Zootaxa 3165: 25–38 (2012)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Two new species of striped *Pseudochromis* from the Philippine Islands and Indonesia, with a redescription of *P. colei* (Perciformes: Pseudochromidae)

ANTHONY C. GILL[1,2], GERALD R. ALLEN[3] & MARK ERDMANN[4]

[1]*Macleay Museum and School of Biological Sciences, A12 – Macleay Building, The University of Sydney, New South Wales 2006, Australia. E-mail: anthony.c.gill@sydney.edu.au*

[2]*Ichthyology, Australian Museum, 6 College Street, Sydney, New South Wales 2010, Australia*

[3]*Western Australian Museum, Locked Bag 49, Welshpool DC, Perth, Western Australia 6986, Australia*

[4]*Conservation International, Jl. Dr. Muwardi No. 17, Denpasar, Bali 80235 Indonesia*

Abstract

Pseudochromis ammeri **sp. nov.** and *P. eichleri* **sp. nov.** are described from Indonesia (Raja Ampat Islands, West Irian and Halmahera) and the Philippines (Calamianes Group, Boracay and northern Palawan), respectively. In having in combination a dark longitudinal stripe on the body and the anterior tip of the palatine tooth patch directed medially behind posterolateral arm of vomerine tooth patch, the two species closely resemble *P. colei* Herre from the Philippines. The latter species is redescribed on the basis of the holotype from Culion and two specimens recently collected in northern Palawan. The three species closely resemble each other but differ in live coloration and several scale count characters.

Key words: Pseudochromidae, dottyback, *Pseudochromis eichleri* **sp. nov.**, *Pseudochromis ammeri* **sp. nov.**, *Pseudochromis colei*, systematics

Introduction

Fishes of the Indo-Pacific fish subfamily Pseudochrominae were revised by the first author (Gill 2004), who recognised 80 species in ten genera. Additional new species have been subsequently described, particularly in the genus *Pseudochromis* Rüppell (1835), mostly resulting from new collections from the highly biodiverse "Coral Triangle" area of the West Pacific. We herein describe two additional new species of the genus from the Coral Triangle. An individual of one of the new species from Boracay Island, Philippine Islands, was illustrated by Eichler and Myers (1997) as *P. colei* Herre (1933), which they also reported from northern Indonesia. Previously, *P. colei* was known only on the basis of the holotype from Culion, Calamianes Group, Philippine Islands. The identification and distribution information were provided by the first author; the record from Indonesia was based on a photograph by R.M. Pyle of an individual at Tanjung Sipsipi, Halmahera (0°39'N 128°23'E). However, as noted by Gill (2004), more careful examination of the photographs showed that these identifications were in error. Although the photographed individuals closely resembled the holotype of *P. colei* in general morphology and in overall colour pattern (though the live coloration of *P. colei* was unknown at that time), they differed in having much smaller scales. Furthermore, the Halmahera and Boracay Island individuals differed slightly from each other in live coloration, raising doubts that they were conspecific. However, as Gill (2004) lacked specimens, he was unable to assess their taxonomic status.

Since publication of Gill's (2004) revision, the second and third authors have collected and photographed specimens of *P. colei* in northern Palawan, specimens conspecific with the Boracay Island fish in northern Palawan and the Calamianes Group, Philippines, and specimens of the Halmahera species in the Raja Ampat Islands and the west coast of West Papua, Indonesia. The latter species is now relatively well known to divers, and has been illustrated in several fish guides (e.g. Kuiter & Tonozuka 2001, Michael 2004, Kuiter & Debelius 2006). These photographs, as well as underwater observations of all three species by the second and third authors, have revealed consistent differences in coloration. Similarly, comparison of specimens has revealed other morphological differences. We therefore herein present descriptions of the two new species and a redescription of *P. colei*.

Accepted by M. R. deCarvalho: 21 Nov. 2011; published: 19 Jan. 2012

Materials and methods

Methods of counting, measuring and presentation follow Gill (2004). Institutional codes are as follows: AMS—Australian Museum, Sydney; SU—Stanford University (specimens held at California Academy of Sciences, San Francisco); MZB—Museum Zoologicum Bogoriense, Cibinong, Indonesia; WAM—Western Australian Museum, Perth. Comparisons with other species are based on specimens listed in Gill (2004).

Pseudochromis ammeri sp. nov.

Raja Ampat Dottyback

Figures 1–4, Table 1

Pseudochromis sp. 3 ("Batanta Dottyback"); Kuiter and Tonozuka 2001: 184 (colour photos; Raja Ampat Islands).
Pseudochromis sp.: Allen, 2002: 52 (habitat).
Pseudochromis sp. ("Raja Dottyback, Bantanta Dottyback"); Michael, 2004: 136 (distribution, habitat, aquarium requirements, colour photo).
Pseudochromis 'Irian Jaya': Kuiter and Debelius 2006: 331 (colour photos).
Pseudochromis sp. 1: Allen and Erdmann, 2009: 599.

Holotype. MZB 20566, 59.6 mm SL, Indonesia, West Papua, Raja Ampat Islands, Pulau Wagmab, 2°00.483'S 130°38.121'E, 32 m, G.R. Allen, 1 February 2008.

Paratypes. WAM P.31444-001, 53.9 mm SL, Indonesia, West Papua, Waigeo Island, west side of entrance to Mayalibit Bay, 0°19.725'S 130°56.390'E, 15–20 m, sand and rubble, spear, G.R. Allen, 2 May 1998; WAM P.31540-001, 2: 57.3–70.7 mm SL, Indonesia, West Papua, Raja Rampat Islands, Kri Island, 0°33.391'S 130°41.417'E, 25–27 m, G.R. Allen, 13 April 1999; WAM P.32949-005, 10: 33.0–66.0 mm SL, Indonesia, West Papua, north Fakfak Peninsula, rocky islets off NW side of Ogar Island (02°36.332'S 132°24.775'E), 3–15 m, G.R. Allen, 16 January 2008; AMS I.45650-001, 2: 42.4-43.4 mm SL, collected with holotype; AMS I.45650.002, 2: 56.0–57.5 mm SL (cleared and stained), collected with holotype; WAM P.32963-002, 3: 26.3–56.0 mm SL, collected with holotype.

Diagnosis. *Pseudochromis ammeri* differs from other pseudochromids in having the following combination of characters: pelvic-fin rays I,5; dorsal-fin rays III,24–25, usually III,24; anal-fin rays III,14; anterior tip of palatine tooth patch directed medially behind posterolateral arm of vomerine tooth patch; dark (dark grey to black in life) longitudinal stripe on upper part of body, when present on body, extending horizontally to or towards caudal-fin base; scales in lateral series 39–43; and circumpeduncular scales 20–21, usually 20.

