

## *Dotsugobius*, a New Genus for *Lophogobius bleekeri* Popta, 1921 (Actinopterygii, Gobioidae, Gobiidae), with Re-description of the Species

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**Abstract** A new gobiid genus *Dotsugobius* is described for *Lophogobius bleekeri* Popta, 1921. *Dotsugobius* belongs to the gobiid subfamily Gobiinae, and differs from the other gobiine genera in having the following combination of characters: head and body deep and compressed; no crest-like dermal ridge along predorsal midline; no free pectoral-fin rays; head and predorsal midline naked; single transverse sensory-papillae row *p* at interorbital area over sensory canal between pores C and D; seven distinct, long transverse rows of sensory papillae (rows 1–7) below eye; row *b* long, extending from transverse row 3 to posterior margin of cheek; row 5 divided into two parts (*viz.*, rows 5*s* and 5*i*) by longitudinal row *b*, and not extending beyond row *d* ventrally; row *n* (divided into two parts by anterior part of longitudinal row *x*<sup>1</sup>) transverse and very long, extending ventrally beyond a horizontal line through pore F; row *f* comprising a pair of short longitudinal rows of papillae; well-developed sensory canals on head, with pores B', C(S), D(S), E, F, G, H', K', L', M', N and O'; typical “Bathygobius Group” type of axial skeletal features, *e.g.*, P-V 3/II II I I 0/9, 10 + 17 = 27 vertebrae, two anal pterygiophores anterior to first haemal arch, and single epural. *Dotsugobius bleekeri* is recorded for the first time from the Japanese waters, and is here re-described based on 111 specimens from Japan, Indonesia (including the holotype of *L. bleekeri*), Solomon Islands, Papua New Guinea, Australia and Myanmar.

**Key words:** *Lophogobius bleekeri*, *Dotsugobius*, new genus, Gobiidae, Indo-West Pacific.

### Introduction

Gill (1862) established a new monotypic goby genus *Lophogobius* for *Gobius crista-galli* Valenciennes in Cuvier and Valenciennes, 1837, known from Cuba, with a very short description: “*Lophogobius*, Gill (crista-galli), characterized especially by a longitudinal coronal crest” (Gill, 1862, 240). The type species is currently regarded as a junior synonym of *Lophogobius cyprinoides* (Pallas, 1770) (Günther, 1861; Jor-

dan and Evermann, 1898; Koumans, 1931, 1937; Dawson, 1972; Bauchot *et al.*, 1991; Akihito and Meguro, 2000). Gill’s “coronal crest”, referred here as a nuchal crest following Akihito and Meguro (2000), is a thin, high crest-like dermal ridge with a rounded margin along the predorsal midline extending anteriorly to the interorbital space. Such a high nuchal crest is known only in some species of *Lophogobius* and *Cristatogobius* Herre, 1927 within the family (Herre, 1927; Koumans, 1931; Akihito and Meguro, 2000),

although a much lower, less crest-like dermal ridge along the predorsal midline is found in several gobiid genera (see, e.g., Larson and Murdy, 2001; Murdy and Hoese, 2003). The condition of the nuchal crest, however, varies from low (as in *L. cristulatus* Ginsburg, 1939) to a high crest-like ridge (as in *L. cyprinoides* and *L. androsensis* Breder, 1932) (Ginsburg, 1939; Dawson, 1972;

Akihito and Meguro, 2000; Thacker and Cole, 2002); Akihito and Meguro (2000) therefore indicated that the high nuchal crest is not regarded as a generic diagnosis of *Lophogobius*.

Since Gill's (1862) description, several gobiids from Atlantic and Pacific coasts of the Americas and the western Pacific were placed in *Lophogobius*. One of these examples is

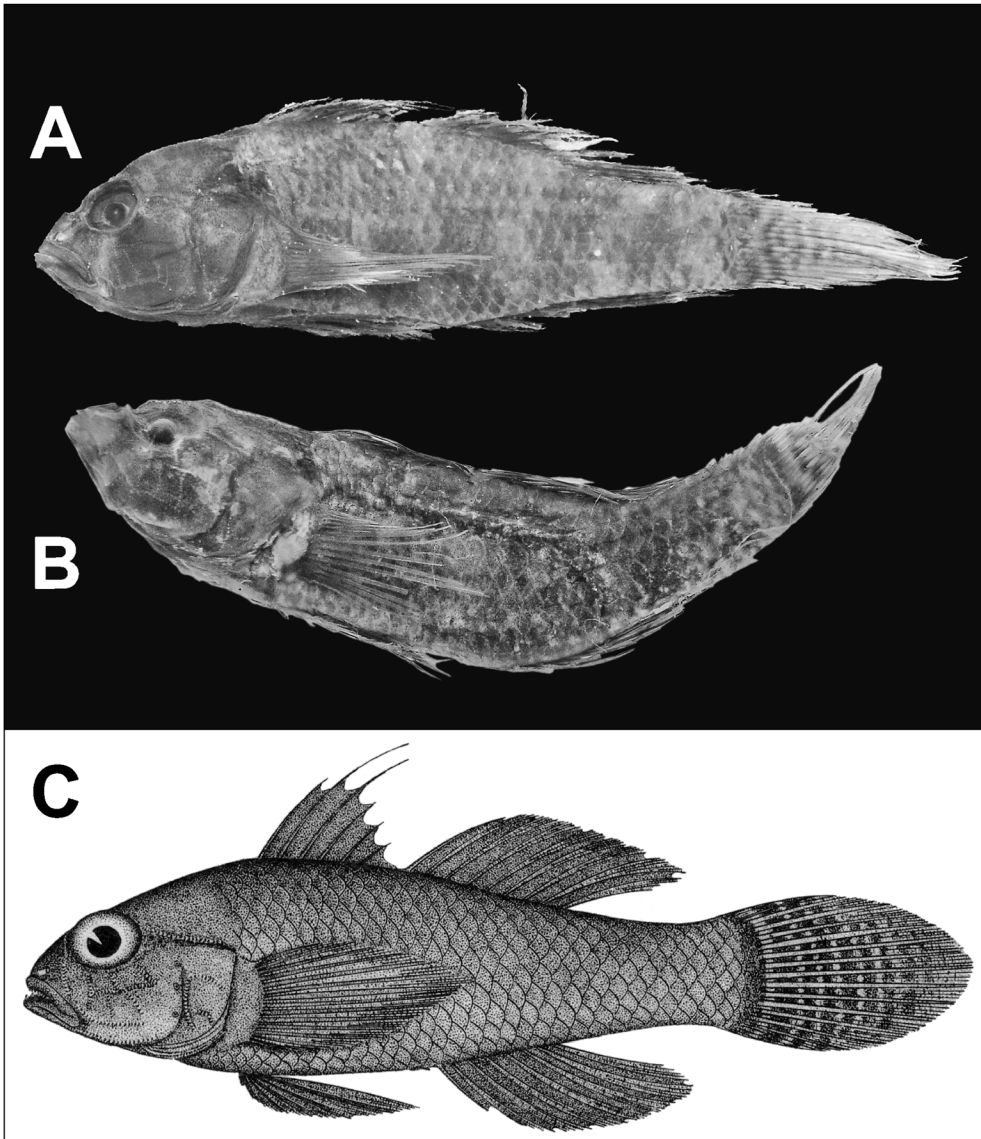


Fig. 1. *Dotsugobius bleekeri* (Popta 1921). A, holotype of *Lophogobius bleekeri* Popta, 1921 (SMF 6584, 29.8 mm SL); B, possible Popta's specimen of *L. bleekeri* (RMNH 10664, 20.1 mm SL); C, illustration of holotype of *Ctenogobius aterrimus* Herre, 1935 (Herre, 1936, fig. 24).

*Lophogobius bleekeri* Popta, 1921, described from a single specimen collected from Raha on Muna Island, off southeast Sulawesi, Indonesia. In the original description, Popta (1921) compared *L. bleekeri* with the similar-looking, deep-bodied Western Pacific gobies considered to belong to *Lophogobius* by her, viz., *L. apogonoides* (Cantor, 1849), *L. dispar* (Peters, 1868) and *L. chryssosoma* Bleeker, 1875. All these nominal species lack the nuchal crest, but Popta (1921) did not address the reason why she assigned these to *Lophogobius*.

Subsequently, all the Western Pacific species once assigned to *Lophogobius* except for *L. bleekeri* were transferred to other gobiid genera. Namely, *L. apogonoides* was regarded as a junior synonym of *Stigmatogobius sadanundio* (Hamilton, 1822) (Larson, 2001, 2005), and both *L. dispar* and *L. chryssosoma* were placed in *Redigobius* Herre, 1927 (Larson, 2001, 2010). The remaining two nominal species of *Lophogobius* described from the Western Pacific, *L. nonatoae* Ablan, 1940 and *L. wera* Popta, 1922, are currently regarded as species of *Cristatogobius* and *Redigobius* [as a junior synonym of *R. oyensi* (de Beaufort, 1913)], respectively (Akihito and Meguro, 2000; Larson, 2010). *Lophogobius bleekeri* is thus the only species of *Lophogobius* known from the Western Pacific. Other species of the genus, viz., *L. cyprinoides*, *L. androsensis* and *L. cristulatus*, are known only from the Americas (Thacker and Cole, 2002).

