Rec. West. Aust. Mus., 1978, 6 (2)

A DISTINCTIVE NEW *ANTHIAS* (TELEOSTEI: SERRANIDAE) FROM THE WESTERN PACIFIC

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[Received 25 March 1977. Accepted 5 May 1977. Published 30 June 1978.]

ABSTRACT

A description is given of *Anthias randalli*, a distinctive new serranid fish from the Philippine, Molucca, Palau and Marshall Islands. Males are characterised by bright red and violet horizontal bands, while females are relatively uniform reddish-orange. *A. randalli* is known from caves and underwater cliffs at depths of 30 to 68 m.

INTRODUCTION

The genus *Anthias* Bloch consists of small, brightly coloured, planktivorous fishes, associated mainly with coral reefs. Sexual dimorphism is common in this group, and certain species have been shown to be sequentially hermaphroditic, sex change being governed by behavioural cues (Shapiro 1977).

Many species are known from the western Pacific (Katayama 1960; Heemstra 1973; Masuda, Araga & Yoshino 1975; Allen & Burhanuddin 1976; Randall & Lubbock, in press); live coloration, which is an important diagnostic feature, is recorded for a number of these species. In the present study we describe a strikingly coloured and sexually dimorphic species that differs significantly from previously known *Anthias* both in coloration and in morphology. It was collected from the Philippine, Molucca, Palau, and

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Marshall Islands at depths of 30 to 68 m, and was usually associated with caves and underwater cliffs.

Type specimens are deposited at the Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); British Museum (Natural History), London (BMNH); Musée d'Histoire Naturelle de Genève (MHNG); United States National Museum of Natural History, Washington, D.C. (USNM); and the Western Australian Museum, Perth (WAM).

ANTHIAS RANDALLI n. sp.

(Figs 1 and 2)

Holotype

BMNH 1977.1.21.1, 69.7 mm SL, male, at 40 m, large cave on vertical drop-off, Baring, Olango Island, Cebu Strait, Philippine Islands, collected by R. Lubbock on 18 August 1976.

Paratypes

AMS I.19756-001, 66.3 mm SL, collected with holotype; BMNH 1976.1.21.2, 65.6 mm SL, at 45 m, vertical drop-off, Baring, Olango Island, Cebu Strait, Philippine Islands, collected by R. Lubbock on 3 August 1976; BMNH 1976.1.21.3, 41.1 mm SL, at 30 m, vertical drop-off, ½ km north of Caubyan Daku Island, Camotes Sea, Philippine Islands, collected by R. Lubbock on 15 August 1976; BPBM 9532, 44.0 mm SL, at 33-52 m, base of drop-off, SW side of Angulpelu reef, Palau Islands, collected by J. Randall, A. Emery and E. Helfman on 22 April 1970; BPBM 19983, 2 specimens, 27.8 and 38.7 mm SL, at 46 m, 70° drop-off with caves, outside reef off S end of atoll, 50 m SE of small boat passage, Kwajalein, Marshall Islands, collected by J. Randall, N. Bartlett, R. Hergenrother and K. Burnett on 8 April 1976; MHNG 1551.39, 52.4 mm SL, collected with holotype; USNM 217534, 56.7 mm SL, collected with holotype; WAM P25233-007, 6 specimens, 22.3-41.3 mm SL, at 40 m, S coast off Latulahat, Ambon, Molucca Islands, Indonesia, collected by G. Allen and J. Randall on 29 January 1975; WAM P25239-002, 8 specimens, 34.8-46.9 mm SL, at 40 m, S coast off Latulahat, Ambon, Molucca Islands, Indonesia, collected by G. Allen and J. Randall on 29 January 1975; WAM P25628-001, 3 specimens, 53.5-55.8 mm SL, at 45 m, steep drop-off, Bairakaseru Island, Palau Islands, collected by G. Allen and W. Starck on 5 March 1972.

