A redescription of *Stiphodon pulchellus* (Herre, 1927) (Gobiidae: Sicydiinae)

by

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ABSTRACT. - *Stiphodon pulchellus* (Herre, 1927) is redescribed based on 29 specimens collected in the Philippines. In addition, a neotype is designated using a specimen collected by Herre near the type locality (Dumaguete, Negros Oriental) and identified by him. *Stiphodon olivaceus* Watson & Kottelat, 1995 is considered to be a junior synonym of *S. pulchellus*. Despite being strikingly similar to *Stiphodon imperiorientis*, *S. pulchellus* can be distinguished by the size, number, and arrangement of black spots on pectoral-fin rays.

RÉSUMÉ. - Redescription de *Stiphodon pulchellus* (Herre, 1927) (Gobiidae : Sicydiinae).

Stiphodon pulchellus (Herre, 1927) est redécrit à partir de 29 spécimens collectés aux Philippines. Un néotype est désigné à partir d'un spécimen collecté et identifié par Herre à proximité de la localité type (Dumaguete, Negros oriental). *Stiphodon olivaceus* Watson & Kottelat, 1995 est considéré comme synonyme junior de *Stiphodon pulchellus*. Bien que proche de *Stiphodon imperiorientis, Stiphodon pulchellus* peut être distingué par le nombre, la taille et la disposition des tâches noires sur les nageoires pectorales.

Key words. - *Stiphodon pulchellus* - *Stiphodon olivaceus* - *Stiphodon imperiorientis* - Redescription - Neotype - Philippines.

Herre (1927) described three new species of goby belonging to the genus *Microsicydium* Bleeker, 1874 based on specimens collected in the Philippines: *M. atropurpureum*, *M. formosum* and *M. pulchellum*. However, these three species in fact belong to the genus *Stiphodon* Weber, 1895 (Herre, 1934), and *Microsicydium* is currently treated as a junior synonym of *Sicyopterus* Gill, 1860 (Koumans, 1953). Among the three species, *Stiphodon atropurpureus* (Herre, 1927) was redescribed by Watson and Kottelat (1995), who proposed that *Microsicydium formosum* Herre, 1927 was placed in synonymy with *S. atropurpureus*. The remaining species, *Microsicydium pulchellum* Herre, 1927 (= *Stiphodon pulchellus*) has not yet been redescribed and the original description was insufficient for comparisons to other *Stiphodon* species.

The taxonomy of the genus *Stiphodon* has progressed considerably and 24 new species have been described in the last 20 years. Nonetheless, no studies have referred to *S. pulchellus* and, with the exception of *Stiphodon surrufus* Watson & Kottelat, 1995 from the Philippines, which is a separate species, no species has been compared with *S. pulchellus*. Indeed, a comprehensive understanding of the genus has not yet been obtained and several undescribed species are known to exist. Thus, a redescription of *S. pulchellus* is considered warranted in order to clarify the taxonomy of this genus. Unfortunately, since the type specimens of *S. pulchellus* were destroyed along with the Philippine Bureau of Science during fighting in World War II (Watson and Kottelat, 1995), evaluations and comparisons of this material are impossible. We therefore examined *Stiphodon* specimens that were collected near the type locality of *M. pulchellum* (Dumaguete, Negros Oriental, Philippines) and identified as *S. pulchellum* by Herre (1934), and which are currently maintained at the California Academy of Sciences, USA. Although the deposited specimens consisted of two species, the morphology of one of the two species corresponded with that of the original *M. pulchellum* description in Herre (1927). In the present study, we designated a neotype of *S. pulchellus* (Herre, 1927) using these specimens and redescribed it in conjunction with the other specimens of this species collected in the Philippines.

MATERIAL AND METHODS

All measurements and counts were taken from the right side, unless the right side was damaged or faded. Measurements were made point-to-point with a dial calliper or a

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divider under a stereomicroscope to the nearest 0.1 mm and expressed as a percentage of standard length (SL). The measurements and counts followed Nakabo (2002), with the following modifications: SL, head length, snout length, and predorsal length were measured to the anterior point of the protruding snout; body depths were measured at the pelvic and also at the anal-fin origins; length of caudal peduncle was measured from the posterior end of the second dorsal- and also from anal-fin bases to the midpoint of the caudal-fin base; first and second dorsal- and anal-fin lengths were measured from the origin of each fin to the farthermost point when the fin was depressed; interval between the first and second dorsal-fin bases was measured from the posterior end of the first dorsal-fin base to the second dorsal-fin origin; preanal length was measured from the snout tip to the anal-fin origin; anus to anal-fin length was measured from the centre of the anus to the anal-fin origin; scales in longitudinal row were counted from the middle of the posterior end of the hypurals to behind the pectoral-fin base (this did not include the scales above the pectoral-fin base, because they did not form a row with the scales on the lateral midline of the trunk and tail, of which the anterior end was behind the pectoral-fin base); scales in transverse series back were counted along a diagonal line extending posteriorly and ventrally from the first scale anterior to the second dorsal fin, including one scale on the dorsal midline and another small scale at the anal-fin base; scales in transverse series forward were counted along a diagonal line extending anteriorly and ventrally from the first scale anterior to the second dorsal fin to the centre of the belly, and including a scale on the dorsal midline; scales in transverse series in the caudal peduncle were counted along a vertical line around the narrowest point of the caudal peduncle in a zigzag manner, and included scales on the dorsal and ventral midlines. Teeth counts of the upper and lower jaws were taken from the right of the symphysis, with terms used in dentition following Watson (2008). Vertebrae were counted from radiographs. Abbreviations pertaining to the cephalic sensory pore system followed Akihito *et al*. in Nakabo (2002). Abbreviations used to represent collections and institutions cited follow Leviton *et al*. (1985), except BLIH (Biological Laboratory, Imperial Household, Tokyo, Japan), ZRC (Raffles Museum of Biodiversity Research, National University of Singapore), and CMK (collection of M. Kottelat, Cornol, Switzerland).

Comparative material

Measurements in brackets are shown in SL (mm).