The taxonomic status of *Lophogobius bleekeri* has not been well explored. Koumans (1953, 384) listed *Lophogobius bleekeri* as one of the "SPECIES INCERTAE" of gobioid fishes, and noted "The type specimen in the Leiden Museum shows that it is not a *Lophogobius*, but a young specimen of Gobiidae." The specimen that Koumans (1953) examined (RMNH 10664, 20.1 mm SL, Fig. 1B) is, however, actually not the type specimen of Popta's *Lophogobius bleekeri*, because Popta's description was based on "1 Exemplar lang 41 mm" (Popta, 1921, 209); the size of the specimen agrees with the Popta's

other specimen (SMF 6584, 29.8 mm SL, 39.5 mm TL, Fig. 1A) deposited in the Senckenberg Research Institute and Natural History Museum, Frankfurt.

*Lophogobius bleekeri* has been recorded from scattered localities in the tropical/subtropical Western Pacific and Andaman Sea (e.g., Hoes and Larson, 2006; Satapoomin, 2011). Recent findings from the insular streams in the Ryukyu Islands of Japan represent the northernmost records for the species (Senou *et al.*, 2004, 471, as "Gobiidae, indet. gen. and sp. 3"; this study). A specimen of *L. bleekeri* recently obtained from Myanmar (NSMT-P 115699) indicates that the species is also distributed in the eastern Indian Ocean.

Our examination, based on 111 specimens from Japan, Indonesia, Solomon Islands, Papua New Guinea, Australia and Myanmar, revealed that *Lophogobius bleekeri* is non-congeneric with the American species of *Lophogobius* (see "Discussion", below). Since the features of the species do not agree with any previously described genus, we here propose a new generic name for *L. bleekeri*. The species is re-described herein, based on these specimens, including the holotype.

## Materials and Methods

Specimens examined in this study are housed in the following institutions: Australian Museum, Sydney, Australia (AMS); Kanagawa Prefectural Museum of Natural History, Odawara, Kanagawa, Japan (KPM); National Museum of Nature and Science, Tsukuba, Japan (NSMT); Naturalis Biodiversity Center, Leiden, Netherlands (RMNH); Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany (SMF).

All fish lengths given are standard lengths (SL). Measurements were made point-to-point with calipers under dissecting microscopes to the nearest 0.01 mm. The methods for measurements followed those of Hubbs and Lagler (1958), with exceptions given below (the snout tip refers to the mid-anteriormost point of the upper lip): interorbital width was the least width between

innermost rims of right and left eyeballs; jaw length was measured between the snout tip and the posteriormost point of lip; head width and depth were measured at the posterior margin of the preopercle; body depth was measured at the anal-fin origin; nape width was measured between the dorsalmost margins of right and left gill openings; preanal and prepelvic lengths were measured from the snout tip to the origin of each fin; pectoral-fin length was measured from the base to the tip of the longest ray; pelvic-fin length was measured between the base of pelvic-fin spine and the distal tip of the longest segmented ray; and caudal-fin length was measured from the base to the tip of the middle caudal-fin ray. The methods of counting followed Akihito (1984), except for the following: longitudinal scale count was the number of oblique (anterodorsal to posteroventral) scale rows taken from just dorsal to the upper attachment of the opercular membrane posteriorly to the midbase of caudal fin; three methods of transverse scale counts were taken (see descriptive accounts); circumpeduncular scale count was the number of scales along a zigzag vertical line, counted from the second middorsal scale prior to the anteriormost upper procurrent caudal-fin ray; gill rakers including all rudiments were counted on the outer side of first arch; count of pseudobranchial filaments included all rudiments. Scales (except for predorsal and circumpeduncular scales) and paired-fin rays were counted on both sides, but gill rakers and pseudobranchial filaments were counted on the right side only. Osteological features were observed from radiographs and a single cleared and stained specimen (OMNH-P 32151), following the method of Potthoff (1984). The method of Akihito (1984) was used in describing the pattern of the interdigitation of the dorsal-fin pterygiophores between the neural spines ("P-V"). Cephalic sensory canals and papillae were observed from specimens stained with cyanine blue, and notations on them followed Akihito (1984) and Sanzo (1911), respectively.

***Dotsugobius* gen. nov.**

[New Japanese name: Kumanoko-haze zoku]

*Type species.* *Lophogobius bleekeri* Popta, 1921.

*Diagnosis.* *Dotsugobius* belongs to the gobiid subfamily Gobiinae (*sensu* Pezold, 1993), and distinguished from the other gobiine genera in having the following combination of characters: head and body deep and compressed; no crest-like dermal ridge along predorsal midline; no free pectoral-fin rays; head and predorsal midline naked; single transverse sensory-papillae row *p* at interorbital area over sensory canal between pores C and D; seven distinct, long transverse rows of sensory papillae (rows 1–7) below eye; row *b* long, extending from transverse row 3 to posterior margin of cheek; row 5 divided into two parts (*viz.*, rows 5*s* and 5*i*) by longitudinal row *b*, and not extending beyond row *d* ventrally; row *n* (divided into two parts by anterior part of longitudinal row *x'*) transverse and very long, extending ventrally beyond a horizontal line through pore F; row *f* comprising a pair of short longitudinal rows of papillae; well-developed sensory canals on head, with pores B', C(S), D(S), E, F, G, H', K', L', M', N and O'; typical "Bathygobius Group" (*sensu* Birdsong *et al.*, 1988) type of axial skeletal features, *e.g.*, P-V 3/II II I I 0/9, 10 + 17 = 27 vertebrae, two anal pterygiophores anterior to first haemal arch, and single epural.

*Etymology.* The genus *Dotsugobius* (Dotsu + *Gobius*, a gobiine genus) is named for Yoshie Dotsu (spelled "Dôtu" in his early publications), the former professor of Nagasaki University, Japan, and supervisor of the second author (TS) when TS belonged to Dotsu's laboratory, in reference to his great contribution to our knowledge about early-life history and taxonomy of Japanese fishes, particularly the gobies. The gender is masculine.

*Comparison.* *Dotsugobius* clearly belongs to the gobiid subfamily Gobiinae (*sensu* Pezold, 1993) by having the following characters: interorbital section of right and left sides of ocu-

loscapular canal fused medially, with an unpaired pore C; single epural; P-V 3/II II I 0/9;  $10 + 17 = 27$  vertebrae; and two anal-fin pterygiophores anterior to the first haemal spine.

In her original description, Popta (1921) compared her new species *Lophogobius bleekeri* (= *Dotsugobius bleekeri*) with some Western Pacific gobies currently placed in *Redigobius* and *Stigmatogobius* (see "Introduction" above). Nevertheless, *Redigobius* and *Stigmatogobius* belong to the gobiid subfamily Gobionellinae (Larson, 2001, 2005, 2010), possessing: oculoscapular canal pore C, if present, paired (vs. pore C unpaired in the Gobiinae, including *Dotsugobius*); usually P-V 3/I II II I 0/9 (vs. P-V 3/II II I I 0/9 or derivate patterns); and usually two epurals (vs. single).

*Dotsugobius* is somewhat similar to *Lophogobius* in general appearance, but readily distinguished by having: no nuchal crest (vs. distinct nuchal crest present in *Lophogobius*); nearly truncate or slightly emarginated tongue (vs. truncate or broadly rounded); sensory-papillae row *p* at interorbital area over sensory canal between pores C and D (vs. row *p* absent); three transverse sensory-papillae rows (rows *1*, *2* and *3*) before row *b* (vs. five or six transverse rows before row *b*); row *b* long, extending anteriorly beyond a vertical through middle of eye (vs. short, reaching anteriorly to a vertical through around posterior end of eye); row *n* long, extending ventrally beyond a horizontal line through pore F (vs. not reaching to horizontal line through pore F);  $10 + 17 = 27$  vertebrae (vs.  $10 + 16 = 26$ ); usually I, 7 anal-fin rays (vs. I, 8–9). *Lophogobius cyprinoides* has a low dermal ridge along the posterior margin of the preopercle between pores M and O (with a shallow notch around pore N), but such dermal ridge is not found in *Dotsugobius bleekeri*; the condition of this ridge in the other two species of *Lophogobius* was not researched in this study, but, according to Dawson (1972), "upper limb of preopercle generally entire, without deep emarginations" in *L. cristulatus*. Morphological data of *Lophogobius* is based solely on examined speci-

mens of *L. cyprinoides* and the literatures, e.g., Breder (1932), Dawson (1972), Birdsong *et al.* (1988), Thacker and Cole (2002) and Bouchereau and Gros (2010).

