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Redescription of *Parapercis macrophthalma* (Pietschmann, 1911) and description of a new species of *Parapercis* (Pisces: Pinguipedidae) from Taiwan

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Abstract

Parapercis macrophthalma is confirmed as a valid species and redescribed on the basis of the holotype and other specimens collected from the type locality, Taiwan, and Japan. It is morphologically similar to *P. muronis* Tanaka, 1918, but differs in having five vertical transverse bars that extend well below the lateral line versus five oblique transverse bars, with the third to fifth bars ending on or above the lateral line. A new species is also described on the basis of a specimen collected from southwestern Taiwan. It is distinct in having numerous pores interconnected by canals on the head, forming 10 vertical or oblique rows on the cheek and opercular apparatus, predorsal scales extending to the level of the posterior margin of the eye, four dorsal-fin spines, six oblique bars laterally on the body, and a combination of other characters. A key to species of *Parapercis* with narrow transverse bars on the upper body is provided.

Key words: Teleostei, taxonomy, *Parapercis macrophthalma*, *Parapercis moki* **n. sp.**, new species, Taiwan

Introduction

Pietschmann (1911) described *Neopercis macrophthalma* on the basis of a single specimen 127 mm in total length collected from Taiwan (Fig. 1A). Cantwell (1964) placed it in *Parapercis* Bleeker, 1863, but with a doubtful status. Gloerfelt-Tarp & Kailola (1984) recognized it as a valid species, based on a 92 mm SL voucher specimen from Western Australia; however that record is based on an undescribed species (J. Johnson, unpub. data). Johnson (2006) described *Parapercis sexlorata* from eastern Australia and compared it to *P. macrophthalma* which brought the first author's attention of the presence of the Taiwanese holotype.

In Taiwan, *P. muronis* (Tanaka, 1918) has been recorded for several decades (Chen, 1969; Shen, 1984a, b; Chen & Yu, 1986; Shen *et al.*, 1993), whereas *P. macrophthalma* has never been mentioned, probably due to the close similarity of the two species. Johnson (2006) outlined the common features of the species, such as five dark transverse bars on the upper body, the presence of palatine teeth, and similar body shape and most meristic values; however characters that differentiate these two species were not provided.

In order to verify the two species mentioned above, a survey of the literature and examination of specimens of both species was conducted. This revealed that records of *P. muronis* from Taiwan and Japan were often confused with or misidentified as *P. macrophthalma*.

Furthermore, a single specimen with similar appearance to *P. muronis* was found in the Pisces collection of National Museum of Marine Biology and Aquarium (NMMB-P) during our investigations. The specimen has several unique characters and is not referable to any currently recognized species. The absence of any additional specimens in collections throughout the region indicate that the species is rare. Hence, although represented by only one specimen, we herein describe it as a new species.

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Methods and material

Type specimens for this study are housed at National Museum of Marine Biology & Aquarium, Pingtung, Taiwan (NMMB-P) and the Humboldt University, Berlin (ZMB). Methods for taking measurements and counts followed Randall *et al.* (2008), except for snout length which is measured as the flat horizontal distance between the tip of the snout and the anterior margin of the eye. Other specimens examined are deposited in NMMB-P, Biodiversity Research Center, Academia Sinica, Taipei, Taiwan (ASIZP), National Taiwan University, Taipei, Taiwan (NTUM), Faculty of Science, Kochi University, Kochi, Japan (BSKU), National Museum of Nature and Science, Tsukuba, Japan (NSMT-P), CSIRO Marine and Atmospheric Research, Hobart, Australia (CSIRO) and Queensland Museum, Brisbane, Australia (QM). Abbreviations of institutes followed Fricke and Eschmeyer (2012). The proportional and meristic values provided below are the value of the holotype, followed by the range of all other specimens in parentheses, if different.

Results

Parapercis macrophthalma (Pietschmann, 1911)

English name: Narrow barred grubfish
Figs. 1A–C, Tables 1–2

Neopercis macrophthalma Pietschmann, 1911:431, fig. 1 (original description; type locality: Taiwan).
Parapercis macrophthalma (Pietschmann): Cantwell, 1964: 245 (new combination, with doubtful status); Johnson, 2006: 55. Ho and Shao, 2011: tab. 1; ?Department of Fisheries Malaysia, 2009: 82.
Parapercis muronis (non Tanaka, 1918): Masuda et al, 1984: pl. 260, fig. E; Shen, 1984a: 115, pl. 115, fig. 37-12a, c (in part); Shen, 1984b: 376; ?Chen and Yu, 1986: 694; Shen *et al.*, 1993: 488, pl.164-4.
Parapercis sp.: Shinohara in Okamura and Amaoka, 1997:553, fig. 7.
Parapercis sp. 2: Shimada in Nakabo, 2002: 1064, 1586.

