

Description of *Pseudanthias rubrolineatus* (Serranidae: Anthiinae) Collected from Take-shima Island, Kagoshima Prefecture, Southern Japan

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Abstract. Male and female specimens of *Pseudanthias rubrolineatus*, collected from 60 m depth off the south coast of Point Ombosaki, Take-shima Island, Osumi Group, Kagoshima, Japan, are described in detail. Although numerous underwater photographs of the species have been published from Japanese waters, no specimens have been reported since its original description from New Caledonia. A new Japanese name is proposed for the species.

Keywords: Serranidae, Anthiinae, *Pseudanthias rubrolineatus*, morphology, Kagoshima, Japan.

Introduction

Species of the Indo-Pacific serranid genus *Pseudanthias* occur on coral and rocky reefs in tropical and subtropical areas. Although Randall and Pyle (2001) regarded 52 species of *Pseudanthias* as valid, *P. calloura* Ida and Sakaue, 2001 and *P. charleneae* Allen and Erdmann, 2008 have been subsequently described, and *P. carlsoni* Randall and Pyle, 2001 regarded as a junior synonym of *P. engelhardi* (Allen and Starck, 1982) (see Kuiter, 2004; Allen and Erdmann, 2008).

During an ichthyofaunal survey off Take-shima and Iou-jima Islands in the Osumi Group, Kagoshima Prefecture, southern Japan, from 24 to 30 May 2010, led by Kagoshima University Museum and National Museum of Nature and Science, two specimens (male and female) of the poorly-known species *Pseudanthias rubrolineatus* (Fourmanoir and Rivaton, 1979) were collected at a depth of 60 m off Take-shima Island. The

species was originally described on the basis of a single specimen (MNHN 1978-686) collected at 400 m depth northwest of New Caledonia, and despite numerous underwater photographs of individuals in Japanese waters (*e.g.*, Kuiter, 2004; Kuiter and Debelius, 2006), no further morphological descriptions have been forthcoming. In this paper, detailed descriptions of the morphology and coloration of the Take-shima Island specimens are given and a new Japanese name proposed for the species.

Material and Methods

Counts and measurements followed Randall and Pyle (2001) and Allen and Erdmann (2008). The last two soft rays of the dorsal and anal fins were counted as single rays, each pair being associated with a single pterygiophore. Caudal-fin length is the horizontal length from the posterior edge of the hypural plate to a vertical through the tip of the uppermost ray; not included filamentous rays. Standard length is expressed as SL. The specimens of *R. rubrolineatus* from Take-shima Island, Japan are deposited at the Kagoshima Univer-