Sensory-papillae row *p*, a transverse row across over the sensory canal at the interorbital between pores C and D, is seldom seen in the Gobiinae, and has been reported only from two Mediterranean and eastern Atlantic species, *Millerigobius macrocephalus* (Kolombatovic, 1891) and *Gorogobius stevcici* Kovačić and Schliewen, 2008 (Bath, 1973; Kovačić and Schliewen, 2008). The only known species of *Dotsugobius*, *D. bleekeri*, differs from these two species by having: a long sensory-papillae row *b*, extending anteriorly to row 3 (vs. row *b* short, not extending beyond row 4 or 5); posterior oculoscapular canal and its associated pores K' and L' present (vs. absent). *Dotsugobius bleekeri* is also distinguished from *G. stevcici* by having  $10 + 17 = 27$  vertebrae (vs.  $11 + 16 = 27$  in *G. stevcici*). [Note that number of precaudal or caudal vertebrae is not known in *M. macrocephalus*, although Bath (1973) and Miller (1986) indicated that the species has 27 or 28 total vertebrae].

Regarding the axial skeletal characteristics, *Dotsugobius* is placed in a phenetically distinct subgroup of the Gobiidae, the Bathygobius Group of Birdsong *et al.* (1988), by having: P-V 3/II II I I 0/9;  $10 + 17 = 27$  vertebrae; two anal pterygiophores anterior to first haemal arch; and a single epural. Although recent molecular analyses suggested that the group is non-monophyletic (Thacker and Roje, 2011; Agorreta *et al.*, 2013), the following 10 genera are currently placed in the Bathygobius Group (Birdsong *et al.*, 1988; Shibukawa and Iwata, 2007) in addition to *Dotsugobius*: *Bathygobius* Bleeker, 1878; *Caf-frogobius* Smitt, 1900; *Coryogalops* Smith, 1958; *Glossogobius* Gill, 1859; *Gorogobius* Miller, 1978; *Grallenia* Shibukawa and Iwata, 2007; *Heteroleotris* Bleeker, 1874; *Lesueurigobius* Whitley, 1950; *Nematogobius* Boulenger, 1910; and *Pascua* Randall, 2005. In these genera, no species are known to have the interorbital sensory-papillae row *p*, exclusive of *D. bleekeri* and

*Gorogobius stevcici* (Kovačić and Schliewen, 2008; present study). Furthermore, *Bathygobius*, *Glossogobius* [except for *Glossogobius circumspectus* (Macleay, 1883)] and *Lesueurigobius* are readily distinguished from *Dotsugobius* by lacking transverse rows of sensory papillae on cheek (Akihito and Meguro, 1975, 1980; Miller, 1986; Miller and Smith, 1989; Miller and Stefanni, 2001; Akihito *et al.*, 2002). *Grallenia* and *Pascua* have reduced sensory-papillae rows on cheek, not or barely forming distinct transverse/longitudinal rows (Randall, 2005, 2006; Hoese and Larson, 2005; Shibukawa and Iwata, 2007). The remaining five genera, *viz.*, *Caffrogobius*, *Coryogalops*, *Gorogobius*, *Heteroleotris* and *Nematogobius*, have distinct transverse rows of sensory papillae on cheek, like *Dotsugobius*. As well as the lack of row *p* (except for *G. stevcici*), these five genera can be distinguished from *Dotsugobius* by having: subcylindrical or depressed head (*vs.* compressed in *Dotsugobius*); relatively short row *b*, not extending anteriorly beyond a vertical through middle of eye (*vs.* long, extending anteriorly beyond a vertical through middle of eye); four or five transverse rows of sensory papillae before row *b* (*vs.* three); 9–14 segmented dorsal-fin rays, exclusive of *Heteroleotris zanzibarensis* rarely with 8 (*vs.* usually 8); 8–12 segmented anal-fin rays, exclusive of *H. zanzibarensis* rarely with 7 (*vs.* usually 7). Additionally, *Caffrogobius* has the upper pectoral-fin rays free from membrane at least partially (*vs.* no free pectoral-fin rays), 30 or more longitudinal scales (*vs.* 26–29) (Hoese, 1986b; Goren, 1996); *Coryogalops* has the upper pectoral-fin rays free from membrane at least partially (*vs.* no free pectoral-fin rays in *Dotsugobius*), first gill slit closed by membrane at least partially (*vs.* completely open, not partly closed by membrane), and hypurals 1 + 2 fused with urostyle and hypurals 3 + 4 (*vs.* not fused with urostyle and hypurals 3 + 4) (Goren, 1985, 1991); *Gorogobius* has ctenoid scales on the predorsal area, cheek and operculum (*vs.* predorsal area, cheek and operculum naked in *Dotsugobius*), sensory-papillae row 5 extending ven-

trally beyond longitudinal row *d* (*vs.* not extending beyond row *d*), and posterior oculoscapular canal and preopercular canal absent (*vs.* present) (Miller, 1978; Kovačić and Schliewen, 2008); *Heteroleotris* has the first gill slit completely or partially closed by membrane (*vs.* open, not or barely closed by membrane), and separated pelvic fins with no frenum in many species (*vs.* pelvic fins fused medially, with a developed frenum) (Akihito and Meguro, 1981; Hoese, 1986a; Shibukawa, 2010); and *Nematogobius* has a pair of developed barbels on chin (*vs.* absent) and 32 or more longitudinal scales (*vs.* 26–29) (Harrison, 1990).

*Dotsugobius* could be possibly confused with another Indo-West Pacific estuarine gobiine genus, *Drombus* (see Larson *et al.* 2008), by its dark coloration of head and body and a distinct transverse pattern of sensory papillae on the cheek. The former is, however, readily distinguished from the latter by having a deep and compressed head and body (*vs.* head slightly depressed and body moderately elongate in *Drombus*), no scales on predorsal midline (*vs.* present), sensory-papillae row *p* (*vs.* absent), usually 8 segmented dorsal-fin rays (*vs.* usually 9–10), row 5 not extending ventrally beyond row *d* (*vs.* extending ventrally beyond row *d*), row *f* comprising a pair of short longitudinal rows (*vs.* a transverse row) and 10 + 17 = 27 vertebrae (*vs.* 10 + 16 = 26) (Hoese, 1986b; Larson and Murdy, 2001).

*Included species.* *Dotsugobius* comprises a single species, *D. bleekeri*, hitherto known from brackish estuarine and the adjacent freshwater areas of the eastern Indian Ocean, Andaman Sea and Western Pacific. The species is re-described below.

***Dotsugobius bleekeri* (Pocta, 1921)**

[New Japanese name: Kumanoko-haze]

(Figs. 1–5; Table 1)

*Lophogobius bleekeri* Pocta, 1921: 207 (type locality: Raha on Muna, Indonesia, holotype: SMF 6584); Koumans, 1953: 384 (comment on the specimen housed in the Leiden Museum, RMNH 10664); Blaber *et al.*,

1991: 10 (Solomon Islands); Ng *et al.*, 1999: 181 (Pulau Tioman, Malay Peninsula); Larson in Randall and Lim, 2000: 638 (South China Sea); Larson and Murdy, 2001: 3598 (Western Central Pacific); Hoese and Larson, 2006: 1663 (Lizard Island and northeastern coast of Queensland, Australia); Satapoomin, 2011: 67 (Andaman Sea); Kottelat, 2013: 412 (Muna Island, Timan Island and Solomon Islands).

*Rhinogobius aterrimus* Herre, 1931: 9 (*nomen nudum*; name only in the check list of fishes from Solomon Islands).

*Ctenogobius aterrimus* Herre, 1935: 423 (type locality: Kulambangra Island, Solomon Islands, holotype: FMNH 17384); Herre, 1936: 364, fig. 24 [resurrection of Herre's description of 1935, with a slight modification of style and unpublished illustration of holotype]; Koumans, 1940: 139 (re-examination of holotype); Grey, 1947: 138 (type catalogue); Munro, 1967: 500 (Solomon Islands); Ibarra and Stewart, 1987: 29 (type catalogue).

Gobiidae, indet. gen. and sp. 3.: Senou *et al.*, 2004: 471 (Okinawa-jima Island and Iriomote-jima Island of Ryukyu Islands, Japan).