Material examined. Holotype: ZMB 16160 (108.3 mm SL), Takao [= Kaohsiung], SW. Taiwan, coll. K. A. Haberer. **Non-type: Taiwan:** ASIZP 61408 (1, 111.6 mm), Audi, Taipei, bottom trawl, 200 m, 15 Nov. 2000, coll. C.-H. Wu. ASIZP 61551 (1, 90.6 mm), Tashi, Yi-lan, bottom trawl, 100 m, 17 Jul. 2000, coll. C.-H. Wu. ASIZP 62349 (1, 87.0 mm), Fonggang, Pingtung, bottom trawl, 200 m, 1 Mar. 2001, coll. J.-H. Wu. CSIRO H.6293-08 (1, 88.2 mm), Tashi fish market, near Yi-Lan, Taiwan, coll. W. White, 22 May 2005. NMMB-P0492 (1, 103.5 mm), Tungkang, Pingtung, coll. H.-K. Mok. NMMB-P1692 (1, 102.1 mm), Tongkang, Pingtung, 7 Feb. 1985. NMMB-P2453 (1, 112.6 mm), Kaohsiung, 9 Apr. 2002, coll. J.-P. Chen. NTUM 4116 (1, 106.1 mm), Kaohsiung, 28 Mar. 1980. NTUM 4468 (1, 113.6 mm), Chung-chou, Kaohsiung, 26 Feb. 1984. NTUM 5613 (4, 98.2–111.6 mm) Chung-chou, Kaohsiung, 24 July 1979. NTUM 5614 (4, 88.9–102.6 mm), Chung-chou, Kaohsiung, 31 Oct. 1982. QM I.37582 (1, 107.2 mm), Donggang, Pingtung, Taiwan, 24 Jul. 2005. **Japan:** BSKU 44047 (1, 116.2 mm), Mimase fish market, Kochi city (offshore trawl in Tosa Bay), Japan, 2 Oct. 1987. BSKU 44049 (1, 117.5 mm), Mimase fish market (offshore trawl in Tosa Bay), Kochi, Japan, 2 Oct. 1987. BSKU 44053 (1, 112.1 mm), Mimase fish market (offshore trawl in Tosa Bay), Kochi, Japan, 2 Oct. 1987. BSKU 44054 (1, 110.3 mm), Mimase fish market (offshore trawl in Tosa Bay), Kochi, Japan, 2 Oct. 1987. BSKU 44069 (1, 95.6 mm), Mimase fish market (offshore trawl in Tosa Bay), Kochi, Japan, 2 Oct. 1987. BSKU 44183 (1, 69.3 mm), Tosa Bay, Japan, 33º 17.79'N, 133º 42.17'E to 33º 17.25'N, 133º 41.07'E, beam trawl 189–191 m, 28 Oct. 1987. BSKU 44968 (1, 60.6 mm), Tosa Bay, Japan, 33º 17.38'N, 133º 42.58'E to 33º 16.81'N, 133º 41.53'E, beam trawl, 183–188 m, 8 Aug 1988. BSKU 44969 (1, 95.6 mm), Tosa Bay, Japan, 33º 17.38'N, 133º 42.58'E to 33º 16.81'N, 133º 41.53'E, beam trawl, 183–188 m, 8 Aug. 1988. BSKU 44971 (1, 79.6 mm), Tosa Bay, Japan, 33º 17.38'N, 133º 42.58'E to 33º 16.81'N, 133º 41.53'E, beam trawl, 183–188 m, 8 Aug. 1988. BSKU 45287 (1, 105.9 mm), Mimase fish market, Kochi city (offshore trawl in Tosa Bay), Japan, 22 Oct. 1988.

Diagnosis. A species of *Parapercis* with five vertical transverse bars on upper body, each extending laterally to lower two-thirds of body and a combination of the following characters: 5 dorsal-fin spines, becoming progressively longer posteriorly, with last spine entirely connected to first dorsal-fin ray by membrane; dorsal-fin soft rays usually 23; anal fin usually with 1 spine and 19 soft rays; entire body covered by ctenoid scales, except for

