

Two New Species of the Gobiid Fish Genus *Trimma* (Perciformes: Gobioidae) from Southern Japan

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Abstract Two new species of the gobiid fish genus *Trimma*, *T. yanagitai* and *T. nomurai*, are described based on specimens from southern Japan. *T. yanagitai* is distinguished from all congeneric species by the following combination of characters: 10–12 predorsal scales; second spine of first dorsal fin elongate (but not filamentous) or not elongate; middle 6–11 (of 18–19) rays of pectoral fin branched; fifth pelvic-fin ray unbranched or branched, 49–57% of fourth ray in length; no connecting membrane between innermost pelvic-fin rays; a deep interorbital trough, no postorbital trough; 24 longitudinal scales; cheek and opercle scaled; when fresh ground color of head and body grayish brown dorsally, dull yellow to pale ventrally, 7 grayish lavender saddles with broad pale pink margins on body. *T. nomurai* is distinguished from all congeneric species by the following combination of characters: 5 to 6 predorsal scales; second spine of first dorsal fin elongate and filamentous; middle 9–15 (of 19) rays of pectoral fin branched; fifth pelvic-fin ray branched, 72–90% of fourth ray in length; height of connecting membrane between innermost pelvic-fin rays 28% of length of fifth ray; interorbital and postorbital trenches deep; 22–23 longitudinal scales; opercle lacking scales; when fresh ground color of head and body pale lilac, 3 vivid yellow longitudinal stripes on body, and a large, rounded, dark brown blotch posterodorsally to base of pectoral fin.

Key words: *Trimma*, two new species, Gobiidae, southern Japan.

Trimma is an Indo-Pacific gobiid fish genus, comprising cryptic, tiny (less than 40 mm SL), colorful, tropical species found in coral and rocky reefs at depths shallower than 80 m. According to Winterbottom (2006), *Trimma* can be recognized by the lack of cephalic sensory canal pores, much reduced cephalic sensory papillae pattern, wide gill opening extending to below the vertical limb of the preopercle or anterior to this, lack of spicules on the outer gill rakers of the first gill arch, less than 12 dorsal and anal-fin rays, and a fifth pelvic-fin ray that is equal to or more than 40% the length of the fourth pelvic-fin ray.

Trimma (type species *T. caesiura*) was established by Jordan and Seale (1906). The genus may contain about 80 species (e.g., Winterbottom, 2006); 50 species are currently recognized

as valid (see Hagiwara and Winterbottom in this volume), while the others are still unnamed.

In Japan, 11 valid species and 16 unnamed species of *Trimma* have been reported so far. Tomiyama (1936) was a pioneer in the study of gobiid fishes in Japan, describing *T. macrophthalmia* from Hachijo-jima Island and *T. grammistes* from Hayama on the west coast of the Miura Peninsula, Honshu. Aoyagi (1949) reported *T. caesiura* Jordan and Seale, 1906 from Miyako-jima Island and Okinawa-jima Island, and described *T. okinawae* as a new species from Okinawa-jima Island. Masuda *et al.* (1975) reported *Trimma* sp. from several islands in the Ryukyu Islands. Subsequently, Akihito *et al.* (1993) identified it as *T. naudei* Smith, 1956. Yoshino and Araga (1975) described *T. caudomaculata* from Okinawa-jima Island; however,

Winterbottom (2005b) regarded it as a junior synonym of *T. tevegae* Cohen and Davis, 1969. Hagiwara and Hayashi (1992) reported *T. shepardi* Winterbottom, 1984 and *T. griffithsi* Winterbottom, 1984 from Amami Group of the Ryukyu Islands. However, Winterbottom (2005a) described *T. griffithsi* sensu Hagiwara and Hayashi as a new species, *T. marinae*. Shimada and Yoshino (1994) reported *T. emeryi* Winterbottom, 1985 and *T. taylori* Lobel, 1979 from several small island groups in the Ryukyu Islands. Suzuki and Senou (2001) reported *T. winchi* Winterbottom, 1984 from Ie-shima Island of the Ryukyu Islands. Suzuki (2004) reported 16 unidentified species of *Trimma* from various localities in southern Japan. *Trimma* sp. 4 and *Trimma* sp. 10 of those were described as *T. hayashii* and *T. flavatrum* respectively by Hagiwara and Winterbottom in this volume.

In the present paper, we describe *Trimma* sp. 11 and *Trimma* sp. 14 of Suzuki (2004) as new species under the names of *T. yanagitai* and *T. nomurai*, respectively.

Materials and Methods

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

Methods of counting and measurements follow Winterbottom (1996) except for the following: the small scale bordering the dorsal and/or anal midline (if present) is counted as "0.5" (rather than "1/2") when transverse scales are given. With respect to dorsal-fin spine appearance, we use the term "elongate" to describe the spine(s) longer than those posterior to it (or them), as well as the term "filamentous" to describe the spine(s) having the filamentous distal part free from the fin membrane. Pectoral- and pelvic-fin ray branching, number and distribution of scales, cephalic sensory system and trough/trench around orbit are described from preserved material stained with a cyanine blue solution.