Diagnosis

A species of *Anthias* with the following combination of characters: dorsal rays X,15-17, usually 16; anal rays III,7-8, 8 rare; pectoral rays 16-18,

usually 17; tubed lateral line scales 38-46, mostly 41-43; gill rakers 8-10 + 1 + 21-23; body depth 2.63-2.96 in SL (standard length); head length 2.79-3.30 in SL; spinous dorsal fin not scaled, third dorsal spine prolonged; anal fin tip acute, caudal fin lunate; flattened dorsal profile of head (see **Fig. 1**); colour pattern in life and in alcohol as described below.

Description

Dorsal rays X,16 (X,16 except one paratype with X,15, three paratypes with X,17); anal rays III,7 (one paratype with III,8); pectoral rays 16 (16-18, usually 17) (upper one or two and sometimes lowermost unbranched); pelvic rays I,5; principal caudal rays 15 (uppermost and lowermost unbranched); lateral line scales 43 (38-46); scales above lateral line to origin of dorsal fin 5; scales below lateral line to origin of anal fin 19 (18-21); circumpeduncular scales 22 (21-23, usually 22); gill rakers 8 + 1 + 22 (8-10 + 1 + 21-23); branchiostegal rays 7. Distributions of selected meristic data (according to locality) are given in **Table 1.**

Table 1: Distributions according to locality of selected meristic data from type specimens of *Anthias randalli*.

Locality	Lateral-line scales									Soft dorsal rays			Soft anal rays		Pectoral rays		
	38	39	40	41	42	43	44	45	46	15	16	17	7	8	16	17	18
Philippine Is			1	1	1	3					4	2	6		2	2	1
Molucca Is	1	1		2	6	2		2		1	13		14		2	11	1
Palau Is				1		1	1		1		2	1	4			3	1
Marshall Is				1							2		1	1		2	

Body depth 2.83 (2.63-2.96) in SL; body moderately compressed, the width 6.22 (5.79-6.88) in SL; head length 3.15 (2.79-3.30) in SL; snout 3.88 (3.49-5.71) in head; front of upper lip of males slightly thickened and occasionally with very small papilla; diameter of orbit 3.81 (2.76-3.77) in head; posterior edge of orbit without fleshy papillae; interorbital space smoothly convex, the bony width 4.33 (4.10-5.00) in head; least depth of caudal peduncle 2.46 (2.43-2.86) in head. Further morphometric data are given in **Table 2.**

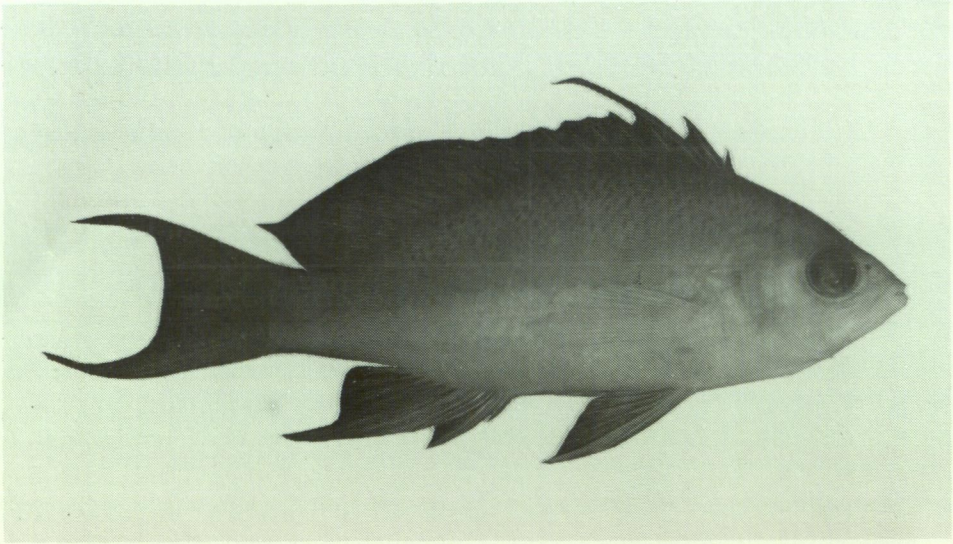

Fig. 1: Holotype of *Anthias randalli*, 69.7 mm SL (photographed after two months in formalin).

