



***Parapercis randalli*, a new sandperch (Pisces: Pinguipedidae) from Southern Taiwan**

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Abstract

Parapercis randalli **sp. nov.** is described on the basis of four specimens collected in southern Taiwan by angling at a depth of 5–150 m. It differs from its congeners in having five broad reddish brown saddles on the dorsal surface; both jaws and anterior portion of snout reddish orange; a yellow bar with red margin on cheek; a series of 8 red bars below body axis; configuration of spots on head, dorsal and caudal fins; and a combination of morphological characters: three pairs of canine teeth anteriorly in lower jaw; no palatine teeth; vomerine teeth stout, in a single curved row; lateral-line scales 53; margin of preopercle smooth; 4th dorsal spine longest; caudal fin slightly rounded on ventral half, truncate on dorsal half, with a prolonged upper lobe; appressed pelvic fin extends beyond anus. A total of 21 valid pinguipedid species are now recorded from Taiwanese waters.

Key words: taxonomy, Pisces, new species, *Parapercis randalli*

Introduction

The sandperch family Pinguipedidae comprises 7 genera and 78 valid species. Sixteen new species of *Parapercis* have been described in the past 5 years (Johnson, 2006; Randall & Yamakawa, 2006; Imamura & Yoshino, 2007; Randall, 2008; Randall *et al.*, 2008), bringing the total number to 70 in the genus. The number of newly discovered species in the genus is showing no sign of decline (Randall *et al.*, 2008).

In Taiwan, Chen (1969) listed 13 species in his “A synopsis of the vertebrates of Taiwan, Vol. 1”. Shen (1983) reviewed the Taiwanese species and recognized 15 species, including 4 new records. Shen (1984a, b) listed 15 species, Chen & Yu (1986) recorded 20 species and Shen *et al.* (1993) recorded 2 genera and 19 species in the family. Chen (1994) recorded 13 species in the Penghu Islands, western Taiwan. Of all species recorded by the publications mentioned above, two Australian endemic species, *P. binivirgata* Waite and *P. nebulosa* (Quoy & Gaimard), are almost certainly misidentifications, and *P. quadrispinosa* (Weber) is an uncertain species. In the absence of voucher specimens, all of the latter should be excluded. Several names have been changed by subsequent studies: *P. cephalopunctata* (Seale) is a junior synonym of *P. millepunctata* (Günther); *P. hexophthalma* (Cuvier in Cuvier & Valenciennes) (*P. polyphthalma* (Cuvier in Cuvier & Valenciennes) being a junior synonym) was replaced by *P. pacifica* Imamura & Yoshino; *P. mimaseana* Kamohara is a junior synonym of *P. striolata* (Weber); and *S. somaliensis* Schultz was replaced by *P. shaoi* Randall. The pinguipedid species recorded by previous publications in Taiwan are reviewed in Table 1.

During a recent visit to southern Taiwan, four unusual specimens of *Parapercis* were found in the Hengchun local market. These specimens were identified as an undescribed species by the authors. The new species is most similar to a recently described species, *P. basimaculata* Randall, Senou & Yoshino, but differs markedly in coloration, as well as in some aspects of morphology. The purpose of present work is to name and describe this new species. This will bring the total number of valid pinguipedid species recorded from Taiwan to 21.

TABLE 1. Species of family Pinguipedidae recorded by previous publications in Taiwan. v, valid record; s, synonym; m, misidentification; and ?, questionable record.