The notation of pattern of interdigitation of the

dorsal-fin proximal pterygiophores between the neural spines (P-V) follows Akihito (1984). Vertebrae are counted from radiographs. Information about tooth morphology and gill raker counts was obtained from a paratype stained with alizarin red. Color descriptions were based on color slides of the holotype of each species. Name of a color follows Japan Color Research Institute (1995). Color when alive is based on the underwater photographs in the Image Database of Fishes in the Kanagawa Prefectural Museum of Natural History (KPM-NR) and/or Suzuki (2004). Proportional measurements are provided in Table 1.

Trimma yanagitai sp. nov.

(New Japanese name: Oni-benihaze)

(Figs. 1, 2)

Trimma sp. 11: Suzuki, 2004: 115 (Izu Peninsula, Kagoshima Prefecture and Ie-jima Island; underwater photograph and brief description).

Holotype. KPM-NI 3444, male, 33.0 mm SL, Izu Oceanic Park, Shizuoka Prefecture, Japan, 56 m depth, M. Yanagita and R. Orita, 17 Feb. 1997.

Paratypes. Ten paratypes (13.5–36.8 mm SL): NSMT-P 73057 (ex. KPM-NI 3443), female, 29.0 mm SL, same collecting data as holotype; BLIH 19900192, female, 32.0 mm SL, same locality as holotype, M. Morita, 15 Jan. 1990; BLIH 19900193, male, 36.8 mm SL, same locality as holotype, M. Morita, 16 Jan. 1990; BLIH 19960019 and 19960283, female and male, 29.3 and 31.5 mm SL, Kamimura, Kagoshima Prefecture, Japan, 35–38 m depth, S. Dewa, 9 Jan. 1996; BLIH 19960124 and 19960284, 2 females, 29.8 mm SL and 33.5 mm SL (stained), same locality as BLIH 19960019, S. Dewa, 19 Apr. 1996; BLIH 19960126, male, 29.5 mm SL, same collecting data as BLIH 19960019; BLIH 19960211 and 19960285, female and young, 26.5 and 13.5 mm SL, same collecting data as BLIH 19960019.

Image Database of Fishes. KPM-NR 8208 and 8324, Osezaki, Shizuoka Prefecture, Japan, 60 and 64 m depth, 20 May 1995. KPM-NR 21786 and 21787, Osezaki, Shizuoka Prefecture, Japan, 76 m depth, 1 June 1996. KPM-NR 26410, Osezaki, Shizuoka Prefecture, Japan, 70 m depth, 30 May 1998. KPM-NR 38883, I.O.P., Shizuoka Prefecture, Japan, 48 m depth, 20 Aug. 2000. KPM-NR 60137, I.O.P., Shizuoka Prefecture, Japan, 45 m depth, 23 Sep. 2000.



Fig. 1. *Trimma yanagitai*, fresh specimen, KPM-NI 3444, male, holotype, 33.0 mm SL, Izu Oceanic Park, Shizuoka Prefecture, Japan, Photo by H. Senou.

Diagnosis. *Trimma yanagitai* differs from the other described species of the genus in the following combination of characters; large size (largest specimen is 36.8 mm SL); 10–12 predorsal scales; second spine of first dorsal fin elongate (not filamentous) or not elongate; middle 6–11 rays of pectoral fin branched; fifth pelvic-fin ray unbranched or branched, 49–57% of fourth ray in length; no connecting membrane between innermost pelvic-fin rays; a deep interorbital trough, no postorbital trough; 18–19 pectoral fin rays; 24 longitudinal scales; cheek and opercular scales; ground color of head and body grayish brown dorsally, dull yellow to pale ventrally, seven grayish lavender saddles with broad pale pink margins on body when fresh.

Description. In following description, data for the holotype are given first, followed by the data for 8 paratypes (except for BLIH 19960211 and 19960285) in parentheses when different.

Dorsal-fin rays VI-I, 8; anal-fin rays I, 8 (I, 7 in one); pectoral fin rays 19 (18 in seven, broken in one); pelvic-fin rays I, 5; segmented caudal-fin rays 9+8; branched caudal-fin rays 6+5 (6+6 in five); longitudinal scales 24; anterior transverse scales 8 (7.5–9.5 in eight, mode 9); posterior transverse scales 7.5 (7.5–8.5 in eight, mode 7.5 and 8.5); predorsal scales 11 (10–12 in eight, mode 12); gill rakers (5+13 in the cleared and