Stiphodon imperiorientis Watson & Chen, 1998: NSMT-P 48063 (holotype), male (48.5), BLIH 19860400 (paratype), male (44.1); Iriomote Island, Japan; 2 Sept. 1986. BLIH 19810202 (paratype), male (43.0); Iriomote Island; 10 Jul. 1981. BLIH 19950002, 19950028 (paratypes), 2 males (37.9, 43.5); Iriomote Island; 4 Nov. 1995. OMNH-P 35471, male (48.2); Iriomote Island; 28 Jul. 1997. OMNH-P 35472, male (39.5); Iriomote Island; 8 Aug. 2000. OMNH-P 34657, male (32.0); Okinawa Island, Japan; 29 Jul. 2008. OMNH-P 34937, male (29.3); Okinawa Island; 15 Nov. 2008. URM-P 3205, 3206 (paratypes), 2 males (41.8, 47.5); Iriomote Island; 4 Jun. 1982. URM-P 4823-4825 (paratypes), 2 males (50.9, 50.9), female (52.0); Iriomote Island; 13 Sept. 1982. URM-P 32169-32171, 2 males (45.2-49.7), female (47.3); Iriomote Island; 29-30 Jul. 1994. URM-P 36457, male (39.4); Iriomote Island; 20 Aug. 1996. URM-P 46079, male (30.6); Okinawa Island; 27 Oct. 2006.

Stiphodon atropurpureus (Herre, 1927): ZRC 38392 (neotype), male (33.1); Leyte, Philippines; 29 Jun. 1993. URM-P 46058, 46059, male (33.6), female (42.2); Okinawa Island, Japan; 13 Dec. 2006. URM-P 45067-45070, 45075-45080, 4 males (32.4-37.5), 6 females (21.8-37.9); Cebu, Philippines; 28 Aug. 2007. URM-P 46060-46063, 2 males (24.3, 24.5), 2 females (32.3, 36.0); Okinawa Island; 10 Nov. 2008. URM-P 46064, 46065, male (30.2), female (36.0); Okinawa Island; 29 Nov. 2009. ZRC 46555, female (47.0); Pulau Tioman, Malaysia; 18 Jul. 2001.

***Stiphodon pulchellus* (Herre, 1927)**

(Tabs I-II, Figs 1-6)

Microsicydium pulchellum Herre, 1927: 299 (type locality: Dumaguete, Negros Oriental, Philippines).

Stiphodon pulchellum (Herre, 1927): Herre, 1934: 92 (34 specimens collected in creeks near Dumaguete, but in fact including at least two species).

Stiphodon olivaceus Watson & Kottelat, 1995: 8 (type locality: Leyte, Philippines).

Material examined

29 specimens collected from the Philippines, totalling 16 males, 13 females, size range of 23.2-59.9 mm SL, largest male 59.9 mm SL, largest female 55.2 mm SL.

Neotype. - CAS-SU 26360, male (50.5); Tanjay River, near Dumaguete, Negros Oriental; 15 Jun. 1931; A.W.C.T. Herre coll. The Neotype is designated under conditions specified in the ICZN article 75.3 (ICZN, 1999).

Additional materials. - CAS-SU 26359, 6 males (45.5-59.9), 3 females (49.6-54.2); Karing Malam River, Culion; 19 Apr. 1931; Herre coll. CAS-SU 26362, female (55.2); Baldat, Culion; 28 Apr. 1931; Herre coll. CAS-SU 69898, male (57.5); same data as neotype. CAS-SU 69760, male (34.6), female (48.2); two localities (Pamplona Plantation near Tanjay; Polo Plantation in Dumaguete), Negros Oriental; 15 Jun. 1931; Herre coll. CAS-SU 38618, male (37.7), 2 females (42.9, 50.6); Wayan Creek, Busuanga; 21 Jun. 1940; Herre coll. CAS-SU 38622, male (48.0); San Nicolas Creek, Busuanga; 24 Jun. 1940; Herre coll. CMK 9986 (paratypes of *Stiphodon olivaceus* Watson & Kottelat, 1995), 2 males (36.0, 42.7), 4 females (23.2-45.3); Hilosig Creek, Leyte; 9

Table I. - Morphometric measurements of *Stiphodon pulchellus* and *S. imperiorientis* expressed as a percentage of standard length. D_1: first dorsal fin; D_2: second dorsal fin; A: anal fin; C: caudal fin; P_1: pectoral fin; P_2: pelvic fin.

	S. pulchellus			*S. imperiorientis*	
	neotype	non-types			
Sex	male	male	female	male	female
Number of specimens measured	1	15	13	17	2
Standard length (mm)	50.5	34.6-59.9	23.2-55.2	29.3-50.9	47.3-52.0
Head length	22.2	20.7-24.0	21.2-25.0	21.3-24.4	22.6-22.7
Snout length	7.9	6.4-9.4	6.6-8.2	7.2-9.3	8.8-9.5
Eye diameter	4.8	4.6-5.6	4.4-6.5	4.1-5.8	4.4-4.7
Postorbital length of head	11.1	10.1-11.9	10.5-12.1	10.2-12.2	9.9-10.4
Upper jaw length	9.1	7.8-9.2	7.3-8.6	7.8-10.0	8.7-9.1
Body depth at P_2 origin	14.3	11.3-15.0	11.8-15.4	12.9-17.2	14.2-14.4
Body depth at A origin	17.4	13.0-16.5	12.2-17.8	15.2-17.8	17.5-17.7
Depth at caudal peduncle	12.5	10.7-12.7	10.7-13.1	11.3-13.1	12.7-12.9
Length of caudal peduncle from A base	19.4	19.1-20.5	17.7-20.7	16.9-20.3	19.2-21.4
Length of caudal peduncle from D_2 base	21.4	20.5-23.7	18.7-22.4	20.1-22.0	21.0-22.2
Predorsal length	32.5	31.1-33.7	33.0-35.5	30.8-36.3	33.1-34.0
Length of D_1 base	19.8	17.3-21.3	18.0-21.4	15.8-22.6	17.5-20.6
D_1 length	31.3	21.4-38.4	16.4-23.4	21.2-30.2	19.7-20.0
Length of longest spine of D_1	23.4	15.8-31.5	12.5-17.5	15.4-23.2	13.7-15.9
Interval between D_1 and D_2 bases	2.6	0.0-4.5	2.7-6.7	1.4-5.7	3.8-4.0
Length of D_2 base	26.9	23.6-29.0	22.4-26.0	24.6-28.7	23.0-24.6
D_2 length	51.9	35.3-47.0	29.3-35.5	37.3-46.7	31.0-31.9
Length of longest ray of D_2	26.7	13.6-21.0	12.4-15.4	15.0-22.7	12.3-13.3
Preanal length	52.3	50.9-55.5	53.4-60.0	52.3-55.6	57.3-59.2
Length of A base	29.3	26.9-30.8	23.4-27.5	27.1-29.9	23.7-25.6
A length	46.9	38.1-45.4	32.4-36.4	37.0-45.2	32.9-33.4
Length of longest ray of A	18.4	11.9-17.8	11.0-12.7	13.4-18.9	11.5-12.3
Anus to A length	4.0	3.8-5.1	2.8-6.3	3.1-4.8	4.6-4.7
Length of longest ray of P_1	19.6	18.9-22.3	17.4-21.6	20.6-23.6	20.9-21.5
Length of longest ray of C	26.7	23.1-28.8	21.3-24.7	23.3-28.6	22.2-24.4
P_2 length	15.4	12.5-16.4	13.5-16.2	12.6-15.9	12.3-14.6