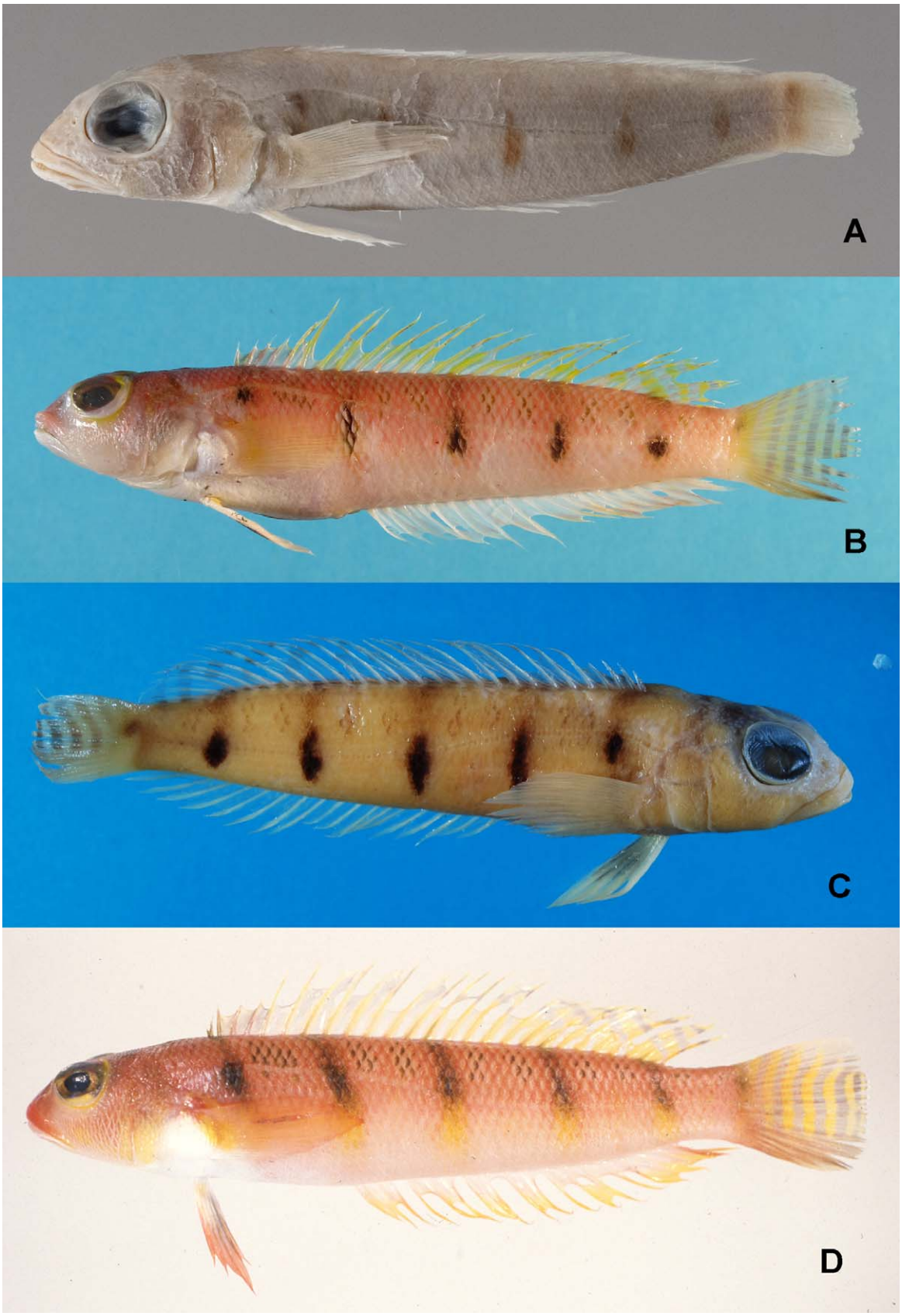

FIGURE 1. A–C. *Parapercis macrophthalma* (Pietschmann, 1911). A. Holotype of *Neopercis macrophthalma*, ZMB 16160, holotype, 108.3 mm SL, Takao [Kaohsiung], Taiwan. B. NMMB-P17746, fresh condition,1 of 3, 120 mm SL, NE Taiwan, photo by H-C Ho. C. NMMB-P2453, 112.6 mm SL, preserved condition. D. *Parapercis muronis* (Tanaka, 1918), BSKU 36380, fresh condition, 123.8 mm SL, Tosa Bay, photo by BSKU.

those on chest; predorsal scales extending forward to vertical from preopercle; generally 4 pairs of canine teeth anteriorly in lower jaw; palatine with two rows of stout teeth, those on outer row larger than inner; vomer with triangular patch of stout teeth; appressed pelvic fin not reaching anus.

TABLE 1. Morphometric data, expressed in percentage of standard length, for *Parapercis macrophthalma*, *P. muronis* and *P. moki* **n. sp.**

	P. macrophthalma			*P. muronis*		*P. moki* **n. sp.**
	Holotype	Non-type		Non-type		Holotype
	ZMB 16160	N=23		N=13		NMMB–P 0892
SL (mm)	108.3	90.4–112.6		80.6–126.7		104.4
Morphometrics		Mean (Range)	SD	Mean (Range)	SD	
Body depth	19.5	19.3 (16.1–21.2)	1.4	19.8 (19.0–20.8)	0.6	17.7
Body width	17.9	19.4 (17.2–22.2)	1.4	18.7 (17.4–20.4)	1.0	18.8
Head length	29.5	27.9 (26.1–29.5)	1.2	26.7 (23.6–28.2)	1.1	28.4
Snout length	5.9	6.0 (5.0–6.6)	0.5	6.4 (5.7–6.7)	0.3	6.8
Orbital diameter	10.6	10.3 (9.0–11.1)	0.7	9.2 (8.1–10.5)	0.9	9.2
Interorbital width	3.2	2.8 (2.0–3.5)	0.5	2.7 (1.8–3.2)	0.5	1.6
Preorbital depth	3.	3.3 (2.9–3.8)	0.3	3.4 (3.0–3.7)	0.2	–
Upper jaw length	12.2	11.5 (10.0–12.4)	0.5	11.5 (10.8–12.5)	0.5	11.6
Predorsal length	32.1	31.1 (30.2–33.2)	0.8	29.4 (28.0–31.2)	1.1	30.7
Preanal length	49.6	48.2 (44.9–51.1)	1.5	47.2 (45.9–49.2)	0.9	48.5
Prepelvic length	27.7	26.3 (24.6–28.7)	1.1	25.5 (24.5–26.7)	0.7	27.3
Caudal-peduncle depth	10.2	9.4 (8.2–10.5)	0.6	9.9 (9.1–10.2)	0.3	8.1
Caudal-peduncle length	8.1	7.8 (6.9–8.7)	0.5	8.2 (7.3–8.8)	0.4	7.7
Dorsal-fin base	61.9	62.8 (60.3–65.6)	1.6	64.0 (62.5–65.0)	0.8	63.9
First dorsal-fin spine	–	2.1 (1.1–3.0)	0.5	2.3 (1.6–2.8)	0.4	5.3
Second dorsal-fin spine	4.1	3.7 (2.5–5.1)	0.7	4.0 (2.7–5.1)	0.6	6.8
Third dorsal-fin spine	5.0	5.3 (4.0–7.0)	0.8	5.4 (4.7–5.9)	0.4	7.5
Fourth dorsal-fin spine	5.9	6.1 (5.1–7.2)	0.6	6.3 (5.5–6.8)	0.4	8.6
Fifth dorsal-fin spine	6.3	6.8 (5.5–8.3)	0.8	7.1 (6.4–7.6)	0.4	Absent
Longest dorsal-fin ray	15.2	14.3 (11.6–15.5)	1.1	14.9 (13.9–16.0)	0.7	14.0
Anal-fin base	43.9	44.5 (42.5–46.8)	1.1	44.9 (40.4–46.5)	1.7	45.0
Anal-fin spine length	4.2	4.0 (3.0–4.9)	0.6	4.4 (3.5–5.3)	0.5	4.0
Longest anal-fin ray	13.1	12.8 (10.9–14.5)	0.7	12.7 (11.7–14.2)	0.7	11.7
Caudal-fin length	–	19.5 (18.5–21.1)	0.7	19.2 (18.1–20.6)	0.8	17.7
Pectoral-fin length	24.5	22.6 (20.4–24.5)	1.1	22.8 (20.3–24.8)	1.2	21.6
Pelvic-fin length	22.5	21.9 (19.4–24.0)	1.2	21.1 (19.0–23.1)	1.4	19.4

