray); cephalic sensory-canal pores

B′, C (single), D (single), E and F′; edge of scale pockets densely pigmented, forming dusky reticulations on body; head with several irregular-shaped dusky spots; conspicuous semi-ocellated spot, followed by single or some smaller black spots, at anteroventral part of first dorsal fin; caudal fin without any conspicuous dark markings (e.g., dots, spots or bands).

Description. In the following description, the counts of holotype have an asterisk, and the frequency of each count in given in the parentheses following relevant count. Dorsal-fin rays VI-I, 8 (2) or VI-I, 9* (5); anal-fin rays I, 8* (7); pectoral-fin rays 15 (3) or 16* (11); pelvic-fin rays I, 5* (14); branches on fourth pelvic-fin rays 3 (2), 5 (3), 6* (3), 7* (4) or 8 (1); segments between branches of fourth pelvic-fin ray 2 (5), 3* (30), 4* (10), 5 (2), 6 (1) or 8* (1); segmented caudal-fin rays 9+8 (7), including 13 (3), 14 (1) or 15* (3) branched rays; dorsal unsegmented (procurrent) caudal-fin rays 4 (1), 6* (4) or 7 (2); ventral unsegmented (procurrent) caudal-fin rays 4 (1), 5 (2) or 6* (4); longitudinal scales counted as number of oblique (anterodorsal to posteroventral) scale rows from the one closest to upper attachment of opercular membrane to mid-base of caudal fin 23* (8) or 24* (6); longitudinal scale rows counted from just posterior of mid-base of pectoral fin to mid-base of caudal fin 23* (5) or 24 (9); transverse scales from anal-fin origin upward and forward to dorsal-fin base 7 (1), 8* (10) or 9 (3); transverse scales from anal-fin origin upward and backward to dorsal-fin origin 7* (10) or 8 (4); transverse scales from origin of second dorsal fin downward and backward to anal-fin base 7 (3) or 8* (11); predorsal scales 0* (7); vertebrae 10+16=26* (7); P-V 3/II II I I 0/9* (7); two* anal-fin pterygiophores anterior to first haemal spine (7); single* epural (7); gill rakers 1+5* (2), 2+5 (3) or 2+6 (1); pseudobranchial filaments 3 (1), 4 (3) or 5* (2).

Proportional measurements are given in Table 1. Anterior 1–2 spines of first dorsal fin very elongate in males (tips of these two spines damaged and its state of elongation not confirmable in a single male paratype, BLIH 20030464), whereas spines not elongate in females; when adpressed, tip of first spine of first dorsal fin reaches to base of first, second or third ray of second dorsal fin in male, and not reaching to origin of second dorsal fin in female. Second dorsal fin slightly higher than anal fin; all second dorsal- and anal-fin rays branched. Pelvic fins moderately long, usually reaching anal-fin origin or extending beyond it when adpressed (not reaching to anal-fin origin in a single paratype, one of NSMT-P 70713); membranes between pelvic-fin segmented rays well-developed (similar to condition appeared in fig. 1 of Lachner and Karnella, 1980), extending distally to or beyond base of first branch of each fin ray; fifth pelvic-fin ray moderately developed, 10.5–18.1% of preceding ray in length.

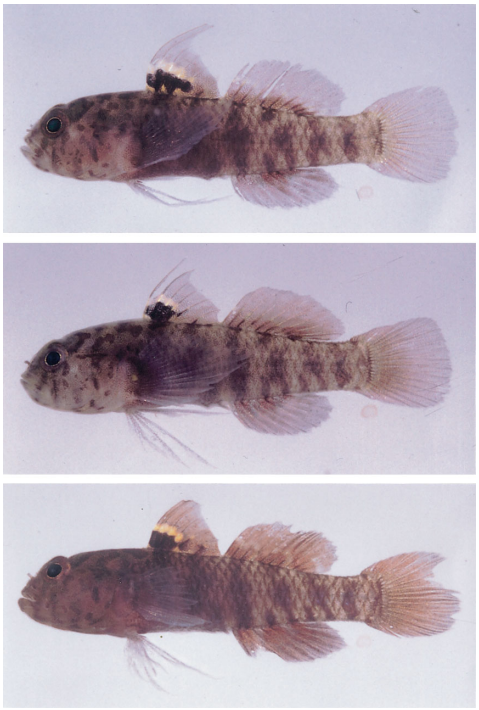

Fig. 2. Freshly collected specimens of *Eviota ocellifer* sp. nov. Top, NSMT-P 70712, holotype, male, 18.4 mm SL; middle, OMNH 29480, paratype, male, 17.0 mm SL; bottom, BLIH 20030464, paratype, male, 18.4 mm SL.