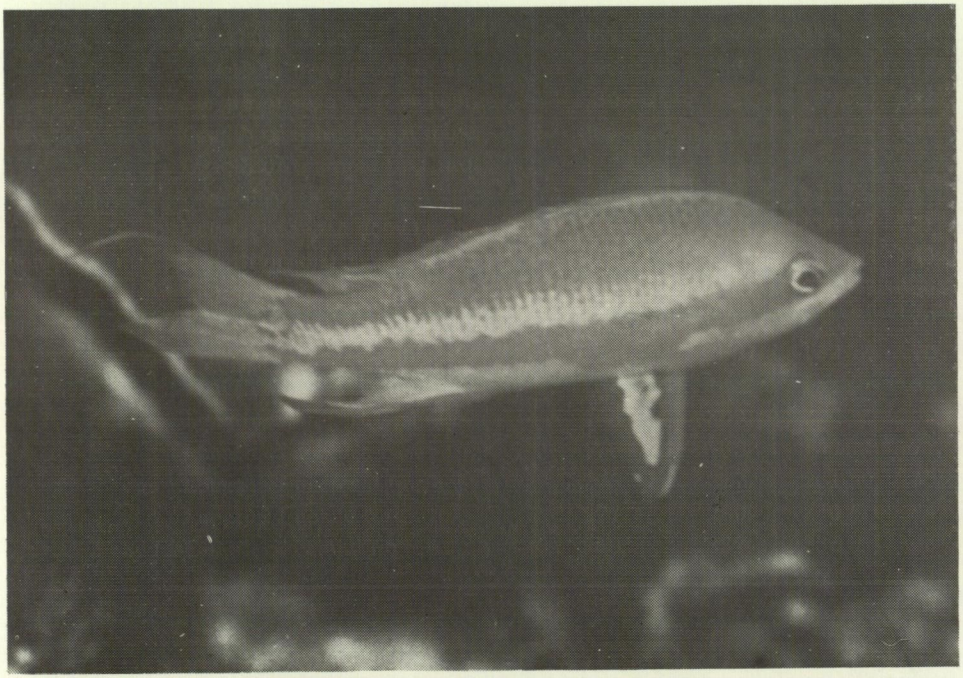

Fig. 2: Underwater photograph of male *Anthias randalli*, approximately 65 mm SL, taken by R. Lubbock at 40 m off Baring, Olango Island (type locality).

Table 2: Measurements of selected type specimens of *A. randalli*, expressed in thousands of SL.

	Holotype	Paratype			
	BMNH 1977.1. 21.1	BMNH 1976.1. 21.2	USNM 217534	BPBM 9532	WAM P25233-007
Standard length (mm)	69.7	65.6	56.7	44.0	33.6
Depth of body	353	380	346	355	363
Width of body	161	172	162	161	155
Head length	317	322	303	332	333
Snout length	82	85	74	75	83
Diameter of orbit	83	85	95	107	110
Bony interorbital width	73	75	74	75	77
Length of maxillary	156	157	148	155	152
Least depth of caudal peduncle	129	122	118	125	128
Length of caudal peduncle	129	120	115	123	143
Predorsal length	320	309	302	316	324
Preanal length	628	645	631	657	664
Prepelvic length	357	367	354	377	381
Length of first dorsal spine	56	56	44	59	48
Length of second dorsal spine	80	88	90	102	95
Length of third dorsal spine	265	233	203	166	155
Length of filament on third dorsal spine	50	79	48	41	18
Length of tenth dorsal spine	118	122	118	121	119
Length of longest dorsal ray	182	220	169	166	137
Length of dorsal fin base	636	640	637	630	622
Length of first anal spine	66	66	62	70	68
Length of second anal spine	155	163	162	170	167
Length of third anal spine	151	143	153	152	140
Length of longest anal ray	306	309	240	209	202
Length of anal fin base	175	163	169	177	152
Length of pectoral fin	275	277	261	289	271
Length of pelvic fin	277	280	246	284	271
Length of caudal fin	359	337	386	343	345