Description. Morphometric and meristic data are provided in Tables 1–2. Dorsal-fin rays V, 24 (V, 22–24; usually 23); anal-fin rays I, 19 (I, 18–19; usually 19); all dorsal and anal soft rays branched, the last to base; pectoral-fin rays 20/21 (19–21; modally 20, rarely 21), branched except uppermost; pelvic-fin rays I, 5; principal caudal-fin rays 9 (upper)+ 8 (lower)=17; upper procurrent caudal-fin rays 7–8; lower procurrent caudal-fin rays 5–6 (both upper and lower procurrent caudal-fin rays unclear in holotype); lateral-line scales 53 (51–56, not including 2 or 3 smaller pored scales on base of caudal fin); scales above first lateral-line scale to origin of dorsal fin 5.5; scales above highest part of lateral line to base of dorsal fin 4.5; scales below lateral line posteroventrally to

origin of anal fin about 14 (14–16); median predorsal scales 9; circumpeduncular scales 22 (22–23) (mainly 23); gill rakers 5+8 =13 (4–6 + 8–10 = 12–16), pseudobranchial filaments 15 (14–22); branchiostegal rays 6; vertebrae 10 + 22 (9–10 + 22 = 31–32).

TABLE 2. Frequency distribution of selected meristic data for *P. macrophthalma* and *P. muronis*. Counts for both left and right pectoral-fin rays are included separately. * denotes holotype.

	Lateral-line scales							Pectoral-fin rays				
	n	51	52	53	54	55	56	n	18	19	20	21
P. macrophthalma	28	2	8	10*	4	2	2	28	–	21	33*	2*
P. muronis	14	1	3	2	2	6	–	13	4	15	7	–
	Gill rakers											
	Upper limb				Lower limb				Total					
	n	4	5	6	8	9	10	11	12	13	14	15	16	17
P. macrophthalma	26	9	15*	2	3*	18	5	–	1	8*	13	3	1	–
P. muronis	14	–	11	3	–	8	4	2	–	–	7	4	2	1

Body depth 5.1 (4.7–6.2) times in SL, 1.5 (1.3–1.8) in HL; body nearly cylindrical anteriorly, the width 5.6 (4.5–5.8) in SL, 1.6 (1.2–1.6) in HL, strongly compressed posteriorly; head relatively globular, its length 3.4 (3.4–3.8) in SL; ventral part of head, chest and abdomen slightly convex; snout relatively short and pointed, its length 5.0 (4.0–5.4) in HL; eye relatively large, orbital diameter 2.8 (2.5–3.0) in HL; interorbital space flat, the least fleshy width 9.2 (7.7–14.4) in HL; caudal-peduncle depth 2.9 (2.6–3.5) in HL; caudal-peduncle length 3.6 (3.1–4.1) in HL.

Mouth large, maxilla nearly reaching a vertical through anterior half of eye, upper-jaw length 2.4 (2.2–2.9) in HL; mouth oblique, forming an angle of about 20° to horizontal axis of body, both jaw equally terminate; upper jaw with outer row of 22/24 (19-28) conical teeth that curve medially and posteriorly, anterior 8 (6–8) increasingly larger and more strongly recurved, remaining teeth in outer row on side of jaw decreasing in length; broad band of villiform teeth medial to canines in about 6 rows at front of upper jaw, gradually narrowing posteriorly to a narrow band in about 2–3 irregular rows; front of lower jaw with 3 (4; rarely 3) pairs of recurved canine teeth, all about equal in size (some specimens including holotype may have lost canine teeth and failed to regrow them, but no vacant tooth sockets were observed in these specimens); band of about 8 rows of villiform teeth medial to canines at front of lower jaw, medial row continuing laterally in jaw posterior to last canine as row of 8 (7–8) increasingly larger and more strongly recurved teeth (last 3-4 of these distinctly enlarged), followed by a single row of small teeth to end of jaw; vomer with stout conical teeth forming a triangular patch of about 3 rows, those in anterior row of 7 (7-8) teeth largest; palatine teeth usually in 2 distinct rows, outer row with 6/7 (6–8) teeth and the inner row with 4/5 (4–5) slightly smaller teeth; lips smooth, their inner surface with large fleshy papillae that interdigitate with anterior teeth; tongue broadly rounded, reaching forward to posterior vomerine teeth.

Gill membranes free from isthmus, with a broad transverse free fold. Gill rakers short and spinous, longest about 1/3 length of longest gill filaments. Nostrils small, anterior nostril tube-like, in front of center of eye (viewed from side), a little more than half way to groove at edge of upper lip, with pointed posterior flap that reaches posterior nostril when laid back; posterior nostril dorsoposterior to anterior nostril, ovate with slight rim.

Pores of cephalic sensory system with row of 3 large pores above maxilla; 1 pore between both nostrils and 1 below anterior nostril; 4 pores on either side of space between posterior nostril to anterior interorbital space; numerous pores connected by canals under the skin on posterior interorbital space and occiput; 1 series continuing to posteroventral margin of eye along the upper margin of cheek scales, 1 series continuing to above the free margin of preopercle, and a third series continuing to anterior end of lateral line on body; 2 rows of pores along the inner margin of preopercle, outer row with 6 larger pores and inner row with 7 smaller pores, continuing to a series of 4 large pores on mandibule; a pair of large pores at front of chin (mainly based on NMMB-P2453, 112.6 mm SL).