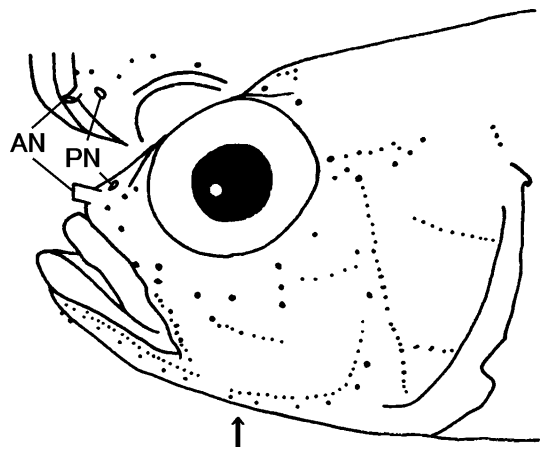


Fig. 2. The cephalic sensory system of *Trimma yanagitai*, KPM-NI 3444, holotype. Anterior part of dorsal (left top) and lateral views of head. Dots represent the sensory papillae. AN and PN indicate anterior and posterior nostrils, respectively. Arrows show position where gill membrane is attached to isthmus.

stained paratype only). Values for holotype and one paratype: P-V 3/II II I I 0/9; vertebrae 10+16=26.

Second spine of first dorsal fin elongate and not filamentous (not elongate in 2 paratypes, slightly elongate in 4 paratypes), longest (second and third spines longest in 1 paratype), reaching posteriorly to base of second ray of second dorsal

Table 1. Measurements (% SL) for *Trimma yanagitai* and *T. nomurai*. Number of specimens is in parentheses.

	<i>T. yanagitai</i>			<i>T. nomurai</i>	
	Holotype	Paratypes		Holotype	Paratype
Sex (Sample size)	male	males (3)	females (5)	male	female
Standard length (mm)	33.0	29.5–36.8	29.0–33.5	19.2	16.0
Head length	27.9	27.0–27.2	26.8–28.3	31.8	33.8
Snout to first dorsal-fin origin	36.1	35.9–36.6	34.1–36.1	36.5	38.1
Snout to second dorsal-fin origin	53.9	54.6–55.2	51.7–56.1	58.6	57.5
Snout to anal-fin origin	53.3	55.9–57.1	52.4–57.9	58.6	62.5
Caudal-peduncle length	30.0	27.8–30.2	29.0–30.0	29.2	26.9
Caudal-peduncle depth	11.5	10.8–11.4	10.0–12.5	15.1	14.4
Longest first dorsal-spine length	24.2	21.2–25.8	18.1–25.6 (4)	41.7	37.5
Snout length	5.5	4.9–6.1	5.3–5.7	5.5	5.9
Upper jaw length	11.2	10.6–11.2	11.3–11.9	12.0	13.4
Interorbital width	2.3	2.4	1.9–2.5 (4)	1.4	1.4
Eye diameter	10.0	8.7–10.5	9.4–10.4	10.2	11.9
Pupil diameter	4.8	4.8–5.1	4.7–5.5	5.2	5.6
4th pelvic-fin ray length	27.3	25.8–28.5	25.3–29.0 (4)	26.0	25.0
5th pelvic-fin ray length	15.2	13.7–15.3	13.7–14.4	18.8	22.5
Pelvic connecting membrane length	absent	absent	absent	5.2	broken

fin when appressed (not to second dorsal fin in one, to base of first to third ray in 7 paratypes). Middle 11 rays of pectoral fin branched (6–11 in 8 paratypes, mode 10); pectoral fin reaching posteriorly to a vertical with first ray of anal fin (not to anal fin in 6 paratypes, to base of second ray in 1 paratype). First 4 rays of pelvic fin each with 1–2 sequential branch points (1–3 in 2 paratypes); fifth ray unbranched (with a sequential branch point and 2 terminal tips in 3 paratypes, 2 sequential branch points and 3 terminal tips in 1 paratype) and 56% (49–57% in 7 paratypes, mean 52%, fourth ray broken in 1 paratype) of fourth ray in length; fourth ray longest, reaching posteriorly to base of second ray of anal fin when appressed (between spine and base of second ray in 7 paratypes). No pelvic fraenum. No connecting membrane between innermost pelvic-fin rays.

Cheek with small ctenoid and cycloid scales posterodorsally (4 cycloid scales in cleared and stained paratype). Opercle with large cycloid scales and a few small ctenoid scales (4 rows of small and large ctenoid scales in cleared and stained paratype). Pectoral-fin base with small and large cycloid scales (3 rows of small cycloid scales in cleared and stained paratype). Breast with small ctenoid scales (small ctenoid and cy-

cloid scales in cleared and stained paratype). Anterior part of belly with small cycloid scales. Nape with large ctenoid scales, extending anteriorly to orbit. Remainder of body with large ctenoid scales. Gill opening extending anteriorly to below middle of pupil. Anterior naris with a long tube; posterior naris pore-like, without rim (with low rim in 1 paratype). Interorbital trough deep (shallow in 1 paratype), no postorbital trough (shallow in 1 paratype). Bony interorbital width 47% (39–51% in 7 paratypes, mean 46%) of pupil diameter. The cephalic sensory system is depicted in Figure 3.