?Taxon	Chen, 1969	Shen, 1983	Shen, 1984a	Shen, 1984b	Chen & Yu, 1986	Shen, 1993	Chen, 1994
<i>K. flavofasciata</i>						v	
<i>P. aurantiaca</i>	v	v	v	v	v	v	
<i>P. binivirgata</i>				?	?		
<i>P. cephalopunctata</i>		s: <i>millepunctata</i>	v				
<i>P. clathrata</i>		v	v	v	v	v	v
<i>P. cylindrica</i>	v	v	v	v	v	v	v
<i>P. decemfasciata</i>	v	v	v		v	v	
<i>P. hexophthalma</i>	m: <i>pacifica</i>			m: <i>pacifica</i>	m: <i>pacifica</i>		m: <i>pacifica</i>
<i>P. kamoharai</i>		v	v	v	v	v	v
<i>P. mimaseana</i>				s: <i>striolata</i>	s: <i>striolata</i>	s: <i>striolata</i>	s: <i>striolata</i>
<i>P. multifasciata</i>	v	v	v	v	v		
<i>P. multiplicata</i>						v	
<i>P. muronis</i>	v	v	v	v	v	v	
<i>P. nebulosa</i>					?		
<i>P. ommatura</i>	v	v		v	v	v	v
<i>P. polyphthalma</i>		m: <i>pacifica</i>					
<i>P. pulchella</i>	v	v	v	v	v	v	v
<i>P. quadrispinosa</i>	?				?		
<i>P. sexfasciata</i>	v	v	v	v	v	v	v
<i>P. somaliensis</i>						m: <i>shaoi</i>	m: <i>shaoi</i>
<i>P. synderi</i>	v	v			v	v	v
<i>P. tetracantha</i>	v	v	v	v	v	v	v
<i>P. xanthozona</i>	v	v	v	v	v	v	v
No. of species	13	15	13	16	20	18	13

Material and methods

Type specimens for this study are housed at National Museum of Marine Biology & Aquarium, Pingtung, Taiwan (NMMBP) and Queensland Museum, Brisbane, Australia (QM). Methods for taking measurements and counts followed Randall *et al.* (2008). Data for comparison are those provided in Randall *et al.* (2008) and Johnson (2006).

Parapercis randalli sp. nov.

(Figs. 1–3, Table 2)

Holotype. NMMBP 10462, female (106.6 mm SL), Kenting, Pingtung, southern end of Taiwan, 5–70 m, 4 Sep. 2010, collected by angling, purchased from Hengchun local market by H.-C. Ho.

Paratype. NMMBP 10463, 2 specimens, 1 male (101.2 mm SL) and 1 female (102.2 mm SL), collected together with holotype. QM I.38817, 1 specimen (96.9 mm SL), sex indeterminate, Kenting, Pingtung,

southern end of Taiwan, 50–150 m, 11 Oct. 2010, collected by angling, purchased from Hengchun local market by H.-C. Ho, otoliths taken before preservation.

Diagnosis. A species of *Parapercis* with five broad reddish brown saddles on dorsal surface; both jaws and anterior portion of snout reddish orange; a yellow bar with red margin on cheek; a series of 8 red bars below body axis; spots on head, dorsal and caudal fins; and a combination of following characters: three pairs of canine teeth anteriorly in lower jaw; no palatine teeth; vomerine teeth stout, in a single curved row; lateral-line scales 53; margin of preopercle smooth; 4th dorsal spine longest; caudal fin slightly rounded on ventral half, truncate on dorsal half, with a prolonged upper lobe; appressed pelvic fin extends beyond anus.

Description. Morphometric data of type series are provided in Table 2.

TABLE 2. Morphometric data of type series of *Parapercis randalli* sp. nov.