Opercle with single sharp spine, at about same level as ventral edge of pupil (when viewed from side); margin of subopercle smooth except for 3 (3-6) blunt, close-set serrae on a small bony prominence on upper edge;

preopercle broadly rounded, its free edge smooth except for slight indentation at each pore site, extending from level of ventral edge of orbit downward and forward to slightly in front of vertical at posterior edge of orbit.

Scales strongly ctenoid and imbricate in entire body, except for those on chest which are cycloid or weakly ctenoid; no scales on dorsal, anal, or pelvic fins; progressively smaller scales extending out on basal portion of caudal fin for at least 2/3 length of fin; predorsal scales extending forward to, or slightly anterior to, a vertical from hind margin of preopercle; lateral line broadly arched over pectoral fin, then gradually slanting to straight midlateral portion on about posterior fourth of lateral body.

Origin of dorsal fin over third to fourth lateral-line scale, predorsal length 3.1 (3.0–3.3) in SL, slightly larger than head length; 1st dorsal-fin spine relatively short, 9.5–26.7 (broken in holotype) in HL; 2nd dorsal-fin spine 7.2 (5.6–11.1) in HL; 3rd dorsal-fin spine 5.9 (4.1–7.2) in HL; 4th dorsal-fin spine longest, 5.0 (3.8–5.6) in HL; 5th dorsal-fin spine 4.7 (3.4–5.0) in HL, entirely attached to 1st soft ray by membrane; last second dorsal soft ray longest, 1.9 (1.7–2.5) in HL; origin of anal fin below base of 4th dorsal soft ray, preanal length 2.0 (2.0–2.2) in SL; anal-fin spine 7.0 (5.3–9.7) in HL; last second anal soft ray longest, 2.3 (1.9–2.6) in HL; caudal fin rounded, without prolongation on upper lobe; total fin length 4.7–5.4 in SL, 1.3–1.6 in HL (caudal fin damaged in holotype, so only data from non-types) ; pectoral fins broadly rounded when spread, tenth ray longest, 4.1 (4.1–4.6) in SL, 1.2 (1.1–1.4) in HL; origin of pelvic fins anterior to pectoral fin origin, below base of exposed part of opercular spine, prepelvic length 3.6 (3.5–4.1) in SL, 1.1 (1.0–1.1) in HL; pelvic fin relatively short, reaches anus to origin of anal fin, fourth pelvic-fin ray longest, 4.4 (4.3–5.1) in SL, 1.3 (1.2–1.5) in HL.

Color when fresh (Fig. 1B). Body pale reddish above, grading to white ventrally, vivid white between pectoral fin and pelvic fin; snout and upper jaw bright red; five vertical transverse bars distributed evenly on lateral body, each with a solid black lower portion extending to about 2/3 of lower body, all well below the lateral line; dorsal fin yellow, its posterior portion with some alternating yellow and blue oblique stripes; anal fin yellow; pelvic fins reddish yellow with a large black patch on inner surface; caudal fin reddish yellow with some alternating yellow and blue stripes; a brownish spot usually present on upper caudal fin base, between fourth to ninth rays.

Color in alcohol (Fig. 1C). Uniformly brownish yellow, with five vertical transverse bars, each with pale grey upper part and solid black lower part; first bar at spinous dorsal fin, extending ventrally to above the upper pectoral fin base; the other four distributed evenly along the body from the soft dorsal fin base, each extending ventrally to a horizontal from lower 1/3 of the pectoral fin base, second bar extends about 5 horizontal scale rows below lateral line, third bar about 4 scale rows below, fourth and fifth bars about 2.5 (2–3) scale rows below. A light brown spot, smaller than iris, usually present on base of fourth to ninth rays of caudal fin. Posterior portions of dorsal fin and upper 2/3 of caudal fin with faint oblique brown bars. Inner surface of pelvic fin with a large dusky patch.

Distribution. Specimens examined were collected from Japan and Taiwan. Three specimens were collected at a depth of 183–188 m.

Remarks. Pietschmann (1911) provided 24 dorsal-fin rays for the holotype which we can confirm is correct; however this appears atypical for the species, as the remainder of our material has 23, or rarely 22 rays. In the original description the pectoral-fin ray count is given as 21; however the holotype has 21 on the right hand side and 20 on the left hand side. We recorded only one other specimen with a count of 21 and 20, respectively, but numerous individuals where the pectoral-fin ray counts differed by one ray between one side and the other. In addition, the lateral-line scale count in the holotype was found to be 53, plus 2 small scales on caudal fin base, instead of 62 as provided in the original description. These diagnostic characters are revised accordingly.

Parapercis macrophthalma is morphologically similar to *P. muronis* (Fig. 1D), having five transverse bars on the upper body and sharing similar proportional measurements (Table 1), meristic counts (Table 2), squamation, and arrangement of teeth on jaws, vomer and palatines. These two species co-occur in Taiwan and Japan. *Parapercis macrophthalma* can be distinguished from *P. muronis* by having transverse bars on the body vertical (vs. oblique) and all bars extending well below the lateral line (vs. 3rd to 5th bars ending on or above the lateral line) and a slightly higher pectoral-fin ray count (19–21, modally 20 vs. 18–20, modally 19).

Examination of all known specimens identified as *P. muronis* in Taiwanese collections has revealed all but one were misidentifications of *P. macrophthalma*. Shen (1984a) identified photographs of three individuals as *P. muronis* (pl. 115, fig. 371-12a–c), of which two specimens (fig. 371-12a and fig. 371-12c, vouchers in NTUM, but not sighted) are identical to *P. macrophthalma*, and one specimen (fig. 371-12b, NTUM 5613, 1 of 4, 97.4 mm SL) is identical to *P. muronis*. Moreover, based on the figures and descriptions provided, *Parapercis muronis* of Masuda *et al.* (1984: pl. 260, fig. E), *Parapercis* sp. of Shinohara (1997: 533, fig. 7), and *Parapercis* sp. 2 of Shimada (2002: 1064) are here reidentified as *P. macrophthalma*.