Tooth morphology in a stained paratype: inwardly curved conical teeth in both jaws. Upper jaw with outermost row of 17 enlarged, spaced teeth, 4 irregular anterior inner rows of small teeth, leading to posterior inner row of small teeth; anterior and outer teeth of inner rows are larger than posterior and inner ones. Anterior part of lower jaw with outermost row of 7 enlarged teeth, 4 irregular inner rows of small teeth; middle and posterior parts with an inner row of enlarged teeth, and an outer row of small teeth.

Color when fresh. Ground color of head and body grayish brown dorsally, dull yellow to pale ventrally. Seven grayish lavender saddles with

broad pale pink margins on body, similar colored marking on ventral part of caudal peduncle just below ultimate saddle. Head with 4 narrow similar colored saddles. Dorsal fins light gray with a broad vivid yellow basal longitudinal stripe; the basal yellow stripe has 1 or 2 light gray large oblong blotches, on first and second dorsal fins, respectively. Anal and pelvic fins light gray. Caudal fin vivid yellow with 3 large hyaline blotches on upper part of fin. Pectoral fin hyaline with pink rays.

Color in alcohol. All yellow, lavender and pink colors faded. Ground color of head and body light grayish brown ventrally.

Color when alive. Similar color when fresh, except as follows: opercle and belly pinkish; 4 narrow lavender blue transverse bands on head, first of which on snout to upper lip; 7 saddles on head and body, similar marking on ventral part of caudal peduncle, and ground color of pelvic fins and anal fin are lavender blue. Variations found in body color (KPM-NR 21786 and 21787) as follows: dorsal half of head and body grayish olive green; ventral half of body except belly, base of dorsal fins; caudal fin light yellow green.

Distribution. Izu Oceanic Park of Shizuoka Prefecture, Osezaki of Izu Peninsula, Kinkou Bay of Kagoshima Prefecture, and Ie-jima Island and Okinawa Group of the Ryukyu Islands, Japan.

Etymology. The specific name, *yanagitai*, refers to Mr. Mitsuhiro Yanagita, who provided the holotype of the new species to us.

Remarks. *Trimma yanagitai* differs from all other congeners in having large body size (largest specimen is 36.8 mm SL) and 7 grayish lavender saddles on body when fresh.

T. yanagitai is similar to *T. fraena* Winterbottom, 1984, *T. mendelssohni* (Goren, 1978) and *T. unisquamis* (Gosline, 1959), which have light bars across the dorsum. But *T. yanagitai* differs from these 3 congeners in having no connecting membrane between innermost pelvic-fin rays (vs. present in other 3 species) (Goren, 1978; Gosline, 1959; Greenfield and Randall, 2004; Herler and Hilgers, 2005; Randall, 2005; Winter-

bottom, 1984, 1995; Winterbottom and Villa, 2003). Furthermore, *T. fraena* has 16–17 pectoral-fin rays (vs. 18–19 in *T. yanagitai*), a few of the lower rays of pectoral fin branched (vs. middle rays branched), fifth pelvic-fin ray subequal to fourth ray (vs. 50–85% of fourth ray in length), fraenum present (vs. absent), no scales on cheek and breast (vs. present), well developed postorbital trough (vs. absent or rarely shallow), and 8 light saddles in dorsal midline (vs. 7); *T. mendelssohni* has no scales on cheek (vs. present in *T. yanagitai*), well developed postorbital trench (vs. absent or rarely shallow), and 2 large spots on base of pectoral-fin rays and second dorsal fin with red dots arranged in 4 lines (vs. absent respectively); *T. unisquamis* has 6–7 second dorsal-fin rays (vs. 8 in *T. yanagitai*), fraenum (vs. absent), 6 anterior and 6 posterior transverse scales (vs. 8–10 and 7–8), no scales on breast and pectoral-fin base (vs. present), and a dark band at caudal-fin base and both dorsal fins with a black border (vs. absent respectively).

Of the species of *Trimma* with predorsal scales, except in body shape and color pattern, *T. yanagitai* is similar to *T. halonevum* Winterbottom, 2000, which has 6–10 predorsal scales; 8–10, 8, 17–20 rays of second dorsal, anal and pectoral fins respectively; 23–25 longitudinal scales; 8–10 anterior and 7–8 posterior transverse scales; middle pectoral-fin rays branched; fifth pelvic-fin ray 50–85% of fourth ray in length; no scales on cheek; scales on opercle, nape, breast and pectoral-fin base; no postorbital trough; bony interorbital width 33–50% of pupil diameter. But *T. yanagitai* differs from *T. halonevum* in having the following features: elongate second spine of first dorsal fin (vs. second and third spines elongate in *T. halonevum*); unbranched or branched fifth ray of pelvic fin (vs. branched); scales on cheek (vs. absent); 7 grayish lavender saddles on body when fresh and no spots (vs. many red brown and yellow spots and no saddles) (Winterbottom, 2000).