*Materials examined.* Total 111 specimens, 7.2–38.9 mm SL. **Japan (Ryukyu Islands):** KPM-NI 19372, 1 specimen (female), 38.9 mm SL, Teima-gawa River, Okinawa-jima Island, Okinawa Group of Ryukyu Islands, Japan, 9 Sept. 2007, collected by K. Uchino; NSMT-P 115693, 1 specimen (small young, anterior part of head heavily damaged), *ca.* 11.6 mm SL, mouth of Nishihonera-gawa River, Iriomote-jima Island, Yaeyama Group of Ryukyu Islands, Japan, 12 Aug. 2001, collected by T. Suzuki, M. Hosokawa and A. Kawai; NSMT-P 115694, 1 specimen (small young), 14.3 mm SL, Nishihonera-gawa River, Iriomote-jima Island, Yaeyama Group of Ryukyu Islands, Japan, 15 Aug. 2001, collected by T. Suzuki, M. Hosokawa and A. Kawai; NSMT-P 115695, 1 specimen (small young), 12.5 mm SL, collected with NSMT-P 115694; NSMT-P 115696, 1 specimen (juvenile), 8.1 mm SL, collected with NSMT-P 115694; NSMT-P 115697, 1 specimen (juvenile), 7.6 mm SL, collected with NSMT-P 115694; NSMT-P 115698, 1 specimen (female), 19.3 mm SL, Nishihonera-gawa River, Iriomote-jima Island, Yaeyama group of Ryukyu Islands, 23 Oct. 2001, collected by K. Yano; OMNH-P 31951, 1 speci-

men (male), 19.0 mm SL, Ge'eda-gawa River, Iriomote-jima Island, Yaeyama Group of Ryukyu Islands, Japan, 9 Oct. 2006, collected by T. Suzuki and M. Hosokawa; OMNH-P 32151, 1 specimen (male, cleared and stained), 34.3 mm SL, Ada-gawa River, Kunigami, Okinawa-jima Island, Okinawa Group of Ryukyu Islands, Japan (26°44'N, 128°18'E), 19 May 2007, collected by T. Suzuki, N. Oseko and M. Hosokawa; OMNH-P 32152, 1 specimen (male), 32.1 mm SL, collected with OMNH-P 32151; OMNH-P 32153, 1 specimen (female), 29.8 mm SL, collected with OMNH-P 32151; OMNH-P 33386, 1 specimen (male), 34.0 mm SL, Ge'eda-gawa River, Iriomote-jima Island, Yaeyama Group of Ryukyu Islands, Japan, 9 Aug. 2007, collected by T. Suzuki and M. Hosokawa; OMNH-P 33389, 1 specimen (small young), 11.6 mm SL, collected with OMNH-P 33386; OMNH-P 33390, 1 specimen (juvenile), 7.2 mm SL, collected with OMNH-P 33386; URM-P 47495, 1 specimen (female), 28.5 mm SL, Gesashi, Okinawa-jima Island, Okinawa Group of Ryukyu Islands, Japan, 22 Mar. 2001; URM-P 47496, 1 specimen (female), 18.4 mm SL, Tabaru-gawa River, Yonaguni-jima Island, Yaeyama Group of Ryukyu Islands, Japan, 18 Oct. 2003. **Solomon Islands:** AMS I. 31085–005, 3 specimens (1 male and 2 females), 10.8–17.9 mm SL, Kolombangora Island, Solomon Islands (08°00'S, 157°10'E), 18 Aug. 1988, collected by S. Blader; AMS I. 31085–007, 3 specimens (females), 18.1–21.0 mm SL, same collecting data with AMS I. 31085–005. **Indonesia (Sulawesi):** RMNH 10664, 1 specimen, 20.1 mm SL; SMF 6584, holotype of *Lophogobius bleekeri* Popta 1921, male, 29.8 mm SL, Raha, Insel Muna, s.ö. von Celebes, Sunda-Arch, 1909, collected by J. Elbert. **Papua New Guinea:** AMS I. 16670–018, 1 specimen (male), 25.9 mm SL, Madang Harbour, July 1969, collected by F. Talbot; AMS I. 16671–056, 1 specimen (male), Madang Harbour, 31 July 1969, collected by F. Talbot; AMS I. 37954–006, 2 specimens (male and female), 22.4–24.8 mm SL, mouth of Saia River, Morobe Province, (7°21.92'S, 147°07.12'E), 22 Nov. 1999, col-

lected by A. Jenkins. **Australia (Queensland):** AMS I. 19468–036, 1 specimen (male), 38.9 mm SL, Lizard Island, Great Barrier Reef, Nov. 1975, collected by AMS party; AMS I. 21258–001, 18 specimens (2 males, 8 females and 8 juveniles), 9.0–22.6 mm SL, a creek just south of Cape Tribulation, 11 Sept. 1979, collected by D.F. Hoese; AMS I. 21263–006, 2 specimens (females), 14.2–21.7 mm SL, Yule Point, north of Cairns (16°35'S, 145°33'E), 15 Sept. 1979, collected by D.F. Hoese; AMS I. 22041–005, 13 specimens (3 males, 7 females and 3 juveniles), 10.7–27.2 mm SL, Mowbray River, 13 Sept. 1980, collected by D.F. Hoese, H.K. Larson and G.R. Allen; AMS I. 22055–003, 38 specimens (9 males, 17 females and 12 juveniles), 9.6–33.6 mm SL, Bailey Creek, 17 Sept. 1980, collected by D.F. Hoese and party; AMS I. 22709–005, 9 specimens (3 males, 4 females and 2 juveniles), 10.7–27.6 mm SL, Cape Tribulation, 1981, collected by D.F. Hoese and R. Winterbottom; AMS I. 22722–026, 1 specimen (male), 22.2 mm SL, mouth of Daintree River, Australia, 26 June 1981, collected by G. Hardy and T. Ayling. **Myanmar:** NSMT-P 115699, 1 specimen (small young), 12.6 mm SL.

*Diagnosis.* *Dotsugobius bleekeri* is only known species of the genus. The diagnosis is that of the genus.

*Description.* In the following description, the counts of the holotype are asterisked; frequency of each count is given in parentheses following relevant count. Dorsal-fin rays VI-I, 8\* (29) or VI-I, 9 (1); anal-fin rays I, 5\* (1), I, 6 (2) or I, 7 (27); pectoral-fin rays 16 (18), 17\* (32) or 18 (5); pelvic-fin rays I, 5\* (60); segmented caudal-fin rays 9 + 8\* (25), including 5–7 + 6–7 branched rays; upper unsegmented caudal-fin rays 4 (2), 5\* (17) or 6 (1); lower unsegmented caudal-fin rays 4\* (13) or 5 (7); longitudinal scales 25 (1), 26 (3), 27\* (29), 28 (18) or 29 (3); transverse scales from anal-fin origin upward and forward to base of first dorsal fin 12 (3), 13 (17), 14\* (19), 15\* (13) or 16 (2); transverse scales from anal-fin origin upward and backward to base of second dorsal fin 11 (14), 12 (26) or 13 (14); transverse scales from origin of second dorsal fin downward

and backward to base of anal fin 10 (1), 11 (15), 12\* (29) or 13 (9); predorsal scales 0\* (27); pre-pelvic scales 1 (2), 3 (5), 4 (2), 5 (4), 6\* (10) or 8 (1); circumpeduncular scales 12\* (12), 13 (10) or 14 (5); gill rakers on outer surface of first arch 3 + 9 (2), 3 + 10 (2), 3 + 11 (1) or 4 + 10 (2); pseudobranchial filaments 8 (1), 9 (3) or 10 (3).

Proportional measurements are given in Table 1. Head and body deep, compressed. Head width 62.7–89.5% of its depth. Snout length subequal or shorter than eye diameter (64.0–104.6% of the latter). Eyes dorsolateral, moderately large, its diameter 24.7–33.6% of head length; interorbital width narrower than pupil diameter. Anterior naris opening at tip of short tube; posterior naris a simple pore with only slightly elevated anterior margin, closer to eye than anterior nasal tube; no flap at tip of nasal tube. Jaw moderate in size, its length 32.4–42.5% of head length; posterior end of jaw extending to a vertical through interspace between anterior margins of eye and pupil; lower jaw projecting a little beyond upper; gape oblique, forming an angle of about 55 degrees of body axis. No bony projections (*e.g.*, spines or serration) at posterior margin of preopercle. Anterior margin of tongue nearly truncate or slightly emarginate, free from floor of buccal cavity. Mental frenum undeveloped. Ventroposterior margin of lower lip broadly interrupted at chin. Gill opening moderate in size, extending dorsally beyond horizontal line through base of uppermost ray of pectoral fin, and reaching ventroanteriorly to a vertical through middle of operculum (not to a vertical through posterior margin of preopercle); gill membranes broadly attaching to isthmus, no free rear fold of gill membranes across isthmus. First gill slit well opens (not closed by membrane or barely so). Gill rakers on outer surface of first arch slender, moderately short. No fleshy projections on lateral surface of cleithrum. No cutaneous ridge along predorsal midline.