Mouth oblique and moderately large, the maxilla reaching to a vertical at posterior edge of pupil; lower jaw projecting slightly when mouth closed; upper posterior corner of maxillary slightly less broadly rounded than lower;

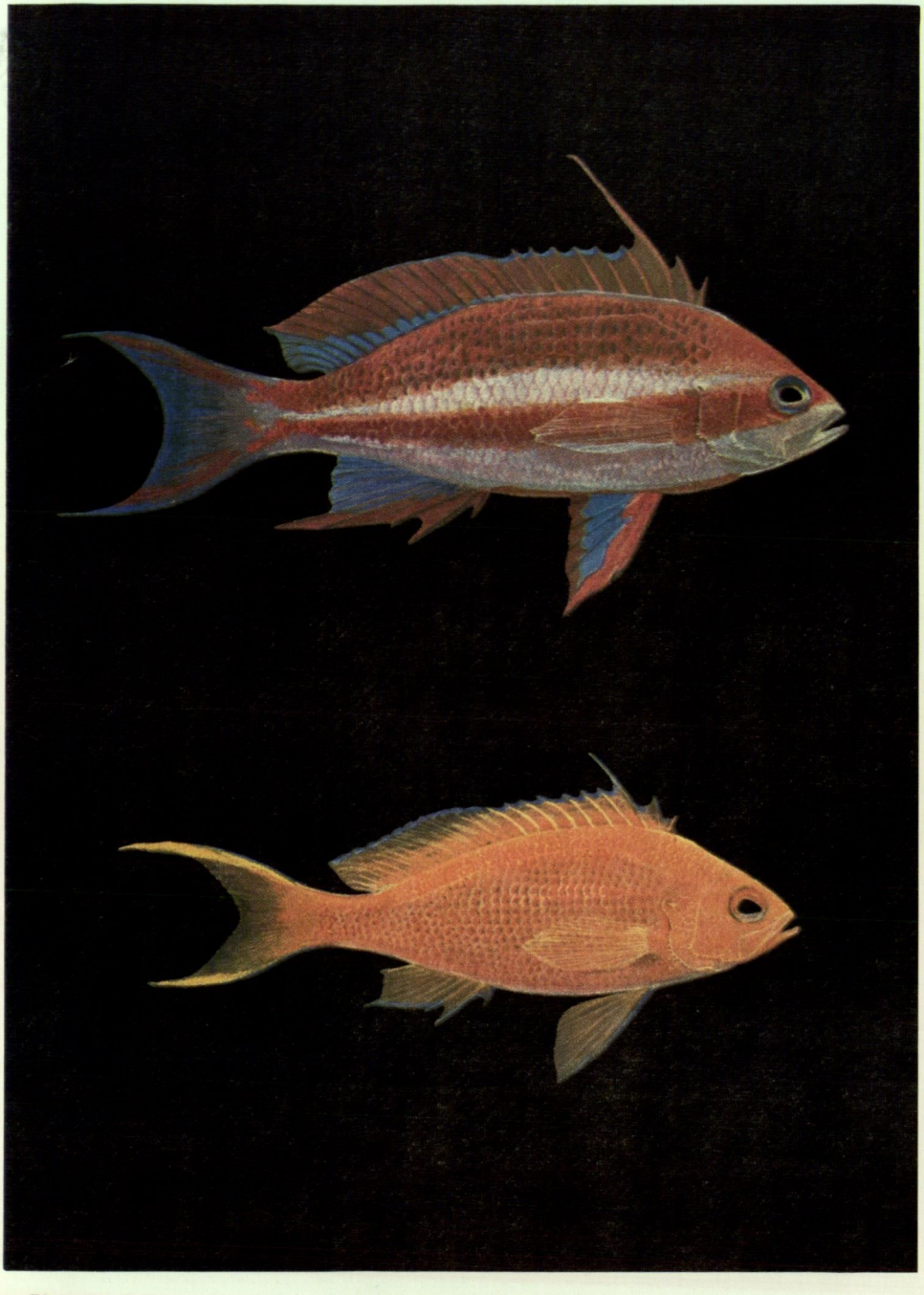

Plate 1: Colouration in life of *Anthias randalli*, male holotype, 69.7 mm SL (upper) and female paratype, 56.7 mm SL. Painting by Dr W.B. Amos.