Description (based on 21 specimens, 26.3.0–70.7 mm SL; data for all types followed, where variation was noted, by data for holotype in parentheses). Dorsal-fin rays III,24–25 (III,24), last 8–25 segmented rays branched (all rays or all but first branched in specimens larger than about 40 mm SL; all branched in holotype); anal-fin rays III, 14, all or all but first 1–2 (all) segmented rays branched; pectoral-fin rays 17–18 (18/18); upper procurrent caudal-fin rays 6–8 (7); lower procurrent caudal-fin rays 6–8 (7); total caudal-fin rays 29–33 (31); scales in lateral series 39–43 (43/39); anterior lateral-line scales 28–34 (30/29); anterior lateral line terminating beneath segmented dorsal-fin ray 15–19 (15/16); posterior lateral-line scales 5–14 + 0–2 (11 + 1/10 + 1); scales between lateral lines 4; horizontal scale rows above anal-fin origin 14–16 + 1 + 2–4 = 18–20 (15 + 1 + 3/14 + 1 + 3); circumpeduncular scales 20–21 (20); predorsal scales 15–22 (21); scales behind eye 2–3 (3); scales to preopercular angle 5–7 (6); gill rakers 5–8 + 12–14 = 18–22 (6 + 13); pseudobranch filaments 9–14 (12); circumorbital pores 24–32 (30/28); preopercular pores 11–17 (14/12); dentary pores 4; posterior interorbital pores 1–2 (2).

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior AIO pores to anterior AIO pores; opercle with 4–5 moderately developed to large, distinct serrations; teeth of outer ceratobranchial-1 gill rakers in two rows running most of length of rakers, becoming restricted to tips on lower rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1 (S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1); dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/1 + 1/1/1 + 1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin emarginated to strongly emarginate; vertebrae 10 + 16; epineurals 13–15 (13); epurals 3.

FIGURE 1. *Pseudochromis ammeri*, striped individual, 20 m, Kri Island, Raja Ampat Islands, West Papua, Indonesia. (Photo by G.R. Allen)

FIGURE 2. *Pseudochromis ammeri*, weakly striped individual 15 m, Waigeo Island, Raja Ampat Islands, West Papua, Indonesia. (Photo by G.R. Allen)

FIGURE 3. *Pseudochromis ammeri*, weakly striped individual, 12 m, Misool Island, Raja Ampat Islands, Indonesia. (Photo by G.R. Allen)

Upper jaw with 2–4 pairs of curved, enlarged caniniform teeth, and about 3–4 (at symphysis) to 2–3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1–4 pairs of curved, enlarged caniniform teeth, and about 3–4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1–2 rows of small conical teeth, forming chevron; palatine with 1–2 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 15 specimens, 36.4–70.7 mm): head length 23.2–28.1 (25.3); orbit diameter 6.8–10.7 (8.7); snout length 6.1–7.6 (7.2); fleshy interorbital width 5.0–5.9 (5.5); bony interorbital width 3.4–3.9 (3.7); body width 10.1–12.7 (11.6); snout tip to posterior tip of retroarticular bone 13.8–17.7 (14.4); predorsal length 31.0–35.3 (32.7); prepelvic length 29.2–36.1 (29.7); posterior tip of retroarticular bone to pelvic-fin origin 15.3–20.5 (16.4); dorsal-fin origin to pelvic-fin origin 24.2–28.8 (26.8); dorsal-fin origin to middle dorsal-fin ray 31.3–36.3 (32.7); dorsal-fin origin to anal-fin origin 38.3–42.2 (40.1); pelvic-fin origin to anal-fin origin 27.5–32.0 (32.0); middle dorsal-fin ray to dorsal-fin termination 22.5–27.5 (26.7); middle dorsal-fin ray to anal-fin origin 23.0–26.2 (23.3); anal-fin origin to dorsal-fin termination 31.3–36.1 (33.1); anal-fin base length 24.1–28.2 (25.5); dorsal-fin termination to anal-fin termination 14.1–16.9 (16.3); dorsal-fin termination to caudal peduncle dorsal edge 10.7–12.4 (11.6); dorsal-fin termination to caudal peduncle ventral edge 18.2–20.4 (20.0); anal-fin termination to caudal peduncle dorsal edge 20.0–22.1 (20.8); anal-fin termination to caudal peduncle ventral edge 12.6–15.3 (13.4); first dorsal-fin spine 1.7–3.0 (1.7); second dorsal-fin spine 3.8–6.2 (4.9); third dorsal-fin spine 6.9–9.4 (7.6); first segmented dorsal-fin ray 10.4–12.6 (11.2); fourth last segmented dorsal-fin ray 14.7–18.8 (17.3); first anal-fin spine 1.4–2.8 (1.8); second anal-fin spine 4.4–6.6 (4.5); third anal-fin spine 5.7–8.1 (6.2); first segmented anal-fin ray 10.1–12.2 (10.6); fourth last segmented anal-fin ray 13.6–17.0 (15.8); third pectoral-fin ray 13.6–16.1 (13.6); pelvic-fin spine 7.9–10.6 (8.1); second segmented pelvic-fin ray 16.8–21.0 (18.3); caudal-fin length 23.3–26.2 (24.8).

TABLE 1. Frequency of meristic characters of *P. ammeri, P. colei* and *P. eichleri*. * indicates characters for which bilateral counts are included. ** indicates characters that include bilateral counts for the holotype of *P. colei*.

	Segmented dorsal-fin rays			Consecutive dorsal Pterygiophores inserting in 1:1 relationship with interneural spaces behind neural spine 4		Segmented anal-fin rays			Pectoral-fin rays*					
	24	25		4	5	14	15		17	18	19			
P. ammeri	20	1		4	17	21	-		3	39	-			
P. colei	3	-		-	3	2	1		2	4	-			
P. eichleri	5	-		-	5	5	-		-	7	3			
	Caudal fin rays													
	Upper procurrent				Lower procurrent			Total						
	6	7	8		6	7	8	29	30	31	32	33		
P. ammeri	1	16	4		3	1 6	2	1	2	14	2	2		
P. colei	2	1	-		3	-	-	2	1	-	-	-		
P. eichleri	-	5	-		2	3	-	-	2	3	-	-		
	Scales in lateral series*													
	33	34	35	36	37	38	39	40	41	42	43	44	45	
P. ammeri	-	-	-	-	-	-	2	8	12	10	10	-	-	
P. colei	1	1	3	1	-	-	-	-	-	-	-	-	-	
P. eichleri	-	-	-	-	-	-	-	-	2	4	1	2	1	
	Anterior lateral-line scales*									Termination of anterior lateral line relative to segmented D rays*				
	28	29	30	31	32	3 3	34	35		15	16	17	18	19	20
P. ammeri	2	3	2	6	9	9	6	-		3	3	10	17	3	-
P. colei	1	4	1	-	-	-	-	-		-	-	-	2	1	3
P. eichleri	-	-	-	1	3	2	2	2		-	1	4	4	1	-
	Posterior lateral-line scales*													
	Peduncular*											Caudal fin*		
	5	6	7	8	9	10	11	12	13	14		0	1	2
P. ammeri	1	-	-	11	-	12	16	2	-	1		3	27	4
P. colei	1	1	-	1	1	1	-	1	-	-		-	3	-
P. eichleri	1	-	-	4	-	-	4	-	1	-		2	4	3

continued next page

TABLE 1. (continued)