Dorsal fins separated from each other, with one or two scales at interspace along dorsal midline; height of first dorsal fin (exclusive of filamentous parts) subequal or slightly higher than



Table 1. Proportional measurements of *Dotsugobius bleekeri*

	Holotype SMF 6584	Possible Popta's specimen RMNH 10664	Other specimens (n = 11)
SL (mm)	29.8	20.1	11.6–34.3
% of SL			
Head length	32.8	33.2	32.9–36.8
Head width	18.8	18.4	16.6–22.4
Head depth	25.2	22.0	23.9–28.1
Snout length	8.5	8.5	7.7–9.3
Eye diameter	8.1	8.9	9.2–12.1
Interorbital width	2.1	1.4	1.8–3.1
Nape width	15.8	14.7	14.4–17.2
Jaw length	13.1	12.4	11.9–14.2
Body depth at P <sub>2</sub> origin	28.2	—	26.3–32.4
Body depth at A origin	28.4	24.2	23.8–28.6
Body width	—	—	12.9–16.8
Predorsal length	35.3	33.8	35.8–40.1
Prepelvic length	32.7	34.5	32.4–35.8
Preanal length	60.4	63.0	58.6–61.1
Caudal-peduncle length	26.6	29.3	26.4–29.5
Caudal-peduncle depth	14.8	13.4	13.4–15.7
Length of D <sub>1</sub> base	21.9	19.2	21.2–24.1
Length of D <sub>2</sub> base	24.1	19.6	22.6–26.1
Length of anal-fin base	17.2	17.0	16.7–18.7
Length of D <sub>1</sub> 1st spine	17.6	16.2	15.4–20.2
Length of D <sub>1</sub> 6th spine	27.0	22.8	16.6–28.9
Length of D <sub>1</sub> longest spine	30.1	18.3	16.5–24.6
Length of D <sub>2</sub> spine	—	—	13.7–17.5
Length of D <sub>2</sub> 1st segmented ray	—	—	16.0–20.3
Length of D <sub>2</sub> longest segmented ray	—	—	18.4–24.3
Length of A spine	—	—	8.8–12.2
Length of 1st segmented ray of A	—	—	13.1–15.8
Length of longest segmented ray of A	—	—	21.0–29.8
P <sub>1</sub> length	29.5	28.6	27.5–33.8
P <sub>2</sub> length	—	—	25.7–31.3
C length	—	—	25.9–37.9

Abbreviations: A, anal fin; C, caudal fin; D<sub>1</sub>, first dorsal fin; D<sub>2</sub>, second dorsal fin; P<sub>1</sub>, pectoral fin; P<sub>2</sub>, pelvic fin.

second dorsal fins; second or third spine of first dorsal fin longest; all dorsal-fin spines slender and flexible; distal part of middle some spines (in particular second and third) usually elongate and filamentous in large specimens; all segmented dorsal-fin rays branched; ultimate dorsal-fin ray split to base (and counted as single ray). Anal fin slightly lower than second dorsal fin, originating ventral to base of first or second segmented rays of dorsal fin; anal-fin spine slender and flexible; all anal-fin segmented rays branched; ultimate anal-fin ray split to base (and counted as single ray). Pectoral fin near elliptical, almost symmetrical dorsoventrally; pectoral fin longer than pelvic fin; almost all pectoral-fin rays branched, except for uppermost one or two; tenth or elev-

enth pectoral-fin ray longest; pectoral fin extending posteriorly to a vertical line through first, second, third or fourth segmented anal-fin ray. Pelvic fin fused medially by well-developed frenum (between spines) and connecting membrane (between innermost rays); pelvic fin extending slightly beyond base of anal-fin spine; all pelvic-fin segmented rays multibranching; fifth pelvic-fin ray longest, slightly longer than fourth; pelvic frenum moderately thin, with smooth and almost straight posterior margin; width of pelvic frenum greater than height. Caudal fin rounded, almost symmetrical dorsoventrally, shorter than head (caudal-fin length 78.4–107.2% of head length); no elongate caudal-fin rays.

Scales ctenoid with peripheral cteni, except for

those on posterior part of side of nape, narrow areas just behind pectoral and pelvic-fin bases, pectoral-fin base, narrow area along dorsal and anal fins and basal part of caudal fin with cycloid scales (single some scales on pectoral-fin base ctenoid in some large adults); no modified scales with enlarged cteni; head naked.

Teeth on jaws slender, unicuspid; teeth on outermost row sparsely spaced and slightly larger than inner teeth in each jaw; inner teeth on jaws forming tooth bands (*ca.* 5 and 6 irregular rows around upper and lower-jaw symphyses, respectively), gradually narrowing posteriorly; no enlarged canine-like teeth in either jaw; no teeth on vomer and palatine.

Cephalic sensory systems are illustrated in Fig. 5. Anterior oculoscapular canal usually with pores B', C(S), D(S), E, F, G and H'. Posterior oculoscapular canal separate from anterior oculoscapular canal, with pores K' and L'. Preopercular canal not continuous with oculoscapular canals, with pores M', N and O'. All sensory-papillae rows uniserial. Distinct transverse pattern of sensory-papillae rows on cheek; seven transverse rows of sensory papillae below eye; row 4 not extending dorsally beyond row *b*; row

5 divided into two parts (*i.e.*, *5s* and *5i*) by row *b*; ventral end of row *5i* closed to, or extending below, posterior end of row *d*; row *b* long, extending from middle of row 3 to posterior margin of preoperculum; transverse sensory-papillae row *p* developed at middle of interorbital area just behind pore C; row *e* and *i* shortly interrupted at midway; a pair of longitudinal rows of sensory papilla just behind chin (= row *f*), forming near V-shape; row *n* transverse, very long, extending from row *x'* to near dorsal midline. Sensory-papillae rows on midlateral body along axis uniserial and restricted on a single scale in each. Three sensory-papillae rows on caudal fin, each arranged along ray and ending near distal margin of fin.

*Color when alive* (Fig. 2). Ground color of head blackish brown or blackish gray, with many irregularly-shaped dark reddish blotches; two oblique narrow beige bands one from eye to anterior naris and one to posterior end of jaws; posteroventral margin of cheek with a narrow beige area; dorsal part of iris beige, mottled with some blackish to black spots; vaguely-defined ovoid black spot (slightly smaller than eye) just above dorsoposterior corner of operculum; body



Fig. 2. Underwater photograph of *Dotsugobius bleekeri*, Iriomote-jima Island, Yaeyama Group of Ryukyu Islands, Japan. Photographed by K. Yano.

with 7 irregular, broad blackish brown bands, broader than beige interspaces; first band below midbase of first dorsal fin, and fused dorsally to next (second) band; third band below anterior part of second dorsal-fin base; fourth band below posterior part of base of second dorsal fin, and fused dorsally to next (fifth) band; sixth and seventh bands at posterior half of caudal peduncle and caudal-fin base, respectively; first dorsal fin beige or light brown anteriorly between first and second spines, remainder largely blackish brown; first spine of first dorsal fin with alternating black and beige markings; second dorsal fin blackish, with beige anteroventral corner; anal fin blackish

brown; pectoral fin nearly translucent, brownish, with two horizontally-elongate blackish spots on pectoral-fin base; caudal fin nearly transparent, with few blackish dots basally.

*Color when freshly-collected (Fig. 3).* Head dark grayish brown or mottled with irregularly-shaped blackish brown blotches, usually with minute irregularly-shaped reddish spots; an oblique beige band from eye to posterior end of jaws; vaguely-defined black spot (as large as, or slightly smaller than, eye) just above dorsoposterior corner of operculum; body usually with 6–7 broad irregularly-shaped vertical bands, much broader than beige or pale brown inter spaces