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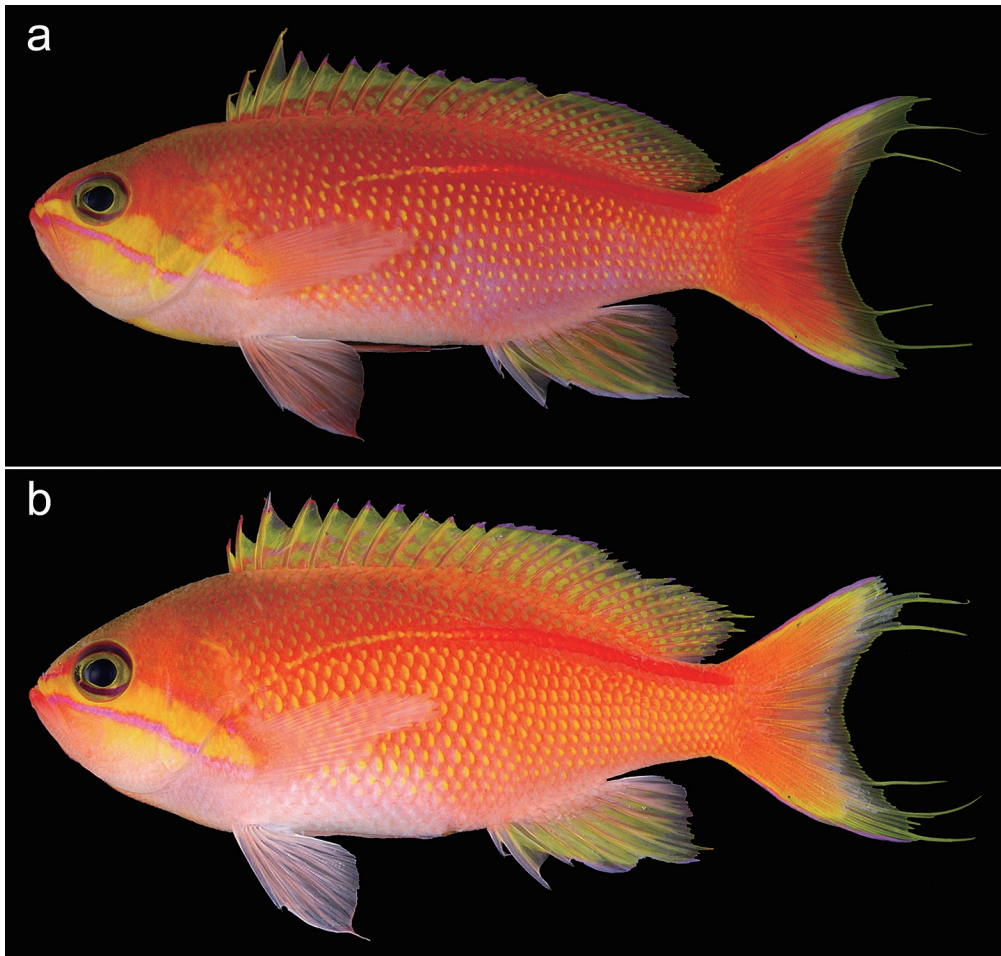


Fig. 1. Color photographs of fresh specimens of *Pseudanthias rubrolineatus* from Take-shima Island, Kagoshima, Japan. a, KAUM-I. 29771, male, 92.2 mm SL; b, KAUM-I. 29772, female, 74.1 mm SL.

sity Museum, Kagoshima, Japan (KAUM). Other institutional abbreviations used in the text are as follows: Laboratory of Marine Biology, Faculty of Science, Kochi University, Kochi (BSKU); Kanagawa Prefectural Museum of Natural History, Odawara (KPM); Muséum National d'Histoire Naturelle, Paris (MNHN); and Western Australian Museum of Natural Science, Welshpool (WAM). The following specimens of *P. fasciatus* were examined for comparative purposes: KAUM-I. 29624, 63.3 mm SL, off west coast of Ioujima Island, Mishima, Kagoshima, Japan, 30°47'04"N, 130°15'42"E, 40–45 m depth, KAUM fish team, 28

May 2010; KAUM-I. 29790, 49.9 mm SL, off south coast of Point Ombo-saki, Take-shima Island, Mishima, Kagoshima, Japan, 30°48'32"N, 130°2'33"E, 60 m depth, S. Dewa and K. Furuta, 27 May 2010.

Pseudanthias rubrolineatus
(Fourmanoir and Rivaton, 1979)

[English name: Thread-tail Basslet]

[New Japanese name: Itohiki-kohaku-hanadai]

(Fig. 1)

?*Anthias georgei* Allen, 1976: 28, fig. 2 [type locality:

Table 1. Proportional measurements of male and female specimens of *Pseudanthias rubrolineatus*, as percentages of standard length.