	Scales between lateral lines*			Circumpeduncular scales							
	3	4	5	16	17	18	19	20	21	22	23
P. ammeri	-	37	-	-	-	-	-	17	3	-	-
P. colei	6	-	-	3	-	-	-	-	-	-	-
P. eichleri	-	3	7	-	-	-	-	-	-	4	1

	Horizontal scale rows above and below anterior lateral line										
	Below*								Above*		
	11	12	13	14	15	16	17	18	2	3	4
P. ammeri	-	-	-	7	26	3	-	-	1	36	1
P. colei	1	4	1	-	-	-	-	-	2	4	-
P. eichleri	-	-	-	-	1	2	6	1	-	10	-

	Total horizontal scale rows above anal-fin origin*								
	14	15	16	17	18	19	20	21	22
P. ammeri	-	-	-	-	14	19	3	-	-
P. colei	1	1	3	1	-	-	-	-	-
P. eichleri	-	-	-	-	-	1	2	6	1

	Predorsal scales										Predorsal scale termination position						
	15	16	17	18	19	20	21	22	23	24	Posterior AIO pores		Mid AIO pores		Anterior AIO pores		Midway between anterior AIO and posterior nasal pores
P. ammeri	1	-	-	-	5	3	8	4	-	-	3		16		2		-
P. colei	1	1	1	-	-	-	-	-	-	-	-		1		1		1
P. eichleri	-	-	-	1	-	1	1	1	-	1	-		5		-		-

	Cheek scales				Pseudobranch filaments**								
	Scales behind eye		Scales to preopercular angle										
	2	3	5	6	7	8	9	10	11	12	13	14	
P. ammeri	6	15	6	12	3	-	1	6	5	6	2	1	
P. colei	1	2	3	-	-	-	1	1	-	2	-	-	
P. eichleri	1	4	-	1	3	1	-	-	1	-	4	-	

	Gill rakers															
	Upper**					Lower**			Total**							
	4	5	6	7	8	12	13	14	16	17	18	19	20	21	22	
P. ammeri	-	1	13	6	1	8	10	3	-	-	8	6	5	1	1	
P. colei	2		1	1	-	2	2	-	1	1	-	2	-	-	-	
P. eichleri	-	-	2	2	1	-	2	3	-	-	-	1	2	1	1	

Live coloration (based on underwater photographs of individuals from Halmahera, the Raja Ampat Islands and the Birds Head Peninsula of West Irian): striped form (specimens smaller than about 65.0 mm SL; Figure 1): dorsal contour of body and head, including snout and usually lips, bluish grey; dark grey to black stripe extending from behind middle of eye to midanterior part of caudal peduncle, stripe diffuse on head; remainder of head below dark stripes pale pinkish grey to white; short dark blue to grey bar behind midposterior edge of eye, this edged posteriorly with longer, anteroventrally curved pale to bright blue bar; additional pale blue to bright blue bars and spots sometimes present on cheek and upper part of operculum; iris reddish brown to dark grey, with bright blue suboval ring around pupil; scales of nape, bluish grey area on body, dark stripe and area surrounding dark stripe each with mauve to blue basal spot; dark stripe on body sometimes becoming bright yellow posteriorly on caudal peduncle and extending on to mid-upper caudal-fin base; dorsal part of caudal peduncle above stripe yellowish grey to bright yellow or orange; bright yellow stripe extending from beneath pectoral-fin base to lower part of caudal-fin base; area between stripes on body pale pink to white; dorsal fin bluish or orangish grey basally, bluish (anteriorly) to yellowish or orangish (posteriorly) hyaline distally, with indistinct bluish grey to pale blue oblique stripes on distal part of fin and pale blue distal margin; anal fin hyaline to pinkish or yellowish hyaline, with two or three bluish grey to blue oblique stripes and blue distal margin; caudal fin yellowish hyaline, with bright yellow to black stripe on caudal-fin base extending to fin-ray tips; lower yellow stripe from body also extending on to fin-ray tips; caudal fin between stripes white basally, becoming yellowish hyaline posteriorly; upper and lower margins of caudal fin pale blue to white; pectoral and pelvic fins pinkish to yellowish hyaline. Weakly striped or non-striped forms (about 55 mm SL or larger; Figures 2–3): Similar to striped form, except dark stripe on body diffuse and yellowish grey to grey, or absent; yellow stripe on ventral part of body either more intense and extending on to ventral part of head, or pale grey and barely differentiated from coloration between stripes; cheeks pale yellow to orange, with blue markings more distinct; dorsal part of body above upper stripe position varying from dark bluish grey to bright yellow; ground coloration of anal fin and posterior part of dorsal fin varying from bluish to yellowish hyaline; stripes on caudal fin varying from yellowish grey to bright yellow, lower or both stripes sometimes absent.

Preserved coloration: pattern similar to live coloration, the dark stripe (when present) remaining; snout and dorsal part of head brown, the remainder of head pale yellowish brown; short dark blue to dark grey bar behind eye becomes dark grey to black; nape and dorsal part of body above dark stripe becomes yellowish brown; body below dark stripe becomes pale yellowish brown, the lower stripe no longer distinguishable; mauve to blue spots and markings on head, nape and body varying from absent to distinct and brown; dorsal fin pale yellowish brown anteriorly, the remainder of fin becoming greyish hyaline basally and hyaline proximally; anal fin similar to dorsal fin, but without greyish hyaline coloration along base; blue stripes on dorsal and anal fins remain, becoming greyish brown; caudal fin pale yellow to pale yellowish brown, with upper body stripe barely extending on to fin base; pectoral and pelvic fins pale yellow to hyaline.

Habitat and distribution. Based on the second and third authors' extensive surveys and collections in eastern Indonesia in general and Halmahera and the Papuan Bird's Head Peninsula in particular, we feel confident in our assessment that *Pseudochromis ammeri* is essentially endemic to the Raja Ampat Islands, where it is the most common dottyback encountered. Although we did collect and photograph several individuals from the Kokas and Ogar Island group just to the southeast of Raja Ampat, and a single individual was photographed by R.M. Pyle on the eastern side of Halmahera (approximately 160 km west of Raja Ampat), exhaustive surveys around Halmahera, Cendrawasih Bay and FakFak and Kaimana (the regions immediately to the west, east and south of Raja Ampat, respectively) have shown conclusively that this species does not penetrate significantly outside of Raja Ampat. Figure 4 shows the distribution records for *P. ammeri*. Within Raja Ampat, it is generally found around isolated, small coral and rock outcrops in both silty and clear water reef environments, usually in about 10–45 m depth (but occasionally seen as deep as 60m). It occurs solitarily or in small loose groups, and is relatively curious and easy to photograph, though it invariably retreats into crevices or under coral heads when approached too closely.