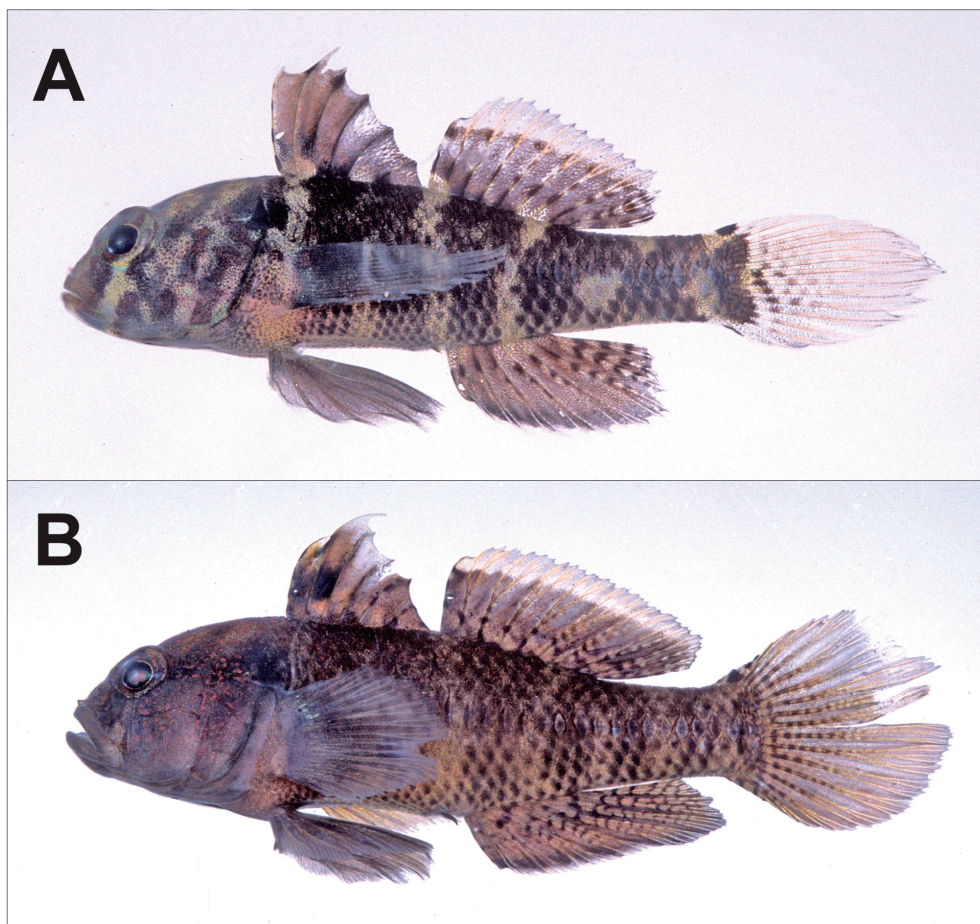


Fig. 3. Freshly-collected specimens of *Dotsugobius bleekeri* from Iriomote-jima Island, Yaeyama Group of Ryukyu Islands, Japan. A, OMNH-P 31951, male, 19.0 mm SL; B, OMNH-P 32151, male, 34.3 mm SL. Photographed by T. Suzuki.

(this banded pattern indistinct in darkened specimens); first dorsal fin pale brown anteriorly, usually darkened posteriorly; second dorsal fin grayish brown or blackish gray with broad pale distal margin; spine and segmented rays of second dorsal fin with several minute blackish spots in each; anal fin grayish brown, blackened distally, with narrow paler distal margin; posterior rays of anal fin at least with several minute blackish spots; pectoral fin grayish with pale brown rays; pelvic fin dark gray with dark grayish brown rays; caudal-fin membrane grayish; caudal fin rays with minute black spots at least basally.

*Color in alcohol (Figs. 1, 4).* Head dark brown, usually with pale stripes from eye to anterior naris and one to end of jaws; three or four indistinct blackish brown spots (each sub-equal or slightly smaller than pupil) around eye,

with one between sensory-canal pores D and E, one behind eye, and the other one or two below eye; two similar blackish brown spots on dorsal midline of nape; posterior and ventral margins of cheek paler in small specimens; rounded blackish spot (slightly larger than pupil) above dorsoposterior corner of operculum; ground color of head and body beige or grayish brown; six or seven irregular, broad dark brown vertical bands (broader than interspaces) on body, some bands united dorsally; first dorsal fin blackish brown; second dorsal fin dark brown with broad pale distal margin in adults (fin much paler in small specimens), with *ca.* 4–8 oblique rows of blackish brown dots; anal fin dark brown with a narrow pale distal margin in many adults (fin much paler in small specimens), with many blackish brown dots at least in posterior part of the fin in

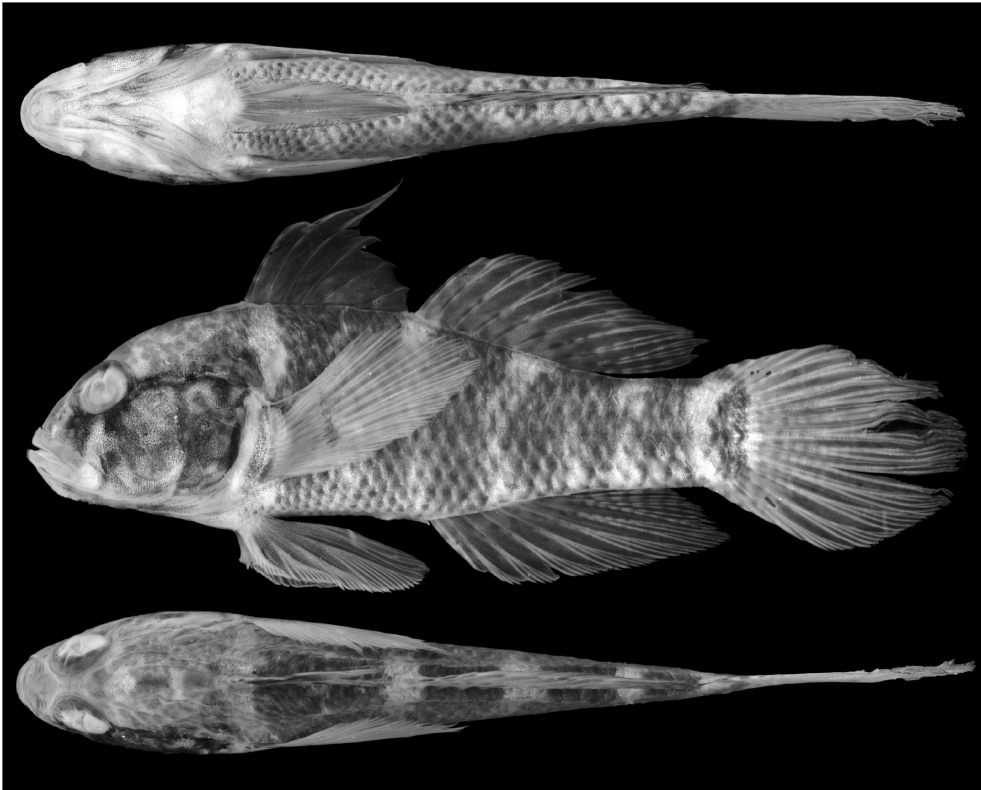


Fig. 4. Ventral (top), lateral (middle) and dorsal (bottom) views of alcohol-preserved specimen of *Dotsugobius bleekeri*, OMNH-P 33386, male, 34.0 mm SL, Iriomote-jima Island, Yaeyama Group of Ryukyu Islands, Japan. Photography and image editing by K. Shibukawa.