***Trimma nomurai* sp. nov.**

(New Japanese name: Kataboshinishiki-benihaze)

(Figs. 3, 4)

Trimma sp. 14: Suzuki, 2004: 116 (Kochi Prefecture, Okinawa Group and Kume-jima Island of the Ryukyu Islands; underwater photograph and brief description).

Trimma sp. 3: Kuitert and Tonozuka, 2001: 704 (Bali Island, Indonesia; underwater photograph and brief description).

Holotype. KPM-NI 4109, male, 19.2 mm SL, Nakanose-higashi, Ie-jima Island, Okinawa Group, Ryukyu Islands, Japan, 40 m depth, T. Nomura, 19 June 1997.

Paratype. NSMT-P 73058 (ex. KPM-NI 4101), female, 16.0 mm SL, stained, same locality and date as holotype, K. Yunokawa.

Non-type. ROM 64407, young, 10.4 mm SL, New Caledonia.

Image Database of Fishes. KPM-NR 11428–11431, Kume-jima Island, the Ryukyus, Japan, 70 m depth, 1 and 5 Sep. 1995. KPM-NR 15799, Okinawa-jima Island, Ryukyu Islands, Japan, 55 m depth, 22 June 1997. KPM-NR 29591, Ie-jima Island, Okinawa Group, Ryukyu Islands, Japan, 55 m depth, 19 July 1999. KPM-NR 30579 and 30589, Ie-jima Island, Okinawa Group, Ryukyu Islands, Japan, 35 m depth, 19 June 1997. KPM-NR 32933, Okinawa-jima Island, Ryukyu Islands, Japan, 35 m depth, 18 July 1999; KPM-NR 27685, Bali Island, Indonesia, 30 m depth, July 1998. KPM-NR 36046, Minna-jima Island, Okinawa Group, Ryukyu Islands, Japan, 45 m depth, 2000. KPM-NR 36820, Ie-jima Island, Okinawa Group, Ryukyu Islands, Japan, 44 m depth, 3 July 2000. KPM-

NR 66265, Ie-jima Island, Okinawa Group, Ryukyu Islands, Japan, 54 m depth, 3 Aug. 2002.

Diagnosis. *Trimma nomurai* differs from the other described species of the genus in the following combination of characters; 5 to 6 predorsal scales; second spine of first dorsal fin elongate and filamentous; middle 9–15 (of 19) rays of pectoral fin branched; fifth pelvic-fin ray branched, 72–90% of fourth ray in length; height of connecting membrane between innermost pelvic-fin rays 28% of length of fifth ray; deep interorbital and postorbital trenches; 22–23 longitudinal scales; no opercular scales; ground color of head and body pale lilac, 3 vivid yellow longitudinal stripes on body, a large rounded dark brown blotch posterodorsally to base of pectoral fin when fresh.

Description. In the following description, data for the holotype are given first, followed by that for the paratype in parentheses when different.

Dorsal-fin rays VI-I, 8 (VI-I, 9); anal-fin rays I, 8 (I, 9); pectoral-fin rays 19; pelvic-fin rays I, 5; segmented caudal-fin rays 9+8; branched caudal-fin rays 6+5; longitudinal scales 23 (22); anterior transverse scales 6.5 (6); posterior transverse scales 6.5 (5); predorsal scales 6 (5); P-V 3/II II I I 0/9; vertebrae 10+16=26, gill rakers (4+11).



Fig. 3. *Trimma nomurai*, fresh specimen, KPM-NI 4109, male, holotype, 19.2 mm SL, Nakanose-higashi, Ie-jima Island, the Okinawa Islands, the Ryukyus, Japan, Photo by H. Senou.

Second spine of first dorsal fin elongate and filamentous, longest reaching posteriorly to base of last ray of second dorsal fin when appressed (to base of 8th ray). Middle 15 rays of pectoral fin branched (8 rays); pectoral fin reaching posteriorly to a vertical with second ray of anal fin (base of first to second ray). First 4 rays of pelvic fin with 2–4 sequential branch points (2–3); fifth ray deformed (with 5 sequential branch points and 6 terminal tips); 72% (90%) of fourth ray in length; fourth ray longest, reaching posteriorly to base of first to second ray of anal fin when appressed (not reaching to anal fin). No pelvic fraenum. Height of connecting membrane between innermost pelvic-fin rays 28% (broken) of length of fifth ray.

Cheek and opercle without scales. Pectoral-fin base with cycloid scales (2 rows of 2 large and 2 small cycloid scales in cleared and stained paratype). Breast with large cycloid scales. Midline of belly without scales (small ctenoid scales except anterior part with small cycloid scales in cleared and stained paratype). Nape with large cycloid scales, scales extending anteriorly to above dorsoposterior margin of preopercle. Remainder of body with large ctenoid scales. Gill

opening extending anteriorly to below middle of pupil. Anterior naris a short tube, posterior naris pore-like, without rim. Interorbital and postorbital trenches deep (moderate). Bony interorbital width 26% of pupil diameter. The cephalic sensory system as in Figure 4.