Comparisons. *Pseudochromis ammeri* resembles *P. eichleri* new species from the Philippine Islands, *P. colei* Herre (1933) from Culion (Calamianes Islands) and northern tip of Palawan Island, Philippine Islands, *P. erdmanni* Gill and Allen (2011) from Indonesia, *P. howsoni* Allen (1995) from the North West Shelf of Australia, *P. moorei* Fowler (1931) from the Philippine Islands, *P. perspicillatus* Günther (1862) from the Philippine Islands and Indonesia, *P. quinquedentatus* McCulloch (1926) from northern Australia, and *P. steenei* Gill and Randall (1992) from Indonesia in having medially-inserted palatine tooth patches (see Gill, 2004: fig. 23A). Of these species, *P. ammeri* most closely resembles *P. colei* and *P. eichleri* in having a dark longitudinal stripe on the upper part of the body; *P.*

perspicillatus also has a dark stripe extending from behind the eye, but it is oblique rather than horizontal (crossing the middle part of the anterior lateral line to join a basal dark stripe on the middle part of the dorsal fin). The following meristic characters distinguish the three species (Table 1): scales in lateral series (33–36 in *P.* colei, 39–43 in *P. ammeri* and 41–45 in *P. eichleri*); scales between lateral lines (3 in *P. colei*, 4 in *P. ammeri* and 4–5 in *P. eichleri*); circumpeduncular scales (16 in *P. colei*, 20–21, usually 20, in *P. ammeri*, and 22–23 in *P. eichleri*); horizontal scales below anterior lateral line (11–13 in *P. colei*, 14–16, usually 15, in *P. ammeri*, and 15–18 in *P. eichleri*). *Pseudochromis colei* possibly differs from the other two species in having the anterior segmented dorsal-fin rays unbranched, though further specimens are needed to confirm this. Although ray branching is size related, all dorsal segmented rays are branched in the available specimens of *P. eichleri* (50.8–68.3 mm SL) and in specimens of *P. ammeri* larger than about 40 mm SL; in contrast, the anterior 5 and 16 rays are unbranched in the two largest specimens of *P. colei* (59.6 and 41.0 mm SL, respectively).

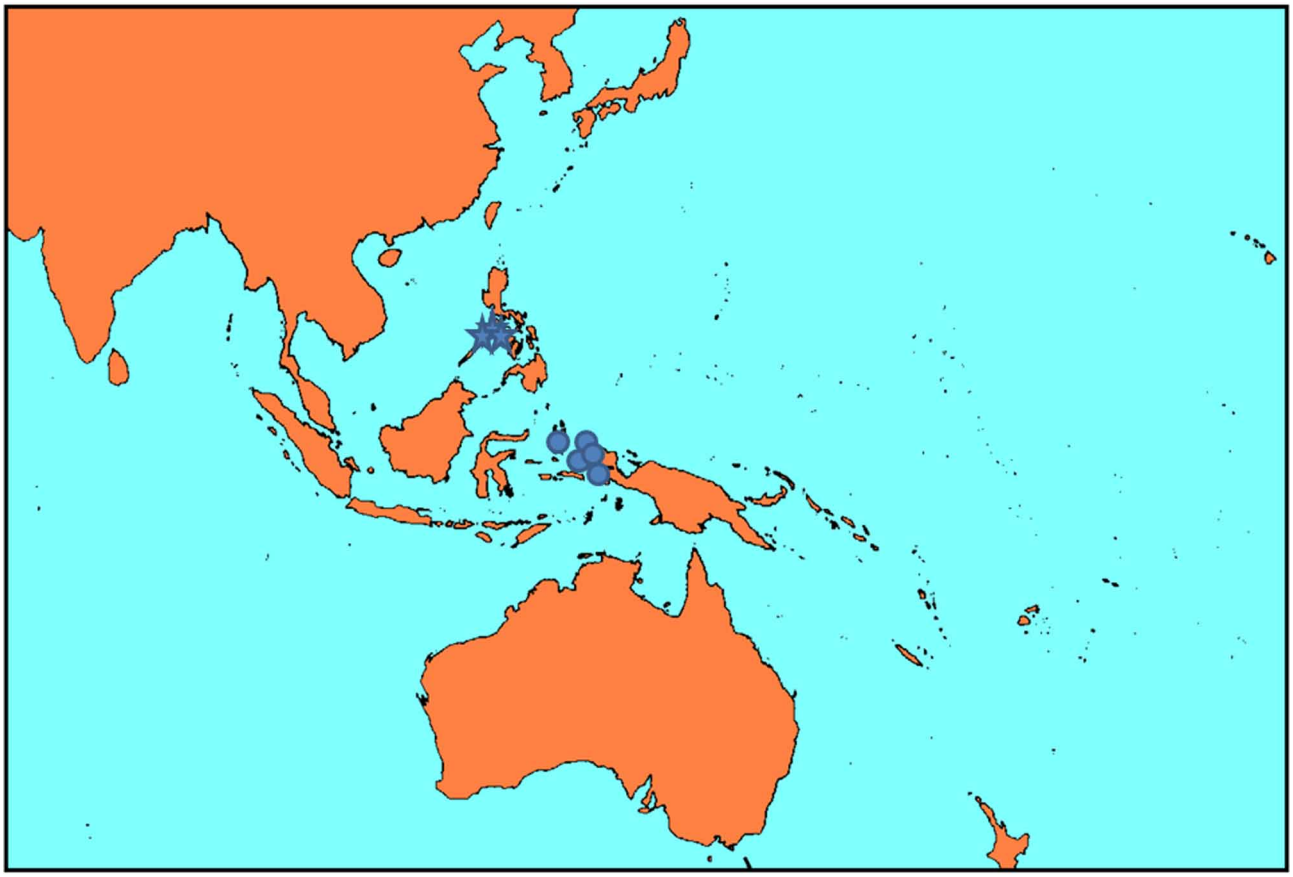

FIGURE 4. Distribution records for *Pseudochromis ammeri* (dots) and *P. eichleri* (stars).

The three species also differ in live coloration. *Pseudochromis colei* is particularly distinctive, differing from the other two species in having: a better defined dark stripe on the body and head; a dark stripe extending from the midanterior edge of the eye to the upper lip (absent in the other two species); and the lower part of the body behind the anal-fin origin pale pink to mauve, with narrow yellow to pale orange oblique stripes along each scale row. The live colorations of *P. ammeri* and *P. eichleri* are more similar. However, *P. ammeri* differs from *P. eichleri* in having the lower (yellow) stripe on the body more distinct, and extending farther forward (to the pectoral-fin base versus to the posterior part of the lower abdomen), though this is less conspicuous in large individuals (e.g., Fig. 3). Moreover, whereas large individuals of *P. ammeri* lack a dark stripe on the upper body, all observed large individuals of *P. eichleri* were distinctly striped.