	Holotype NMMBP 10462	Paratype NMMBP 10463	Paratype NMMBP 10463	Paratype QM I.38817		
SL (mm)	106.6	102.2	101.2	96.9		
% SL	female	female	male	sex indet.	Mean	SD
Body depth	20.0	17.6	18.4	19.7	18.9	1.1
Body width	18.9	18.3	18.0	17.4	18.4	0.6
Head length	31.1	29.7	30.7	29.2	30.5	0.9
Snout length	10.6	9.1	10.0	9.3	9.9	0.7
Orbital diameter	8.5	8.5	8.0	8.9	8.4	0.4
Interorbital width	5.0	5.0	5.6	3.8	5.2	0.8
Upper-jaw length	12.6	12.7	13.0	12.8	12.8	0.2
Caudal-peduncle depth	9.1	8.9	9.3	8.6	9.1	0.3
Caudal-peduncle length	9.6	9.7	9.3	8.6	9.5	0.5
Predorsal length	31.1	30.1	30.8	29.2	30.7	0.9
Preanal length	46.7	47.1	47.8	45.4	47.2	1.0
Prepelvic length	27.3	27.7	26.5	26.1	27.2	0.7
Dorsal-fin base	60.3	61.3	62.9	61.8	61.5	1.1
1st dorsal spine	2.3	2.5	4.2	1.9	3.0	1.0
2d dorsal spine	4.7	5.2	6.5	4.4	5.5	0.9
3rd dorsal spine	5.4	6.2	7.3	6.8	6.3	0.8
4th dorsal spine	6.8	7.3	8.9	6.7	7.7	1.0
5th dorsal spine	6.7	6.9	7.1	6.0	6.9	0.5
Longest soft dorsal ray	15.5	12.4	15.9	12.7	14.6	1.8
Anal-fin base	41.9	42.4	42.8	41.8	42.4	0.4
Anal-fin spine	3.7	4.1	5.1	3.3	4.3	0.8
Longest soft anal ray	12.6	12.0	13.1	12.1	12.6	0.5
Caudal-fin length	21.7	20.6	22.1	20.2	21.5	0.9
Pectoral-fin length	19.6	19.7	20.1	20.9	19.8	0.6
Pelvic-spine length	6.7	6.8	6.8	6.3	6.8	0.3
Pelvic-fin length	19.4	20.5	22.0	18.0	20.6	1.7

Meristic values are provided for holotype, followed by variation in the parentheses (if present). Dorsal fin V, 21; anal fin I, 17; all dorsal and anal soft rays branched, the last to base; pectoral-fin rays 18 (17/18 in

102.2-mm paratype), all branched except for uppermost; pelvic fin I, 5; branched caudal-fin rays 15; upper procurrent caudal-fin rays 10, the posterior 3 segmented; lower procurrent caudal-fin rays 9, the posterior 3 segmented; pored lateral-line scales 53 (not including 3 smaller ones on base of caudal fin); scales above first lateral-line scale to origin of dorsal fin 6; 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 11 (12 in 96.9-mm paratype); median predorsal scales 9; circumpeduncular scales 24; gill rakers 5+10=15 (4+10=14 in 102.2-mm paratype, 5+11=16 in 96.9-mm paratype); pseudobranchial filaments 16 (18 in 101.2-mm and 102.2-mm paratypes); branchiostegal rays 6; vertebrae 10+20=30.

The following values are given for holotype followed by the range of all four types in the parentheses. Body depth 5.0 (5.0–5.7) in SL, 1.6 (1.5–1.7) in HL; body nearly cylindrical anteriorly, the width 5.3 (5.3–5.7) in SL, 1.6 (1.6–1.7) in HL, strongly compressed posteriorly; head length 3.2 (3.2–3.4) in SL; ventral part of head, chest, and abdomen slightly convex; snout length 9.4 (9.4–11.0) in SL, 2.9 (2.9–3.3) in HL; orbital diameter 3.6 (3.3–3.8) in HL; interorbital space flat, the least fleshy width 6.2 (5.5–7.6) in HL; caudal-peduncle depth 3.4 (3.3–3.4) in HL; caudal-peduncle length 3.2 (3.1–3.4) in HL.

Mouth large, the maxilla nearly reaching a vertical through center of eye, the upper-jaw length 2.5 (2.3–2.5) in HL; mouth oblique, forming an angle of about 20° to horizontal axis of body, the lower jaw projecting; front of upper jaw with three pairs of recurved canine teeth, the middle one on each side twice as large as the rest; side of upper jaw with a row of about 20 slender conical teeth that curve medially and posteriorly (except for the 101.2-mm paratype having only 8), the anterior 8 relatively large, about equal size; remaining teeth in outer row on side of jaw decreasing in length (except for the 101.2-mm paratype lacking teeth in outer row); a broad band of villiform teeth in about 7 rows medial to canines at front of upper jaw, gradually narrowing posteriorly in jaw to a narrow band, about 3 irregular rows; front of lower jaw with three pairs of incurved canine teeth, increasing in length laterally, the 3rd twice as large as 2nd and strongly curving laterally as well as posteriorly; a band of about 5 rows of villiform teeth medial to canines at front of lower jaw, the medial row continuing laterally in jaw posterior to last canine as a row of 7 increasingly larger and more strongly recurved teeth, followed by a single row of small teeth to end of jaw; vomer with a chevron-shaped row of 9 (8 in all 3 paratypes) stout conical teeth, the middle largest, the lateral teeth progressively smaller; no palatine 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 free fold across. Gill rakers short and spinous, the longest about 1/3 length of longest gill filaments. Nostrils small, the anterior in front of center of eye (as viewed from side), a little more than half way to groove at edge of upper lip, with a slight anterior rim and a pointed posterior flap that reaches 3/4 internarial distance when laid back; posterior nostril dorsoposterior to anterior nostril, the aperture ovate, with a slight rim.