Tooth morphology in a stained paratype: inwardly curved conical teeth in both jaws; upper jaw with outermost row of eight enlarged, spaced teeth, three irregular anterior inner rows of small teeth, grading to single posterior inner row of small teeth; anterior and outer teeth of inner rows larger than posterior and inner ones; anterior part of lower jaw with outermost row of 5 enlarged teeth, 2 irregular inner rows of small teeth; middle and posterior parts of lower jaw with an inner row of enlarged teeth and an outer row of small teeth; single large tooth on midlateral part of upper jaw and 2 large teeth on anterolateral part of lower jaw.

Color when fresh. Ground color of head and body pale lilac. Snout and jaws pale yellow; cheek grayish white; nape and opercle light yellowish brown. Iris bright vivid yellow orange. A large rounded dark brown blotch (slightly larger than pupil), broadly encircled by yellowish white just posterodorsal to upper base of pectoral fin. A large white blotch dorsal to base of pelvic fin. Two vivid yellow longitudinal stripes dorsally and mid-laterally. An interrupted vivid yellow longitudinal stripe ventrally. These 3 stripes start below posterior part of first dorsal fin and continue onto caudal fin. Ground color of vertical fins pale lavender. First dorsal fin with 3 vivid yellow longitudinal stripes; second dorsal fin with four vivid yellow longitudinal stripes; distal part of dorsal fins hyaline. Anal fin with basal and submarginal vivid yellow longitudinal stripes and a longitudinal series of 4 vivid yellow blotches medially. Caudal fin with 8 vivid yellow longitudinal stripes. Pectoral fin hyaline. Pelvic fin hyaline with light yellow blotch on posterior part of fin.

Color in alcohol. All yellow, orange and lavender colors faded. Ground color of head and body yellowish white. A large grayish brown blotch just posterodorsal to base of pectoral fin.

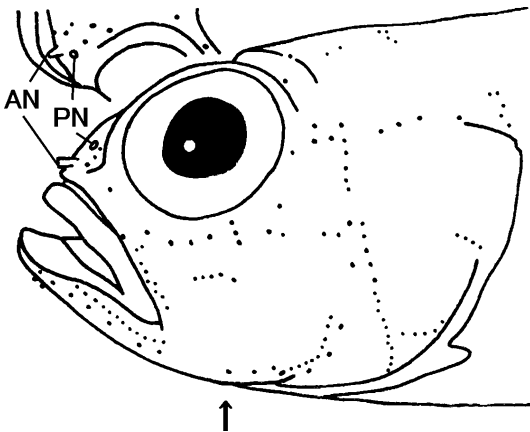


Fig. 4. The cephalic sensory system of *Trimma nomurai*, KPM-NI 4109, holotype. Anterior part of dorsal (left top) and lateral views of head. Dots represent the sensory papillae. AN and PN indicate anterior and posterior nostrils, respectively. Arrows show position where gill membrane is attached to isthmus.

Color when alive. Similar color when fresh, except as follows: snout with a bright yellow line on midline; iris bright red with a bright yellow circle around pupil; dorsal side of eye with 3 bright yellow transverse lines; a large, triangular deep pink blotch on head, and a bright red to dark red, large rounded blotch just posterodorsal to base of pectoral fin; a series of 7 bright white blotches that diminish in size posteriorly, from cheek to ventral surface of caudal peduncle; a series of 6 small bright white blotches on dorsal side of body; base of pectoral fin with 2 bright white blotches.

Distribution. Kochi Prefecture, and Ie-jima Island, Okinawa-jima Island and Kume-jima Island, the Ryukyus, Japan. In addition, Bali Island, Indonesia (KPM-NR 27685; Kuiter and Tonozuka, 2001) and New Caledonia (ROM 64407).

Etymology. The specific name, *nomurai*, refers to Mr. Tomoyuki Nomura, who provided the holotype of the new species.

Remarks. *Trimma nomurai* differs from all other congeners in having the vivid yellow longitudinal stripes on body and vertical fins, and the large dark blotch posterodorsally to the base of pectoral fin when fresh.

Trimma nomurai is similar to *T. striatum* (Herre, 1945), both of which have longitudinal stripes. *T. striatum* differs from *T. nomurai* in having no predorsal scales (vs. five to six predorsal scales in *T. nomurai*); and six longitudinal red stripes on head (vs. absent) (Herre, 1945; Randall, 2005; Randall and Goren, 1993).

Trimma nomurai is similar to *T. perclarum* Winterbottom, 2006, both of which have three yellow longitudinal stripes on body. *T. perclarum* differs from *T. nomurai* in having a red or cerise iris with four large, irregularly-spaced yellow spots (vs. iris bright vivid yellow orange without spots in *T. nomurai*); and no large dark blotch posterodorsally to the base of pectoral fin (vs. present, see Winterbottom, 2006).