The live colorations of *P. ammeri* and P. *eichleri* closely resemble that of the striped form of *P. dixurus* Lubbock from the Red Sea (see Gill, 2004: pl. 5J). However, the species are readily distinguished by various characters, including: palatine tooth-patch orientation (medially inserted in *P. ammeri* and *P. eichleri* versus more-or-less contiguous with posterior arms of vomerine tooth patch in *P. dixurus*); gill-raker counts (5–8 +12–14 = 18–22 in *P.*

ammeri, 6–8 + 13–14 = 19–22 in *P. eichleri* versus 7–9 + 16–17 = 23–26 in *P. dixurus*); and caudal-fin shape (emarginate to strongly emarginate in *P. ammeri* and *P. eichleri* versus strongly forked to lunate in *P. dixurus*). Moreover, the two species differ from *P. dixurus* in not having a gold-edged dark spot on the opercular flap (present in *P. dixurus*).

Remarks. This species is named for Mr Max Ammer, the pioneer of diving in the Raja Ampat Islands and the man who invited the second author to lead the marine rapid assessment of Raja Ampat that provided the first detailed observations of this species. For the past decade Max has continued to support the second and third authors' biodiversity research in the region and has been a close friend and eager compatriot in exploring Raja Ampat and the Bird's Head region. It is a pleasure to name this beautiful dottyback species in his honour.

***Pseudochromis eichleri* sp. nov.**
Eichler's Dottyback
Figures 4–5, Table 1

Pseudochromis colei [*non* Herre 1933]; Eichler and Myers 1997: 119 (colour photo; distribution in part).
Pseudochromis cf. *colei*; Gill 2004: pl. 5F (colour photo).

Holotype. WAM P.31398-014, 68.3 mm SL, Philippine Islands, Calamianes Group, off southeast tip of Galoc Island (11º57'N 119º50'E), spear, 10–20 m, G.R. Allen, 12 February 1998.

Paratypes. AMS I.45651-001, 56.4 mm SL, Philippine Islands, Palawan, south Dilumacad Island, Bacuit Bay, 11°12.395'N 119°20.138'E, 20 m, clove oil and net, M.V. Erdmann, 6 June 2007; WAM P.32997-001, 58.2 mm SL, Philippine Islands, Palawan, Daracotan, 11°21.682'N 119°31.771'E, 30 m, M.V. Erdmann, 7 June 2008; WAM P.33003-006, 2: 50.8–57.2 mm SL, Philippine Islands, Palawan, Tigpuro Ang Bobog, 11°15.330'N 119°34.563'E, 25 m, clove oil and net, M.V. Erdmann, 9 June 2008.

Diagnosis. *Pseudochromis eichleri* differs from other pseudochromids in having the following combination of characters: pelvic-fin rays I,5; dorsal-fin rays III,24; anal-fin rays III,14; anterior tip of palatine tooth patch directed medially behind posterolateral arm of vomerine tooth patch; dark (dark grey to black in life) longitudinal stripe on upper part of body, extending horizontally to or towards caudal-fin base; scales in lateral series 41–45; and circumpeduncular scales 22–23.

Description (based on five specimens, 50.8–68.3 mm SL; data for all types followed, where variation was noted, by data for holotype in parentheses)**.** Dorsal-fin rays III,24, all segmented rays branched; anal-fin rays III,14, all segmented rays branched; pectoral-fin rays 18–19 (18/18); upper procurrent caudal-fin rays 7; lower procurrent caudal-fin rays 6–7 (7); total caudal-fin rays 30–31 (31); scales in lateral series 41–45 (45/43); anterior lateral-line scales 31–35 (35/33); anterior lateral line terminating beneath segmented dorsal-fin ray 16–19 (18/17); posterior lateral-line scales 5–13 + 0–2 (8 + 1/13 + 1); scales between lateral lines 4–5 (5); horizontal scale rows above anal-fin origin 15–18 + 1 + 3 = 19–22 (17 + 1 + 3/17 + 1 + 3); circumpeduncular scales 22–23 (22); predorsal scales 18–24 (21); scales behind eye 2–3 (2); scales to preopercular angle 6–8 (6); gill rakers 6–8 + 13–14 = 19–22 (6 + 13); pseudobranch filaments 11–13 (13); circumorbital pores 28–37 (31/32); preopercular pores 14–20 (19/20); dentary pores 4/4; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to mid AIO pores; opercle with 4–5 strong serrations; teeth of outer ceratobranchial-1 gill rakers in 2 rows running most of length of upper rakers, becoming confined to raker tips on lower rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1 + 1 (S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1); dorsal-fin spines moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1/1/1 + 1 (3/1 + 1/1/1/1 + 1/1/1 + 1); anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin slightly emarginate to emarginate; vertebrae 10 + 16; epineurals 13–14 (13); epurals 3.

Upper jaw with 2–4 pairs of curved, enlarged caniniform teeth, and about 6–7 (at symphysis) to 2–3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2–3 pairs of curved, caniniform teeth, and about 3–4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1–2 rows of small con-

ical teeth, forming chevron; palatine with 1–2 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

FIGURE 5. *Pseudochromis eichleri*, AMS I.45651-001, 56.4 mm SL, paratype, Bacuit Bay, Palawan, Philippines. (Photo by G.R. Allen)

As percentage of SL: head length 24.2–26.2 (24.2); orbit diameter 8.3–9.3 (8.3); snout length 6.5–7.7 (6.6); fleshy interorbital width 4.6–6.1 (5.3); bony interorbital width 3.7–4.2 (3.8); body width 11.2–12.4 (12.0); snout tip to posterior tip of retroarticular bone 14.9–15.4 (14.9); predorsal length 32.4–35.0 (32.4); prepelvic length 30.4–31.4 (30.9); posterior tip of retroarticular bone to pelvic-fin origin 15.9–17.3 (17.3); dorsal-fin origin to pelvic-fin origin 27.7–28.9 (27.7); dorsal-fin origin to middle dorsal-fin ray 31.8–34.4 (31.8); dorsal-fin origin to anal-fin origin 40.8–43.4 (40.8); pelvic-fin origin to anal-fin origin 29.5–33.9 (32.2); middle dorsal-fin ray to dorsal-fin termination 25.4–26.1 (25.5); middle dorsal-fin ray to anal-fin origin 25.7–26.5 (25.8); anal-fin origin to dorsal-fin termination 32.1–35.6 (34.4); anal-fin base length 24.5–27.8 (26.5); dorsal-fin termination to anal-fin termination 15,8–16.8 (16.8); dorsal-fin termination to caudal peduncle dorsal edge 11.8–12.7 (12.7); dorsal-fin termination to caudal peduncle ventral edge 19.3–20.4 (20.4); anal-fin termination to caudal peduncle dorsal edge 20.6–22.2 (21.5); anal-fin termination to caudal peduncle ventral edge 12.9–14.8 (14.8); first dorsal-fin spine 1.6–2.4 (2.2); second dorsal-fin spine 4.0–5.8 (5.3); third dorsal-fin spine 7.5–8.6 (7.9); first segmented dorsal-fin ray 11.4–13.1 (12.2); fourth last segmented dorsal-fin ray 15.8–17.0 (16.8); first anal-fin spine 1.4–2.2 (1.9); second anal-fin spine 4.7–6.3 (6.3); third anal-fin spine 6.7–7.6 (7.6); first segmented anal-fin ray 10.8–12.3 (12.3); fourth last segmented anal-fin ray 14.8–16.0 (16.0); third pectoral-fin ray 13.8–16.6 (14.8); pelvic-fin spine 9.4–10.2 (10.2); second segmented pelvic-fin ray 17.7–20.3 (18.6); caudal-fin length 23.9–25.0 (25.0).