	KAUM-I. 29771 Male	KAUM-I. 29772 Female		KAUM-I. 29771 Male	KAUM-I. 29772 Female
Standard length (mm)	92.2	74.1			
Body depth	33	37.9	Pectoral-fin length	28	31.3
Body width	17.3	18.8	Longest pelvic-fin soft ray length	27.7	30.2
Head length	31.2	32.5	Pelvic-fin spine length	15.9	15.9
Snout length	7.9	7.3	First dorsal-fin spine length	4.9	5.1
Orbit diameter	10	9.6	Second dorsal-fin spine length	8.7	—
Interorbital width	9.6	9.6	Third dorsal-fin spine length	14.5	12.4
Caudal-peduncle depth	14.2	13.6	Last dorsal-fin spine length	10.4	10.8
Caudal-peduncle length	17.8	18.4	Longest dorsal-fin soft ray length	16.1	18.9
Upper-jaw length	14.4	15.5	First anal-fin spine length	6.3	5.7
Predorsal-fin length	29.6	31.4	Second anal-fin spine length	13.1	13.5
Preanal-fin length	67.8	68.2	Third anal-fin spine length	12.5	11.5
Prepelvic-fin length	36	35.5	Longest anal-fin soft ray length	21.9	22.9
Dorsal-fin base length	60.5	61.7	Caudal-fin length	29.8	—
Anal-fin base length	16.8	18.9	Caudal concavity	12.6	—

about 40 nautical miles (74 km) west of Bernier Island, Western Australia, 24°59'S, 112°27'E].

Anthias rubrolineatus Fourmanoir and Rivaton, 1979: 413, fig. 7 (type locality: Leleizour Island, northwest of New Caledonia).

Pseudanthias fasciatus (not of Kamohara): Heemstra and Randall, 1999: 2470 (in part; list only).

Pseudanthias rubrolineatus: Randall and Pyle, 2001: 34 (listed as a valid name); Kuitert, 2004: 51, figs. A–F (Izu-oshima Island and Kochi, Japan); Kuitert and Debelius, 2006: 296, unnumbered figs. (Japan).

Pseudanthias sp. cf. *rubrolineatus*: Yoshino, 2008: 123 (Izu-oshima Island, unnumbered fig.).

Material examined. KAUM-I. 29771, male, 92.2 mm SL, off south coast of Point Ombo-saki, Takeshima Island, Mishima, Kagoshima, Japan, 30°48'32"N, 130°24'33"E, 60 m depth, S. Dewa and K. Furuta, 27 May 2010; KAUM-I. 29772, female, 74.1 mm SL, collected with KAUM-I. 29771.

Description. Proportional measurements are given as percentages of SL in Table 1. Dorsal-fin rays X, 16; anal-fin rays III, 7; pectoral-fin rays 17 on each side of body (16 on left side of body in KAUM-I. 29771); pelvic-fin rays I, 5; pored lateral-line scales 37–40; scales above first lateral-line scale to base of second dorsal-fin spine 6; scales above lateral line to base of

middle of spinous portion of dorsal fin 3; scales below lateral line to origin of anal fin 15–16; circumpeduncular scales 22; gill rakers 10–11 + 25–26 = 35–37.

Mouth moderately large, posterior end of maxilla just reaching to a vertical through middle of pupil; mouth strongly oblique, forming an angle of 50–60 degrees to horizontal axis of head and body; lower jaw slightly projecting; posterior margin of maxilla nearly straight, corners rounded; front of upper lip fleshy, forming a small protuberance. A pair of widely separated, downward-projecting canine teeth at front of upper jaw, followed by an outer row of slender conical teeth (18 teeth in male and 15 female), more posterior teeth forward-curved; an inner band of small slender teeth. A pair (two pairs in female) of widely separated, stout, laterally recurved canines at front of lower jaw, these canines just medial to upper canines when mouth closed, tips of the recurved canines exposed when mouth closed; 2 large recurved canines (1 in one side of male) at each side of lower jaw about one-third distance from lower jaw symphysis; a villiform teeth band between anterior and posterior recurved canines; no teeth on lower jaw posterior to posterior canines. Vomer with a small triangular patch of villiform teeth in about 2 rows. Palatines with a band of villiform teeth in about 7–10 rows at its widest point. Tongue triangular and sharply pointed, upper surface with small

papillae. Gill rakers long and slender with a double band of minute rigid projections on inner edge; longest raker near angle much longer than longest gill filaments, and less than orbit diameter.