Department of Fisheries Malaysia (2009) recorded *P. macrophthalma* from Malaysia; however, we are unable to verify the record due to the lack of any figure or voucher specimen.

***Parapercis moki* n. sp.**
New English name: Mok's sandperch
Figs. 2A–B, Table 1

Holotype. NMMB-P0892 (104.4 mm), Chong-Chou, Kaohsiung, southwestern Taiwan, northern South China Sea, 29 Nov. 1984, coll. M. Mok *et al.* (originally catalogued NSYU 1943).

Diagnosis. A species of *Parapercis* with relatively slender body; six transverse bars on upper body; numerous small pores with canals forming about 9–10 vertical rows on cheek, opercle and subopercle; scales on nape extending anteriorly to level of posterior margin of eyes; large spine on posteroventral corner of subopercle; interorbital space very narrow (1.6% SL); and combination of the following characters: 4 dorsal-fin spines, each spine progressively longer posteriorly, with last spine entirely connected by membrane to first dorsal-fin ray; 23 dorsal-fin soft rays; anal-fin with 1 spine and 19 soft rays; pectoral-fin rays 18 or 19; four pairs of canine teeth anteriorly in lower jaw; palatine teeth present, in two rows; vomerine teeth stout, in two rows; scales on sides, belly and prepectoral region ctenoid, becoming cycloid on nape and prepelvic areas; margin of preopercle smooth with some small indentations on posterior margin; appressed pelvic fin not reaching origin of anal fin.

Description. Morphometric data based on the holotype are provided in Table 1. Dorsal-fin rays IV, 23; anal-fin rays I, 19; all dorsal and anal soft rays branched, the last to base; pectoral-fin rays 18 (left side) and 19 (right side), branched except uppermost; pelvic-fin rays I, 5; principal caudal-fin rays 9 (upper) + 8 (lower) =17; upper procurrent caudal-fin rays 9; lower procurrent caudal-fin rays 7; pored lateral-line scales 56 (not including 2 pored scales on base of caudal fin); scales above first lateral-line scale to origin of dorsal fin 4; scales above highest part of lateral line to base of dorsal fin 3; scales below lateral line posteroventrally to origin of anal fin about 17; median predorsal scales 12 (counted to level of posterior margin of eye); circumpeduncular scales 26; gill rakers of outer first gill arch 5 + 9 = 14; pseudobranchial filaments 16; branchiostegal rays 6; vertebrae 10 + 23 = 33.

Body relatively slender, its depth 5.6 times in SL, 1.6 in HL; body subcylindrical anteriorly, the width 5.3 in SL, 1.5 in HL, strongly compressed posteriorly; head relatively short, its length 3.5 in SL; ventral part of head, chest, and abdomen slightly convex; snout relatively short, its length 3.3 in HL; eye relatively large, orbit diameter 3.1 in HL; interorbital space very narrow and flat, the least fleshy width 17.5 in HL; caudal-peduncle depth 3.5 in HL; caudal-peduncle length 3.7 in HL.

Mouth large, the maxilla not quite reaching a vertical through center of eye, upper jaw relatively short, its length 2.5 in HL; mouth slightly oblique, forming an angle of about 20° to horizontal axis of body, lower jaw projecting; front of lower jaw with 4 pairs of recurved canine teeth, the middle one on each side twice as large as the rest; side of upper jaw with row of about 24 slender conical teeth that curve medially and posteriorly, anterior 8 increasingly larger and more strongly recurved; remaining teeth in outer row on side of jaw decreasing in length; broad band of villiform teeth medial to canines in about 7 rows at front of upper jaw, gradually narrowing posteriorly to a narrow band in about 3 irregular rows; front of lower jaw with 4 pairs of incurved canine teeth, increasing in length laterally, 4th twice as large as 1st and strongly curving laterally as well as posteriorly; band of about 5 rows of villiform teeth medial to canines at front of lower jaw, medial row continuing laterally in jaw posterior to last canine as row of 7 increasingly larger and more strongly recurved teeth, followed by a single row of small teeth, with an additional inner row of 3 teeth at posterior part, to end of jaw; vomer with a triangular patch of stout conical teeth, 7 on anterior margin largest, lateral and posterior ones progressively smaller; palatine with two rows of stout teeth, those on outer row larger than those on inner row; lips smooth, their inner surface with large fleshy papillae that interdigitate with anterior teeth; tongue broadly rounded, reaching forward to posterior vomerine teeth.

Gill membranes free from isthmus, with a broad transverse free fold. Gill rakers short and spinous, longest about half length of longest gill filament. Nostrils small, anterior nostril in front of center of eye (viewed from side), a little less than half way to groove at margin of upper lip, with high anterior rim and pointed posterior flap that reaches nearly anterior margin of posterior nostril when laid back; posterior nostril dorsoposterior to anterior nostril, its aperture ovate, with slight anterior rim.

Pores of cephalic sensory system as shown in Fig. 2. Row of 3 large pores above maxilla; 3 pores near nostrils, one above, one between and one below; row of 3 pores on either side anteriorly in interorbital space; irregular series of small pores medially on posterior half of interorbital space; numerous small pores with subcutaneous canals posteriorly on occiput, pores divided into several irregular double series, from anterior end of lateral line on body, continuing to ventral margin of eye, opercle and subopercle; cheek with 8–9 irregular double series; series of 10 small pores along the margin of preopercle; a series of 4 large pores on mandible; two medial pore at front of chin.