Live coloration (based on photographs of individuals in northern Palawan, Boracay Island and the Calamianes Islands, Philippine Islands; Figure 5): snout and dorsal contour of head and body bluish grey; dark grey to black stripe extending from behind middle of eye to midanterior part of caudal peduncle, stripe diffuse on head; remainder of head below dark stripes pale pinkish or yellowish grey to white; short dark blue to grey bar behind midposterior edge of eye, this edged posteriorly with longer, anteroventrally curved pale to bright blue bar; additional pale blue to bright blue bars and spots sometimes present on cheek and upper part of operculum; iris reddish brown to dark grey, with bright blue suboval ring around pupil; scales of nape, bluish grey area on body, dark stripe and area

surrounding dark stripe each with mauve to blue basal spot; dark stripe on body sometimes becoming bright yellow posteriorly on caudal peduncle and extending on to mid-upper caudal-fin base; dorsal part of caudal peduncle above stripe yellow to pinkish grey; indistinct pale pink to salmon stripe extending from lower part of abdomen to lower part of caudal-fin base, becoming distinct and bright yellow posteriorly; area between stripes on body pale pink to white; breast sometimes pale blue to pale purplish grey; dorsal fin bluish grey (anteriorly) and yellow to orangish grey (posteriorly) on fin base, with remainder of fin bluish (anteriorly) to yellowish (posteriorly) hyaline; basal part of dorsal fin sometimes with blue-grey to blue (anteriorly) or yellow (posteriorly) spot at base of each fin ray; remainder of fin sometimes with bluish grey to pale blue stripes or rows of spots; distal margin of dorsal fin pale blue distal; anal fin hyaline to pinkish or yellowish hyaline, sometimes bright yellow basally, with two or three bluish grey to blue stripes and blue distal margin; caudal fin yellowish hyaline, with bright yellow to black stripe on caudal-fin base extending to fin-ray tips; lower stripe also extending on to fin-ray tips, area between stripes white basally, becoming yellowish hyaline posteriorly; upper and lower margins of caudal fin pale yellow or pale blue to white; pectoral pinkish to yellowish hyaline; pelvic fins white to pinkish or yellowish hyaline.

Preserved coloration: pattern similar to live coloration, the dark stripe on body remaining, though becoming less distinct on head; snout and dorsal part of head brown, the remainder of head pale yellowish brown; short dark blue to dark grey bar behind eye becomes dark grey to black; nape and dorsal part of body above dark stripe becomes yellowish brown; body below dark stripe becomes pale yellowish brown, the lower stripe no longer distinguishable; dorsal fin pale yellowish brown anteriorly, the remainder of fin becoming greyish hyaline basally and hyaline proximally, with about three (on anterior part of fin) to eight (on posterior part of fin) greyish brown stripes and rows of small spots; anal fin similar to dorsal fin, but without greyish hyaline coloration along base; caudal fin pale yellow to pale yellowish brown, with dark body stripe barely extending on to fin base; pectoral and pelvic fins pale yellow to hyaline.

Habitat and distribution. *Pseudochromis eichleri* is known only from the Philippine Islands, from northern Palawan, Boracay Island off the north-western tip of Panay Island, and from the Calamianes Group, northern Palawan Province (Figure 4). The second author observed this species at 12 of 38 sites in the Calamianes. It was most common on the western side of the group, particularly along the western coasts of Busuanga, Galoc and Culion Islands. It inhabited depths between 15–40 m, but was most common below 20 m, invariably in rubble habitats in low rocky outcrops. All individuals observed in northern Palawan were similarly below 20 m and in rubble habitats with low coral heads. The Boracay Island individual was photographed at a depth of 5 m in an open area with sand and some isolated corals and rocks (D. Eichler, pers. comm.).

Comparisons. See comparisons above for *P. ammeri*.

Remarks. The specific epithet is for Dieter Eichler, who first photographed the species.

***Pseudochromis colei* Herre**

False Bandit Dottyback

Figures 6–7, Table 1

Pseudochromis colei Herre, 1933: 18 (type locality: Culion, Philippine Islands); Herre, 1934: 45 (list); Roxas & Martin, 1937: 123 (list); Herre, 1953: 372 (list); Böhlke, 1953: 70 (list); Gill & Randall, 1992: 44 (comparison); Gill, 2000: 2563 (key); Gill, 2004: 91, figs 35–36 (description, distribution).

Diagnosis. A species of *Pseudochromis* with the following combination of characters: palatine tooth patches inserted medially behind vomerine tooth patch; circumpeduncular scales 16; and upper part of body with dark longitudinal stripe extending from middle of upper lip through eye above anterior lateral line to mid-upper caudal-fin rays.

Description (based on three specimens, 28.2–59.6 mm SL; holotype values are provided elsewhere by Gill 2004). Dorsal-fin rays III,24, last 7–19 segmented rays branched; anal-fin rays III,14–15, last 4–15 segmented rays branched; pectoral-fin rays 17–18; upper procurrent caudal-fin rays 6–7; lower procurrent caudal-fin rays 6; total caudal-fin rays 29–30; scales in lateral series 33–36; anterior lateral-line scales 28–30; anterior lateral line terminating beneath segmented dorsal-fin ray 18–20; posterior lateral-line scales 5–12 + 1; scales between lateral lines 3; horizontal scale rows above anal-fin origin 11–13 + 1+ 2–3 = 14–17; circumpeduncular scales 16; predorsal scales 15–17; scales behind eye 2–3; scales to preopercular angle 5; gill rakers 4–7 + 12–13 = 16–19; pseudobranch filaments 9–12; circumorbital pores 22–27; preopercular pores 11–16; dentary pores 4; posterior interorbital pores 1.

FIGURE 6. *Pseudochromis colei*, WAM P.33000-001, 41.0 mm SL, Imorigue Channel, Palawan, Philippine Islands. (Photo by G.R. Allen)

Lower lip incomplete; scales absent from dorsal and anal fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 3–5 relatively large serrations; teeth of outer ceratobranchial-1 gill rakers well-developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1; dorsal-fin spines pungent and stout; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1/1/1 + 1; anal-fin spines pungent and stout, second spine stouter than third; pelvic-fin spine pungent and stout; second segmented pelvic-fin ray longest; caudal fin truncate to emarginate; vertebrae 10 + 16; epineurals 13–14; epurals 3.