Pores of cephalic sensory system as shown in Fig. 3. A row of 3 large pores on each side of maxilla; 2 median pores near nostrils, one above and one below; 2 median pores in anterior interorbital space; a irregular series of small pores on posterior interorbital space, followed by 2 irregular transverse series of pores posteriorly on occiput, forming a canal under the skin, divided into 3 double series, one continue to ventral-posterior margin of eye, one continue to above free preopercle and one continue to anterior end of lateral line on body; a series of 2 small pores at upper posterior corner of eye connected to anterior series of occiput series; a row of 3 median pores below anterior half of eye (4 in right side of holotype, 3 in the rest); a series of 6 large pores along the inner margin of preopercle, continue to a series of 4 large pores on mandibular; a pair of large pores at front of chin (fused to a very large one in 102.2-mm paratype).

Opercle with a single sharp spine at level of ventral edge of pupil (when viewed from side); margin of interopercle smooth except for 5 (7 in 96.9-mm paratype, 4 in 2 other paratypes) tiny, close-set serrae on a small bony prominence at upper edge; preopercle broadly rounded, its free edge smooth except for slight indentation at pore sites, extending from level of ventral edge of orbit to slightly anterior to a vertical at posterior edge of orbit.

Scales finely ctenoid on body, becoming cycloid anterior to a line from base of 3rd dorsal spine to anterior end of lateral line, and on prepectoral and prepelvic areas; scales on opercle cycloid except above spine where

a few are very weakly ctenoid; scales on cheek cycloid, small, mostly nonimbricate, in about 14 irregular horizontal rows, from below center of eye to posterior edge of preopercle, with 8 additional short rows of scales extending dorsally to behind ventral half of orbit; no scales on dorsal, anal, or pelvic fins; progressively smaller scales extending out on caudal fin to at least 2/3 length of fin; base of pectoral fins with up to 4 rows of small cycloid scales; lateral line broadly arched over pectoral fin, then gradually declining to straight midlateral portion on about posterior fourth of body.