Anterior nostril membrane tube with skin flap posteriorly, the flap reaching posterior nostril when laid back; anterior nostril at level with upper margin of pupil. Posterior nostril vertically elongate; a short skin flap at anterior margin of nostril, the flap reaching posterior margin of nostril when laid back; posterior nostril between anterior nostril and anterodorsal margin of orbit. Opercle with 3 flat spines, lower 2 spines acute and tips exposed, upper spine with rounded tip embedded in scales; middle spine largest, at level of center of eye. Upper edge of preopercle with serrae (30 in male and 25 in female), progressively larger ventrally, with serrae (6 in male and 3 in female) just below angle. Lower edge of subopercle with serrae (6 in male and 3 in female); upper edge of interopercle with serrae (8 in male and 5 in female).

Ctenoid scales on head and body, except for lips, isthmus, and around snout region; no scales on pelvic fin and basal spinous portions of dorsal and anal fins; soft-rayed portions of dorsal and anal fins with few scales; caudal fin nearly fully scaled; small scales on basal half of pectoral fin. Lateral line smoothly curved approximately following contour of back.

Dorsal-fin origin posterior to upper end of gill opening and just above upper end of pectoral-fin base. Base of soft-rayed portion of dorsal fin longer than base of spinous portion. Upper end of pectoral-fin base slightly anterior to pelvic-fin origin. Tip of depressed pelvic fin extending slightly beyond anus in male (reaching to anus in female). Anal-fin origin posterior to last dorsal-fin spine base. Third dorsal-fin spine longest, particularly in male; tip of the spine with a filament. Thirteenth dorsal-fin soft ray longest, longer than third dorsal-fin spine. Second anal-fin spine longest. Caudal fin lunate, not deeply forked, with several filamentous rays on upper and lower lobes.

Color when fresh. — Based on color photographs (Fig. 1): upper half of head and anterior body orange, shading to yellow posteriorly; ventral part of body pinkish; each scale on upper part of body with a yellowish green spot, that on middle part of body with a yellow spot. A narrow, curved red stripe from above pectoral-fin base to upper part of caudal peduncle at caudal-fin base; the stripe across lateral line below base of fifth or sixth dorsal-fin soft ray. A narrow, pale pink stripe from upper lip through below orbit to lower part of pectoral-fin base; a narrow reddish stripe from tip of snout to anterior margin of orbit; a broad pale yellow band from snout to pectoral-fin base between the pink and reddish stripes; area below the pink stripe yellowish. Iris yellow with red stripe ventrally. Dorsal fin translucent yellow with lavender margin, red to orange basally with irregular yellow spots. Pectoral fin translucent white. Pelvic fin translucent pink to red, without markings. Anal fin translucent yellow, with pinkish basally; anteroventral margin of the fin lavender. Caudal fin orange to red, shading to translucent yellow posteriorly; lavender-edged yellow margin on each lobes; caudal-fin filaments yellow.

Remarks. The present specimens from Take-shima Island agree with the original description and figure of the holotype (MNHN 1978-686, 26.5 mm) of *Anthias rubrolineatus* (= *Pseudanthias rubrolineatus*) in Fourmanoir and Rivaton (1979), and underwater photographs of the species in Kuitert (2004) and Kuitert and Debelius (2006), with the exception of some counts; e.g., 16 or 17 pectoral-fin rays (versus 18 in the holotype) (Fourmanoir and Rivaton, 1979); 37–40 pored lateral-line scales (versus 42); and 25 or 26 gill rakers on the lower limb (versus 24). These small differences may simply reflect the limited overall number of specimens available.