Upper jaw with 2–4 pairs of curved, enlarged caniniform teeth, and about 3–4 (at symphysis) to 2–3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1–3 pairs of curved, caniniform teeth, and about 3 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1–2 rows of small conical teeth, forming chevron; palatine with 1–2 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 22.5–28.7; orbit diameter 8.1–11.0; snout length 6.6–6.7; fleshy interorbital width 5.5–6.0; bony interorbital width 3.7–4.3; body width 11.0–12.9; snout tip to posterior tip of retroarticular bone 15.8–16.0; predorsal length 35.1–37.6; prepelvic length 31.7–36.9; posterior tip of retroarticular bone to pelvic-fin origin 16.8–23.8; dorsal-fin origin to pelvic-fin origin 29.0–31.2; dorsal-fin origin to middle dorsal-fin ray 33.7–34.1; dorsal-fin origin to anal-fin origin 42.9–43.9; pelvic-fin origin to anal-fin origin 28.4–31.2; middle dorsal-fin ray to dorsal-fin termination 23.9–24.8; middle dorsal-fin ray to anal-fin origin 28.9–29.8; anal-fin origin to dorsal-fin termination 36.2–36.3; anal-fin base length 27.3–29.4; dorsal-fin termination to anal-fin termination 16.6–16.9; dorsal-fin termination to caudal peduncle dorsal edge 8.0–10.4; dorsal-fin termination to caudal peduncle ventral edge 18.1–19.9; anal-fin termination to caudal peduncle dorsal edge 21.0–22.0; anal-fin termination to caudal peduncle ventral edge 11.5–12.9; first dorsal-fin spine 3.2–4.3; second dorsal-fin spine 6.6–8.9; third dorsal-

fin spine 10.2–12.4; first segmented dorsal-fin ray 12.7–14.2; fourth last segmented dorsal-fin ray 17.3–19.1; first anal-fin spine 2.4–2.8; second anal-fin spine 6.8–8.1; third anal-fin spine 9.0–10.3; first segmented anal-fin ray 12.2–14.2; fourth last segmented anal-fin ray 14.6–17.1; third pectoral-fin ray 16.7–17.3; pelvic-fin spine 11.7–12.2; second segmented pelvic-fin ray 20.6–24.5; caudal-fin length 24.0–26.6.

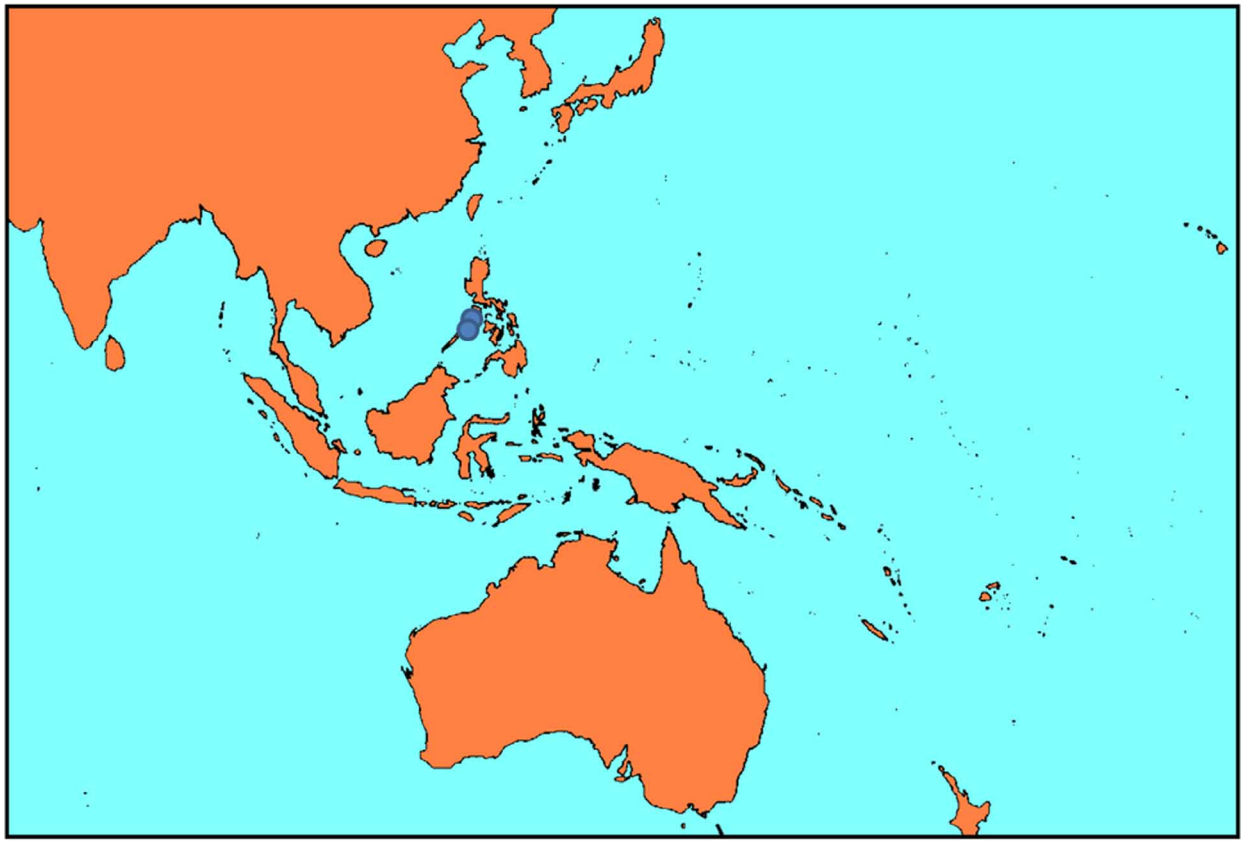

FIGURE 7. Distribution records for *Pseudochromis colei*.

Live coloration (based on photographs of live specimens in northern Palawan; Figure 6): nape and dorsal contour of head and body dark brown; dark grey to black stripe extending from behind middle of eye to upper part of caudal-fin base; dark grey to black stripe extending from midanterior edge of eye to mid-upper part of upper lip; remainder of head and body below dark stripes pale yellow, becoming pink to mauve posteriorly, this darkest in a broad stripe extending from lower abdomen to lower part of caudal peduncle; curved pale to bright blue bar around posteroventral part of eye to midlower part of upper lip; iris reddish brown to dark grey, with bright blue suboval ring around pupil; nape with scattered dark grey to black spots; scales within pale pink to mauve area of body each with narrow yellow to pale orange posterior margin, which align to form indistinct oblique bars; dorsal part of caudal peduncle above dark grey to black stripe pinkish grey; dorsal fin orangish brown basally, orangish hyaline distally, with indistinct pale blue distal margin; anal fin pinkish hyaline, with two or three bluish grey to blue stripes and blue distal margin; caudal fin pinkish hyaline, with black stripe on caudal-fin base extending to middle of upper fin rays; pectoral and pelvic fins pinkish to yellowish hyaline.