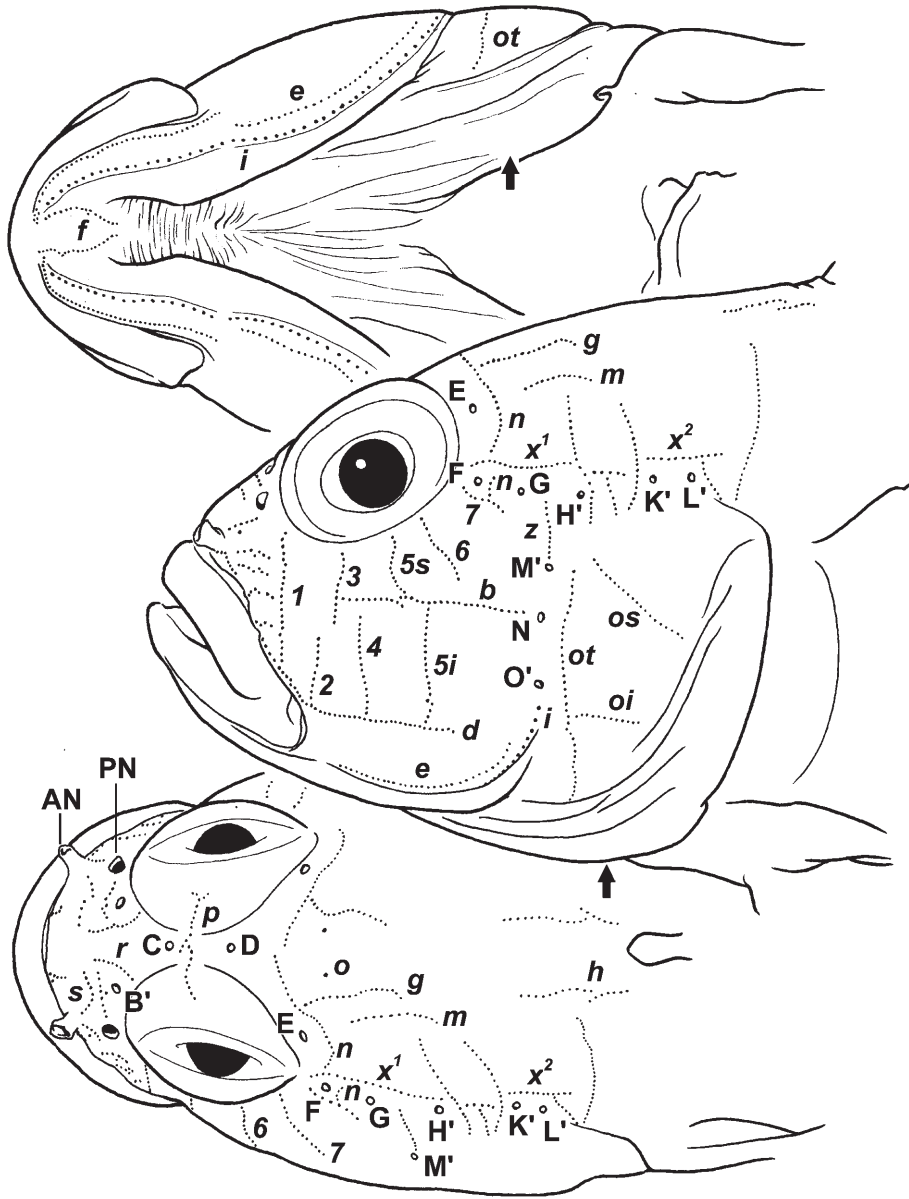


Fig. 5. Ventral (top), lateral (middle) and dorsal (bottom) views of head of *Dotsugobius bleekeri* (OMNH-P 32152, male, 32.1 mm SL), showing cephalic sensory canal pores (indicated by Roman uppercase letters, except for AN and PN) and papillae (indicated by Roman lowercase letters). AN and PN, anterior and posterior nares, respectively. Arrows show position where gill membrane attached to isthmus. Drawing by K. Shibukawa.

adults; caudal fin pale brown, with numerous blackish brown dots on rays at least in adults; pectoral fin pale brown, usually with two indistinct blackish brown spots basally; pelvic fin dark or blackish brown; basal half or more of

pelvic frenum blackish; genital papilla blackish brown with paler tip. In some specimens, paler markings (e.g., bands on head and body) much reduced, forming entirely dark brown appearance.

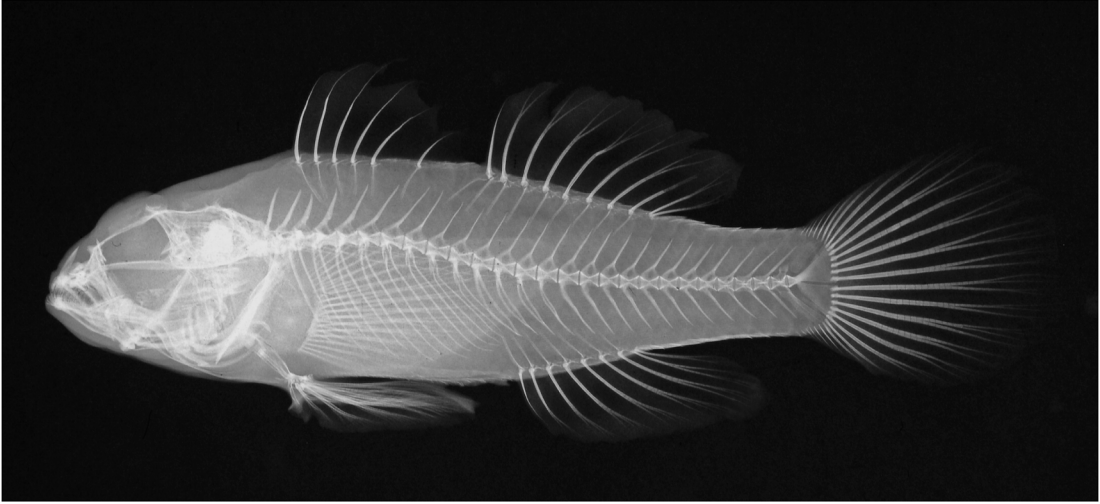


Fig. 6. Left lateral view of a radiograph of *Dotsugobius bleekeri* (OMNH-P 32153, male, 29.8 mm SL).

*Osteology* (Fig. 6). Frontals not fused medially; frontal crest well developed, high; frontals narrow at interorbital region, as wide as parasphenoid at interorbital region; anterior margin of post-ocular part of frontal with bony-canal structure, supporting oculoscapular canal (between pores D and F); dorso-lateral margin of sphenotic and pterotic with longitudinal bony trough-like structure, supporting oculoscapular canal (between pores F and H); no spinous posterior projecting process on epioccipital; interorbital part of mesethmoid cartilaginous; anterior margin of mesethmoid deeply emarginate; median ethmoid cartilage oblong, encircled by vomer (anteriorly) and methethmoid (posteriorly); anterior margin of vomer nearly pointed; no vomerine teeth; subtemporal fossa (Birdsong, 1975) well developed, large, encircled by prootic anteromedially, pterotic laterally, basioccipital posteromedially, and intercalar posteriorly; Baudelot's ligament connects anteriorly to basioccipital. Nasal very small, thin and near ovoid, not stained by alizaline red; lacrymal elongate pear-shape, thin, almost entirely stained by alizarin red. Rostral cartilage well developed, large, attached anteriorly to ascending process of premaxilla; ascending process of premaxilla high (higher than articular process), well differenti-

ated from articular process; postmaxillary process of premaxilla well developed; palatine edentate, T-shaped (namely, ethmoid process moderately developed), well separated from quadrate; ectopterygoid moderately long, extending dorsally to about three-fourths of palatine shaft and ventrally to dorsoanterior edge of quadrate; mesopterygoid absent; metapterygoid broad, with greatly developed dorsal lamina; dorsal lamina of metapterygoid a little overlapping quadrate, but well separated from ectopterygoid; symplectic process of premaxilla well developed, elongate, nearly contact with symplectic dorsoanteriorly; no spinous projections along posterior margin of preopercle; bony canal support developed along posterior margin of preopercle. Basihyal spatulate anteriorly, with weakly emarginate anterior margin of anterior cartilaginous part; five branchiostegal rays, comprising four and one rays in contact with anterior and posterior ceratohyals, respectively; no transverse bony shelf developed along ventral margin of urohyal. Infrapharyngobranchial 1 absent; interarcual cartilage moderately large, nearly oviform, contact with dorsoposterior arm of first epibranchial and infrapharyngobranchial 2 via very short ligament; ossified gill rakers on outer surface of first arch relatively short and flap-like, with no acces-

sory spines; inner surface of first gill arch and both inner and outer surfaces of second to fourth gill arches with stout, very short, dorsally spinulose ossified gill rakers. Four pectoral radials; scapula cartilaginous ossified dorsally, cartilaginous ventrally; scapula reduced in size, thus, uppermost pectoral radial attached to cleithrum; dorsal postcleithrum absent; short thread-like ventral postcleithrum present. Pelvis articulating with cleithrum via well-developed pelvic intercleithral cartilage; postpelvic process (Akihito and Meguro, 1981) moderately developed. Vertebrae  $10 + 17 = 27$ ; height of all but posteriormost neural spines much greater than horizontal length of respective centra; posteriormost neural spine (on sixteenth caudal vertebra) blade-like, height subequal or shorter than horizontal length of respective centra; haemal arches of anterior four caudal vertebrae large, height of arches much greater than length of haemal spine of respective vertebra; pleurals on third to tenth precaudal vertebrae; epineurals on all precaudal vertebrae and anteriormost two caudal vertebrae; all epineurals not fused with pleurals; anterior dorsal prezygapophysis not developed, except for second to fifth precaudal vertebrae with blunt, anteriorly directed projections; P-V 3/II II I I 0/9; proximal radial of anteriormost pterygiophore of first dorsal fin inclined anteriorly, with large triangular anterior lamella (hanging over neural spines of anteriormost three vertebrae); anterior two pterygiophores of second dorsal fin lacking middle radials; two anal-fin pterygiophores anterior to first haemal spine; single epurals; hypurals  $3 + 4$  fused to urostyle, articulating with hypurals  $1 + 2$ ; parhypural moderately developed, pointed medially; dorsal and ventral procurrent cartilages relatively small, not reaching anteriorly to tips of neural and haemal spines of third pleural centrum (PU3), respectively.

*Sexual dimorphism.* Urogenital papilla long, slender and pointed in males, broad triangular or rectangular (usually with bifurcate tip) in females. Sex of small specimens less than ca. 13 mm SL difficult to determine externally.

*Distribution and habitat.* *Dotsugobius bleekeri*

has been recorded from scattered localities of the tropical/subtropical Western Pacific and Eastern Indian Ocean, including Ryukyu Islands of Japan (Senou *et al.*, 2004, as Gobiidae, indet. gen. and sp. 3; this study), South China Sea (Larson in Randall and Lim, 2000, as *Lophogobius bleekeri*), Solomon Islands (Herre, 1935, as *Ctenogobius aterrimus*; Munro, 1967, as *C. aterrimus*; Blaber *et al.*, 1991, as *L. bleekeri*; this study), Papua New Guinea (this study), northeastern Australia (Hoese and Larson, 2006, as *L. bleekeri*; this study), peninsular Malaysia (Ng *et al.*, 1999, as *L. bleekeri*), Andaman Sea of Thailand (Satapoomin, 2011, as *L. bleekeri*) and Myanmar (this study). Jiro Sakaue (Southern Marine Laboratory, Koror) kindly showed us a photograph of *D. bleekeri* from Palau. According to Larson *et al.* (2008: 148), record of *L. bleekeri* from Singapore by Lim and Larson (1994: 259) was actually based on *Drombus triangularis* (Weber, 1909).