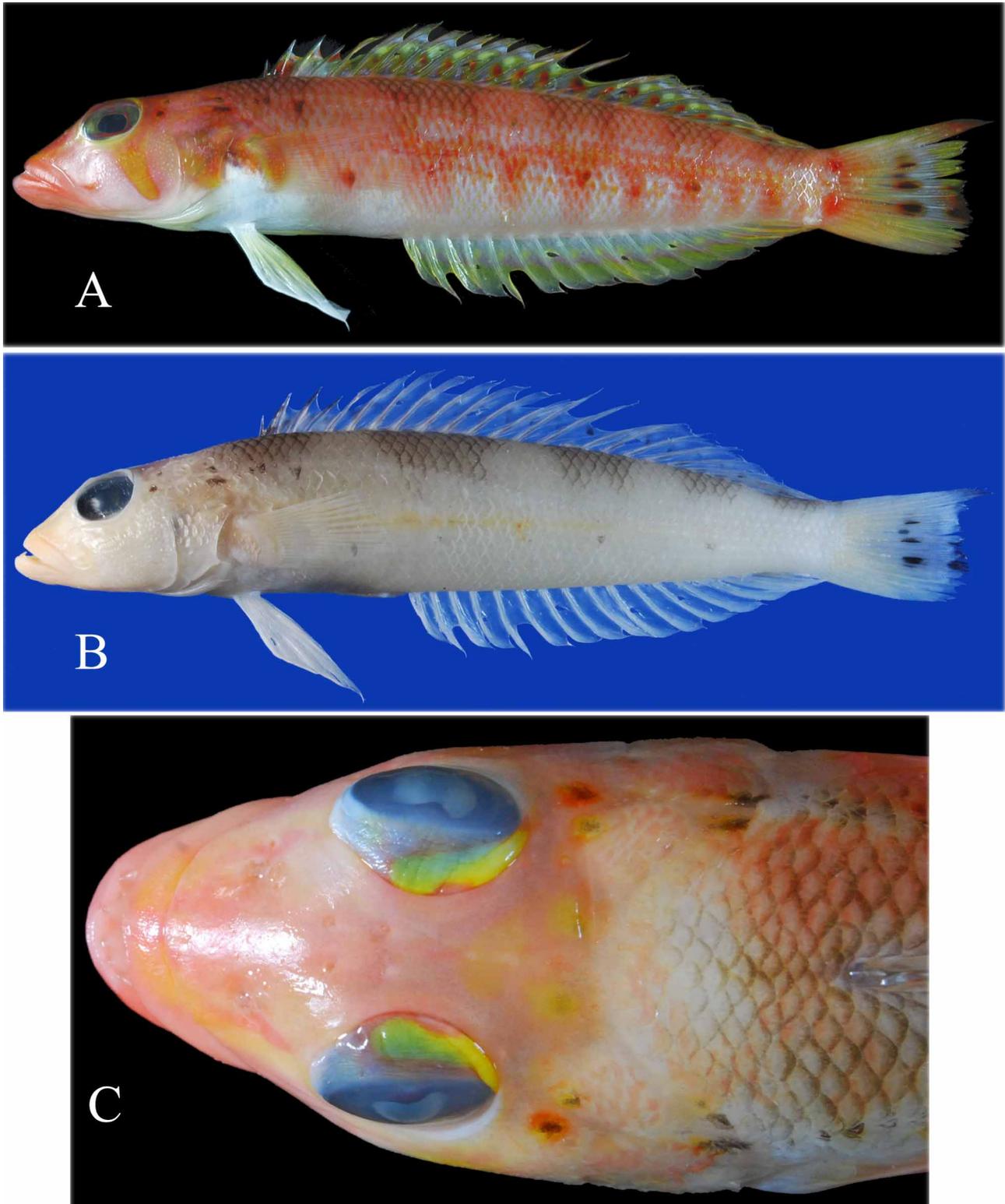


FIGURE 1. *Parapercis randalli* sp. nov., holotype, NMMBP 10462, female, 106.6 mm SL. A. fresh caught specimen. B. same specimen, after preservation in ethanol. C. dorsal view of head, after 2 days preservation in formalin.



FIGURE 2. *Parapercis randalli* sp. nov., A. NMMBP 10463, paratype, 1 of 2 specimens, female, 102.2 mm SL, after 2 days preservation in formalin. B. QM I.38817, paratype, 96.9 mm SL, fresh caught specimen.

Origin of dorsal fin over 3rd lateral-line scales (2nd or 3rd in all paratypes), the predorsal length 3.2 (3.2–3.4) in SL, equal to head length; 1st dorsal spine 13.8 (7.4–15.7) in HL; 2nd dorsal spine 6.6 (4.7–6.6) in HL; 3rd dorsal spine 5.7 (4.2–5.7) in HL; 4th dorsal spine longest, 4.5 (3.5–4.5) in HL; 5th dorsal spine 4.7 (4.3–4.9) in HL, entirely attached to 1st soft ray by membrane; last dorsal soft ray longest, 2.3 (1.9–2.4) in HL; origin of anal fin below base of 4th dorsal soft ray, the preanal length 2.2 (2.1–2.2) in SL; anal spine 8.0 (6.5–8.8) in HL; last anal soft ray longest, 2.5 (2.3–2.5) in HL; posterior margin of caudal fin slightly rounded on ventral half, a small notch at middle, truncate on dorsal half, with a prolonged upper lobe centered on 3rd branched ray, extending about 2/3 orbit diameter posterior to central margin of fin, the total fin length 4.6 (4.5–4.9) in SL, 1.4 in HL; pectoral fins broadly rounded when spread, the tenth ray longest, 5.1 (4.8–5.1) in SL, 1.6 (1.4–1.6) in HL; origin of pelvic fins anterior to that of pectoral fin, below base of exposed part of opercular spine, the prepelvic length 3.7 (3.6–3.8) in SL, 1.1 (1.1–1.2) in HL; pelvic spine slender, 4.7 (4.3–4.7) in HL; pelvic fins extends beyond the anus (slightly beyond in 96.9-mm paratype), the fourth soft pelvic ray longest, 5.1 (5.0–5.6) in SL, 1.6 (1.4–1.6) in HL.