Jul. 1993; M. Kottelat & J. Margraf coll. NSMT-P 45093, male (51.2); Iwahig River, Palawan; 13 Nov. 1988; K. Matsuura coll. ZRC 38396 (holotype of *S. olivaceus*), male (50.2), ZRC 38397 (paratypes of *S. olivaceus*), male (49.8), 2 females (24.7, 53.5); Hilosig Creek, Leyte; 6 Jul. 1993; M. Kottelat coll.

Diagnosis

Dorsal fins, usually VI-I, 9. Larger male having pointed first dorsal fin with elongate spines 4 and 5, posterior tip of the fin usually extending to base of soft-rays 2-5 of second dorsal fin. Pectoral-fin rays 14-16 (mode 15). Premaxillary teeth 32-56. Dentary with 29-61 horizontal teeth. Male with nine blackish obscure transverse bars laterally on tail. Clear black spots distributed over almost entire rays of male pectoral fin, number of spots on the longest ray 5-10. Female having two black, straight and simple longitudinal bands laterally on body. Female often with 1-4 black spots on second dorsal-fin rays, 2-5 black transverse bars on central part of caudal fin, and 1-7 black spots on pectoral-fin rays.

Description

Morphometric measurements are given in table I. Body elongate, cylindrical anteriorly and somewhat compressed posteriorly. Head somewhat depressed with a round snout protruding beyond upper lip. Anterior nostril short tubular, posterior nostril not tubular. Mouth inferior with upper jaw projecting beyond lower jaw. Upper lip thick with small, medial cleft and crenulated with tiny fimbriate projections. Premaxillary teeth 32-56, fine and tricuspid. Dentary with recurved conical to canine-like symphyseal teeth, number of teeth usually 3-5 (ranging 1-8) in males, usually none in females (2 in a case with teeth); dentary with a row of unicuspid horizontal teeth enclosed in a fleshy sheath, number

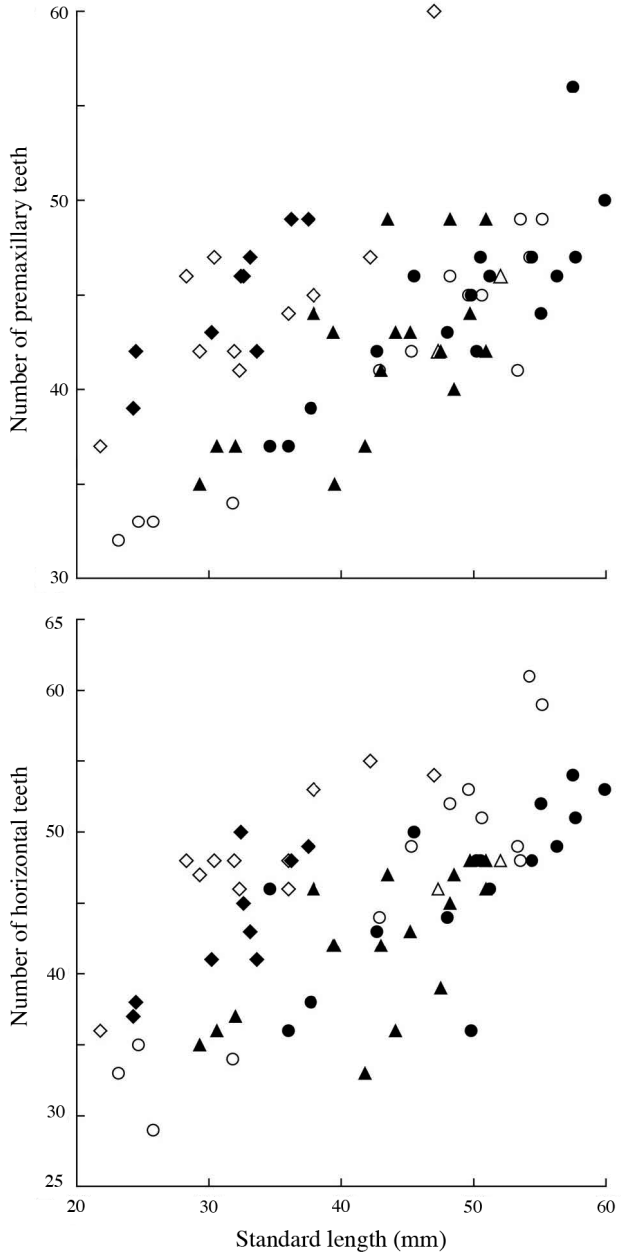

Figure 1. - Number of premaxillary and horizontal dentary teeth of *Stiphodon pulchellus* (circles), *S. imperiorientis* (triangles), and *S. atropurpureus* (squares). Solid and open symbols represent males and females, respectively.

of teeth (29-61) similar or slightly more numerous than premaxillary teeth. Larger fish having more premaxillary and horizontal teeth (Fig. 1).

Dorsal fins VI-I, 8 (n = 1), VI-I, 9 (n = 25), VI-I, 10 (n = 2), VII- 9 (n = 1), in female, first dorsal fin almost semicircular and spine 3 longest; in male, first dorsal fin forming parallelogram or triangular with spines 4 and 5 elongate but not filamentous. Most posterior point of first dorsal fin in male extending to base of soft-rays 2-5 of second dorsal fin