Pseudanthias rubrolineatus can be easily distinguished from all other congeners, except *P. georgei* (Allen, 1976), by the caudal fin having several prolonged filaments in both sexes. *Pseudanthias georgei*, originally described as *Anthias georgei* by Allen (1976) on the basis of three specimens (holotype, WAM P. 25205-001, 79.5 mm SL; 2 paratypes, WAM P.25205-002, 29.0–32.8 mm SL) from a depth of 71 fathoms (ca. 130 m) off Bernier Island, Western Australia, Indian Ocean, has subsequently been regarded as a valid species (Randall and Pyle, 2001; Hutchins, 2001; Allen *et al.*, 2006) with prolonged caudal-fin filaments (Al-



Fig. 2. Color photograph of a fresh specimen of *Pseudanthias fasciatus* from Take-shima Island, Kagoshima, Japan. KAUM-I. 29790, 49.9 mm SL, collected with *P. rubrolineatus*.

len, 1976). However, Allen's (1976) description was based on preserved specimens, the fresh and/or live coloration of the species being unknown, although color is most important for the identification of species of *Pseudanthias* as Randall and Pyle (2001) and Ida and Sakaue (2001) pointed out. Furthermore, no additional specimens or underwater photographs of *P. georgei* have been recorded since the original description. Therefore, taxonomic characters of *P. georgei* and relationships between *P. georgei* and *P. rubrolineatus* have remained unclear. Although Randall and Pyle (2001) treated both species as valid, they did not give diagnostic characters for each, and although Kuitert (2004) also regarded *P. rubrolineatus* as valid, he appended "(*P. rubrolineatus*) appears to be identical to *Anthias georgei*, a possible senior synonym" to the former species account. In addition, neither additional specimens nor photographs of *P. rubrolineatus* from the western central Pacific, including the type locality, have been recorded. Therefore, any taxonomic decision regarding the two nominal species should await the collection of additional specimens and documentation of coloration. There remains also the possibility that the Japanese population is an undescribed species, closely related to *P. rubrolineatus* and/or *P. georgei*.

Pseudanthias rubrolineatus is similar to *P. fasciatus* (Kamohara, 1954) in having a distinct, blue- or white-

edged reddish longitudinal stripe on the mid-lateral surface of the body [thus, Heemstra and Randall (1999) mistakenly treated *P. rubrolineatus* as a junior synonym of *P. fasciatus*]. However, the blue- or white-edged reddish stripe of *P. rubrolineatus* extends posteriorly above the lateral line at the caudal-fin base (middle of upper half of caudal-fin base; Fig. 1), whereas that of *P. fasciatus* extends onto the lateral line (near middle of caudal-fin base; Fig. 2). In large male *P. fasciatus* the stripe becomes indistinct or absent during courtship (Kuitert, 2004). In addition, the reddish stripe of *P. rubrolineatus* is narrower than that of *P. fasciatus* (see Figs. 1–2). The upper and lower lobes of the caudal fin in *P. rubrolineatus* are not prolonged, although having several filamentous rays (Fig. 1), and the fin lunate rather than deeply forked. The caudal-fin lobes of *P. fasciatus*, however, are extremely prolonged, although without filamentous rays (Fig. 2), the fin being deeply forked.

Pseudanthias rubrolineatus is likely to be widely distributed in the western Pacific Ocean (and in the eastern Indian Ocean if *P. georgei* is identical with *P. rubrolineatus*). However, collected examples of the species are known only from New Caledonia (Fourmanoir and Rivaton, 1979) and Japan (this study). Underwater photographs of the species are also limited, having been published only from Japanese waters