greatest depth of maxillary 1.56 in orbit of holotype; no supplemental maxillary bone; an inner row of villiform teeth of moderate size along side of upper jaw broadening to a maximum of about 5 rows anteriorly, the innermost and most medial of these teeth notably enlarged, lying nearly flat, and sometimes angling inward (occasionally a second similarly enlarged tooth immediately beside medial tooth); one or two canines laterally at front of upper jaw followed by a row of about 14 teeth along side of jaw which are about as long but more slender, those posteriorly angling forward; one or two enlarged canines anteriorly on each side of lower jaw which project outwards and slightly forward, and about one third back in jaw a single enlarged canine curving posteriorly; posterior to the latter, a row of moderate canines (about 13 in holotype) on side of jaw; lower jaw with a patch of villiform teeth anteriorly; vomer with a chevron-shaped patch of villiform teeth; palatines with elongate patch of villiform teeth; pharyngeals with numerous villiform teeth; tongue pointed, the upper surface with scattered very small papillae; gill membranes free from isthmus; gill rakers slender and long (largest 1.26 in orbit of holotype), notably longer than gill filaments (longest gill filament of first gill arch of holotype contained 1.88 in longest raker).

Opercle with three flattened spines, the central one the largest and most posterior, the upper somewhat anterior to lower; two lower spines acute, the upper slightly obtuse and indistinct; distance between tips of two lower spines about four-fifths the distance between central and upper spines; lower margin of preopercle smooth, corner and upper margin finely serrate (26 serrae on holotype; number of serrae variable but tending to increase with size; paratype 65.6 mm SL with 35 serrae, paratype 56.7 mm SL with 27 serrae, paratype 33.6 mm SL with 19 serrae, and paratype 22.3 mm SL with 12 serrae); lower margin of subopercle with 7-8 (2-9) serrae; interopercle with 7 (0-7) serrae near upper end of margin.

Anterior nostril in a membranous tube (higher dorsoposteriorly) directly anterior to middle of eye about half the distance from edge of orbit to edge of groove separating upper lip from rest of snout; posterior nostril diagonally upward and posterior to anterior, roughly semicircular, without a rim, and large, the greatest diameter of opening about as great as distance between nostrils, 6.4 in orbit diameter of holotype.

Scales ctenoid; no auxillary scales; head, including mandible, scaled except throat, gill membranes, lips, extreme front of snout, and a broad zone of snout from level of lower edge of eye to above nostrils; spinous dorsal fin without scales, soft dorsal fin with scales on basal half to quarter; anal fin

with scales on approximately basal half; caudal fin with small scales extending close to posterior margin; pectoral fins scaled on about basal third; pelvic fins scaled on medial surface, the scales on first ray extending for about length of pelvic spine.

Lateral line a little more strongly arched than dorsal body contour, reaching highest point below about the sixth dorsal spine; last pored scale of lateral line approximately above posterior edge of hypural plate.

Origin of dorsal fin vertically above upper end of gill opening; third dorsal spine prolonged in females (4.93-6.04 in SL in three Philippine females), more prolonged in males (3.77 in SL in holotype, 4.29-4.74 in SL in two other Philippine males), with distal fleshy filament, longer in males; posterior parts of dorsal and anal fins with prolonged rays in males and adult females, rays relatively more prolonged in males, extending just posterior to a vertical through hind edge of hypural plate in holotype; origin of pectoral fins below third or fourth dorsal spine, the fins extending (when placed horizontally) to a vertical through first or second soft dorsal ray; origin of pelvic fins immediately below lower margin of pectoral fin base, first and second soft pelvic rays longest, reaching close to anal fin origin; caudal fin lunate, the lobes filamentous in larger specimens.