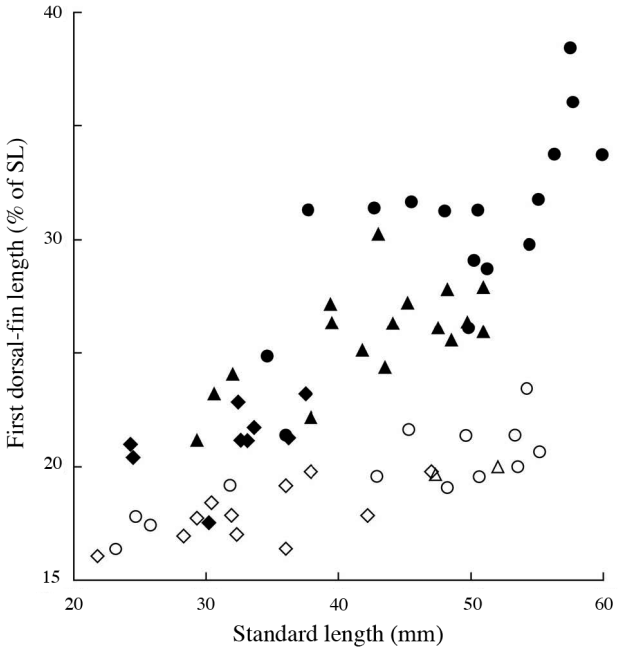

Figure 2. - First dorsal-fin length (% of standard length) of *Stiphodon pulchellus* (circles), *S. imperiorientis* (triangles), and *S. atropurpureus* (squares). Solid and open symbols represent males and females, respectively.

when depressed, except in three males (34.6, 36.0, 49.8 mm SL) having a shorter first dorsal fin extending to base of spine or soft-ray 1 of second dorsal fin; first dorsal-fin length of male 21.4-38.4% of SL (Fig. 2). Anal fin I, 9 (n = 1), I, 10 (n = 28), below second dorsal fin. In female, anterior rays (usually soft-ray 1 or 2 in second dorsal fin, soft-ray 2 or 3 in anal fin) longest in second dorsal and anal fins; in male, most posterior two rays usually longer than anterior rays. Caudal fin with 12 (n = 1), 13 (n = 17), 14 (n = 7), 15 (n = 1) branched rays (three specimens not countable due to broken tips) within 16 (n = 1), 17 (n = 28) segmented rays, posterior margin rounded or somewhat truncated, male with somewhat larger fin than female. Pectoral fin with 14-16 rays (Tab. II), male with somewhat larger fin than female. Pelvic fin I, 5, paired fins joined together to form a strong cup-like disk with fleshy frenum. Number of vertebrae 10+16 (n = 18).

Scales in longitudinal row 30-34 (Tab. II); scales in transverse series back 10-11 (Tab. II); scales in transverse series forward 13-17 (Tab. II); scales in transverse series in the caudal peduncle 9 (n = 29). Predorsal scales 7-16 (Tab. II). Ctenoid scales covering lateral sides of trunk and almost entire tail. Cycloid scales dorsally on trunk and head, posterior to pectoral-fin base, on belly between middle of pelvic fin to origin of anal fin, along second dorsal- and anal-fin base, along dorsal and ventral midline in caudal peduncle (often with ctenoid scales), and caudal-fin base. Pectoral-fin base naked.

Urogenital papilla in male rectangular or somewhat rounded with two small projections at both sides of tip, often some tiny projections between the two projections; females similar but tip projections more pronounced and posterior edge almost smooth.

Cephalic sensory pore system always A, B, C, D, F, H, K, L, N, and O; pore D singular, all others paired (Fig. 3). Oculoscapular canal separated into anterior and posterior canals between pores H and K. Cutaneous sensory papillae developed over lateral and dorsal surface of head (Fig. 3).

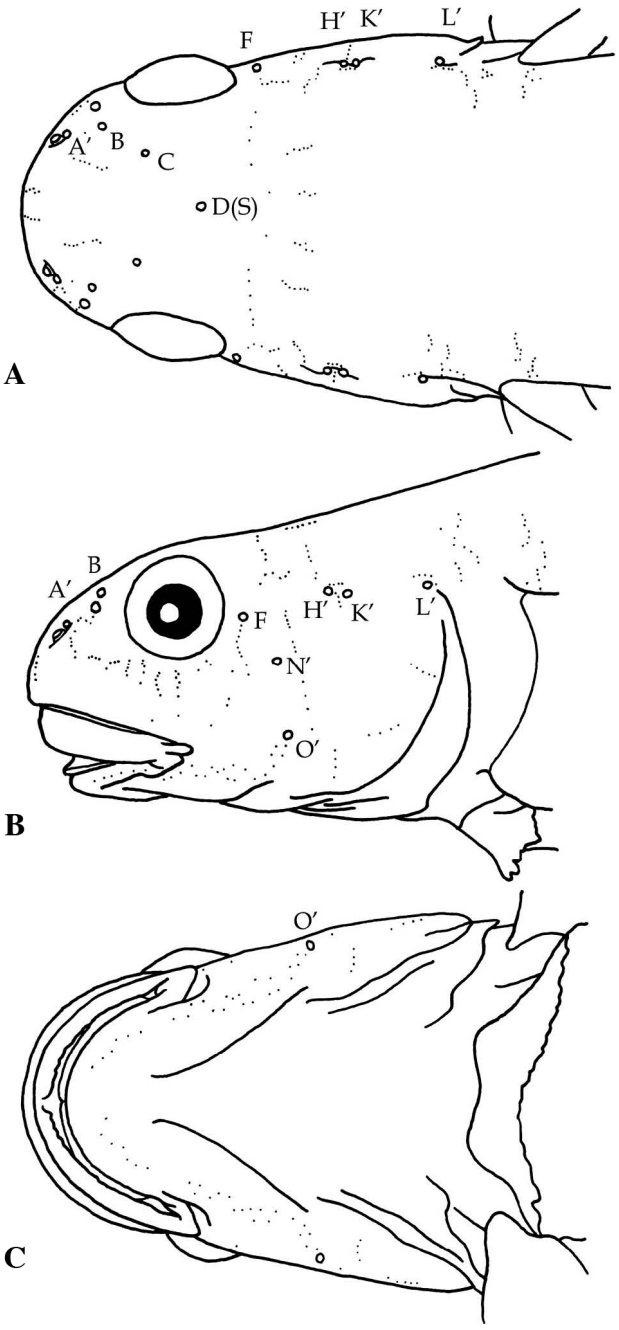

Figure 3. - Diagrammatic illustration of head showing arrangement of the cephalic sensory pores and cutaneous sensory papillae in *Stiphodon pulchellus* (CAS-SU 26360), neotype; **A**: dorsal view; **B**: lateral view; **C**: ventral view.

Table II. - Meristic counts of *Stiphodon pulchellus*, *S. imperiorientis*, and *S. atropurpureus*.