in depths of 40–55 m (Kuitert, 2004; Kuitert and Debelius, 2006; Yoshino, 2008 as *P. sp. cf. rubrolineatus*). Notwithstanding, numerous underwater photographs of the species taken by scuba divers in Japanese waters have been uploaded to internet web sites, indicating that the species occurs along the Pacific coast of southern Japan, and the Izu and Ogasawara Islands. Twenty one underwater photographs taken from Izu Peninsula (Futo and Osezaki), the Izu Islands (Izu-oshima Island), the Ogasawara Islands (Chichi-jima Island), and the Tokara Islands (Yokoate-jima Island) are registered in the Image Database of Fishes at KPM. The fourth author identified the following four specimens as *P. rubrolineatus* (although not available to this study): BSKU 79057, 40.7 mm SL, Shimizu Port, Tosa-shimizu, Kochi, Japan, 8 m, H. Morita, June 10 2006; KPM-NI 11561, 19.8 mm SL, off Yome-jima Island, Muko-jima Islands, Ogasawara Islands, from stomach of *Epinephelus fasciatus* from 70 m, O. Morishita, Sept. 2002; KPM-NI 11581, 17.9 mm SL, KPM-NI 11582, 28.6 mm SL, Tatsumi Bay, Chichi-jima Island, Ogasawara Islands, 45 m, O. Morishita, Dec. 2001.

‘Itohiki-kohaku-hanadai’ meaning ‘thread-amber-basslet’ is herein proposed as the new standard Japanese name for the present specimens of *P. rubrolineatus*. The two Take-shima Island specimens were collected by the second and third authors from five individuals forming a harem, the former being the two largest individuals. The species was noted as usually forming a harem with five or six individuals frequenting areas of large rocks scattered on graveled slopes in depths of 55–80 m at Take-shima Island, Kagoshima.

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Literature Cited

- Allen, G. R., 1976. Descriptions of three new fishes from Western Australia. *J. Royal Soc. West. Aust.*, **59** (1): 24–30.
- Allen, G. R. & Erdmann, M. V., 2008. *Pseudanthias charleneae*, a new basslet (Serranidae: Anthiinae) from Indonesia. *Aqua, Inter. J. Ichthyol.*, **13** (3–4): 139–144.
- Allen, G. R., Hoese, D. F., Cross, N. J. & Bray, D. J., 2006. Anthiinae. Basslets, Seaperches. In Hoese, D. F., Bray, D. J., Paxton, J. R. & Allen, G. R. (Eds), *Zoological catalogue of Australia. Vol. 35, part 2: 982–997*. ABRS & CSIRO Publishing, Collingwood.
- Fourmanoir, P. & Rivaton, J., 1979. Poissons de la pente récifale externe de Nouvelle-Calédonie et des Nouvelles-Hébrides. *Cahiers de l’Indo-Pacifique*, **1** (4): 405–443.
- Heemstra, P. C. & Randall, J. E., 1999. Serranidae. Groupers and sea basses (also, soapfishes, anthiines, etc.). In Carpenter, K. E. & Niem, V. H. (Eds), *FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific. Vol. 4. Bony fishes part 2 (Mugilidae to Carangidae)*: 2442–2548. FAO, Rome.

- Hutchins, J. B., 2001. Checklist of the fishes of Western Australia. *Rec. West. Aust. Mus., Suppl.*, (63): 9–50.
- Ida, H. & Sakaue, J., 2001. *Pseudanthias calloura* (Teleostei: Perciformes), a new serranid fish from Palau, Central Pacific. *Ichthyol. Res.*, **48** (3): 263–268.
- Kuiter, R. H., 2004. *Basslets · Hamlets, and their relatives. A comprehensive guide to selected Serranidae and Plesiopidae*. 216 pp. TMC Publishing, Chorleywood.
- Kuiter, R. H. & Debelius, H., 2006. *World atlas of marine fishes*. v + 720 pp. IKAN-Unterwasserarchiv, Frankfurt.
- Randall, J. E. & Pyle, R. L., 2001. Four new serranid fishes of the anthiine genus *Pseudanthias* from the South Pacific. *Raffles Bull. Zool.*, **49** (1): 19–34.
- Yoshino, Y., 2008. *Sea fishes of Japan*. 543 pp. Yamakei, Tokyo.

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