Scales on body ctenoid, excluding those on belly cycloid; head and predorsal and prepelvic

regions naked. Teeth on jaws simple, conical, forming villiform patches anteriorly to anterolaterally; in upper jaw, teeth in outermost row enlarged, those in inner rows distinctly smaller; lower jaw teeth arrangement similar to upper jaw, except for 2–5 enlarged teeth forming innermost row anteriorly.

Patterns of cephalic sensory systems are illustrated in Figure 3. Anterior oculoscapular canal with pores B′, C (unpaired), D (unpaired), E, and F′; one specimen (BLIH 20030464) has a pair of D pores, but this condition clearly regarded as abnormal. Preopercular and posterior oculoscapular canals undeveloped.

Coloration of freshly collected material (based on color slides of holotype and three paratypes). Ground color of head pale brown, becoming darker dorsally; cheek and operculum with several irregular-shaped blackish-brown spots; three radiating blackish-brown bars from eye, the first one from ventral part of eye to just behind rictus, the second one anteroventral part of eye to posterior part of upper jaw, and the third one from anterior part of eye to anterior part of upper jaw passing through base of anterior naris; anterior naris subtranslucent; iris bronze or dark brown, with faint blackish brown radiation from pupil; pupil narrowly edged by gold; nape and occipital region with three saddle-like blackish-brown blotches, in addition to two diagonally-elongate blackish-brown blotches behind eye; two vague blackish-brown blotches on base of pectoral fin, the upper one short arc-shaped (sometimes hemispherical) and restricted around bases of upper pectoral-fin rays, whereas the lower one ovoid (well extending anteriorly but not reaching to gill cover); ground color of body subtranslucent and pale brown, becoming darker anterodorsally; margin of each scale pocket blackish brown, forming dusky reticulation of body; about seven small saddle-like black blotches on back from base of first dorsal fin to caudal-fin base; six subcutaneous blackish brown bars on side of body, middle two of those on tail forming an "X"; 5–7 dark ventral midline spots associated with subcutaneous bars on tail, the first three at anal-fin base; first dorsal fin subtranslucent and pale gray, sometimes tinged with brown; a conspicuous semi-ocellated spot (black spot bordered dorsally by pale yellow), followed by single or some smaller black spots, at anterovetral corner of first dorsal fin; base of first dorsal fin usually brownish; second dorsal-fin subtranslucent and pale gray, with narrow brownish basal area; a row of three vague, arc-shaped and/or diagonal subtranslucent bars sometimes present on proximal half of second dorsal fin; anal fin subtranslucent and pale gray (sometimes hardly tinged with brown), with a row of three basal brown spots separated by indistinct narrow pale bar in each other; caudal fin subtranslucent and pale gray, its