	Second dorsal-fin ray		
	8	9	10
S. pulchellus	1	26	2
S. imperiorientis		18	1
S. atropurpureus		20	

	Pectoral-fin ray		
	14	15	16
S. pulchellus	2	19	8
S. imperiorientis		15	4
S. atropurpureus	1	16	3

	Scales in longitudinal row					
	29	30	31	32	33	34
S. pulchellus		4	8	7	8	2
S. imperiorientis		3	9	4	2	1
S. atropurpureus	5	9	6			

	Scales in transverse series back			
	9	10	11	12
S. pulchellus		1	28	
S. imperiorientis	1	4	13	1
S. atropurpureus		5	15	

	Scales in transverse series forward				
	13	14	15	16	17
S. pulchellus	1	6	9	10	1
S. imperiorientis		5	6	4	1
S. atropurpureus	1	10	8		

	Predorsal scales													
	3	4	5	6	7	8	9	10	11	12	13	14	15	16
S. pulchellus					2	1	4	4	4	5	2	2	3	1
S. imperiorientis			1		1	3	3	1	2	4	3	1		
S. atropurpureus	1			4	2	5	2	2	1	1		1		1

Colour in preservation

Sexual dichromatism well developed.

Males (Fig. 4A-C). - Background of body and head pale brown, but often dusky dorsally and laterally; caudal peduncle sometimes with an obscure pale brown patch laterally; tail with 9 obscure blackish transverse bars laterally; blackish longitudinal band sometimes from behind eye extending dorsolaterally to base of upper procurrent caudal-fin rays; dorsum often dusky with 1, 3, and 5 pale brown blotches on head, trunk, and tail, respectively; snout, infraorbital and opercular regions, upper lip, middle and upper part of pectoral-fin base blackish. First dorsal-fin membranes dusky, first spine with 3-6 black spots, other spines usually entirely blackish without spot, but sometimes with 2-5 faint black spots. Second dorsal-fin spine and soft-rays with 2-5 black spots with whitish spots between each black spot; membranes dusky, whitish spots on spine and soft-rays extending to membranes around the spots; distal margin of fin faintly translucent. Anal fin dusky with faint translucent narrow margin, sometimes with two obscure whitish longitudinal bands. Caudal fin dusky with 6-8 translucent transverse bars; distal margin of fin transparent, upper part with wider margin; proximal part of fin blackish. Pectoral-fin membranes transparent, but blackish on around middle of fin base; almost all rays with distinct black spots, distributed over almost entire rays (Fig. 5A), number of spots on longest rays

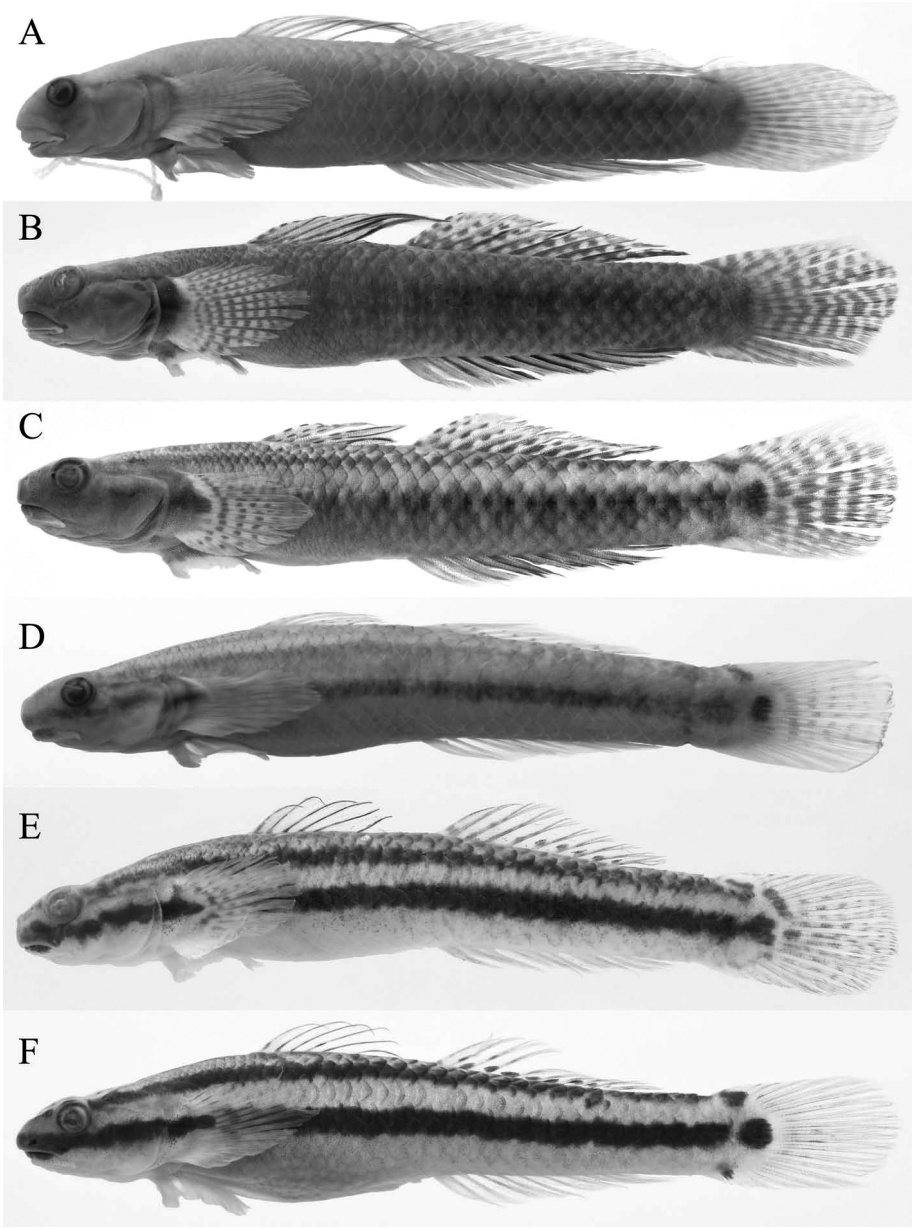

Figure 4. - *Stiphodon pulchellus*. **A**: CAS-SU 26360, neotype, male, 50.5 mm SL; **B**: ZRC 38396, male, 51.1 mm SL; **C**: CMK 9986, male, 36.0 mm SL; **D**: CAS-SU 38618, female, 50.6 mm SL; **E**: ZRC 38397, female, 53.8 mm SL; **F**: CMK 9986, female, 45.3 mm SL.

(usually ray 7 and/or 8) 5-10 (Fig. 6); translucent between each black spot. Middle to proximal part of pelvic-fin rays, fin membranes, and frenum dusky, distal margin translucent except around soft-ray 5, which has dusky edge.