Colour in alcohol: overall pale, the scales on dorsal half of body dark basally. Colour of male holotype in life and up to 2 hours after death: a narrow violet stripe from predorsal region along dorsal fin base; remainder of dorsal body contour orange, each scale faintly greenish basally; a diffuse violet band from upper hind margin of eye to centre of caudal peduncle bordered immediately below by a conspicuous bright red band extending from top of snout through eye and upper half of pectoral fin base to lower part of caudal peduncle; tip of snout and ventral part of body pinkish-violet, more intense anteriorly, with a diffuse red stripe running from isthmus to anal fin origin. Iris reddish-violet. Pectoral fins pinkish hyaline; pelvic fins red-orange anteriorly, blood red posteriorly, with a violet anterior margin and a large bright bluish-violet central region; anal fin anterior to third or fourth soft rays bright red with a violet distal margin, posteriorly bright bluish-violet; distal margin of dorsal fin posterior to fourth spine, basal part of anterior soft dorsal rays, and three posteriormost dorsal rays violet; remainder of dorsal fin deep red, becoming orange on anterior half of spinous portion, the first three spines with violet tinges; caudal fin violet, the lobes slightly reddish. Two to three hours after death, the banding began to fade, and the body tended towards an overall bright red colour. Colour of 56.7 mm SL female paratype in life and shortly after death: dorsal body

contour orange, shading to reddish-orange with violet tinges ventrally; scales on upper half of body faintly greenish basally; snout yellow-orange. Iris orange, violet ventrally. Pectoral fins pinkish hyaline; pelvic fins pinkish hyaline, anterior margin with violet tinges; anal fin orange, spinous portion and distal margin with violet tinges; dorsal fin orange with violet distal margin, anterior three spines with violet tinges; caudal fin yellow-orange.

Habitat and Distribution

The present species has been collected in the Philippine Islands, Molucca Islands, Palau Islands, and Marshall Islands, living in caves or on vertical drop-offs at depths of 30-68 m.

In the Philippines it was relatively common, and on one occasion several hundred individuals were observed together in a large cave off Marigondon, Mactan Island. At Marigondon, and also at Baring, Olango Island and Caubyan Daku Island, *A. randalli* did not appear to share its habitat with any other anthiines. At Apo Island in the north Mindanao Sea, a small cave was found containing both *A. randalli* and *A. bicolor* Randall; at Pescador Island in the Tañon Strait, *A. randalli* was found on a vertical drop-off also inhabited by *A. fasciatus* (Kamohara), *A. squamipinnis* (Peters), and *A. tuka* (Herre & Montalban). The bright colours of male *A. randalli* rendered them particularly conspicuous underwater.

At the Palau Islands, off Bairakaseru Island, it was frequently encountered in small aggregations adjacent to a vertical cliff at depths ranging between about 40 and 68 metres. The fish were observed chiefly around the bases of large colonies of black coral (*Antipathes*).

Remarks

This species is closest to an as yet undescribed species from the western Indian Ocean (J. Randall, pers. comm.); it bears only a superficial resemblance to other known species of *Anthias*, and may be distinguished using the diagnosis above.

We provisionally place *A. randalli* in the subgenus *Pseudanthias* Bleeker. In spite of the slight thickening of the upper lip of males, the species appears to share fewer characters with the subgenus *Mirolabrichthys* Herre and Montalban as defined by Randall and Lubbock (in press) than with *Pseudanthias*. Unfortunately the exact limits of the latter subgenus remain unclear.

As in other *Anthias* investigated, the males of *A. randalli* are larger and more brightly coloured than females. The gonads of this and several other

species of *Anthias* are currently being examined histologically by Shapiro and Lubbock.

The Philippine population of *A. randalli* appears to reach a significantly larger size than those examined from other localities. Marked size differences according to geographical range are known in other *Anthias*. In the collections of Shapiro (1977), for example, *A. squamipinnis* from the Gulf of Aqaba reached a maximum length of 93 mm SL, while *A. squamipinnis* from the central Red Sea were not larger than 75 mm SL.

The present species is named after Dr J.E. Randall, who was the first to collect it, and who kindly provided us with specimens.

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