Of the species of *Trimma* with predorsal scales, except in body shape and color pattern, *T. nomurai* is similar to *T. squamicana* Winterbot-

tom, 2004, which has 8–9, 8–9, 17–20 rays of second dorsal, anal and pectoral fins respectively; 23–26 longitudinal scales; 7–9 anterior and 6–8 posterior transverse scales; elongate second spine of first dorsal fin; middle pectoral fin rays branched; fifth pelvic-fin ray 50–70% of fourth ray in length; no scales on cheek and opercle; scales on breast, nape and pectoral fin base; deep interorbital trench; bony interorbital width 25–33% of pupil diameter. *T. nomurai* differs from *T. squamicana* in having the following features (Winterbottom, 2004): 5 to 6 predorsal scales (vs. 8–9 predorsal scales in *T. squamicana*); branched fifth ray of pelvic fin (vs. unbranched); height of connecting membrane between innermost pelvic-fin rays about 28% of length of fifth ray (vs. vestigial); 3 vivid yellow longitudinal stripes and no saddles on body (vs. 8 red to reddish brown saddles and no longitudinal stripes).

Trimma sp. 3 of Kuiter and Tonozuka (2001) photographed in Bali Island, Indonesia, was identified as *T. nomurai* by its characteristic color pattern, elongate second spine of first dorsal fin and predorsal scales.

A specimen (ROM 64407, 10.4 mm SL) from New Caledonia resembles *T. nomurai* in counts of second dorsal, anal- and pectoral-fin rays respectively, counts of longitudinal and transverse scales and a color pattern, although it lacks scales on the head. We believe that this is a reflection of the immature nature of the specimen, and we identified it as *T. nomurai*.

Acknowledgments

We wish to express our sincere gratitude to S. Dewa (Diving Service Umiannai, Kagoshima), Y. Ikeda (BLIH), M. Morita (Dive Dream, Ito, Shizuoka), T. Nomura (Volunteer of Fish Division, KPM), R. Orita (Izu Oceanic Park, Ito, Shizuoka), R. Winterbottom (ROM), M. Yanagita (NASO Dive, Ito, Shizuoka) and K. Yunokawa (Iejima Diving Service, Ie-jima Island, Okinawa) in their cooperation in the present study. We also thank K. Shibukawa (NSMT) for his critical comments on the manuscript.