Females (Fig. 4D-F). - Background of body and head pale cream; black longitudinal band extending from snout to below eye and to middle of pectoral-fin base, straight and simple band continuing from behind pectoral-fin base to posterior end of caudal peduncle through lateral midline. Unpigmented below band except for faint black pigments scattered just below band, black upper lip, and black pigments along anal-fin base and ventral midline of caudal peduncle. Another black longitudinal band from just behind eye extending dorsolaterally to base of upper procurrent caudal-fin rays, this band thinner than lower lateral band; distance between two longitudinal bands 18-29% of body depth at origin of anal fin; faint black pigments scattered between two longitudinal bands and sometimes forming 9 faint pale brown bars on tail. Dorsum between upper lateral bands brown sometimes with 3 and 5 pale cream bars on trunk and tail, respectively. Snout with U-shaped black band connecting both eyes; irregular black markings scattered between eyes. An obscure longitudinal band sometimes on both sides of dorsal midline from nape to second dorsal-fin origin. First dorsal-fin membranes transparent, first spine often with 3-4 black spots, other spines usually dusky without clear markings, but sometimes with 3-4 black spots. Second dorsal-fin spine often with 2-4 black spots, soft-rays usually with 1-3 black spots, membranes transparent except black pigments spreading from black spots on soft-rays. Anal fin without clear markings, but sometimes with faint black pigments on rays and membranes. Black blotch at centre of proximal part of caudal fin; caudal-fin rays usually with black spots, forming 2-5 transverse bars on some central rays, membranes mostly transparent. Black lateral band on pectoral-fin base spreading to proximal part of rays 5-8 of pectoral fin; pectoral-fin rays with black spots, number of spots on longest rays 0-7 (Fig. 6); membranes transparent. Pelvic fin translucent without pigment. Juveniles (23.2-25.8 mm SL) lacking black spots on first and second dorsal-, caudal-, and pectoral-fin rays.

Remarks

Stiphodon pulchellus (Herre, 1927) was originally described from a holotype (32 mm SL) collected by A.W.C.T. Herre in Dumaguete River, Dumaguete, Oriental Negros, Philippines (Herre, 1927). The holotype is clearly a female, because the anterior rays were noted as being the longest among the second dorsal- and anal-fin rays in the original description. The morphology of the neotype and all of the other specimens examined in the present study corresponded with the original description in Herre (1927); however, the following comments apply to some characters: 1) Pectoral-

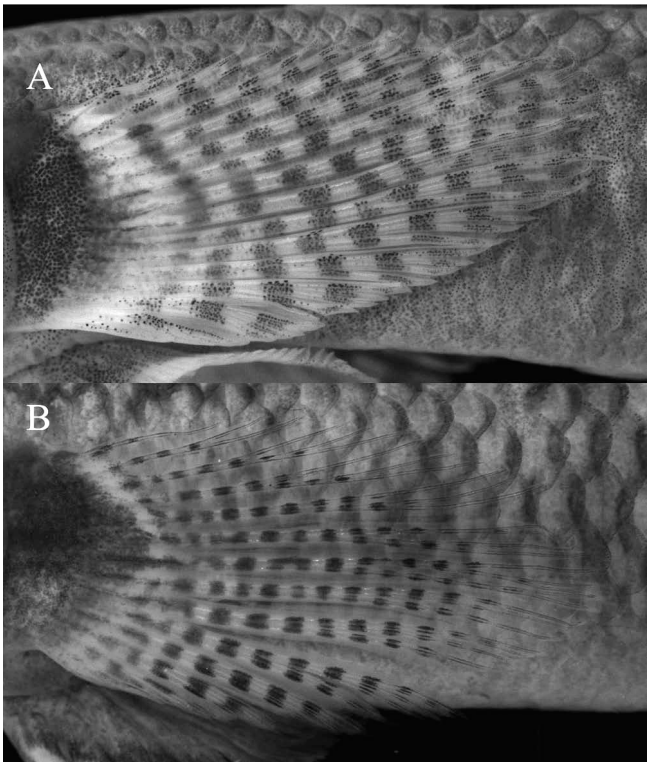

Figure 5. - Pectoral fin of *Stiphodon pulchellus* male (**A**: NSMT-P 45093, 51.2 mm SL) and *S. imperiorientis* male (**B**: URM-P 32169, 49.7 mm SL).

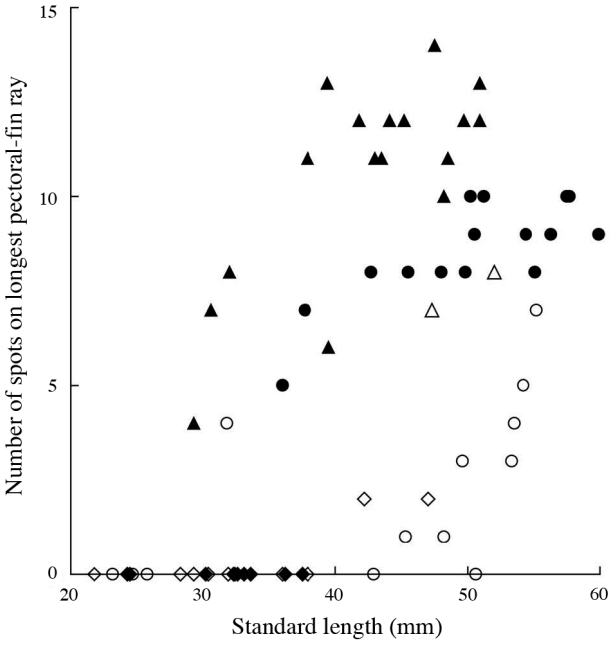

Figure 6. - Number of black spots on the longest pectoral-fin ray of *Stiphodon pulchellus* (circles), *S. imperiorientis* (triangles), and *S. atropurpureus* (squares). Solid and open symbols represent males and females, respectively.