Opercle with single sharp spine level with ventral edge of pupil (when viewed from side); subopercle with a single sharp spine at posteroventral corner; preopercle broadly rounded, its free edge smooth except for slight indentations at each pore site, extending from level of ventral edge of orbit downward and forward to slightly in front of a vertical at posterior edge of orbit.

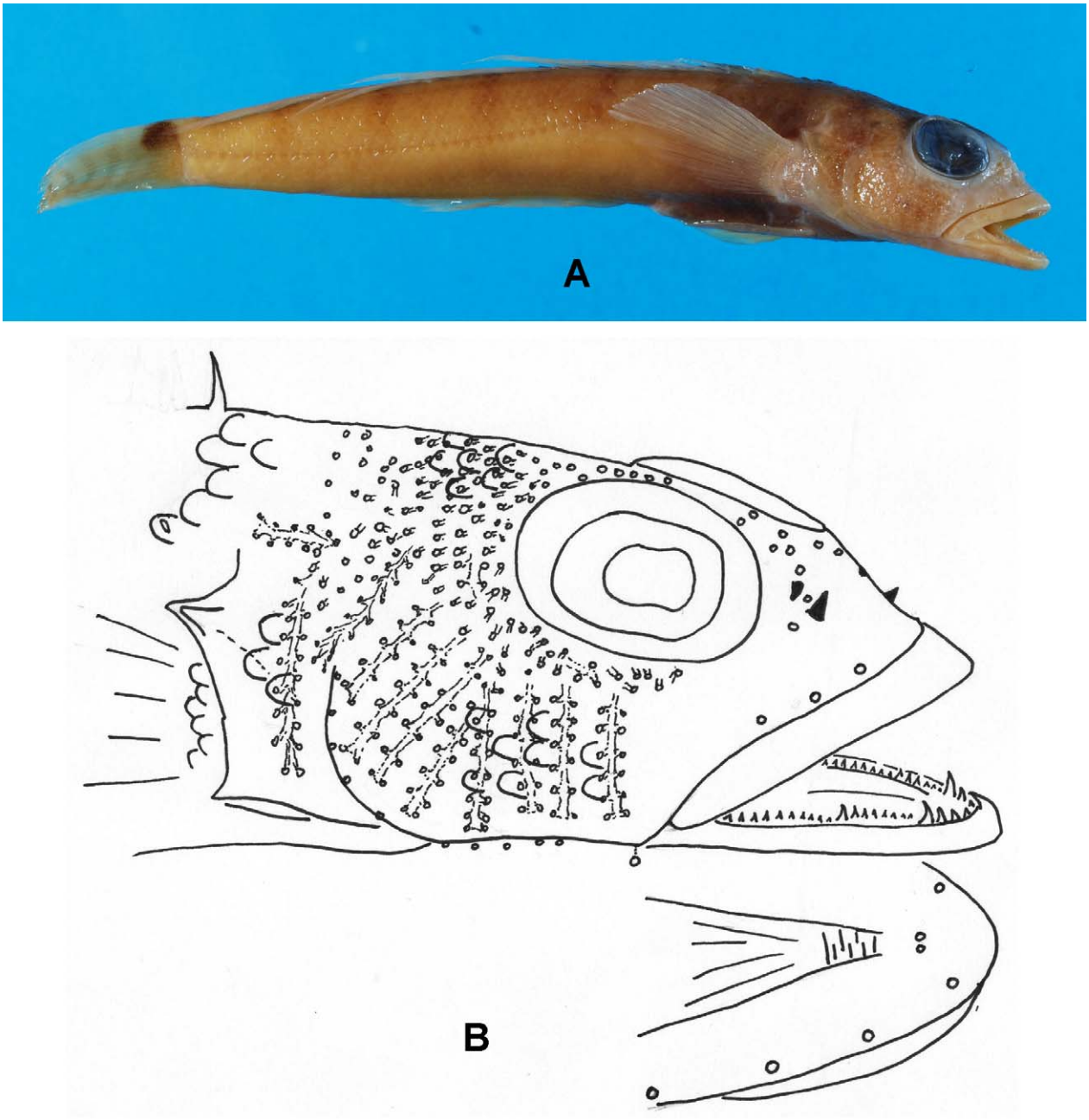

FIGURE 2. *Parapercis moki* **n. sp.**, holotype, preserved condition, NMMB-P0892, 104.4 mm SL, Kaohsiung, southwestern Taiwan. A. lateral view of the fish. B. dorso-lateral view of head pore pattern and squamation (upper) and pores on lower jaw (lower).

Scales finely ctenoid on body, becoming cycloid anterior to a line from base of third dorsal spine to anterior end of lateral line, extending forward to a vertical from posterior margin of eye; scales on base of pectoral fin ctenoid, those on area anterior to pelvic–fin base, opercle and subopercle cycloid; cheek scales cycloid, in about 9 irregular horizontal rows, relatively large and nonimbricate, extending anteriorly to a vertical from anterior 1/3 of eye; progressively smaller scales extending out on basal portion of caudal fin for at least 2/3 length of fin; base of pectoral fin with up to 4 rows of small cycloid scales; lateral line broadly arched over pectoral fin, then gradually slanting to straight midlateral portion on about posterior fourth of lateral body.