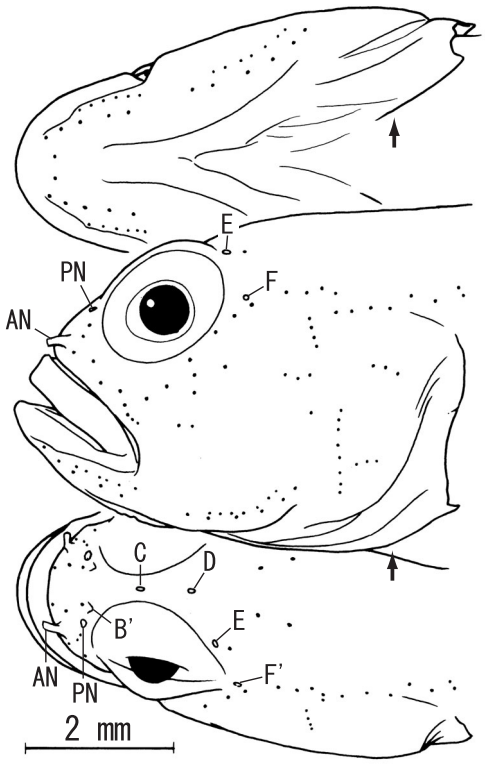

Fig. 3. Ventral (top), lateral (middle), and dorsal (bottom) views of head of *Eviota ocellifer* sp. nov. (holotype, NSMT-P 70712), showing cephalic sensory-canal pores (open circles) and papillae (dots). AN and PN, anterior and posterior nares, respectively. Arrows show position where gill membrane is attached to isthmus.

proximal part sometimes tinged with brown; a distinct vertical blackish brown line at just behind caudal-fin base; pectoral and pelvic fins subtranslucent.

Live coloration. Live coloration is shown in an underwater photograph appeared in Senou *et al*. (2004: as "*Eviota* sp. 14"). The color is similar to that of fresh specimens, but differs as follows: light-colored area of body tinged with pale green or pale yellow; iris bronze with distinct blackish-brown radiation from pupil; filamentous part of first dorsal fin pale, a little tinged with yellow; three arc-shaped and/or diagonal bars on proximal half of second dorsal fin pale yellow and relatively conspicuous.

Color in alcohol. Similar to live or fresh coloration, except as follows: ground color of head and body pale yellow or brownish; dusky subcutaneous spots and bars on body disappeared in external view; pale and reddish color on dorsal and caudal fins faded, except for pale area of "ocellus" on first dorsal fin turn to translucent; iris entirely blackish.

Sexual dimorphism. Urogenital papilla in male not fimbriate, relatively slender and long, usually reaching to base of anal-fin spine posteriorly (not reaching to there only in holotype); female urogenital papilla bulbous, short with finger-like projections at its tip. Anterior 1–2 spines of first dorsal fin elongate in male, whereas not in female.

Comparison. In addition to *Eviota ocellifer*, only two described congeners, *E. lacrimae* Sunobe, 1988 and *E. sparsa* Jewett & Lachner, 1983, are known to lack both anterior oculoscapular-canal pore H (="IT pore" of Lachner & Karnella, 1980) and preopercular-canal pores (Jewett & Lachner, 1983; Sunobe, 1988); these three species resemble with the "Group II" members of *Eviota*, comprising 12 described species (Lachner & Karnella, 1980; Jewett & Lachner, 1983; Gill & Jewett, 2004), in sharing most meristic and cephalic sensory-pore system characters (e.g., cephalic sensory-pore system lacks pore H, 26 vertebrae, some pectoral-fin rays branched), but the latter always has preopercular-canal pores. *E. ocellifer* is readily distinguished from *E. lacrimae* in having: usually nine dorsal-fin segmented rays (vs. eight in *E. lacrimae*); 5–8 branched pectoral-fin rays (vs. none or single); 13–15 branched caudal-fin rays (vs. 12); well developed pelvic-fin membrane (vs. reduced); three to eight branches on fourth pelvic-fin ray (vs. two); conspicuous semi-ocellated spot at anteroventral part of first dorsal fin (vs. such spot absent). *E. sparsa*, known only from the Indonesian waters, is most similar to *E. ocellifer*, sharing usually nine dorsal-fin segmented rays, presence of moderately to well-developed fifth pelvic-fin ray, and well developed pelvic-fin membrane, as well as same cephalic sensory-canal pore configuration. However, *E. sparsa* differs from *E. ocellifer* in having: usually 17 or more pectoral-fin rays (53 of all 60 examples based on 30 specimens examined) (vs. 15–16 in *E. ocellifer*); well developed fifth pelvic-fin ray, its length 53.3–81.7% of preceding ray (vs. 10.5–18.1%); vertically-elongated double dusky blotches on side of occipital region, anteriormost blotch well-separated from eye (vs. two diagonally-elongate spots or short lines on side of occipital region, anteroventral end of anterior one almost attached to eye); no conspicuous black blotches on first dorsal fin (vs. present).