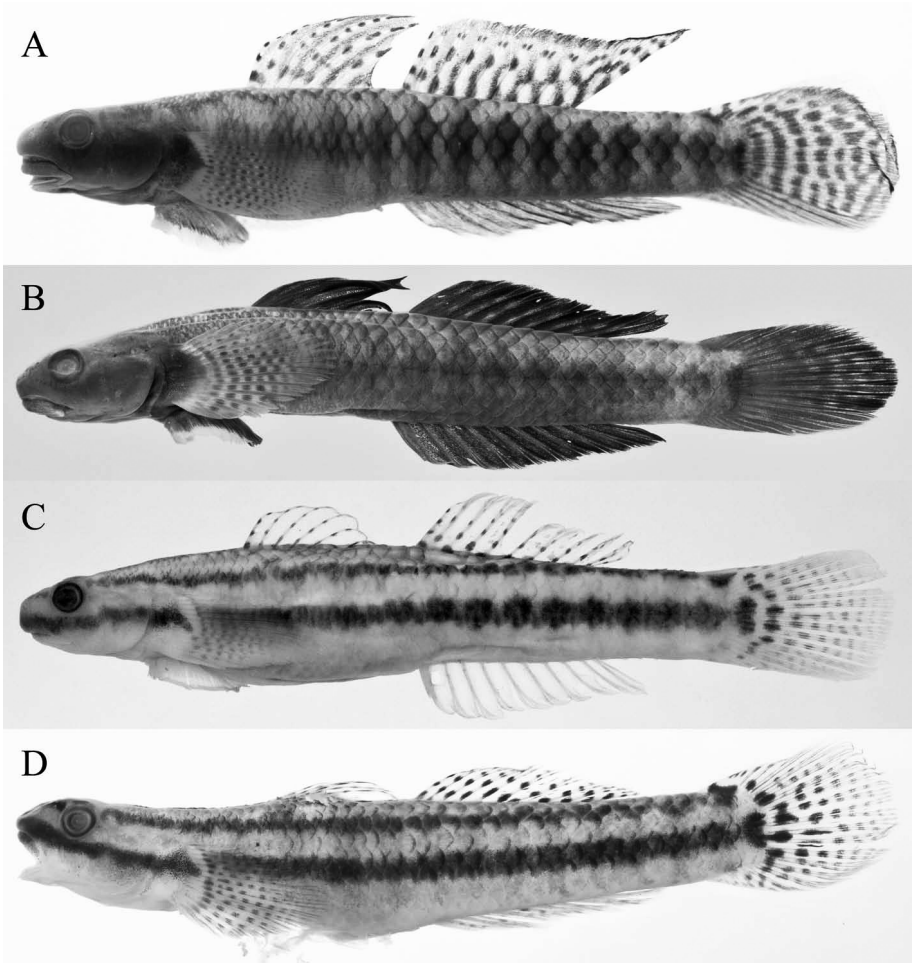

Figure 7. - *Stiphodon imperiorientis*. **A**: URM-P 36457, male, 39.4 mm SL; **B**: URM-P 46079, male, 30.6 mm SL; **C**: URM-P 4823, paratype, female, 52.0 mm SL; **D**: URM-P 32171, female, 47.3 mm SL.

fin rays 14-16 (Tab. II), but they could have been counted as approximately 13 from Fig. 4 in plate 23 of Herre (1927). Nonetheless, these counts generally exhibit some variation, and the actual count of the holotype cannot be determined as it was not described in the text of the original description. It is therefore difficult to conclude that the pectoral-fin ray counts of the specimens examined in the present study disagree with that of the holotype. 2) Scales in longitudinal row 30-34, which is somewhat more than in *S. atropurpureus* (29-31; Tab. II), with Herre (1927) stating that it was 30 and fewer than that in *S. atropurpureus* (36 and 38 counted in holotypes of *Microsicydium atropurpureum* and *M. formosum*, both are synonyms of *S. atropurpureus*). However, scale counts are highly variable within and among species because of irregular scale placement (Parenti and Maciolek, 1993), and differences in counting methods. Consequently, the differences in scale counts could not be evaluated based on just the holotype. 3) Females usually had some black spots on the first and second dorsal-, caudal-, and pectoral-fin rays, and although Herre (1927) noted that the fins were all colourless, except for a rounded blackish-brown spot on the proximal part of the caudal fin, such a disparity may have arisen because the holotype lacked remarkable black markings on the fins. Size and density of the fin markings varied between individuals and the developmental phase, for example, juveniles lacked the black spots on the fin rays, and the black spots were sometimes not conspicuous, even in larger adults. Possibly Herre (1927) did not mention these spots because the fin markings of the holotype were not as distinctive as those possessed by *M. formosum* holotype (= *S. atropurpureus* female).

Herre (1927) also briefly described another specimen (28 mm SL) collected at the same time and location as the holotype. We conclude that it is a male based on its colour pattern, but it is difficult to identify the species based on this brief description. The characters in the description did not differ from those of *S. pulchellus* specimens examined in the present study, neither did they differ from those of *S. atropurpureus*.

The neotype of *S. pulchellus* designated in the present study was collected by Herre from the Tanjay River, near Dumaguete, Negros Oriental, in 15 June 1931. Although this