Origin of dorsal fin over third lateral-line scale, predorsal length 3.3 in SL, equal to head length; 4 dorsal-fin spines, all relatively slender, progressively longer posteriorly; 1st dorsal-fin spine 5.4 in HL; 2nd dorsal-fin spine 4.2 in HL; 3rd dorsal-fin spine 3.8 in HL; 4th dorsal-fin spine longest 3.3 in HL, full length of spine likely attached to 1st soft ray by membrane (membrane damaged in holotype); last dorsal soft ray longest, 2.0 in HL; origin of anal fin below base of 4th dorsal soft ray, preanal length 2.1 in SL; anal-fin spine 7.1 in HL; last anal soft ray longest, 2.4 in HL; caudal fin rounded, without prolonged upper lobe; total fin length 5.6 in SL, 1.6 in HL; pectoral fins broadly rounded when spread, tenth ray longest, 4.6 in SL, 1.3 in HL; origin of pelvic fins anterior to pectoral-fin origin, below base of exposed part of opercular spine, prepelvic length 3.7 in SL, 1.0 in HL; pelvic-fin spine slender, 4.1 in HL; pelvic fins extending to genital papilla, but not reaching origin of anal fin; fourth soft pelvic ray longest, 4.6 in SL, 1.3 in HL.

Color when fresh. Currently unknown.

Color in alcohol (Fig. 2A). Uniformly light brown with six slightly oblique narrow bars laterally on upper body, each bar of about the same width, extending from base of dorsal fin to slightly below midbody; first bar at front of spinous dorsal fin and posterior base of pectoral fin; second at base of 2nd–3rd dorsal-fin rays; third at 6th–7th rays; fourth at 11th–12th rays; fifth at 16th–17th rays; and sixth at 21st–22nd rays. A prominent black spot at upper corner of caudal fin base, from the last procurrent to 7th ray of upper lobe, slightly larger than pupil of eye, appearing non-ocellate. About 5 narrow oblique bars on caudal fin.

Distribution. Known only from the holotype collected from off Chong-Chou, Kaohsiung, southwestern Taiwan.

Etymology. Named after Professor Hin-Kiu Mok, National Sun Ye-San University, in recognition of his numerous contributions to fish studies and for providing the holotype for this study.

Comparison. *Parapercis moki* is unique within the genus in having many vertical rows of lateral-line pores on the cheek. It is most similar to *Parapercis sexlorata* Johnson, 2006, these two being the only *Parapercis* species with 6 narrow oblique black bars on the upper body. *Parapercis moki* can readily be distinguished from *P. sexlorata* in having 4 pairs of conical teeth anteriorly in the outer row of the lower jaw (vs. three pairs) and a strong spine on posteroventral corner of subopercle (vs. some feeble spinules). *Parapercis moki* is also similar to *P. muronis* and *P. macrophthalma* in general appearance. It can be distinguished from both of the latter in having 4 dorsal-fin spines (vs. 5); 6 narrow oblique black bars on upper body (vs. 5 vertical bars in *P. macrophthalma* and 5 oblique bars in *P. muronis*); a prominent spot slightly larger than the pupil of the eye on the anterodorsal corner of caudal fin base (vs. an relatively inconspicuous spot smaller than the pupil of the eye). Other *Parapercis* species with 4 dorsal fin spines are easily distinguished by colouration.

A key to species of *Parapercis* with narrow transverse bars on the upper body

1A.	Dorsal fin with 4 spines (rarely 5)	2
1B.	Dorsal fin with 5 spines (rarely 4)	4
2A.	Ten transverse bars on upper body	*P. decemfasciata* (Franz, 1910)
2B.	Six transverse bars on upper body	3
3A.	Three pairs of conical teeth in outer row at lower jaw; feeble spinules on posteroventral corner of subopercle	*P. sexlorata* Johnson, 2006
3B.	Four pairs of conical teeth in outer row at lower jaw; a large spine on posteroventral corner of subopercle	*P. moki* Ho & Johnson, **n. sp.**
4A.	No teeth on palatine	*P. allporti* (Günther, 1876)
4B.	Teeth present on palatine	5
5A.	Five transverse bars on lateral body	6
5B.	Ten to 13 transverse bars on lateral body	7

6A. Transverse bars on body oblique, third to fifth ones usually ending above lateral line; modally 19 pectoral fin rays. . . . . .*P. muronis* (Tanaka, 1918)

6B. Transverse bars on body vertical, third to fifth ones usually extending well below lateral line; modally 20 pectoral fin rays . . . . . *P. macrophthalma* (Pietschmann, 1911)

7A. Pored lateral-line scales 58–60; 10 transverse bars on body, each extending to below midbody. . . . . *P. multifasciata* Döderlein, 1884

7B. Pored lateral-line 65–70; 13 short transverse bars on body, none extending below midbody . . . . . *P. binivirgata* White, 1904

Comparative materials. ***Parapercis muronis***: BSKU 29197 (1 specimen, 91.2 mm SL); BSKU 29982 (1, 86.5); BSKU 36380 (1, 123.8) ; BSKU 36381 (1, 121.1); BSKU 36390 (1, 126.7); BSKU 36391 (1, 114.7); BSKU 36392 (1, 100.7); BSKU 37293 (1, 123.2); BSKU 42160 (1, 74.2); BSKU 42549 (1, 109.6); BSKU 42550 (1, 107.6); BSKU 43579 (1, 106.3); BSKU 44178 (1, 80.6); NSMT-P61134 (1, 74.2); NSMT-P 79900 (1, 54.0); all collected from Japan. NTUM 5613 (1 of 4, 97.4), collected from Taiwan. ***Parapercis decemfasciata***: ASIZP 58547 (1, 101); ASIZP 59484 (1, 104); ASIZP 59484 (1, 111.7); NMMB-P0487 (1, 96.8); NMMB-P0489 (2, 80.2–86.8); NMMB-P11436 (1, 129.1); NMMB-P10044 (1, 124); all collected from Taiwan. ***Parapercis multifasciata***: ASIZP 64301 (1, 96.8); ASIZP 60097 (1, 113); ASIZP 58609 (1, 134); NMMB-P10141 (2, 109.5–121.4); all collected from Taiwan.

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