Preserved coloration: pattern similar to live coloration, the dark stripes on head and body remain, becoming dark brown to dark grey-brown; head and body above and below stripes brown and pale brown, respectively; dorsal and anal fins pale brown basally, the remainder of fins brownish hyaline; dark stripe on caudal fin becoming dark brown to dark grey brown, the remainder of fin pale brown to brownish hyaline; pectoral and pelvic fins pale brown to brownish hyaline.

Habitat and distribution. *Pseudochromis colei* was previously known only from the holotype collected at Culion, Culion Island, in the Calamianes Group, Philippine Islands. Its range is extended to north eastern Palawan on the basis of two specimens collected in Imorigue Channel (Figure 7). No habitat information was provided in Herre's original description of *P. colei*. The Palawan specimens were collected in 22 m depth at the bottom of a current-swept channel with strong coastal influences (relatively low visibility and otherwise silty conditions). Both individuals were associated with low rocky outcrops covered with sea fans.

Comparisons. See comparisons above for *P. ammeri.*

Remarks. Gill (2004) provided a description and photograph of the holotype of *P. colei*. Herre (1933) named the species for Dr Howard I. Cole, chemist of the leper colony at Culion at the time Herre made collections in the area.

Material examined. PHILIPPINE ISLANDS: Calamianes Group, Culion Island, Culion, CAS-SU 30974, 1, 59.6 mm SL (holotype); Palawan, Imorique Channel, 11°10'N 119°33'E, WAM P.33000-001, 2, 28.2–41.0 mm SL.

Acknowledgements

We thank D. Eichler and R.M. Pyle for sending us photographs. J.P. Garcia, S. Raredon, A. Hay and J. King radiographed specimens. We'd also like to thank L. and V. Perez and I.R. Marcelo of the El Nido Foundation for inviting the second and third authors to conduct reef fish surveys in northern Palawan from 2007-2011. The staff of the El Nido Resorts (particularly Romel and "Papa Don") provided outstanding logistical and dive support for these surveys. We also thank M. Ammer and his fantastic staff at Papua Diving Resorts for first inviting the second author to conduct reef fish surveys in Raja Ampat, and for their long-standing support of reef science and conservation over the past decade. We thank Dr. Suharsono, Dr. Rosichon and R. Hadiaty from the Indonesian Institute of Sciences for their assistance with the type material of *P. ammeri*. Finally, we thank Conservation International for sponsoring the field work in Raja Ampat.

References

Allen, G.R. (1995) *Pseudochromis howsoni*, a new species of dottyback fish (Pseudochromidae) from Ashmore Reef, Timor Sea. *Revue Française d'Aquariologie Herpétologie*, 21, 83–85.

Allen, G.R. (2002). Reef fishes of the Raja Ampat Islands, Papua Province, Indonesia. *In*: McKenna, S.A., Allen, G.R. & Suryadi, S. (Eds). *A Marine Rapid Assessment of the Raja Ampat Islands, Papua Province, Indonesia. RAP Bulletin of Biological Assessment 22*. Conservation International, Washington, D.C., pp. 46–65.

Allen, G.R. & Erdmann, M.V. (2009) Reef fishes of the Bird's Head Peninsula, West Papua, Indonesia. *Check List*, 5, 587–628.

Böhlke, J.E. (1953) A catologue of the type specimens of Recent fishes in the Natural History Museum of Stanford University. *Stanford Ichthyological Bulletin*, 5, 1–168.

Eichler, D. & Myers, R.F. (1997) *Korallenfische Zentraler Indopazifik*. Jahr Verlag, Hamburg, 489 pp.

Fowler, H.W. (1931) Contributions to the biology of the Philippine Archipelago and adjacent regions. The fishes of the families Pseudochromidae, Lobotidae, Pempheridae, Priacanthidae, Lutjanidae, Pomadasyidae, and Teraponidae, collected by the United States Bureau of Fisheries Steamer "Albatross", chiefly in Philippine seas and adjacent waters. *United States National Museum Bulletin*, 100(11), 1–388.

Gill, A.C. (2000) Pseudochromidae. *In*: Carpenter, K.E. & Niem, V.H. (Eds.). *FAO Species Identification Guide for Fisheries Purposes. The Living Marine Resources of the Western Central Pacific. Vol. 4*. FAO, Rome, pp. 2557–2577.

Gill, A.C. (2004) Revision of the Indo-Pacific dottyback fish subfamily Pseudochrominae (Perciformes: Pseudochromidae). *Smithiana Monograph*, 1, 1–214, pls 1–12.

Gill, A.C. & Allen, G.R. (2011) *Pseudochromis erdmanni*, a new species of dottyback with medially placed palatine teeth from Indonesia (Teleostei: Perciformes: Pseudochromidae). *Zootaxa*, 2924, 57–62.

Gill, A.C. & Randall, J.E. (1992) *Pseudochromis steenei*, a new sexually dimorphic dottyback fish from Indonesia (Perciformes: Pseudochromidae). *Revue Française d'Aquariologie Herpétologie*, 19, 41–46.

Herre, A.W.C.T. (1933) Twelve new Philippine fishes. *Copeia*, 1933, 17–25.

Herre, A.W.C.T. (1934) *Notes on fishes in the Zoological Museum of Stanford University. 1. The fishes of the Herre Philippine expedition of 1931*. The Newspaper Enterprise, Hong Kong, 106 pp.

Herre, A.W.C.T. (1953) Check list of Philippine fishes. *United States Department of the Interior, Fish and Wildlife Service, Research Report*, 20, 1–977.

Kuiter, R.H. & Debelius, H. (2006) *World Atlas of Marine Fishes*. IKAN-Unterwasserarchiv, Frankfurt, 720 pp.

Kuiter, R.H. & Tonozuka, T. (2001) *Pictorial Guide to Indonesian Reef Fishes. Part 1. Eels– Snappers, Muraenidae – Lutjanidae*. Zoonetics, Australia, 302 pp.

Michael, S.W. (2004) *Reef Fish Series Book 2. Basslets, Dottybacks and Hawkfishes*. T.F.H. Publications, Neptune City, 296 pp.

Roxas, H.A. & Martin, C. (1937) A check list of Philippine fishes. *Commonwealth of the Philippines Department of Agriculture and Commerce Technical Bulletin*, 6, 1–314.

Rüppell, E. (1835) *Neue Wirbelthiere zu der Fauna von Abyssinien gehörig. Fische des Rothen Meeres. 3*. Vol. 1. S. Schmerber, Frankfurt am Main, 28 pp., 7 pls.