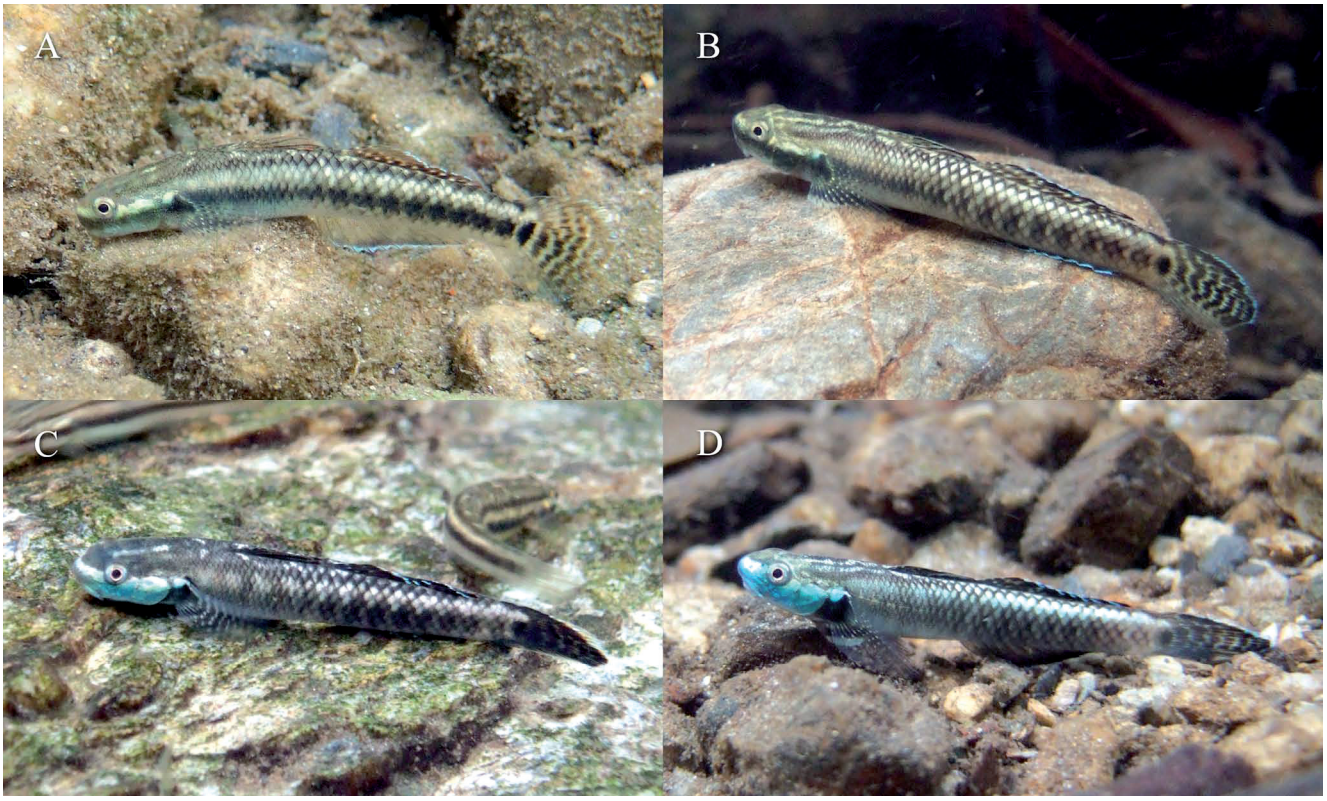

Figure 8. - Non-blue phase (**A**, **B**) and blue phase (**C**, **D**) of *Stiphodon imperiorientis* males observed in a stream on Okinawa Island, Japan (photo by K. Maeda). **A, C**: URM-P 46079, 30.6 mm SL (measured after collection in 27 Oct. 2006); **A**: 19 Sep. 2006, **C**: 2 Oct. 2006. **B**, **D**: same individual, not collected, ca. 30 mm SL; **B**: 22 Oct. 2007, **D**: 6 Nov. 2007.

river is not located in Dumaguete, which is the locality given for the holotype, it is in the same region of the island (southeastern Negros) some 20-30 km northwest from Dumaguete. Herre (1934) reported that he caught 34 *Stiphodon pulchellum* specimens in creeks near Dumaguete during his 1931 Philippine Expedition, and spent almost all of June 1931 in and around Dumaguete. It was also noted that at least one specimen of every fish listed by Herre (1934) was deposited in the Zoological Museum of Leland Stanford Junior University, USA. This collection was transferred to the California Academy of Sciences in 1969 (Brittan, 1997), where they are currently held. We examined all of the *Stiphodon* specimens collected by Herre in Negros Oriental in 1931 held in the California Academy of Sciences. We found that the 24 specimens that had been preserved consisted of two species: 20 specimens (14 males and 6 females) were identified as *S. atropurpureus* and four specimens (3 males and 1 female) were described as *S. pulchellus* in the present study. It was considered that we should use one of the latter four specimens to designate the neotype of *S. pulchellus* because Herre (1927) described *M. pulchellum* as constituting a different species with characteristics that differed from both *M. atropurpureum* and *M. formosum* (both were *S. atropurpureus*). Thus, these four specimens were the most appropriate ones for selecting the neotype, because they were collected near the type locality, identified by the author of the original description, and have characters that correspond with the original description. Although the holotype was female, the neotype was selected from among the males because of the poor condition of the only female specimen.

Stiphodon olivaceus Watson & Kottelat, 1995 could be a junior synonym of *S. pulchellus* (Herre, 1927), because the morphology of its holotype (ZRC 38396) is identical to that of the *S. pulchellus* neotype. Although scale counts in lateral series of *S. olivaceus* in Watson and Kottelat (1995) (35-39) are different with scale counts in longitudinal row of *S. pulchellus* (including all of *S. olivaceus* type materials) in the present study (30-34), it should be caused by differences in counting methods.

Comparison

Stiphodon pulchellus is strikingly similar to *S. imperiorientis* (Fig. 7). All meristic characters and measurements were nearly identical between these two species (Tabs I, II). Although Watson and Chen (1998) state that *S. imperiorientis* most closely resembled *S. olivaceus* (= *S. pulchellus* in the present study), they described only one character separating the species; males of the former species had a blue head with

some blue parts laterally on the body while those parts of the males of the latter species were olive greenish or brownish with no blue. However, *S. imperiorientis* would have been difficult to distinguish from *S. pulchellus* using only the presence of the blue colour, because *S. imperiorientis* males do not always have blue markings, and it has not yet been determined whether *S. pulchellus* always lacks blue. In fact, when we observed *S. imperiorientis* males in a stream on Okinawa Island, Japan, they did not display any blue colouration (Fig. 8A, B) and bore a remarkable resemblance to the live *S. pulchellus* male shown in Fig. 7 of Watson and Kottelat (1995). However, on another occasion, the same male individuals on Okinawa Island exhibited blue colouration (Fig. 8C, D). Furthermore, since blue colouration fades soon after fixation, robust characters for distinguishing preserved male specimens are not yet known for these two species. Indeed, the only remarkable difference between the males of these two species found in the present study was the size, number, and arrangement of black spots on the pectoral-fin rays: larger *S. pulchellus* males (> 40 mm SL) had bold spots on the rays, spots were distributed over most of the length of the ray (Fig. 5A), and the number of spots on the longest rays 8-10 (Fig. 6). Conversely, the same spots in *S. imperiorientis* males (> 40 mm SL) were smaller and not as bold as those of *S. pulchellus*, and each ray had more spots (the number of spots on the longest rays was 10-14; Fig. 6) even though distal one fourth of the upper and middle rays usually lacked well-defined spots (Fig. 5B). Since there were only two *S. imperiorientis* female specimens available, conducting an extensive comparison of female morphology between these two species was difficult; however, those two large *S. imperiorientis* females had more numerous black spots on the dorsal-, caudal-, and pectoral-fin rays (Figs 6 and 7) than the *S. pulchellus* females (Figs 4 and 6).

Stiphodon atropurpureus could be distinguished from *S. pulchellus* by the following characteristics: upper jaw with more premaxillary teeth and lower jaw with more horizontal teeth when compared within the same size class (Fig. 1); pectoral-fin rays usually lacking black spots (Fig. 6); male with a white patch behind pectoral-fin base (invisible in live fish); first dorsal fin of male round in shape; and anal fin of female with a black longitudinal band along the white distal margin.

Distribution

Stiphodon pulchellus specimens examined in this study were collected on the islands of Negros, Leyte, Culion, Busuanga, and Palawan in the Philippines. This species has not been reported in other regions to date.

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