Literature Cited

- Aoyagi, H. 1949. Studies on the coral fishes of the Riu-Kiu Islands, V. Notes on gobioid fishes found on the coral reef. *Zoological Magazine*, 58(9): 171–173. (In Japanese.)
- Akihito, Prince. 1984. Suborder Gobioidi. Pages 236–238 in H. Masuda, K. Amaoka, C. Araga, T. Uyeno and T. Yoshino, eds. *The Fishes of the Japanese Archipelago*, English edition. Tokai University Press, Tokyo.
- Akihito, A. Iwata, K. Sakamoto and Y. Ikeda. 1993. Gobioidi. Pages 997–1086. 1355–1356 in T. Nakabo, ed. *Fishes of Japan with Pictorial Keys to the Species*. Tokai University Press. Tokyo. (In Japanese.)
- Goren, M. 1978. A new gobiid genus and seven new species from Sinai coasts (Pisces: Gobiidae). *Senckenbergiana biologica*, 59(3/4): 191–203.
- Gosline, W. A. 1959. Four new species, a new genus, and a new suborder of Hawaiian fishes. *Pacific Science*, 13(1): 67–77.
- Greenfield, D. W. and J. E. Randall. 2004. The marine gobies of the Hawaiian Islands. *Proceedings of the California Academy of Sciences*, 55(27): 498–549.
- Hagiwara, K. and M. Hayashi. 1992. First records of two gobiid fishes in the genus *Trimma* from Japan. *I.O.P. Diving News*, 3(8): 2–5. (In Japanese.)
- Hagiwara, K. and R. Winterbottom. 2007. Two new species of *Trimma* (Gobiidae) from the western Pacific. *Bulletin of National Science Museum*, Ser. A, Supplement 1: 163–174.
- Herler, J. and H. Hilgers. 2005. A synopsis of coral and coral-rock associated gobies (Pisces: Gobiidae) from the Gulf of Aqaba, northern Red Sea. *Aqua, Journal of Ichthyology and Aquatic Biology*, 10(3): 103–132.
- Herre, A. W. C. T. 1945. Notes on fishes in the Zoological Museum of Stanford University. XIX. — Two new Philippine gobies, with key to the genera of gobies with vomerine teeth. *Proceedings of the Biological Society of Washington*, 58: 77–81.
- Japan Color Research Institute, ed. 1995. *Concise Manual of Color Names*. Japan Color Research Institute, Tokyo. 90 pp.
- Jordan, D. S. and A. Seale. 1906. The fishes of Samoa. Description of the species found in the archipelago, with a provisional check-list of the fishes of Oceania. *Bulletin of the Bureau of Fisheries*, 25(1905): 173–455 + index 457–488, pls. 33–53.
- Kuiter, R. H. and T. Tonozuka. 2001. *Pictorial Guide to Indonesian Reef Fishes*. Part 3. Jawfishes–Sunfishes, Opistognathidae–Molidae. Zoonetics, Australia. 623–893.
- Leviton, A. E., R. H. Gibbs, Jr., E. Heal and C. E. Dawson. 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional reference collections in herpetology and ichthyology. *Copeia*, 1985(3): 802–832.
- Masuda, H., C. Araga and T. Yoshino. 1975. *Coastal Fishes of Southern Japan*. Tokai University Press, Tokyo. 378 pp.
- Randall, J. E., 2005. *Reef and Shore Fishes of the South Pacific*. New Caledonia to Tahiti and the Pitcairn Islands. University of Hawaii Press, Honolulu. i–xii + 707 pp.
- Randall, J. E. and M. Goren. 1993. A review of the gobioid fishes of the Maldives. *Ichthyological Bulletin of J. L. B. Smith Institute of Ichthyology*, (58): 1–37.
- Shimada, K. and T. Yoshino. 1994. First records of several gobiid genera *Eviota*, *Sueviota*, *Trimma* and *Trimmatom* from Japan (IV). *I.O.P. Diving News*, 5(5): 2–6. (In Japanese.)
- Suzuki, T. 2004. Genus *Trimma*. Pages 96–117 in H. Senou, ed. *A Photographic Guide to the Gobioid Fishes of Japan*. Heibonsha, Tokyo. (In Japanese.)
- Suzuki, T. and H. Senou. 2001. First record of the gobiid fish *Trimma winchi* from Ie-shima Island, the Ryukyu Islands, Japan. *I.O.P. Diving News*, 12(4): 2–4. (In Japanese.)
- Tomiyama, I. 1936. Gobiidae of Japan. *Japanese Journal of Zoology*, 7(1): 37–112.
- Winterbottom, R. 1984. A review of the gobiid fish genus *Trimma* from the Chagos Archipelago, central Indian Ocean, with the description of seven new species. *Canadian Journal of Zoology*, 62(4): 695–715, pl. 1.
- Winterbottom, R. 1995. Red Sea gobiid fishes of the genus *Trimma*, with the description of two new species. *Revue Française d'Aquariologie, Herpétologie*, 22(3/4): 93–98.
- Winterbottom, R. 1996. A new species of gobiid fish, *Trimma benjamini*, from the western Pacific. *Revue Française d'Aquariologie, Herpétologie*, 23(1/2): 57–60.
- Winterbottom, R. 2000. Four new species of *Trimma* (Gobiidae), from the Indian and Western Pacific Oceans. *Aqua, Journal of Ichthyology and Aquatic Biology*, 4: 57–66.
- Winterbottom, R. 2004. Three new species of *Trimma* (Pisces; Gobiidae) from the central, western and south Pacific. *Aqua, Journal of Ichthyology and Aquatic Biology*, 9(1): 7–16.
- Winterbottom, R. 2005a. Two new species of the *Trimma tevegae* species group from the western Pacific (Percomorph: Gobiidae). *Aqua, Journal of Ichthyology and Aquatic Biology*, 10(1): 29–38.
- Winterbottom, R. 2005b. On the status of *Trimma tevegae* and *Trimma caudomaculata* (Percomorpha; Gobiidae). *Aqua, Journal of Ichthyology and Aquatic Biology*, 10(2): 51–56.
- Winterbottom, R. 2005. Two new species of the *Trimma*

- tevegae* species group from the western Pacific (Percopha: Gobiidae). *Aqua, Journal of Ichthyology and Aquatic Biology*, 10: 29–38.
- Winterbottom, R. 2006. Two new species of the gobiid fish genus *Trimma* from the coral reefs of the western Pacific Ocean (Pisces; Perciformes; Gobioidae). *Zootaxa*, (1331): 55–68.
- Winterbottom, R. and C. A. Villa. 2003. A new species of the *Trimma caesiura* species complex (Teleostei: Gobiidae) from the north-eastern margin of the Australian Plate, with a redescription of the other nominal species in the complex. *Aqua, Journal of Ichthyology and Aquatic Biology*, 7(1): 13–28.
- Yoshino, T and C. Araga. 1975. *Trimma caudomaculata* Yoshino et Araga sp. nov. Pages 272, pl. 89-M in H. Masuda, C. Araga and T. Yoshino. Coastal Fishes of Southern Japan. Tokai University Press, Tokyo.

Manuscript received 22 February 2006; revised 4 December 2006; accepted 14 December 2006.

Associate editor: K. Matsuura.