Semi-ocellated spot at anteroventral part of first dorsal fin is a useful diagnostic character of the new species.

Distribution and habitat. *Eviota ocellifer* is known only from the mouth of Urauchi-gawa River, Iriomote-jima Island, Yaeyama Islands of Ryukyu Archipelago, Japan; it is found within the holes and/or crevices of rocks and interstices between oyster shells at the depths of 1–1.5 m in the estuary (Senou *et al*., 2004).

Etymology. The new species is named *ocellifer*, the combination of the Latin *ocellus* (meaning "little eye") and *fero* (meaning "to bear") in reference to its characteristic semi-ocellated spot at anteroventral part of first dorsal fin.

Comparative materials. Eviota lacrimae: NSMT-P 41874, holotype of *E. lacrimae* (male), 13.1 mm SL, Cape Sata, Kakoshima Prefecture,

Kyushu, Japan, 30 July 1985 (collected by T. Sunobe); NSMT-P 41875, paratype of *E. lacrimae*, 1 specimen (male), 14.0 mm SL), same locality with holotype, 2 July 1983 (collected by T. Sunobe); NSMT-P 41876, paratype of *E. lacrimae*, 1 specimen (female), 14.5 mm SL, same collecting data with NSMT-P 41875; NSMT-P 41877, paratype of *E. lacrimae*, 1 specimen (female), 13.4 mm SL, same collecting data with NSMT-P 41875. *Eviota sparsa*: NSMT-P 64200, 2 specimens (2 females), 15.6–17.1 mm SL, southeast coast of Kotania Bay, Seram Island, Indonesia, 20 m depth, 4 Dec. 1998 (collected by K. Matsuura and K. Shibukawa); NSMT-P 64313, 2 specimens (male and female), 14.3-16.2 mm SL, Batu Kapal, Marsegu Island, Kotania Bay, Seram Island, Indonesia, 20 m depth, 3 Dec. 1998 (collected by K. Matsuura and K. Shibukawa); NSMT-P 70928, 26 specimens (7 males and 19 females), 12.7–17.0 mm SL, Lilibooi, Ambon Island, Indonesia, 15 m depth, 5 Dec. 1998 (collected by K. Matsuura & K. Shibukawa).

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References

Akihito, Prince, 1984. Suborder Gobioidei. In Masuda, H, K. Amaoka, C. Araga, T. Uyeno & T. Yoshino (eds.), *The Fishes of the Japanese Archipelago. English text*. Tokai Univ. Press, Tokyo, pp. 236–238.

Akihito, A. Iwata, K. Sakamoto & Y. Ikeda, 1993. Gobioidei. In Nakabo, T. (ed.), *Fishes of Japan with Pictorial Keys to the Species*. Tokai Univ Press, Tokyo, pp. 997–1087 & 1355–1366. (In Japanese)

Akihito, K. Sakamoto, Y. Ikeda & A. Iwata, 2000. Gobioidei. In Nakabo, T. (ed.), *Fishes of Japan with Pictorial Keys to the Species*. Tokai Univ Press, Tokyo, pp. 1139–1310 & 1606–1628. (In Japanese)

Akihito, K. Sakamoto, Y. Ikeda & K. Sugiyama, 2002. Gobioidei. In Nakabo, T. (ed.), *Fishes of Japan with Pictorial Keys to the Species, English Edition*. Tokai Univ Press, Tokyo, pp. 1139–1310 & 1596–1619. (In Japanese)

Allen, G. R., 2001. Description of two new gobies (*Eviota*, Gobiidae) from Indonesian Seas. *Aqua*, **4** (4): 125–130.

Fricke, R., 1998. A new species of *Eviota* with vertical trunk bars from the Loyalty Islands (Teleostei: Gobiidae). *Stuttgarter Beiträge zur Naturkunde Ser. A* (*Biol.*), (577): 1–5.