In the Ryukyu Islands, *Dotsugobius bleekeri* is found around the tidal estuaries and intertidal zone at or near the boundary between freshwater and brackish water areas of small insular streams with gravel bottoms and boulders. The species is usually seen perched on large boulders, and nimbly skates on the surface of the boulders when disturbed (like estuarine blennies, *e.g.*, *Omx biporos*).

*Remarks.* The morphology of Japanese specimens agrees well with other examined specimens from Indonesia (including the holotype, SMF 6584), Solomon Islands, Australia, and Myanmar. The holotype appears to differ from the other specimens in having I, 5 anal-fin rays [vs. I, 6–7 (usually I, 7) in the others], but, owing to its correspondence of the other morphological aspects, we regard the condition as intraspecific variation or possibly abnormal condition; in the original description, Popta (1921) gave the number as “A. 7.” Examination of anal-fin pterygiophores of the holotype based on radiographs is needed for confirmation of its status, although we were unable to do this. The other possible Popta’s specimen (RMNH 10664) has I, 7 anal-fin rays.

Eschmeyer (2014) treated *Ctenogobius aterrimus* Herre, 1935 as a junior synonym of *Lophogobius bleekeri* (= *Dotsugobius bleekeri*), following the personal data of D. F. Hoese (Australian Museum, Sydney) and H. K. Larson (Museums and Art Galleries of the Northern Territory, Darwin), and Kottelat (2013) accepted this synonymy. We concur with their decision. Judging from the original description (Herre, 1935) and drawing of the holotype (Herre, 1936, 364, fig. 24; Fig. 1C), any salient differences are not recognized between the holotype of *C. aterrimus* and the specimens of *L. bleekeri*, except for the coloration; the coloration of holotype of *C. aterrimus* is "black over the entire body and fins except the caudal, which is cross barred by rows of paler spots" (Herre, 1935, 423). Similar blackened specimen was reported as *L. bleekeri* from peninsular Malaysia by Ng *et al.* (1999, 181, figs. 7, 16). Ng *et al.* (1999) provided a black-and-white photograph of preserved specimen, and noted, "The fish is uniformly bluish-black with a broad white distal margin on its soft dorsal fin." Actually, in the specimens examined here, we confirmed a great variation of coloration; many specimens have a more or less distinct banded pattern on body, but others have a largely blackish brown head and body with quite an indistinct banded pattern.

Although the holotype of *Lophogobius bleekeri* is housed in the Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main (SMF 6584, Fig. 1A), the other specimen labeled "type" is in Leiden. It is a single specimen, deposited at the Naturalis Biodiversity Center, Leiden, with a bottle label "*Lophogobius bleekeri* Popta type" (RMNH 10664, Fig. 1B). In this bottle, there is an additional label, noted "Senckenberg. Museum, Frankfurt...Sunda-Exped. des Frankf. Vereins für Geographie 1909" and "Dr. J. Elbert, S." As noted in the "Introduction" above, this specimen is not actually the type of *L. bleekeri*. However, judging from these labels, this specimen may be brought together with the holotype in the SMF. We could not detect the reason why the specimen was labeled "type".

## Discussion

Prior to this paper, *Dotsugobius bleekeri* was the only neglected nominal species of *Lophogobius* from the Western Pacific. Although the Popta's (1921) assignment of this species to *Lophogobius* was doubted more than 60 years ago (Koumans, 1953), no attempts to clarify the taxonomic status were done by subsequent researchers.

In the present study, any particular morphological characters for suggesting a close relationship between the Indo-West Pacific *Dotsugobius* and the American *Lophogobius* are not detected. *Dotsugobius bleekeri* has a deep and compressed head and body like the species of *Lophogobius* indeed, but similar body shape, as well as some other common characters including fin-ray counts and scalation, is not peculiar to these gobies within the Gobiinae. On the contrary, in addition to the absence of nuchal crest, several salient differences are found between *Lophogobius* and *Dotsugobius*, such as vertebral counts and configuration of sensory-papillae rows on head (see "Comparison" above). We thus consider that it is better to remove *D. bleekeri* as a species of *Lophogobius*. Although a few gobioid genera containing species found in both the tropical western Atlantic and Indo-Pacific regions are known (Randall, 1995), *Lophogobius* is no longer one of these examples.

Interrelationships between *Dotsugobius* and the other gobiine genera are unresolved. Possible candidates for representing sister-group relationships with *Dotsugobius* are *Gorogobius* (known from eastern Atlantic) and *Millerigobius* (Mediterranean Sea), both of which also include species bearing sensory-papillae row *p* over oculoscapular canal between pores C and D; as mentioned above, this character is known only from three species in these genera within the Gobiinae. *Dotsugobius*, *Gorogobius* and *Millerigobius* share a distinct transverse pattern of sensory papillae rows on cheek, usually 3/II II I I 0/9 P-V pattern and 27 (27 or 28 in *Millerigobius*) vertebrae, although these characters



are also found in the other several gobiine genera. *Dotsugobius* and *Millerigobius* are each monotypic, whereas *Gorogobius* comprises two species. Of the two species of *Gorogobius*, *G. stevcici* has sensory-papillae row *p* (like species of *Dotsugobius* and *Millerigobius*), but *G. nigrincinctus* (Delais, 1951), the type species of the genus, lacks this row (Miller, 1978; Kovačić and Schliewen, 2008). Furthermore, *G. nigrincinctus* differs from *G. stevcici* in having  $10 + 17 = 27$  vertebrae (vs.  $11 + 16 = 27$  in *G. stevcici*) (Birdsong *et al.*, 1988; Kovačić and Schliewen, 2008); the axial skeletal features in *G. stevcici* and *G. nigrincinctus* are typical for the genera assigned to the “Gobius Group” and “Bathygobius Group” of Birdsong *et al.* (1988), respectively, although recent molecular analyses (e.g., Thacker and Roje 2011; Agorreta *et al.* 2013) suggested that these two phenetically grouped assemblages are non-monophyletic. In the original description, Kovačić and Schliewen (2008) compared *Gorogobius stevcici* with several Atlantic-Mediterranean gobies, and, judging from the robust squamation on head and nape, and extensive anterior dorsal rows along the oculoscapular groove and behind the eye (= sensory-papillae row *n*), they tentatively placed it in *Gorogobius* rather than the other “similar” genera that they listed, *viz.*, *Chromogobius* de Buen, 1930, *Corcyrogobius* Miller, 1972, *Didogobius* Miller, 1966, *Gammogobius* Bath, 1971, *Millerigobius*, *Odondebuenia* de Buen, 1930 and *Vanneaugobius* Brownell, 1978. Although the head is not scaled, a similar modification of row *n*, extending ventrally beyond a horizontal line through pore F, is also found in *Dotsugobius*; the row *n* of *Dotsugobius* differs from that of *Gorogobius* in being divided into two parts by the anterior part of longitudinal row *x*<sup>l</sup> (Fig. 5). According to Kovačić and Schliewen (2008), they avoided “generic oversplitting for reasons related to the limited state of knowledge on the taxonomy of West African Gobiidae”, since substantial inconsistencies with the present generic classification was suggested in the Atlantic-Mediterranean gobiids by their preliminary analysis

on mitochondrial and nuclear DNA. Subsequent Agorreta *et al.*'s (2013) paper on molecular phylogeny of gobioid fishes indicated that *Gorogobius nigrincinctus* and *Millerigobius macrocephalus* were included in a clade named “Gobius lineage”, although these two species represented non-sister relationships. In their analysis, *Gorogobius stevcici* and *Dotsugobius bleekeri* were not studied. Comprehensive taxon sampling in future molecular analysis, including *G. stevcici* and *D. bleekeri*, will bring informative source for establishing a stable classification of these ambiguous gobies, as well as our better understanding on the significance of the configuration of sensory-papillae rows (particularly the row *p*) for gobiine phylogeny. Innervation and homology assessment of the row *p* in *D. bleekeri*, *G. stevcici* and *M. macrocephalus* seems to be also crucial.

*Comparative materials.* *Lophogobius cyprioides*: NSMT-P 115700, 1 specimen, 39.5 mm SL, collecting data unknown; NSMT-P 115701, 1 specimen (stained with alizarin red and partially dissected), 42.0 mm SL, collecting data unknown.

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