Color when fresh. Light reddish, grading to white ventrally, bright white between pectoral and pelvic fins; both jaws and anterior portion of snout reddish orange; five broad reddish brown saddles evenly distributed on dorsal surface of body; a row of eight red bars on lateral side between body axis and anal fin; one pair of brown spots posterior to eye, one pair above opercle and two unpaired ones between spinous dorsal fin and pectoral fin (those spots are smaller and yellowish in 96.9-mm paratype, Fig. 2C); upper portion of eye greenish yellow (Fig. 1C); a yellow ventroposterior-directed bar with red margin on cheek, a horizontal series of 15 brownish red spots on membranes between the soft dorsal-fin rays, the middle ones with a darker center; spinous dorsal fin membrane red anteriorly and dorsally, blackish in the remaining portion; two diffuse red spots on caudal fin base; two vertical series of irregular black spots on caudal fin, one at posterior 2/5 length and one at rear margin of the fin; prolonged caudal-fin rays blackish; pelvic and anal fins yellowish; and a light blue stripe crossing upper soft dorsal fin and a light pink stripe crossing the anal fin.

Color in alcohol. Creamy white with five broad dusky blotches on dorsal surface of body, grading smaller from anterior to posterior, the first one between posterior margin of neurocranium and origin of soft dorsal fin, the middle three at soft dorsal fin base, slightly forked ventrally and the last one at caudal peduncle; one pair

of grey spots posterior to eye, one pair above opercle and two single ones between spinous dorsal fin and pectoral fin; a horizontal series of small grey spots on membranes between the soft dorsal-fin rays; spinous dorsal fin grayish; two irregular vertical series of dark spots on caudal fin, one at posterior 2/5 length and one at rear margin of the fin; prolonged caudal-fin rays blackish; a series of five small grey spots on lateral body below the body axis (Figs. 1B, 2A); peritoneum light brown; and gill cavity pale to grayish.