Gill, A. C. & S. L. Jewett, 2005. *Eviota hoesei* and *E. readerae*, new species of fish from the southwest Pacific, with comments on the identity of *E. corneliae* Fricke (Perciformes: Gobiidae). *Rec. Aust. Mus.*, **56** (2): 235–240.

Hayashi, M, M. Aizawa, T. Itoh & R. Arai, 1990. The marine gobiid fish fauna of Amami-Oshima Island, the Ryukyus, Japan. *Mem. Nat. Sci. Mus.*, (**23**): 123–150, 2 pls. (In Japanese with English abstract)

Jenkins, O. P., 1903. Report on collections of fishes made in the Hawaiian Islands, with descriptions of new species. *Bull. U.S. Fish Commission*, **22**: 417–511.

Jewett, S. L. & E. A. Lachner, 1983. Seven new species of the Indo-Pacific genus *Eviota* (Pisces: Gobiidae). *Proc. Biol. Soc. Wash.*, **96** (4): 780–806.

Jordan, D. S. & A. Seale, 1906. The fishes of Samoa: description of species found in the Archipelago, with a provisional check-list of the fishes of Oceania. *Bull. Bureau of Fisheries*, **25**: 173–455.

Jordan, D. S. & J. O. Snyder, 1901. A review of the gobioid fishes of Japan with descriptions of twenty-one new species. *Proc. U.S. Nat. Mus.*, **24** (1244): 33–132.

Karnella, S. J. & E. A. Lachner, 1981. Three new species of the *Eviota epiphanes* Group having vertical trunk bars (Pisces: Gobiidae). *Proc. Biol. Soc. Wash.*, **94** (1): 264–275.

Lachner, E. A. & S. J. Karnella, 1978. Fishes of the genus *Eviota* of the Red Sea with descriptions of three new species (Teleostei: Gobiidae). *Smithsonian Contr. Zool.*, (286): 1–23.

Lachner, E. A. & S. J. Karnella, 1980. Fishes of the Indo-Pacific genus *Eviota* with descriptions of eight new species (Teleostei: Gobiidae). *Smithsonian Contr. Zool.*, (315): 1–127.

Lachner, E. A. & J. F. McKinney, 1974. *Barburigobius boehlkei*, a new Indo-Pacific genus and species of gobiidae (Pisces), with notes on the genera Callogobius and

Pipidonia. *Copeia*, **1974** (4): 869–879.

Leviton, A. E., R. H. Gibbs Jr., E. Heal & C.E. Dawson, 1985. Standards in herpetology and ichthyology: part 1. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, **1985** (3): 802–832.

Masuda, H. & Y. Kobayashi, 1994. Grand Atlas of Fish Life Modes. Tokai University Press, Tokyo, 47+467 pp. (In Japanese)

Greenfield, D. W. & J. E. Randall, 1999. Two new *Eviota* species from the Hawaiian Islands (Teleostei: Gobiidae). *Copeia*, **1999** (2):439–446.

Pezold, F., 1993. Evidence for a monophyletic Gobiinae. *Copeia*, **1993** (3): 634–643.

Senou, H., T. Suzuki, K. Shibukawa & K. Yano, 2004. A Photographic Guide to the Gobioid Fishes of Japan. Heibonsha, Tokyo, 535 pp. (In Japanese)

Shibukawa, K., T. Peristiwardy & S. R. Suharti, 2003. Gobiidae. In Kimura, S. & K. Martsuura (eds.), *Fishes of Bitung, Northern Tip of Sulawesi, Indonesia*. Ocean Research Institute, The University of Tokyo, Tokyo, pp. 174–194.

Sunobe, T., 1988. A new gobiid fish of the genus *Eviota* from Cape Sata, Japan. *Japan. Jour. Ichthyol.*, **35** (3): 278–281.

Winterbottom R. & D. F. Hoese, 1988. A new genus and four species of fishes from the Indo-West Pacific (Pisces; Perciformes; Gobiidae), with comments on relationships. *Royal Ontario Museum, Life Science Occasional Paper*, (37): 1–17.

Whitley, G. P., .1943. Ichthyological description and notes. *Proc. Linn. Soc. N.S.W.*, **68** (3–4): 114–144.