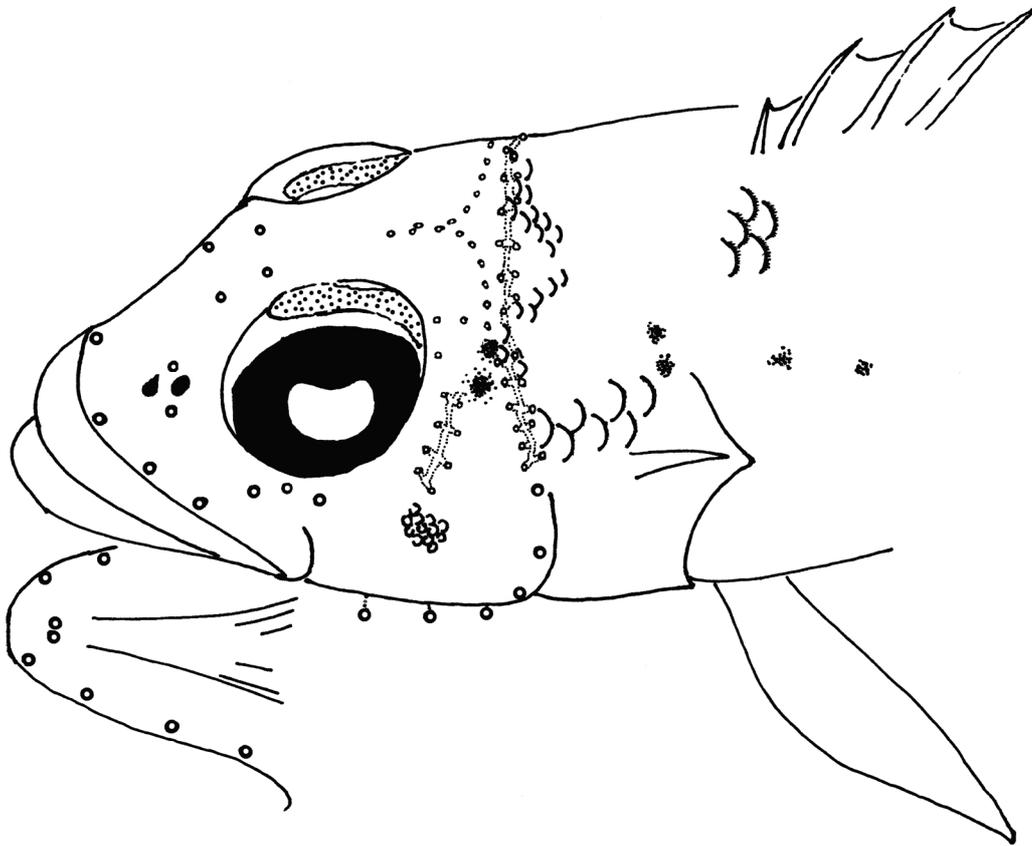


FIGURE 3. Dorsolateral view of head of *Parapercis randalli* sp. nov., holotype, NMMBP 10462, female, 106.6 mm SL, showing the cephalic sensory pores and the black spots on head. Mandibular pores are showed in lower figure, nostrils are in black color.

Etymology. Named after Dr. John E. Randall in recognition of his great contributions to the taxonomy of pinguipedids and his long-term friendship with the authors.

Distribution. Known from three specimens collected from Kenting, Pingtung, southern Taiwan. Bathymetric range 5–150 m.

Comparison. *Parapercis randalli* sp. nov. is most similar to *P. basimaculata*, which was described from Ryukyu Islands at a depth 50–70 m, in having similar meristic formula, body proportions, a prolongation on caudal fin and black spots on dorsal and caudal fins. It differs from *P. basimaculata* in coloration (i.e. two small spots above opercle vs. a large blotch; the blotches crossing dorsal body very wide vs. relatively narrow; cheek bar yellowish with red margin vs. reddish without contrasting margin; a single row of small spots on soft dorsal fin vs. two rows; two rows of black spots on rear margin of caudal fin vs. one row; a row of 6 small gray spots below the body axis vs. absent; no spots on neurocranium vs. three pairs; no spots on anal fin vs. present; lacking a narrow bar between each blotches vs. present; and lacking narrow bars of caudal fin vs. present); a relatively long prepelvic length (26.5–27.7% SL vs. 24.5% SL), a relatively low dorsal and anal fin, reflected by the relatively short longest soft dorsal and anal fin rays (12.4–15.9% SL vs. 16.3% SL and 12.0–13.1% SL vs. 14.7% SL, respectively); a relatively short pectoral fin (19.6–20.9% SL vs. 22.8% SL), a relatively short caudal fin (20.2–22.1% SL vs. 25.7% SL).

Parapercis randalli sp. nov. is also similar to *P. colemani* Randall & Francis from the Norfolk Island in having five brownish saddles on dorsal surface but differs mainly in having black spots on caudal fin and a relatively fewer scale counts (lateral-line scales 53 vs. 57–58 in *P. colemani*, transversal scale rows 6/11–12 vs. 8/14, and circumpeduncular scales 24 vs. 29).

Remarks. Four type specimens were collected by angling together with *Parapercis shaoi* Randall, *P. clathrata* Ogilby, *P. millepunctata* (Günther), *Synodus dermatogenys* Fowler and *Synodus* sp. in coastal areas off Kenting, southern Taiwan, at a depth of 5–150 m.

It is notable that the male specimen (101.2-mm paratype) has all dorsal-fin spines relatively longer than the two other female specimens. This may represent sexual dimorphism in this species. However, no color differences are observed between the sexes.

Acknowledgements

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